2ND SYMPOSIUM ON FRENCH RESEARCH IN THE PACIFIC

UNDER THE AUSPICES OF
MR. NICOLAS SARKOZY
PRESIDENT OF THE FRENCH REPUBLIC

THE 11TH PACIFIC SCIENCE INTER-CONGRESS

HILTON HOTEL TAHITI / 02-06 MARCH 2009

PACIFIC COUNTRIES AND THEIR OCEAN FACING LOCAL AND GLOBAL CHANGES

PROGRAM

Polynésie française

PACIFIC SCIENCE ASSOCIATION

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RÉPUBLIQUE FRANÇAISE

The 11th Pacific Science Inter-Congress

in conjunction with

the 2nd Symposium on French Research

in the Pacific

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Organized by France and French Polynesia
In association with the Pacific Science Association

Under the auspices of
Mr. Nicolas SARKOZY
President of the French Republic

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2-6 march 2009
Hilton Hotel TAHITI
French Polynesia

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Greeting

With the growing scale and scope of human influence on the Earth's natural systems, we are now entering what is effectively a new geological era, " the Anthropocene Epoch". In the Anthropocene, human activities have begun to significantly impact virtually all the planet's ecosystems – even fundamental natural processes such as the climate system and carbon cycle. This significance of the profound shift in the stability of Earth's systems has been amply demonstrated elsewhere, but what is important to note is that we are the first generation to have the intelligence and imagination to understand the collective impact we are having on the planet. With this knowledge comes both an opportunity as well as an obligation to start to redefine our relationship with the planet – to move from consumption and exploitation towards a path of sustainability.

The mission of the Pacific Science Association is to advance science and technology in support of sustainable development in the Asia-Pacific region – a vast region that spans from Russia to Chile and Australia to Canada, and including tens of thousands of islands that despite their tiny size, are all linked to one another in important and vital ways.

PSA facilitates interdisciplinary and international research and collaboration with a focus on critical issues, in order to engage science in the service of human needs – to improve both the quality of life of the region's peoples and the integrity of the natural environment upon which all life depends. PSA serves as an important catalyst for scientific and scholarly collaboration and works to help advance scientific capacity in the region. By fostering more effective communication between scientists, policymakers and the public, and by actively involving the Pacific Island states in regional and international scientific activities, PSA's role has never been more critical. The expansive regional scope of PSA may seem daunting, but promoting the "Science of the Pacific" is crucial. After all, the Pacific Ocean is the essential common element that links all the countries of the Pacific Rim and Basin. It links us, provides our sustenance, and determines the fundamental conditions under which we live.

It is with great pleasure that I introduce to my esteemed colleagues the 11th Pacific Science Inter-Congress in Tahiti, French Polynesia. The theme of " Pacific Countries and their Ocean Facing Local and Global Change" is particularly appropriate given the increasing pace of change that is impacting even the most islands in the Pacific. Each of the Inter-Congress subthemes – Ecosystems, Biodiversity and Sustainable Development; Climate Change and Ocean Acidification; Health Challenges in the Pacific; Politics; the Stakes of Modernity; and Governance and the Economy, all address important current and future challenges for the Pacific in this new Anthropocene Epoch.

I also like to take this opportunity to thank the High Commissioner of the Republic and the President of French Polynesia; the communities of French Polynesia, New Caledonia and Wallis and Futuna for their strong support for the Tahiti Inter-Congress. Thanks also go to all members of the PSA International Scientific Committee and the Local Organizing Committee for their great contributions to this conference..
Thank you to the hosts of the Tahiti Inter-Congress, and especially the Governments of France and French Polynesia for your outstanding generosity and hospitality.

I have no doubt that this Inter-Congress will provide an important multidisciplinary international platform that will establish new and effective links among the region's scientists to discuss and review common concerns and priorities in the region, and to further intellectual exchanges and effective communications between scientists, policy makers and the public. There has never been a more important time for the region's scientists to work together to examine important issues of nature and development, to understand how those factors are inextricably intertwined, and to help the public and policymakers understand how build a more effective path of sustainability that will secure our planet's future and that of humankind in the Anthropocene.

With sincere wishes for a great and successful Inter-Congress!
Ia orana,

Congbin FU
President (2007-2011)
Pacific Science Association

Le mot du Président de la PSA

De par l'échelle et la portée croissantes de l'influence humaine sur les systèmes naturels de la Terre, nous entrons maintenant dans ce qui est effectivement une nouvelle ère géologique, « l'époque Anthropocène ». Dans l'Anthropocène, les activités humaines ont commencé à impacter de manière significative tous les écosystèmes de la planète – y compris des processus naturels fondamentaux tels que le système climatique et le cycle du carbone. La portée de cette modification profonde dans la stabilité des systèmes de la Terre a été amplement démontrée ailleurs, mais ce qui est important de noter est que nous sommes la première génération à avoir l'intelligence et l'imagination pour comprendre l'impact collectif que nous avons sur la planète. Avec cette connaissance, se présente une opportunité aussi bien qu'une obligation pour commencer à redéfinir notre rapport avec la planète – afin de se déplacer de la consommation et de l'exploitation vers la voie de la durabilité.

La mission de la Pacific Science Association est d'avancer sur la voie de la science et de la technologie en soutien au développement durable dans la région Asie-Pacifique – une vaste région qui s'étend de la Russie au Chili et de l'Australie au Canada, incluant des centaines de milliers d'îles qui en dépit de leur minuscule taille, sont toutes liées les unes aux autres de manière importante et vitale.

La PSA facilite la recherche et la collaboration interdisciplinaires et internationales en se focalisant plus particulièrement sur des thèmes importants susceptibles d'engager la science au service de l'homme – pour améliorer la qualité de vie des peuples de la région et conserver l'intégrité de l'environnement naturel de laquelle dépend toute vie. La PSA est un important catalyseur de la collaboration scientifique et universitaire, et aide à la formation scientifique et technique dans la région. En stimulant une communication plus efficace entre les scientifiques, les décideurs et le public ainsi qu'en impliquant activement les Etats insulaires du Pacifique dans des activités scientifiques régionales et internationales, le rôle de la PSA n'a jamais été aussi important. Après tout, l'Océan Pacifique est l'élément essentiel commun qui lie tous les pays de la côte et du bassin Pacifique. Il nous lie, nous fournit notre subsistance, et détermine les conditions fondamentales dans lesquelles nous vivons.

C'est avec un grand plaisir que je vous présente, chers estimés collègues, le 11ème Inter-Congrès des Sciences du Pacifique, à Tahiti, en Polynésie française. Le thème des « Pays du Pacifique et leur environnement océanique face aux changements locaux et globaux » est particulièrement approprié, étant donné l'allure croissante à laquelle le changement s'effectue et impacte la plupart des îles du Pacifique. Chaque sous-thème de l'Inter-Congrès - Ecosystèmes, Biodiversité et Développement durable ; Changement climatique et Acidification de l'Océan ; Les défis de santé dans le Pacifique ; Culture et politique : les enjeux de la modernité et Gouvernance et Economie- tous s'intéressent aux défis actuels et futurs pour le Pacifique dans cette nouvelle époque Anthropocène.

J'aimerais saisir cette occasion pour remercier le Haut Commissaire de la République française et le Président de la Polynésie française ; les communautés de Polynésie française, Nouvelle-Calédonie et Wallis et Futuna pour leur fort soutien pour l'Inter-Congrès à Tahiti. Mes remerciements vont également à tous les membres du Comité scientifique international et au Comité local d'organisation pour leur grande contribution à cette conférence.
Je remercie également les hôtes de l'Inter-Congrès de Tahiti, et particulièrement les gouvernements de France et de la Polynésie française pour leurs remarquables générosité et hospitalité.

Je n'ai aucun doute quant au fait que l'Inter-Congrès fournira une plate-forme multidisciplinaire internationale importante, qui permettra d'établir des relations nouvelles et efficaces entre les scientifiques de la région afin de discuter et de passer en revue les intérêts et priorités communs dans la région ainsi que de favoriser d'autres échanges intellectuels et des communications efficaces entre les scientifiques, les décideurs politiques et le public. Il n'y a jamais eu un moment plus important que celui de l'Inter-Congrès pour permettre aux scientifiques de la région de travailler ensemble afin d'examiner les questions importantes relatives à la nature et au développement, pour comprendre comment ces facteurs sont inextricablement entrelacés, et pour aider le public et les décideurs à comprendre comment construire un chemin plus efficace vers la durabilité qui sécurisera le futur de la planète et celui de l'espèce humaine dans l'Anthropocène.

Avec mes plus sincères vœux de réussite et de succès pour l'Inter-Congrès !

Ia orana,

Congbin Fu
Président (2007-2011)
Pacific Science Association

- General Presentation-

The Inter-congress theme

«Pacific Countries and their Ocean facing Local and Global Changes»

A theme central to present-day stakes and preoccupations.

The work will be divided into five sub-sessions to address this thematic under a pluridisciplinary aspect (scientific, human, socio-economic and cultural)

- ➔ Ecosystems, Biodiversity and Sustainable development
- ➔ Climate Change and Ocean Acidification
- ➔ Health Challenges in the Pacific: Infectious diseases, non-communicable diseases and health workforce
- ➔ Culture and Politics: The stakes of modernity
- ➔ Governance and the Economy: Future challenges for the Pacific.

The goals of the Inter-Congress are to:

➔ Assess problems and issues related to local and global changes in countries and territories in the Pacific, and how these changes are linked to geographic location

➔ Gather together scientists from the whole Asia-Pacific region because all countries and territories in the Pacific Rim and Basin face similar or linked problems

➔ Provide an opportunity to young scientists in the Pacific to garner important experience and take part in stimulating intellectual exchanges

➔ Develop productive exchanges between participants from the countries and territories in the Asia-Pacific region and the communities in French Polynesia, Wallis and Futuna and New Caledonia.

Background

The 1st Symposium on French Research in the Pacific was held in August 2004 in Noumea, in New Caledonia.

In 2007, France and French Polynesia agreed to organize the 2nd Symposium on French Research in the Pacific in conjunction with the 11th Pacific Science Inter-congress providing an international status to the event.

Inter-Congress Organization

This Inter-Congress is a joint endeavour of France and French Polynesia in cooperation with the Pacific Science Association.

The High Commissioner of the Republic and the President of French Polynesia have mobilized their resources to ensure the success of the Inter-Congress.

The New Caledonia and Wallis and Futuna French Communities are also involved in the organization.

Two committees have been appointed to organize and coordinate the event:
➔ an International Scientific Committee and
➔ an Local Organizing Committee.

The International Scientific Committee

Members of the International Scientific Committee have been appointed in consultation with the organisers and the Pacific Science Association.

Co-chairs
- Dr. Congbin FU, President of the Pacific Science Association, Chinese Academy of Science, China
- Dr. Fabrice COLIN, Institut de Recherche pour le Développement, Nouméa, Nouvelle-Calénie

Members
- Dr. Bill AALBERSBERG, University of the South Pacific, Fiji
- Dr. Hamid AMIR , Université de Nouvelle-Calédonie, Nouvelle-Calédonie
- Dr. Marie-Lise CHANIN, Académie des Sciences, France
- Dr. Jean-Claude COCHARD , Institut Français de Recherche pour l'Exploitation de la Mer, Polynésie français
- Dr. Julie COLE, University of Arizona, Tucson, USA
- Dr. Juan CORREA, Pontificia Universidad Catolica, Chile
- Dr. Jacques COMMAILLE, Ecole Normale Supérieure, Cachan, France
- Dr. David FIELDING, Otago University, New-Zealand
- Dr. Jean-Pierre GATTUSO, Centre National de la Recherche Scientifique – Université Paris 6, Villefranche-sur-mer, France
- Dr. Hervé JOURDAN, Institut de Recherche pour le Développement, Nouméa, Nouvelle-Calédonie
- Dr. Nancy LEWIS, East-West Center, Hawaii, USA
- Dr. Christian MONTET, Université de Polynésie française, Polynésie française
- Dr. Claude PAYRI, Institut de Recherche pour le Développement, Nouméa, Nouvelle-Calédonie
- Dr. Serge PLANES, Centre National de la Recherche Scientifique, Centre de Recherches Insulaires et Observatoire de l'Environnement, Polynésie française
- Dr. Sumonta PROMBOON, Science Society of Thailand, Thailand
- Dr. Georges RODERICK, University of California, Berkeley, USA
- Dr. Bernard SALVAT, Ecole Pratique des Hautes Etudes, Université de Perpignan, France
- Dr. Gérard SICLET, Académie des Sciences, France
- Dr. Serge TCHERKEZOFF, Centre National de la Recherche Scientifique – Ecole des Hautes Etudes en Sciences Sociales - Université de Provence, Centre de Recherche et de Documentation sur l'Océanie, France
- Dr. Rémy TEYSSOU, Institut Sanofi Pasteur Lille, France
- Dr. Randy THAMAN, University of the South Pacific, Fiji
- Dr. Darrell TRYON, Australian National University, Australia
- Dr. Makoto TSUCHIYA, University of the Ryukyus, Okinawa, Japan

The Organizing Committee

Local Organizing Committee in French Polynesia

A Local Organizing Committee is established under the joint auspices of the High Commissioner of the Republic in French Polynesia and of the President of French Polynesia. Special Assistants in charge of Research and Technology in French Polynesia and in New Caledonia and the Director of the Research Delegation of French Polynesia will be on duty for the committee secretariat.

Co-chairs

- the High Commissioner of the Republic in French Polynesia or his representative
- the President of French Polynesia or his representative

Representing French Polynesia

- the Vice-President of French Polynesia or his representative
- the Minister in charge of Research or his representative
- the Minister in charge of Environment or his representative
- the Minister in charge of Marine Resources and Sea or his representative
- the Minister in charge of Land Planning or his representative
- the Minister in charge of Health or his representative
- the Minister in charge of Cultural affairs or his representative
- the Minister in charge of the Economy or his representative
- the Heads of French Polynesia Departments or their representatives if needed

Representing the High Commissioner

- the General Secretary or his representative
- the Attache to the General Secretary or his representative
- the Windward Islands Administrator or his representative
- the Chief of Staff of the High Commissioner or his representative
- the Heads of France Departments or their representatives, if needed

Representatives of Research Organizations

- the President of the University of French Polynesia or her representative
- the « Centre de Recherches Insulaires et Observatoire de l'Environnement » Director or his representative
- the University of California at Berkeley, Gump station Director or his representative
- the « Initiative Française pour les Recifs Corralliens » in French Polynesia Correspondent or her representative
- the « Institut Français de Recherche pour l'Exploitation de la Mer » Director or his representative
- the « Institut Louis Malardé » Director or his representative
- the « Institut de Recherche pour le Développement » Director or his representative
- the « Laboratoire d'Étude et de Surveillance de l'Environnement » Director or his representative
- the « Laboratoire de Géophysique » Director or his representative
- the « Météo France » Director or his representative
- the Director of the Research Department of French Polynesia
- the Special Assistant in charge of Research and Technology in French Polynesia

- Association Proscience Te Turu'Ihi

Local organizing committee in New Caledonia

- the High Commissioner of the Republic in New Caledonia or his representative
- the President of the Government of New-Caledonia or his representative
- the President of the University of New Caledonia or his representative
- the « Bureau de Recherches Géologiques et Minières » Director or his representative
- the « Centre National de la Recherche Scientifique » Director or his representative
- the « Institut Agronomique néo-Calédonien » Director or his representative
- the « Institut Français de Recherche pour l'Exploitation de la Mer » Director or his representative
- the « Institut Pasteur de Nouvelle-Calédonie » Director or her representative
- the « Institut de Recherche pour le Développement » Director or his representative
- the Special Assistant in charge of Research and Technology in New Caledonia

About the Pacific Science Association

www.pacificscience.org

The Pacific Science Association (PSA) is a regional non-governmental, scholarly organization that seeks to advance science, technology, and sustainable development in and of the Asia-Pacific region, by actively promoting interdisciplinary and international research and collaboration.

PSA is composed of both national member organizations (typically National Academies of Science) and individual member scientists. The PSA Secretariat has been based at the Bishop Museum in Honolulu, Hawai'i since the organization's founding in 1920.

PSA facilitates interdisciplinary and international research and collaboration in the Asia-Pacific region, with a focus on key issues and problems in the region in order to engage science in the service of human needs and improving both the environment and quality of life of the region's peoples. PSA serves as a catalyst for scientific and scholarly collaboration; develops scientific capacity within the region; fosters effective communication between scientists, policy makers and the public; actively involves the Pacific Island states in regional and international scientific activities; and promotes the "Science of the Pacific".

Through quadrennial Congress and Inter-Congress meetings and ongoing scientific Working Groups, PSA provides an interdisciplinary international platform for scientists to discuss and review common concerns and priorities in the region. Through our scientific network, PSA links scientists from developed countries with those from developing countries, including the archipelagic and more remote states of the Pacific. PSA facilitates research initiatives on critical emerging issues for the region, such as biodiversity loss, climate change and ocean acidification, emerging infectious diseases, and the social implications of globalization – issues in which science can provide crucial information required by both society and policymakers to make sound and informed decisions.

PSA's ongoing activities include:

➔ Multi-symposia Pacific Science Congresses, held in a different location every four years. Somewhat smaller and more topically focused Inter-Congress meetings are also held in between each Congress.

➔ Pacific Science, the official journal of the PSA. Pacific Science is a quarterly journal devoted to the biological, physical, and social sciences of the Pacific Region.

About Pacific Science Congresses and Inter-Congresses

Twenty-one Pacific Science Congresses have been held since the first meeting in Honolulu in 1920. They are the principal meetings of the Pacific Science Association and held every four years. Inter-Congresses are held at four year intervals between Congresses. Ten Inter-Congresses have been held since the first meeting in Kuala Lumpur in 1969. Other venues have included Guam, Fiji, Bali, Taipei, Valparaiso, and Singapore. Inter-Congress meetings are typically somewhat smaller (less than 1000 attendees) and more thematically focused than Congresses.

General information

Transportation

The Organizers propose to transport conventioneers on all Congress-related trips. Shuttles will be made available to the conventioneers over the following runs:

- arrival at airport → hotels
- hotels → meeting site (a daily shuttle will do the run several times a day)
- meeting site → place where the evening ceremonies are to be held
- return to hotels at the end of each evening event

Registration

The registration desk will be located at Hilton.

Conference materials such as name badges will be given at your arrival at the hotel. Persons not accommodated at the hotel will be provided with a briefcase and badge at the Convention Reception area.

Congress Name Badge

All delegates are required to wear the congress name badge at all times while in the Congress venue. This badge will serve as admission to all scientific sessions, exhibition and official functions included in the registration fee. Accompanying persons are also required to wear the official name badges during all official functions that they attend.

Language

The official languages of the congress are French and English.
Plenary sessions and the culture and governance session will be simultaneously translated into French and English.

Message board

Any program change or urgent announcements from the Secretariat and private messages will be posted on the message board located in the registration area. Please check the message board occasionally.

Lunch and refreshments

During the pauses, conventioneers will have access to a buffet with drinks and snacks located in front of the "Ecosystem" halls.
Lunch will be held in the "lunch tent" near the beach.

Network and Internet connections

Six computers with Internet access will be available to conventioneers.
Conventioneers having their own personal computers will have free WIFI access at the congress place.

However, be aware that Internet connections are slow in Tahiti, so please consequently organize yourself.

Keynote Speeches

Louise Peltzer
French Polynesia Challenges for equal opportunities versus globalization
Monday March 2nd, 2009, 11:15 – 12:00
Plenary session hall

Anne Salmond
Sacrifices from AFAR: from first encounter to the future
Monday March 2nd, 2009, 14:00 – 14:45
Culture and Politics session room

Brian Bowen
Genetic Connectivity and the Origin of Tropical Reef Biodiversity
Tuesday March 3rd, 2009, 8:15 – 9:00
Ecosystems session room 1

Jonathan Overpeck
The Pacific, Climate Change and the Future
Tuesday March 3rd, 2009, 8:15 – 9:00
Climate Change session room

John Connell
What About the Workers? Where are Health Workers Going, Why and With What Impact?
Tuesday March 3rd, 2009, 8:15 – 9:00
Public Health session room

Mark McGillivray
Achieving Growth through Increasing Connectivity: Lessons from the South Pacific
Tuesday March 3rd, 2009, 8:15 – 8:30
Economy session room

Patrick Kirch
Oceanic Islands as Model Systems for Human Ecodynamics
Wednesday March 4th, 2009, 8:15 – 9:00
Ecosystems session room 1

Joanie Kleypas
Pacific Acidification - Past, Predictions, Perceptions, and Preventions
Wednesday March 4th, 2009, 8:15 – 9:00
Climate Change session room

Eric Dewailly
Global changes and health in French Polynesia
Wednesday March 4th, 2009, 8:15 – 9:00
Public Health session room

Dominique Wolton
Identité, communication et mondialisation
Wednesday March 4th, 2009, 8:15 – 9:00
Culture and Politics session room

Pierre Jacquet
« Comprendre pour agir : Quels outils pour décider des politiques de développement durable ? »
Wednesday March 4th, 2009, 8:15 – 9:00
Economy session room

Special Speech

All registered participants and their accompanying persons are invited to attend.

Welcoming ceremony
Monday March 2nd, 2009, 8:30 – 9:15
Plenary session hall

The french Research in the Pacific
Monday March 2nd, 2009, 9:15 -11:15
Plenary session hall

Regional and Inter-regional Cooperation
Thursday March 5th, 2009, 8:15-11:15
Plenary session hall

Summary sessions
Thursday March 5th, 2009, 14:00 – 16:00
Plenary session hall

Closing ceremony
Thursday March 5th, 2009, 16:00 – 17:00
Plenary session hall

Social Program

All registered participants and their accompanying persons are invited to attend.

Opening cocktail
Monday, March 2, 2009 12:00 noon
At the outcome of the inaugural morning, conventioneers are invited for drinks at a friendly get-together.

Reception at the High Commissioner's
Monday, March 2, 2009, 7:00 pm
High Commissioner's Residence

Polynesia Cultural evening
Tuesday, March 3, 2009, 7:00 pm
Museum of Tahiti and Her Islands

Reception at the initiative of the President of French Polynesia
Wednesday, March 4, 2009, 7:00 pm
Office of the President of French Polynesia

Closing dinner
Thursday, March 5, 2009, 6:00 pm
Hilton Hotel Tahiti

Instruction for presenters

Oral presentation

All the session meeting rooms are equipped with the following audio visual equipment:

- 1 computer projector
- 1 computer (PC)
- 1 laser pointer

Speakers are asked to kindly send us their presentation prior to the Congress. The Secretariat will install the presentations in each conference room.

Format for oral presentations

PCs installed in the conference rooms are equipped with Windows XP operating systems. They will be equipped with the following software :

- Open Office : Writer, Calc, Impress, Draw
- Windows Office : Power Point, Word, Exel

Please ensure that your presentations are compatible with the proposed operating system and the software made available to you.

Poster presentation

All the posters will be exhibited in the "Poster Exhibition" tent.
Conventioneers must arrive with their poster printed in a full AO portrait format. The Secretariat will handle the posters.

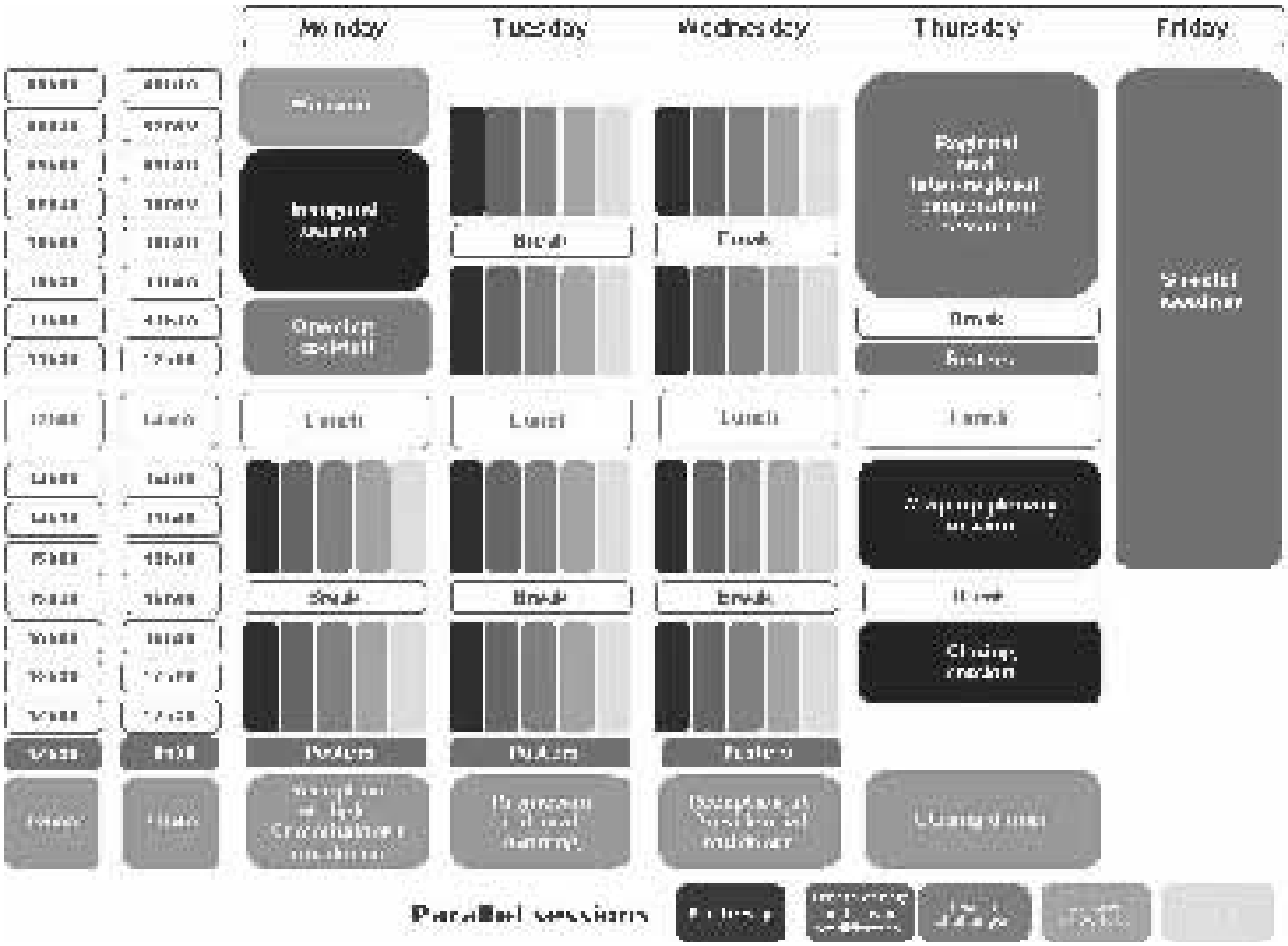
Format of the posters

- A0 = 841 x 1189 millimeters
- Four color process
- Fixation system : 4 reinforcement rings

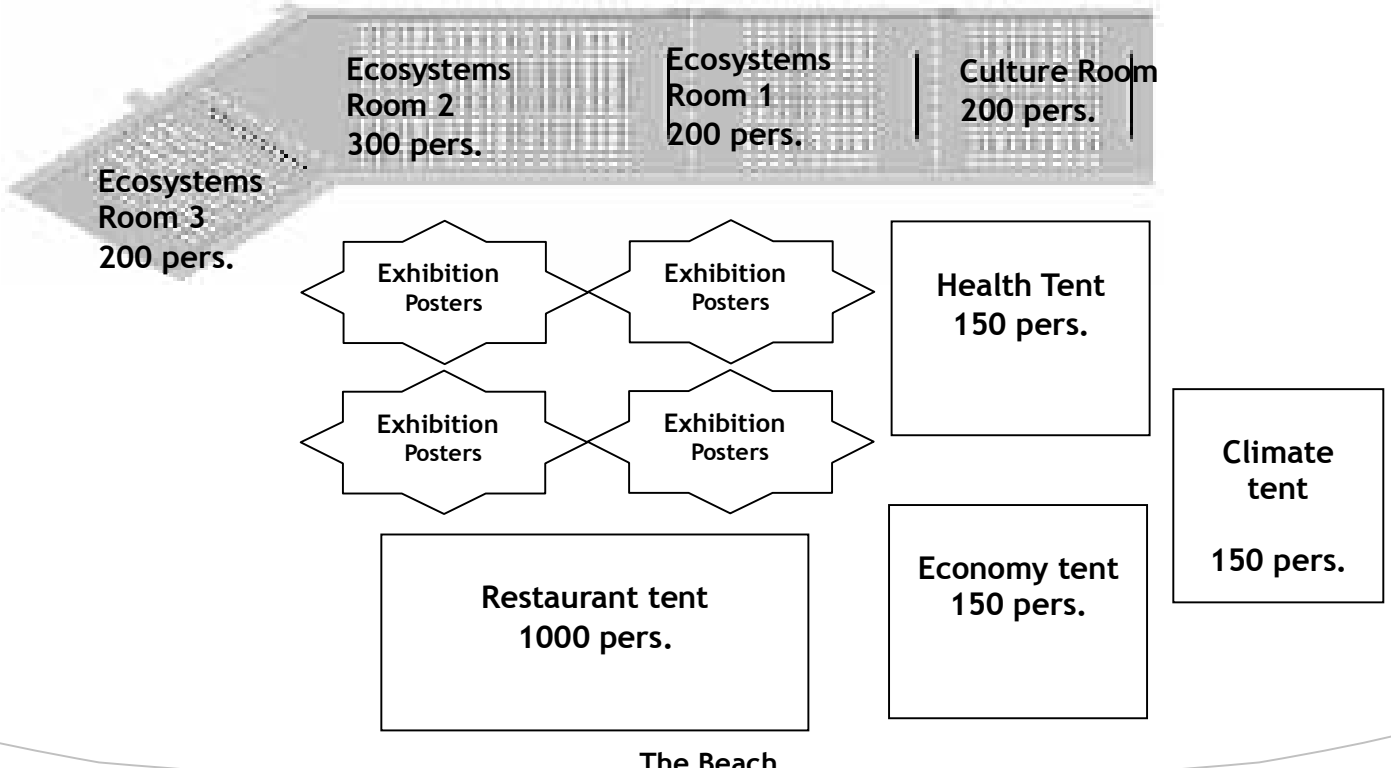
Final contribution

The final contributions to PSI2009 should be registered online on the website www.psi2009.pf.
The paper should have a maximum of 10 pages for a keynote lecture and a maximum of 5 pages for all the other presentation.

Schedule at a glance



The seven conference rooms of the hotel



Monday March 2nd, 2009

	Ecosystem 1	Ecosystem 2	Ecosystem 3	Culture room	Health Tent	Climate tent	Economy tent
	Plenary session hall						
08:00 12:00	- Welcome Ceremony 8:30 – 9:15 - French Research in The Pacific 9:15 – 10:45 - Opening Address 11:15 – 12:00 - Opening cocktail 12:00 noon						
12:30 14:00	Lunch time						
14:00 19:00	Invasive Species 14:00 - 17:40	Hydro-dynamics and Physical Processes 14:00 – 17:05	Development Strategy 14:00 – 17:h30	Keynote lecture 14:00 – 14:45 Cultural Heritage for Today and Tomorrow 14:45 – 18:15	Infectious and Vector-borne Diseases 14:00 - 17:30	Modern Climate Processes, Dynamics and Extremes 14:00 - 16:35	Exchange Rates and Macro-economic Policies 14:00 - 17:15

Tuesday March 3rd, 2009

	Ecosystem 1	Ecosystem 2	Ecosystem 3	Culture room	Health Tent	Climate tent	Economy tent
	Plenary session hall						
08:00 12:00	Keynote lecture 8:15 – 9:00			Heritage for Today and Tomorrow - 8:15 – 10:30	Keynote lecture 8:15 – 9:00	Keynote lecture 8:15 – 9:00	Keynote lecture 8:15 – 8:30
	Bio-geography 9:00 - 12:00	Biological Processes and Sustainable Development 9:00 – 12:05	Pearl, Oyster 9:00 - 11:55	Cultural Heritage for Today and Tomorrow 10:30 – 12:28	Infectious and Vector-borne Diseases 9:00 - 12:10	ENSO, Geo-morphology, Fossil Reefs and Sea Level 9:00 – 12:30	Topics in Micro-economics 9:h00 – 11:45
12:00 14:00	Lunch time						
14:00 19:00	Bio-geography 14:00 - 17:15	Biological Processes and Sustainable Development 14:00 – 17:25	Aqua-culture and Fisheries 14:00 - 17:25	Cultural Heritage for Today and Tomorrow 14:00 – 17:30 Society and Environment 17:30 – 18:20	Non-Communi-cable Diseases 14:00 - 17:30	Climate adaptation and impacts 14:00 – 16:00 Responses to ocean acidification and climate change 16:00 – 17:15	Governance 14:00 – 17:30

Wednesday March 4th, 2009

	Ecosystem 1	Ecosystem 2	Ecosystem 3	Culture room	Health Tent	Climate tent	Economy tent
	Plenary session hall						
08:00 12:00	Keynote lecture 8:15 – 9:00			Keynote lecture 8:15 – 9:00	Keynote lecture 8:15 – 9:00	Keynote lecture 8:15 – 9:00	Keynote lecture 8:15 – 9:00
	Human Eco-dynamics 9:00 – 12:15	Natural Products and Eco-toxicology 9:00 – 11:55	Conser-vation Ecology 9 :00 – 11 :50	Communication and Social Space: political constructs, custom and the law, social differentiation, ethnic minorities 9:00 – 12:06	Population Health and Health Care Systems 9:00 – 11:50	Ocean Aci-dification 9:00 – 11:45	Trade and Tourism 9:00 – 12:15
12:00 14:00	Lunch time						
14:00 19:00	Long Term Monitoring 14:00 – 17:35	Biodiversity Assessment 14:00 – 17:20	Conser-vation Ecology 13:45 – 18:15	Communication and Social Space: political constructs, custom and the law, social differentiation, ethnic minorities 13:35 – 18:42	Population Health and Health Care Systems 14:00 – 17:10	Ocean Acidifi-cation 13:45 – 18:30	Environ-mental Economics 14:00 – 17:30

Thursday March 5th, 2009

	Ecosystem 1	Ecosystem 2	Ecosystem 3	Culture room	Health Tent	Climate tent	Economy tent
	Plenary session hall						
08:00 12:00	Regional and Inter-Regional Cooperation 8 :15 – 11 :15						
12:00 14:00	Lunch time						
14:00 17:00	Summary Sessions 14:00 – 16:00						
	Closing Ceremony 16:00 – 17:00						

Friday March 6th, 2009

	Ecosystem 1	Ecosystem 2	Ecosystem 3
	Plenary session hall		
08:00 12:00	**Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Legal Framework** 8:15 – 10:30	**Coastal Environment** 8:30 – 13:00	**Health Challenges** 8:30 – 13:50
	Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Current Status of ABS Legislation in the Pacific 10:30 – 12:15		
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9:00 Bienvenue du Président de la Polynésie française Welcome from the President of French Polynesia

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12:30 **Lunch break**

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14:40 **Climate Change and Ocean Acidification: Summary and concluding remarks**
15:00 **Health Challenges in the Pacific: Summary and concluding remarks**
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Abstracts

Mo. 11:30 Plenary session hall
Conférence inaugurale - Opening Address

Les défis de la Polynésie française pour une égalité des chances face à la mondialisation French Polynesia Challenges for equal opportunities versus Globalization

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La Polynésie française est confrontée, en même temps que d'autres collectivités territoriales de la République, aux défis de la mondialisation mais a-t-elle autant de chances que celles-ci de pouvoir y répondre?
La mondialisation est souvent perçue comme un avatar essentiellement économique d'une modernité qui est entrée dans un nouveau cycle historique que l'on peut qualifier d'hyper-modernité. L'actualité viendra en illustrer les dangers alors qu'on vient de constater que les excès de la mondialisation financière et économique (largement facilitée par le développement de l'information numérique) ont abouti à la crise que nous vivons. La mondialisation est-elle notre futur inéluctable alors que ses aspects positifs, aussi bien pour la consommation que pour le capital, n'équilibrent pas ses aspects négatifs: délocalisation, inéquités, dégâts environnementaux, émergence d'une culture commune et standardisée? Faut-il pour cela la rejeter, si tant est que cela soit possible, et lui opposer le passé et la tradition?
Notre approche sera alimentée par notre triple expérience de Ministre de la Culture, de Présidente de l'Université et d'enseignante de reo ma'ohi. Nous essayerons de décrire l'état réel de la Polynésie française et d'expliquer qu'il ne suffit pas d'installer les câbles de la mondialisation mais qu'il faut les alimenter en contenus culturels. Après un rappel des spécificités historiques et géographiques de la Polynésie française, souvent rebattues mais de plus en plus génératrices d'inégalités, il convient de faire un effort indispensable de rattrapage si on ne veut pas que le fossé se creuse encore plus.

Mo. 14:00 Ecosystems session room 1
Invasive Species

Marine Invasive Species in the Pacific Islands region

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Invasion of our coastal waters by non-native species is a constant threat to the livelihood of the people of the Pacific, due to their dependence on marine resources. Despite warnings and much publicity in the media, very few Pacific Island countries consider marine invasive species as of national significance. Only a handful of countries, Guam, Hawaii, American Samoa and Samoa have made real progress in addressing marine invasive species, through establishing national invasive species committees, developing strategies and policies, undertaking marine invasive species surveys and training of staff on basic marine-life identification. A critical issue to addressing marine invasive species is the lack of capacity within governments, and throughout the Pacific Islands, to correctly identify marine species and to be able to distinguish native from non-native species. This impediment must be addressed at all levels, and importantly through national and regional partnerships such as the Pacific Islands partnership for taxonomy (PaciNET). In this presentation, I will provide a brief overview of the issue of marine invasive species in the Pacific region and discuss the steps that the Samoan government undertook to address this. Finally, the results from the marine invasive species surveys that were carried out under the Samoan National Invasive Species Management initiative will be provided, and recommendations made for a region-wide strategy to combat marine invasive species.

Mo. 14:15 Ecosystems session room 1
Invasive Species

Etude du caractère invasif d'espèces introduites dans les milieux dulçaquicoles de la Nouvelle Calédonie

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Les invasions biologiques sont actuellement considérées par l'UICN comme l'un des premiers facteurs de menace pour la biodiversité et l'intégrité des écosystèmes, avec la destruction de l'habitat, la pollution et la surexploitation des milieux par l'homme. La Nouvelle-Calédonie n'a pas échappé à l'introduction incontrôlée d'espèces exotiques. Dans ce " hot spot " de la biodiversité mondiale, il semble essentiel de comprendre quels sont les impacts des espèces exotiques sur les écosystèmes et d'essayer d'en contrôler la dispersion. C'est dans ce cadre que s'insère la présente étude qui s'intéresse à 6 espèces exotiques envahissantes des milieux d'eau douce : les végétaux Hydrilla verticillata et Eichhornia crassipes (jacinthe d'eau); le mollusque gastéropode Melanoides tuberculata ; la tortue à tempes rouges Trachemys scripta elegans et les poissons Oreochromis mossambicus (tilapia du Mozambique) et Micropterus salmoides (black bass à grande bouche). A l'exception de M. tuberculata, les cinq autres espèces sont considérées par l'UICN comme faisant partie des 100 espèces introduites les plus nuisibles au niveau mondial. Nous dressons ici un état des lieux de la présence de ces espèces en milieu naturel en Nouvelle Calédonie : historique de leur introduction, distribution spatiale, types de milieux colonisés et principaux impacts écologiques et socio-économiques. Enfin, les stratégies de contrôle de ces espèces dans le contexte insulaire calédonien sont discutées.

Mo. 14:30 Ecosystems session room 1
Invasive Species

From pets to pest. Cat impacts on island biodiversity. A global perspective and a focus on the tropical Pacific area

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Cats have traveled with humans to most part of the world, including many remote islands in all oceans. Although domestication of this predator took place thousands of years ago, cats show a high capability to revert feral. This process explains rather well why many isolated islands present feral populations of cats even without human permanent presence. The diet of cats can be considered as generalist both in continental and insular environments. This ecological trend indicates that feral cats predate upon a wide type of prey, including both invertebrates but overall vertebrates (mainly reptiles, birds and mammals). However, islands harbor a high number of endemic species, and are important in the context of whole biodiversity. Sometimes the impacted populations correspond to local subspecies or even unique species. Therefore, all information on the trophic ecology is really important as a tool to evaluate their effects on the different island faunas and prioritize efforts in conservation. Here, we reviewed more than 60 feral cat diet studies and more than 150 studies on feral cat impacts on island worldwide in order to analyze the overall biogeographical and ecological patterns in the diversity and type of preys with the aim to evaluate the main groups and species deleteriously affected, to know what characteristics make island natives more vulnerable than others, and to prioritize future conservation actions. By intensively compiling data from published and grey literature, we will make a special focus on the islands of the Pacific area and will propose priorities both in term of conservation action and scientific investigations that are urgently needed.

Mo. 14:45 Ecosystems session room 1
Invasive Species

Strategic Research for Management of Invasive Plants in the Galapagos Islands

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As on islands everywhere, invasive species are one of the most serious threats to native biodiversity in Galapagos. Management of introduced mammals is well advanced there, with many populations having been eradicated. Management of other organisms is a step behind, with poorer information available on the problems, and development of effective techniques a priority. The Charles Darwin Research Station has developed a strategic approach to research for the management of invasive plants, which includes obtaining baseline information on status and distribution, monitoring change, prioritizing the threats of different species on each island, research into the biology and control of priority species, and experimental management with an emphasis on eradication. We illustrate the successes and challenges of this approach using examples from the programme.

Mo. 15:00 Ecosystems session room 1
Invasive Species

The positive effects of a biocontrol pathogen agent introduced against the invasive alien tree miconia (*Miconia calvescens*, Melastomataceae) on the growth and fertility of two threatened endemic plants *Ophiorrhiza spp.* (Rubiaceae) in Tahiti (French Polynesia)

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Very few studies have demonstrated the positive impacts of biological control agents on the recovery of native species. A fungal pathogen *Colletotrichum gloeosporioides* forma specialis *miconiae* (Coelomycetes, Deuteromycetinae), highly specific to the invasive alien tree miconia (*Miconia calvescens* DC., Melastomataceae), was successfully released in the tropical island of Tahiti (French Polynesia). It has caused partial defoliation of miconia trees in forest canopy, ranging from 10% to 40% according to elevation. We studied population structure and life history traits of two endemic rare and threatened suffrutescent herbs (*Ophiorrhiza tahitensis* Seems. and *O. subumbellata* Forst., Rubiaceae) growing in the understorey of cloud forests highly invaded by miconia. We compared 12 populations of *O. tahitensis* and 14 populations of *O. subumbellata* in 25 m^2 plots set up in two sites of Tahiti, located between 800-1100 m elev., and showing different miconia defoliation degrees. Defoliation was estimated by measuring leaf area damages on canopy leaves, and canopy opening was calculated with a spherical densiometer. Our results showed that growth and fertility of *O. subumbellata* were significantly higher in more defoliated miconia forest. These trends were not significant for *O. tahitensis*, a more shade-tolerant species. A better seedling recruitment and survival observed for *O. subumbellata* in one study site might be confirmed by a long term monitoring survey. The miconia biocontrol agent has contributed to the conservation of endemic threatened plants by partially opening the canopy in dense miconia forests.

Mo. 15:15 Ecosystems session room 1
Invasive Species

The Human Colonisation of the Pacific: Process and Impact

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One of the most significant impacts on the pristine environments of the remote Pacific islands was the initial arrival of humans and their commensal plants and animals. Our research group has spent the last ten years studying mtDNA variation in these commensal plants and animals and the human populations that carried them to try to unravel the process of the human colonisation of Remote Oceania. The patterns of mtDNA variation in the various species when combined reflect a complexity that has not generally been considered in most archaeological or linguistic reconstructions of Pacific settlement. Comparing these biogeographic patterns with those of other species across the Pacific and through time might provide useful information relating to modes of dispersal and impacts of the arrivals of new species on island ecosystems.

Mo. 15:30 Ecosystems session room 1
Invasive Species

Interactions Between Invasive Plants and their Bird Dispersers in the Society Islands (French Polynesia, South Pacific)

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There is growing evidence that the presence of multiple introduced organisms can exacerbate the consequences of invasive species through facilitation and through the breakdown of mutualisms between native species. In the tropical high volcanic islands of the Society archipelago (French Polynesia), the introduced Red-Vented Bulbul (Pycnonotus cafer), the introduced Silvereye (Zosterops lateralis), and the native Gray-green Fruit Dove (Ptilinopus purpurata) consume the fruit of introduced and native plants. We are investigating their feeding habits and their role as seed dispersers on the islands of Tahiti and Moorea. Bird diet was determined through analysis of fecal samples and direct field observations. Seed viability was assessed using germination tests with seeds extracted from intact fruits and fecal samples. Birds consumed the fruits of 21 plant species, 13 of which are naturalized alien plants. The invasive tree Miconia (Miconia calvescens) was the most commonly consumed fruit for all three species. The Gray-green Fruit Dove consumed the fruit of 9 species of plant, 4 of which are introduced and naturalized. Nearly 50% of the total diet of the fruit dove was comprised of Miconia fruit, with an average of 500 seeds per fecal sample. We suggest that birds in French Polynesia exacerbate the dynamics of plant invasions by dispersing high numbers of viable seeds of many different alien plants and over long distances. Additionally, the indirect impacts of changes in the diet of the native fruit dove in the presence of high concentrations of invasive fruit-bearing trees may have important consequences for the regeneration of native plant communities.

Mo. 16:15 Ecosystems session room 1
Invasive Species

Worldwide Invasion of the Argentine Ant Imperial

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Invasive alien species threaten native biodiversity worldwide, and cause significant economic loss. The frequency of these introductions through commercial trade pathway, and subsequent potential for establishment and spread is increasing with expanding recent trade liberalization and economic globalization. The Argentine ant *Linepithema humile* is an invasive insect that has successfully spread from its native range in South America across much of the globe, including the Pan-Pacific countries, with human activities. The ant displaces or disrupts the local arthropod fauna, protects agricultural pests, destroys fruits and buds of plants, and even invades human houses. The ecological domination of this species is thought to stem from its social structure, called unicoloniality, whereby individuals mix freely among separated nests at large scales. Argentine ants were first noted in Japan in 1993, and their distribution is non-continuous, apparently by human mediated dispersal. To prevent further expansion, the control measures of the species, with systems for early detection and rapid response, are required. A vital component of this prevention is the identification of pathways of introduction into new locations. The recent advances in molecular markers allow us to retrospectively construct individual invasion histories. In addition, for accidentally introduced alien species, trade route essentially represent pathways for invasion, with transport hubs (shipping ports, airports and mail centers) acting as important foci for the arrival and spread of alien species. Therefore, the ecological and economic links will be essential for insight of invasion biology. Here, we attempt to develop risk assessments for specific pathways or expanding process of Argentine ants worldwide. For the purpose, we collate the studies for population genetic structure, associated with trade data of the countries where Argentine ants have been established.

Mo. 16:30 Ecosystems session room 1
Invasive Species

Ants in French Polynesia and the Pacific: species distributions and conservation concerns

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The distribution of ants in the islands of French Polynesia is of interest because, unlike most of the rest of the world, there are likely no endemic ant species in this biogeographic region. In fact, these archipelagoes may possess few or even no native ants, in contrast to most areas where ants are highly important components of biological communities. The status of a group of wide-ranging species in the southeastern Pacific remains unclear, and these ants therefore present a highly interesting biogeographical question. More urgently, a steady stream of clearly non-native ant species continue to be introduced to the islands of Polynesia, and some of these are highly invasive. Research from Hawaii, New Caledonia, the Galapagos, and many continental systems indicates that these invasive ant species pose serious threats to endemic biodiversity. Some fire ant species, such as the little fire ant (Wasmannia auropunctata), can also become a threat to human health, quality of life, and certain sectors of the economy. We discuss the results of recent surveys of ants in French Polynesia, what is known about current species distributions in the Pacific, and what these findings mean for quarantine efforts and the conservation of native biodiversity.

Mo. 16:45 Ecosystems session room 1
Invasive Species

Unicolonal Aggression Within and Among Local Population of the Invasive Ant, *Tapinoma melanocephalum* (Fabricus, 1973) in Viti Levu, Fiji

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Invasive species are among the most significant threats to biodiversity in the world. They cause local extinctions and drastically alter ecosystem structure and function. Ants that infest human infrastructure are also the cause of frequent pest problems in urban environments because of their violation of esthetic and economic thresholds, and their potential influences on human health. *Tapinoma melanocephalum* is a "tramp" ant probably of African or Oriental origin. Commonly called the ghost ant *Tapinoma melanocephalum* appears to be a disturbance specialist and in many locations is absent from undisturbed natural habitat. This species is widely distributed all around Fiji, especially on the main island of Viti Levu. Many invasive ants have an extraordinary form of social organisation, called unicoloniality, whereby individuals mix freely among physically separated nests. This form of social organisation has been attributed to their success. The pattern of aggression and genetic structure of seven unicolonal populations of the ant *Tapinoma melanocephalum* on the main island of Viti Levu was studied; within nests and among nests within the populations. Ants within populations showed no aggressive behavior while there was a distinct behavioral "supercolony" boundary pattern found, where populations became highly aggressive towards each other, from the eastern and western side of the island. This pattern led to an assumption that there may have been two different introduction points which led to the existence of two different supercolonies. This study has provided evidence that unicoloniality can be maintained in invasive ants despite genetic differentiation and that individuals have the ability to discriminate between nest mates and non- nests mates.

Mo. 16:50 Ecosystems session room 1
Invasive Species

Quantifying the dominance of little fire ant (*Wasmannia auropunctata*) and its effect on crops in Solomon Islands

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Introduced most probably intentionally, as a biological control against nutfall bugs (Amblypelta sp) in coconut and cocoa, the little fire ant (*Wasmannia auropunctata*) has for over 30 years continued to spread across and colonise a number of different environments in the Solomon Islands. To date, no studies have investigated the ecological impact of these ants. We measured the impact of little fire ants on (1) the ant fauna within gardens, and (2) on a significant pest of one crop - taro and its natural predators. We surveyed the ant fauna in garden sites of four common subsistence crops: potato, cassava, taro and yam; a total of 24 gardens with three trials per garden, using baiting and hand collecting. The impact of W. auropunctata on Tarophagus sp (a pest on taro crops) and Cyrtohinus fulvus (a natural predator of Tarophagus) was measured in 56 taro gardens with half of the gardens infested with little fire ants. Twenty five taro plants were randomly selected in each taro garden where standardized visual identification and recording was conducted for Tarophagus sp and C. fulvus. Sites with W. auropunctata had significantly lower mean abundance of other ant species than gardens free of W. auropunctata. Although there was no difference in the mean population density of C. fulvus per taro plant, significantly more Tarophagus were found on taro plants in the presence of W. auropunctata than in the absence of W. auropunctata. We propose here two issues, (1) the presence of W. auropunctata appears to lead to a reduction in the ant fauna at a site, and could lead to ecological damage to other invertebrates and vertebrates. (2) The presence and dominance of W. auropunctata on subsistence crops may provide an environment for insect pests to thrive. Little fire ants therefore could pose an economic as well as an ecological risk in subsistence gardens in the Solomon Islands.

Mo. 16:55 Ecosystems session room 1
Invasive Species

Engineering an invasion in tropical islands: classical biological control of the glassy-winged sharpshooter, *Homalodisca Vitripennis*, by the egg parasitoid *Gonatocerus ashmeadi* in French Polynesia

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Tropical islands are paradises for potential invaders; they offer ideal conditions for pest proliferation: mild climate, numerous host-plants, few competitors and natural enemies. The invasion of the glassy-winged sharpshooter, Homalodisca vitripennis Germar (= H. coagulata Say) (Hemiptera: Cicadellidae) in French Polynesia is a typical example. Homalodisca vitripennis was first recorded in Tahiti in 1999. It reproduced and spread very rapidly and was found in 10 islands of French Polynesia located in three different archipelagos few years later. It became an important pest threatening agriculture, native biodiversity, and created intolerable social and recreational problems. Further, massive uncontrolled populations on Tahiti presented an elevated invasion threat to other South Pacific nations.
To minimize these problems, a classical biological control program against H. vitripennis was conducted using the host specific egg parasitoid Gonatocerus ashmeadi Girault (Hymenoptera: Mymaridae). After risk assessment studies indicated an acceptably low level of risk to non-target species, parasitoids were released in Tahiti in 2005. Within a few months, the parasitoid colonized all Tahiti and all other infested islands in French Polynesia. The impact of G. ashmeadi on H. vitripennis was extremely rapid and catastrophic in all infested islands. Arrival of G. ashmeadi slashed H. vitripennis densities by more than 95%. Pest populations were maintained at very low densities until now in spite of seasonal fluctuations. French Polynesia was a paradise for H. vitripennis and became a paradise for G. ashmeadi.

Mo. 17:00 Ecosystems session room 1
Invasive Species

Perpetuating the 'ecocide': the invasion of Rapa Nui (Easter Island, South Pacific) by recently introduced species

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Rapa Nui (Easter Island), one of the most remote inhabited islands on Earth, is famous for its ancient Polynesian civilisation collapse and past forest destruction, sometimes designated as an "ecocide". Vegetation degradation was aggravated by extensive sheep farming between 1870 and 1952, fires, and more recently by overgrazing by cattle and horses. As a result, the native flora and fauna of this small volcanic island (166 km^2) is extremely depauperate with no surviving native bird, and ca. 46 vascular native plants left. By comparison, the introduced biota is composed of more than 370 alien plants including ca. 180 naturalized species, and five established alien birds. During a field-survey conducted in 2008, we identified a total of 36 major invasive plants and weeds causing ecological and/or archaeological impacts, and 38 potentially invasive plants or "sleeper weeds". Many of these plant invaders were recently (i.e. during the last 30 years) and intentionally introduced to the island for reforestation (e.g. the thorny tree *Robinia pseudoacacia*), soil erosion control (e.g. the Pampas grass *Cortaderia selloana*), fodder (e.g. the molasses grass *Melinis minutiflora* and the leguminous shrub *Crotalaria grahamiana*), or ornamentals (e.g. the thorny shrub *Lantana camara*); others were accidentally introduced (e.g. the milkweed *Asclepias curassavica* and the spiny thistle *Cirsium vulgare*). With the recent burst of its tourism industry, and in the absence of a strong biosecurity system, Rapa Nui is experiencing an unprecedented rate of biological invasions by well-known Pacific-wide aggressive plants and animals (e.g. the Argentine ant *Linepithema humile*). A strategic action and management plan is urgently needed for Rapa Nui, to protect the surviving native biota and to try to restore or rehabilitate the last stands of native vegetation in this World Heritage Cultural Site. A major component of this plan should address biological invasions, emphasizing prevention, early detection and eradication.

Mo. 17:05 Ecosystems session room 1
Invasive Species

Wedelia (*Sphagneticola trilobata*) - Daisy Invader of the Pacific Islands: The Worst Weed in the Pacific?

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Can a pretty daisy be compared with the likes of the Anopheles mosquito, the dreaded malaria vector; the brown tree snake that has brought birds and lizards in Guam to extinction; or the fire ant that threatens endemic lizards and cause blindness in dogs in New Caledonia? I think so. "Wedelia", creeping oxeye, or the trailing daisy, formerly known as Wedelia trilobata, but now *Sphagneticola trilobata*, a deceptively beautiful, bright emerald-green creeper with bright yellow daisy-like flowers, is one of the world's most aggressive weeds and listed among the worlds 1000 worst invasive alien species. Native to tropical America from Mexico to Brazil and throughout the Caribbean, wedelia is now cultivated, firmly established and has escaped from cultivation throughout the tropics and subtropics and in most of the main islands of Polynesia, Micronesia and Melanesia. Wedelia is out-of-control on the atolls of Kiribati, Tuvalu, Tokelau and Tuamotus and the limestone islands of Niue and Nauru; and has rampantly spread to grazing and garden lands, national parks, conservation areas, offshore islands, mangroves, swamps, towns, villages, and along coastlines, rivers, drainage ditches and roads in Samoa, Fiji, Palau, Pohnpei, Tahiti, New Caledonia and Papua New Guinea. Most attempts to control or eradicate it have failed, some at considerable cost. It is suggested that wedelia should be immediately declared a serious noxious weed, be restricted from introduction into new islands and habitats, and, where possible, eradicated from areas where it is yet to gain a foothold. If action is taken NOW, islands and communities throughout the Pacific can prevent the spread of wedelia BEFORE it replaces extensive areas of indigenous where it out-competes plants of considerable ecological and cultural importance. This conclusion is based on my studies of wedelia over the past 30 years in most of the countries and territories of the Pacific.

Mo. 17:10 Ecosystems session room 1
Invasive Species

La mangrove des îles de la Société et de Hawaii : histoires parallèles d'un écosystème introduit

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Introduite lors de la première moitié du XXè siècle dans les îles de la Société et les îles Hawaii de façon intentionnelle, la mangrove s'y est rapidement naturalisée. Son adaptation a été facilitée par le fait que les deux archipels polynésiens sont parties intégrantes du domaine intertropical. *Rhizophora mangle*, originaire de Floride, a été le premier palétuvier introduit à Hawaii, plus précisément sur Molokai en 1902, dans le but de stabiliser les marais maritimes attenants aux plantations de canne à sucre. Très dynamique, à la différence des deux palétuviers introduits postérieurement (*Bruguiera gymnorrhiza* et *Conocarpus erectus*), l'espèce forme de nos jours des peuplements monospécifiques denses sur les six grandes îles habitées de l'archipel. En Polynésie française, l'apparition de *Rhizophora stylosa* remonte aux années 1930. Si sa provenance néo-calédonienne ne fait aucun doute, l'antériorité de son introduction à Tahiti par rapport à Moorea n'est pas encore bien établie. Dans les deux cas, l'exploitation d'un écosystème porteur de ressources nouvelles (huîtres, crabes) semble avoir été la motivation première de l'introduction. Plusieurs éléments restent mal connus, entre autres la date d'arrivée de ce palétuvier dans certaines îles de l'Ouest de la Société et son mode de propagation, naturel ou anthropique. A Hawaii, la mangrove fait l'objet d'un rejet de plus en plus manifeste par la société. Des coupes systématiques sont organisées par des groupes motivés afin de préserver des aires réglementairement protégées, de réhabiliter des sites archéologiques polynésiens, ou plus simplement de retrouver l'état initial de leur cadre de vie. En revanche, dans la Société, la mangrove est généralement perçue comme un moindre mal, notamment en regard d'autres espèces végétales dont la propagation est catastrophique. Une réflexion sur la nécessité de lutter contre la mangrove avait été esquissée par les services territoriaux dans les années 1970, mais peu d'actions concrètes avaient suivi. Plus récemment, des coupes spontanées, individuelles, se sont multipliées, avec la prise de conscience des impacts potentiels de cette espèce naturalisée envahissante.

Mo. 17:15 Ecosystems session room 1
Invasive Species

Resolving natural ranges and marine invasions in a globally distributed octocoral (genus Carijoa)

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The first published report of the invasive snowflake coral in Hawaii comes from Pearl Harbor in 1972. Subsequent identification of this species as the Caribbean octocoral Carijoa riisei led to the general conclusion that it was introduced to Hawaii via maritime vectors. In an attempt to confirm the source of the Hawaiian population, we used mitochondrial (h = 0.8379; π = 0.0022) and nuclear (H = 0.8904; π = 0.0299) sequence data to compare Hawaiian populations with samples of Carijoa collected worldwide (n=244). In addition, cumulative vessel traffic patterns from 1940-1979 were compiled for the Pacific Ocean to determine maritime connectivity to and from Hawaii during the assumed time of introduction. Combined mitochondrial and nuclear data show higher genetic diversity in the Indo-Pacific compared to samples from throughout the Caribbean-Atlantic. C. riisei sampled from throughout Hawaii (n=96) share none of the Caribbean mtDNA haplotypes and only a single nDNA allele (of 28 each), indicating that the Hawaiian populations derive from Indo-Pacific rather than Caribbean-Atlantic origins. Further, both mtDNA and nDNA show significant isolation-by-distance patterns overall and among the Pacific sampling locations. These data imply that Carijoa is native to the Indo-Pacific, and that published reports of geographically wide-ranging invasions throughout the Pacific may be unfounded. In contrast, our global sampling shows high genetic diversity throughout the Pacific, indicating long presence of Carijoa in the region. Our data clearly refute a Caribbean origin, but cannot differentiate unambiguously between multiple recent introductions and natural colonization of Carijoa into the Hawaiian Archipelago.

Mo. 17:20 Ecosystems session room 1
Invasive Species

Specimen-based databases for the study of invasive species of the Pacific

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Biological databases are critical for the study of biodiversity, including understanding the abundance, spread, and impact of invasive species. However, not all types of databases are constructed in the same way, nor do they use the same data, and accordingly, databases differ in their usefulness. Here, we show why databases for the study of invasive species (and for other issues in biodiversity) must be specimen-based, that is, the entries must represent individual specimens. Traditionally, databases of invasive species have been species-based, such that there exists a single entry for each species, with accompanying characteristics for that species, including geographical range and other attributes. While important for the dissemination of general information, such databases are not useful for research questions. Species databases are not geographically explicit and they lack the ability to represent variation within species, making it impossible to study spatial and temporal processes. By contrast, specimen-based databases are constructed such that each entry is an individual specimen, typically with associated collection information including geographical data and ecological attributes. The specimens (and their DNA) are also typically saved as vouchers in natural history museums. Specimen-based databases allow one to use a range of new tools in biodiversity informatics, including visualizing and analyzing specimen distributions, attribute look-ups, dynamic niche modeling, and specimen validation. Further, when databases follow international standards, such as promoted by the Global Biodiversity Information Facility (GBIF, http://gbif.org), it is possible to make queries and analyze data across distributed databases housed at different institutions. We illustrate how specimen-based databases can be used to understand the distribution and spread of select invasive species of the Pacific, using tools available through the Berkeley Natural History Museums (http://bnhm.berkeley.edu).

Mo. 14:00 Ecosystems session room 2
Hydrodynamics and Physical Processes

Modelling the hydrodynamic and biogeochemical processes in tropical lagoons: a synthesis

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A synthesis of the work completed during the last 10 years will be presented in order to improve our knowledge on hydrodynamic circulation, sediment transport and biogeochemical processes gained from model simulations performed for two tropical lagoons in New Caledonia (NC) and Suva (SU).
Circulation of the water masses is studied using a 3D hydrodynamic model controlled by tides and winds. Validation of this model is obtained by comparing model outputs with measured current profiles and drifter trajectories. Main patterns of circulation and various calculated total or local residence times are discussed. Two specific studies from NC lagoon are presented in terms of (1) water and energy fluxes above the reef resulting from the surge of ocean swells, and (2) wind-wave distribution in the lagoon which behaves as a fetch limited area.
Concerning suspended sediment transport, we measured the nature and characteristics of bottom sediments and the distribution of suspended particles in terms of concentrations and grain size. A suspended sediment transport model was developed for both sites UC and SU based on optical measurements. These were used to quantify suspended matter concentrations either in situ (monochromatic measurements) or by remote sensing (spectral measurements).
Finally, we coupled a biogeochemical process model to the 3D hydrodynamic model in order to describe the main features of spatial and temporal interactions between water motion and biology. By analysing numerical results for NC lagoon, we could conclude that the gradients of trophic states encountered in this ecosystem are largely dependent on physical processes like wind driven dispersion and residence times of the water masses.

Mo. 14:15 Ecosystems session room 2
Hydrodynamics and Physical Processes

Do mangroves act as a filter towards heavy metals along tropical coastline?

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The mangrove swamp is a specific ecosystem of the intertidal zone, dressing a major importance as well at the level ecological as economic. Currently, mangrove occupies approximately 75 % of the tropical coastlines on about 200 000 km2. However, because of the population growth, of the greater urbanization, the expansion of the industrial activities, the prospecting and the exploitation of natural resources, mangrove swamp disappears at a rate from 1 to 2 % a year. This rate is equivalent even superior to that of the threatened ecosystems, such as coral reefs or primary rain forest. The destruction of this ecosystem takes place everywhere worldwide, and particularly in emerging countries, where are 90 % of mangrove swamps and where the demographic pressure in coastal zone is increasing. This pressure is notably translated by the refusal of certain number of contaminants in the environment, among which heavy metals. The future of these last ones, because of their toxicity, of their persistence, and of their capacity of bioaccumulation, represents in major environmental stake. Heavy metals can accumulate locally or be transported on long distance. So, they can be transported by rivers, and accumulate in estuarine zones where develop mangroves. Considering the distribution of mangroves at the global level, as well as their richness in organic carbon, these play a role, certainly important, in the cycle of metals in estuarine environment. Some emitted the hypothesis that the mangrove would act as a filter towards heavy metals, and that it would allow to obtain downstream a purified environment. The objective of the present synthesis is to review our knowledge, on one hand, of the geochemistry of mangrove sediments, and on the other hand, the capacity of mangroves to accumulate metals, to verify the truthfulness of this assertion.

Mo. 14:30 Ecosystems session room 2
Hydrodynamics and Physical Processes

Impacts of troposheric volcanic gas plumes on terrestrial ecosystems: case of Ambrym volcano, Vanuatu archipelago

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Gases released non-eruptively into the troposphere by degassing volcanoes have been the subject of numerous investigations, since volcanic emissions may convey valuable information about subsurface magma activity and magma hydrothermal interactions, which can be used in conjunction with other geophysical techniques for eruption monitoring. The release of volcanic gases and aerosols may significantly influence the chemistry of the troposphere at the local, regional and global scale. Because the physico-chemical environment of troposphere volcanic plumes can be quite different from anthropogenic emissions, distinct chemical transformation pathways in the atmosphere may results. In a similar manner, volcanogenic air contaminants may affect exposed ecosystems through distinct reactions. Long ignored in the global volcanic emission budget, Ambrym volcano (Vanuatu archipelago) was revealed through recent measurements as one of the largest known contemporary points sources of volcanic emissions on Earth. Temporary and continuous detrimental effects on natural and cultivated vegetation have been observed in relation to its passive volcanic degassing. Deposition of halogen acids, combined with SO2 and sulphuric acid aerosols has caused significant defoliation of vegetation on the island, and a very high fluorine flux results in long-term exposure to high fluoride levels.

Mo. 14:45 Ecosystems session room 2
Hydrodynamics and Physical Processes

Contamination on coral reefs waters and adjacent environments around the Ryukyu Archipelago

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In recent decades, coral reefs have begun to face many threats mainly caused by both natural and anthropogenic sources. This study assesses the current contamination status of diuron and its behavior in the coral reefs and adjacent environments around the Ryukyu Archipelago, southwestern Japan. Water and surface sediment samples were collected from rivers, and ports around Okinawa islands, including Naha Bay and Shiraho coral reefs at Ishigaki Islands between May, 2007 and February, 2008. The concentrations of diuron ranged from ND to 90.00 ng/L and 0.18 to 3.97 ng/g for water and sediments, respectively. The detection frequency was higher (82.4%, 42/51 samples) in Okinawa mainland waters compared to Ishigaki water samples (39.5%, 32/81 samples). Detection frequency of diuron at Naha Bay was comparable to Shiraho coal reefs waters (38.1%, 16/42 samples). Temporal variation results show that relatively high concentrations of diuron were detected during December (winter) in Shiraho coral reefs, while higher levels diuron were detected during September (summer) in Naha Bay. The results suggest that Okinawa mainland is contaminated with diuron from various sources such as agricultural, urban uses and shipping activities while Ishigaki Island is mainly contaminated from agricultural activities. Comparing to eco-toxicological data, our results indicate that at present the level of contamination of diuron in this region is not at an alarming stage for the health of corals. However, long term exposure studies for environmental relevance levels of diuron around coral reefs should be given a priority in future.

Mo. 15:00 Ecosystems session room 2
Hydrodynamics and Physical Processes

Algorithm for Oil Slick Detection Using Envisat ASAR Images

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The oil spilled worldwide causes ecological disasters that results in enormous damages to the marine environment, and so great expenses on clean-up operations are needed. Synthetic Aperture Radar (SAR) is a convenient tool for oil spill monitoring due to its wide area coverage and all-weather surveillance capability. In this paper, an algorithm for detection of oil spills in Envisat ASAR images is presented. The algorithm contains three steps: 1) dark spots detection; 2) spots feature extraction; and 3) classification of dark spots as oil spills or look-alikes. The result of classification of the algorithm has been evaluated on a data set containing verified examples of oil spill and look-alike.

Mo. 15:15 Ecosystems session room 2
Hydrodynamics and Physical Processes

Préparation et Propriétés Physicochimiques de Dispersions Modèles élaborées pour l'étude du Transport Sédimentaire

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La dynamique des zones interfaces terre-mer, constituées par les zones littorales, dépend fortement de l'apport sédimentaire issu de l'altération des roches de la Grande Terre riches en éléments tels que Nickel, Cobalt, Manganèse et Magnésium. Ces sédiments du littoral sont constitués de particules fines d'oxyde ou métalliques dont la taille s'étend du domaine micrométrique au domaine nanométrique. Leur transport s'effectue lorsque ces particules sont dispersées au sein d'effluents naturels ou de rejets industriels. L'influence de ces sédiments minéraux finement divisés sur les modifications géologiques (ou de la biodiversité) est étroitement liée à la phase minérale sous laquelle ils se présentent ainsi qu'à leurs propriétés physicochimiques à l'état dispersé. La première partie de notre travail concernant le comportement de ces particules fines est de mettre en œuvre des systèmes modèles permettant d'étudier leur comportement physicochimique en fonction de plusieurs paramètres clés tels que leur taille, leurs charges de surface ou encore leur aptitude à s'auto-organiser en milieu plus concentré. Nous présenterons les techniques de préparation de ces systèmes de nanoparticules modèles (de type hydroxyde et métallique) et plus particulièrement le contrôle de leur taille par adsorption de ligands organiques chargés. Le comportement de leurs dispersions en fonction de leur salinité et de leur fraction volumique sera détaillé en s'intéressant à leur organisation révélée par des propriétés physiques particulières telle que la biréfringence spontanée par exemple.

Mo. 15:30 Ecosystems session room 2
Hydrodynamics and Physical Processes

Habitat dependent carbon production in the coral reef ecosystem in Okinawa, Japan

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Community carbon metabolism in the coral reef ecosystem in Bise, Okinawa, Japan was observed. The 5 different habitat points selected were: I - sand (SD), II - seagrass (SG), III - coral + seagrass (CR+SG), IV - coral (CR) and V - acorn worm (AC). 3 benthic chambers were covered in each habitat during the day and night time at low and high tide. We took water samples before and after the 2-h chamber incubations. Organic and inorganic carbon productions were estimated from the change in total alkalinity (TA) and total dissolved inorganic carbon (TIC). TIC was calculated from pH and TA using the carbonate equilibrium in seawater. In the SD community, carbon production was relatively low during the day and night time. In the SG community, calcification rate was low, but photosynthesis rate was the highest. In the CR community, a high calcification rate was found. The net photosynthesis rate by coral symbiotic algae was lower than that by SG. In the SG+CR community, photosynthesis and calcification rates were between those found in the SG and in the CR only communities. In the acorn worm community, dissolution of CaCO3 and respiration were found both during the day and night time. In the day time, inorganic and organic productions were strongly correlated to irradiance intensity. In the CR community, dark calcification was found. However, in the SG community, we found dissolution of CaCO3 at night. In the CR+SG community, dissolution was also found in night time. These results suggest that the SG community can dissolute coral skeleton during the night time. Thus, this indicates a possible negative relationship between SG and CR. However, further studies need to clarify this relationship.

Mo. 15:45 Ecosystems session room 2
Hydrodynamics and Physical Processes

Système d'alerte aux tsunamis en Polynésie : développement et organisation

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Système d'alerte aux tsunamis en Polynésie : développement et organisation.
Le système d'alerte aux tsunamis en Polynésie est régi par le Haut-Commissariat et lle Service Interministériel de Défense et de Protection Civile, et en cas d'alerte effective, les actions des services d'Etats sont codifiées par le PSS-tsunami (Plan de Secours Spécialisé). Toutefois en amont de ce vaste plan de secours, peuvent se poser les questions suivantes : quel est le point de départ du système d'alerte ? Comment le danger d'un tsunami potentiel est-il évalué dans un premier temps à partir de l'analyse des données sismiques ? Comment prendre en compte les données marégraphiques pour l'estimation du tsunami ? Quelle est la marge d'erreur ? Comment est organisé le système d'alerte dans le Pacifique et quelles sont les différentes coopérations ? Enfin, une catastrophe comme celle de Sumatra du 26 décembre 2004 pourrait-elle se reproduire à l'échelle du Pacifique ?

Mo. 16:30 Ecosystems session room 2
Hydrodynamics and Physical Processes

The Typhoon Vector Map Research and Application Base on SVG

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Based on analyzing the characteristic of SVG, we firstly researched the map relationship between spatial information and tag of SVG. Secondly, the SVG building method and Encrypt project from spatial information was introduced. Using a vector map of typhoon route trend as example, prove the possibility that the use SVG develops the vector map.

Mo. 16:35 Ecosystems session room 2
Hydrodynamics and Physical Processes

Tuamotu Archipelago's wind wave and ocean circulation patterns

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A multidisciplinary project funded by the European Development Fund (EDF) was recently launched to enhance pearl oyster aquaculture management. The project focuses, among several tasks, on the oceanic and atmospheric environment of the atolls where the pearl industry is significant. One of the actions includes the characterization of the oceanic swell regime and ocean circulation in French Polynesia and especially around the targeted Ahe and Takaroa atolls.
Knowledge of height and direction of swell and locally forced wind waves is essential to understand the atoll lagoon hydrodynamic circulation variability. In order to analyse the seasonal and inter-annual variability of wind waves, two high resolution WAVEWATCH III regional model (a 1/20 degree resolution and a finer unstructured grid) were nested into a global 0.5° resolution model, all forced by ECMWF wind analyses. The global model is calibrated against altimeter and synthetic aperture radar measurements. Main results for the period 2004-2008 show a strong energy attenuation inside the archipelago due to dissipation processes and a shared influence of locally and remotely generated waves.
Furthermore, the Tuamotu's ocean circulation pattern is reproduced based on numerical simulations from a 1993-2004 regional oceanic model (ROMS) run 1/6 degree resolution. Results are coherent with observations (TAO moorings, XBT profiles, satellite sea level and temperature). They also indicate a complex circulation within the archipelago, and an attenuation of current intensity related to the interaction with atolls.
The presentation will detail the methods and most recent modeling results at the time of the conference. Perspectives for atoll lagoon studies and feasibility of an operational oceanographic system will be discussed.

Mo. 16:40 Ecosystems session room 2
Hydrodynamics and Physical Processes

Short-term temporal and spatial dynamics of nutrients and organic materials in the island river systems of Okinawa, Japan

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The movement of materials between ecosystems is a common process in nature. Rivers transport materials via water movement and connect terrestrial and marine ecosystems. In addition, abiotic transportation processes are modified by biotic process (i.e. photosynthesis, respiration, feeding, excretion and migration). Thus, the shorter, narrower features of Island river systems probably have unique functions and processes in regards to material transportation to the marine environment. Although knowledge of river ecosystems are necessary for a comprehensive understanding of island ecosystems, there is a paucity of basic information. The purpose of the present study is to clarify temporal and spatial dynamics of materials in island river systems. This study was conducted in two rivers on Okinawa Island. Genka River is surrounded by natural forest while Mukue River is under intensive human activity. We measured diurnal and spatial variations in water temperature, pH, DO, ORP, currents and nutrients (nitrate and ammonium) at four sites in each river (upper, middle, river mouth surface and bottom). Floating and deposited plant materials were observed in Genka River. Litter bags were used to assess leaf decomposition over a three week period. Nutrients in Mukue River were 10-100 times higher than those in Genka River. This is clearly due to anthropogenic influx from the basin. With respect to spatial variation within a river, both nitrate and ammonium showed higher concentrations in the middle sites, except ammonium in Genka River. Day-night variation of nutrient dynamics was obscure at both rivers, but fluctuation with the tide was detected in both the river mouth surface areas; high concentrations occurred at low tide. Leaves were decomposed by about 40% of the initial weight over three weeks, however there were no significant differences between sites. The C/N ratio gradually decreased at all the sites except for the upper stream.

Mo. 16:45 Ecosystems session room 2
Hydrodynamics and Physical Processes

Carbon budget and heavy metal flux in the river system on the silicate and carbonate rock area in the Okinawa Island Japan

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Dissolved inorganic carbon ions and heavy metal concentration in river water were measured at two typical geological areas of carbonate and silicate rock in Okinawa Island, Japan to investigate the temporal and spatial variability in water quality and the effects of metals on riverine ecosystem. We took water samples from Genka river (Silicate area) and Mukue river (Carbonate area) from headwater to river mouth. Total alkalinity (potentiometric titration) and pH were measured immediately after the sampling. Calcium was measured by Atomic Absorption Spectrometer. Heavy metals such as zinc, copper, nickel and cadmium etc. were measured by ICP-MS after the matrix separation using a chelate disk cartridge. Water flow was obtained by current meter to estimate the amount of water flux. Total alkalinity was higher in Mukue river than Genka river, indicating dissolution of carbonate rocks during the water passing through the mainstream and tributary and the water from percolating ground water. Heavy metal concentration was also higher in Mukue than Genka. Mukue river locates in the developing urban area where the population has been growing recently, whereas Genka river locates in a primeval forest. These situations could have a effect on two different riverine ecosystems.

Mo. 16:50 Ecosystems session room 2
Hydrodynamics and Physical Processes

The effect of landscape characteristics on the nitrogen dynamics within the coral reef ecosystem: Bise, Okinawa, Japan

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Coral reef ecosystems often act as "filtration" systems for the open ocean via processes which occur within and the interactions between the coral, seagrass, and beach landscapes. While many studies have separately assessed the biogeochemical dynamics in each landscape community, few have yet to elucidate the interactions within co-existing/ mixed ones (i.e. coral+seagrass). This study assessed the seawater nutrient dynamics in various communities within the coral reef ecosystem of Bise, Okinawa, Japan using a closed-chamber system. The uptake/release of nitrate, nitrite, and ammonium into the water column was measured in coral (CR), seagrass (SG), coral+seagrass (CR+SG), sand (SD), and sand+acorn worm (AC) environments over several, 2-hour incubation periods conducted over 4-days. Preliminary assessment of the results show that the highest fluctuations nitrate and nitrite concentrations (<1-33μmol/l) were found in the AC environment closest to the coast. Although uptake rates were often the highest in this area, (max. $\sim$1000μmol/ m^2/ hr), this was not necessarily an indicator of efficiency. Significant differences in the uptake/ release of total nitrates between chamber environments confirm that landscape characteristics influence the nutrient dynamics within the coral reef ecosystem. The uptake rate similarities and differences found between the CR+SG chamber (depending on the tide, tidal level and time of day) and the CR and SG chambers respectively, indicate a need for further assessment to clarify the biogeochemical relationships within the landscapes co-inhabited by seagrass and coral.

Mo. 16:55 Ecosystems session room 2
Hydrodynamics and Physical Processes

Spatialisation et évaluation de l'aléa érosion des sols dans les îles hautes du Pacifique

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Les îles hautes du Pacifique peuvent être soumises à des processus érosifs intenses du fait de phénomènes naturels (climat tropical agressif...) et anthropiques (agriculture, feux de forêts, urbanisation galopante, exploitation minière...). Cette érosion des sols se traduit particulièrement par des apports sédimentaires très abondants au littoral. Ces derniers induisent des modifications du profil côtier et dégradent les écosystèmes récifaux. Pour assurer le suivi et la gestion intégrée du littoral, il est indispensable de pouvoir évaluer ce type de pression qui se développe surtout au niveau des bassins-versants en amont de la partie terrestre du système littoral, mais qui affecte directement l'environnement côtier. Dans ce sens, dans le cadre du programme CRISP (Coral Reef InitiativeS for the Pacific), la spatialisation de l'aléa érosion a été mise en œuvre sur les îles d'Efate au Vanuatu, de Veti Levu à Fidji et de Papeete et Moorea en Polynésie Française et sur la côte Ouest de la Grande-Terre en Nouvelle-Calédonie. Cette communication décrit la méthodologie de cartographie de la sensibilité des sols à l'érosion, réalisée en appliquant l'équation universelle de perte en sols (USLE) sur chaque site d'étude. L'intérêt de notre démarche, réside et s'appuie sur l'apport de la télédétection et des données numériques par l'exploitation d'un système d'information géographique (SIG). L'ensemble des facteurs impliqués dans USLE (érositivité des précipitations, longueur et déclivité de la pente, érodibilité des sols et couverture végétale) ont été croisés afin d'estimer la valeur de perte en sol par unité de surface (tonnes/hectare/an). Cette connaissance de la répartition et de la quantification de l'aléa érosion permet alors d'identifier les sites à réhabiliter sur les bassins versant et les zones de gestion prioritaire au niveau du littoral.

Mo. 17:00 Ecosystems session room 2
Hydrodynamics and Physical Processes

The Flow-through Permeation Liquid Membrane, a tool for Metal Speciation Measurements in waters

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Heavy metals are pollutants of environmental concern and significance in New-Caledonia because of mining activities. Mining industries have affirmed their commitment to the principle of sustainable development and a range of measure must be implemented to ensure that terrestrial, aquatic and marine environments are not affected by their activities. Metal toxicity is not related to the total metal ion concentration, but to those of some specific species. New analytical techniques so-called dynamic speciation methods are emerging as a powerful tool for development of predictions of bioavailability and reliable risk assessment strategies. The Permeation Liquid Membrane (PLM) technique is one of those techniques and is based on the carrier-mediated transport of the test metal across a hydrophobic membrane. PLM measurements enable to discriminate between various trace metal species in solution; the labile and inert Cu(II) complexes can be determined selectively. The performance of the technique was studied in well-defined synthetic solutions containing simple organic hydrophilic ligands forming either inert (nitrilotriacetic acid), or labile complexes with Cu(II) (tartaric acid, malonic acid). The results are compared with theoretical predictions of thermodynamic species distribution in solution. Uncertainties on stability constants for copper speciation calculation are taken into account. The detection limits of the device are discussed. This work demonstrates that the flow-through cell PLM is a reliable tool for metal speciation measurements in natural waters. It is thus a reliable sensor for prediction of metal ecotoxicity and a promising tool for sustainable management of water resources.

Mo. 17:05 Ecosystems session room 2
Hydrodynamics and Physical Processes

Tahiti: the study of fossil reefs as a way to determine the evolution of the sea level in the last 14000 years.

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Coral reefs are biological constructions built from elements dissolved in sea water. This mechanism needs a symbiosis between colonial animals and algae; then, a reef is formed by precipitation of calcium carbonate (CaCO3). This structure evolves with the variations in the sea level. Thus, the curve illustrating the rise of the sea level can be infered by measuring the reef growth. Given that the deepest drillholes reach 90m and, taking into account the subsidence phenomenon correspondig to the natural sinking of the island of Tahiti, we can determine the rise in sea level. Thus, in 14000 years, a rise in the sea level of more than 70 meters can be observed.

Mo. 14:00 Ecosystems session room 3
Development Strategy

10 years of community managed marine protection supported by ecotourism-based income generation, at Waitabu Marine Park, Fiji Islands

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In April 1998, a small indigenous community began one of the earliest Community-managed Marine Protected Areas (MPA) in Fiji, beginning a decade of commitment to protecting reef life for future generations. The project was a founder member of the Fiji Locally Managed Marine Areas (FLMMA) network, and one of the few FLMMA projects to include an income-generating community-managed tourism operation.

Annual biological monitoring since the project's inception, undertaken by a team of scientists and community members, utilised in-water survey methods, including Catch Per Unit Effort (CPUE) for key invertebrate species, Manta Tows for broad-scale habitat and invertebrate assessment, Point Intercept Transects for coral cover, and Fish Underwater Visual Census (UVC). These surveys demonstrated increased fish populations within the MPA after 3 years, and increased invertebrate populations after 5 years. Fish and invertebrates important to local subsistence and commerce are harvested in the spill-over area near the MPA. Some poaching occurs inside the MPA, but so far has not significantly impacted overall populations, suggesting the ecosystem is now adequately robust to withstand some harvesting.

Coral growth was retarded by a bleaching event in 2000, but herbivory has reduced macroalgal cover within the MPA, creating better coral-growth substrate, accelerating coral settlement and recovery in comparison with heavily fished areas where macroalgae covers most available substrate, preventing new coral settlement. A small coral restoration project is thriving inside the MPA.

Socio-economic surveys have shown the MPA to have economic and social importance to the local inhabitants, and the value of the MPA as a reserve for conservation and future fish stocks has been reinforced by the income-generating potential of eco-tourism activities.

Mo. 14:15 Ecosystems session room 3
Development Strategy

Coastal Planning and Urban Development: A Case Study of Land Use and Human Settlements Along the Motuan Coastline of Port Moresby, Papua New Guinea

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Coastal planning and urban development is now becoming an actual issue of concern to the planners, decision makers, service providers and those few concern with the health of the coastal ecosystems in Papua New Guinea. The complex coastal processes that results in the unified landforms in the coastal areas are being greatly affected by human activities. Human settlement is one of those activities that have adverse effects on the coastal environment. Hence this study is based on the impacts of land use and human settlements on the coastal landscape and marine resources. It considers the fragile zone for urban development and points to the need of an effective land use planning policy that embraces an integrated coastal management approach. Such understanding would help decision-makers in making well informed decisions that would enable efficient use and management of the coastal ecosystems and their resources thus maintaining biodiversity.

Mo. 14:30 Ecosystems session room 3
Development Strategy

Planned and Existing Developments at the National University of Samoa for promoting Sustainable Development (SD) and education for sustainable development (ESD) in Samoa and the Pacific Region

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The small size, remoteness, and fragility of ecosystems and economies makes sustainability in Pacific island countries a real challenge. In order to address this challenge, the Pacific island countries have embraced sustainable development (SD) as a pathway for the future by becoming party to various international, regional and national agreements. However, the capacity needed for the implementation of these agreements, strategies and action plans is seriously lacking in the Pacific region. An important element is the recognition that education is the key to SD and with the declaration of the Decade of Education for Sustainable Development (UNDESD, 2005), the Pacific Island Countries are taking special measures to use education for sustainable development (ESD) to build capacity towards sustainable livelihoods for all. This paper looks at existing and planned developments at the National University of Samoa to promote ESD and SD. An existing development in promoting ESD and SD is NUS participation in the Asia Pacific Initiative program (API). API is a collaboration between universities and research institutions in the Asia Pacific region to build online educational materials on human development and environmental sustainability. The first of the planned actions in promoting ESD at the National University is the Edulink NIU project. NIU is a collaborative project between NUS, University of the South Pacific and University of Papua New Guinea. At NUS, the NIU Project will also expand on the Asia Pacific Initiative. The main aim of the Edulink NIU project is to mainstream ESD into university curriculum at all levels. The second planned development at NUS to promote ESD is the establishment of a research facility in Marine and Environmental Science. The research facility which will be part of the NUS Ocean Campus, will provide a research base for issues crucial to sustainable development such as climate change, disaster management, and coastal reef management. The paper details the activities in these developments, along with issues and benefits and conclude with a set of recommendations for further promotion of the ESD framework.

Mo. 14:45 Ecosystems session room 3
Development Strategy

Surf tourism and sustainable tourism development in the South Pacific: A focus on Surf Resorts and their associated social, environmental and economical impacts

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Surf Tourism, defined as travel of at least 40 km and stay overnight with surfing as the primary purpose for travel is a relatively new phenomenon in the South Pacific Islands. The majority of surfers stay at surf resorts or surf camps, unlike other parts of the world like South and Central America where surfers have the option of staying in local accommodation ranging from cheap home-stays to large hotels. Most surf resorts in the South Pacific are situated in remote pristine natural environment due to the locality of un-crowded perfect waves, these virgin landscapes have extremely sensitive ecosystems and indigenous communities therefore there is a much higher risk of damage to the local environment and community. There has been very little research undertaken investigating surf tourism and the associated impacts on local community, environment and economy. Surf Tourism is rapidly increasing in the South Pacific and the current boom in the Surf Tourism Industry is not forecasted to stop any time soon, therefore it is vital to the sustainability of not only Surf Tourism in the South Pacific but tourism as a whole to profile surf tourism and surf resorts, study the impacts and come up with solutions. The study will provide very valuable information for local governments, resort owners and communities to reduce the adverse impacts and implement sustainable development strategies, management systems and education programs to protect future communities and environments. The findings of the study will contribute to the theory sustainable development from many different aspects of ie: Sustainable development in the South Pacific, sustainable development in small developing island nations, sustainable development indicators and sustainable development of resort based tourism. The knowledge gained by this research could be applied to many resort situations within the South Pacific around the world and provide models for future resort tourism development.

Mo. 15:00 Ecosystems session room 3
Development Strategy

AgroResource Refining Concept: Promising Tool for a Sustainable Development Combined with Bioresources and Biodiversity Managements

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In order to better manage bioresources availability and biodiversity decrease, a multivalorization approach, respecting the rules of a sustainable development and called "AgroResource Refining Concept" (A2RC) was developped for sequentially valorizing high value compounds of plants for food uses and by-products ones for non-food applications. Basically, constituting compounds were first extracted by using mainly physical processing methods, then in a second step secondary metabolites were valorized by usingl hydrodistillation or novel green solvent extraction and finally, by-products were processed either for the design of agromaterials or for an energetic valorization. This approach, based on the Green Chemistry concept, appeared to be an efficient strategy for utilizing the whole plant potential, by reaching by-products to the rank of co-products, while allowing the design of new bio-products. Three examples were reported illustrating A2RC application to renewable agroresource valorization in Mediteranean basin (France and Tunisia) before its application to Pacific biodiversity hotspots, especially to Tahiti. First applied in France to sunflower (Helianthus annus), it allowed the obtention of essential oil, gelling agent, fibers for producing corrugated cardboard and low density agromaterials in addition to the classical products (vegetable oil and cake for animal feeding). Then applied to French saffron (Crocus sativus) stamen, petals, leaves and stems and Tunisian coriander (Coriandrum sativum) seeds, A2RC allowed the production of concrete, absolute and essential oil for aromatic industry, a yellow/orange dye for textile industry, a vegetable oil for cosmetic uses and cake-pellets as energetic source. In Tahiti, different parts of the famous "uru", bread fruit (Artocarpus altilis) were traditionnally valorized by Polynesian inhabitants: fruits and leaves for food, latex for medecinal applications, wood for dugouts manufacturing,...A2RC allowed to obtain various extracts from wood, bark and leaves with antioxidant and phytochemical activities while fruit by-products extracts could be sources for aromatic molecules for flavors and fragrances.

Mo. 15:15 Ecosystems session room 3
Development Strategy

Parc Patrimonial de Hakahetau

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L'actuelle volonté de la municipalité de Uapou d'assurer un plan général d'aménagement induit un développement très rapide des besoins des populations et la nécessité de mettre en place des démarches de gestion intégrée des territoires. Un parc patrimonial est un espace protégé, géré dans le but de préserver et valoriser ses composantes patrimoniales, naturelles, culturelles et paysagères à des fins touristiques, éducatives et de loisirs. Divers projets en accord avec les objectifs du parc ont été et seront mis en place :
2002 ouverture des itinéraires de randonnées 2003 formation animateur-nature 2004 début des études scientifiques (inventaire des patrimoines) et formation de guide de randonnée pédestre 2005 conservatoire de l'arbre à pain, pépinière, développement et promotion des sports nature 2006 restauration sites archéologiques, atelier-relais, maison de village 2007 festival des arts des Marquises, embellissement du village, amélioration du quai de Hakahetau
Le parc patrimonial de Hakahetau n'est pas une enceinte fermée mais un terme technique pour désigner la vallée de Hakahetau. Les principaux objectifs sont :
- l'inventoria, la préservation et la valorisation des patrimoines - la sensibilisation des populations interne et externe aux patrimoines du parc - le développement durable de la vallée de Hakahetau - le classement du parc en zone protégé
La vallée de Hakahetau offre un potentiel environnemental, culturel et socio-économique extraordinaire. Le cadre entièrement naturel et pittoresque, la végétation verdoyante, les sites culturels et panoramiques contribuent à son charme. La forte personnalité, les qualités artisanales et artistiques de ses habitants démontrent leur appartenance à une culture très riche. Le parc patrimonial de Hakahetau doit être perçu comme un merveilleux outil de protection et de développement durable de la vallée avec, et pour sa population.

Mo. 15:30 Ecosystems session room 3
Development Strategy

Linking Coral Reef Ecosystem Integrity and Human Health in Pacific Island Nations

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Human perturbations to coral reef ecosystems have led to declines in biodiversity, loss of ecosystem integrity, and shifts in ecosystem states. A principle challenge remains in understanding how the degradation of coral reef ecosystems affects the health and well-being of human populations, particularly coastal communities that are coupled with coral reefs for goods and services and cultural values. In the Pacific Islands, coastal societies are strongly connected to marine ecosystems, which harbor marine resources and hold significant cultural value for Pacific Islanders. We targeted a large number of ecological, socio-economic, cultural, and human health variables to investigate the connection between coral reef ecosystem condition and human well-being in 17 Pacific Island nations throughout Polynesia, Melanesia and Micronesia over the past 30 years. Coral reef condition is determined through an ecological assessment of the status of 7 guilds of marine organisms, utilized as broad measures of ecosystem function and integrity. Guild status is derived from published accounts of species density, in situ stock assessments, fisheries records, and the ecological functions of coral reef species. We include a broad range of variables in order to quantify an integrated definition of human health and "well-being", including cultural attributes. A large number of socio-economic and demographic variables are highly associated with coral reef condition, with the major drivers being urbanized population and spatial proximity of marine resources to resource users. Ecosystem state is associated with a number of human health variables, including infant mortality. Elucidating these direct links among socio-economic, ecological, and human health variables has potential for enhancing knowledge of how coral reef degradation might lead to declines in the well-being of Pacific Islanders, leading to a better understanding of the regional dynamics and future trajectories of linked social-ecological systems.

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Development Strategy

Transfert de la recherche et innovation pour concilier développement économique et environnement en milieu océanien : une approche technologique intégrée

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Les questionnements liés à l'environnement et au développement économique nécessitent de disposer du maximum de données sous une forme assimilable par les équipes qui prennent des décisions. Ce postulat pose le problème de la collecte, de l'organisation et de la disponibilité des connaissances scientifiques dans les délais impartis mais également de la bonne adéquation des résultats avec les usages métiers. De plus, les enjeux environnementaux dans la zone Pacifique sont spécifiques, ils nécessitent des compétences thématiques tout aussi spécifiques, souvent rares. Il est donc utile de permettre d'une part la reproductibilité de ces savoir-faire et d'autre part de favoriser la fusion de disciplines complémentaires très différentes, de la montagne aux récifs. BLUECHAM est une société issue de l'IRD, qui a relevé ce défi. Elle se situe à l'interface entre la recherche et l'industrie. Son rôle est d'accélérer la valorisation de travaux scientifiques comme outils adaptés à l'analyse, la surveillance et la gestion de l'environnement océanien. Ce projet propose des solutions technologiques à l'intersection d'évolutions récentes dans les domaines de la télédétection, de l'Internet et de l'informatique. Il a reçu le soutien de l'UNC, de la Province des îles Loyauté et de l'industriel SMSP. Depuis 1999, le concours national d'aide à la création d'entreprises de technologies innovantes assure avec succès son rôle de détection de projets de création d'entreprises innovantes en suscitant plus d'un millier de candidatures par

an. En 2007, le jury national a choisi de récompenser 74 lauréats parmi 7000 dossiers. Le projet BLUECHAM a été lauréat pour un montant de 350 000 euros. C'est le montant le plus important attribué cette année là. Cette présentation propose de décrire cette expérience de création d'entreprise à travers ses réalisations et ses perspectives. Des exemples concrets traitant de problématiques océaniennes seront présentés.

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Development Strategy

Classification and change analysis of the bay oriented exploiture–Taking the bays in Guangdong as an example

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Abstract: The bay is like the bright pearl that is enchased on coastal line. It's also bridgehead by means of which people exploite ocean and enter into inland. Researcher is always interested. Means of classification of the bay are rich and varied. However, most of them are on the basis of nature or geomorphy. Along with economic development intensity being strengthened, the method of classification that is aimed at exploiture of the bay begins to become scientific foundation of development plan or management. So, this paper, oriented exploiture of a bay's exploiture, brings forward extent definition and quantitative indexes of the bay's classification, completes classification of the bay in Guangdong. Based on that, using interpretation data of remote sensing image in different time, this paper as well as analysises exploiture changes of varied bays in Gongdong among 20a.

Mo. 16:15 Ecosystems session room 3
Development Strategy

The Goro-Nickel project in New-Caledonia: how the putative risk associated to manganese discharge in the southern lagoon was studied

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The Goro-Nickel project in New-Caledonia involves the mining and processing of a nickel lateritic ore deposit, producing Ni-Co concentrates. In this process, a waste liquor will be discharged in a pristine lagoon. As part of an environmental risk-assessment for this project, the Southern Province asked a group of experts to conduct an ecotoxicological assessment of the putative impact of this liquor on marine fauna. Following a preliminary screening analysis, manganese was identified as a potential risk factor. At first we used the "Species Sensitivity Distribution" approach, commonly utilized for environmental risk assessments that involve metals. It is based on measurements of growth retardation, lethal doses, and amounts of larval abnormalities after 2-7 days. To be able to make the judgment being asked of us concerning the suggested Mn threshold value of 300 μg/L, revised in 2006 to 150 μg/L (protection of 95% of the species), we tested the impact of Mn at 100 μg/L by using molecular biology and genetic analysis in tetraodon fish and by focusing on a mechanistic understanding of manganese toxicity in other test animals (rats and mice). The initial aim was to properly confirm the innocuousness of manganese at less than lethal doses, for an exposure that might be assumed, a priori, not to present any great risk. But in all of the organs we observed a disturbance of the mechanism for regulating iron (a mechanism clearly identified in mammals contaminated by manganese), the expression of a protection against free radicals, and signs of DNA repair. Apoptosis mechanisms were strongly over-expressed in the brain. Thus, the overall data showed clearly that the previously accepted "target" values of 300 or 150 μg/L, to protect 95% of the marine species, cannot be considered as being free of risk for marine organisms. The Southern Province fully followed our recommendations

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Solid, Liquid and Hazardous Waste Issues in Barakau Village, a Coastal Community in Papua New Guinea

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Increasing population and indisriminate waste disposal by human in coastal communities is posing a serious problem to human health and environment quality. Hence this study was carried out to determine the common waste types, those waste types that could persist in the environment and be washed out by the sea and the way people percieved waste in terms of their harmfulness to the environment and human health together with the way people disposed of their waste.

The findings revealed that most of the wastes produced resulted from peoples safisfaction of their daily needs with a consistent production of biodegradable wastes. The non-biodegradable wastes were seen to be persistent in the environment with plastics being the most dominant material that was carried out by the sea. In terms of peoples perception of waste, people thought that all waste were harmful to human and all non-biodegradable wastes were harmful to both human and the environment. Most people indicated throwing away waste in the sea or on land with most people burning plastics. This indicated that people had an anthropocentric world view and practiced the throwaway method of waste disposal.

In light of the above, recommendations have been made to improve community waste managment in the village, which can also be applicable to other coastal communities.

Mo. 16:25 Ecosystems session room 3
Development Strategy

De l'intérêt de la culture in vitro pour la conservation et la valorisation de la biodiversité végétale néo-calédonienne ou comment produire et conserver ex-situ des plantes endémiques menacées et/ou d'intéret économique

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La Nouvelle-Calédonie est considérée comme l'un des 34 "hotspots" de la biodiversité mondiale du fait de l'originalité de sa flore. Ce territoire de 19000 km^2 possède, en effet, 2432 espèces de plantes vasculaires endémiques (76.4% d'endémicité) se développant au sein d'une grande variété de végétation. Malheureusement, la pression anthropique a conduit à la réduction et à la fragmentation de ces écosystèmes et de fait à la réduction du nombre de populations et d'espèces végétales, en particulier des plus originales. Notre laboratoire s'est positionné depuis 1996 comme le seul en Nouvelle-Calédonie à utiliser la culture *in vitro* comme moyen de multiplication d'espèces en danger. Divers programmes soutenus tant par les Provinces Nord, Sud et Iles de la Nouvelle-Calédonie que par le Programme Forêt Sèche ont ainsi permis de s'attacher à sauvegarder trois espèces appartenant à des genres endémiques; deux palmiers en danger critique *Lavoixia macrocarpa* et *Pritchardiopsis jeanneneyi*, provenant de forêts denses humides du Mont Panié et de la Forêt Nord ainsi qu'une Rubiaceae, *Captaincookia margaretae*, provenant de la forêt sclérophylle. Cette dernière présente par ailleurs un intérêt dans le cadre de la réhabilitation de ces forêts ainsi qu'un intérêt commercial. En effet, outre l'aspect sauvegarde d'espèces rares, la multiplication d'espèces d'intérêt économique, pharmacologique ou horticole est réalisée. Ainsi, des espèces de la famille des Cunoniaceae, à potentialité pharmacologique, utilisées en restauration écologique, des fougères natives et/ou endémiques d'intérêt horticole, une Myoporaceae dont l'huile essentielle fait l'objet d'un brevet, ont toutes fait l'objet d'études approfondies. C'est l'ensemble des résultats obtenus qui permet aujourd'hui d'envisager des perspectives de production qui sera exposé. Ils permettront de montrer combien cette méthode est essentielle pour prévenir l'extinction d'espèces très particulières dans le cadre de la conservation de la biodiversité des écosystèmes néo-calédoniens et de leur valorisation.

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Development Strategy

Community Based Management of Mangroves in Airai State, the Republic of Palau

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Mangroves provide food and timber; act as an important natural buffer protecting coastlines and as a sediment and carbon dioxide sink. The role of mangroves is more crucial as climatologists predict more frequent and intense storms and sea level rise. Mangroves in the Republic of Palau cover 48 km2. Airai State has 4 protected mangrove areas (7.0 km2) representing 56% of all protected mangrove areas in the Republic. Aerial photographs show that mangroves within Airai Bay expanded 4.2 to 7.9 km2 over a 37 year period or at a rate of 0.1 km2/yr. Expansion has been attributed to natural and accelerated rates of sedimentation. Fisherfolk are concerned with the loss of traditional practices to manage the land and mangroves and the expansion of mangroves into nearby seagrass beds and fishing grounds. Traditional chiefs requested mangroves studies to address the changes they observed. In response, community groups and local partners are conducting a mangrove study in Airai focusing on the relative abundance and distribution of the mangrove crab, Scylla serrata and mangrove clam, Anodontia edulenta - two culturally significant flagship species that may be potential indicator species to monitor long term change within the mangroves. The team is collecting baseline data on size distribution of the crabs and clams; forest structure; physical parameters of the soil and water; differential rates of vertical accretion and elevation change; traditional trapping and harvesting methods; and the potential role of the crab and clam in aerating the soils. Traditional ecological knowledge and standard scientific methods are being applied to develop strategies to better understand and manage the mangroves in Airai State. Preliminary findings will be presented and discussed.

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Effectiveness of Low Cost Drying of Local Fruits in Fiji: Using Guidelines of HACCP and Microbial Analysis

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In Fiji the climate favours the production of tropical fruits and since these are seasonal it is vital to preserve them as it goes to waste when it could be used as an export item for overseas markets. This study compares the effectives of solar dryer with direct sun drying and electric oven drying. The three different types of solar dryers (Marquee, solar cabinet and indirect solar dryer) were built and its effectives in drying were assessed by assessing the quality of the dried product and the drying rate. Local fruits such as Hawaiian papaya (Carica papaya), Pineapple (Ananas comosus), plantain (Musa acuminata) and mango (Mangifera indica) were used. The fruits selected were given treatment with ascorbic acid, sodium metabisulfate and calcium chloride separately and steamed or blanched in order to maintain good quality and prevent enzymatic browning during and after processing. Microbial analysis and sensory evaluation such as descriptive analysis using sensory panellist and sensory evaluation equipment were used to assess the quality of the product and the effect of drying on the aesthetic value and acceptability of the product in the market. Qualitative nutritional analysis was also carried out using AOAC procedures. HACCP was used to ensure that the hazards were eliminated or controlled by identifying hazards and allocating critical control points. The indirect solar dryer was very effective as the fruits were dehydrated by the circulating hot air. The fruits that were treated with ascorbic acid and steam blanched showed the best results and were more acceptable in quality. Solar drying is cheap, pollution free and generates a good quality product with a good profit margin. Therefore it is a good source of income for farmers in the rural areas as it is easy to build and cheap to maintain and produces good quality product.

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Development Strategy

Des structures de concertation facilitant la coordination dans la programmation de la Recherche au service du développement durable d'une activité maritime. Le cas de la crevetticulture en Nouvelle-Calédonie

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Le développement de la filière crevetticole en Nouvelle-Calédonie (écloseries, fermes, provende, usine de conditionnement...) a démarré, ex nihilo, dans le début des années 1970. Ce développement a bénéficié d'un apport constant de la Recherche et de l'innovation technologique notamment apporté par Ifremer. Au fur et à mesure des travaux et de l'émergence de nouvelles questions il est très clairement apparu aux acteurs concernés : les professionnels de la filière, les collectivités territoriales gestionnaires (Gouvernement de la Nouvelle-Calédonie, Provinces Nord et Sud, Etat) et l'organisme de Recherche Ifremer coordinateur du programme le besoin d'organiser et de maintenir un flux permanent de communication et d'échange.
A cette fin ont été mis en place, à la faveur d'accords cadre quadriennaux établis entre les partenaires depuis 2003, et en complément des structures d'évaluation scientifique stricto sensu, des structures de concertation entre acteurs qui sont: - un Comité Technique, avec forte représentation des professionnels, qui évalue une programmation de travaux à 4 ans et une programmation annuelle sur la base de questions scientifiques et de questions pratiques émanant de la filière professionnelle et/ou des collectivités publiques, - un Comité Mixte, outil politique, qui valide ces programmations et gère les flux financiers associés sur la base d'un financement du fonctionnement du programme par les partenaires externes et d'un financement de la masse salariale par Ifremer. La présentation proposée décrira ces structures de concertation, leur composition et leur règles de fonctionnement dans le cadre de la programmation de travaux de Recherche & Développement et du maintien d'une veille technique. Un accent sera mis sur leur rôle et responsabilité vis-à-vis des échéanciers, du partage des financements, du transfert adéquat des produits dérivés de la Recherche et de leur adaptation aux problèmes soulevés ainsi que vis-à-vis de la valorisation des résultats.

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Development Strategy

La Plate-Forme du Vivant de Nouvelle-Calédonie : un outil régional performant pour la recherche dans les Sciences du Vivant

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Le développement d'outils performants pour appréhender la dynamique et le fonctionnement de la biodiversité est une priorité. En effet, le déficit de connaissance dans ce domaine impacte négativement la gestion d'écosystèmes fragiles et la mise en œuvre de procédés de restauration et de préservation à long terme. C'est particulièrement une priorité en Nouvelle-Calédonie. La création de la " Plate-Forme de recherche pour les sciences du Vivant de Nouvelle-Calédonie " (PFV-NC) résulte de la volonté de cinq établissements de recherche conduisant des travaux en relation avec les Sciences du Vivant en Nouvelle-Calédonie : IAC, IFREMER, IPNC, IRD, UNC, de mutualiser leurs moyens pour acquérir des outils performants, comme un plateau technique de biologie moléculaire. Cet outil permet l'évaluation de la biodiversité terrestre et marine afin de : (i) développer une gestion optimisée de ces ressources-clés pour le développement durable, (ii) approfondir les connaissances des " processus du vivant " en analysant la dynamique et la distribution spatiale des gènes et de leur expression dans les écosystèmes régionaux, (iii) fédérer et structurer en Nouvelle-Calédonie un pôle d'excellence scientifique et de formation permettant l'investigation du vivant du gène à l'écosystème. La mise en œuvre de ce plateau technique permet l'analyse de la structure et du fonctionnement des génomes : génotypage, séquençage, analyse transcriptomique, dans les règnes animal, végétal, microbien aussi bien en milieux terrestre que marin. Cet ensemble assez complet des moyens les plus performants pour mener une recherche moderne dans le domaine de la biodiversité a pour vocation de s'ouvrir aux projets de recherche de la Région Pacifique dans ce domaine.

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Positionnement de l'Ifremer en Polynésie française

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En Polynésie française, le Centre Océanologique du Pacifique constitue une plate forme de recherche exceptionnelle incluant un panel complet d'installations aquacoles et de laboratoires de biologie et environnement. Le centre a ces dernières années ciblé son activité sur la perliculture, la pisciculture marine et la crevetticulture en concentrant ses efforts sur la perliculture, activité primordiale sur le plan socio-économique en Polynésie française. Ces recherches ont été effectuées en étroite collaboration avec les services du pays de la perliculture et de la pêche.
Les recherches en perliculture se sont inscrites dans les grandes orientations définies en concertation avec la profession et le gouvernement de la Polynésie française.
Sécurisation et pérennisation de la perliculture : réseau de veille zoosanitaire et compréhension du développement des larves in situ.
Amélioration de la rentabilité des entreprises : domestication pour la sélection génétique et compréhension des mécanismes de formation des perles pour en améliorer la qualité.
Un effort a été fait pour élargir et inscrire les recherches de l'Ifremer dans des programmes pluri-annuels, pluri-disciplinaires et pluri-organismes : **Qualité des Perles**, **Ressources Génétiques de l'Huître Perlière** et **Huître Perlière et Environnement**. L'importance économique de la perliculture justifie d'envisager une étude systémique englobant tous les aspects qui conditionnent l'activité.
En pisciculture, l'objectif est de définir un référentiel d'élevage d'une espèce de poisson lagonaire, le Paraha Peue (*Platax orbicularis*) pour créer une filière de production alimentant le marché local. En crevetticulture l'Ifremer soutient le Pays pour développer la production actuelle de crevettes (50 tonnes) en réduisant les importations (600 tonnes).
Un nouvel axe de travail concerne la surveillance des contaminants chimiques au moyen d'intégrateurs biologiques (bivalves) en partenariat avec la direction de l'environnement.
Fort du soutien des équipes métropolitaines de l'Ifremer, le Centre apporte son expertise aux thématiques comme les énergies renouvelables d'origine marine, le changement climatique, la biodiversité, l'halieutique, les aires marines protégées.

Mo. 14:05 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Les cyclones en Polynésie française : fréquence et discrétisation des trajectoires

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The French Polynesia islands and atolls are exposed to hurricane hazard. Hurricane frequency is actually high during El Niño events as many scientists have already shown. Using GIS methodology, a survey of hurricane tracks in the South Pacific has been made from 1945 to 2008 in order to assess hurricane hazard in the Polynesian area. Results show that hurricanes can also occur both in La Niña events and normal years. Moreover, we have tried to appraise the hazard predictability using Gumbel's statistical distribution. Even if figures do not allow more precise analysis than at the regional scale, such a work also provides important information on hurricane spatial and temporal feature that can be useful when hazard preventive plans are to be adopted by French Polynesia local authorities.

Mo. 14:20 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Prévision Saisonnière en Polynésie française

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Depuis octobre 2000, la DIRPF participe à l'élaboration d'un bulletin climatique mensuel: "The Island Climate Update", édité par le NIWA (National Institute Water and Atmospheric). Plusieurs services météorologiques du Pacifique collaborent à sa réalisation, notamment par l'envoi en début de mois des données de précipitations, de pressions et de températures et en participant à une téléconférence de validité. L'une des rubriques de ce bulletin présente la prévision sur 3 mois des précipitations et depuis août 2008 la prévision sur 3 mois des températures est traitée. En 2006, le NIWA a réalisé une estimation de ces prévisions saisonnières à partir d'un échantillon de 60 cas. Nous avons poursuivi sur 31 cas en calculant les scores de la prévision sur les différents archipels de la Polynésie française et pour 5 modèles de prévision saisonnière consultés par tous les partenaires: IRI, UKMO, ECMWF, NSIPP et NCEP/CMB. Tout comme en 2006 les scores de réussite réalisés par la DIRPF et l'équipe du NIWA sont peu satisfaisants sur l'ensemble du pays. Toutefois l'étude a mis en exergue l'efficacité de certains modèles sur des régions bien ciblés de la Polynésie française. Ainsi c'est avec le modèle IRI que l'on obtient les meilleurs scores pour les archipels des Marquises et des Tuamotu notamment en saison chaude et plus particulièrement pendant l'intersaison aux Marquises avec 80% de prévision correcte. Par contre c'est le modèle UKMO qui présente les meilleurs scores de réussite pour l'archipel de la Société avec des scores supérieurs à 60% pendant la saison chaude.

Mo. 14:35 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Historique des Cyclones en Polynésie-Française de 1878 à 2007

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Les cyclones sont des phénomènes atmosphériques naturels qui participent aux transferts d'énergie entre les zones tropicales et les régions tempérées. Sur la carte du monde, la Polynésie française est peu exposé aux risques cycloniques. Cependant il est acquis que l'activité cyclonique coïncide avec la saison chaude et semble plus importante en phase chaude d'ENSO (El Niño Southern Oscillation)qu'en situation normale. En effet la population polynésienne a en mémoire les intenses cyclones tropicaux qui ont sévi lors des forts El Niño de la saison chaude de 1982-1983 et 1997-1998. Pendant plus d'un an l'équipe du service météorologique en Polynésie française, a répertorié les cyclones et dépressions tropicales qui ont navigué sur le bassin de la Polynésie française de 1878 à 20047 et a entrepris une démarche pour valider les trajectoires et les documents qui s'en réfèrent. Deux périodes bien distinctes ont été mises en exergue. La période de 1878 à avril 1969, pauvre en données et dont l'étude s'est beaucoup rapprochée du récit historique. Et la période de novembre 1969 à avril 2007, mieux documentés et dont les archives sont issus des rapports rédigés par les différents centres météorologiques, avec un poids prépondérant pour les données issues du centre météorologique de la Polynésie française. De novembre 1878 à avril 1969, soit 91 ans, 22 phénomènes ont été listés. De novembre 1969 à avril 2007, soit 38 ans, 43 phénomènes ont été répertoriés. Enfin l'équipe a listé 5 phénomènes de 1831 à 1878 mais n'a pas pu trouver d'archives.

Mo. 14:50 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Locations of tropical cyclogenesis and decay in the South Pacific over the period of satellite record

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Much research is currently focused on the frequency, strength and points of origin of tropical cyclones in various ocean basins of the world, particularly in relation to the influence that greenhouse-enhanced global warming and consequent rising sea-surface temperatures may have on patterns of storm activity. Our work presents a newly-verified database of storm origins in the South Pacific, which is archived by the Regional Specialized Meteorological Centre (RSMC) of the Fiji Meteorological Service (FMS). Latitude and longitude fixes are investigated for points of tropical cyclongenesis, i.e. locations where tropical depressions intensify in wind strength to 35 kts and are upgraded to named tropical cyclones. The dataset extends from the start of reliable satellite observations in 1969 to present. Preliminary results show that patterns of storm origin have changed little through recent decades. In general there has been no noticeable shift in average start latitude (15°S), but a slight eastwards shift in average start longitude is evident (Fig. 1). By analysing the positions of storm decay (in this work, the positions at which average wind speeds drop to below 35 kts), the data suggests that (extra)-tropical cyclones are migrating farther poleward than in the early period of record. These evolving distributions of tropical cyclogenesis and decay positions probably point towards improvements that have been made in satellite monitoring of storms, but climatic influences on cyclone behaviour and longevity may also have changed over time. These factors are briefly discussed.

Mo. 15:05 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Changes in heat content and mixed layer depth in the Coral Sea based on Argo observations

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The mixed layer plays a crucial role in air-sea interactions through the flux and storage of heat, CO2 and momentum. The seasonal and long-term variability of the mixed layer depth (MLD) and the ocean heat content (OHC) within the Coral Sea is investigated using Argo conductivity-temperature-depth (CTD) profiles. A distinct seasonality in the mixed layer depth was found throughout the Coral Sea, but was generally more pronounced in higher latitudes as a result of greater seasonality in sea surface temperature (SST) and wind stress. Austral winter MLDs, which tend to be much deeper than summer MLDs throughout the Coral Sea, display a shallowing trend over the last two decades, whereas the average summer MLD remains relatively constant. The trend towards a shallower MLD could have dire consequences for the Great Barrier Reef as SST is expected to increase more rapidly within a shallow mixed layer, thus likely resulting in more severe and more frequent coral bleaching events. However, a general trend towards cooler SSTs and lower OHC has been noted over the last seven years. Further CTD profiling is required throughout the entire Coral Sea in order to accurately determine the long-term trends in ocean heat content and the mixed layer depth.

Mo. 15:20 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Seasonal Atmospheric Water Vapor Monitoring over Tahiti Using GPS measurements

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Significant changes in the spatial distribution of the atmospheric water vapor can occur rapidly during active weather. The neutral molecules in the lower part of the atmosphere, mainly the troposphere, introduce propagation delays into Global Positioning System (GPS) signals. This tropospheric delay (TD) is often divided into a dry and wet delay. Given surface temperature and pressure readings at the GPS receiver, the integrated water vapor (IWV) can be derived from the estimated delays. Using the three orbitography softwares (Gipsy-Oasis, Gamit-Globk and Gins) , time series of (TD) and (IWV) have been estimated, during dry and wet seasons, at the four IGS (International GPS Service) GPS permanent stations located in the northwest coast of Tahiti. The overall consistency between the solutions is about 6 mm in terms of TD corresponding to 1 kg/m^2 in terms of (IWV) and the comparison with radiosonde profiles show an agreement at the 10-12 mm level. These results support the future assimilation of GPS data into the Tahitian numerical weather prediction model.

Mo. 15:25 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Lightning-Integrated Water Vapor relationships in the South Pacific

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Lightning can be a tracer of vigourous convections that can be measured with relative ease from satellite and/or from ground station networks especially over huge oceanic surfaces like the Pacific ocean. Therefore, lightning activity can provide a valuable means of validating the performance of model convective schemes. Indeed, lightning occurs where vigourous convective drafts lift large particules above the 0°C isotherm, although that correlation may be modulated by other parameters. Various relationships have been published linking lightning and properties of convective systems. In a previous work, we have shown that the location of the maximum lightning activity distribution (from World Wide Lightning Location network) as a function of latitude, and modeled by a polynomial function, leads to a curve comparable with the monthly mean position of the South Pacific Convergence Zone. That band of cloudiness is assumed to be the main source of lightning in the South Pacific. Nevertheless, the maximum lightning activity is correlated not to the maximum but to moderate rainfall rates. Departures between both parameters occur when the monthly position of the SPCZ is clearly different from its mean position calculated over nearly 40 years. To learn more about that correlation we are taking advantage of the recent development of the GPS applications which allows the precipitable water content in the troposphere to be estimated in a vertical integrated form (Integrated Water Vapour). The IWV temporal series recorded over Tahiti are compared to the lightning activity, taking into account the type of lightning discharge (Cloud to Ground or Intra Cloud) distinguished thanks to the radiated electric field measurements.

Mo. 16:00 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

SPICE: Southwest Pacific Ocean Circulation And Climate Experiment

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South Pacific oceanic waters are carried from the subtropical gyre centre in the westward flowing South Equatorial Current (SEC), towards the southwest Pacific-a major circulation pathway that redistributes water from the subtropics to the equator and Southern Ocean. The transit in the Coral Sea is potentially of great importance to tropical climate prediction because changes in either the temperature or the amount of water arriving at the equator have the capability to modulate ENSO and produce basin-scale climate feedbacks. The south branch is associated with comparable impacts in the Tasman Sea area. The Southwest Pacific is a region of complex circulation, with the SEC splitting in strong zonal jets upon encountering island archipelagos. Those jets partition on the Australian eastern boundary to feed the East Australian Current for the southern branch and the North Queensland Current and eventually the Equatorial Undercurrent for the northern branch. On average, the oceanic circulation is driven by the Trade Winds, and subject to substantial variability, related with the South Pacific Convergence Zone (SPCZ) position and intensity. The circulation, and its influence on remote and regional climate, is poorly understood due to the lack of appropriate measurements. Ocean and atmosphere scientists from Australia, France, New Zealand, the United States and Pacific Island countries initiated an international research project under the auspices of CLIVAR to comprehend the Southwest Pacific Ocean circulation and its direct and indirect influence on the climate and environment. The outline of a regionally-coordinated experiment to measure, study and monitor the ocean circulation and the SPCZ, to validate and improve numerical models, and to integrate with assimilating systems is presented. This project reflects a strong sense that substantial progress can be made through collaboration among South Pacific national research groups, coordinated with broader South Pacific projects.

Mo. 16:05 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Oceanic Circulation at the entrance of the Coral Sea (southwest Pacific Ocean), SPICE-France

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The water masses entering the Coral Sea are of primary importance in the long-term variations of the conditions affecting the equatorial Pacific Ocean through potential impact on El Niño phenomenon. The study of their circulation has been identified as a major priority in the international scientific program CLIVAR-SPICE. The subtropical part of the South Equatorial Current enters the Coral Sea primarily through the gap between New Caledonia and Solomon Islands. Due to the reefs and islands the broad scale wind-driven oceanic gyre breaks into western boundary currents and narrow, predominantly zonal jets identified as the North Vanuatu Jet (NVJ) and the North Caledonian Jet (NCJ). Since 2003 a program composed by four oceanographic cruises allowed to provide quantitative transport estimates with uncertainties and to infer the pathways and boundary current formation. A survey of the circulation along 162°E using a Spray glider also revealed that the characteristics of the NVJ and NCJ entering the Coral Sea differ from those derived either from mean hydrography or from climate-scale oceanic models. The vertical extension of the jets remains largely unknown, even if the trajectories of the ARGO floats at their standard parking depth show that the waters transported by the NCJ do not have a unique source. Considering the ARGO collection of profiles allows to derive the averaged geostrophic zonal currents between 10°S and 20°S at some fine spatial resolution down to the 1/3 degree in latitude that was not previously considered. The patterns of the geostrophic circulation as well as other properties of the water masses will be compared and jointly analyzed with different regional models using high horizontal resolution (1/12 degree). Measurements at the entrance of the Coral Sea will be a key component to the SPICE observing system, which will include observations of the waters inflows to the Solomon Sea and the Tasman Sea.

Mo. 16:10 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Oceanic circulation in the Solomon Sea (Solwara/SPICE-France)

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The oceanic circulation in the South Pacific redistributes waters from the large subtropical gyre toward the equator through a subtle journey. These waters are first transported westward from the central South Pacific, by the South Equatorial Current. An important part enters the Coral Sea, flows northward along the Australian coast, and crosses the Solomon Sea before joining the equator. At the equator, these waters, through their influence on the mean state of the thermocline, could influence the El Niño Southern Oscillation (ENSO) phenomenon. The "direct" path toward the equator is taken into account by the large scale observations/modeling programs (satellites, Argo network, operational models,...), but circulation through the southwest Pacific requires specific studies. The Solomon Sea, which is the unique pathway to the north, is a choke point where boundary currents become intense. Waters entering from its south (around 10°S) exit to the north by 3 main straits, and the transport partition among these straits may affect the response of the equatorial system to changes in the South Pacific climate. The strong boundary currents, combined with the complicated topography and very narrow straits of the Solomon Sea make remote measurements (satellite) and numerical modeling difficult to interpret. We present here a major research program dedicated to the Solomon Sea, based on insitu observations, long-term monitoring and high-resolution modeling. Such a combined analysis will provide a sound synthesis on the role of this region in the climate system and its variability. A depiction of waters transport and transformations from their subduction zones in the South to the equatorial area will provide information to improve our understanding of low-frequency modulations of ENSO and the supply of trace elements to the equatorial upwelling. On long term, this research could lead to improve the oceanic component of climate models, lay the basis for a monitoring network, and increase the skills of climate forecast.

Mo. 16:15 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

The interdecadal trend and shift of dry-wet over the central part of North China and their relationship to the Pacific Decadal Oscillation (PDO)

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Based on monthly precipitation and monthly mean surface air temperature (SAT), the dry/wet trends and shift of the central part of North China and their relationship to the Pacific Decadal Oscillation (PDO) from 1951 to 2005 have been analyzed through calculating surface wetness index (SWI). The results indicate that there was a prominent drying trend and an abrupt change in the analysis period. A persistent warming period with less precipitation from the mid and late 1970s to present was found, and a shift process exists from the wet to the dry in the central part of North China during 1951-2005. The transition is located in the mid to late 1970s, which should be related to the shift variation of large-scale climate background. The correlation analysis has brought about a finding of significant correlativity between PDO index (PDOI) and SAT, precipitation and SWI in this region. The correlation exhibits that the positive phase of PDOI (warm PDO phase) matches warming, less precipitation and the drought period, and the negative PDOI phase corresponds to low SAT, more precipitation and the wet period. The duration of various phases is more than 25 years. The decadal variation of sea surface temperature (SST) in the North Pacific Ocean is one of the possible causes in forming the decadal dry/wet trend and shift of the central part of North China.

Mo. 16:20 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Variability of amplitude and phase of modulated annual temperature cycle in China

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An increasing interest has risen over the last 10 years on estimating variation and possible causes of amplitude and phase change of annual temperature cycle. All the previous studies are done by applying Fourier analysis-based harmonic functions to calculate annual cycle, thus remain a problem, i.e., using linear functions to fit nonlinear data (e.g. temperature) that may induce spurious signals. In order to overcome this shortcoming, a newly developed temporally local analysis method-Ensemble Empirical Mode Decomposition (EEMD) is used to extract annual cycle from the surface air temperature (SAT) data.
Daily observational SAT data during 1951-2004 in China are used here. EEMD method is applied to extract the modulated annual cycle (MAC) component from SAT data in each selected station and the corresponding amplitude of MAC in each station is further calculated. EOF analysis is applied to all the MAC amplitudes. The results show that the first principle component (PC) exists a distinct decreasing trend before late-1980s, which is well-recognized by previous observations and model results, however, from late-1980s on, it reverses to increasing trend. This decadal change may be due to the solar dimming/brightening shift.
The "earlier onset of spring" phenomenon is used as an example for estimating the phase change of MAC of SAT and Beijing station is used as a case study. EEMD method is applied to quantify the changes of spring onset date associated with annual cycle change and with the low frequency (warming) trend from the daily SAT record during 1951-2007. We find the cold surges in February can serve as a potential predictor of the onset date of spring every year. Moreover, the earlier onset of spring related to natural variability and greenhouse -induced warming trend are tentatively separated.

Mo. 16:25 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Simulation of Soil Moisture and Its Variability in East Asia

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Soil moisture and related hydrological process play an important role in regional and global climates. However, large-scale and long-term observation of soil moisture is sparse. In this study, the latest NCAR Community Land Model is used to simulate regional soil moisture in East Asia for recent 25 years with the atmospheric forcing provided by NCEP/DOE reanalysis. A 50-year simulation has been conducted with the first 25 years as the model spins up for soil moisture to reach steady state. The last 25 years simulation provides a soil moisture dataset with physical consistency and spatio-temporal continuity. Our analysis focuses on spatial and temporal variability of the regional soil moisture based on the last 25-year modeling. Additionally, The trend in the regional soil moisture and its possible link to climate warming is examined. The main conclusions can be summarized as follows: 1. Simulated soil moisture exhibits clear sensitivity to its initial condition. Such sensitivity is a function of soil depth. This study indicates that the equilibrium time of soil moisture increases with the depth of soil layers. It takes about 20 years to reach equilibrium below 1.5m. Therefore either a longer spin-up (20 years or more) or accurate initial soil moisture is necessary for a quality land surface modeling. 2. In comparison with the reanalysis and in-situ measurements, the model reproduces the observed large-scale structure reasonably well. The simulation shows mesoscale spatial variation as well. 3. Linear trend analysis shows that soil has become drier in most areas of East Asia in recent years except southern China and the Tibetan Plateau where soil gets wetter. Further analysis indicates that such dry trend may have a close link to warming surface climate through enhanced evaporation.
Key words: Soil Moisture; Land Process Model; Simulation; East Asia

Mo. 16:30 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Climate change in the Loess Plateau of China and its affection to apple suitable region

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1 The fact of climate change in the Loess Plateau of China In recent 50 years, the major trend of temperature in the Loess Plateau is increasing. The abrupt climate change event occurred in the middle of 1980. Before this event, the temperature decreased slowly and the lowest temperature appeared in 1984. After this event, the temperature increased obviously and the highest temperature appeared in 1998. On the contrary, the trend of average total amount of cloud appears decreasing tendency when compares with the temperature. They appear negative correlation obviously, which amount of cloud's increasing(decreasing) corresponds to temperature's decreasing(increasing). For low cloud and high cloud, they have similar decreasing tendency. So, sunshine hours in the Loess Plateau increase. 2 Affection of climate change to apple growth For the Loess Plateau region, the main characters of climate change is increasing temperature, especially in winter and spring. The flowering stage of apple is ahead of 20d since 1990 because of warm winter and spring. Through further analysis, warm winter often accompanies strong temperature drop in following spring. During 2001-2007, there are 6 warm winters in the apple suitable region in the Loess Plateau, which occurred 33 strong temperature drops in 5 years and the flowering stage met strong temperature drop in 4 years. So, although on the background of global warming, the freezing injury events by strong temperature drop in flowering stage increase obviously. 3 Affection of climate change to apple suitable region Apple production needs suitable ecological and climatic condition. At present, apple suitable region in Shannxi province is in southeast of the Loess Plateau about south of 37°N. The suitable meteorological condition, soil(neutral or little acid soil with loose texture and thick layer), topography. Based on above conditions, the ecological and climatic conditions in other regions become better for apple growth with the global warming. By comprehensive analysis of the change in climate resource, a conclusion about apple suitable region extending to northward can be drawn out.

Key words: The Loess Plateau; Apple; Cloud; Temperature

Mo. 16:35 Climate Change session room
Modern Climate Processes, Dynamics and Extremes

Future Change in Precipitation Intensity of Baiu Rain Band Simulated by CMIP3 models

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The reproducibility of precipitation intensity by the Couple Model Intercomparison Project 3 (CMIP3) models was investigated for the East Asia summer monsoon rain band "the Baiu rain band". The Simple Daily precipitation Intensity Index (SDII) in June and July are calculated for the last ten years of 20th Century Climate in Coupled Models (20C3M) simulations with respect to sixteen CMIP3 models. For the verification of simulated precipitation, we used the one-degree daily data of Global Precipitation Climatology Project (GPCP). Models tend to underestimate precipitation intensity. One of the highest horizontal resolution models shows relatively higher reproducibility compared with lower horizontal resolution models, but the advantage of higher resolution models over lower resolution models was not evident. Models with higher reproducibility of precipitation climatology tend to show higher reproducibility of precipitation intensity. Future change in precipitation intensity was investigated by the global warming projections for green house gas emission scenario A1B. Target period is 10 years from 2091 to 2100. After selecting five models with higher reproducibility of precipitation intensity for present-day climate, ensemble average was calculated. Precipitation intensity increases over the Yangtze river valley, the East China Sea and western part of Japan.

Mo. 14:00 Public Health session room
Infectious and Vector-borne Diseases

Bioinformatics applied to infectious diseases

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To face up to the threat of emerging infectious disease, one of the major challenge is to understand the molecular mechanisms of pathogenesis, host immunity, environmental adaptation in pathogens and drug resistance. The objective is to facilitate the development of therapeutics, diagnostics and vaccines to combat the diseases. With the recent advances in high-throughput experimental technologies, bioinformatics has an essential role in deciphering the vast amount of data generated and in organizing information gathered from traditional biology. Applied to the study of infectious diseases, bioinformatics permits a gene survey of related biological sequences, which consists of molecular characterisation, structure prediction, phylogenetic analysis and regulatory motif prediction. Bioinformatics has also become an integral part of the investigation of the biological complexity of host-pathogen interactions. For example, the increasing number of genome sequences available in public databases, produced by novel sequencing technologies, not only enhances studies of biodiversity and molecular epidemiology but also allows to explore the dynamic processes of co-evolution in host-pathogen systems. During the last decade, a variety of other experimental systems have been developed allowing bioinformatics analysis at the genome scale giving insights into host responses against pathogens such as microarrays for transcriptional or protein expression profiling, genetic screening systems like the yeast-two-hybrid system used to identify pairwise protein interactions and novel mass spectrometry approaches. The integration of system-wide approaches, including transcriptomics, metabolomics, proteomics and high- throughput techniques, increases understanding of the fundamental mechanisms leading to the development of innovative strategies to deal effectively against infectious diseases.

Mo. 14:20 Public Health session room
Infectious and Vector-borne Diseases

PacNet: An Early Warning System to Prevent and Control Outbreaks of Infectious Diseases in the Pacific Islands

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The PacNet list was created in April 1997 as a service of the Pacific Public Health Surveillance Network, to enable timely exchange of information on outbreak-prone infectious diseases present in or threatening the Pacific Island Countries and Territories, and ultimately to serve as an Early Warning System.

It is a self-moderated discussion list open only to health professionals, and includes a significant number of experts in various areas, e.g. infectious diseases, surveillance and response, laboratory technology.

In numerous instances, the list has shown its usefulness through raising awareness and preparedness. This was demonstrated during the SARS crisis in 2003, and this is also true for the present exchange of information between countries regarding their respective experience with dengue fever.

PacNet has also proven its robustness, given its simplicity and accessibility that are key elements for effective communication.

Another list called "PacNet-restricted" was launched in December 2000, to allow not-yet verified information on outbreaks to be circulated as early as possible amongst the Pacific Island Departments or Ministries of Health. The aim of this restricted list, that complements PacNet, is to preserve timely alert and preparedness regarding outbreaks possibly threatening the Pacific Islands, together with a higher degree of confidentiality.

Mo. 14:40 Public Health session room
Infectious and Vector-borne Diseases

Leptospirosis as a major public health concern in New Caledonia: the need for a multidisciplinary approach

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Leptospirosis is a zoonosis of worldwide distribution with major incidence in the tropics, notably in New Caledonia. The Institute Pasteur in New Caledonia (IPNC) is the local reference laboratory for diagnosing human leptospirosis and has been studying this disease for years, notably developing and implementing efficient molecular diagnostic tools. At the same time, an expertise on this disease has led to numerous studies on epidemiology and virulence mechanisms of pathogenic leptospires. Because leptospirosis is a complex pathology involving reservoir hosts, environmental sources of infection and susceptible mammals (including Man), IPNC has launched a multidisciplinary research programme on this disease.

One research theme is aimed at a global understanding of the epidemiology of leptospirosis in New Caledonia using molecular tools to characterize pathogenic Leptospira associated with humans, animal reservoirs, susceptible hosts and environmental samples. Microbiologists, epidemiologists and mammalogists work together in a pilot zone of high endemicity.

The World Health Organization points to the need for an accurate, rapid and simple diagnostic test for leptospirosis available in poor resourced settings. Therefore, another theme of our research aims at developing such a test that could be used within minutes in low-technology health centers.

Finally, there is also a need for a better knowledge and understanding of the immune response during acute leptospirosis. Actually, the host response possibly contributes to severe forms of the disease, notably to multiple organ failure responsible for lethal outcomes. Therefore, a program aiming at identifying the cytokine response to Leptospira infection in a hamster model is underway. Preliminary results point to several factors that correlate with a fatal outcome and could be used by clinicians as decision-helping parameters. A clinical study for validating these indicators in humans is scheduled.

An efficient surveillance of human leptospirosis will be the basement of this global programme.

Mo. 15:00 Public Health session room
Infectious and Vector-borne Diseases

Why contact tracing in TB is important for Pacific islands

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Pacific islands discussed in this presentation refer to 20 Pacific island countries and territories (PICT) with a total population of just over 3 million people. Overall TB rate increased from 49 to 53 per 100,000 population between 2000 and 2006 with TB rates varying widely between countries from less than 10 per 100,000 in Cook Islands (∼15,000 pop) to 400 per 100,000 in Kiribati (∼93,000 pop). More than 30% of TB cases are found in the age group 0-24 years suggesting on going active transmission in the community.

PICTs endorsed and implemented DOTS strategy in 2000 and achieved over 85% Treatment success rate and 70% Case detection rate in 2005. Despite good performance, active transmission of the disease continues to increase. To date, no formal contact investigation has been performed in any country and there are no standard treatment protocols on INH prophylaxis.

Given the increasing incidence of TB in children in the island communities and the lack of a standardized approach to contact investigation, a well designed approach was recommended beyond DOTS in selected countries where DOTS programs are well established and where resources are available.

In October 2007, a pilot training course was conducted to teach contact investigation skills to participants from 10 Pacific island countries. Participants who attended the course helped establish guidelines and recommendations for the region. Course evaluations indicated participants gained knowledge and skills that could help them implement contact investigation. This course could be taught in other resource limited regions to implement contact investigation.

Mo. 15:20 Public Health session room
Infectious and Vector-borne Diseases

Multidrug-resistant tuberculosis in the Pacific

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Multidrug-resistant tuberculosis (MDR-TB), defined as TB resistant to at least isoniazid and rifampicin, is posing a substantial threat to TB control in the Pacific Island countries and territories (PICTs), due do its complex diagnostic and treatment challenges. If available data indicate overall low level of drug resistance in the southern Pacific, the resistance levels are already alarmingly high in some PICTs, especially the Micronesian. Recent survey data from Northern Mariana Islands show a prevalence of MDR-TB among new TB cases as high as 11.1%. Chuuk State of the Federated States of Micronesia (FSM) recently experienced an MDR-TB outbreak with six laboratory confirmed MDR-TB cases resulting in four deaths and a total of six patients currently isolated for treatment of MDR-TB with IV and oral medications. Four MDR-TB have also been reported since 2005 on Ebeye, a small islet in Kwajalein atoll, Republic of Marshall Islands. Most of the cases have been managed on an informal basis, and major constrains have been timely provision of second-line drugs, long-term management of patients on isolation and laboratory services support. Hence, there is an urgent need to support the development of a framework of response to drug-resistant TB in the Pacific that will link the three critical aspects of case management of drug-resistant TB, i.e., laboratory services, technical/clinical support for case management, and the timely provision of second-line drugs.

Mo. 15:40 Public Health session room
Infectious and Vector-borne Diseases

Implementing Molecular Tools to Quickly Detect Arboviruses Introduction in French Polynesia

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To date, dengue viruses are the only arthropod-borne viruses (arboviruses) ever identified in French Polynesia. They belong to the genus Flavivirus and are transmitted by mosquitoes, principally Aedes aegypti. Since 1944, twelve dengue outbreaks have occurred in French Polynesia, caused each time by one of the four dengue serotypes. These epidemics were either due to the introduction of a new dengue strain or to the re-emergence of a strain that has caused an outbreak in the previous years. The Institut Louis Malardé (ILM) has contributed to the local dengue surveillance effort for many decades by using more and more effective tools, particularly the classical semi-nested RT-PCR implemented at ILM since the 90's. However, efficient dengue surveillance requires the ability to quickly identify new viral introductions and new foci of dengue cases and thus, requires the constant improvement of new tools such as the faster and more sensitive real-time RT-PCR. Besides, with the increase of worldwide exchanges, French Polynesia is also threatened by the potential introduction of other emerging arboviruses. Hence, to anticipate the risk of diseases emergence, we implemented classical RT-PCR and/or real-time RT-PCR to detect the Flavivirus, Alphavirus or Phlebovirus genera. In addition, we developed specific RT-PCR detection tools against the Chikungunya and West Nile viruses, respectively members of the Alphavirus and Flavivirus genera and both of potential high risk for French Polynesia. Moreover, mosquito-spiked external positive controls were tested to further validate the use of these new tools in field-captured mosquito pools. Furthermore, non-dengue related arboviruses might have circulated undetected in French Polynesia. We have thus investigated the presence of antibodies against a range of arboviruses in the sera of people living in the 5 archipelagoes of French Polynesia. The results of this serological screening will condition the implementation of additional specific RT-PCR detection tools.

Mo. 16:30 Public Health session room
Infectious and Vector-borne Diseases

Population genetic study of variants of genes conferring resistance to severe dengue disease

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Dengue virus (DENV) is an emerging mosquito-borne pathogen that produces significant morbidity worldwide resulting in an estimated 50-100 million cases annually. DENV causes a spectrum of illness ranging from inapparent disease to life-threatening hemorrhagic fever and shock. The varied DENV disease outcome is determined by complex interactions between immunopathologic, viral, and human genetic factors.

Dengue disease is most severe in South East Asia, milder in South America and Pacific region and rarely reported in Africa where both vector and virus are presence. Although the difference in disease severity could be explained by several factors including viral genotypes and epidemic vs endemic transmission, population genetic difference could be one possible factor.

In this report, we investigated population genetic differences of polymorphisms found associated with protection against severe dengue disease including DC-SIGN-336 G allele (Sakuntabhai et al., Nat Gen, 2005). We found that resistance alleles showed higher frequency in African population and less frequent in South East Asian comparing to the Caucasian. High frequency of these resistance gene variants in African population could be one of factors explaining that severe dengue disease is rarely reported in Africa.

Mo. 16:50 Public Health session room
Infectious and Vector-borne Diseases

History and particular features of dengue epidemiology in French Polynesia

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In French Polynesia, like in most tropical and subtropical regions of the world, dengue fever is still a major public health concern. Since the middle of the last century, French Polynesia has experienced twelve epidemics caused by all four dengue virus serotypes. Nine of these epidemics occurred after the introduction of a new viral strain, originated from the Americas, South East Asia or the Pacific: DEN-1 (1944, 1975, 1988, 2001), DEN-2 (1971, 1996), DEN-3 (1964, 1989), DEN-4 (1979). The three other epidemics were caused by strains already implicated in the previous outbreak: DEN-3 (1969), DEN-4 (1985) and DEN-1 (2006). The dynamic of dengue epidemics in French Polynesia seems to be driven by particular events. The introduction of a dengue serotype that hasn't circulated for years in the area causes an epidemic. After the outbreak, the virus can persist for years (endemic strain), however, if a new serotype is introduced and causes a new epidemic, the endemic strain will be totally replaced in few months (persistent co-circulation of multiple serotypes has never been reported). In the absence of new viral introduction, the endemic strain can re-emerge and cause a second dengue outbreak five to six years later. By collecting all available data related to past and recent dengue epidemics (epidemic duration, number of cases, epidemic severity, season of outbreak, attack rates per age,...), we investigated whether the epidemiological pattern of dengue in French Polynesia can be related to the particular geographical (insularity and high distance from continental countries), eco-biological (climate, presence of endemic vectors) and sociological contexts (relatively stable human flows). Because the Pacific Island Countries (PICs) share most of the French Polynesian particularities, the identification of the events and factors characterizing the epidemiology of dengue in French Polynesia would contribute to a better understanding of dengue epidemiology in the PICs.

Mo. 17:10 Public Health session room
Infectious and Vector-borne Diseases

Targeting Mosquito Vector Populations To Curb Disease Transmission In the Pacific

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Although the diversity of mosquitoes found in French Polynesia and in much of the South Pacific is relatively limited, most of the species like Aedes polynesiensis and Aedes aegypti that have invaded the Pacific islands are known vectors of human diseases such as lymphatic filariasis (LF) and dengue respectively. Despite seven years of anti-filarial drug distribution through the Pacific Elimination of Lymphatic Filariasis (PacElf) programme, lymphatic filariasis remains a serious public health concern in French Polynesia, particularly in the Society islands and the Marqueses, with a high risk of resurgence when the programme will end. To ensure the success of the global LF elimination campaign supplemental control strategies are thus required. Because they are obligate vectors, mosquitoes provide additional targets that can complement existing anti-filariasis strategies. However, conventional control methods are inefficient against Aedes polynesiensis. thus precluding the use of otherwise efficient control approaches like insecticide-treated bednets, or indoor residual spraying. Such paucity in the arsenal of tools available to control Ae. polynesiensis raised the interest in innovative (bio)control strategies. An international research programme was initiated recently in French Polynesia to bring these novel technologies closer to the field to control and perhaps eliminate naturally isolated populations of mosquito disease vectors This integrative research programme will aim at developing and testing biological and insecticidal approaches, culminating in a field trial with Ae. polynesiensis elimination as the goal. If proven successful, this integrated vector control strategy would ideally complement the ongoing MDA campaign to effectively break the disease transmission cycle in regions where Ae. polynesiensis is the primary vector of LF. The demonstration of an epidemiological impact on the transmission of a disease would likely encourage the development and implementation of sustainable vector control strategies to other regions of the Pacific where mosquito-borne diseases occur.

Mo. 14:00 Culture and Politics session room
Conférence plénière Culture et Politique : les défis de la modernité - Keynote lecture on Culture and Politics: The Stakes of Modern

Sacrifices from AFAR: from first encounter to the future

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During their first meetings with those harbingers of modernity - the European explorers from Britain, France and Spain - and into the present, Tahitians and other islanders have drawn upon ancestral power in order to shape the future.
This paper discusses various strategies used by Tahitians in those early exchanges, and later continuities and ruptures in the transmission of ancestral practices and knowledge.
With reference to Tahitian prophetic chants and Walter Benjamin's image of the 'Angel of History,' the paper concludes by addressing the philosophical relationship between ideas such as mana and tapu and the Western concept of 'cultural heritage,' and the implications of how we think about the past for imagining possible futures."

Mo. 14:45 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

The sacred complex of 'Te Pô': Polynesian heritage and the cultural landscape of the Opoa Valley, Raiatea

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A three year research project, initiated by the Na-Papa_E-Vau association of Raiatea, is mapping the Polynesian cultural landscape of the 'Opoa Valley, Raiatea Island, French Polynesia. The research is documenting the layered cultural landscape of the valley using oral traditions, anthropological, historical and archaeological evidence. The valley is an elusive tapestry of present and past, tangible and intangible and at its heart is the sacred complex of 'Te Pô' and the great Taputapuatea Marae, the centre of Polynesian navigation in the 18th century. The research aims to record the layers of the landscape to provide the basis for a proposed future nomination of the valley for inscription on the World Heritage List and sits within a wider collaborative project re-establishing historical links between Polynesian communities in French Polynesia, Hawai'i, Rapanui, Aotearoa/New Zealand and the Cook Islands through voyaging and navigation traditions. This paper presents the outcomes of the first year of research and the process of cultural twinning with communities across the Polynesian triangle.

Mo. 15:15 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

The Treasures in the Storeroom

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Most museums with Tahitian collections have left them largely unexhibited, unpublished and unexplored. These objects, which number in the many thousands, range from the sacred to the everyday, from archaeological finds to contemporary art. They are treasures in their own right as well as being exceptional documents of Tahiti's past, holding ongoing insights and potential for Tahitians now. They attest to Maohi ways of living in the world, living with their ocean, and, through the trajectories the objects have traced from island to museum, they uncover histories of exchanges that stretch from the eighteenth century to the present day.

Tahitians today are inclined to see objects in museums as being out of reach. Some see the Musée de Tahiti, despite its exciting and well-contextualised program of exhibitions, as a useful repository for old things that are too potent or difficult to keep at home - rather than as a place to visit or engage in. Many of the world's museums are starting to actively open up their collections, providing ways for communities to connect to their heritage. With access becoming easier, these objects could be informing, inspiring and contributing more vibrantly to the current renaissance of cultural practice in the Society Islands. Museum objects are not the sole preserve of curators.

In this paper, I survey Tahitian collections in major institutions around the world. I explore examples of the ways objects from Tahiti (as well as more broadly from the Society Islands) have been presented and put to work in exhibitions, publications, artworks and projects of reconstruction and re-enactment. I also suggest potential ways forward for future deployments of these extraordinary collections.

Mo. 15:45 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

La renaissance symbolique des courses de pirogues polynésiennes en haute mer. Entre enjeux culturels, identitaires, nationaux et autonomistes

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C'est peu après l'instauration du Protectorat français de 1842 sur l'île de Tahiti, que l'administration coloniale de la Marine institutionnalise des courses de pirogues afin d'animer ses toutes nouvelles fêtes patriotiques. Depuis, la tradition de courses annuelles de va'a s'est pérennisée et affirmée, permettant ainsi aux techniques corporelles ancestrales ma'ohi de rester vivantes. Dans les années 1970, suite au bouleversement culturel induit par l'installation du Centre d'expérimentation nucléaire français, ces courses de va'a acquièrent une coloration plus symbolique en cristallisant les affirmations identitaires de la communauté ma'ohi. Les Polynésiens se réapproprient alors l'organisation de ces pratiques et les transforment en infléchissant les épreuves vers la haute mer. Cette orientation sportive vers l'océan, vers la "mer patrie" des ma'ohi, est donc avant tout une construction symbolique où le développement spectaculaire des courses marathon au large exprime concrètement la ré-appropriation des traditions anciennes. Sur le plan politique, le Territoire de la Polynésie française accède à une autonomie sans cesse élargie tandis que, selon un processus classique dans le champ du sport, acteurs politiques et instances territoriales, voire nationales, entreprennent d'instrumenter à leur profit les puissantes représentations symboliques du va'a. Ainsi, en 1986, Gaston Flosse, secrétaire d'Etat "aux problèmes du Pacifique Sud", favorise la structuration sportive internationale naissante des courses de pirogues, avec le dessein de réhabiliter régionalement l'image de la France (ternie par le scandale du Rainbow Warrior). Parallèlement de grands rassemblements culturels sont organisés pour retisser les liens symboliques du Triangle polynésien. La singularité majeure de ces courses de pirogues, créées par le pouvoir colonial en tant que facteur d'assimilation des valeurs patriotiques, est donc,paradoxalement, de devenir un symbole d'expression des aspirations communautaires. Cette analyse des étapes de la structuration sportive moderne du va'a révèle les enjeux des politiques culturelles ainsi que leurs modes d'instrumentalisation. Des visées électoralistes locales aux desseins de politique internationale soucieux de retisser des liens culturels dans la région Pacifique, l'image sportive de la pirogue s'affirme comme un ancrage identitaire et symbolique signifiant.

Mo. 16:15 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Va'a, la résurrection médiatique de la pirogue polynésienne

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En 1975, lorsqu'une équipe de piroguiers tahitiens part à Hawaii pour y concourir à la fameuse course hauturière Molokai, les médias assimilent ce challenge sportif à une "redoutable aventure océanienne". "La course, lit-on, se court sur 75 kms dans des conditions particulièrement épouvantables. Le chenal entre Molokai et Honolulu est exactement dans l'axe des alizés et l'on assiste parfois au phénomène impressionnant de vagues qui vont contre le vent, créant une mer confuse et dangereuse". En exaltant ainsi l'image des piroguiers du fenua, quittant les eaux calmes du lagon pour l'incertitude et les dangers du "Grand Océan", la presse ne relance-t-elle pas une nouvelle épopée de la conquête du Pacifique ? La même année, pressentant l'intérêt des lecteurs de souche polynésienne, le magazine Télé cocotier annonce qu'une expédition scientifique se prépare : "Prochainement, des Hawaiiens ferons revivre les grandes migrations polynésiennes du temps passé. Okule'a, une pirogue double, a été construite et, d'ici 1976, les hommes qui s'entraînent au régime alimentaire des anciens navigateurs maori, seront prêts". Devant l'audience obtenue sur le sujet, le magazine entreprend alors de populariser les connaissances historiques et scientifiques, jusque-là réservées à une élite cultivée. Au demeurant, les événement médiatiques se bousculent : arrivée triomphale d'Okule'a, victoires sportives mythiques, désignation du va'a comme emblème central du drapeau polynésien, politiques culturelles ciblées autour de rassemblements internationaux de grandes pirogues anciennes ou, encore, création de la très populaire course marathon Hawaiki Nui Va'a (qui, depuis 1992, relie symboliquement les îles Sous-le-Vent). Cette étude analyse comment les médias ont traité les informations relatives au va'a, recréant ainsi une tradition et participant de facto à la construction d'une nouvelle identité ma'ohi. Par-delà les eaux de la Polynésie française, cette image renouvelée du va'a concourt à la redécouverte des liens et des valeurs qui fondent les cultures du Pacifique.

Mo. 16:25 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Culture, identity and patrimony: Questioning the past in Tahiti

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At the beginning of the 21st century, the cultural heritage has become a major stake in Tahitian society. From the seventies we have seen a re-evaluation of some pre-Christian activities condemned by churches like dances and tattoo. Along with the Tahitian language these practices have become the main indicators of Tahitian identity in the Polynesian world today. Nevertheless if the identity discourses often represent the ancient Tahitian society as a golden age, the relation to the past is more ambiguous because in this strong Christian island it refers to a pagan time. Despite of that, a grass root movement structured in associations and engaged in identical claiming, has tried to revalorize the cultural heritage by means of ceremonies largely filled with pre-Christian references. They claim for reconciliation with the ancestors and with the past. They also hope for a cultural awakening of the society. These last years the social status of these associations has improved and they have influenced the political community who tried to determine a new cultural and patrimonial public policy. In this way, the number of cultural manifestations has increased and some of them became official like the Matari'i i nia celebration. Matari'i is the Tahitian name for the Pleiades and the rise of this constellation indicates the traditional New Year Eve. In this context of revitalization this paper will try to investigate how the actors of the cultural life in Tahiti (especially the government cultural agencies, the cultural associations and the Churches) reshape the local "stage setting" of patrimony, culture or tradition and what this phenomenon reveals about the evolution of the relationship the Tahitians have with their pre-Christian past.

Mo. 16:50 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Touristic Encounters: Imaging Tahiti and Its Performing Arts

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Tahiti, in the 21st century, has turned its eye increasingly to the expanding global markets of international tourism. As the country endeavors to position itself as an important and desirable destination, tourism has also become a focal point of French Polynesia's plan for modern economic development.

The nature of contemporary tourism is such that the complexity of this global market demands an increased differentiation of products that retain and promote the uniqueness of the destination point. Vitally important to many island nations, tourism as distinctiveness is also of particular interest to ethnomusicologists. Looking at what Gillian Youngs calls "the interconnections between tangible and intangible products and services," this paper looks at the role of music and dance in contributing to notions of cultural product and considers the ways in which the performing arts contribute to the uniqueness of a particular place.

In viewing music and dance as a part of the larger product of tourism, this paper explores the way Tahiti constructs tourism, markets ideas of cultural distinction, and turns the ephemeral arts of performance into tangible experience. I first discuss the imaging of Tahiti, the promotion of difference, and the shifting tourist gaze to see how tourism aligns with both a changing global market and Tahitian definitions of their arts. Then, taking a cue from Edward Bruner's view of touristic encounters as social performances in their own right and without a need for authenticity, I look to music and dance as events where tourists encounter and experience local performative culture.

Mo. 17:15 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Les initiatives endogènes dans le système touristique polynésien

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Beaucoup d'analyses scientifiques présentent un tourisme subi par les sociétés locales exclues du système touristique. Cette interaction tourisme/société locale réduite à la problématique de l'impact est à remettre en question en Polynésie française. Le tourisme y a été impulsé dans les années 1960 et reste en partie structuré par des acteurs exogènes. Néanmoins, des acteurs endogènes ont investi le système touristique. En effet, le développement de l'hébergement chez l'habitant et des activités touristiques proposées par des locaux montre que le tourisme peut être choisi. Ces initiatives endogènes pionnières induisent une extension de l'espace touristique polynésien, en offrant des infrastructures dans des îles ou parties d'îles qui en étaient dépourvues et permettent ainsi à des espaces isolés et dépourvus d'autres activités, devenus touristiques, une intégration au territoire polynésien. Ces initiatives introduisent également une complexification des jeux d'acteurs entraînant des recompositions territoriales : hétérogénéité des acteurs locaux et de leur investissement, ascension sociale ou confirmation d'une hiérarchie sociale, renforcement des effets de réseaux (“ dynasties ” touristiques), rivalités ou complémentarités touristiques à l'échelle familiale, intra-insulaire et interinsulaire, amplification ou atténuation des inégalités socio-économiques et territoriales selon les échelles. Certes le tourisme participe aux dynamiques culturelles, sociales et territoriales, mais il est un vecteur de changement parmi d'autres : les moyens de télécommunication modernes sont un facteur de changement socioculturel puissant. Le tourisme est d'autant moins imposé que les initiatives des acteurs endogènes dans le système touristique polynésien sont doubles : en tant qu'acteur professionnel touristique et en tant que touriste local.

Mo. 14:00 Economy session room
Exchange Rates and Macroeconomic Policies

Quel ancrage monétaire pour le Franc Pacifique et la Polynésie française ?

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La question du régime monétaire est importante pour un pays comme la Polynésie française car les implications en termes de politique économique seront différentes en fonction du régime monétaire. En effet, si le passage à l'euro est évoqué dans les 3 collectivités territoriales du Pacifique, seule la Polynésie française s'est prononcée favorablement, la Nouvelle- Calédonie et Wallis-et-Futuna se trouvent dans une situation mitigée, dans la mesure où la Nouvelle-Calédonie est inscrite dans un processus d'émancipation institutionnel et que Wallis-et-Futuna suivrait les décisions calédoniennes. L'objectif de ce papier est de s'interroger sur la meilleure stratégie qui s'offre à la Polynésie française dans un contexte économique international défavorable. En effet, le Franc CFP a un ancrage nominal fixe avec l'euro, celle-ci souffre d'une crise internationale, l'euro est une monnaie forte et le dollar ne cesse de se déprécier. Dans un contexte économique défavorable et de crise financière mondiale, la Polynésie française doit s'interroger sur les avantages et les inconvénients de son accrochage à l'euro. Par conséquent, l'article essaiera de répondre aux enjeux qui s'offrent à la Polynésie française, un territoire vaste comme l'Europe (5 millions de Km2 Zone Economique Echange) mais éloigné de ses principaux partenaires commerciaux (à 18 000 km de Paris ou à 7 500 km de Los Angeles).

Mo. 14:15 Economy session room
Exchange Rates and Macroeconomic Policies

Taux de change réel du franc CFP et commerce extérieur de la Polynésie française

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A partir de données portant sur la période 1959-2004, ce travail étudie les déterminants du taux de change réel du franc CFP par rapport au dollar américain et par rapport au franc français, puis à l'euro. Les effets des variations du change réel sur les principales composantes des exportations et des importations sont évalués. L'étude permet de conclure sans ambiguïté à une surévaluation du FCFP. Il est montré toutefois qu'une tentative de rééquilibrage par une dévaluation lors du passage à l'euro risque de générer des effets inflationnistes désastreux. La marche vers un taux de change réel plus favorable à un équilibre des transactions courantes moins dépendant des transferts en provenance de la France passe plutôt par une recherche de gains propres de productivité et d'efficacité dans l'affectation des ressources et le fonctionnement de marchés plus concurrentiels.

Mo. 14:45 Economy session room
Exchange Rates and Macroeconomic Policies

The Impact of Exchange Rate Arrangements on Bilateral Trade: the Case of Oceania

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The twenty-two Oceania island countries (OICs) exhibit an endemic paradoxical feature: an obvious diversity prevails among their local currencies, in terms of the degree of fixity of the exchange rate (from administrated floating to formal dollarization), as well as in terms of the reserve-currency (which is either the euro, the US, Australia, or New Zealand dollar, or a composite of these currencies plus the Japanese Yen). Since OICs are small open economies, the impact of currency arrangements is questioned from a trade viewpoint, and takes on two particular dimensions: the role of the reserve-currency and the role of the degree of fixity of the exchange rate.

Based on a classification of Oceania currency zones and on empirical evidence, this paper aims at providing robust estimates for the relative promoting trade effect of the exchange rate arrangements which actually prevail among OICs. Thanks to an original panel database covering the direction of trade and national accounts of OICs from 1980 to 2006, several variants of the gravity model are estimated.

The analysis shows that hard currency arrangements are associated with higher bilateral trade with both the reserve-currency country as well as with the other member countries of the Oceania currency zone considered. Currency arrangements induce asymmetric effects on both directions of bilateral trade with non Oceania countries. Moreover, the pro-trade effect of fixed exchange rate regimes is all the more sizeable that colonial ties and formal trade integration are deep.

This paper comes within the scope of the literature on the link between exchange rate regimes and trade integration, which results are confirmed in the specific case of Oceania. I intend to shed light on the perspective of a deepening in Oceania regional integration via a process of monetary integration based on the emergence of a common reserve-currency for Oceania.

Mo. 15:15 Economy session room
Exchange Rates and Macroeconomic Policies

Aid and Dutch Disease in the South Pacific

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The impact of aid inflows on relative prices and output is ambiguous. Aid inflows that increase domestic expenditure are likely to cause real exchange rate appreciation, ceteris paribus. However, if this expenditure raises the capital stock in the traded goods sector, then output in this sector might not contract, at least in the steady state. Moreover, if investment in the nontraded goods sector is relatively high and/or productive, then there is not necessarily any real exchange rate appreciation in the steady state. We use time-series data to examine the impact of aid inflows on output and real exchange rates in ten South Pacific island states, and find aid inflows to produce a variety of outcomes in economies of different kinds.

Mo. 16:15 Economy session room
Exchange Rates and Macroeconomic Policies

Accounting for changes in Australian development assistance policy in the Pacific

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Most explanations for the evolution of development assistance policies privilege the actions of rational agents motivated by desire for human development, 'national interest' or self-interest. According to these analyses, the changes in policy that can be observed stem from a learning process regarding economic development, changes in the distribution of state power or the interaction among self-interested actors. This paper argues, through an examination Australia's development policies in the Pacific since 1980, that important changes such as the professionalisation of Australia's aid programme following the 1984 Jackson report, the policy begun in 1994 of overtly demanding economic reform in exchange for aid, and the vastly more interventionist approach associated with 'Whole of Government' assistance from 2003 cannot adequately be explained in this way.

An alternative account can be derived through a historical institutionalist approach which takes as independent variables prevailing ideas about the nature of economic development and how to promote it, the interests associated with the delivery of development assistance, the institutions through which development policy is formulated and implemented, and the norms that govern state behaviour. In this analysis a shift in one or more of these factors is a necessary but not sufficient condition for a change in policy. In addition, for change to occur, historical circumstances such as a change of government, economic crisis, or dramatic event must provide an opportunity, and some actor the impetus. By providing such an account, this paper demonstrates that none of the situation in the Pacific, Australian national interest however conceived nor the self-interest of any player has had a determining impact on the form of Australian development assistance policies.

Mo. 16:45 Economy session room
Exchange Rates and Macroeconomic Policies

L'économie de la Polynésie française : Bilan et stratégie de développement
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Depuis 1995, date de l'arrêt définitif des essais nucléaires, la Polynésie française suit officiellement, avec l'aide de l'Etat une stratégie de développement tendant à diminuer la part des transferts publics de métropole dans l'ensemble de ses ressources extérieures, pour augmenter celle de ses ressources extérieures propres: Exportations, recettes touristiques. Cette stratégie n'a pas été entièrement couronnée de succès, malgré des débuts prometteurs entre 1995 et 2000.
Cette contribution tente de faire un bilan des résultats obtenus par rapport aux objectifs, et de réexaminer l'adéquation des politiques entreprises par rapport à la stratégie officiellement prônée de promotion des exportations de biens et de services. Le déficit des paiements courants, en Polynésie française comme en Nouvelle-Calédonie, est la contrepartie des transferts publics unilatéraux de l'Etat vers la collectivité. Ces transferts représentent de loin le premier moteur de l'économie. Leur effet multiplicateur et stabilisateur (en raison de leur progression régulière) est un atout, mais à long terme ils contribuent à un effet d'éviction sur le secteur privé (concurrence salariale, sécurité de l'emploi), qui peine à trouver de la main d'oeuvre et à la retenir en raison de l'attractivité du secteur public. Dans les faits, la politique économique a surtout maintenu des barrières protectionnistes élevées, à l'abri desquelles des monopoles et des oligopoles issus de la concentration extrême de certains secteurs obtiennent un pouvoir de marché quasi-illimité, générateur de rentes de situation. Ceci entretient un niveau des prix élevé, qui justifie des revendications salariales importantes. Ainsi, les secteurs directement exposés à la concurrence internationale (tourisme,perliculture,pêche), sont de plus en plus handicapés, leurs marges étant pincées par la hausse des coûts alors que leurs prix, souvent fixés en dollar, ne peuvent être réévalués. Or, dans une petite économie ouverte, ces secteurs devraient être les moteurs de la croissance. La politique économique menée n'a donc pas été jusqu'à présent cohérente avec les objectifs officiellement poursuivis. Pour finir, l'exposé proposera une réorientation de la stratégie économique de la collectivité pour faire face aux nombreux défis à venir.

Tu. 8:15 Ecosystems session room 1
Keynote lecture on Ecosystems, Biodiversity and Sustainable Development

Genetic Connectivity and the Origin of Tropical Reef Biodiversity
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Coral reefs underlie less than 0.1% of the world's oceans, but host a much higher proportion of marine biodiversity, including about a third of the marine fishes. In the face of an increasing human presence and diminishing resources, it is essential to understand how reef biodiversity is produced and maintained. Phylogeographic studies have provided several key insights by mapping the distribution of genetic lineages across reef habitats. First, genetic surveys demonstrate that reef biodiversity is higher than current estimates. A recent analysis of reef fishes revealed cryptic evolutionary partitions in eight out of 15 species. Second, life history may be as important as geography/oceanography in determining the extent of dispersal between reef habitats. Ecological specialists tend to disperse less than generalists, and species endemic to a single archipelago may also have limited dispersal. Third, coloration can be an uncertain basis for species designations, as some color-morphs are distinct evolutionary genetic lineages while others are not. Fourth, reef ecosystems may have a shallow evolutionary history, indicating widespread extirpation and recolonization in association with glacial cycles. Finally, the conventional model of allopatric speciation (by strict isolation) is not consistent with the dispersal of reef organisms, and speciation may occur along ecological gradients more than physical barriers. The high biodiversity of the Coral Triangle (Indo-Malay Archipelago) has been explained as either a center of speciation, or a center of overlap between Indian and Pacific faunas. Recent genetic studies indicate that speciation is occurring both in the Coral Triangle and at oceanic archipelagos, in a biodiversity feedback process that enhances overall species richness. Hence the coastal ecosystems of the West Pacific and island habitats of the Central Pacific are linked by an evolutionary process that enhances biodiversity in both regions.

Tu. 9:00 Ecosystems session room 1
Biogeography

Global phylogeography and seascape genetics of the lemon sharks (*Genus Negaprion*)

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Seascapes are complex environments, and populations are often isolated by factors other than distance. Here we investigate the role of coastal habitat preference in shaping the distribution and population structure of lemon sharks. The genus *Negaprion* comprises the amphiatlantic lemon shark (*N. brevirostris*), with a relict population in the eastern Pacific, and its Indo-West Pacific sister species, the sicklefin lemon shark (*N. acutidens*). Analyzing 138 individuals throughout the range of both species at the mitochondrial control region and nine microsatellite loci, we find evidence of allopatric speciation corresponding to the Tethys Sea closure (10-14 million years ago) and isolation of the eastern Pacific *N. brevirostris* population via the emergence of the Isthmus of Panama, (∼3.5 million years ago). There is significant isolation by oceanic distance ($R^2 = 0.94$, $P = 0.001$), defined as the maximum distance traveled at depths greater than 200 meters. We find no evidence for contemporary transatlantic gene flow (m, M = 0.00) across an oceanic distance of ∼2400 kilometers. *Negaprion acutidens* populations in Australia and French Polynesia, separated by oceanic distances of at least 750 kilometers, are moderately differentiated (F_{ST} = 0.070 - 0.087, $P < 0.001$; $\Phi_{ST} = 0.00$, $P = 0.99$), with South Pacific archipelagos probably serving as stepping stones for rare dispersal events. Migration between coastally linked *N. brevirostris* populations is supported by nuclear ($m = 0.31$) but not mitochondrial ($m < 0.001$) analyses, possibly indicating female natal site fidelity; however, philopatry is equivocal in *N. acutidens*, which has the lowest haplotypic diversity (h = 0.28) of any shark yet studied. Restricted oceanic dispersal and high coastal connectivity stress the importance of both local and international conservation efforts for these threatened sharks.

Tu. 9:15 Ecosystems session room 1
Biogeography

Influence of fragmentation on the connectivity of *Dascyllus aruanus* populations within three reef systems

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Marine protected areas (MPAs) have been shown to be efficient tools for the conservation and management of coral reefs and associated resources. The connectivity between populations is an essential parameter in determining the effective size and distance between MPAs. Therefore studies related to population connectivity of reef fish is of considerable interest for a better understanding in a context of marine biodiversity and resources conservation. However, recent studies concerning factors that govern population connectivity in marine fish provide contradictory results. These contradictions could be due to a lack of a direct comparison between the reef systems in which these studies were carried out and the spatial scales used. The goal of this study was therefore to compare the gene flow between populations of Dascyllus aruanus, a coral reef fish, in the context of habitat fragmentation. A continuous habitat (French Polynesia), a habitat with intermediate fragmentation (Fiji Islands) and a highly fragmented habitat (French Polynesia) were chosen to test our hypothesis. A total of 765 individuals were analysed using 10 polymorphic microsatellite loci. Results revealed a marked gradient of genetic diversity between systems with the highest allelic richness observed in New Caledonia and the lowest in French Polynesia. This underlines, for the first time, a positive correlation between the species diversity and genetic diversity in the marine realm. Results obtained showed that, in average, all the samples were genetically homogenous at a small scale (within a system), and a highly significant genetic differentiation exists at larger spatial scales (between systems). These results suggest that D. aruanus populations in a continuous habitat were highly connected, which holds as well for this species in a fragmented habitat at the spatial scales under study.

Tu. 9:30 Ecosystems session room 1
Biogeography

Ecological Importance of and Ethnobiodiversity of Parrotfishes (Scaridae: A Pacific Island Perspective

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Parrotfishes (Scaridae) are among the most common, diverse and prolific of reef food fishes and play critical ecological roles in marine ecosystems. Some species are also under threat from overfishing, and some may be among the best indicators of the health of our marine environment. This paper examines the diversity, ecological niches, conservation status, and the role of parrotfishes as indicator species of the health of our coral reef and nearshore marine ecosystems. Parrotfishes have major impacts on coral reefs through intensive grazing and associated bioerosion. Grazing patterns of large schools of parrotfish prevent algae from choking out corals. Many parrotfishes feed on coral and calcareous algae, contributing significantly to bioerosion and the creation of sediments on reefs, beaches and in lagoons and play a major role in determining the topography and resilience of reefs, lagoons and beaches in the face of climate change.. The paper also examines indigenous knowledge and the taxonomies for parrotfishes, which shows that most Pacific societies have in-depth knowledge of their ecology and distinctive names for different species and different growth or color. We suggest how indigenous knowledge, referred to as ethnobiodiversity, when combined with the most up-to-date knowledge, can provide a basis for better understanding of this ecologically and cultural important fish family, and how this knowledge can be applied to the conservation and sustainable use of marine biodiversity in the Pacific Islands. The results are based on studies in Ouvea, New Caledonia, Bellona, Solomon Islands and a number of areas in the Fiji Islands.

It is hoped that knowledge gained and experiences learned from local indigenous taxonomists will provide a basis for a marriage of traditional ethnobiodiversity and modern science as a foundation for a better understanding of parrotfishes and their role in ecological sustainability and improved management of coral reef ecosystems and fisheries.

Tu. 9:45 Ecosystems session room 1
Biogeography

Phylogeography of a Hawaiian endemic spiny lobster, *Panulirus marginatus*: Implications for management and biodiversity conservation

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Hawai'i has the highest level of marine endemism of any archipelago in the Pacific Ocean; hence, maintaining marine biodiversity in Hawai'i requires conservation of endemic species. The spiny lobster, Panulirus marginatus, is endemic to the Hawaiian archipelago and Johnston Atoll, and was once utilized by ancient Hawaiian ali'i in ritual ceremonies. In the late 1970s, a commercial fishery was initiated for Panulirus marginatus in the Northwestern Hawaiian Islands (NWHI), and within 20 years, lobster stocks there were depleted to unsustainable levels, and the fishery was closed. Small-scale commercial and recreational fisheries for this species exist in the Main Hawaiian Islands (MHI), but catch rates have declined since the 1950s. The Papahanaumokuakea Marine National Monument (PMNM), established in 2006, now provides an extensive harvest refuge area for this species in the NWHI. We investigated the potential for the PMNM to rejuvenate lobster populations in the Main Hawaiian Islands by examining population connectivity patterns and direction of gene flow throughout the Hawaiian archipelago. We sequenced a 664 bp fragment of the mitochondrial cytochrome oxidase 2 (COII) gene for over 300 samples from 10 islands and atolls throughout the archipelago. We discuss the management implications of our results, and compare our findings to connectivity patterns in a pan-Pacific congener, *Panulirus penicillatus*, which was not heavily exploited by the NWHI lobster fishery but has been targeted by MHI fisheries.

Tu. 10:30 Ecosystems session room 1
Biogeography

Biogeographical pattern of the French Polynesian marine flora: the case of Sargassum (Phaeophyceae, Fucales)

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The brown algae genus Sargassum (Phaeophyceae, Fucales) is worldwide distributed and recognized as one of the most diverse genus of the order Fucales. It is especially well represented in the tropical and intertropical Pacific where it shows a decreasing species richness from west to east. With about a thousand taxa described during the last 200 years and a complex and old classification, Sargassum species are difficult to identify accurately. In French Polynesia, Sargassum is the largest most conspicuous alga inhabiting reefs and lagoons surrounding the high volcanic islands of the Society, Austral and Gambier archipelagos. An assessment of Sargassum in French Polynesia was done through the critical revision of the literature, type specimens and specimens from type localities. Sargassum samples were newly collected and three speceis were identified on morphological characters. Phylogenetic analyses of the nuclear ITS-2, chloroplastic partial rbcLS and mitochondrial cox3 markers generated two clades and confirmed the recent divergence suspected between two closely related species. Although 18 different epithets have been attributed to French Polynesian Sargassum since 1828, only three species are recognized in this study. Most of these species were transferred into synonymy of S. pacificum, the only species present in the Society archipelago, while S. obtusifolium was restricted to the Austral archipelago and S. aquifolium to the Austral and Gambier archipelagos. The French Polynesian Sargassum flora shows both species with a large Indopacific distribution or more geographically restricted. Several hypotheses about the regions potentially involved as refuges during the Last Glacial Maximum, and from which actual floras could have dispersed and diversified, are discussed. The western Pacific region could represent a refuge for S. echinocarpum whereas the Pacific coast of America could have played the role of a refuge for S. obtusifolium and S. pacificum.

Tu. 10:45 Ecosystems session room 1
Biogeography

Dynamics and Conservation of the Coconut Palm *Cocos nucifera L.* in the Pacific Region: Towards a New Conservation Approach

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Coconut palms, long a symbol of tropical Pacific islands, play an important role in the environment, agriculture, culture and tourism. Through the International Coconut Genetic Resources Network, numerous countries and institutions are collaborating to conserve coconut germplasm and to make coconut a more profitable crop for smallholders. Recent studies, combining both diachronic and interdisciplinary approaches, provide a better understanding of the dynamics of the coconut genetic resources in the Pacific region. Some isolated islands were known by ancient Polynesians as varietal reservoirs for coconut landraces. From 1800 to 1950, the number of coconut palms was multiplied by 40 to 50. The landraces selected over thousands of years by the Polynesians were gradually diluted in the mass of coconut palms selected only for copra production. Successive cyclones have also severely damaged the coconut groves. The socio-economic changes that affected Polynesia also exacerbated the loss of both traditional knowledge and biological resources. Coconut landraces are now under threat from the globalization of trade, cultural leveling, changes in agriculture and climate. These studies lead us 1) to better locate the genetic diversity to be conserved; and 2) to conceive and promote a new conservation strategy, based on the use of smallest islands and isolated valleys to conserve coconut, other plants and fauna. One variety per species will be conserved on each islet. The geographical remoteness of the islets will ensure the reproductive insulation needed for true to type breeding of crop varieties conserved there. This unique mode of conservation does not fit the typical classification distinguishing In situ from Ex situ conservation. It more closely fits with the landscape spatial organization, the reproductive biology of the plants, the profitability of conservation, and traditional Polynesian practices linked to insularity. Numerous research questions remain to be addressed in the framework of this project.

Tu. 11:00 Ecosystems session room 1
Biogeography

Modes of speciation in a coral reef fish species complex

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Recent studies, seeking an answer to explain the mysterious biodiversity occurring on coral reefs has given promising insights, suggesting that ecological speciation, via selection pressure, may promote diversification. Coupling extensive sampling, a multilocus genetic approach (Mitochondrial control region and 13 nuclear microsatellites), morphological, ecological and behavioral data, we infer: (1) the species boundaries; (2) the geographical mode of speciation; and (3) the role of ecological pressure in speciation processes within the Dascyllus trimaculatus complex that comprises four described species: D. trimaculatus, D. auripinnis, D. albisella, D. strasburgi. Mitochondrial and nuclear phylogenies gave congruent and complementary results. The complex consists of seven genetically distinct entities that do not all differ morphologically. Despite the dispersion abilities of these fish, the genetic partitions were very likely to arise via genetic drift following an absence or reduction of gene flow in allopatry. Moreover, in spite of strong habitat specialization that theoretically would increase the selection pressure (inter and intraspecific competition), ecological speciation might not have been the primary factor involved in the diversification of the complex, given the frequency of the cryptic genetic partition in the complex. However, the ecological pressure resulting in speciation likely acted throughout periods of geographical isolation, leading for example to host shifts in the Marquesas (D. strasburgi) and Hawaii (D. albisella) (recruitment onto branching corals instead of anemones like in the rest of Indo-Pacific province) and color variations in D. auripinnis. This study mainly highlights the major role that barriers may have played in gene flow across oceans throughout time to create the species diversity we all can admire today.

Tu. 11:05 Ecosystems session room 1
Biogeography

Genetic connectivity in the sea cucumber *Holothuria atra* indicates that Johnston Atoll is a biodiversity bridge to Hawaii

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The coral reefs of the Hawaiian Archipelago are the most isolated in the world. This isolation has been a significant factor contributing to the high endemism and lower biodiversity in Hawai'i compared to reefs in the South and West Pacific. In order to test hypotheses about biogeographic connections that can drive biodiversity within Hawai'i, we examined the genetic population structure of the wide-ranging tropical sea cucumber Holothuria atra across the Hawaiian Archipelago and among neighboring habitats in the southern and western Pacific: Japan, the Marshall Islands, Line Islands, and Johnston Atoll. We found significant genetic structure between the inhabited Main Hawaiian Islands and the Northwestern Hawaiian Islands, and between the widespread locations in the South and West Pacific, with the strongest barriers between Japan and Hawai'i and between the Line Islands and Hawai'i In contrast, we observed no significant genetic structure between the Northwest Hawaiian Islands and Johnston Atoll, 800 km to the southeast and Hawai'i's closest neighbor. These results supports previous hypotheses about connectivity based on faunal comparisons and computer modeling, indicating that Johnston Atoll may be a biogeographic gateway into the Hawaiian Islands. The production and maintenance of Hawaiian biodiversity, which is the basis of a healthy island community, may depend on this critical link to other Pacific reef ecosystems.

Tu. 11:10 Ecosystems session room 1
Biogeography

Investigating Whale and Dolphin (Cetacean) Diversity in the Pacific Islands Region

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There is a limited understanding of distribution, conservation status, and habitat of cetacean species' within the Pacific Islands Region (PIR). To address this knowledge gap an examination of pertinent peer-reviewed journals, field surveys, museum stranding records, internal reports, anecdotal sightings and communications, and whaling ship accounts was undertaken. Each record was verified for accuracy and reliability, consistency with current taxonomic designations, and geographic location. This process confirmed that at least 30 different cetacean species are present in the PIR and also produced diversity checklists for each Pacific Island Country and Territory (PICT). Overall it was found that sperm whales were the most widely reported species, while both spinner dolphins and humpback whales also had a relatively high number of records. In contrast only a small number of reports of such species as the Indo-Pacific humpback dolphin and several types of beaked whales were found. A relatively high number of species were available for both Papua New Guinea and Solomon Islands, while a limited number were found for the Pitcairn Islands and Wallis and Futuna. However, it's important to note that these findings are strongly constrained by spatial and temporal variability in research effort. These limitations also make it plausible that as yet unreported species may be present in the PIR. These first listings of PICT-specific cetacean diversity are intended to assist national management plans and initiatives, as well as demonstrate the need for increased research and capacity building efforts. Furthermore, this work has been progressed to provide relevant background material for discussions related to the Convention of Migratory Species Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the PIR. This agreement currently has 11 PICT signatories and represents the largest oceanic area designated for cetacean protection in the world.

Tu. 11:15 Ecosystems session room 1
Biogeography

Macro-algal flora of the Samoan Archipelago - status and biogeographic comparison

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Our knowledge of the Samoan Archipelago marine flora has increased following research over the last ten years. This builds on previous collections made by visiting scholars, itinerant collectors and residents. While many of the collections are still scattered throughout various international herbaria, the significant ones (Jepson Herbaria, University of California, Berkeley, and Bernice P. Bishop Museum, Hawaii) were visited and specimens were taxonomically scrutinised. From the visits and our research we enumerated a total of 360 macro-algal species and sub-species for the Samoan Archipelago. Of these, four were found to be new to science: *Codium arenicola* Silva & Chacana , *Gracilaria ephemera* Skelton et al., *Ceramium upolense* South & Skelton and *Ceramium rintelsianum* South & Skelton, five were new combinations and four were recent introductions. Ninety-five per cent of the flora consists of widely distributed species (Western-Central Pacific, Indo-Pacific pan-tropical, subtropical and cosmopolitan), with very low endemism, probably attributed to the relatively young age of the archipelago and its geographic location from the centre of biodiversity (Indo-West Pacific).

Tu. 14:00 Ecosystems session room 1
Biogeography

Biodiversity of Terrestrial Arthropods of French Polynesia

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Because of their isolation, the islands of French Polynesia, like those of the Hawaiian chain, can serve as microcosms, allowing unique insights into mechanisms of diversification of terrestrial arthropods, community assembly and ecosystem processes. Also like Hawaii, the islands (at least the Societies and Marquesas) are arranged in chronological order, a feature that provides a time frame within which to examine the evolutionary process. Moreover, because these islands harbor a similar series of invasive species to those in Hawaii, with the impacts often more severe, it should be possible to elucidate common parameters underlying invasions and their impacts in the different islands systems. French Polynesia's archipelagoes thus offer an important comparison to the Hawaiian archipelago, allowing insights into the generality of processes which, based on research on terrestrial arthropods in Hawaii, are thought to play a role in dictating patterns of biodiversity. A vital first step in understanding the processes responsible for biodiversity patterns of terrestrial arthropods in French Polynesia is a detailed description of the fauna of the islands. To this end, in 2005 a team of scientists started work on a survey of the arthropods of the different archipelagoes of French Polynesia, funded by the National Science Foundation and the Government of French Polynesia. The emphasis was on the native fauna, which is generally confined to middle/high elevations, with participants selected to cover groups of arthropods known or hypothesized to be diverse in French Polynesia. We focused on 2 major elements, (1) Diversity assessment of presumed native species and levels of endemism. (2) Databasing and mapping. This talk represents the first attempt to compile our data for the region, examining overall patterns of colonization to, and diversification between and within, the different archipelagos.

Tu. 14:15 Ecosystems session room 1
Biogeography

Plant-insect Interactions on Pacific Islands

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Across the Pacific there are many complex interactions between plants and insects, including both mutualistic pollination and antagonistic parasitic interactions. The biology of many of these systems is poorly known and can be extremely challenging to study. Recent studies have looked at the effect of invasive species on native plant-insect interactions; the influence of host plant hybridization; co-biogeographic patterns and co-evolutionary processes in endemic radiations; and the threat of extinction for insects that are highly specialized on increasingly rare native plants. I will present an overview of these recent studies as well as a specific example using the Myrtaceae-feeding psyllids (Hemiptera, Psylloidea) of the Pacific. Psyllids are characterized by a high degree of host plant specificity and high levels of island endemism. *Metrosideros* is a primary host plant for psyllids in French Polynesia and the Hawaiian Islands, but although the plant species on these archipelagos are closely related the insects belong to phylogenetically independent radiations: the French Polynesian psyllids being more closely related to species feeding on other plants in the Myrtaceae from the western Pacific (New Caledonia, New Zealand, Australia). Diversification in Pacific psyllids ranges from widespread single species, usually coastal or lowland species feeding on plants such as *Hibiscus* and *Calophyllum*, that occur throughout the Pacific; to single island endemics, and island radiations, usually occurring on upland plants such as *Metrosideros* and *Weinmannia*. More detailed knowledge of plant-insect interactions across the

Pacific is needed to better understand the complexities of these interactions and their role in maintaining biodiversity and functional ecosystems.

Tu. 14:30 Ecosystems session room 1
Biogeography

Biogeography of leafroller moths (Tortricidae: Lepidoptera) in Oceania

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Tortricid moths are distributed worldwide and include ecologically and economically important species. Larvae of most species feed within the reproductive structures or on the leaves of agricultural, ornamental, and/or forest herbs, shrubs, and trees; and can be numerically dominant among moths in particular habitats. Although some genera, such as Cryptophlebia and Bactra, are represented by only one or two species in each island group throughout the Pacific, others such as Dichelopa in French Polynesia, and Pararrhaptica and Spheterista in Hawaii have radiated into fifteen or more species. Still others, such as Crocidosema, have been moved about by commerce or for biological control of pest plants. This paper presents the distribution of tortricid genera throughout the Pacific, biogeographic relationships among species groups, and hypotheses for the colonization of the Pacific by various genera within the family Tortricidae.

Tu. 14:45 Ecosystems session room 1
Biogeography

Ecology and Phylogeny of Damselflies (Zygoptera) in French Polynesia

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The Zygoptera biota of the island groups contained within the modern political province of French Polynesia is incompletely surveyed. Only a few named species have been recorded from this region, but many new taxa are known to us from the Society, Marquesas, and Austral archipelagoes, based on surveys by the authors since 1999. In this paper, we report on several new species of Ischnura damselflies from French Polynesia, and review the overall known Zygoptera fauna of the French Polynesia as a whole. Additionally, We have performed molecular systematics analyses of roughly 75 individual damselflies collected from Tahiti, the leeward Society Islands, the Austral Islands, and the Marquesas Islands. Data include roughly 1300 bp of mtDNA and 1000 bp of nuclear DNA sequences from most specimens. Results suggest that larger islands (e.g., Nuku Hiva, Hiva Oa, Raiatea) contain more than one endemic species, while most smaller islands are home to one endemic species. In only two cases did we find a single species on two islands (Tahaa and Bora Bora, and Hiva Oa and Tahuata). Patterns of dispersal between islands are not clear, but include cases consistent with the progression rule as well as potentially more complicated scenarios. These findings contrast with patterns of Zygoptera speciation in the Hawaiian archipelago, where islands have up to 8 endemic species. Because of difficult to access terrain and often rainy conditions in the upland areas, the main island of Tahiti so far has been poorly sampled. However, preliminary observations indicate that at least 3 damselfly species and possibly more exist in the upper elevation areas of Tahiti Nui. Endemic zygoptera were also found to be effective in assessing watershed conditions, and were absent from highly modified and impacted landscapes.

Tu. 15:00 Ecosystems session room 1
Biogeography

The Insect Fossil Record and the Reconstitution of Indo-Pacific Island Diversity
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There are fundamentally two ways of doing historical biogeography. One is to study extant biota - the distribution of taxa, their diversity and relationships - and infer history. The other is to integrate evidence from the study of biota preserved within the fossil record with data derived from the study of extant biota. In Remote Oceania, and more widely in the Indo-Pacific, the application of this latter approach is critical if we are to understand the impact of almost a millennium (or more) of human presence on the nature of ecosystems. Recent research has revealed that rich and informative fossil insect records are widespread in the Indo-Pacific region. Organic-rich sediments from swamps, caves and lakes contain insect, spider and mite remains that are identifiable, datable and ecologically informative. Importantly, the fossil insect record provides data regarding the nature of lost taxa that, often, could not be inferred from the nature of extant biota. Further, the fossil record can also reveal that taxa considered adventive are actually indigenous. In essence, the fossil record of Remote Oceania is ideal for telling us about the prehuman diversity of islands and their subsequent history, but less informative regarding deep-time history because of the lack of older fossil bearing deposits. This paper examines the ways in which exploration of the insect fossil record of Remote Oceania will enable us to reconstitute and therefore better understand Indo-Pacific island biodiversity.

Tu. 15:15 Ecosystems session room 1
Biogeography

Divergent colonizations of Eastern Polynesia archipelagos by landbirds
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Few groups of landbirds have successfully colonized the remote archipelagos of Eastern Polynesia. We present here the evolution history of three groups, monarch flycatchers (Monarchidae), reed-warblers (Acrocephalidae), and fruit-doves (Columbidae), based on molecular phylogenies. Colonization patterns vary greatly between archipelagos and between groups. After presenting the main results for the three groups, we focus on the two passerines of one the most remote archipelago of the Pacific Ocean, the Marquesas. Molecular results suggest that Pomarea monarchs derived from a single colonization event followed by speciation in the different islands. The timing of monarch evolution was moreover consistent with the sequential appearance of the Marquesas islands (from 5.5 to 1.8 Ma). This scenario contrasts with the evolutionary pattern found for Acrocephalus reed-warblers, which have successfully colonized the archipelago at least twice. Our data indicate that two independent reed-warblers lineages have reached the archipelago more or less simultaneously at ca. 0.6 Ma, much more recently than the islands' formation. Thus, endemic reed-warblers and monarch flycatchers have colonized the archipelago at a completely different pace and no general trend has emerged from the history of the passerines of the Marquesas.

Tu. 15:30 Ecosystems session room 1
Biogeography

Cyrtandra and other supertramps

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Standing out among the plant colonization of the Pacific islands is the very widespread dispersal of certain "supertramp" plant lineages. These supertramps may be divided into two broad kinds: those plants, often anthropochorous, in which little or no speciation has occured (e.g. Thespesia) and those characterized by at least some island radiations (Bidens, Metrosideros). This talk will survey what is known of the evolutionary history of the major supertramps, analyse the patterns they show, in the context of the biotic history of the Pacific islands. Particular prominence will be given to the genus Cyrtandra, one of the major radiations of the Pacific, and an important part of the biodiversity of many islands.

Tu. 15:45 Ecosystems session room 1
Biogeography

Flora of the Tuamotu atolls and its sensivity to sea-level rise

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Tuamotu archipelago in French Polynesia encompasses 76 atolls scattered among 1.5 million km^2 of ocean. These atolls are characterized by a lagoon surrounded by a ring of land. This superficial homogeneity hides a real diversity, linked either to their size or their morphology. Until recently, botanists supported this idea of homogeneity and only 15 atolls can be considered floristically well known. The present study, first step to the Tuamotu flora project, is based on 30 atolls, 40% of the archipelago atolls. Then, Tuamotu flora consists of 100 native taxa, 11 of them archipelago endemic. Among these 11 endemic taxa, 9 are restricted to the 3 main uplifted atolls, Makatea, Niau and Anaa. Floristic richness is highly correlated with the uplifted level. Thus, Makatea is the richest atoll with 71 native taxa, followed by Niau with 62 and Anaa with 54. These 3 uplifted atolls encompass 94 of the 100 native taxa of the archipelago and therefore should be considered as a priority area for conservation purposes in the Tuamotu. On the other side, most of the low atolls of the Western Tuamotu carry only around 30 native taxa, this number droping to 20 in the South-East. Phytogeography of the archipelago is also of particular interest with, for different reasons, the progressive disappearance from West to East of several taxa yet characteristic of atoll vegetation in the Pacific. Tuamotu flora is shaped by sea-level variation. Thus, a rise of less than 4 meters will lead to the complete submersion of most of the atolls and partial submersion of the main uplifted atolls, phenomena similar to the late holocene transgression. Only Makatea and 71% of the previous flora would survive to a rise of the sea-level above 4 meters. Moreover, this would contribute to the extinction of 6 of the archipelago endemics.

Tu. 16:30 Ecosystems session room 1
Biogeography

Origins and patterns of endemism in New Caledonia. Contribution to a new paradigm of island biogeography

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New Caledonia has generally been considered a continental island, the biota of which largely dates back to Gondwanan times owing to its geological origin and the presence of phylogenetic relicts. This classical view is now challenged by recent development of robust, temporally calibrated phylogenies used in concert with increasingly precise and reliable geological reconstructions indicating long Palaeocene and Eocene submersions and placing the biota no older than the Oligocene. Phylogenetic relicts do not provide conclusive information in this respect, as their presence cannot be explained by simple hypotheses but requires assumption of many ad hoc extinction events. The implication of this new scenario is that all the New Caledonian biota colonized the island since 37 Ma, local richness can be explained by local radiation and adaptation after colonization but also by many dispersal events, often repeated within the same groups of organisms. Local micro-endemism is another remarkable feature of the biota. It seems to be related to recent speciation mediated by climate, orography, soil type and perhaps unbalanced biotic interactions created by colonization disharmonies. In this respect, New Caledonia offers fascinating opportunities to explore island biogeography process. Its long time in isolation since the last submersion, offers unique opportunity of study regional patterns and test all different hypothesis of species evolution. It is a unique place to help understand island biogeography, especially in the context of emergence of new paradigm, to reconcile the two classical but dissimilar and incompatible models (equilibrium and vicariance) that have dominated debate over insular biogeography in the past decades

Tu. 16:45 Ecosystems session room 1
Biogeography

New Guinea Highland Origin of a Widespread Arthropod Supertramp

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The biologically and geologically extremely diverse archipelagos of the Wallacea, Australasia and Oceania have long stimulated ecologists and evolutionary biologists. Yet, larger scale molecular phylogenetic analyses of terrestrial fauna to understand evolutionary patterns remain rare. We use dense taxon and character sampling of > 7000 bp DNA sequence data for a group of diving beetles ranging from the Holarctic throughout Asia as far east as French Polynesia. We here show that an ecologically diverse, common and widespread (Portugal to New Zealand) arthropod supertramp species originated in the highlands of New Guinea, c. 4.0-2.7 MYA. All its ∼25 closely related species are narrow endemics in Australasia/Oceania. The ancestor of this clade colonised that region from Eurasia c. 6.8 MYA. Our finding contradicts the widely held view of local endemism as an evolutionary dead-end, as we find multiple peripatric speciation events within the Pleistocene and complex colonization patterns between the Oriental and Australian zoogeographic regions, including the recolonization of Eurasia, jumping across Wallace's line, and colonization of continental Australia out of New Guinea. Our study documents the early phase of a taxon cycle, strongly highlighting the importance of dispersal in shaping biogeographical patterns. The Pacific islands harbour two clades of the beetles studied here, an older, early Miocene component of yet unknown origin, and a more recent clade that has spread from Eurasia all the way to French Polynesia, where it has produced four endemic species in the last c. 5 million years. Clade and island age appear correlated

Tu. 16:50 Ecosystems session room 1
Biogeography

Biogeography and diversification of French Polynesian Weevils (Curculionidae)
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The weevils of French Polynesia were first rigorously collected by the members of the Pacific Entomology Survey; more than 80 years on the fauna is still incompletely known and expeditions carried out by the French Polynesia Arthropod Survey have collected numerous previously undescribed species. This paper summarizes the major findings of these recent expeditions, focusing on the biogeographic patterns seen in two of the most diverse genera of weevils from French Polynesia - Miocalles and Rhyncogonus. Patterns, timing and modes of diversification are inferred for the genus Rhyncogonus using molecular phylogenetic evidence. The observed patterns are compared with other taxa in French Polynesia and with other weevil genera found on other isolated island chains. A general conclusion is that species diversity is remarkably high in French Polynesia, particularly if island size is taken into account, a pattern that is not just restricted to weevils. This highlights the need for continued survey work in the region, as well as the need to protect indigenous habitats, which are increasingly being threatened by habitat destruction and the impacts of introduced species.

Tu. 16:55 Ecosystems session room 1
Biogeography

Hasard, déterminisme et construction des communautés écologiques insulaires d'araignées : comparaison entre les îles du Pacifique et de l'Océan Indien
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Les îles océaniques présentent les conditions expérimentales nécessaires et suffisantes pour comprendre les patrons et processus impliqués dans la genèse de la biodiversité. En effet, elles n'ont pu être colonisées que par le biais d'événements de dispersion et ce fait, elles sont relativement pauvres en termes de diversité spécifique. De plus, puisque l'âge des îles océaniques est souvent connu avec une bonne précision, et que la diversification dans ces îles ne peut précéder l'origine des îles, les archipels océaniques fournissent un cadre temporel au sein duquel il devient possible d'évaluer l'importance relative de certains facteurs conditionnant l'édification des communautés écologiques insulaires au cours du temps.
Un des facteurs conditionnant la construction des communautés est la distance à la source de colonisateurs potentiels. Plus celle-ci est importante, plus le nombre d'individus arrivant sur l'île serait faible. Il est donc probable que la distance à la source joue sur l'importance ultérieure des phénomènes de diversification génétique et écologique au sein de la communauté insulaire.
Afin de tester cette hypothèse, nous allons comparer, par analyse globale des patrons de diversification, les structures de communautés de différents groupes d'araignées entre des archipels semblables en terme d'écologie, de géologie et d'âge, mais variables en terme de distance au continent le plus proche. Par exemple, nous étudierons les communautés d'araignées d'archipels du Pacifique (e.g. Hawaii, 4000km de l'Amérique du Nord) mais aussi de l'Océan Indien (e.g. Mascareignes, 725km de Madagascar et 1800km de l'Afrique). En comparant les patrons et processus à travers plusieurs archipels, nous pourrons aboutir à une compréhension plus générale des processus impliqués dans la structuration des communautés écologiques.

Tu. 17:00 Ecosystems session room 1
Biogeography

Native Sap Beetles (Coleoptera: Nitidulidae) in French Polynesia, Diversity and Biogeography
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There are two radiations of Sap Beetles endemic to French Polynesia founded by progenitors in the subfamilies Cillaeinae and Epuraeinae. The cillaeine radiation is present in high elevation wet forests on five of the Marquesas Islands and on Tahiti. The epuraeine radiation is known from the Austral Islands of Tubuai and Rapa. The specimens from Tubuai are only known from subfossils and the Rapa species are apparently limited to high elevation native forest on the highest peak, Perau, and a single ridge to the south of the summit. The Marquesan species have been collected in cloud forest on the islands of Nuku Hiva, Ua Huka, Ua Pou, Hiva Oa, and Tahuata. They are morphologically and behaviorally typical Cillaeinae, being flattened, parallel sided, and elongate, and are found inside decaying stipes of tree ferns in the genera Cyathea and Angiopteris, rotting Freycinetia fruit, and under decaying tree bark. One species is found across Tahiti in tree ferns and subcortically in association with Reynoldsia verrucosa. Phylogenetic hypotheses are used to examine patterns of migration and speciation within and between islands and determine the relationship of the Tahiti species to the Marquesan radiation. The Rapa species are found in leaf litter, in flowers, in decaying fruit, and on live vegetation. Flightlessness has evolved at least once, a condition that is very rare in the family Nitidulidae. Flightless sap beetles are also known from Hawaii (23 spp.), New Zealand (1 sp.), and the Himalaya (1 sp.). The fossil species from Tubuai appears to be closely related to the Rapa species based on elytral morphology.

Tu. 17:05 Ecosystems session room 1
Biogeography

Diversity of Taiwanese Drosophilids (Diptera)
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The Drosophilidae family is well known for the model species in genetics. But beyond Drosophila melanogaster a huge diversity of species exists within the family. This diversity takes different aspects, including the morphology, the behavior and the ecology. Diversity is not only observed at a worldwide scale but also at the smaller scale of an island like Taiwan. Taiwan is an island of about 35 000 km2 (0.024% of emerged lands) lying in the west part of the Pacific close to the Asian continent and located on the Fire Belt between the japanese archipelago and the Philippines. The island shows a variety of relief with mountains culminating at 3952 m and is bathed in a tropical to subtropical climate. The first drosophilid species recorded specifically from Taiwan were described by Hendel in 1914. Up to now 304 species have been recorded in Taiwan (nearly 8% of world species). Taiwanese drosophilids are distributed in 31 genera (41% of world genera) with the dominance of the Drosophila genus. However only 7% of the species of Drosophila s. str. exist in Taiwan, while 24% of all Phortica and 20% of all Liodrosophila are represented there. Some smaller genera like Pararhinoleucophenga or Parastegana are more specific to Taiwan. Finally 56 species are endemic to Taiwan (18% of taiwanese fauna). Migration also contributes to the diversity, with species originating from as far as Africa or South America. Species diversity is sustained by ecological diversification. The most obvious being the diversity of food substrates including tree sap exudates, flowers, fruits, mushrooms. Diversity of life history traits is observed at each developmental stages. Taiwan is rich and diverse in species but its drosophilid fauna has not been fully investigated. Many species have probably not been discovered yet and ecological data is missing for most known species.

Tu. 17:10 Ecosystems session room 1
Biogeography

Speciation and biogeographic relationships of Dacini (Diptera: Tephritidae)in New Caledonia

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Tephritidae, commonly known as fruit flies, are one of the most injuring insect pests in fruit and vegetable crops. They are also of major concerns for Quarantine, with high economic costs for both exporting and importing countries. In the Pacific, the Dacini tribe, essentially represented by Bactrocera and Dacus genera, represents a high contribution to the fauna with numerous pest species but also with high local level of speciation with some "species complex" known in several taxa. Almost 200 Dacini species are known from Papua New Guinea, 90 from Australia, 53 from Solomon Islands (including Bougainville), 13 from New Caledonia, 12 from Vanuatu, 7 from Samoa, 6 in Tonga and 4 in Fiji, while other islands are inhabited by 1 or 2 endemic species. In this context, New Caledonia tephritid fauna is of high interest, even if this fauna represents only 2 % of the total Dacini species. The New Caledonian Dacini tribe presents 10 endemic species among 13, non-Dacini fruit flies are composed by non-endemic species with Oriental Australia connections (17 species with only 5 endemics). Here we present results of a biomolecular study to assess phylogenetic relationships between the 13 Dacine taxa, and to appreciate their biogeographic relationships with other Dacini of the region. These results shed light on speciation process in New Caledonia (post-Gondwanan history) but also on the regional phylogenetic links. Further works are recommended to better understand success of pest species. Further works are recommended to better understand success of this group of pest species. Tephritidae are presumably post-Gondwanan, recent phylogenetic studies in several New Caledonian taxa show quite recent speciations, the study of this group can be useful in the study of New Caledonia endemism.

Tu. 9:00 Ecosystems session room 2
Biological Processes and Sustainable Development

Commercial Coral Reef Fish Community Structure along an Island Gradient of Contrasting Habitat and Fishing Pressure in the Society Archipelago (French Polynesia)

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Demographics and dynamics of coral reef fish communities rely on geomorphological (habitat), biological (recruitment, predation) and anthropogenic factors (pollution, fishing), among others. Subsistence fishing remains an essential economic and cultural activity in French Polynesia. Fishing has differing impacts in Tahiti and its surrounding islands, as they are not equally populated. Coral reef geomorphology also differs between them. The influence of both factors on commercial coral reef fishes was studied at four different high islands of the Society group: Tahiti, Moorea, Raiatea and Maupiti. Commercial fish communities were monitored using underwater visual censuses (UVC) on the outer slopes of each island (60 UVC per island). Abundance, size and habitat of 29,967 individuals were recorded. They fell into 110 species and 19 families, the most abundant being acanthurids (surgeonfishes) followed by scarids (parrotfishes). Fishing pressure was as a major structuring factor in Tahiti and its surrounding high islands. A significant decrease in fish biomass occurred from the Leeward islands (Raiatea and Maupiti) to the Windward islands (Moorea and Tahiti). The highest biomass of fish was recorded in Raiatea, followed by Maupiti, which also had the lowest densities of commercial fishes. This apparent paradox results from higher mean fish sizes compared to those of Tahiti and Moorea, where low abundances of large individuals were also recorded. A significant change in trophic structure occurred between the different islands: Raiatea had many piscivores, the communities of Maupiti were comprised mainly of zooplanktivores and macroherbivores, and microherbivores dominated in the Tahiti-Moorea group. Furthermore, fish density and biomass were negatively correlated to fishing pressure at the site scale. This work represents a first step in the estimation of coral reef fish stocks in the Society islands and highlights the need for further management efforts.

Tu. 9:15 Ecosystems session room 2
Biological Processes and Sustainable Development

Connectivity and self-recruitment of coral reef fishes in a marine reserve network in Kimbe Bay, Papua New Guinea

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The scale of larval dispersal of marine organisms is important for the design of networks of marine protected areas. We examined the fate of coral reef fish larvae produced at several small island reserves in a network of reserves throughout Kimbe Bay, Papua New Guinea. We assessed larval dispersal and self-recruitment using several methods, including mass-marking larvae via maternal transmission of stable isotopes to offspring, parentage analysis using microsatellite markers, and natural markers in the elemental composition of otoliths in known-origin larvae. Using both a pelagic spawning fish with a long (>1month) pelagic larval duration and a benthic spawning fish with a short (<2 weeks) PLD, we found that local retention ("self-recruitment") appears to be relatively high at our study sites, with typically 50-60% of newly settled larvae having natal origins at the same site. However, we are also able to document with these techniques dispersal events among the marine reserves in the Kimbe Bay network. Empirical and direct measurements of dispersal and connectivity will be critical to inform and test the coupled-biophysical models of larval dispersal dynamics necessary for effective marine reserve designs.

Tu. 9:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Movement and group structure in wild blackfin reef sharks, *Carcharhinus melanopterus*, at Moorea, French Polynesia

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The blackfin reef shark (*Carcharhinus melanopterus*) is the most abundant shark species of Polynesian reef communities. Despite its abundance, many aspects of its basic natural history remain poorly or incompletely documented. The blackfin reef shark, neither a solitary nor a schooling fish, is often seen in small aggregations, especially when feeding. Such group living is commonly observed in shark populations, but relatively little is known about the overall organisation, structure, and complexity of these groups. Using a combination of approaches including tagging, photo-identification and genetics, this study aimed to document whether reef shark population organisation is structured or random. Twenty blackfin reef sharks were tagged with Vemco Rcode acoustic transmitters (model V16) and six Vemco VR2 acoustic receivers were deployed. Preliminary results show that sharks demonstrate a high degree of site fidelity with small home ranges. These results suggest that stable group living may be present in this species in the wild. On different sites around the island of Moorea, sharks were caught, photo-identified and DNA sampled for microsatellite analysis. Subsequent underwater surveys using distinctive markings to identify individuals, combined with our genetic results enabled group composition and relatedness to be analysed. Our research will determine whether shark groups are composed of close relatives or are randomly structured.

Tu. 9:45 Ecosystems session room 2
Biological Processes and Sustainable Development

Study of the pink whiprays, Himantura fai,in French Polynesia

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Our research project concerns a sting ray species never studied before in French Polynesia: Himantura fai. This species is involved in a stingray feeding tourism industry. Our study encompasses human, cultural, and economic issues associated with the feeding activity that involves more than 60 000 visitors annually and 10 tour operators. Amongst the 58 individuals identified in the study zone (30 males, 28 females), 13 (6 males, 7 females) have been studied by telemetry (up to 340 days) to quantify their behavior in the feeding zones: 11 showed high fidelity and their minimal attraction range is over 2060 m. A tracking survey was conducted on 3 human fed rays and 3 wild rays and showed limited effects on home range (below 0.7 km^2), speed as well as stationary times between the 2 groups. The genetic structure of the H. fai population amongst 4 Polynesian archipelagos confirms limited exchange of individuals. The results of this study also contribute to the "stingray feeding guideline" included in the Moorea Marine Space Management Plan in existence since 2004.

Tu. 10:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Pollination Webs in Hawaiian Ecosystems

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Pollinators are an essential resource for plant reproduction for the majority of angiosperms in Hawai'i. However, very little is known about the pollinators of most of Hawai'i's native plants. We took a community approach to studying pollination in Hawai'i by studying how plant-pollinator interactions change along an elevation gradient on the island of Hawai'i. We quantified pollinator visitation rates to all of the flowering plant species in communities on an 1855 lava flow to understand how pollination webs and the integration of native and alien species change with elevation. Pollinator observations on eight flowering plant species at six sites ranging from 880-2400m were conducted. Plants at mid-elevation sites (1570-1820m) received the highest visitation rates, with steep declines above and below these elevations. In addition, the proportion of native pollinators changed along the elevation gradient, where the proportion of native pollinators increased with increasing elevation. In particular, three species of native Hylaeus bees made up to 84% of all visits at mid and high elevation sites, whereas Hylaeus were in extremely low abundances at low elevations. Our finding of low visitation rates at low elevations, where Hylaeus were rare, suggests that important native pollinators may not be easily replaced by aliens. Our study also highlights the importance of native bees for plant reproduction in early succession habitats in Hawai'i.

Tu. 10:45 Ecosystems session room 2
Biological Processes and Sustainable Development

Coffee species natural hybridization in New-Caledonia: genetic and environmental characterization and spatial distribution

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Coffee trees (mainly of the species *Coffea canephora* (Robusta) and *C. arabica*) were at one time introduced in New-Caledonia for cultivation. Many plantations have since been abandoned, leaving the cultivars to evolve in natural conditions. This situation has allowed gene flow between sympatric species and has created hybrid zones which can be considered as a natural laboratory for studying gene flow dynamics. We studied abandoned coffee plantations in the central mountains of New-Caledonia, and more particularly one tri-specific population, composed of *C. canephora*, *C. arabica* and *C. liberica*. The objectives were to understand (1) the genetic dynamics and hybridization events occurring in a sympatric population and (2) how environmental parameters are involved in such a phenomenon at a regional scale. We analyzed the tri-specific population with 26 microsatellite markers (16 SSRs and 10 EST-SSRs) using a multilocus analysis approach. We applied two complementary methods (implemented in GENECLASS 2.0 and STRUCTURE v2.1 softwares) to characterize the species identity of founder individuals and to identify interspecific hybrids. A high level of genetic diversity and interspecific hybridization events was observed in the tri-specific population, suggesting a high level of gene flow. A mixed Geographic Information System (GIS) and Remote Sensing approach was used to introduce the spatial differentiation in the studied phenomenon and to optimize hybrid collecting missions. We constructed a predictive distribution model based on climatic parameters (precipitation and temperature), on physical parameters derived from the Digital Elevation Model data (elevation, slope, and hydrographic network) and on bio-physical parameters derived from satellite imagery treatments (soil occupation, vegetation index, stress index...). More than forty percent of the studied region appeared favorable to the sympatric situation and to hybridization events.

Tu. 11:00 Ecosystems session room 2
Biological Processes and Sustainable Development

Strong Indirect Effects on Coral Dynamics from Interactions between Planktivorous Damselfish and Hawkfish

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Ecological processes that influence population dynamics of stony corals play an essential role in shaping biodiversity on tropical reefs. Because mortality rates of coral typically scale inversely with size of a colony, factors that enhance the growth of smaller, more vulnerable sizes are centrally important to their dynamics. In a field experiment at Moorea, French Polynesia, branching coral in the genus Pocillopora grew a third faster when a colony was occupied by planktivorous damselfishes, possibly because the fish increased interstitial concentrations of nutrients. The biomass of resident damselfish and degree of openness of the coral's branching structure (which affects material flux) explained ~75% of the variation in growth in the experiment. Because larger corals host more damselfishes, a feedback loops exists where damselfish enhance coral growth and larger corals can host more damselfish; the openness structure of a colony affects the strength of the feedback. However, interactions involving a common, small-bodied predator (the arc-eye hawkfish Paracirrhites arcatus) can decouple the feedback. Field surveys revealed three fish occupancy patterns related to coral size: coral <40 cm in circumference were unoccupied, intermediate-sized corals (40-75 cm) hosted either damselfish or a hawkfish, and large corals (>75 cm) frequently hosted both types of fish. Subsequent explorations revealed that hawkfish can prevent establishment of a damselfish group on intermediate-sized corals by suppressing recruitment of young damselfish through both direct consumption and enhancement of vulnerability to other predators. This in turn retarded the growth rate of the host colony. However, hawkfish cannot prevent older damselfish from migrating onto corals that become sufficiently large. These results indicate that biotic interactions among species of fish that use corals as habitat can have substantial but non-obvious indirect effects on the dynamics of corals.

Tu. 11:15 Ecosystems session room 2
Biological Processes and Sustainable Development

Ecological Design: Nature's Design Models

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Ecological design provides a framework for holistic, sustainable development. Its principles are fundamental to create green communities and for humans to (re)form symbiotic relationships with the natural world. These principles were first recognized by the grandmothers and grandfathers of indigenous cultures worldwide and this cultural component remains a keystone for successful implantation of modern versions of applied ecological technologies. Through the understanding that ecosystems have purpose, humans can create functional landscapes that prevent pollution, restore impaired ecosystems, while promoting local flora, fauna, and culture. An example is the constructed wetland. In nature, wetlands and marshes are the liver and kidneys of the earth. Over the past forty years, researchers and engineers have designed the wetland ecosystem into various landscapes to remediate and restore impacted, polluted waters. They also have been successfully installed at the end pipes of industries and municipal sewer systems turning waste into resources. Although there has been found to be a wide range of applications, the fundamental components of the technology are the same. Ecological technologies are mechanically simple, but biologically diverse and complex. By harnessing the energy from the sun, the wetland 'engine' is ignited and the billions of year's experience of Nature to self-organize, self-regulate and self-perpetuate drive the breakdown and transformation of the organic wastes into biomass. Today the constructed wetland along with various other forms of the technology is being installed globally to remediate and heal damaged waters and prevent pollution and disease. The wetland technologies are living models of applied ecology. Through a whole systems, place-based approach, the technology promotes biodiversity and the incorporation of local materials, both living and nonliving which inherently aids in their longevity. The discussion will review these principles of ecological design and the technologies applied both in the Pacific and globally.

Tu. 11:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Spatio-temporal evaluation of population density of Crown-of-Thorns starfish (*Acanthaster planci*), and analysis of a potential mechanism behind their damaging effect on reef coral in French Polynesia

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Since the 1960's, outbreaks of the coral-feeding starfish Acanthaster planci have been recorded throughout the Indo-Pacific region. The outbreaks have profound impacts for coral reef habitats and the ecosystem that depend on them. On some reefs up to 90% of live coral cover has been lost, as was the case in areas of Saipan, Guam, the Marshall Islands, and the Great Barrier Reef (Australia).In previous outbreaks, the branching corals of French Polynesia were completely decimated by Acanthaster planci and replaced by flat areas of rubble, which had significantly lower fish diversity. Due to the observed high densities of Crown-of-Thorns starfish (COTS) at Moorea and in other Pacific Society Islands (Raiatea - Tahaa; Bora-Bora) since 2004, we aimed to examine and study this phenomenon and evaluate its consequences for the coral reef ecosystem after two years. First, we compared the density of COTS and their distribution along the entire reef surrounding Moorea in November 2006, April 2007 and January 2008 using Manta-Tow and belt transects. In January 2008, we observed an increase in the density of individuals between 10 and 30 m depth compared to April 2007. We then examined the impact of this population increase by comparing coral cover at the beginning of this phenomenon in 2005, to that recorded in 2006 and 2007. A decrease in total coral cover and an increase in dead substrate were observed in Moorea and Society Islands of French Polynesia. In parallel the pourcent decrease in live coral cover may range from 50-95% depending on the abundance of COTS on the four islands, suggesting that local processes are present. These quantitative and qualitative changes of coral communities may have considerable ecological and economical consequences.

Tu. 11:35 Ecosystems session room 2
Biological Processes and Sustainable Development

Diversity matters: symbiotic coral guard crabs differ in ecological function

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Trapeziid crabs have been recognized as playing important roles in the defense of their host corals from predation, sedimentation, and competition for space. The varied roles played among different species within this guild of coral defensive crabs remains largely unexamined, despite the recognition of more than twenty crab species across a size range encompassing several orders of magnitude. I investigated the roles of several species of Trapezia species in response to sedimentation and predation in Ofu, American Samoa, and Moorea, French Polynesia. Results indicate that efficacy of defense varies among crab species, size group, and corallivore (Drupella, Culcita, Acanthaster), suggesting a beneficial role of diversity in this crab-coral mutualism.

Tu. 11:40 Ecosystems session room 2
Biological Processes and Sustainable Development

Spatial trends of macrobenthic community on reef-associated sea-grass beds in coastal area around Weno Island, Chuuk State, FSM

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Reef-associated sea-grass beds are characterized by benthic community as well as coral-reef fishes as nursery. Seagrasses are important in their interactions within coral reefs. These systems exert a stabilizing effect on the environment, resulting in important physical and biological support for the other communities. Seagrass providing food and shelter for diverse variety of organisms lagoon for many of reef species similar to mangrove forests in Chuuk. According to vertical scale from land to open sea by transect method using quadret, benthic community structure have been influenced by several types of habitats based on sea-grass beds such as density and species composition. The seagrass bed is dense and mostly sandy on the area close from coastline to middle of area of the end of reefs sheltered. Coverage by three of species, Cymodocea rotundata, Enhalus acoroides and Syringodium isoetifolium dominated over 70% at this area. But it showed the changes by spatially. A total of 14 species of macro-invertebrate were associated with all seagrass beds. Holothuroideans, Synaptula sp., Bohadschia mamorata, and Holothuria hilla were commonly distributed, and echinoideans Echinothrix sp., Mespilia globules and Tripneustes gratilla also observed neighboring of middle area which sea-grass showed sparse density. As results by multivariate analysis, based on the number of density of each species, spatial distribution of benthic community showed clear separation along the transect. Seagrass density influenced to the sedimentary characteristics as well as reef formations. It also may affected to the benthic community in reef area .

Tu. 11:45 Ecosystems session room 2
Biological Processes and Sustainable Development

Small Things Matter: Differences in Bacterial Communities Provide Insights into Coral Interactions with Vermetids

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Coral reefs are under siege. A range of environmental stressors has caused significant coral declines throughout the world. These ecosystems are both extremely biologically diverse and economically important, especially throughout the Indo-Pacific. Some studies have shown, however, that certain corals, even different representatives of the same species, are more resilient than others. One possible source of this variation is the bacterial communities living on and among the coral polyps. Bacteria associated with corals change in response to environmental factors, and may mediate coral interactions with the surrounding environment and with other organisms in both beneficial and detrimental ways. In Moorea, vermetid gastropods (Dendropoma maxima) have been identified as a cause of coral stress. We hypothesized that the taxa present in the bacterial community on the P. lobata surface would differ when vermetids were present (either due a shift in bacterial communities or differential survival of corals with different bacteria). Samples were collected in the northern lagoon of Moorea from patch reefs that had been randomly assigned to two treatment groups: vermetids removed (all vermetids were killed approximately 6 weeks prior to sample collection) and vermetids present (mean ambient densities of vermetids were 19/reef). A highly conserved region of the 16S rRNA gene was amplified via PCR, cloned and sequenced. Maximum likelihood trees for each bacterial community were built. Differences between communities were evaluated using a combination of statistical tests that allowed us not only to identify differences between the communities, but also to determine the nature of those differences. These results serve as guides for exploration of the functional shifts that occur in the surface bacterial communities in the presence of vermetids. Ultimately, understanding the mechanisms that drive sensitivity of corals to vermetids (and other stressors) may provide insights about management strategies that can reduce the deleterious effects.

Tu. 11:50 Ecosystems session room 2
Biological Processes and Sustainable Development

Enjeux individuels et collectifs des usages de la terre et de la mer à Rapa iti (îles Australes)

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La gestion communautaire des ressources foncières et maritimes à Rapa iti (archipel des Australes) présente des caractéristiques uniques dans la Polynésie française d'aujourd'hui. La société insulaire locale régule en effet l'accès individuel et collectif à la terre pour y résider ou pour la cultiver par le biais d'un conseil des sages comprenant des membres représentatifs des différents lignages (toohitu). Il en va de même pour l'usage de la mer pour pêcher qui est régulé par un comité des pêches (tomite tiaia) à travers l'instauration d'un interdit sacré rituellement levé de temps à autre sur certaines zones (rahui). Ces deux conseils coutumiers, largement soutenus par la municipalité, sont composés de membres dont le statut moral est localement reconnu. Cette communication décrira les modalités de fonctionnement de ces conseils en pointant la particularité du système foncier à Rapa qui est que les résidents et leurs familles ne sont officiellement jamais propriétaires de la terre sur laquelle la maison est placée et/ou qu'ils cultivent: celle-ci reste la propriété collective de la population entière qui peut - en principe - en redistribuer l'usage à travers son conseil des sages si ceux qui en ont obtenu le droit d'usage ne résident plus dans l'île. Alors qu'elle périclite dans le reste de la Polynésie française (en référence au code civil), la distinction polynésienne "droit d'usage" / "droit de propriété" est plus que jamais à l'ordre du jour à Rapa. Après avoir exposé les principes et pratiques qui soudent la communauté insulaire, cette communication abordera également leur mise à mal croissante par des stratégies individuelles, notamment déployées par des originaires de l'île non résidents à plein temps, et les réponses locales déployées pour maintenir ce système à la fois dynamique et fragile.

Tu. 14:00 Ecosystems session room 2
Biological Processes and Sustainable Development

Recruitment potential and recruitment survival as a function of habitat degradation

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Management of target species and conservation of reef ecosystems would benefit from an understanding of the recruitment potential, as well as post-recruitment survival, between different reef habitats. Many coral reefs have been subjected to, and continue to suffer from, habitat degradation due to both natural and anthropogenic stress. However, the effects of habitat degradation on larval recruitment potential and on the survival of settled recruits are not currently known. An ANR and CRISP funded project aimed to distinguish between these two processes by simultaneously measuring survival and recruitment of bivalve larvae, in particular Pinctada margaritifera, on Rangiroa atoll in French Polynesia over two spatial scales of degradation. On a large scale, non-degraded and degraded sites were chosen with 41 % and 30 % live coral cover respectively. On a smaller scale, three sites: live coral, dead coral and a sand control had 55 %, 16 % and 0 % live coral cover respectively. Neither survival nor growth of P. margaritifera differed with habitat degradation, therefore post-recruitment traits are not affected by habitat. However, higher bivalve recruitment was observed on degraded reefs and on live and dead coral sites. Invertebrate recruitment potential is clearly affected by habitat and larval sensory cues are likely to be sensitive to habitat degradation. We also aimed to determine whether the presence of adult conspecifics affected the recruitment potential of P. margaritifera on Takapoto atoll. Higher recruitment of pearl oyster larvae was observed on dead coral sites where adult conspecifics were present, and larval recruitment increased with the proximity to adult conspecifics. In conclusion, sensory cues are clearly important for black pearl oyster larvae settlement, and larvae use the presence of adult conspecifics and habitat quality to locate suitable settlement sites.

Tu. 14:15 Ecosystems session room 2
Biological Processes and Sustainable Development

Impact of *Turbinaria ornata* on Reef Structure and Function

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The abundance and distribution of the brown alga *Turbinaria ornata* is increasing throughout French Polynesia. As this alga becomes a dominant component of the reef it has the potential to alter the structure and function of this ecosystem. Turbinaria has three distinct functional stages: attached to the substratum, detached and floating, and sunken; each potentially providing a different functional role on the reef. Observations and manipulative studies showed that Turbinaria provides a refuge for associated flora and fauna. Attached aggregations of Turbinaria create an herbivory refuge for associated algae, while invertebrate communities show distinct differences in species diversity between stages. Collection of Turbinaria rafts indicated that these rafts host juvenile fish and invertebrates, potentially facilitating dispersal of these organisms along with the alga itself. Decomposition of sunken Turbinaria also recycles nutrients back onto the reef and sandflats through detrital food webs. The large biomass of Turbinaria decomposing throughout barrier reef systems creates the potential for huge nutrient input and may have impacts for reef nutrient dynamics. In sum, the impact of increasing abundance of *Turbinaria ornata* on reefs throughout French Polynesia has implications for the structure and function of these systems through its affect on associated organisms and nutrient dynamics.

Tu. 14:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Indirect effects alter coral community structure

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Complex ecological interactions, coupled with abiotic processes, can alter the structure of coral reef communities. In Moorea, French Polynesia, an abundant algal-farming fish, the dusky farmerfish *Stegastes nigricans*, engineers the coral reef community by farming algal turf and exerting resource control through territorial defense. These behaviors can affect coral indirectly by modifying their interactions with two guilds of community members: 1) increased interactions with farmed algal turf; and 2) decreased interactions with mobile grazers and predators due to reduced reef access. Small scale experiments involving farmerfish and / or turf removals indicated dominant massive *Porites* were more vulnerable to competition with turf than branching *Acropora*, *Pocillopora*, or encrusting *Montipora*. In contrast, delicate branching corals were more vulnerable to predation by mobile corallivores and grow and survive better in the presence of *S. nigricans* defense. We addressed these indirect effects in a demographic context using a combination of recruitment tiles and size specific population monitoring in the presence and removal of *S. nigricans*. We then tested experimental parameter estimates by comparing projected size distributions with spatially explicit size distributions of corals in the presence and absence of this abundant farmerfish.
In Moorea, the disturbance history has played a pivotal role in the types of community changes we observed. While *S. nigricans* usually colonizes *Acropora* thickets, a series of disturbances on the north shore virtually eliminated these habitats and farmerfish subsequently colonized the dominant disturbance tolerant, but turf sensitive, massive *Porites*. The relative resistance to competition with turf allowed recovering, disturbance sensitive, species to utilize dead portions of these massive corals. This increase in substrate availability, when coupled with lower predation rates, has led to enhanced recovery of important branching corals within farmerfish territories relative to outside.

Tu. 14:45 Ecosystems session room 2
Biological Processes and Sustainable Development

Hormones and reproduction in scleractinian corals

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In southern Taiwan, the mass spawning of scleractinians occurs in lunar mid- March. Endocrine system has been proposed to play important roles in this annual phenomenon. The scleractinian corals, Euphyl lia ancora (broadcast spawner) and E. glabrescens (brooder) has been selected as a model for the hormones and reproduction studies. Testosterone (T) and estradiol (E2) in free and glucuronided forms were identified and consistently detected in coral polyps throughout the year. In contrast, peak Levels of free E2 were obtained in the coral tissue just prior to E. ancora spawning. Higher concentrations of E2 glucuronide than free E2 found in seawater during E. ancora spawning. No steroid glucuronide could be detected in the seawater during E. glabrescens spawning even though the levels of T and E2 in free and glucuronided forms in coral. In conclusion, our data suggest that corals already evolved the vertebrate-type hormone system in the sexual reproduction and glucuronided E2 may play important roles in the control of reproduction and mass spawning in broadcast spawning corals.

Tu. 15:00 Ecosystems session room 2
Biological Processes and Sustainable Development

High levels of chimerism in adult populations of the broadcast spawning coral *Acropora millepora* on the Great Barrier Reef

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Chimeras are organisms containing tissues or cells of two or more genetically distinct individuals, and are known to exist in at least nine phyla of protists, plants, and animals. Although widespread, and common in marine invertebrates, it is unknown to what extent chimerism is present in wild populations of corals. The extent of genetic chimeras (i.e. the cohabitation of different genotypes with a single coral colony) was explored within two populations of a common coral, Acropora millepora, on the Great Barrier Reef, in Australia, using 8 polymorphic microsatellites. We found remarquably high proportions of chimerism in the studied populations, which represented 6% overall. Indeed, 10% and 3% of chimerism were found in Magnetic Island and Pelorus Island respectively, when genotypes were differing by at least two alleles. However, the proportion of chimerism in Acropora millepora populations presented here are likely to be an underestimate, as our sampling protocol was restricted to a maximum of 8 branches per colony, and a maximum of 2 genotypes were observed per colony. Another finding was the very high relatedness of individuals within chimeras, suggesting they were associations of closely related individuals. The study found high levels (6%) of chimeras in wild populations of corals and demonstrated that chimerism was a common feature of *Acropora millepora* 's life cycle. Although, brooding corals are known to have the potential to form genetic chimeras in their early life stages under experimental conditions, this study represents the first genetic proof of the occurrence of corals chimeras in the wild. Consequently, chimerism might be much widespread than previously thought and could represent a common life history strategy for colonial marine invertebrates, and should subsequently be considered when exploring the connectivity and the population genetics of corals.

Tu. 15:15 Ecosystems session room 2
Biological Processes and Sustainable Development

Interactions between picoeukaryote and reef corals- a microcosm study

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A Chlorella-like picoeukaryote ($\sim$1.6 μm) was cultured and fed to two species of cultured reef corals, Montipora stellata and Stylophora pistillata, respectively. The result showed that within 6 hrs., picoeukaryote abundance were significantly reduced in M. stellata and S. pistillata treatments as compared to the control. When extending the experiment for 6 days, picoeukaryote abundance in the S. pistillata group were reduced significantly, while those in M. stellata group were significantly higher, as compared to the control. In second experiment, we grew the two coral species in triplicates for 2 days, removing the corals, and added similar amount of picoeukaryote to the tanks. The results showed that picoeukaryote abundance in the S. pistillata tanks were significantly higher than the other treatments, while those in M. stellata tanks were not significant as compared to the control. We concluded that picoeukaryote can be consumed by reef corals M. stellata and S. pistillata, and the exudates of M. stellata and S. pistillata can reciprocally enhance the growth of picoeukaryote.

Tu. 15:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Reproductive and Growth Variation of the Gorgonian *Junceella fragilis* in Southern Taiwan

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The sexual reproduction and growth of the gorgonian coral, Junceella fragilis, at Xiashuijui, Wanlitong, Talauko and Leidashi in southern Taiwan were compared in order to understand the life history strategies. J. fragilis was gonochoric. The length of oogenesis was 14-15 months. Spawning occurred from July to September during the end of seasonal disturbance. Most of the reproductive characteristics, including fertile polyps and fecundity for both females and males, diameter of oocyte and spermary, as well as thickness of fleshy tissue of the Talauko population were significantly higher than other populations. This may be benefited from the tidally induced upwelling with higher nutrient occurring at Talauko. For the Leidashi population, the axial skeleton was significantly thicker, but most of the reproductive characteristics were significantly lower than those of other populations. It suggests that the Leidashi population had higher investment in growth and may be an adaptation to the environment with stronger wave.

Tu. 15:45 Ecosystems session room 2
Biological Processes and Sustainable Development

De l'étude approfondie des semences de plantes natives candidates à la restauration écologique et de leur intérêt primordial dans la conservation de la biodiversité végétale néo-calédonienne

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Un tiers de la "Grande Terre" néo-calédonienne est recouvert de sols dérivés de roche ultramafiques. Ce sol est excessivement riche en métaux lourds (Ni, Co, Mn, Cr), mais pauvre en nutriments (Ca, K, P, N) et en matière organique. Ces caractéristiques ont contribué à la formation d'une flore originale et unique (près de 2145 espèces endémiques à 81%) susceptible d'avoir développé des mécanismes adaptatifs spécifiques lui permettant de survivre dans cet environnement austère. Malheureusement, l'exploitation minière du nickel conduit à une dégradation rapide des sols et des écosystèmes. C'est pourquoi les programmes de revégétalisation sont essentiels et l'utilisation de plantes pionnières est requise afin d'amorcer la reconstitution du couvert d'origine. Cependant, les connaissances sur la biologie des semences des espèces néo-calédoniennes sont pauvres. Nous avons donc décidé d'étudier la structure, la biologie, les conditions de germination et son optimisation, la conservation et les réserves métaboliques des semences de ces plantes en relation avec leur utilisation dans la restauration. En citant des exemples spécifiques, nous discuterons les méthodes utilisées et les progrès réalisés. Nous mettrons aussi en avant les applications pratiques de ces techniques. La plupart des semences se sont révélées orthodoxes et dans la majorité des cas, elles possèdent un taux important de lipides composés essentiellement d'acides gras insaturés. Ces réserves jouent un rôle important dans le choix des méthodes de stockage. De nombreuses espèces sont aussi pourvues d'une ou plusieurs dormances pour lesquelles des expérimentations visant à les lever ont été étudiées. Enfin, des études microscopiques ont apporté un éclairage nouveau sur la façon dont certaines espèces accumulent le nickel au sein de leur fruit et de leur graine. L'ensemble des résultats obtenus s'avère essentiel pour l'optimisation des méthodes employées en restauration écologique, garante de la conservation de la biodiversité génétique, spécifique et écosystémique de la Nouvelle-Calédonie.

Tu. 16:30 Ecosystems session room 2
Biological Processes and Sustainable Development

Spatiotemporal Variation in Predation Pressure Structures Reef Fish Communities

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Studies examining the role of predation in structuring communities often focus on presence or absence of predators, thus emphasizing mean rather than variable predator densities. In marine systems, spatiotemporal variation in recruitment strength results in considerable variation in abundance of both prey and predators. Yet, no studies have compared variable vs. non-variable predator densities in marine systems. We conducted a 4-month field experiment to assess how the mean and variance of predator density and the timing of predator arrival affect prey fish abundance and community composition. Our experiment contained five replicated experimental treatments: 1) "predator absent" - no predators for four months, 2) "early" - two predators for the first two months and no predators for the second two months, 3) "late" - no predators for the first two months and two predators for the second two months, 4) "low density" - one predator for the entire four months, and 5) "high density" - two predators for the entire four months. Compared to the predator absent treatment, predators reduced average prey abundance: early (32%), late (57%), low density (48%), and high density (63%). However, predators increased rarefied species richness: early (129%), late (152%), low density (123%), and high density (170%). For both abundance and diversity, reefs with mean predator densities of 1, and a variance of 2 ("early" and "late" treatments) were not statistically different from the low-density treatment (mean predator density of 1 and a variance of 0) suggesting that differences in abundance and diversity among reefs were driven by order of predator arrival rather than variation itself. We evaluate two mechanisms by which predators are capable of increasing diversity: 1) prey-switching and 2) removal of dominant competitors. Our results demonstrate that the magnitude of predator effects in structuring reef fish communities is dependent upon both density and timing of arrival of predators.

Tu. 16:45 Ecosystems session room 2
Biological Processes and Sustainable Development

Population size, residence patterns and reproduction of a sicklefin lemon shark population (*Negaprion brevirostris*) visiting a shark-feeding location at Moorea Island, French Polynesia

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Although the early years of the Atlantic lemon shark, *Negaprion brevirostris*, are now well known, the adult stage remains poorly documented. The ecology of its Pacific sister species, the sicklefin lemon shark, Negaprion acutidens, is almost unknown at any life stage. The presence of a daily shark-feeding tourism site at Moorea (French Polynesia) provided us with the opportunity to investigate the ecology, residence and reproductive patterns of adult sicklefin lemon sharks visiting the site. This population was monitored with daily underwater surveys during 41 months between January 2005 and May 2008. Photographic identification was successfully used as a non-invasive tagging method for studying the ecology and population residency along our four year study. We photographically identified a population of 36 adult individuals visiting the study site, including 20 females (55.6%) and 16 males (44.4%). Residence patterns of individuals were divided into four main categories: (1) resident males; (2) resident females that were present all year; (3) non-resident males and (4) non-resident females that visited the provisioning site infrequently. The reproductive cycle of the sicklefin lemon shark was found to be mostly biennial with a 10-11 months gestation period. Impacts of provisioning on shark behaviour will also be discussed.

Tu. 16:50 Ecosystems session room 2
Biological Processes and Sustainable Development

Marine fish spermatozoa: racing ephemeral swimmers

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After a long period of spermatogenesis (weeks to months), marine fish spermatozoa are delivered at male spawning in sea water at the same time as ova. In most fish species, these minute unicells (spermatozoa) have to accomplish their task, that is reaching the micropyle within a very brief period (seconds to minutes), for delivery of the haploid male genome to the ova. To achieve this goal, their highly performant flagellum must fully activate immediatly on contact with the sea water and propel the sperm cell at an unusually high initial velocity. The cost of such " hyperactivity " is a very rapid consumption of intracellular ATP which outstrips the supply. The spermatozoa become rapidly exhausted because mitochondria cannot compensate for this fast flagellar energy consumption. Therefore, any spermatozoon either becomes immotile or reaches the egg micropyle within its very short motility period (several tens of seconds to minuts) before micropyle becomes closed in relation to both contact of seawater and cortical reaction. Within a brief period, successive events occur from activation untill full arrest of flagellar motility. The present knowledge allows a good description of the activation mechanism as well as that of the movement parameters characterizing the motility period. As a complement, further understanding of axonemal motility results from in vitro experiments obtained after demembranation of flagella. In combination with the sperm energetic content (ATP and other high energy compounds) and its evolution during the swimming period, a general model is proposed which explains the successive cellular events occurring after activation and offers a guide line for understanding of events governing the sperm life span in the marine fish species which reproduce through external fertilization.

Tu. 16:55 Ecosystems session room 2
Biological Processes and Sustainable Development

Sperm motility in marine fish: an overview on the state of the art

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Knowledge on teleost sperm motility and factors controlling it have been so far obtained from a restricted number of selected species. In marine teleosts with external fertilization (halibut, turbot, sea bass, hake, cod and tuna as examples), the osmolality controls sperm motility: movement is activated by transfer from the seminal fluid into sea water, representing a large upward step in osmolality. The exception are flatfishes (such as halibut or turbot) where mainly CO2 is responsible for flagellar immotility in seminal fluid. In all species, the duration of motility is short and limited to minutes ranges due to partial exhaustion of the ATP and to increase of internal ionic concentration as suggested by studies with de-membranated flagella. In this overview, we compare motility characteristics (percentage of active spermatozoa, velocity, linearity), flagellar waves parameters (wave length and amplitude, number of waves) and energy content (respiration and ATP concentration) within 6 species. All parameters show a rapid decrease after activation; therefore progressive forward movement needed by the sperm to effectively reach the egg surface, is limited to a short initial period following activation. The rapid decrease of motility is reflected by a corresponding decrease of fertilizing ability. Exposure to external sea water also leads to local defects of the sperm flagella posing additional limitations on motility duration. However, minor flagellar damages as well as energetic exhaustion are reversible: after a resting period in a non-swimming solution at the end of the motility period, spermatozoa can be re-activated for a second motility period. From these results, a paradigm is developed establishing a link between external osmolality (sea water), internal ionic concentration and control of axonemal activity.

Tu. 17:00 Ecosystems session room 2
Biological Processes and Sustainable Development

The Composition and Variability of Insects Visiting the Flowers of Five Seed Crops in New Zealand

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The managed honey bee (Apis melifera) is relied upon to pollinate most insect pollinated crops, however, their long term availability for crop pollination is threatened by pest and diseases. Additional pollination services may be provided by other unmanaged flower visitors, however, in New Zealand few studies have assessed their identity, distribution and occurrence within and between crops. We observed flower visitors to onion, pak choi, carrot, radish and white clover seed crops and found that most visitors were recorded on the flowers of across crop species. The bees Apis mellifera, Bombus sp. as well as Syrphid, Sarcophagid and Anthomyiid flies visited the flowers of all crop species, while the native bees Lasioglossum spp. and Leioproctus spp., as well as the Calliphorid, Tachinid and Stratiomyid flies were flower visitors of onion, pak choi and carrot. Bibionid flies were observed on pak choi, onion and radish flowers. The abundance of unmanaged insects was highly variable between fields, even for the same crop species. Although some of these species contribute to crop pollination, an understanding of the factors influencing their occurrence within and between crops is necessary to improve their reliability as crop pollinators.

Tu. 17:05 Ecosystems session room 2
Biological Processes and Sustainable Development

Extremly Recent Spread of Male-killing Wolbachia in *Hypolimnas bolina*

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The butterfly Hypolimnas bolina hosts a diversity of Wolbachia infections. Extensive variation among populations of the South Pacific has made this species a model system to investigate the dynamics and evolutionary consequences of Wolbachia infections. Previous work, based on partial sequences of the mitochondria locus CO1 has established that one male killing infection (namely wBol1a) has spread recently throughout the species range. Here we further investigate the invasion dynamics of this infection through extensive sequencing of mitochondrial and bacterial loci. Seven mitochondrial loci (3 748 base pairs) and eleven loci of the bacterial genome (6 103 base pairs) were sequenced from nine different populations. Neither intra nor inter-population variation was detected at any of these loci. Potential explanations to this lack of diversity and biogeography predictions that these results allow are discussed.

Tu. 17:10 Ecosystems session room 2
Biological Processes and Sustainable Development

Relationship between environmental factors in the Gonadosomatic Index of Red Sea-urchin (*Loxechinus albus*) at Caleta Maitencillo (32°39'S y 72°26'W), Chile

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A fundamental aspect in the production of Red Sea-urchin seeds in controlled environments is to have background information about the reproductive cycle and environmental factors associated with reproductive timings, as they can change with latitude. Because of the above this research has a general goal to relate the state of gonadal maturity in a Red Sea-urchin population at Caleta Maintencillo (32°39'S y 72°26'W) with the environmental variables (Sea Surface Temperature (SST) and photoperiod). A quantitative analysis of the Gonadosomatic Index (GSI) in L. albus, established two periods of gonadal maturation, the main one in winter (July-August) and a lesser one in autumn (May). The photoperiod and the SST showed an inverse relationship with the GSI, showing a higher correlation (r2 = 0.83) with photoperiod. On the other hand, the SST shows a low correlation with GSI (r2 = 0.39). However, considering both photoperiod and SST, together they have a higher correlation with GSI of r2 = 0.92. This reflects the coupling of the photoperiods + SST to the development of gonadal maturation in L. albus at Caleta Maitencillo. However, the model does not include all the factors that affect the gametogenic process, such as the moon cycle, salinity, BDO and endogenous factor.

Tu. 17:15 Ecosystems session room 2
Biological Processes and Sustainable Development

The Distribution and Food Preference of Papilio schmeltzii Herrich-Schaffer

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Genus Papilio is a very small group in the Southwest Pacific and are found in Papua New Guinea, Solomons, Vanuatu, New Caledonia, Australia, Fiji and Samoa. The swallowtail butterfly Papilio schmeltzii Herrich-Schaffer is endemic to the Fiji Islands and first described by entomologist Dr. Gottlieb August Wilhelm Herrich-Schaeffer in 1869. The Fijian swallowtail butterflies prefer forested and isolated areas and are found near the edge of the forest. Swallowtail butterflies mainly visit Stachytarpheta urticifolia occurring around the edge of light-dark area. Oviposition by female P. schmeltzii has been observed on Micromelum minitum plant and also larvae of P. schmeltzii are found feeding on M. minitum plant. The localities of P. schmeltzii are Suva, Korolevu, Savusavu, Labasa, Nananu -I - Ra, Ovalau, Kadavu, Mango Vanua Balavu, Yasawa, Naviti, and Nathula. Three large outer islands of Fiji (Taveuni, Vauna Balavu and Kadavu) were visited to observe the swallowtail butterflies. In the vicinity where swallowtail butterflies were sighted, lots of Citrus plants of the Rutaceae family were present but no Micromelum minitum plants. In addition a new record for Taveuni and Kadavu as there is no documentation of P. schmeltzii present there. Although P. schmeltzii is commonly seen in Fiji, they occur in few numbers in their natural habitat. Investigation is ongoing about the biology and ecology of P. schmeltzi in detail, to better understand this iconic species and the survey is being carried out in Vatukarasa area in Sigatoka. In addition, P. schmeltzii has been successfully reared in captivity.

Tu. 17:20 Ecosystems session room 2
Biological Processes and Sustainable Development

Native and exotic plant-pollinator mutualisms in New Zealand
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Disruptions in key ecological interactions, such as plant-pollinator mutualisms can lead to evolutionary changes in community structure. The evolution of New Zealand's flora and fauna proceeded in isolation from other regions but this has been overlaid by the naturalisation of agricultural pollinators such as Apis mellifera and Bombus spp. and of exotic plant species. Considering their shared origin and evolutionary background, we would expect exotic pollinators to prefer exotic plants and native pollinators to prefer native plants. To determine the extent of the separation between exotic and native pollinators on exotic and native plants in New Zealand, the Landcare Research Community Pollination Project has conducted a broad survey of flower visitors at 7 natural and 2 cultivated sites throughout New Zealand. The number of flower visitors at individual plants along transects in mixed communities of natives and exotics were recorded. Observations of day-active flower visitors were made based on recognisable categories: honey bee, bumblebee, native bee, fly, beetle/bug, and butterfly/moth. A discriminant analysis on the combined data (>200 plant species) did not reveal any overall separation of flower visitor assemblages (based on proportion of visitor categories) on native or exotic naturalised plant species. Although the general survey does not support separation of exotic and native plant-flower visitor associations at the overall community level, there are some exotic plant species that are exclusively or predominantly visited by exotic insects. These are potential invasive mutualisms if these plant species are pollinator dependent and native pollinators are unable to service them.

Tu. 9:00 Ecosystems session room 3
Pearl, Oyster

La perliculture polynésienne à la croisée des chemins
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Au cours de ses presque 50 ans d'existence la perliculture polynésienne est passée par différentes étapes que l'on peut caractériser ainsi : une initiation et un questionnement (1961-1971), un développement lent et une quête de reconnaissance internationale de la perle (1972-1981), une aquaculture fragilisée par des accidents climatiques et des mortalités élevées des cheptels (1982-1985), une production accélérée à la conquête de l'" or noir " (1981-1990), un développement anarchique et une qualité des perles de Tahiti moins constante dans un marché de plus en plus concurrentiel (1991-2000), une production soutenue dans un contexte économique peu favorable qui conduit à une crise en 2008. L'existence de la perliculture, sous sa forme actuelle, est alors remise en question tandis que se profilent à court terme les menaces d'un changement climatique planétaire susceptible de modifier l'équilibre actuel des écosytèmes lagonaires perlicoles. Pourtant, l'existence de cette filière aquacole marine est vitale pour l'économie de la Polynésie française à laquelle elle contribue annuellement pour 70 à 80 % à l'export et en rapportant, en 2007 par exemple, 88,6 millions d'euros pour 7,6 t de perles de culture brutes commercialisées. A côté des professionnels de la perliculture des scientifiques s'impliquent dans diverses recherches visant à une meilleure connaissance de la biologie et de l'écophysiologie de l'espèce-cible, Pinctada margaritifera, tant dans le milieu naturel que dans des structures expérimentales, les écloseries-nurseries. Les programmes de recherche sont essentiellement centrés sur la connaissance de la vie larvaire des pintadines et la valorisation de la perle qui passe notamment par la compréhension des mécanismes biologiques de la greffe et la sélection d'individus donneurs de greffon. Les scientifiques doivent aussi participer à la mutation de la perliculture en développant une approche écosystémique à partir des travaux existant. Cette évolution pluridisciplinaire et pluriorganismes doit conduire à une production écologique durable de la ressource, la pintadine, et de son principal produit nacrier, la perle. Les résultats des travaux de recherche doivent permettre de conserver la supériorité actuelle de la Polynésie française en termes d'avancées technologiques et ainsi de sécuriser et de pérenniser la filière perlicole.

Tu. 9:15 Ecosystems session room 3
Pearl, Oyster

Presentation of the collaborative network ADEQUA aiming at the improvement of pearl quality in French Polynesia

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Pearl farming industry as the first exporting sector, is critical to french polynesian economy. It plays an essential role for regional development and employs about 5000 people. However, the liberalization of pearl farms concessions at the beginning of the 90s, followed by the grafting act popularization, concurred to the uncontrolled development of the industry and of the pearl production. Pearl quality suffered from that crisis lead by a continuous increase of the number of defective pearls on the market. Consequently, the farm profits decreased as evidenced by the drastic fall of the average pearl gram price observed from 2001. In that context, the IFREMER laboratory for "biotechnology and pearl quality" together with the local "Pearl farming agency" created in 2008 a scientific collaborative network aiming at the "improvement of pearl quality in French Polynesia" (also called ADEQUA). That research project, gathering 11 partner laboratories from French Polynesia and Metropole, applies an integrated and multidisciplinary approach to study the influence of each grafting step on pearl quality. That global approach integrates, for the first time, simultaneously all steps leading to pearl formation: from the grafting act itself, through the molecular mechanisms underlying mineralization processes, to the crystal structure of pearls. Those analyses should shed light on the dynamic process of pearl development and to propose solutions to help limit the frequency of pearl blemishes. The ultimate goal of that scientific network is to allow French Polynesia to make innovative progresses to increase the production of superior quality pearls. In a sector where the product prevalence cannot be maintained without a constant seek for maximum quality, this project will allow the Polynesian territories to keep their actual leadership in terms of technological advance and to ensure the durable development of that industry.

Tu. 9:30 Ecosystems session room 3
Pearl, Oyster

Experimental production of Tahitian black pearls using triploids

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Triploids are commonly used in aquaculture, their sterility and superior growth could be of some interest to pearl culture industry. Rearing time would thus be shortened and grafting process facilitated.
Triploids of *Pinctada margaritifera* have been successfully produced i using cytochalazin B in the Service de la Perliculture hatchery in Rangiroa atoll. Ratio of triploid juveniles was above 98%. Triploid of *P. margaritifera* appeared to grow slightly but significantly faster. The development of gonad was reduced and, in males, the germ cell line was interrupted at spermatocyte stage.
Diploid and triploid pearl oysters from the same batch were used as donors of mantle tissue or as receiver for nucleation in a pairwise grafting experiment within and between the two populations. The oyster were not conditioned prior to nucleation.
No differences were observed for mortality or nucleus retention. Pearls from triploid receivers were significantly larger than from diploids. This difference was even greater when the donor was triploid.
The pearl shape and quality of surface appeared to be influences by ploidy : triploid receivers gave significantly more round pearls with less flaws whatever the origin of the donor. This improvement of quality may be attributed to the reduced development of the gonad at seeding. It is not clear however if the usual conditioning of diploid oyster (induction of spawning before seeding mainly) would not be sufficient to obtain such high quality pearls. Possible consequences for pearl industry are discussed

Tu. 9:45 Ecosystems session room 3
Pearl, Oyster

Improvement of french polynesian pearls quality: transcriptomic SAGE approach for identification of biomineralization markers in *Pinctada margaritifera* oyster

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Pearl farming occupies an essential place in French Polynesian economy. Thus, Ifremer's laboratory collaborates with the "Service de la Perliculture" in Tahiti in order to deepen the knowledge concerning molecular mechanisms of biomineralization processes leading to the pearl formation.
This research project contributes to a large program aiming at enhancing pearl quality. The goal is to get a global view of transcriptomic events taking place in mineralizing tissues of the oyster Pinctada margaritifera involved in pearl formation. Therefore, a transcriptome analysis by the SAGE method (Serial Analysis of Gene Expression) and the construction of an EST library (Expressed Sequence Tag) were developed in parallel on mantle epithelial cells in order to characterize graft cell genes differentially expressed. Expression profiles of 48.000 genes have been established and more than 280.000 EST have been sequenced allowing the constitution of 47.000 clusters. These results represent an important set of genomic data for this organism, and have allowed the selection of a combination of genes, which characterization was undertaken by real-time PCR. Correlation between the expression level of these potential biomarkers and the quality of pearls is now assessed in the course of experimental graftings.
This work will allow the identification of a set of genes in correlation with the nature of calcium carbonate deposits of the pearls. The evidenced biomineralization markers will be used to gain original tools (bio-assays) for the professionals to assess and select donor oysters with higher mineralization capacities. This work is therefore closely linked to the concerns of the professionals, and will contribute to the sustainable development of the aquaculture industry essential to French Polynesia.

Tu. 10:30 Ecosystems session room 3
Pearl, Oyster

Hydrodynamic modeling for pearl oyster aquaculture management: strategy currently implemented for western Tuamotu atolls

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A multidisciplinary 3-year long project funded by the European Development Fund was recently launched to enhance pearl oyster aquaculture management in French Polynesia. The project includes, among many other tasks, a study on the hydrodynamic functioning of Ahe and Takaroa atolls. Significant spat collecting activities occur in the lagoons of these two atolls. The management of this critical activity would benefit from decision-support tools that come with a better understanding of the lagoon circulation.
We present here the strategy used to develop 3D numerical models for Ahe and Takaroa lagoons, and for their proper parameterization and validation. The models implementation require 1) a correct oceanic and atmospheric forcing based on a combination of models, remote sensing and in situ data, 2) a characterization of the atoll morphology (depth and aperture along the rims) using high resolution remote sensing and in situ measurements, 3) the acquisition of in situ hydrodynamic measurements (tide, current) in lagoons, passes and hoas across the different seasons, 4) a 3D numerical modeling toolbox and efficient computing architecture that needs to be optimized for different aspects specific to atolls (e.g. the rim structure). Then specialized results from researchers and engineers need to be digested in the form of convenient web-based and printed consultation and decision-support tools for managers of the pearl oyster industry.

We present the status of all these actions after one year in the project.

Tu. 10:45 Ecosystems session room 3
Pearl, Oyster

Quality and quantity of available food for pearl oyster: a key parameter for a successful culture

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This pearl oyster culture suffered actually a major crisis in Polynesia, involving a dramatic fall of the average price of the pearl. Overproduction, lowers quality and disorganization of the trade-circuits destroyed an industry representing more than 12 billion Fcfp (100 million e) in 2005 and employing up to 7.000 people. The pearl culture occupies, with tourism, an important place in the economy of French Polynesia, with 78% small producers dispersed in many atolls. The bad quality of a pearl can have multiple causes; beyond human "errors", the environmental conditions of the culture remain determining. The program "Study of the biological components which characterize the environment of the pearl oyster Pinctada margaritifera" aims to get a better knowledge on the productivity of the plankton of the lagoons, as well as on the capacity of oysters to retain the particles according to their sizes and their natures. This program is part of the program "Professionalization and perpetuation of the pearl oyster culture" conducted by the "Service of perliculture" of French Polynesia and funded by the European development fund. Results of the first expedition lunched in May 2008 in Ahe atoll demonstrated that pearl oysters (adults and juveniles) can retain only a small percent of the phytoplankton production. Indeed, phytoplankton biomass is dominated by picoplancton (organisms with a size less than 2 μm). Three more expeditions are scheduled in 2008 and 2009 to describe the plankton food web, to calculate the filtration rates of larvae, juveniles and adults and to determine which preys are grazed by oysters. Another action of the program concerns the lagoon hydrodynamism (bathymetry, water circulation). These studies complete an action lunched in parallel by the University of Polynesia and IFREMER which aim is the modeling of the growth, the reproduction and the recruitment of P. margaritifera. Recommendation on lagoon capacity charge for aquaculture will be one of the products of the program.

Tu. 11:00 Ecosystems session room 3
Pearl, Oyster

Nutritional Behaviour of the Pearl Oyster *Pinctada margaritifera* in the Lagoon of Ahe (Tuamotu archipelago, French Polynesia)

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Whereas the Tahitian pearl farming industry has developed on natural spat collection, very little is known about parameters controlling reproduction events of the black lip pearl oyster. Collection of spat is made empirically which leads to unsustainable practices (e.g spat transfer, increasing of spat collector numbers). As in many other bivalves, trophic resources seem to be one of the major environmental parameters controlling reproduction effort and gametogenesis in P.margaritifera. This study aims to measure clearance rates, ingestion rates and assimilation rates for putative trophic resources in atolls. A flow trough grazing system supplied with lagoon water has been designed to measure filtration rates of food particles. Ingestion rate and assimilation rate are calculated from the food particle concentration in faeces and pseudo faeces. Flow cytometry, Utermohl decantation, chlorophyll extraction, and compound microscope are used to evaluate biomass and cellular ingestion of phytoplankton, zooplankton and other particles in the size range of 0.2μm to 200 μm. In May 2008, a first campaign was made on the atoll of Ahe to validate

the experimental in-situ flow through system. For individuals of 112.5 ± 2.5 mm shell length the pumping rate was 58 Lh-1. The clearance rate of particulate organic matter was of 11 ± 2 Lh-1. Clearance rates of picophytoplancton and of nano/microphytoplancton obtained by chlorophyll extraction were 10 ± 5 Lh-1 and 27 ± 3 Lh-1 respectively. Further work financed by European Development Fund will focus on measurement of ingestion and assimilation rates, monitoring of trophic resource abundance and related reproduction effort. Eventually the construction of a DEB growth and reproduction model will allow a better comprehension of reproduction in P.margaritifera.

Tu. 11:15 Ecosystems session room 3
Pearl, Oyster

Commercial collection of pearl oyster (*Pinctada margaritifera*) spat and impacts on genetic diversity of farmed and wild populations

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Pearl oyster culture is an important commercial activity in several Pacific and Asian countries. In French Polynesia, pearl oyster culture is supported by large scale collection of juvenile (spat) on collectors deployed in atolls exhibiting good recruitment. This unique situation allows some degree of protection of the wild adult stocks which are not directly exploited for pearl production. Socio-economic benefits are also derived as many people are employed by this collection activity which does not require expensive capital investment or highly skilled labour. However, it is not known how many parents successfully contribute to the collected juveniles that will be put into cultivation. The potential genetic impacts of this collection activity on the genetic diversity of the farmed stocks and ultimately the wild stocks present in these atolls are therefore largely unknown. Genetic diversity is an important component of biodiversity and its maintenance is paramount to the sustainability of this industry. Losses of genetic diversity could lead to decreases in capacity of the oyster populations to adapt to changing environment, associated with climate change for example. Using recently developed microsatellite genetic markers, the genetic diversity of wild and farmed oyster populations will be compared in four atolls. In addition, the genetic diversity and potential family make-up of three groups of 1.5 year old oysters recruited at three different locations in the same atoll the same year will be examined. Lastly, temporal settlement patterns will be determined using recruitment data from a series of short term collectors that were deployed and recovered at monthly intervals over a year. DNA marker-based pedigree reconstruction will be performed on large cohorts of spat that recruited at the same place and time to determine if peak of recruitment could be driven by successful spawning of a small number of parents.

Tu. 11:30 Ecosystems session room 3
Pearl, Oyster

Planktonic compartment of Ahe Atoll (Tuamotu Archipelago, French Polynesia): potential preys for pearl oyster *Pinctada margaritifera*

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Among coral reef systems, Tuamotu atolls are of great interest because they are very productive compared to the surrounding ocean and they host numerous pearl oysters farms in their lagoons, with a high economic value. To improve the understanding of the nutritional behavior of larvae, juveniles and adults of the pearl oyster *Pinctada margaritifera*, an European program has begun in 2008 for 3 years (1) to study the planktonic productivity of Ahe atoll and (2) to evaluate experimentally the contribution of the various nature and size of organisms and particles (Transparent Exopolymeric Particle, bacteria, pico-nanophytoplancton, microphytoplankton, protists, metazooplankton) to the diet of pearl oysters. The first survey conducted in May 2008 revealed a spatial and temporal distribution of plankton in the lagoon which was different of planktonic structure observed in surrounding ocean (e.g. lower concentrations of bacteria but higher bacterial diversity, lower abundances of picoautotrophs and ciliates). Specific biological characteristics were noted at the station located in the west part of the lagoon (noted L1) such as lower concentrations of *Prochlorococcus* (picocyanobacteria) and photosynthetic capacity values of picophytoplankton and higher concentrations of nanoflagellates and ciliates. The metazooplankton dominated by small organisms (bivalve larvae, copepod nauplii, *Oithona spp*, Clausocalanidae) displayed a clear spatial pattern with higher abundance at two stations (P1 and P11). At the atoll scale (4 stations and 3 depths at three dates), the principal preys for larvae and juveniles of oysters can be represented in term of carbon biomass as follow: nanoflagellates (35% of heterotrophs) followed by bacteria, autotrophic picoplankton dominated by picocyanobacteria (*Synechococcus*: 61%; *Prochlorococcus*: 4.8% and picoeukaryotes: 4.1%). The microplankton (ciliates and diatoms) was low represented in

the lagoon system. Grazing pressure by larvae and juveniles on these preys was estimated by experiments in batches.

Tu. 11:45 Ecosystems session room 3
Pearl, Oyster

Effect of the Splitted Habitats of the French Polynesian Lagoons Associated with Commercial Exploitation on the Genetic Diversity and Wild Population Structure of the Pearl Oyster: *Pinctada margaritifera*

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Due to their isolation, oceanic islands provide shelter for original ecosystems with clear geographical limits. In such context, French Polynesia offers an insular system with highly isolated islands, en even more while considering lagoonal species. The black-lipped pearl oyster Pinctada margaritifera comes as one of the best example of species occurring almost exclusively in lagoons. Populations of this species are essentially distributed in lagoons and can therefore be separated by several hundreds of kilometres. In addition of being isolated lagoonal species have also undergone several sea levels fluctuations responsible for reduction or complete loss of genetic diversity as in some other species (i.e. fish). These processes can generate either a significant genetic structuration among populations from different lagoons together with apparition of new clades, or on the contrary a loss of genetic diversity with an upholding of the most frequent haplotypes. In this context of population natural evolution one must also include the role and the impact of human activity. Indeed many juveniles of P. margaritifera have been and are still translocated from a lagoon to another to supply oyster farms. Because translocation causes genetic homogenization of wild populations from distinct atolls, it seems necessary to evaluate the actual genetic diversity of wild populations of P. margaritifera, thanks to genetics markers like microsatellites and introns (involved in the nacreous layer synthesis) in order to replace this level of diversity and the spatial variability of this diversity in a larger evolutionary model of populations and species. According to six microsatellite markers, significant genetic differentiation exists between populations from Rangiroa Island and two populations from Takapoto and Mangareva islands. Supporting these first results, two intronic markers sequences analyses on three hundred samples seem to reveal geographic specificity of some haplotypes.

Tu. 11:50 Ecosystems session room 3
Pearl, Oyster

Photosynthetic Capacity and Community Structure of Microphytoplankton in Ahe Atoll (Tuamotu Archipelago, French Polynesia): Preliminary Results

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Tuamotu atolls host highly productive pearl oyster farming in their lagoons while carrying capacity of these coral ecosystems is little known. Primary production is mostly done by small cells ($<2\mu$m), cyanobacteria and picoeukaryotes, which represent around 80% of the biomass. The paradox is that adult oyster cannot fully access to this resource since the optimal size of the seston they can process is from 5-7μm. Few studies were conducted on the plankton larger than 2μm and particularly on the microphytoplankton either on its production or community structure. Two major hypotheses are tested in a new European program (FED). The first one is a trophic mediation through heterotroph protits and the microbial loop; this will be discussed in a companion presentation. The second one is that the productivity of microphytoplankton is high and could compensate its low biomass by a high replacement rate of the biomass filtered by oyster and other suspension feeders. The aim of our study was to determine photosynthetic capacity and efficiency of microphytoplankton and its community structure. A spatial and temporal sampling design was conducted on four stations at three depths and at four dates on a two-week period in May 2008. In order to estimate photosynthetic capacity (PC), production vs light curves were realised using an in vivo modulated chlorophyll a fluorometer (PAM). Photosynthesis parameters were compared between plankton size fraction below and above 2μm. Community structure of the microphytoplankton ($>2\mu$m) was determined using photonic and scanning electronic microscopy. Preliminary results showed that photosynthetic capacity was spatially and temporally variable. Briefly, the spatial variability of PC was higher than the temporal one for microphytoplankton while it was the opposite for picophytoplankton. Generally, PC of picophytoplankton was equal or higher than microphytoplankton except for one station. Numerical dominant taxons were coccolithophores, dinoflagellates and diatoms. Correspondence analysis of the community structure revealed significant spatial discrimination.

Tu. 11:55 Ecosystems session room 3
Pearl, Oyster

Measurement of pearl oyster shell and pearl growth with calcein fluorochrome

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Nacre depth of cultured Tahitian pearls is an essential quality criterion. A minimum nacre depth of 0.8mm is required for exportation. The growth of this layer is influenced by environmental factors such as temperature, food, and pH. An experimental work has been initiated in order to evaluate the respective influence of these parameters on growth of the shell and of the pearl of the black lip pearl oyster (*Pinctada margaritifera*).
As a first step of this study, a visible mark of the beginning of the experiments must be inserted into the calcified structures. The inexpensive and easy to use fluorescent calcein was chosen to test the suitability and the reliability of this method on pearl oyster shell and pearl.
Two different ways of marker administration were used in these experiments : immersion and injection. The treated animals were juveniles and seeded adults. Different concentrations were used in immersion experiments : 50, 100 and 150 mgL-1 for shell marking experiments ; 150 and 200 mgL-1 for shell and pearl marking experiments. For each concentration of shell marking experiments, a series of immersion times were examined: 6, 12 and 24 hours. For injection method, calcein concentration and the site of injection were different according to the calcified structure considered. For shell marking experiments, calcein (50 and 100 mgL-1) was injected into the palleal cavity. For pearl marking experiments, calcein (150 and 200 mgL-1) was injected into the pearl sack to mark the pearl.
After the immersion/injection period, mollusks were reared in the laboratory for two months. The efficiency of the two methods are compared. The effects of immersion duration and concentration on marker incorporation and persistence are presented.

Tu. 14:00 Ecosystems session room 3
Aquaculture and Fisheries

Sustainable Management of a Hake–Anchovy Peruvian Fisheries Model by Viability Methods

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We study the sustainable management of the hake–anchovy couple in the Peruvian ecosystem by viability methods. We put articular emphasis on consistency between ecological and economic conflicting objectives.

Tu. 14:15 Ecosystems session room 3
Aquaculture and Fisheries

Achieving Sustainable Fisheries: Gradually or Abruptly?

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A key issue in fisheries restoration is the speed at which recovery can occur, while still meeting the economic and social constraints which managers must deal with. It is particularly true when coastal population depends directly on the fishing activity, and can not face fishing bans. This paper uses the viable control approach to examine fisheries restoration and study the tradeoffs involved with the selection of recovery strategies. We define sustainability as a combination of biological, economic and social constraints which need to be met for a viable fishery to exist. The set of states for which constraints are met, or viable states, is considered as the target for recovery of the fishery. The analysis is based on a discrete time bio-economic model of the Bay of Biscay nephrops fishery, with stock biomass and fleet size as the two state variables, and per vessel fishing effort and adjustment of fleet size as the two control variables. We address the particular optimal control problem of minimizing the time required for the fishery to recover from unsustainable states, under a minimum transition-profit constraint corresponding to the need to maintain a minimum level of revenue for vessels during the transition phase. We apply this framework to a historical crisis situation in the case study, and analyze various recovery paths with different transition profit constraints, including the historical path followed by the fishery.

Tu. 14:30 Ecosystems session room 3
Aquaculture and Fisheries

Thirty years of aquaculture in French Polynesia: history, status, planning and key species for a sustainable development

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In French Polynesia, aquaculture has really started during the sixties with pearl culture trials. Ifremer set up a research center in Tahiti in 1972 that offered new potential of experiments for aquaculture development. A lot of species have been tested for their aquaculture potential. Technical success were achieved on hatchery reproduction and grow-out protocols for green mussel (Perna viridis), pacific oyster (Crassostrea gigas), freshwater prawn (Macrobrachium rosenbergii), shrimps (Litopenaeus vannamei, Penaeus monodon, Litopenaeus stylirostris, ...), finfishes (Lates calcarifer, and now ongoing Platax orbicularis). Other techniques have been successfully tested by the Fisheries Department of French Polynesia : capture-based aquaculture development yielded some pioneering works on milkfish (Chanos chanos) and reef fish post larvae capture and culture (PCC), as well as black-lip pearl oyster's (Pinctada margaritifera) and giant clam's (Tridacna maxima) spat collection have been developed in some specific lagoons. Pearl farming has grown and has become the first export industry of the country, and the first aquaculture industry in the Pacific islands. However, most of the technical know-how developed on the other commodities has not been turned into economic success. Using some classic and appropriate criteria, we assess the strengths, the weaknesses and the constraints of each type of aquaculture in their specific environments of French Polynesia. Those experiments in aquaculture resulted in the production of some guidelines and the selection of some key species for a sustainable future. Currently, the following activities are being implemented : - adapting aquaculture technologies to specific local conditions, - building a public hatchery, - improving policy-making and regulations, - aquaculture development strategic planning and zoning. Our goal is to reach economic, social and environmental sustainability within 2 to 5 years for spat collection of giant clam, aquaculture of Polynesian's delicacy Platax orbicularis, shrimp farming (particularly in sea cages) and lagoon ecotourism using PCC.

Tu. 14:45 Ecosystems session room 3
Aquaculture and Fisheries

Techniques of diagnosis in fish pathology

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Aquaculture is currently one of priority fields in French Polynesia. For instance, " Service de la Pêche " (" fisheries office ", a local government agency) has initiated together with Ifremer (" the french research institute of research on exploitation of the sea ") a research program on finfish aquaculture of Platax orbicularis. However, at different stages of breeding mortalities occur. Indeed, fish concentration increases the contacts between them and then, the transmission of pathogens . In fish farming (intended for the human consumption), few curative treatments are authorized and such treatments are heavy to implement in sea cage. Consequently, we have worked on the biosecurisation of our livestock and developed preventive treatments together with premature diagnosis. These diagnosis are based on microbiology, histology and molecular biology techniques. When abnormal symptoms appear, different analysis are required to determine their origin. Wet mount are made first to determine the presence of ectoparasites. The identification is then realized by morphological criteria and can be confirmed by Polymerase Chain Reaction (PCR). In the case of bacterial infection, after isolation on marine agar, the phenotypic identification is realized using API 20E gallery, while the genotypic identification is made by PCR using primers. Additionally, we have been confronted to mortalities due to the Viral Nervous Necrosis (VNN) Virus, or Nodavirus responsible for the Viral Encephalopathy and Retinopathy -VER- in fish species). In that case, diagnostic is realized by histology and confirmed by in situ hybridization or PCR. The developments of these methods in our breeding program have allowed us to use a precise diagnostic of the pathology, then to use the best adapted curative strategy in order to respect environment and animal welfare.

Tu. 15:00 Ecosystems session room 3
Aquaculture and Fisheries

DEDUCTION (Développement Durable de la Crevetticulture, Traitement de l'Information et Observatoire du Système en Nouvelle-Calédonie) : un Projet Scientifique et Technique en Soutien à l'Activité Crevetticole Calédonienne

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La crevetticulture de Litopenaeus stylirostris en Nouvelle-Calédonie a démarré il y a trente ans pour atteindre aujourd'hui une production voisine de 2000 tonnes. Depuis une dizaine d'années, les élevages sont affectés par les syndromes d'été et d'hiver, mettant en jeu Vibrio nigripulchritudo et V. penaecida. Le projet DESANS (Défi Santé Stylirostris - 2003-2006), mené par l'Ifremer, a mis en évidence les interrelations fortes entre le bassin, le pathogène et son hôte, la crevette, en proposant des scenarii explicatifs des syndromes. Le projet multidisciplinaire DEDUCTION (2007-2010) poursuit l'élucidation des processus mettant en jeu les trois compartiments précités, en élargissant le point de vue aux écloseries. L'estimation des flux à l'interface sédiment-colonne d'eau dans les bassins est une pièce majeure dans la compréhension du modèle environnemental, avec pour finalité la définition d'indicateurs biogéochimiques d'état du fond de bassin. La pathogénéicité des vibrios fait l'objet d'une collaboration avec les instituts Pasteur de Paris et Nouméa, et les voies d'infection dans l'animal sont étudiées. Les références physiologiques de la crevette aux différents stades larvaires et en grossissement sont déterminées, fondant ainsi la recherche de l'effet des probiotiques et l'approfondissement des études nutritionnelles. L'effet d'heterosis chez les hybrides des souches calédonienne et hawaiienne de L. stylirostris est évalué sur la croissance et la résistance aux pathogènes, pour laquelle des marqueurs micropeptidiques sont activement recherchés par l'équipe Ifremer de Montpellier. Ifremer assure une veille clinique dans les fermes et les écloseries en lien avec les services vétérinaires du gouvernement, et est chargé de la gestion et de l'exploitation des données des élevages de la base Stylog. Enfin dans un contexte de durabilité de l'activité, les rejets des fermes dans les effluents sont caractérisés et leurs impacts investigués dans le proche lagon, en lien avec les travaux de l'Institut de Recherche pour le Développement (IRD).

Tu. 15:15 Ecosystems session room 3
Aquaculture and Fisheries

Evaluation of Selected Philippine Endemic Plants as a Sustainable and Environment-friendly Piscicide for Aquaculture Management

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The use of commercially available insecticides as fish toxicants (piscicides) in pond water is too toxic in the environment. To address the control of fish predators and competitors without compromising the environment, there is a need to find alternative fish toxicants that are effective, abundant (locally available) and environment-friendly (biodegradable).

The study was conducted to determine the toxicity and piscicidal effects of the leaf extracts of makabuhai Tinospora rumphii, kamoteng kahoi Manihot esculenta, and datiles Muntingia calabura, and bark extracts of kamatsili Pithecellobium dulce and payhod Albizia procera as a sustainable and environment-friendly piscicide against African Catfish Clarias gariepinus and Tilapia Oreochromis niloticus. Lethal concentrations (LC50 and LC100) , expressed as ml L-1 of plant extract to water, were determined through a laboratory static bioassay.

The 6-hour lethal concentration showed that the plant with the strongest toxicity (expressed as LC50) and piscicidal (expressed as LC100) activity for both C. gariepinus and O. niloticus is the bark extract of payhod.

The toxicity effects of the five plant extracts used against C. gariepinus arranged in order of decreasing toxicity is as follows: A. procera (0.95)>T. rumphii (1.76)> P. dulce (2.04)> M. esculenta (21.84)> M. calabura (28.91) and for O. niloticus: A. procera (0.45)>T. rumphii (1.65)> P. dulce (3.41)> M. esculenta (36.42)> M. calabura (37.99).

The piscicidal effects of the five plant extracts used against C. gariepinus arranged in order of decreasing effect is as follows: A. procera (1.92)>T. rumphii (4.79)> P. dulce (4.84)> M. esculenta (51.63)> M. calabura (74.59) while for O. niloticus: A. procera (1.71)>T. rumphii (4.65)> P. dulce (6.88)> M. esculenta (72.85)> M. calabura (82.80).

Results showed that the evaluated endemic plants could be a potential source of locally available, environment-friendly and sustainable toxicant for aquaculture management.

Tu. 15:30 Ecosystems session room 3
Aquaculture and Fisheries

Genetic Technologies as Tools to Add Value to Geographically Isolated Shellfish Production Systems

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Genetic improvement programmes are becoming increasingly common in shellfish aquaculture for enhancing productivity, reducing processing costs, and improving product quality and value. Heritable characteristics that are often considered desirable include meat yield, shell and pearl colour and resistance to disease and environmental fluctuations. Classical selective breeding using family based selection is suited to the biology of many shellfish species, and gains of 10 - 20% per generation for growth rate are typical. Most existing breeding programmes invest in sophisticated hatchery technology enabling the rearing of multiple families through the difficult larval phase. Simultaneous production of a greater number of families allows a higher selection intensity to be applied, therefore increasing the potential level of genetic gain achievable. The simultaneous production of a large number of families is challenging even in a sophisticated shellfish hatchery and becomes very difficult in an island based facility, where services may be unreliable and risk of storm damage is a serious disincentive to significant capital investment. Molecular biological tools such as microsatellite markers for pedigree analysis are becoming increasingly affordable and provide a potential means for shifting some of the complexity-burden involved in genetic improvement programmes away from the localised hatchery environment, to centralised laboratories. The comparative advantages of these distinct genetic improvement strategies will be discussed in the context of delivering economic benefit to geographically isolated, island based shellfish production systems, while still maintaining local stakeholder involvement.

Tu. 15:45 Ecosystems session room 3
Aquaculture and Fisheries

Pacific Island Fisheries and Interactions with Marine Mammals, Sea Birds and Sea Turtles

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The Pacific Island countries and territories cover over 300 million sq km of the largest ocean in the world and support commercial, subsistence and artisanal fisheries both inshore and offshore. Long lived species such as sea turtles, marine mammals and seabirds can be especially vulnerable to interactions with fisheries. This study summarizes Pacific Island fisheries, existing research on distribution, abundance and local knowledge of marine mammals, sea turtles, and seabirds, and the interactions between these species and fisheries both individually for each of the 22 Pacific Island states and territories and also at a regional level.

There is little information on fisheries interactions with marine mammals across the region but recent complaints by fishermen about the depredation of catch by toothed whales have been cause for USP to begin research on the subject. Sea turtle bycatch is a known problem in commercial fisheries in the region but bycatch rates are not well quantified due to lack of observer coverage. Information on interactions with sea turtles in nearshore fisheries is almost non-existent as turtles are often directly hunted or consumed as part of local culture.

Even with limited observer coverage in the region, existing reports from logbooks and observers indicate that seabird interactions with commercial fisheries are extremely rare (Watling, 2007). No information exists on seabird interactions with nearshore subsistence fisheries.

Priorities for future research include abundance and distribution of marine mammals, sea turtles and seabirds both regionally and for individual states and territories. Increases in observer coverage and preliminary studies into nearshore fisheries for quantification of catch and interactions with long-lived species are also important. The cultural and political context of managing fisheries interactions with these species is also discussed.

Tu. 16:30 Ecosystems session room 3
Aquaculture and Fisheries

Toward appropriate methodologies and indicators to assess the impact of coastal fisheries on reef fish communities in New Caledonia (South Pacific)

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The ongoing creation of a nickel mining complex will soon increase demographic pressure on the rural Northwest coast of New Caledonia (Southern Pacific Ocean). As a consequence, fishing pressure on reef fish resources is expected to significantly rise in this area, and there is a need to identify relevant indicators for a long-term monitoring of these resources. This paper aims at examining the impact of fishing activities on reef fish communities in New Caledonia, by analysing the structure of fish assemblages along a gradient of fishing intensity. Underwater Visual Censuses (UVC) and fisher interviews were conducted in two study areas showing contrasted exploitation levels: Northwest and Southwest lagoons, the latter being already subjected to high fishing pressure. In situ data was then analysed with relation to spatialized fishing data. Because of a high spatio-temporal variability of reef fish assemblages in New Caledonia, the use of functional groups and eco-trophic guilds was preferred to a taxonomic approach. Our results highlighted an effect of fishing intensity on fish assemblages, with significant interactions between size and functional structures in terms of biomass and density. These analyses allowed identifying relevant indicators that could be used for a long-term monitoring on the Northwest coast study site. As a step toward their use for local management, it also provided clues for establishing reference points associated with these indicators. Nevertheless, UVC methods remain not fully appropriate to alone characterise fishing impacts. In situ complementary methods (e.g. video observations) may provide supplementary data on targeted species and exploited biotopes that cannot be surveyed by UVC. Furthermore, validation of UVC data and future monitoring should still be based on fish landing surveys, especially targeting informal fishers.

Tu. 16:35 Ecosystems session room 3
Aquaculture and Fisheries

Fisheries externalities and biodiversity preservation: Frigatebirds, discards and the viability of shrimp fishery in French Guiana

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In this paper, we develop a viability analysis of a shrimp fishery in a sub-tropical coastal area. On the one hand, the studied fishery generates discards of by-catched species, raising ecosystemic management issues. On the other hand, these discards have a positive externality on a protected marine bird population (Frigatebirds) as the birds feed on the discards of the fishery. This feeding effect is important as recent discards reduction has implied an important increase of newborns mortality, which may jeopardize the conservation program of the bird population. We examine the sustainability of that program by taking into account the impact of the Guiana shrimp fishery's dynamics on the survival of newborns Frigatebirds. We examine the consistency between the fishery's dynamics and several sustainability objectives (economic, social and ecological): We reveal coastal management decisions that make it possible to maintain fishery's profit, to reduce its impact on marine biodiversity, and to maintain a significantly high reproduction rate of the Frigatebird population.

Tu. 16:40 Ecosystems session room 3
Aquaculture and Fisheries

Combining Resource Status, Fisheries and Socioeconomic Information to Identify Fishing Pressure and Exploitation Trends of Coral Reef fisheries in Pacific Island Countries

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Knowledge of the current exploitation status of coral reef resources and their actual condition helps to evaluate the degree to which coral reef fisheries are overexploited. Site specific resource, fishery and socioeconomic data collected over the past 6 years in 17 Pacific Island countries and at over 60 sites were tested against exploitation scenarios (Newton et al. 2007) that correspond to the range of sustainable coral yield data published worldwide.
While, at the macro-scale, coral reef fisheries in Pacific Island countries are mostly classified as being still sustainable, our site-specific analysis across sites in Pacific Island countries reveals that over half of all sites assessed are subject to potential or definite overexploitation.
Significant relationships between population and fishery factors suggest a number of fishing pressure indicators.
Abundance, biomass and size composition of fish communities composed by 15 selected commercial fish families was analysed, based on data collected from in situ underwater visual censuses. The community size distribution and dominance patterns of families were used as indicators of resource condition.
Indicators from both resource and socioeconomic datasets were tested against each other, aiming to demonstrate the possible response of the local fish community to fishing pressure. We found significant relationships between fish community characteristics, in particular slopes of size-spectra (size-abundance graphs) and fishing pressure indicators

Tu. 16:45 Ecosystems session room 3
Aquaculture and Fisheries

Structure spatio-temporelle des populations d'invertébrés benthiques des platiers récifaux pêchés du Grand Nouméa

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Les ressources marines constituent un apport alimentaire, économique ou récréatif important pour les pays en voie de développement des îles du Pacifique sud. Parmi elles, les invertébrés peuvent représenter une grande partie des espèces cibles pour les populations locales. Ils sont ramassés en plongée ou à pied pendant les marées basses. La pêche à pied se pratique de façon informelle et cible de nombreuses espèces, c'est pourquoi elle est difficile à quantifier. De plus, la perturbation entraînée par le piétinement des pêcheurs peut à son tour affecter l'habitat et les espèces associées. Les conséquences biologiques et écologiques de cette pratique sont encore mal connues et l'application d'une approche écosystémique incluant l'homme, la ressource et l'environnement semble nécessaire pour une gestion durable des ressources marines. Dans ce cadre général cette étude, faisant partie d'un travail de thèse, se propose de décrire la structure spatio-temporelle des populations d'invertébrés benthiques sur des platiers soumis à différents niveaux de pression de pêche en prenant compte des habitats occupés par les différentes espèces. Elle met l'accent sur les changements des descripteurs biologiques tels que la densité et la biodiversité spécifique, ainsi que des descripteurs fonctionnels tels que la taille et le régime alimentaire sous influence de la pêche. On s'attend à une diminution de densité et de biomasse des espèces cibles ainsi que des changements de biodiversité de l'ensemble de la communauté benthique. L'étude est appliquée aux platiers côtiers et platiers d'îlots du Grand Nouméa où la pratique de la pêche à pied est essentiellement récréative et de pression différente. Les premiers résultats décrivant la composition de la communauté benthique en fonction de la pression de pêche et de l'habitat seront présentés.

Tu. 16:50 Ecosystems session room 3
Aquaculture and Fisheries

Thresholds and multiple scale interaction of environment, resource use, and market proximity on reef fishery resources in the Solomon Islands

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Reef fish are critical in maintaining the ecological function of coral reefs and providing food security for coastal communities in developing countries. Reef fishery stocks are under increasing threat from factors such as climate-related habitat degradation, land use practices, and resource extraction related to human population growth, direct consumption and increasing connectivity between in situ fishery and fish markets. This study investigates how reef fish stocks are related to environmental, localised market forces and market proximity indicators across 51 sites in The Solomon Islands. Hard coral cover is the best indicator of total target fishery biomass, with cover of less than 31.25% associated with significantly less biomass than sites with higher coral cover. Direct resource use indicators including fish consumption and fish sale pressure were poor predictors of target fish biomass across the determined models. Distance of the fishery resource from community, provincial sub-station, provincial capital and national capital are all significantly and positively correlated with biomass for four key fishery families: Acanthuridae (surgeonfish), Scaridae (parrotfish), Lethrinidae (emperor), Lutjanidae (snapper). Multiple scale relationships are evident between market proximity indicators and Lutjanidae and Scaridae families. Thus, while pooled target fishery species are constrained by environment, higher resolution analysis reveals the effects of anthropogenic impact through market proximity on constraining fishery biomass distribution in The Solomon Islands. This study highlights the need for reef fishery managers and conservation practitioners to focus more attention on proximity of resources to markets to sustain the ecological health of both human and reef dominated ecosystems.

Tu. 16:55 Ecosystems session room 3
Aquaculture and Fisheries

Commercial Fishing, Conservation, and Compatibility in the Northwestern Hawaiian Islands

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In the Pacific, significant focus has been given to the scaling-up of marine protected areas (MPAs) to regional scales of ecosystem protection. The management of large-scale MPAs and MPA networks faces different challenges than local or community-based MPAs, including the prevalence of governance structures that require institutional co-management or co-trusteeship of the marine environment. We address a critical issue that often arises in marine ecosystem-based management - that of achieving a balance between ecosystem protection and sustainable management of marine resources. Research findings are based on our experience in the management planning process for the proposed Northwestern Hawaiian Islands National Marine Sanctuary (later designated the Papahānaumokuākea Marine National Monument), which involved addressing the compatibility of commercial fishing and marine ecosystem protection. A participatory planning process was initiated to establish common decision criteria for compatibility determination through a series of expert fishing discussion group meetings. Sources of conflict were attributed to the differing approaches to resource management, their policy foundations, and the decision criteria utilized by different institutions involved in multiple agency planning processes for the Northwestern Hawaiian Islands. Our findings suggest the key elements of an ecosystem-based approach to protected area management include developing a common understanding among decision-makers of ecosystem boundaries and ecosystem condition, informed by the best available science. We propose that compatibility relies on an informed assessment of whether use is likely to compromise ecological integrity and is consistent with the goals and objectives of the marine protected area. In conclusion, a planning framework and best practices for compatibility determinations are proposed for multi-agency MPA management. The lessons learned are critical as regional-level marine protection efforts involving multiple partners, institutions, and user groups continue to develop in the Pacific.

Tu. 17:00 Ecosystems session room 3
Aquaculture and Fisheries

Assessment of the Aquarium Trade in Fiji: Sustainability and Management

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The aquarium trade represents an important use of coral reef resources. Complementing subsistence and artisanal resource utilization, aquarium products provide economic opportunities to improve the lives of coastal people in the Pacific Island countries. The trade can also provide incentives to conserve reef ecosystems which are typically very high in biodiversity. To achieve these goals, good management and best practice within the marine ornamental industry is essential.

An important component of sustainable management of exploited species is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Fiji, Samoa and Vanuatu have acceded to the Convention. Of particular relevance is the trade in hard corals. Fiji has had substantial experience with the hard coral fishery, with exports dating back to the early 1980s and is the most prolific exporter of aquarium products within the Pacific Island region.

All hard coral taxa are listed on CITES Appendix II, and the Management Authority (MA) is required to issue an export permit. Exports are permitted only if the specimens were legally acquired, and the Scientific Council (SC) has advised that the export will not be detrimental to the survival of the species concerned. The Dept. of Environment as the national secretariat must also compile annual trade statistics for all species listed in the Appendices and submit them to the CITES Secretariat in Geneva.

The history of compliance to the CITES convention in Fiji is of interest both in terms of its benefits and disadvantages. The role of developed countries as consumers and importers of these taxa from the Indo-Pacific region is examined.

Tu. 17:05 Ecosystems session room 3
Aquaculture and Fisheries

Spat collection of giant clam *Tridacna maxima*: first results and promises from Eastern Tuamotu lagoons

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The widespread elongated giant clam *Tridacna maxima*, reaches outstanding concentration in several lagoons of eastern Tuamotu archipelago, especially around submarine to subtidal carbonate structures locally called "mapiko," made of accumulations of cemented or loose T. maxima shells. This species is considered endangered in many locations worldwide, but in French Polynesia it remains a favourite seafood delicacy. Spat collecting was tested given the great dominance and abundance of Tridacna maxima and the likely large pelagic larval pool in those semi-closed lagoons. Since 2001 the success led the French Polynesia Fisheries Department (SPE) to further enhance spat collecting techniques, and launch a multi-disciplinary research programme for the management of this species. Tatakoto and Fangatau were the main pilot sites. With an average density on collecting substrates superior to 100 ind/m^2 and medium settlement rate of 78%, the technique is a real success never reported anywhere else for this species. Growth tests on sea cages are also encouraging. Collecting, rearing and transport have been tested and mastered. Finally, in situ restocking field experiments gave interesting results but warrant further investigations on diversified sites throughout French Polynesia. First cost-effectiveness assessment suggests that this innovative giant clam production scheme is competitive compared to classic hatchery/nursery-based schemes. It provides exciting perspectives for international markets, restocking and stock enhancement, ecotourism and restoration for a variety of locations. Furthermore, technology transfer is now possible and legal, since new laws have been established to control the activities, especially the implementation of a tracking and labelling system. Tatakoto is thus the first atoll where spat collection is authorized. SPE and their partners wish that balanced efforts between fishery and spat collections will provide sustainable livelihoods for these remote outer islands.

Tu. 17:10 Ecosystems session room 3
Aquaculture and Fisheries

Giant clams fishery management in French Polynesia: a review of recent progress

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The elongated giant clam, *Tridacna maxima*, is one of the favourite French Polynesian seafood invertebrate. In the densely populated islands of the Society Archipelago they have been locally overfished while stocks in some remote islands are still abundant. Several lagoons of Eastern Tuamotu archipelago and of the Austral archipelago are characterized by enormous populations of *Tridacna maxima*. Abundance, coverage and density are considered the highest of any coral reefs in the world. In these islands the rapid development of small-scale fisheries that feeds the growing Tahitian market calls for management actions. This has prompted the French Polynesian Fishery Department to fund and participate in a multi-disciplinary research program in the past six years, with special interest in fishery management. Natural giant clam stocks and community structures were first assessed with a combination of remote sensing and in situ data collection. Population size and structure of four Eastern Tuamotu atolls and two central Austral Islands have been investigated. While invertebrate fishery management models are still in their infancy, a first diagnosis regarding overfishing was made for the main giant clam flesh exporters (Tatakoto, Fangatau and Tubuai). For parameterization, purposed giant clams population dynamic and fishery data have been monitored in situ. Although some inter-island and inter-archipelago patterns appear, we suggest that management actions be quite similar. A network of small reproductive refuges, spread along the lagoon, is highly recommended. Considering a necessary precautionary approach, an adaptative co-management scheme is proposed to allow sustainable economical incomes and data collection. Indicators that measure key aspects of the resource, ecosystem and fishery status are needed to enhance decision-support tools. This framework seems to be relatively well adapted to the local context as it calls traditional management methods used in the past (tapu and tomite toohitu) and will offer a path for the sustainable development of these remote islands.

Tu. 17:15 Ecosystems session room 3
Aquaculture and Fisheries

Impacts of harvest and post harvest processing methods on quality and value of beche-de-mer in Fiji Islands

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There are at least 19 commercial species harvested in Fiji. The main target species are *H. fuscogilva, H. whitmaei* and *H. scabra* although *H. scabra* is currently banned from export in Fiji. This thesis studied the impacts of processing methods on quality and value of bêche-de-mer in Fiji Islands. The findings revealed that poor processing methods contributed significantly to value loss of dry bêche-de-mer product. The knowledge and poor understanding of processing techniques by the fishermen is a key factor linked to loss in value. First boiling after harvest, improper cutting/gutting, smoke curing and harvesting of undersized species were identified to be the main problematical areas of processing leading to revenue losses.

Sea cucumber species *H. fuscogilva, Stichopus herrmanni* and *S. cholonotus* were found to be the more difficult species to handle post capture and for processing. Poor quality products traded by the fishermen resulted in the fishermen obtaining a difference in value of almost 20-30% of the maximum price offered for well-processed products. These products when exported by the main agents in Fiji received a value at a difference of 10-20% of the maximum prices offered by species and grade. The prices that are received by the main agents often resemble the prices offered for grade "B" products with large difference observed for high value species.

This research raised concerns for over the lack of general awareness and information on improvements in processing techniques at fisher level and sea cucumbers general significance in the coastal ecosystem. Knowledge of the reproductive biology of commercial sea cucumber species and effective management is essential for future sustainability of bêche-de-mer production in Fiji Islands.

Tu. 17:20 Ecosystems session room 3
Aquaculture and Fisheries

Valvometry HFNI applied to giant clams: an open tool to communicate on water quality in New Caledonia by JC Massabuau, P Ciret, G Durrieu, M Sow, D Tran

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Protection of the aquatic environment is a top priority and there is a clear interest in remote online biosensors to inform, in real time, managers, decision makers and populations of water conditions. The ability of giant clams or other mollusk bivalves to 'taste' their environment is one of the possible ways to monitor the water quality. Monitoring their natural opening/closing activity is yet another way to put a 'thermometer' in waters and read, throughout the year, the health of both the bivalves and their environment. Based on our knowledge on bivalve ecophysiology and ecotoxicology, on electronic and mathematic and surfing on the recent technological advances in internet and mobile telephone networks, a multidisciplinary team from the Marine Station of Arcachon (France) developed such a system. It allows, since 2006, to continuously survey, record and publish on a website (l'Oeil du Mollusque : http://www.domino.u-bordeaux.fr/molluscan_eye), the behaviour of groups of 16 bivalves anywhere there is a cellular network in the world. In the Bay of Arcachon, France, we are studying oyster since 2006. In New Caledonia we are studying 16 giant clams since 2007. In short, we glue light electrodes to the 2 shells of freely behaving bivalves so that we can measure the amount of shell opening and closing, biological rhythms and growth-rate online; total electronic consumption is 2 watts; solar panels can be used; only 1 field intervention/year. When the raw data arrive in the laboratory, they are modelled and analysed in about 30'. We produce a single mathematical equation for each animal for each day, and we exploit these equations so that the maximum possible amount of 'digested' data can be obtained and statistically analysed for daily to yearly patterns. The data are shown graphically for easy reading and available, in an analysed form, on the web

Tu. 8:15 Climate Change session room
Keynote lecture on Climate Change and Ocean Acidification

The Pacific, Climate Change and the Future

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The evidence for climate change over the global and Pacific is unequivocal, and it is likely that humans are causing the majority of this climate change. Significant changes in sea-surface and air temperature are taking place, with some recent warmth in the tropical Pacific possibly unprecedented in over 1000 years; continued warming is likely. Sea level increases also appear to be accelerating due to human influences, and will continue even after greenhouse gas emissions are stabilized. Without stabilization, global sea level rise by the end of the 21st century could be as much as two meters above pre-industrial levels, depending on how ice sheets respond. If greenhouse gas emissions are not reduced dramatically early in the 21st century (e.g., to 80% below 1990 levels by 2050), there may be a commitment to many more meters of sea level rise as the ice sheets respond to warming over the coming centuries. Although there is substantial debate about the future of typhoon and hurricanes in the Pacific basin, the consensus still suggests that there will be an increase in the intensity (e.g., including wind and rainfall) of the largest storms as the oceans continue to warm. Globally, rainfall is already becoming more intense as the global hydrological cycle intensifies, and this trend should continue. Monsoon systems should also intensify, with more summer rainfall likely in, for example, Southeast Asia. It is still not clear how the El Niño Southern Oscillation (ENSO), and related climate variability will change, with different models suggesting divergent future projections. Taken collectively, large - and hard to predict - potential climate change impacts give the people and societies of the Pacific strong motivation to push for global reductions in greenhouse gas emissions. There must also be proactive efforts to start planning for, and implementing, climate change adaptation programs in and around the Pacific.

Tu. 9:00 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Climate variability in the southeastern Pacific during the last few centuries: combining documentary historical evidence from Chile and Peru with high-resolution sedimentary records of the continental margin

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Reconstructing recent climate variations in the last centuries has become a high priority to refine the understanding of climate changes such as those which accompanied the set up and/or the end of the Little Ice Age. Climate modellers need precise proxy data for the recent periods during which instrumental meteorological information was not yet available. The combination of historical documentary data on rainfall anomalies on the Pacific coasts of Peru and Chile and high-resolution studies of laminated marine sediments extracted within the oxygen minimum zone of the continental margin of northern Chile and central Peru offer an opportunity to consolidate the chronology of the major El Niño events that occurred in the last five centuries. The compilation of written historical data on climate and ocean anomalies led to establish that it is since ∼1817 AD that El Niño events are characterized by both rainfall excess in north-western Peru during summer times and in central Chile during winter times. Before the early nineteenth century, the episodic precipitation excesses reported in either region were apparently unrelated with the meteorological conditions in the other area. This observation suggests 1) that the modern teleconnection system was not operative during the Little Ice Age, and 2) that the large-scale atmospheric circulation pattern was different than nowadays in south-western South-America. High-resolution studies of sedimentary cores also show that a major environmental change occurred at ∼1820 AD. This sudden regime shift documented by sedimentological, geochemical, phytoplanktonic, foraminiferal, and fish remain data is best explained by a regional-scale alteration of the biogeochemical environment, possibly linked to a regional hydrological change onshore and to a northward latitudinal shift of the inter-tropical convergence zone. In northern Chile, marine sedimentary data also point to a major change in the climate-ocean system but which was more progressive within the nineteenth century.

Tu. 9:15 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Insights on Pacific Climate from Coral Paleoclimate Records: ENSO, Decadal Variability, and Trends
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How will ENSO respond to anthropogenic climate forcing? Do recent conditions reflect natural variability or perturbations that can be attributed to human-caused warming? Instrumental climate records from the tropical Pacific are short and sparse, but paleoclimate records from long-lived corals offer the opportunity to address questions related to longer-term variability and sensitivity in the ENSO system. The paleoclimate record offers several "lessons" about ENSO that complicate the detection and attribution of an anthropogenic ENSO signal. Replication is shown to be critical, particularly for oxygen isotopic data. We use a comparison of 6 coral records from Kiribati to highlight the range of variation seen among means, variability, and trends in isotopic data. Initial Sr/Ca measurements from these sites suggest the potential for reducing such uncertainties and quantifying long-term SST trends. We have also used a growing database of coral records to document coherent patterns of ENSO-like decadal and longer-term variability. These patterns fluctuate in strength over recent centuries, in ways not clearly linked to radiative forcing. The natural variance of ENSO as revealed in Pacific coral records complicates any attempt to link recent ENSO variability to anthropogenic forcing. Nonetheless, if we can use coral records to identify specific long-term responses that are expected from modeling experiments, we may have greater confidence in attribution.

Tu. 9:30 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Evidence for changes in ENSO over the past few thousand years from fossil corals in Galápagos
Sandy Tudhope[a], Julia Cole[b], Colin Chilcott[c], David Lea[d], Josephine Brown[e] and Matthew Collins[f]
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There is currently no consensus about the likely response of ENSO to future greenhouse gas warming. However, evidence from natural archives suggests major changes in its strength over the past 10,000 years. The largest of these changes are generally believed to result from the response of the tropical Pacific to changes in seasonality consequent on orbital forcing, and indicate a strong sensitivity of the ENSO system to some forms of external forcing. However, most of the available proxy evidence comes from precipitation-sensitive regions, and uncertainty remains about whether these records may be interpreted as reflecting the operation of the whole ENSO system. This question is highlighted by the fact that most modelling studies that have attempted to simulate early-mid-Holocene ENSO have failed to reproduce the magnitude of ENSO reduction inferred from the proxy data. Here we present preliminary results from the analysis of annually-banded fossil corals in the Galápagos that have the potential to help resolve some of these outstanding questions about the mechanisms and drivers of changes in ENSO and its atmospheric teleconnections.
We cored sub-fossil massive Porites corals ranging in age up to ∼4,500 years old. Each coral contains a few decades of coral growth and stable oxygen isotope analysis of ∼monthly resolution increments reveals well-preserved seasonality and interannual variability consistent with the occurrence of palaeo-El Niño events. Analysis of one 50 year long record at about 3,500 years BP indicates that ENSO was similar to or slightly weaker than modern day ENSO. We are analysing further corals for δ^{18}O, Sr/Ca and Ba/Ca with the aim of deriving independent estimates of changes in SST, upwelling and water δ^{18}O. By combining records from several corals it will be possible to quantify changes in the strength and frequency of El Niño through time and their relationship to changes in seasonality.

Tu. 9:45 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Mid- to Late Holocene Climate Change and Shoreline Evolution in Tumon Bay, Guam

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Archaeological investigations in Tumon Bay, Guam, have provided data documenting age and extent of the mid-Holocene high stillstand and the age and duration of progradation to present shoreline elevation. Radiocarbon ages from coral reef pinnacles in the Tumon Bay fringing reef, from an organic drape over the relict late Holocene foreshore ramp, from carbonate cementation zones both above and shoreward from the ramp, and from archaeological features ranging in age from 2,000 ybp to late Latte period, ca. 1000 to 500 ybp, effectively constrain high stand and subsequent progradation and provide a model for interpreting cementation in near-shore contexts. These data conform with expectations of previous geological work in the region and in Guam, but provide more precision and also a model for geoarchaeological interpretation.

Tu. 10:30 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Tropical Eastern Pacific- Interhemispheric teleconnections during the last 2000 years

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Marine Late Holocene proxy records from the Eastern Pacific suggest that the climate between 500 and 1350 AD was characterized by cool sea surface temperatures (SST) along the Peruvian coast, stronger reducing conditions in the sediments linked to the intensification of Oxygen Minimum Zone and limited of terrigenous input associated to arid conditions in the hinterland. This pattern is consistent with the hypothesis that the dry Medieval Climate Anomaly (MCA) in the Eastern Pacific region resembled to modern La Niña conditions. This (MCA) was followed by wetter conditions and warming coastal SST during the "Little Ice Age" (LIA). Comparison with other records in the Pacific and in Cariaco Basin strongly suggests a southward latitudinal shift of the InterTropical Convergence Zone (ITCZ) position as the key mechanism explaining the centennial-scale changes.

Tu. 10:35 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Scales of Variability: 2800 Years of El Niño and Human Impact in Internationally Significant Galapagos Archipelago Wetlands

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The Galapagos Islands are arguably the most famous islands in the world. This fame derives from the Islands' rich biological history and unique locality that provides opportunities for research in the fields of evolution, geomorphology and biodiversity. Furthermore, the unique geographical location of the archipelago has in the past and continues to provide excellent potential for palaeoclimatology, palaeolimnology and palaeoecology. In particular the location of the islands within what is essentially the heart of the ENSO region ensures the islands are frequently influenced by El Niño driven precipitation events. These El Niño precipitation events are extremely influential, given that the islands location within the Pacific Equatorial Dry Zone (PEDZ) ensures the islands have a semi-arid climate (<500 m asl). Due to the influential nature of El Niño variability in the Galapagos, the numerous saline to hyper-saline coastal lagoons throughout the archipelago have the potential of recording past hydrological changes associated with El Niño-related climate variability. Furthermore, the influence of humans via the introduction of goats and burning may have influenced erosion rates in the catchment. The Preliminary multi-proxy analysis of laminated sediment sequences raised from coastal lagoons on the islands of Santa Cruz and Santiago, will be presented. The data includes a 14C AMS radiocarbon and 210Pb chronology, fossil diatom analysis, magnetic susceptibility, particle size analysis and 2mm resolution ITRAX x-ray fluorescence geochemical results. The sediment sequences cover approximately the past 2800 years BP and illustrate that the ENSO variability (strength, frequency) we experience today has not always been in existence. Preliminary results also show that during the Medieval Warm Period, the Galapagos Islands were not warm at all and additionally during the Little Ice Age the Galapagos Islands were actually warm and wet rather than cold.

Tu. 10:40 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Position du TSUP durant les phases ENSO

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L'impact d'ENSO est global sur la POLYNESIE FRANÇAISE. Durant la phase chaude, la fréquence des cyclones tropicaux augmentent, les précipitations sont plus importantes sur l'archipel des MARQUISES et moindre sur l'archipel des AUSTRALES. La transition s'observant sur la zone géographique qui comprend TAHITI. Durant la phase froide, la fréquence des Alizés et des orages augmentent, plus particulièrement sur l'archipel des Marquises. La position du thalweg supérieur (TSUP), caractéristique synoptique du climat marquisien, semble être une des conditions de la formation de Super cellules et de la fréquence des orages qui s'observent des MARQUISES jusqu'à l'archipel de la SOCIETE. Pour caractériser le TSUP on utilise les données du géopotentiel à 500hPa et 200hPa (Z500 et Z200) issues d'une part des radiosondages réalisés à ATUONA (9°48'5"S/1139°2'1"W) sur l'île de HIVA OA et à FAA'A (17°33'4"S/149°36'8"W) sur l'île de TAHITI et d'autre part des réanalyses du centre européen ERA40. La démarche adoptée repose sur l'Analyse en Composantes Principales et l'Analyse Spectrale. Les résultats issus de cette analyse donnent la position géographique des pôles de variance, équivalent aux anomalies positives ou négatives du géopotentiel, les périodes où ces pôles sont actifs et leurs fréquences d'apparition. En phase chaude on observe une anomalie positive pour Z200. Le TSUP est localisé sur l'extrême Est de la Polynésie française, peu favorable à une intense activité orageuse. En phase froide l'anomalie du géopotentiel à 200hPa est négative. Le TSUP est observé à l'ouest de la Polynésie française, favorable à une augmentation de l'activité orageuse.

Tu. 10:45 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Interannual to interdecadal climate variability of the western Pacific (1963-2008): Implications for reef island geomorphology using Australian case studies

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The future of low-lying reef islands is of particular concern in the face of global climate change, given the projected rise in sea level, sea surface temperatures, and tropical cyclone intensity. Climatic-oceanographic phenomena such as ENSO (El Niño Southern Oscillation) can have significant impacts on coastal erosion through their effects on winds, tides, and inter-annual sea level fluctuations. Of particular focus in this study, are the large-scale climate controls (e.g. ENSO, PDO, IPO) on beach processes occurring on low-lying reef islands of the Western Pacific. Historical surveys, photogrammetric analysis, and digital terrain modelling were combined in a GIS, to reconstruct trends in shoreline change and beach volumetric fluctuations on two reef islands in the Great Barrier Reef (GBR) and Torres Strait, Australia. A positive agreement (R=0.78, R2=0.61) between total island accretion and ONI (Oceanic Niño Index) values of ENSO was discernible at Raine Island, results clearly indicating that both ENSO and PDO/IPO influence the spatial variability of beach volume change. Erosion of the leeward shore is associated with La Niña, during which Australian NW monsoon winds are stronger and more persistent than normal, while accretion of the leeward shore typically occurs during El Niño, when SE trades are stronger. Conversely, much of the windward shore displays marked volumetric decreases during the most recent warming phase of the Pacific Decadal Oscillation (PDO) (1977-1998). No clear relationships were observed at Masig highlighting regional specificity. Results from this study have broader implications to reef island stability over a period of global warming and sea level rise, as natural sources of climate variability may temper sensitivity to slower rates of projected sea level change.

Tu. 10:50 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

GPS monitoring for natural risk assessments and research in French Polynesia

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The applications of the Global Positioning System (GPS) have revolutionized the world. At the Geodesy Observatory of Tahiti we are developing two GPS applications tailored to the assessment of natural risks over French Polynesia.
The first, in collaboration with Meteo France in French Polynesia, deals with the assimilation of GPS derived humidity levels into forecasting models, to complement radiosonde measurements, in order to improve short term forecast.
The second focus on the monitoring of long term variations of sea level, with an enhanced network (seven stations) of tide gauge / GPS recorders over French Polynesia.
In conjunction with the second application we are also modelling from long term GPS heights the subsidence rate of Tahiti, to obtain absolute sea level variations and to better understand the elastoviscoplastic behaviour of the oceanic lithosphere loaded by the volcanic edifice.
In this presentation we detail all these points, from a scientific and societal point of view.

Tu. 11:05 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Reef depositional events along the Marquesas foreslopes (French Polynesia) since 26 ka

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The response of reef growth to the last deglacial sea-level rise (i.e.the last 24 to 26 ka, 1 ka= 1,000 years) is poorly documented, especially in the early stages following the last glacial maximum. This can be explained by the scarcity of reefs recording the entire deglacial period. Nevertheless, such sites are found in the Marquesas archipelago (French Polynesia). The bathymetric surveys of submarine platforms and terraces, coupled with sedimentological and paleoecological analyses and radiometric dating of dredged rocks, revealed the occurrence of several episodes of reef deposition during the last 26 ka. These intervals are represented by 4 reef generations (RG):1) RG 0 from 26 to 19 ka from 125 to 115 m depth interval; 2) RG 1 from 18 to 15 ka between 110 and 95 m; 3) RG 2 from 14 to 11.5 ka between 80 and 68 m; and 4) RG 3 younger than 11.5 ka, from 60 to 55 m. The RG 0 to RG 2 exhibit a clear reefal zonation, from upper reefslope to reef flat as identified from biofaciial attributes (e.g. biological assemblages including corals and coralline algae). The development of each reef generation was probably interrupted by abrupt rises in sea level and / or drastic climate changes. This scenario is similar to those described from Barbados and Hawai'i. In these areas, rapid rises in sea level, interpreted as reflecting major melting events of continental ice (melt water plulses), caused the drowning of reefs. The younger reef generation (RG 3) can be referred to coral banks similar to those observed in the Marquesas today. The replacement of typical coral reefs by coral banks may indicate an increase in frequency and intensity of El Niño-Southern Oscillation events over the last 12 ka, that were unfavorable to reef development over the last 12 ka.

Tu. 11:20 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Geomorphic Response of Coral Reef Landforms to Climate Change

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Coral reef landforms (reef islands, beaches and reef platforms) are widely considered to be physically susceptible to climate change. Such popular assertions are founded on measures of reef ecological condition which globally is in decline. This study examines the assertion that reef landforms will be severely impacted as a consequence of climatic change through consideration of the environmental processes that control the formation of coral reefs and reef associated sedimentary landforms. Results indicate that reef landforms exhibit morphological adjustment to changing boundary conditions at a range of space and timescales (geological to event scale) as a consequence of the complex interplay between ecological and physical processes (including climate change and anthropogenic activities). It highlights the fact that the future geomorphic integrity of coral reef landforms is not linearly coupled to reef ecological state. It also shows there are some large gaps in scientific understanding of landform response to climatic change. Key findings are that the future trajectory of reef landforms is contingent on the integrity of the morphodynamic system. Consequently, geomorphic response is expected to vary geographically and be contingent upon the antecedent geomorphic condition of, and environmental start up conditions that affect reefs. Reef islands and beaches will undergo continued morphological adjustment that may result in island migration and island/shoreline narrowing. Scientific assessment of the eco-morphodynamics of reef systems indicates coral reefs are geomorphically resilient systems. While future geomorphic changes are expected to be spatially highly variable and occur across a wide range of timescales, both reef structures and associated sedimentary landforms are expected to persist beyond the 21st century.

Tu. 11:35 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Spatial variations in the calcitization of fossil *Porites* sp corals from uplifted reefs in the Pacific Ocean
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Geochemical analyses of trace elements in pristine fossil corals provide reliable records of paleo oceanographic factors at a mensual resolution, such as the Sr/Ca ratio which informs on the past sea surface temperatures. Records of temporal series from Holocene and Pleistocene are in progress using modern and fossil corals. Yet, most of them can be subaerially affected by the freshwater diagenetic effects, and can be more or less calcitized. During the process of alteration, the trace element ratios may have varied and the geochemical analyses cannot be directly taken into account in order to reconstruct the past oceanographic factors. The diagenetic effects must therefore be understood better to validate the reconstruction of the past tropical climates. We present the mechanisms of calcitization under meteoric conditions of fossils corals of the genus *Porites* collected from emerged reefs in the South-West Pacific (New Caledonia, Vanuatu and Futuna). Our observations and analyses prove that calcitization can proceed according to several modes. These modes are represented by several low-magnesian calcites characterized by various trace element components. Our data is constrained by numerous analytical means (e.g. Raman spectrometry, cathodo-luminescence, areal electron microprobe analysis) and provides evidence to recognize (1) the compositional heterogeneity at the scale of the ultrastructure of corals and (2) the relationship between the skeletal architecture and the geochemical characteristics in relation with the millimeter-wide annual light vs. dark bands, the random bioerosion, etc. Taking into account this small-scale heterogeneity in composition is a real challenge to produce general and predictive models in order to assess the diagenetic effects in paleoclimatic reconstructions.

Tu. 11:50 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Impact of abrupt climate and tectonic events on South Pacific ocean systems and submarine landscapes
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Past environmental changes are key to understanding future change. Validation of predictive models necessary for sustainable management and mitigation of natural hazards and anthropogenic activities can be achieved by studying past tectonic and climate changes. New Zealand is situated astride an active plate margin, at the critical boundary between northern-tropical and Southern Ocean sub-Antarctic climates, so that the combined actions of intense tectonic activity and drastic glacial-interglacial climatic changes since the beginning of the Pleistocene are over-amplified and can be differentiated. Here we use long sediment cores collected along the NZ continental shelf during the MATACORE voyage of R.V. Marion Dufresne in January 2006, co-funded by the Pacific Fund of the French Ministry of Foreign Affairs, to derive new well-constrained geological data. Sediments in shelf basins relate directly to intense land erosion and represent high-temporal resolution archives of climate-tectonic interactions back many years beyond historical records. During sea level highstand the continental shelf captures terrigenous sediments; whilst during glacial low sea level, sediment by passes the shelf and is deposited along the troughs and canyons surrounding New Zealand. Sediment within these submarine canyons is influenced by warm surface water, Antarctic Intermediate Water, and cold Circumpolar Deep Water as it descends from shelf to abyssal depths. In addition, earthquakes of large magnitude along both the Alpine Fault and the Hikurangi subduction interface will typically produce sudden large supplies of sediment to the continental shelf; with the NZ region also the locus of gigantic submarine avalanches, for which the timing is largely unknown. This project aims to identify the impact of catastrophic events (mega-avalanches, tsunamis, floods) resulting in rapid sediment discharge from rivers onto the shelf caused by rapid climatic change and large earthquakes, thus providing an understanding of the consequences of future instabilities in the ocean-atmosphere system.

Tu. 12:05 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Comparison of Braided Rivers in the Humid Tropics with Other Climatic Settings: Example of the Jourdain River in Vanuatu

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Braided rivers are often large river systems that form in semi-arid or pro-glacial regimes. Humid tropical examples can also be found, although not so commonly, such as in Papua New Guinea and Solomon Islands in the South Pacific. The Jourdain River on the island of Santo, Vanuatu, is one such example of a braided river that has developed under a humid tropical climate.

The paper discusses the formation of braided rivers, particularly Santo's Jourdain River, in the context of climatic influences, by comparing this system with braided rivers elsewhere in different climatic regions. The aim is to investigate whether climate is the most important factor that determines the morphological characteristics of braided rivers. The comparison will also examine climatic influences on several physical geographic variables such as river sediments, discharge and vegetation. This will help in identifying the main similarities and differences between braided rivers in contrasting climatic settings.

A preliminary finding is that semi-arid and pro-glacial braided systems have far less vegetation cover compared to the humid tropics where cover is dense. Normally, the supply of coarse bedload sediments in the humid tropics would therefore be expected to be less than in poorly-vegetated arid or pro-glacial regions. However, on islands there may be strong local uplift encouraging basin-wide erosion or pre-existing sedimentary sequences that can supply sufficient material to allow braidplain formation, in spite of good vegetation cover. These influences, and other climate-related parameters are discussed.

Tu. 12:20 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

Subsidence and hydrological erosion of Tahiti Island using space geodetic and hydrological data

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Built on an oceanic elastic lithosphere, the volcanic edifice of Tahiti island has undergone vertical motions such as uplift during its construction, and subsidence due to its load as the plate cools. We present a subsidence rate that is derived from GPS data collected at permanent stations in Tahiti spanning over eight years. Intense erosion is commonly observed in this tropical island which is characterized by very strong hydro-climatic contrasts and heavy rainfall hazard. The idea is to estimate the hydrological erosion rates from the 3-D landscape evolution model APERO (Progressive analysis of EROsion; Carretier and Lucazeau, 2005). Such model, developped under climate, tectonics and material transport physical basis, is used to investigate how the precipitations produce hillslope erosion and bedrock incision in several selected watersheds. A 20-m digital elevation model produced by the Service de l'aménagement et de l'urbanisme and rainfall or runoff data given by the Groupement Etudes et Gestion du Domaine Public are our model inputs among other defined physical parameters. Experiments are led for both short and long geologic time intervals. We observe contrasts in denudation rates that are related to the spatial distribution of rainfall and the tropical wind regime. These results, combined with present subsidence estimate, will enable us to discuss on the implications on the elastic isostatic response of the lithosphere.

Tu. 12:25 Climate Change session room
ENSO, Geomorphology, Fossil Reefs and Sea Level

The Polynesian Geodetic Network (POGENET): 2009 milestone

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During the last colloquium "Point d'Etape 2006" in Papeete on the French research on the Pacific area we presented our plans to establish a Polynesian geodetic network dedicated to the monitoring of short and long-term variations of geodetic quantities relevant to the prevention of natural disasters and to the recording of absolute sea levels.
Here we detail the present state of this network, which includes several tide gauges stations, an Earth tides gravimeter, as well as permanent GPS / Doris / laser stations, and a proprietary database.
We discuss its integration into the Global Geodetic-Geophysical Observing System (GGOS) that is currently being set by the International Association of Geodesy (IAG), and that is dedicated to the generation of consistent and integrated geodetic time series for the description and modeling of the geophysical processes in the Earth system. These integrated geodetic time series are an absolute requirement for constraining the predictions of climate models, such as the ones used by the Intergovernmental Panel on Climate Change (IPCC).

Tu. 14:00 Climate Change session room
Climate adaptation and impacts

Pacific Ocean 2020 Challenge - Scientists call on leaders for change

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In late 2008, over three hundred scientists signed a Pacific Ocean Scientific Consensus Statement (Statement) stating that the environmental threats to the Pacific Ocean and the human communities that depend on it are remarkably the same in tropical, temperate and polar waters, and rich and poor countries alike. An extensive meta-analysis of the more than 3, 400 peer-reviewed scientific publications was the foundation for the Statement, and experts from over 30 Pacific countries provided input. The meta- analysis identifies common trends in and around the Pacific Ocean regarding threats, impacts and solutions and represents one of the first Pan-Pacific Ocean environmental assessments. The four dominant threats throughout the Pacific Ocean include over-harvesting of resources; land run- off and pollution; habitat destruction; and climate change. This similarity in threats enables government and civic leaders to develop a unified effort to address them.
The Statement condenses the societal-relevant information found in thousands of scientific publications in order to make it broadly available outside the scientific community and to draw attention to the seriousness of the problems. This is the first step of the larger Pacific Ocean 2020 Challenge, an ambitious initiative to identify the threats and impacts to the Pacific Ocean and develop and implement solutions.
Findings from the meta-analysis will also be discussed. It is a comprehensive and systematic survey of published scientific literature, government publications, and other peer-reviewed reports throughout the Pacific. The meta-analysis identifies threat impacts, research gaps, and trends country by country, region by region and Pacific-wide. It also highlights gaps in knowledge and areas where more natural and social science research is needed. This information can be used to direct funding for critical research and critical efforts to address the most pervasive threats to the Pacific ocean.

Tu. 14:15 Climate Change session room
Climate adaptation and impacts

An integrated analysis of the vulnerability of rural livelihoods in Pacific Island countries to future climate change

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Climate change will impact the Pacific Islands, their inhabitants and the natural resources they depend upon in complex ways. Of particular note are the potential impacts of increases in temperature, changes in average and seasonal rainfall, increases in climate extremes such as tropical cyclones, and increases in atmospheric CO2 on the terrestrial and oceanic ecosystems that underpin rural livelihood strategies and food security.

Climate change impacts are highly likely to alter the capacity to produce food and cash crops, and increase variability of production. In addition, some traditional food resources may become less suitable or more risky under climate change resulting in a devaluing of existing varieties at a local scale, whilst increasing the value of broader diversity in these resources across the Pacific. There is a strong likelihood that higher fuel prices and restrictions on greenhouse gas emissions will render ocean and air transport significantly more expensive and limited in the future. As a result, pressures are likely to increase for existing management practices to be modified and new production systems adopted to safeguard local food security and enhance agro-ecosystem and livelihood resilience.

We are developing an integrated analysis of the above issues to assess the vulnerability of rural livelihoods in Pacific island country groupings/island types to future climate change. A modified version of the sustainable livelihoods approach is used to synthesise existing scientific knowledge on climate change impacts and adaptive capacity, with less formal indigenous knowledge provided by representatives from country and regional-level organisations attending a regional workshop.

This assessment will identify future key information gaps and offer recommendations for future research and development relating to climate change impacts and adaptive response strategies aimed at enhancing economically, socially and environmentally resilient and dynamic rural livelihood strategies within the Pacific region.

Tu. 14:30 Climate Change session room
Climate adaptation and impacts

Monitoring and management needs in bird conservation for the Pacific region in a changing climate

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The impacts of anthropogenic climate change differ from those of previous climate changes in that they are occurring in fragmented and degraded ecosystems. Islands and their biodiversity are especially vulnerable. Bird species of the Pacific islands are highly endemic and therefore represent an important worldwide biodiversity asset and deserve special attention. Their abundance and distribution will be affected by climate change and changes in habitats and food sources are expected. The challenge for researchers, managers and policy makers is to facilitate the natural, adaptive responses of birds. First of all, we need to manage for increased variability and uncertainty of the climate. Adaptation involves combined monitoring, interpretive studies and adaptive management. Long-term monitoring is needed to reveal geographical and seasonal changes in species occurrence. This includes observations designed to differentiate between the effects of changes in climate, land use and land cover on birds. As most island land birds are rare, specialist and less mobile, monitoring and management have to be carefully balanced. In addition, their relationships with food, shelter and other species, such as predators, competitors and parasites, often alien to these ecosystems, are poorly understood. We also need to facilitate collaboration between climate change, biodiversity and invasive species researchers to enhance our understanding and to improve predictive models. This is best done through proposing alternative models of how different avian groups would respond to different changes. The most urgent management actions are to increase the area of representative habitat types, enhance their connectivity and rectify the damage caused by land clearing and invasive species. We need sufficient habitat with adequate structural complexity and connectivity to enable birds to adapt to climate change. Adapting to climate change will require the setting of priorities for conservation based on three criteria of threats, costs and biodiversity values.

Tu. 14:45 Climate Change session room
Climate adaptation and impacts

Could global warming affect the marine algal flora of French Polynesia?

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Our recent phycological investigations in Salomon, Vanuatu, Fijian and New Caledonia waters brought a number of results that confirmed the general trend of biodiversity decreasing from west to east. In that context, at the eastern part of the gradient, French Polynesia shows a relatively high algal diversity (400 species) despite its very remote location from the Indo-Malaysian biodiversity epicentre. This is partly because of its geological history, notably with a large number of high islands and old atolls, and the simultaneous presence of mostly tropical species with a small group of species with temperate or even cold affinities in the Austral archipelago, more precisely in the southernmost island of Rapa iti. The most temperate island ecosystems in the Pacific (e.g. Lord Howe, Ile des Pins, Kermadec, Pitcairn, and Easter Island) are the most vulnerable with respect to the forecast global increase in sea temperatures due to general warming of the planet, and species whose distributional limits occur in the south of these archipelagos could disappear. The majority of large Phaeophyta beds (e.g. Stypopodium australasicum, Sargassum complex), and associated Rhodophyta (e.g. Gloiosaccion brownii, Phaeocolax kajimurai) along the Rapa coastline could be affected and disappear in favour of undesirable species such as the invasive Phaeophyta Turbinaria ornata, already present in the north of the archipelago and which could invade the region, as is the case presently in the Society and Tuamotu archipelagos. The adverse effect on the diversity of the flora will have repercussions on the species linked to the seaweed beds, which are without doubt key resources for local populations. Long-term monitoring of these temperate affinities species would enable the detection and monitoring of the effects of forecast changes, and a locality such as Rapa could become a regional South Pacific observatory for these changes.

Tu. 15:00 Climate Change session room
Climate adaptation and impacts

Sociétés insulaires francophones du Pacifique et gestion des risques climatiques sur la zone littorale : quelle(s) représentation(s) pour l'action publique?

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Depuis quelques décennies, les travaux relatifs au changement climatique et à ses conséquences se multiplient. Pour les îles basses des petits Etats insulaires du Pacifique, le phénomène de submersion marine et l'amplification des événements météorologiques de haute énergie (cyclones) constituent les risques majeurs pour les populations.
Les observations scientifiques et les demandes émanant des décideurs de ces Etats montrent que le trait de côte des littoraux meubles connaît un net recul depuis une vingtaine d'années et ce, en raison de la montée du niveau marin, d'une urbanisation accrue, et plus globalement, des phénomènes érosifs d'origine naturelle ou anthropique.
Quelles sont les solutions pour faire face à ces constats dont l'importance va s'accentuer avec les effets du réchauffement climatique décrits par le GIEC ? Des réponses existent telles que la construction d'ouvrages de protection, mais ceux-ci ne sont pas toujours bien conçus en terme d'ingénierie et les populations adhèrent souvent assez mal à la conception des aménagements proposés qui s'opposent à la vision océanienne de l'espace littoral.
La communication présente l'approche développée pour tenter d'établir un lien entre aménageurs, décideurs et populations. Basée sur des enquêtes de perception, l'étude a été élaborée afin de sonder l'opinion de la population sur les questions d'aménagements, et plus globalement sur les représentations du littoral et des risques associés. Bénéficiant du partenariat UNC/IRD, la recherche est menée dans le cadre d'une thèse (Paris IV - "Communautés d'Outre-mer et espaces littoraux : interactions des populations locales et de leurs systèmes de gestion à Wallis et Futuna, Mayotte et Lifou"). Elle s'appuie sur les programmes MOM et IFRECOR portés par l'Université de la Nouvelle-Calédonie. Les enquêtes de perception sont menées parallèlement dans l'océan Indien et dans la zone Pacifique afin de favoriser une approche comparative entre systèmes de gestion et pratiques culturelles propres à chaque espace insulaire.

Tu. 15:05 Climate Change session room
Climate adaptation and impacts

The Rising Tide: Global Warming, Sea Level Rise, and Coastal Erosion Threaten Our Maritiime HIstory

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Models of global warming predict that world sea levels may rise as much as two meters by the end of the 21st century. Warming seas are also predicted to foster larger and more frequent storms that threaten densely-populated coastal communities. Rising seas and stronger storms will accelerate coastal erosion that threatens millions of significant archaeological and historical sites around the world. Global warming and sea level rise were naturally-driven processes for much of the last 20,000 years–which ancient peoples also had to adapt to–but they have become increasingly anthropogenic processes during the last century or two. Ironically, just as coastal archaeological sites are increasingly recognized as repositories of valuable data on past human impacts on island and coastal ecosystems, as well as human adjustments to earlier climate and geographic change, those records are now threatened with destruction. Government agencies, archaeologists, and marine scientists need to develop protocols to evaluate the effects of coastal erosion on historic sites and mitigate the loss of important sites.

Tu. 15:10 Climate Change session room
Climate adaptation and impacts

Capacity Building of Sea Level and Climate Monitoring in the Pacific Region

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For the benefits of all Pacific Island Countries, every effort should be made to introduce climate change and sea level issues, together with the consequences of poor management of marine resources and habitat. Greater effort is necessary, to involve local communities in coastal area management through helping them to develop the necessary awareness and understanding of the coastal environment. There is a general consensus that global warming is the consequence of negligence of the developed countries. Developing countries contribute also as is evidenced by the recent forest fires in South East Asia and in the Amazon Basin.

Even greater effort may be necessary to develop the necessary awareness programme on the subject of climate change and sea level. Appropriate programmes of continuing community education are also recommended. The publication of a series of state-of-the-art papers, readily available, written in a reader-friendly manner and incorporating new developments, would be very useful. This kind of publication must be encouraged and supported. Skilled scientists and teachers who are good communicators should be encouraged to write and produce educational packages [books, teaching manuals, videos, etc.] and general information material on climate change and global warming, particularly those relevant to specific regions, to satisfy the needs of both the specialists and the generalists.

Tu. 15:15 Climate Change session room
Climate adaptation and impacts

What Actions Can Hawaii Take to Protect a Native Forest Vegetation Matrix in the Face of Global Climate Change?

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Although native forests of Hawaii's lowlands have been eliminated or strongly modified by human actions, relatively intact forest ecosystems, dominated overwhelmingly by the endemic tree Metrosideros polymorpha (Myrtaceae), persist in many windward areas above 800 m elevation. These montane forests have withstood substantial prehistoric climate changes and may have inherent potential for persisting in spite of a likely scenario of rising temperature and increasingly severe droughts over the coming century. Many Metrosideros forests comprise crucial watersheds for human populations, and the loss of Metrosideros would be catastrophic for conservation in Hawaii. Invasions of introduced flowering plants, damage from feral ungulates, and the impacts of non-native fungal pathogens seem to pose the greatest threats to maintaining these high-elevation ecosystems/watersheds. Control of biological stressors should not only deal with existing invasions by the plants Psidium cattleianum, Hedychium gardnerianum, Clidemia hirta, and Miconia calvescens, they should also address biosecurity or quarantine objectives as well. For example, Metrosideros is susceptible to non-native fungal pathogens that could be dispersed through the horticultural trade or Eucalyptus forestry. Exchange of pathogens between plantation Eucalyptus and native Myrtaceae is possible wherever they come into juxtaposition, and new diseases of Eucalyptus can be spread internationally via forestry germ plasm. Since we expect that climate change is likely to contribute additional stress to Metrosideros forests, it is imperative that fungal pathogens and other threats to Myrtaceae be prevented from establishing. Tightened and enforced quarantine regulations, supported by the national and international phytosanitary system and the local Eucalyptus industry, are potential mechanisms for preventing the wholesale spread of devastating Myrtaceae pathogens to Hawaii. Similar considerations apply to other high Pacific islands.

Tu. 16:00 Climate Change session room
Responses to ocean acidification and climate change

An Integrated, Multidisciplinary Approach Towards Responding to Coral Bleaching and Climate Change

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The need for a management response to mass coral bleaching is well established. The incidence and severity of mass coral bleaching events has increased continuously over the last two decades. As a result, almost every reef region of the world has now suffered extensive stress or coral morality. While the need for management has become clear, identifying practicable and effective management responses has proven challenging. Coral reef managers are unable to directly mitigate or influence the main cause of mass bleaching: above average water temperatures. This makes mass bleaching and climate change a uniquely challenging environmental management problem. To address this challenge, multiple domains of knowledge needs to be accessed to increase predictive and response capabilities for coping with climate change and its particular effects on coastal and island based communities. In September 2008, through collaboration with NOAA Coral Reef Watch, NOAA Papahänaumokuäkea Marine National Monument and the Hawai'i Institute for Marine Biology; a workshop was coordinated to assist marine resource managers from around the Pacific to develop a coral bleaching response plan utilizing both cutting edge conventional science and indigenous knowledge. This unique workshop brought together 27 coral biologists, managers, cultural practitioners, and other stakeholders from across the Pacific, including Palau, Pohnpei, American Samoa, Samoa, Aotearoa (New Zealand), and Hawai'i. The four-day experiential workshop covered social, ecological and economic impacts from mass coral bleaching events, coral resilience, identifying coral bleaching and predicting coral bleaching events and was the first in its series of workshops to include traditional knowledge and local perspectives alongside western scientific approaches. This talk aims to share the highlights, challenges and potential applications of undertaking an integrated approach for climate change initiatives around the Pacific. Case studies of indigenous Hawaiian tools for long-term monitoring of marine ecosystem health and change will also be presented.

Tu. 16:05 Climate Change session room
Responses to ocean acidification and climate change

Réchauffement climatique et réponses des récifs coralliens de la Polynésie française, entre 2050 et 2100
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Comment les récifs coralliens de Polynésie française vont-ils réagir face au changement climatique et aux modifications qu'il engendre ? Les conséquences les plus graves pour ces écosystèmes coralliens sont : une élévation de la température de l'eau de surface, accompagnée d'une acidification, une augmentation du nombre et de l'intensité des cyclones et une élévation du niveau de la mer. Comment la barrière récifale corallienne va-t-elle réagir et quel rôle pourra t-elle jouer dans la protection de l'urbanisation côtière entre 2050-2100 ? Telle est la problématique que nous proposons d'étudier à travers une large base de données bibliographiques et les résultats de l'expédition " Integrated Ocean Drilling Program, 310, Tahiti Sea Level ". La première étape à intégrer est un état des lieux de la réalité du changement climatique en Polynésie française et la prise en compte des modifications des paramètres physico- chimiques, cités ci-dessus, ainsi que les impacts directs et indirects qui en résultent sur les communautés récifales. Dans un second temps, nous devons analyser les perspectives possibles en fonction de la géomorphologie des îles, mais aussi de la capacité d'adaptation, d'acclimatation et de résilience des coraux. Enfin, nous devons tenir compte qu'en synergie avec les menaces anthropiques directes, le réchauffement climatique modifiera cet écosystème et le rendra encore plus vulnérable aux activités humaines. Une gestion de cet écosystème, appropriée au phénomène du changement climatique, s'avère nécessaire pour minimiser les menaces et les conséquences à prévoir non seulement pour les récifs coralliens mais également pour les zones littorales, urbanisées et vulnérables. Plusieurs scenarii d'évolution des coraux sont envisageables selon les archipels. La disparition potentielle des récifs coralliens aura des conséquences directes sur les différents niveaux de risques littoraux pris en compte dans les Plans de Prévention de Risques (PPR) de la Polynésie française.

Tu. 16:10 Climate Change session room
Responses to ocean acidification and climate change

Coral reef bleaching in South China Sea observed using satelite data
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Climate changes have some influences on marine ecosystem.Coral reef bleaching, the whitening of diverse invertebrate taxa, results from the loss of symbiotic zooxantheallae and/or reduction of photosynthetic pigment concentrations in zooxanthellae residing within scleractinian corals. Severe bleaching may cause death of coral reef. Although coral reef bleaching is caused by various anthropogenic and natural variations in the reef environment, high sea surface temperature (SST) has the closest relationship with bleaching.
The present study applies HotSpot and Degree Heat Weeks (DHW), based on remote sensing Advanced Very High Resolution Radiometer (AVHRR), to investigate coral reef bleaching in the South China Sea (SCS) from July to September in 1998, which was the strongest El Niño year in the last century. During this El Niño period, HotSpot value reached one (°C)and DHW value reached eight (DHW) in most area of the SCS. Based on Satellite Bleaching Alert levels (SBA), four main reef areas (Dongsha, Xisha, Zhongsha and Nansha) in the SCS all suffered bleaching in 1998 El Niño. The bleaching occured from July to September in Dongsha and Zhongsha, and from August to September in Xisha. Nansha encountered bleaching in July, which matched the official reports of coral bleaching in this area. Dongsha and Zhongsha had the highest bleaching level of two, next to Xisha level one, Nansha had the lowest level, but still reached warning level. Therefore it is urgent for us to pay more attention to coral reef bleaching in SCS and take plans to protect coral reefs in this area.
This study was supported by research grants LYQ200701 and The CAS/SAFEA International Partnership Program for Creative Research Teams awarded to Dr. Tang DL. Some of information in this study was provided by:ReefBase (http://www.reefbase.org/),World Conservation Monitoring (WCMC, http://www.unep-wcmc.org/),Institute for Marine Remote Sensing Centre (http://www.imars.usf.edu/MC/index.html),and National Oceanic and Atmosphere Administration (NOAA,http://www.noaa.gov/)

Tu. 16:15 Climate Change session room
Responses to ocean acidification and climate change

The Pacific's Approach to Emission Reduction - A Regional Effort?
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The European Union (EU) is tackling global warming to the full extent through the Emissions Trade Scheme (ETS) which limits carbon usage by big industries. With an aim to reduce 20% of emissions by 2020, the EU is making stricter rules and invites the rest of the world to participate. This paper will examine the current changes to the ETS and its impact on the Pacific. The revenue generated from auctioning emission allowances could go towards funding third countries that have ratified the Kyoto protocol to practice and support energy efficiency. It will discuss how the Pacific islands could benefit from participating in the scheme and explore their potentials, such as by developing biomass projects as a region (including the French territories) with common resources and production. There are already many supporting mechanisms, organisations and frameworks to accomodate such actions, namely the European Development Fund, the Pacific Islands Forum, The South Pacific Community, the Pacific Plan, etc. The ETS can help the Pacific to enhance relations with the EU, strengthen regional integration and move towards a greener and a financially brighter future for the Pacific.

Tu. 16:20 Climate Change session room
Responses to ocean acidification and climate change

Influence of sea level variations on an endemic landbird of the Tuamotu (French Polynesia)
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Climate fluctuation and glaciation events during the Holocene and Late Pleistocene impacted greatly the habitats of coral reef islands in the South Pacific. In the Tuamotu (French Polynesia), recent studies evaluated the effects of sea level variation on marine organisms, especially in shallow lagoon habitats, but no terrestrial taxa have been studied so far. This archipelago includes 76 islands spread on more than 1,700 km. We analyzed mitochondrial DNA sequences and nuclear data (microsatellites) of an endemic terrestrial bird, the Tuamotu reed-warbler Acroccephalus atyphus. This passerine inhabits most islands of the archipelago and we collected samples from 11 atolls distributed over its entire range. Both phylogenetic and population genetic analyses indicate that populations from the three main uplifted atolls of the Tuamotu, Ana'a, Niau and Makatea, are genetically distinct, suggesting that these atolls acted as refugia during the last episode of high sea-level. Moreover, the reed-warblers of all the remaining atolls are closely related to the population of Makatea, the largest uplifted atoll, which was probably the main reservoir for the re-colonization of the entire archipelago during episodes of low sea-level. Detailed population structure is discussed in the light of the sea level variations known in the Tuamotu. Conservation applications for this terrestrial bird are presented, and we discuss the implication of the future sea level rise for terrestrial fauna in the atolls of the Tuamotu.

Tu. 16:25 Climate Change session room
Responses to ocean acidification and climate change

Long term Prediction of Atmospheric CO_2 concentration and Ocean Acidification

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We have come to actually feel the various phenomenon related to global warming. For example, abnormal weather, habitat change of flora and fauna, melting polar ice caps, etc. A lot of important influences on the global environment in descendant's age by the present emission of greenhouse effect gas besides present influences are especially feared. Therefore, it is important that the reduction measures to consider the global environment in the future are achieved at the early stage.

CO_2 is one of the greenhouse effect gases. The anthropogenic CO_2 according to the heavy consumption of the fossil fuel caused an increase of the atmosphere CO_2 concentration (pCO_2) together with the influence by the change in the land use. On the other hands, the ocean is known as huge reservoir of CO_2. However, the increase in the atmospheric pCO_2 continues because the CO_2 emission speed is farther more than the absorption speed of the ocean surface. It has been understood that a large amount of CO_2 absorbed to the ocean causes an ocean acidification.

This research targeted the forecast of the change of atmospheric pCO_2 and ocean acidification, and the effect of evasion of the CO_2 reduction measures of 1000 years. In the BAU case by the B2 scenario, the atmospheric pCO_2 became the maximum in around 2270, and became about 600ppm in 3000. In the case that shifted to the carbonless society through the low carbon society, pCO_2 decreased gradually, and it became about 400ppm similar to present year in 3000. The acidification on an ocean surface changed corresponding to an atmospheric pCO_2. On the other hand, the reduction measures by CCS were able to control pCO_2 rise and ocean acidification.

This study is supported by the CO_2 ocean sequestration project of RITE under the fund from METI.

Tu. 16:30 Climate Change session room
Responses to ocean acidification and climate change

Projection of long-term changes in pCO2 within the Coral Sea

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The present study investigates the possible long-term changes in pCO2 and pH within the Coral Sea using the coupled regional model ROMS-PISCES. As a result of increased atmospheric pCO2, oceanic geochemistry has already significantly changed since 1880, with pH levels in the surface ocean having decreased by 0.1 units as a result of higher pCO2. The effects of higher atmospheric pCO2 will likely be further aggravated by shallower mixed layer depths as a result of reduced upper ocean mixing due to warmer sea surface temperatures. Various IPCC scenarios for predicted atmospheric pCO2 were used to determine likely changes in the geochemistry of the Coral Sea during the 21st century. Increases of atmospheric pCO2 to 650-1000 ppm results in a decrease of sea surface pH by 0.15-0.38 units within the Coral Sea in the model. The difference between atmospheric and upper ocean pCO2, in turn, would generally decrease by 0-50 ppm, resulting in the Coral Sea changing from a predominant sink of pCO2 to a seasonal source (mainly during summer and autumn months). Concurrent with increased ocean acidification and pCO2, the saturation state of aragonite and calcite will decline significantly, which would have wide-reaching effects on the coral calcification rates and the general health, and structural strength, of calcifying organisms. To this date, there has been surprisingly little effort to monitor the changes in biogeochemistry within the Coral Sea and, specifically, within the GBR as a result of increased atmospheric pCO2. Further large-scale studies are required throughout the entire Coral Sea in order to accurately determine the long-term trends in oceanic pCO2, CO32-, saturation state and pH.

Tu. 16:35 Climate Change session room
Responses to ocean acidification and climate change

Coral reef degradation - The future of crustaceans?

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Despite a limited surface area (1.2 % of the continental shelf), coral reefs, based on recent estimations, may encompass around 25 % of oceanic diversity. However, increasing anthropogenic pressures (overfishing, pollution, global warming) have led to major habitat degradation and habitat fragmentation in the last few decades. Therefore, it has become critical to understand coral reef ecological processes in order to implement efficient management tools with two main challenges: (1) Understanding how communities will be affected by perturbations, as well as their ability to recover; (2) Understanding the scale of marine organism dispersion (connectivity). So far, several studies have already given insight into the level of demographic connectivity between reef fish populations, estimations that are crucial in order to decide where and how to set up marine reserve networks. But a lot remains to be done. Fish represent only a small proportion of coral reef diversity, and crustaceans in particular, have been largely overlooked. Therefore, during my 3 year PhD I will study the sensitivity of different life stages of crustaceans to habitat degradation. I will use the crustacean communities associated with the sea anemone Heteractis magnifica and corals Pocillopora sp. as my model species. I will briefly present the project as well as preliminary results. In situ transplant and in vitro experiments will test the impact of habitat modification on the recruitment of crustacean communities. Secondly, consequences of habitat degradation on the genetic diversity and long/short term sustainability of the species will also be discussed. This project aims to make more reliable predictions on the future of coral reef biodiversity and give an indication on how to optimize its management.

Tu. 16:40 Climate Change session room
Responses to ocean acidification and climate change

Deep-sea carbonate concentrations in the SW Pacific: How do they affect the distribution of carbonate sediments and deep-water benthic organisms?

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The oceans have absorbed 48% of the increasing atmospheric CO2 over the last 200 years. This has lowered the ocean pH by 0.1 unit and reduced carbonate ion concentrations. A number of recent studies have been focused on the effects of reduced carbonate concentrations on low latitude coral reefs. However, the biological impacts will be exacerbated in deep waters as CO2 is more soluble in cooler, deeper waters. Particularly vulnerable are the carbonate-producing organisms that inhabit the poorly understood, cool, intermediate and deep-water masses.

We have calculated the saturation horizons for the two main polymorphs of carbonate, aragonite and calcite, in the SW Pacific region. Unfortunately there is currently very limited data for this region, both spatially and temporally. The data shows that the aragonite saturation horizon (ASH) varies between 1050 to 1350 mbsl (metres below sea level), while the calcite saturation horizon (CSH), the more stable, naturally occurring, polymorph, is found between depths of 2800 to 3500 mbsl. We compare the depths of the calculated CSH with the carbonate content of ∼1000 deep-sea surface sediment samples in the region, and the foraminiferal fragmentation % from 150 samples. We also compare the ASH with the known distribution of deep-sea aragonitic scleractinian corals around New Zealand. The majority of living scleractinian corals are found above the current ASH.

Current models forecast that these carbonate saturation horizons will shallow significantly in the next century due to increasing anthropogenic CO2. Using a IPCC IS92a "business-as-usual-scenario" the ASH is predicted to shoal to >500 m by 2100 in the SW Pacific region (Orr et al 2005). If this eventuates, it will significantly reduce the water depths and area available for deep-sea aragonitic organisms.

Tu. 16:45 Climate Change session room
Responses to ocean acidification and climate change

Managing Coral Reefs and Climate Change in American Samoa

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Coral reefs are in trouble. Approximately 20% of the world's coral reefs have already been destroyed and another 24% are under imminent risk of collapse due to human related threats. One of the major causes for this global decline is climate change and the resultant coral bleaching events it creates. There have been at least six mass coral bleaching events since 1979, with a severe global die off occurring in 1998 during which 40% of corals were seriously damaged. What's worse, climate models predict that coral bleaching events will occur annually by approximately 2050. This will undoubtedly result in coral reefs will are severely depleted, if not entirely destroyed, as mortality will exceed expected rates of recovery. While American Samoa is hardly a contributor to global climate change, this small island will undoubtedly be affected by rising sea levels and predicted changes in weather patterns. Scientists from the Governor's Coral Reef Advisory Group have created a Local Action Strategy to create targeted, strategic, multi-agency projects and policies aimed at enhacing coral reef resilience and reducing island vulnerability. Coastal managers are addressing these serious threats via this formalized multi-agency and have also received strong government support. Aside from a bleaching response plan and ongoing territorial benthic monitoring, the Governor has issued an Executive Order mandating that the American Samoa Government work to address climate change by minimizing its carbon footprint. This mandate complements the on-the-ground activities and ensures American Samoa improves the purchase of fuel efficient vehicles, the adoption of energy saving lightbulbs, and the inclusion of energy rated appliances for Government buildings, among a variety of other recommendations. Although coral reefs continue to decline, small measures around the world, even on small islands, can help to ensure these systems sustain themselves for future generations.

Tu. 16:50 Climate Change session room
Responses to ocean acidification and climate change

Diffusion of low pH/high CO_2 environment at natural CO_2 venting sites

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At seafloor hydrothermal systems, natural hydrothermal CO_2 is diffused into the ocean as a hydrothermal plume and low pH/high CO_2 environment is appeared around natural CO_2 venting sites. Natural analogue of the hydrothermal CO_2 vents would provide an opportunity for understanding the mechanism, influence and recovery of ocean acidification. In the Okinawa Trough and Mariana Trough, liquid CO2 is emitted from hydrothermal vents at about 1500m depth. Even more, CO_2 gas bubbles are erupted from seafloor at 100-200m depth in the Kagoshima Bay and 20m depth in Taketomi Island.

Dissolution of liquid CO_2 during ascent of CO_2 droplet and diffusion of low pH seawater (pH 6.4 to 7.3) were observed at the Hatoma Knoll in the Okinawa Trough. The CO_2 droplets emitted from the seafloor dissolve slowly into the ambient seawater while ascending, but changes in pH and pCO_2 near the rising CO_2 droplets are small. The in-situ pH mapping revealed that the discharged liquid CO2 does not cause widespread pH depression in the ambient environment. At the NW Eifuku submarine volcano in the Mariana Trough, the low pH plume (pH 6.7 to 7.4) derived from hydrothermal liquid CO_2 was detected in 100m high and 200m wide area above the summit of the volcano. The result of CO_2 gas bubbles mapping survey at the Wakamiko Caldera in the Kagoshima Bay indicated only localized pH depression (pH 6.4 to 7.7) below 120m depth because CO_2 in gas bubbles dissolved to seawater during ascent of gas bubbles. At shallow hydrothermal system off Taketomi Island, 10m x 10m area around CO_2 venting site showed low pH environment (pH 6.3 to 7.6).

In this presentation, we report our observation results of diffusion of low pH/high CO_2 environment at natural CO_2 venting sites in Japan.

Tu. 16:55 Climate Change session room
Responses to ocean acidification and climate change

A Method for Algal Bloom Detection from MODIS Images and its Application in Pearl River Estuary
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In recent years, the coastal regions in China have frequently experienced algal blooms, which are harmful or otherwise toxic because of their potential threat to humans as well as marine organisms. This article mainly focused on the following aspects: (1) analyzed the MODIS spectral characteristics of the four typical sea water: clear water, turbid water, red tide water, mixed water. (2) Analyzed the merits and shortcomings of band ratio method for red tide extraction. (3) Proposed a new red tide extraction method: Supervised Classification method based on Band Ratio (R4/R3) and MODIS band 1, 4, and 3. Based on this method, successful extraction has been carried on for the Pearl River Estuary algal bloom incidence in Feb.2006

Tu. 17:00 Climate Change session room
Responses to ocean acidification and climate change

The sentinels of Europe
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The European Union overseas entities are particularly vulnerable to climate change effects. Typically tropical islands, they are generally small in size with limited resources; they are often isolated and largely exposed to cyclone and sea level rise. Insular ecosystems are particularly rich, with remarkable endemism rates, but they are also extremely fragile and often highly deteriorated; therefore, their resilience to new aggressions is limited. Furthermore, island economies strongly rely on the quality of their natural environment, notably through tourism, fishing and subsistence farming; a degradation of their environment could deeply affect local communities. European territories located in the Polar Regions are particularly threatened as well; rises in temperature projected in the Arctic are twice higher than the global average. In summary, the European Union overseas entities seem to be "sentinel territories" or indicators testifying to the effects of global changes on ecosystems and societies worldwide.
A book (174 pp), produced by IUCN (International Union for the Conservation of Nature) in collaboration with ONERC (Observatoire National des Effets du Rechauffement Climatique), offers for the first time a comparative analysis of the 28 overseas entities of the European Union. It starts with a thematic analysis presenting the transversal threats on overseas entities in the face of climate change. Subsequent sections, specific for each of the 28 entities, provide some contextual data and an overview of their remarkable biodiversity, in addition to presenting the new threats resulting from climate change. Lastly, examples of responses to climate change or "best practices" are reported for selected territories.
Available on www.reunion2008.eu

Tu. 8:15 Public Health session room
Keynote lecture on Health Challenges in the Pacific: Infectious Disease, Non-Communicable Disease and the Health Workforce

What About the Workers? Where are Health Workers Going, Why and With What Impact?
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In the past decade the migration of skilled health workers (mainly doctors and nurses) from less-developed countries has been said to have reached crisis proportions; press reports talk of poaching, looting, stealing and even the new slave trade, while even sober academic accounts have talked of fatal flows. The migration of health workers has long been said to epitomize the brain drain, and various writers talk of carousels of migration, and tug-of-wars for skilled migrants. Yet despite the significance of this migration, in numbers, impacts (medical, economic, social and political) and its seemingly inexorable growth, there have been few accounts that examine this situation in any detail. So where and why are these global flows evolving, and what impact are they having? And what does all this mean for the Pacific region? The migration of health workers in the Pacific is part of a wider culture of migration, especially in the Polynesian states, that extends into a medical culture of migration. Selective migration has meant the loss of superior skills but a gain in remittances. Does this adequately compensate for an absent workforce, or is this a perverse flow that has generated a new inverse care law? Restructuring and privatization, significant global trends, have placed new pressures on the sustainable development of health systems. What are the policy implications of all these movements, and what do they mean for compensation, codes of practice, equity and ethics?

Tu. 9:00 Public Health session room
Infectious and Vector-borne Diseases

Vector surveillance and control of *Aedes aegypti* in New Caledonia
Edouard Bourguet[a], Laurent Guillaumot[a], Anne Pfannstiel[b], Aurélie Guigon[a], Martine Noel[b], Jean-Paul Grangeon[b] and Suzanne Chanteau[a]
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Dengue is now endemic in New Caledonia. From year to year, severe outbreaks occur during the hot and rainy season from January to March. In the Pacific islands, in a given period, only one serotype of the virus is circulating and contributes to the acquisition of the immunity of the population to this serotype. The introduction of one of the 3 other serotypes and consequent outbreaks take place when the herd immunity to this new serotype is low. The control of the *Aedes aegypti* larvae is a main concern to prevent and control epidemics. In 1998, The Pasteur Institute of New Caledonia (PINC) implemented a Network for surveillance and control of Ae. aegypti, in tight collaboration with local authorities, municipal staff and technical services. Main cities were parted in clusters of 100-150 houses, which are randomly sorted every month to be visited by the surveillance teams. All Ae. aegypti breeding sites are identified, notified and destroyed. Entomological indices are calculated monthly and published in the main local newspaper. Warning messages are also broadcasted on TV and radios when epidemic risk is high. Meteorological indicators collected from Météo France are analyzed in parallel with entomological indices. Before and during the rainy season, the populations are sensitized to the elimination of vector breeding sites. However, new tools of communications are obviously needed to remotivate the populations for ensuring an efficient education program. During the 2008 outbreak in New Caledonia, spreading of insecticides targeted around biological confirmed cases was possible thanks to the availability of rapid Dengue diagnostic assays. The sensitivity of Ae. aegypti to insecticides is regularly monitored at PINC, using WHO standardized tests to better adapt the control strategy.

Tu. 9:20 Public Health session room
Infectious and Vector-borne Diseases

Dengue-Specific T Cell Responses in Hawaii and French Polynesia

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Dengue is a mosquito-borne illness which is present in endemo-epidemic form throughout the year in much of the Pacific. The disease is caused by any one of four dengue viruses (dengue virus (DV) serotypes 1-4), RNA viruses of the family Flaviviridae. Most patients experience dengue fever and typically recover after about 5-6 days, but about 5-30% of cases develop the more severe dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS). DHF/DSS frequently occurs during secondary infection with any of the 4 dengue viruses. Onset of the most severe symptoms occurs when viral load drops and fever remits, suggesting that the vascular leakage leading to shock is the result of immunopathology. We are studying the role of cross-reactive dengue-specific memory T cells and their capacity to produce excessively high or low levels of cytokines and other immunomodulatory molecules, when they are activated by heterologous dengue serotypes in a secondary infection. To do this we first need to characterize the nature of dengue-specific cell mediated immune responses in Pacific Islanders, whose HLA frequencies may be distinct from Asian and Caucasian populations, the most studied groups to date. Between 2005-2007 we recruited individuals infected with dengue in Hawaii and French Polynesia between 1975 and 2001, with well described single or multiple DV1, DV2, and DV3 infections. Using a peptide library we synthesized based on the epidemic DV1 strain Hawaii2001, we mapped T cell epitopes in the dengue NS3 and NS5 genes, the highly conserved viral protease and RNA-dependent RNA polymerase, respectively. Responses were detected in 15/32 subjects up to 14 years after infection, measurable directly ex-vivo. We identified a highly immunodominant epitope at NS5329-337, in 8 subjects, restricted by HLA B*5502, a molecule frequently expressed in Polynesian populations. Our current studies of dengue-specific T cell cross-reactivity focus on this response, and will be discussed. This is the first study of dengue-specific cellular immunity in Pacific Islanders. The findings from our work are directly applicable to dengue vaccine design that may improve safety by avoiding potential cross-reactivity in T cell responses.

Tu. 9:40 Public Health session room
Infectious and Vector-borne Diseases

Predominance of ST306 serotype 1 among invasive *Streptococcus pneumoniae* in the South Pacific

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Background. Serotype 1 pneumococci are a major cause of invasive disease, sometimes associated with outbreaks. In the South Pacific, many reports described the prevalence of serotype 1 infections in indigenous, such as Aboriginal Australians, or Melanesians and Polynesians in New Caledonia. Methods. We genotyped invasive serotype 1 pneumococci isolated in Australia (n=6), New Caledonia (n=66), Wallis and Futuna (n=6) and French Polynesia (n=33) from 1999 to 2007. A total of 111 isolates were analysed by macrorestriction DNA (PFGE), of which 32 were selected for MLST typing. An e-burst analysis was performed including our sequence types (ST) and all serotype 1 strains available in the MLST database. Results. Only two distinct pulsotypes were found. The major pulsotype (60 strains, found in all of the 4 countries) was of ST306 sequence type and a new ST 3717, a single locus variant of ST306. Responsible for outbreaks in 1999 and 2007 the ST306 and SLV clones were the exclusive clonal complex found in New Caledonia and Wallis and Futuna. The minor pulsotype (8 strains) belonged to ST304 clone and was found in both Australia and French Polynesia. Discussion. PFGE was not able to discriminate between the ST306 strains suggesting the high stability of this clone in the South Pacific from 1999 to 2007. Refering to the MLST S. pneumoniae database, ST 306 was the most important serotype 1 associated sequence-type and defined as the lineage A-associated STs. It was assigned by e-BURST analysis as one of ancestral genotype from which other STs of lineage A arose (included ST227). Lineage A isolates were described from Europe, the United States, or Canada and now in the islands of the South Pacific. The predominance of ST306 serotype 1 among invasive *Streptococcus pneumoniae* in the South Pacific contributes to the lower protective impact of vaccines

Tu. 10:30 Public Health session room
Infectious and Vector-borne Diseases

The Challenge of filariasis control in French Polynesia

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From 1993 to 2007 mass drug administration (MDA) was re-implemented in French Polynesia due to the re-emergence of this ancient endemic after 10 years of active MDA interruption (1982-1992). Despite the implementation in 2000 of a regional programme to eliminate lymphatic filariasis (PacELF), based on an MDA combining diethylcarbamazine and albendazole, the filarial endemic remains above the elimination threshold as defined by the PacELF standard. Although effective this strategy has failed to achieve a quick and sustained reduction of filarial prevalence even after the extension of the programme beyond the recommended 5 years of MDA. The aim of this presentation is to summarize different important data of the PacELF programme in French Polynesia and the problems encountered in this epidemiological island setting.

Tu. 10:50 Public Health session room
Infectious and Vector-borne Diseases

Statement of Appeal on An Integrated Information and Communications Network for Avian Influenza

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1. Avian Influenza The primitive virus of the avian influenza that wild birds carry the pathogenicity is low. However, it infected bird to bird, the mutation will be occurred and finally get high pathogenicity. If this virus infected directly from bird to human, the prognosis of the patient will be so bad. The death rate of the past H5N1 is 63%, while SARS was only 4%. When the pandemic happen, Japan cannot help developing nations. Because we are facing to luck of vaccine, luck of human resources. The socio-economical damage will be tremendous. It is said that the economical loss will be equal to World War II. The only solution of this problem will be the prevention.
2. Our action The ITU-D SG2 Q14 Rapporteur's Meeting hosted by the Ministry of Internal Affairs and Communications of Japan started in Tokyo on July 2008. The Question 14 deals with application of information and telecommunication technologies in health care. During the meeting, the Statement of Appeal on An Integrated Information and Communications Network for Avian Influenza was approved by participants. This Tokyo declaration consists of the following main points; 1.Principle of Information Disclosure 2.Technological Research and Developments 3.Utilization of Radio Frequency, Standardization and Developments 4.Integrated Information Network 5.Co-operations with relevant Organizations 6.Human Resource Development This report intends to input the outline of this statement and the importance of the development of the telecommunication technology to track wild birds and monitor their topology using with such as 1) the next generation data collection satellite, 2) short and long-distance RFID, and 3) the GIS which integrated avifauna and epidemiology information. There are many members from developing nations in ITU-D which support the study. So we believe that the ITU-D will be one of the suitable home body to deal with this study and will set the new question to the forthcoming WTDC 2010.

Tu. 11:10 Public Health session room
Infectious and Vector-borne Diseases

Satellite tracking of bird migration

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From early days, bird migration has been a mysterious for people and the first effort to study the migration of birds was done to attach a numbered ring to bird. This is called Bird Banding Program. In Japan, the banding program was started in 1924 and Yamashina Institute for Ornithology has been in charge of this program. Total 4,390,000 birds were ringed until 2007 and 28,800 recovery data were collected. But in this program, the data shows only the sites of banded and recovery. A lot of efforts were made to improve the method such as tracking by a motor-glider in 1987 and finally the satellite tracking system was established. In Japan a small transmitter for the satellite use was developed in 1991 and a bird with the transmitter could be tracked by a satellite. The first study was done for the migration of the White-naped Crane and the Hooded Crane. The transmitters were attached at the Daursky Nature Reserve in Russia to both species and one White-naped Crane was successfully tracked to its wintering site in the southern part of Japan. In 1995, the satellite tracking succeeded for the Demoiselle Crane migration from it breeding site in Mongolia to the wintering site in India over Himalayas. The result of the satellite tracking showed us not only the sites of attached and the recovery but its rout and exact time crane was migrating. From the result of the satellite tracking, it is possible to get enough information on migration route of cranes and important stop-over sites during the migration. Based on the result, for cranes, co-operations for the conservation of important sites and international network of the sites was established in 2001. Now, the satellite tracking is well known as a very much useful method and has been used widely to study the migration of many other birds as albatrosses, divers, swans, waders and hawks.

Tu. 11:30 Public Health session room
Infectious and Vector-borne Diseases

Legislation poses a challenge for HIV/AIDS Intervention Programmes targeted at Pacific Men Who Have Sex With Men

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Issues:
In Samoa and other Pacific Islands, current legislation affecting MSM and MSM Positive People is archaic and is heavily influenced by their colonial and religious past. Pacific MSM and MSM Positive People and their Human Rights under constitutional law have been heavily undermined by politically driven amendments or repeals of the most important provision.
Description:
Pacific MSM known as Faafafine, Leiti, Vakasalewalewa, Akavaine, Rere, Mahu and other Pacific translations are automatically identified as gay, transgender and transvestite. It is inappropriate to describe this Pacific uniqueness through Western eyes. Sodomy laws criminalize same sex intimacy between consenting males, justify anti-homosexual discrimination. The Laws do not limit the actual behavior but serves to demonize, isolate and promote fear through ignorance by limiting access to safe sex education. It is through this interpretation that Pacific MSM are at increased risk of contracting HIV since they do not receive safe sex information and are not included in safe sex education, care and treatment.
Lessons learned:
The establishment of the Pacific Sexual Diversity Network made up of informed organizations, individuals and informal groups promote access to knowledge and resources, regional advocacy for policy and legislation change, promotion of social justice and equitable allocation of public resources for HIV care, treatment and other services.
Next Steps
Strategies amending Pacific Constitutions with clauses to ensure the protection of Human Rights and include MSM and HIV/AIDS as prohibited grounds for discrimination. Advocacy groups should work to position the community for political change and garner support amongst church and traditional leaders to open dialogue on MSM and HIV Issues.

Tu. 11:50 Public Health session room
Infectious and Vector-borne Diseases

The Impacts of Sexual Behaviours on HIV Infections in Men Who Have Sex with Men in the Pacific Region

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Issues:
Previous research demonstrates that's gaps in HIV/AIDS/STIs awareness and prevention show increase vulnerability among th MSM Communities. Little is known about the prevalence of awareness of HIV transmission of Pacific MSM sexual behaviour . MSM who engage in male to female behaviours maybe a bridge to HIV transmission in the heterosexual populations.
Description:
Studies of HIV/AIDS/STIs in the Pacific Region are limited and do not provide tools for evidence informed policies and programs. Papua New Guinea record the highest levels of HIV in the Pacific. Currently 1.8% of the adults in the Pacific is HIV Positive. By the year 2015 research predicts a 10% prevalence of HIV amongst adults. The projection suggests that men who engage in bisexual behaviour and men who do not identify as homosexual may be a source of HIV infection amongst adults.
To further assessment, FHI commissioned a qualitative and quantitative survey in MSM populations in Port Moresby, Papua New Guinea. 223 men were surveyed. Men reported sexual behaviour and any signs of symptoms of STIs in the last 12 months. Urethral discharge reported by 27.9% and genital ulcers reported by 23.9%. 23% of MSM self identified as homosexual and practised commercial sex. A quarter of the sample is married to female partners.
Lessons learned:
The respondents in Port Moresby demonstrated a lack of knowledge of HIV/AIDS/STIs transmission and the proper use of condoms. The sample reported barriers to heath care, education and condoms. Alcohol use reflects a high increase number of high sexual behaviours in the study population.
Next steps:
The results of the study demonstrate the immediate need of health education programs to increase HIV safe sex practices. Culturally sensitive education strategies targeting MSM are essential. Further research is needed to evaluate the risk and levels of awareness of HIV in the Pacific.

Tu. 12:10 Public Health session room
Infectious and Vector-borne Diseases

Consensus Document on HIV testing algorithm and STI Case Definition in the Pacific

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It is internationally recognized that human immunodeficiency virus (HIV) testing is a crucial entry point for prevention, treatment, care and support services for those vulnerable to, or living with HIV. Recently conducted second-generation surveillance studies show that, there is a high prevalence of sexually transmitted infections (STIs) in the Pacific region. STI reporting varies from country to country. However there is a need to strengthen the process on HIV testing and STI case reporting.
Hosted by the Government of American Samoa, a technical meeting was convened on 5 and 6 May 2008 by the Secretariat of the Pacific Community (SPC) in Pago Pago with key regional partners, including the World Health Organization (WHO), United Nations Children's Fund (UNICEF), Centers for Disease Control and Prevention, USA (CDC), Oceania Society for Sexual Health and HIV Medicine (OSSHHM), Australian National Serology Reference Laboratory (NRL), Pacific Paramedical Training Centre (PPTC), Hawaii AIDS Education and Training Center (HAETC), Pacific Island Health Officers Association (PIHOA) and Life Foundation.
The primary purpose was to examine and agree on a more harmonized regional approach for HIV testing. The document provides a clear direction on HIV testing, reducing turn around time for results, providing direction of scaling-up for HIV testing, and also reduces cost for the HIV testing in the future.
Also this meeting allowed agencies to discuss and come up with the consensus document on case definition and minimum data set for STI.
These consensus documents will be utilized by public health staff, program manager, laboratory and clinical staff. Adopting a consistent approach to definitions and reporting STI cases will enable more accurate and consistent data for monitoring trends in STI incidence and prevalence over time.
The positive outcome from the meeting aligns it self with the goals of the Pacific Regional Strategy on HIV Implementation Plan.

Tu. 14:00 Public Health session room
Non-Communicable Diseases

Multisectoral Trans-disciplinary Approach to Prevention and Control of NCD in the Pacific

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Non Communicable Diseases (NCDs) are the leading cause of death in the Pacific, accounting for approximately 75% of deaths every year compared to 70% worldwide.
Evidence from STEPs surveys undertaken in selected PICTs revealed significant rates of NCDs (such as diabetes, hypertension and obesity) arising from key risk factors, mainly poor diet, physical inactivity, tobacco smoking and alcohol abuse. Research has shown that addressing major risk factors by improving diet, increasing physical activity, and controlling the use of tobacco and alcohol, can have a significant effect on lessening the incidence of NCDs, with as much as 80 percent of heart disease, stroke and Type 2 diabetes, and 40 percent of cancer prevented.
The current level of resources available at country and regional level are neither proportionate nor adequate to address this major challenge. The Secretariat of the Pacific Community (SPC) joined forces with the World Health Organization (WHO) developing the Pacific NCD Programme .
The Programme aims to assist, support and enable Pacific Island Countries and Territories (PICTs) to improve the health of their populations by establishing a comprehensive , multisectoral and trans-disciplinary approach to combat NCDs and associated risk factors. It is part of the responds to calls for actions on NCD from the Pacific Ministers of Health meetings over the last five years, Global WHO Plan of Action for NCD, Healthy Island Vision and consultations with PICTs.
It also seeks to harmonize and coordinate the efforts of both implementing partners and donors, sharing resources, minimize duplication and build on the comparative advantages of SPC and WHO working together under the concept of "ONE TEAM TWO ORGANISATIONS FOR 22 COUNTRIES AND TERRITORIES". It embodies the 3 ones principles or the Paris and Rome declaration and adapt them into the Pacific context. .

Tu. 14:20 Public Health session room
Non-Communicable Diseases

Paradoxical relationships between anthropometric variables and phenotypic expression of the metabolic syndrome in non-diabetic Polynesians of New Caledonia

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Objective : Obesity and diabetes are highly prevalent in Polynesians of New Caledonia. We explored whether this ethnic group would present the cluster of cardiometabolic disorders named "metabolic syndrome", an established risk factor for type 2 diabetes and cardiovascular diseases in populations of European descent. **Methods** : A total of 419 non-diabetic participants were selected from the CALDIA Study, a population-based survey of diabetes prevalence in New Caledonia. Anthropometric variables, glucose, insulin, lipids and blood pressure were compared between the three main ethnic groups of the archipelago (Melanesians, Europeans, Polynesians). The associations between anthropometric and cardiometabolic variables were also studied. **Results** : Despite their much higher mean body mass index and waist circumference, Polynesians had lower plasma insulin levels and indices of moderate insulin resistance compared to Melanesians and Europeans. They also had a much higher rate of glycemic abnormalities (62% vs. 46% and 28%, respectively). On the other hand, their mean triglycerides and blood pressure were lower compared to Melanesians (mean, 1.20 mmol/l, 95% CI [1.05-1.38], vs. 1.45 [1.36-1.54] mmol/l, $p<0.01$; 133.3 [127.6-139.0] vs. 138.9 [136.4-141.5] mmHg, $p<0.05$) and total cholesterol was lower compared to Europeans (4.44 [4.22-4.71] vs. 5.26 [4.95-5.58] mmol/l, $p<0.001$). Moreover, in this ethnic group, triglycerides were not associated, and total cholesterol was inversely associated ($p<0.04$), with abdominal obesity. **Conclusions** : Despite their high body mass, marked abdominal fat distribution and high blood glucose levels, non-diabetic Polynesians did not exhibit the cluster of abnormalities usually observed in the metabolic syndrome. This illustrates the diversity of phenotypic expressions of the metabolic syndrome across populations, and may have implications for the assessment of disease risk and for the design of preventive measures in Polynesians.

Tu. 14:40 Public Health session room
Non-Communicable Diseases

Mercury exposure and cardiovascular risk factors among adults of French Polynesia

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Background: Seafood is rich in nutrients which are beneficial for cardiovascular health. However, fish may contain high quantities of contaminants such as mercury which has been suggested to increase blood pressure (BP) and decrease heart rate variability (HRV). Objective: To assess the influence of mercury on HRV and BP in two communities of French Polynesian (Tubuai and Papeete). Methods: A health survey was conducted among residents of Tubuai and Papeete and 189 adults $\geq$ 18 years old accepted to participate (102 from Tubuai and 87 from Papeete). HRV was measured using a 2-hour ambulatory electrocardiogram (Holter) and time and spectral parameters were calculated. Three measurements of BP were performed and means of systolic and diastolic blood pressure were calculated. BP and HRV parameters were compared among tertiles of mercury concentrations using ANOVA analysis and adjusted means were obtained using ANCOVA analysis. Results: Mercury blood concentrations were higher in Papeete than in Tubuai (94.5 vs. 54.4 nmol/L; p< 0.0001). Papeete participants had lower HRV compared to Tubuai which was expressed by reduced SDNN (75 vs. 86 ms; p= 0.01) and SDANN (50 vs. 57 ms; p= 0.023). No difference was observed in heart rate or in BP parameters. In Papeete, SDNN decreased with tertiles of mercury concentration but only means differences between tertile 1 (85 ms) and 2 (65 ms) were statistically significant (diff means= -0.29; 95% CI: -0.53, -0.05). For SDANN, significant differences were also observed between tertile 1 (58 ms) and 2 (41 ms) (diff means= -0.35; 95% CI: -0.63, -0.07). These patterns were similar after adjusting for age and gender. No significant differences were observed among Tubuai residents. Conclusion: Mercury exposure seems to affect HRV among Papeete adult's residents. Further studies will explore these associations in Papeete and Tubuai teenagers.

Tu. 15:00 Public Health session room
Non-Communicable Diseases

The dietary transition in French Polynesia: what objective scores to measure its extent and components?

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OBJECTIVE: Most of the studies investigating the dietary transition use either individual food consumptions or complex dietary patterns as a measure of dietary changes over age and space. Our aim was to build simple scores of dietary transition to be used in the framework of the ongoing cohort about the "Dietary and health transition in French Polynesia".
DESIGN : Maohi participants aged 12-88 years (n=232) gave blood and spot urine samples and answered a 24-groups food-frequency-questionnaire. We measured the fatty acid profile of red blood cell (RBC) membrane phospholipids as a surrogate for individual intakes of PUFA and trans-fatty acids. We calculated two scores: the "dietary transition score" (DTS) was based on the sum of food frequency scores: local foods scored positively while store-bought-foods scored negatively. The "dietary fat transition score" (DFTS) was the ratio of (EPA+DHA) to *trans*-fatty acids in RBC. We compared scores across three age groups (12-17years, 18-49years, 50years+) and two communities (urban Papeete and rural Tubuai).
RESULTS: DTS varied greatly according to age: from -61.0$\pm$58.8 in teenagers to 12.3$\pm$52.9 in elders ($p\leq0.0001$), and community: -5.33$\pm$63.0 in Tubuai and -33.9$\pm$62.7 in Papeete ($p=0.0006$), without interaction. There was a positive linear trend from teenagers in Papeete to elders in Tubuai ($p\leq0.0001$). DTS was correlated to DFTS (Spearman $R^2=0.40$, $p\leq0.0001$), urinary iodine-to-creatinine ratio ($R^2=0.32$, $p\leq0.0001$), plasma selenium ($R^2=0.35$, $p\leq0.0001$), and non n-6 fatty acids in RBC ($R^2=0.45$, $p\leq0.0001$), n-6 being a marker of all types of low quality food. DFTS correlated even better with iodine ($R^2=0.43$, $p\leq0.0001$) and selenium ($R^2=0.78$, $p\leq0.0001$), which may be considered as markers of marine food consumption.
CONCLUSIONS: The simple dietary transition scores we propose capture generational and geographical differences in food consumption patterns that may be relevant to the study of the ongoing health transition in French Polynesia and other populations facing social change.

Tu. 15:20 Public Health session room
Non-Communicable Diseases

Glycemic index in relation to nutrient intake, body composition, and metabolic risk factors in French Polynesia

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OBJECTIVE: High-glycemic index (GI) diets have been associated with consumption of foods of poor nutritional quality, and have been linked to a greater risk of cardiovascular diseases and type 2 diabetes in Caucasians. Recent evidences suggest a shift away from traditional lifestyles and diets by the French Polynesians. We aimed at examining the association between dietary GI and nutrient intake, anthropometric variables, and metabolic risk factors in French Polynesia.
DESIGN : We measured dietary GI and nutrient intake among 148 adults from Papeete (capital of French Polynesia) and Tubuai (Austral Islands), using a 24-hours dietary recall. Physiological (lipid profile, fasting glucose and insulin, apolipoprotein levels, and C-reactive protein) and anthropometrical measurements were obtained. We calculated partial correlation coefficients between GI, nutrient intake and biomarker values adjusted for potential confounders.
RESULTS: In total, 41.9% of subjects from Papeete and Tubuai consumed a high-GI diet the day before the survey (p=0.04). No difference in mean (±SD) dietary GI were observed between Islands (60±8 and 61±6; p=0.55). After adjustments for potential confounders, dietary GI was positively correlated with body weight, body mass index, body fat mass, and waist circumference (all p<0.01) in Papeete. Dietary GI was also positively correlated with smaller LDL peak particles size (p=0.05), higher plasma cholesterol (C), C/HDL ratio, apoB100, fasting insulin (p<0.01), and lower plasma HDL-C (p=0.009) in Papeete. We found significant positive correlations between dietary GI, protein consumption and monounsaturated fatty acids intake in Papeete (all p<0.05). No association was observed between dietary GI and any of the nutrient intake and metabolic risk factors in Tubuai.
CONCLUSIONS: Dietary GI is correlated with an unfavourable metabolic risk profile in Papeete, but not in Tubuai. The traditional diet, and other favourable lifestyle factors such as physical activity, which are more predominant in Tubuai, might induce some protection on cardiovascular and metabolic risk factors.

Tu. 15:40 Public Health session room
Non-Communicable Diseases

Children & Cardiovascular Disease: Is the Polynesian Youth at Risk ?

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Background: Atherosclerosis is reported to progressively accelerate through childhood especially in the presence of risk factors for cardiovascular disease (CVD). We therefore sought to evaluate the atherosclerosis status in Polynesian children in whom traditional risk factors for CVD are becoming omnipresent.
Method: As part of the "Dietary and Health Transition in French Polynesian" survey, 101 children (aged 12-17yrs) from 4 different communities underwent evaluation of risk factors for CVD. The ultrasonographic measurement of the carotid intimal to medial thickness (CIMT) was interpreted as a surrogate maker of atherosclerosis. Traditional risk factors for CVD known to induce CIMT were obtained by clinical and blood measurements and subdivided as follow: 1) Obesity (normal, risk of overweight, overweight), 2) Hypertension (normal, pre-hypertension, hypertension), 3) Diabetes (normal, impaired fasting glucose). We compare CIMT between categories of risk factors using analysis of covariance (ANCOVA) adjusting for age and gender.
Results: The CIMT measurements of our young Polynesians were higher that was has been reported in healthy, obese, hypertensive and diabetic children. There was no difference in CIMT between communities (p=0.24), with a total global average of 0.48 ± 0.06 mm. The obesity (normal: 0.46 ± 0.04 mm, risk of overweight: 0.47 ± 0.04 mm, overweight: 0.45 ± 0.06 mm; p=0.59), hypertension (hypertension: 0.46 ± 0.04 mm, normal: 0.46 ± 0.05 mm; p=0.53) et diabetic status (Impaired fasting glucose: 0.46 ± 0.07 mm, normal: 0.46 ± 0.04 mm; p=0.6) did not impart CIMT.
Conclusion: Polynesian children show increased signs of atherosclerosis evaluated by CIMT compared to what is being reported in the current literature. Such increase is not attributable to traditional risk factors for CVD. This intriguing lack of association may be caused by other mechanism that requires further investigation.

Tu. 16:30 Public Health session room
Non-Communicable Diseases

Obesity is not Related to Hypertension Among French Polynesian Adolescents

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Objectives: Recent data suggest that pacific islanders are not spared from the epidemic of childhood obesity. Excess of body weight is associated with an array of health complications, such as hypertension (HTN). This study aimed to describe the anthropometric features of French Polynesian adolescents and examine their associations with hypertension. Methods: adolescents aged 12 to 17 years (n=117) from four French Polynesian islands were invited to participate in the "Dietary and health transition cohort study". The present analysis uses baseline data. Anthropometric measures (body weight, waist circumference...) were obtained by standardised protocol; body composition was assessed by bio-impedance analysis. Body mass index (BMI) was derived from the CDC normalized growth charts. HTN ($\geq$95th percentile for gender, age and height) and pre-hypertension(Pre-HTN) ($\geq$90th percentile but lower than 95th percentile) were defined according to the 4th report from the US National High Blood Pressure education program working group on children and adolescents. Results: 27.6 % of adolescents were identified with a significant likelihood of persistence of obesity into adulthood and among them around 15% had BMI > 30Kg/m2. No gender or difference between regions (Papeete, Tubuai, Raivave and Rapa) was detected. BMI is highly correlated with all anthropological measures and in all overweight teens, waist-to-hip ratio was lower than 0.94 that suggests a "pear shape". HTN and pre-HTN were observed respectively in 21.8% and 17% of teens, without gender or regional difference. Logistic regression between hypertension and each anthropometric measures adjusted for age and gender revealed no independent association (BMI: OR: 1.04[0.96-1.12]; waist circumference: OR: 1.03 [0.99-1.06]; % of body fat OR: 1.02 [0.96-1.08]). Conclusion: Obesity and HTN were both prevalent but independent among Maohi adolescents. This unexpected result that needs to be explored further supports, however, an important public health intervention due to numerous sequelae of both of these health conditions.

Tu. 16:50 Public Health session room
Non-Communicable Diseases

Ciguatera risk assessment campaigns in French Polynesia: what are their benefits?

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Ciguatera Fish Poisoning (CFP), the most frequent marine food intoxications reported in the world, is the cause of major health and economic problems in communities whose nutrition depends heavily on seafood resources. With a mean annual incidence of 2-4 cases per thousand population, French Polynesia has long been regarded as a hot spot of CFP. The impetus for extensive researches initiated at the Institut Louis Malardé since the late 60's has lead to important advances in our understanding of local CFP events. Practical applications of this research effort are now effective through the implementation of large scale-risk assessment programmes for the benefit of island populations, as illustrated by the campaigns recently conducted in two CFP-endemic islands of French Polynesia : Raivavae (Australes) and Fakarava (Tuamotu). On the spot, our objectives were to list and characterize the aetiology of poisoning incidents resulting from seafood consumption, assess the abundance and geographic distribution of the causative micro-organisms (e.g. the dinoflagellate Gambierdiscus), assess the toxicity in contaminated seafood from various fishing areas, and ensure local information. Among the most significant benefits of these studies are : the reactivation of the marine food poisoning reporting program in collaboration with the medical structures of the Public Healh directorate of French Polynesia; evidence for a new source of CFP-related toxins, namely marine benthic cyanobacteria; and their subsequent transfer to invertebrates (giant clams); the linkage between the history of environmental aggressions, either natural or anthropogenic, undergone by the lagoons of these 2 islands and CFP occurrence; the increased awareness by locals of seafood resources, species and fishing areas with high CFP risk, and recommendations for the prevention of CFP at an individual level and with local authorities.

Tu. 17:10 Public Health session room
Non-Communicable Diseases

Ciguatera Shellfish Poisoning: a new ecotoxicological phenomenon related to marine Oscillatoriales (cyanobacteria) blooms?

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Ciguatera Fish Poisoning (CFP) is primarily caused by the consumption of fish that have accumulated potent neurotoxins, the ciguatoxins (CTXs) that originate in the benthic dinoflagellate Gambierdiscus. Giant clams, another important marine resource for South Pacific islanders, are generally regarded as edible although occasionally blamed in CFP cases. Our recent studies in two Pacific islands, Lifou (New Caledonia) and Raivavae (French Polynesia), show that: (i) marine benthic cyanobacteria of the Oscillatoria group can produce CTX-like compounds, in association with paralytic toxins, (ii) following cyanobacterial blooms, giant clams can accumulate these toxins, provoking a new type of intoxication tentatively named "Ciguatera Shellfish Poisoning". These findings, which provide a new link in the CFP food chain, emphasize the need for including the monitoring of marine cyanobacteria in CFP risk assessment and management programs so far based on Gambierdiscus surveys.

Tu. 8:15 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Language and Identity in the South Pacific: the challenge of globalisation

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Some 1250-1500 languages, nearly one-quarter of the vernacular languages of the world, are spoken in the Pacific today, often by small numbers of speakers, at best sometimes only a few tens of thousands and most often by a much smaller number of speakers, commonly fewer than one thousand, especially in Melanesia. Unfortunately many of the smaller languages are seriously endangered, some are moribund and others have become extinct over the past decade or two. Language is a primary identity marker for most Pacific communities. Language endangerment has implications for all Oceanic peoples today, as they face up to increasing urbanisation, and indeed out-migration to Pacific Rim countries such as Australia, New Zealand, the United States of America and France, driven by economic imperatives. At the same time, the electronic revolution, almost universal access to television and the internet, dominated in the Pacific by English and French, is diminishing the prestige and roles played by Pacific vernaculars. While there are undoubted benefits to be gained from such developments, they come at a cost, as Pacific languages inevitably change to meet these new challenges. This paper examines some of these challenges and the range of responses developing in Oceania, as Pacific languages assimilate new ideas and concepts, while holding fast to their linguistic heritage and identity.

Tu. 8:30 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

The Documentation of Endangered Linguistic, Lexical and Cultural Knowledge of the Marquesan and Tuamotuan Languages of French Polynesia

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This paper reports on an interdisciplinary project within the DoBeS-program of endangered languages (Volkswagen foundation) in which digital multimedia encyclopaedic lexica are created for the endangered Marquesan and Tuamotuan languages of French Polynesia with the web-based lexicon tool LEXUS. LEXUS has a flexible scheme of linking multimedia documents to lexical entries as well as the possibility of creating relational links which allow to make associations between words and their concepts in and across languages and cultures visible via Information Technology. The development of a multimedia encyclopaedic lexicon is an important step towards language documentation as a means of language maintenance and preservation of endangered linguistic, lexical and cultural knowledge. One major objective is to motivate the speech communities to actively participate in the process of creating these multimedia lexica by a) learning basic methodology of lexicography and linguistic software, b) working out a system of collaborative workspaces for future online participation by the speech community, c) writing monolingual definitions of indigenous words for language maintenance and revival purposes and d) creating their own "ethno-ontologies" and relations between words and their concepts which are based on indigenous categorisation alone. Over the course of several years, linguistic, lexical and cultural data have been gathered, analysed and annotated by researchers (linguistics, anthropology, botany) in close cooperation with the Marquesan and Tuamotuan speech communities in order to build up digital multimedia language archives housed by the Max Planck Institute for Psycholinguistics (Nijmegen, Netherlands). Apart from giving details about the specifics of the LEXUS project mentioned above, this paper also talks about the language documentation procedure and methodology, the major purposes of such documentations (e.g. for pedagogical exploitation, anthropological studies) and how other speech communities of the Pacific can become major agents of the documentation, maintenance and revival of their endangered languages and cultures.

Tu. 8:38 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Empowerment and Capacity Building in Endangered Speech Communities: an Example from French Polynesia

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According to UNESCO estimates over half of the 6700 languages spoken world-wide will vanish in the next 100 years, and with them unique cultural knowledge, expressions of thought and social organisation. Since 2000 the Volkswagen foundation has funded over 40 endangered language projects world-wide to prevent this irretrievable loss by financially supporting researchers from various disciplines to make recordings and still images, subsequent annotations (transcriptions, translations) and dictionaries and build-up an electronic multimedia archive of endangered languages. This paper reports on how a team of researchers (linguistics, anthropology) within the DoBeS-program of endangered languages (Volkswagen foundation) documents and save-guards the endangered indigenous languages of the Marquesan and Tuamotuan archipelagos together with members of the speech communities. The documentation projects of the Marquesan and Tuamotuan languages are trying to capture the intimate link between language and cultural knowledge by documenting a wide range of different topics such as traditional narratives, songs, secret languages, toponymy as well as traditional practices such as food and plant medicine preparation, handicrafts, etc. by video-taping these procedures and activities and letting speakers give verbal explanations about them. The heart and success of these documentations are largely depend on the participation and engagement of speech community members. Our language documentation project has made increasing efforts to promote language documentation skills within the speech communities to ensure that language documentation efforts will continue after the short-term documentation projects of three to five years. Skills of using modern recording technologies, work with linguistic software or learning how to edit spoken texts for the development of pedagogical material have been some of the foci in the cooperation with the speech communities during fieldwork periods. This paper gives details about the cooperation with the speech communities, the linguistic software used for language documentation and the built-up of an electronic language archive.

Tu. 8:45 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

L'Ecole plurilingue dans les collectivités françaises d'Océanie

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Les populations autochtones des collectivités françaises du Pacifique aspirent à une intégration dans le réseau-monde et souhaitent que leurs enfants maîtrisent le français, langue nationale et internationale, mais elles opposent une résistance plus ou moins active aux processus d'assimilation qui menacent leurs langues et cultures d'origine. Alors que l'école coloniale prônait l'éradication des particularismes locaux pour favoriser la francisation, les systèmes éducatifs contemporains de ces collectivités, en réponse à la demande sociale, sont engagés chacun à leur rythme dans une réforme bilingue dès la maternelle. Si le français demeure la principale langue de scolarisation, les langues locales sont déjà inscrites dans les programmes scolaires dans un volume de trois à sept heures hebdomadaires. Toutefois, la mise en oeuvre de cette réforme soulève encore de nombreuses appréhensions. L'objectif de cette communication est de présenter les enjeux et les contraintes de cette réforme plurilingue, en faisant un état des lieux des cadres juridiques et des dispositifs en place dans les trois collectivités et en s'appuyant sur les résultats d'une recherche longitudinale qui a évalué les effets d'un programme d'enseignement bilingue français/langue kanak à l'école primaire publique de Nouvelle-Calédonie (2003-2005), selon deux axes complémentaires, psycholinguistique et sociolinguistique. Elle présentera également un programme de recherche financé par l'Agence Nationale de la Recherche qui débutera en 2009, en Nouvelle-Calédonie, en Polynésie française et en Guyane, et qui prolongera les études antérieures en évaluant, d'une part, l'entrée bilingue des élèves dans l'écrit et, d'autre part, la dimension conative (estime de soi et des langues). Ces travaux fournissent aux autorités politiques et pédagogiques des instruments d'appréciation afin d'optimiser le développement des compétences langagières et scolaires des élèves océaniens en conciliant la diffusion de la langue française avec la préservation de la diversité culturelle et linguistique.

Tu. 9:00 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Evaluation psycholinguistique des programmes d'enseignement bilingue français/tahitien en Polynésie française

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En complémentarité avec la présentation sur la réforme plurilingue dans les collectivités françaises d'Océanie, cette communication présentera les résultats d'une recherche longitudinale de 3 ans visant à évaluer les effets d'un dispositif d'enseignement des langues polynésiennes à l'école primaire expérimenté par le gouvernement de la Polynésie française depuis janvier 2006. L'efficacité de ce dispositif doit se traduire par une progression des élèves qui en ont bénéficié non seulement dans leur langue d'origine, le tahitien, mais aussi en français et plus généralement dans leurs compétences scolaires. 421 élèves de petite (PS), moyenne (MS) et grande (GS) section maternelle, issus de 13 écoles maternelles de Tahiti et de Moorea, ont été évalués cinq fois en 3 ans (début et fin d'année scolaire). Pour chaque niveau scolaire, deux groupes ont été constitués : un groupe expérimental qui bénéficie du dispositif depuis janvier 2006 et un groupe contrôle qui n'en bénéficie pas. Les deux groupes appartiennent à des milieux familiaux dans lesquels le tahitien, langue maternelle ou d'origine, est pratiqué à des degrés divers. Ils sont appariés sur l'âge, le sexe, le niveau cognitif non verbal et l'origine socio-économique. Les compétences des élèves (groupes expérimental et contrôle) ont été évaluées en français au moyen de cinq épreuves de la batterie d'évaluation du Langage Oral de Khomsi. Ces épreuves ont également été adaptées et administrées en tahitien. À partir de fin de GS, les élèves ont été évalués dans la maîtrise de l'écrit et dans le domaine numérique. Les résultats révèlent un effet positif du dispositif sur le tahitien sans effet négatif sur le français. Ces résultats vont dans le sens de ceux obtenus dans les travaux internationaux ainsi que dans l'étude du même type réalisée en Nouvelle-Calédonie en 2005. On précisera les paramètres pour lesquels il convient de poursuivre l'évaluation.

Tu. 9:15 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

Les prestations alimentaires à Tahiti aujourd'hui

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Avec la monétarisation de l'économie et les rythmes et modes de vie imposés par l'urbanisation, la Polynésie française a connu ces dernières décennies une modification profonde de ses types traditionnels de relations sociales. Pourtant, les flux importants de relations entre maisonnées montrent la persistance d'une sociabilité qui va au-delà de la simple civilité. Notre propos est de mettre en évidence dans la société tahitienne moderne et urbaine la permanence d'un lien social dont les prestations alimentaires seraient le pivot, malgré l'acculturation importante subie au cours des deux derniers siècles. Nous montrerons le rôle essentiel dans la culture polynésienne des échanges et de la communauté de production, de préparation et de consommation en matière alimentaire. Conformément à son rôle central chez les anciens Tahitiens, l'aliment est bien resté aujourd'hui créateur de lien, grâce aux dons et échanges dont il constitue le moteur, et dont l'analyse de la circulation permet de retracer la topographie et la densité du réseau social. Si l'autoproduction est de moins en moins présente en milieu urbain, l'autoconsommation y reste importante qualitativement et quantitativement. Les comportements autour de la nourriture subsistent longtemps malgré les changements radicaux intervenus dans la vie sociale. Ils sont donc susceptibles de jeter un éclairage sur la culture d'un groupe donné, celui des Tahitiens, malgré l'impact de la colonisation et la mutation des systèmes de production. Au-delà du processus physique d'incorporation, en mangeant l'homme s'incorpore dans un système culturel : l'alimentation constitue ainsi un élément central de la construction des identités, par la transmission des normes sociales et des valeurs, et par la création et l'entretien de liens sociaux. Les dons et échanges alimentaires ne doivent pas se mesurer à leur seule valeur économique, mais aussi à l'aune de valeurs plus relationnelles et subjectives, de " valeurs de lien ".

Tu. 9:30 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.1 Le cas de la Polynésie française - Cultural Heritage for Today and Tomorrow - 1.1 Fren

L'Autre est un Je : l'Anthropologue, au coeur des débats identitaires en Polynésie française

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A l'heure de la globalisation et de l' " homogénéisation " culturelle, la " maohitude " en Polynésie française fait écho à la multitude de revendications identitaires nationales ou régionales qui ont fleuri un peu partout depuis une vingtaine d'années. Cette identité culturelle polynésienne, inextricablement liée à une politique d'identité nationale, a corollairement des ramifications jusque dans le domaine de la Recherche où de plus en plus d' acteurs sociaux du monde politique et culturel polynésien se posent avec acuité, voire agressivité , la question de la légitimité de la parole sur l'Autre caractéristique de la doxa anthropologique. Jusqu'à présent, les scientifiques interpelés se sont contenté majoritairement de brandir l'argument épistémologique du " regard éloigné " de C.Lévi-Strauss pour justifier la validité de leur démarche et réhabiliter leur statut. Nous voudrions ici dépasser la querelle stérile entre cette parole sur l'autre versus la parole de l'autre (réclamée par les acteurs sociaux locaux mais aussi légitimement par les chercheurs d'origine polynésienne, de plus en plus nombreux) en démontrant que la réelle problématique épistémologique se situe ailleurs (et que ce débat est d'abord un objet d'analyse pour le chercheur en sciences sociales). Nous posons en effet l'hypothèse que la validité des data réside dans la nécessité méthodologique de " briser le miroir de soi(M.Godelier)" quelle que soit l'origine socio-culturelle du chercheur et que, exogène ou endogène à la société d'observation, les biais sont différents mais aussi importants et qu'il convient avant tout de prendre congé de soi-même pour pouvoir prétendre éclairer l'intelligibilité de la société polynésienne contemporaine. La démonstration qui veut tout à la fois épistémologique, méthodologique et éthique sera étayée par une expérience de terrain menée pendant deux années aux Tuamotu du Nord-Est, à Tatakoto et à Puka-puka il y a dix ans, ainsi qu'un parcours de vie mené depuis lors à Tahiti.

Tu. 10:30 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Belau National Museum

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Founded in 1955, the Belau National Museum is the oldest of the Micronesian museums and has constantly focused on the cultural and natural heritage of the peoples of this island nation from historical and contemporary 20th-21st century perspectives. Working with the International Council of Museums and the Pacific Island Museums Association, the museum is working to forge strong partnerships with international museums for the mutual benefits of home communities and their institutions and metropolitan museums. The politics of cultural heritage and identity in the 21st century straddles economic, legal, and professional issues.

Tu. 10:42 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Cultural Landscape, Stories, and Knowledge: How islanders integrate land and philosophy

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In bringing together "fundamental values upon which Pacific cultures are based" and in recognizing social change in the islands, one must take into account what cultural contexts (introduced and traditional) frame current epistemologies in how Pacific Islanders live in the modern world. Accounts of previous events, the shape and shifting of landscapes, and the philosophy of how life was formerly lived, these all determine how Pacific Islanders place themselves in dealing with social change.
How did the people of Belau live once upon a time? And how does it affect how they live today? This paper is meant to look at how Belauan knowledge and philosophy influenced how they lived and at the same time how they live today. The heritage in past that still exists in Belau provide significance to exploring what epistemologies are still kept, what is now lost, and what introduced values are being accepted.

Tu. 10:54 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Local Perception of Cultural Heritage and Globalization, a Case Study: a Cultural Centre in Chambri Lakes (East Sepik Province, Papua New Guinea)

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In 2001, the Chambri (east Sepik Province, Papua New Guinea) decided to set up a "cultural centre" or a "museum" in their village. Their culture, well known since the studies conducted by Margaret Mead in the 1930's, has attracted since the many scholars and artefacts buyers. Chambri artefacts are today conserved in many parts of the world and so far about 2000 have been identified. Documents related to these artefacts (sketches and photographs) were brought back to the village and are today considered as an important testimony about their culture by the Chambri.
Confronted to rapid changes in their culture and important modifications in their relationship with their neighbours and the modern administration, they decided to create a new social and architectural structure in which they intend to show and promote their existence. The museum located near a symbolic stone symbolizes the very first inhabitants of their island and hosts a series of artefacts specifically designed for this institution. It is surrounded by a botanical garden designed to transmit to new generations environmental knowledge and their sense of aesthetics as well as offering to visitors what they consider as the best of themselves. This institution as an architecture, as a collection and as a public expression is an important element of the Chambri strategy to transmit, promote and advocate their culture. It is the expression of the understanding they have of themselves as well as a local reflection on the contextual and conceptual changes they are facing.

Tu. 11:06 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Hula in the Diaspora: Adapting to Continental Environments

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Hula as a global art form acquires new meaning when we acknowledge the wide-ranging mobility of the art and the vast distances it has traveled from its roots in Hawai'i. Understanding "place" as an element that shapes Hawaiian identity, hula constructs new identities informed by these places in which it is practiced, thus allowing for its continued survival. Hula has an inalienable connection to 'āina (land), drawing its inspiration, its poetic images, and its resources from its surrounding environment. This environment is crucial, for example, to the proper adornment of performing dancers in specific types of fresh foliage to invoke Laka, a deity of hula. Hula characteristically reflects the surroundings in which it lives and is perpetuated. Hula that moves beyond Hawai'i, therefore, may be as diverse as the continental environments in which it is practiced and may thrive outside of a Hawaiian environment and in a modern global world because hula adapts to its surroundings. The statistics documenting dozens of hula schools in Europe, hundreds in North America, and over a thousand in Japan, reflect the agency and creativity of Hawaiians in developing and sustaining a global culture of hula. This successful adaptation of hula beyond Hawai'i's beaches has been steadily developing over the past few decades and is slowly being recognized as a viable vehicle in which to globally market both hula as well as Hawaiian music in general. This paper focuses on the ways in which hula adapts to its host environment as a model for a path that the greater culture must also follow. With the intense level of socio-economic changes in this 21st century, a thriving future for Hawaiians in Hawai'i and abroad is dependent upon our ability to balance the adaptation of the old and new to our changing environments.

Tu. 11:18 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Chanting the Opposition:
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Since the overthrow of the Hawaiian Kingdom and annexation into the United States, Hawai'i continues to face an arduous process of cultural, nationalistic, and economic acculturation to the American lifestyle; resulting in governmental usurpation of land usage and tenure, the continued growth of homelessness, and the marginalization of the Native Hawaiian language, culture, and identity. In reaction to this process, a movement in the 1970s, referred to as the Hawaiian Cultural Renaissance, became a pivotal point in placing agency into the hands of Hawaiians.
Despite these great strides in Hawaiian indigeneity, the local political, economic, and cultural climates in Hawai'i continued to reflect American influence and governance. To better propagate agency in the generations to come, educators, cultural authorities, and tradition-bearers in the 1990s, began to combat this acculturation at the source, nā 'ōpio (the youth), by creating Hawaiian Cultural Charter Schools. The curricula of these schools reflect many of the ideals of the renaissance: revitalizing Hawaiian language, hula, music, indigenous rights and voyaging.
These Hawaiian Cultural Charter Schools represent an educational revolution against American culture and values that the public education system is instilling in students. These schools are empowering young native and non-native students alike to embrace Hawaiian values, culture-production, and political rights that were celebrated in the Hawaiian Cultural Renaissance.
This paper examines how Hawaiian Cultural Charter Schools negotiate modernity and American acculturation through mele and hula, traditions by which students empower their maoli identities. Moreover, the performative aspects of these arts allow the students of these schools to represent their culture, re/invent traditions, and protest politically through chants, songs, and dance. I discuss the act of "culture resistance" that these charter schools foster in their young students. The goal being to prepare students to navigate future challenges in the 21st century.

Tu. 11:30 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

The Journeys of Hawaiian Men: Cultural Politics and Indigenous Masculinities in Oceania
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In this essay I discuss the ways that indigenous Hawaiian men have remade their identities by reconnecting to a broader Oceanic cultural and political genealogy. I focus here on a 2004 trip to Aotearoa/New Zealand carried out by the Hale Mua, a Kanaka Maoli (Native Hawaiian) men's group that undertook this voyage for the purpose of "cultural exchange" with their Maori cousins. The story of this journey, which occurred at a time when both Maoli and Maori were engaged in major battles over legal rights to land and resources, reveals the ways in which cultural transformations enable new visions of political futures and pasts.

Tu. 11:42 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Hawai'i Place Based-Education for Exercise and Health

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A growing population of educators continue the thrust for cultural identity and equity via traditional knowledge. Thereby they experience the benefits of a place-based educational approach in their teaching and research. The project "Uluakea", funded by US Department of Education and conducted by Kipuka Native Hawaiian Student Center at University of Hawai'i at Hilo, aims to enable faculty to teach and research out of a Hawaiian worldview. Therefore, concepts of Hawaiian culture are studied and applied into concepts of modern sciences, such as exercise and health. Several Hawaiian concepts such as Lei, Hula, Wahi Pana, Kihei, Chanting, Ka'ao, and Ki'i could be identified and were used as a foundation for introduction to exercise as a tool for psychological, social, and physical health. Spirituality could be identified as a key element of the anchient concepts studied, mostly neglected by their modern counterpart models. However, a new model of health uses spirituality as the foundation for successful application in daily life. The study shows that when using Hawaiian concepts in a place-based educational approach it will foster the learning process, and most likely compliance to health regimes such as exercise by using the traditional knowledge and current environment. Furthermore, teaching and applying traditional concepts into modern sciences ensure retention and value of these concepts and the culture.

Tu. 11:54 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Heritage Documentation and Place Base Management:

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Heritage landscape documentation based on oral history, legends, historical documents, archaeological reports, old survey maps, topographic maps, aerial photography, satellite data, tax key maps, land tenure records, and site analysis, are processed into searchable tabular databases and GIS maps for land use planning and place base management of the intersecting traditional ahupua'a, or island districts running from the mountain into the sea. The information is used to establish trail alignment and ownership and to involve stakeholders in participating in the project including families with ancestral association with the ahupua'a, community organization that can engage in community based development, as well as public and private landowners. This specific application is for the corridor and alignment for the Ala Kahakai National Historic Trail on the Island of Hawaii, a project by the U.S. National Park Service. However the procedure is valuable and replicable for other district level analysis of cultural, historical and natural assets. The focus of this presentation is on the programmatic and technical aspect of data collection, processing, mapping and analysis.

Tu. 14:00 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Exactly What Adidas Wanted: Maori Haka in Sports and Popular Culture

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For the Maori people of Aotearoa (New Zealand), the term haka is equivalent to the concepts of 'to dance' or 'song accompanying a dance'. Traditionally, the Maori have called all of their dances haka while recognizing many subdivisions. The purposes of performing haka vary: some were used for welcome guests, while others were meant to intimidate enemies before battle. Due to the characteristically masculine movements of haka, and stylized embellishments highlighting wide-open eyes and sticking out the tongue, many non-Maori audiences have reinterpreted haka as an intimidating or fearsome dance form. With energetic movements and striking facial expressions, haka is now performed as a male-dominant dance form in many popular culture and media although, traditionally, women played an equal role. Therefore, haka has in the past decade been appropriated for the purpose of representing and constructing different masculinities, whereby new settings provide the basis for recontextualization of the art form beyond its original cultural roots. In this paper, I discuss three exemplary representations of haka to show how it has become a vehicle for the construction of gender identities that can vary considerably depending on the socio-aesthetic context, as well as to demonstrate that concepts of masculinity are not fixed but rather socially constructed "fictions" that depend on the host culture. Therefore, I argue that haka has become not only a stereotypically gendered performance style but also a tool for the construction and creation of performers' - and by extension audience members' - gender roles, though performative contexts nonetheless continue to modulate the specific and multiple gender statements that are delivered. Moreover, the continuity of such representations reinforces how masculinity continues to play a central role in performative contexts, eventually creating an accepted "social reality" in the specific culture.

Tu. 14:12 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

MUA IA, INA MUA O! Samoan Music and Dance, Cultural Identity, and Education in American Sāmoa

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MUA IA, INĀ MUA ŌO! Samoan Music and Dance, Cultural Identity, and Education in American Sāmoa
By Kuki Motumotu Tuiasosopo Ethnomusicologist/Music Instructor Fine Arts Department American Samoa Community College

As in other Pacific cultures, music and dance are a significant part of Samoan culture. They both amplify community ceremonies and reinforce cultural values among the Samoan people. Through chants, songs, and body movements, music and dance allow the Samoans to acknowledge the va tapuia, (the sacred space or sacred relationship between humans, man and the environment, man and God), the most spiritual essence of being Samoan. On the local level, Samoan music and dance stand side by side with the Samoan language and Samoan cultural practices to determine cultural identity. In other words, being a Samoan is defined by fluency in the native language, the practice of cultural values, participation in cultural ceremonies and events that include music and dance. The Samoan culture has survived colonization in the past. In the present, it is adapting to modernization. With the influence of the American popular culture on today's young people, however, it is through educational programs in villages, church youth groups, and institutions such as Samoan Studies Institute at the American Samoa Community College that the young people are constantly reminded of their cultural identity through educational programs in Samoan language, history, and culture. Unfortunately, less attention is given to the study of music and dance performance and repertoire, especially in its modern form that raises issues of authenticity. Looking at the challenges of curriculum policies and college politics, this paper examines the crucial role of the Fine Arts Department at the American Samoa Community College in establishing an indigenous music program to accommodate the need for educating young people about the importance of these art forms in defining Samoan cultural identity.

Tu. 14:24 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Taming Tourism for Sustainable Outcomes in New Caledonia

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This presentation will analyse how a particular form of development (tourism, because of the possibility to establish it from the grass roots) encouraged within New Caledonia by the French government is used to (try to) overcome decades of colonial rule in spite of political and colonial resistance by the settler community. Forms of relationships that diminish the worth of the other party are to be contested and overthrown but encouraging the colonised to speak can give them a voice only if we question the colonial context of development whatever its forms (tourism in our case). Kanak agency has produced positions from which they have proclaimed their own narratives and cultural practices, which have enabled them to maintain a Kanak landscape in the face of global intrusion. Development as it is mostly approached continues colonial forms of interaction, even though they have become less visible. Western tourism discourse controls the production and dissemination of tourism, hence its nature and shape, and thus articulates and maintains uneven development and unequal territorial relations. The presentation will first justify the postcolonial framework used for this analysis, including its limitations. It will then describe the (post?)colonial context of New Caledonia. Tourism is examined to determine its validity as a tool to rebalance economic wealth in New Caledonia through economic growth in areas where Kanak population predominates. Tourism development would allow their culture to flourish. Kanak people would then entertain a more equal rapport with visitors and resist disappearance from the tourist imagination and especially from networks of capital accumulation.

Tu. 14:36 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Développement du tourisme en tribu, un enjeu identitaire pour les mélanésiens de Nouvelle-Calédonie

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Les touristes sont souvent déçus par l'accueil qui leur est réservé en Nouvelle-Calédonie. Leurs critiques se focalisent plus précisément sur trois éléments: une hospitalité en demi-teinte voire une hostilité à leur encontre, l'absence des prestataires à leur arrivée, le manque de rigueur de l'organisation des activités de découverte culturelle. Ces remarques sont récurrentes quelques soient les Provinces visitées ou les structures d'hébergement choisies (gîtes ruraux, tribaux et hôtellerie de luxe). Dans le cadre d'une thèse de doctorat, entretiens qualitatifs et observation participante révèlent les relations complexes que les visiteurs nouent avec la population locale de Hienghène qui les reçoit en tribu. L'expérience touristique s'inscrit dans un échange interculturel où les pratiques et représentations du voyage sont hétérogènes. Plus précisément, la rhétorique de l'exotisme construit chez les voyageurs occidentaux un imaginaire où les mélanésiens seraient enfermés dans un carcan "traditionnel". Alors que les touristes sont déçus de percevoir en tribu ce qu'ils considèrent être des signes de la "modernité", les prestataires s'interrogent: comment minorer les insatisfactions des visiteurs sans folkloriser leur propre culture? Sachant qu'au delà de cette appréhension, les crispations se situent aussi au niveau des modifications que peut entraîner le développement touristique-c'est à dire- les hiérarchies coutumières en place, les statuts, rôles et rapports sociaux. Notre propos se limite ici à rendre compte des modalités d'actions mises en oeuvre par une population locale pour accueillir l'étranger chez elle sans que cette altérité ne devienne une menace?

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Tu. 14:48 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Patrimoine(s), Identité(s) et mondialisation en Nouvelle-Calédonie : les enjeux de la recherche en Histoire et des politiques patrimoniales pour la construction d'un patrimoine calédonien commun

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Le patrimoine se définit comme un regard porté sur certaines réalités matérielles ou non, qui leur donne un sens social, une utilité morale. Il constitue donc un élément fondamental pour l'identité d'un " pays ". Les membres d'une communauté s'identifient, c'est à dire se considèrent comme mêmes, autour de référents communs à tous qu'ils recréent, rediscutent au cours de leur histoire. Le patrimoine et les valeurs qui lui sont associées, ne sont donc ni immuables, ni intrinsèques mais sont créées par le discours social à un moment historique donné, dans un consensus plus ou moins général. Le patrimoine devient lieux de mémoire, d'identification donc support d'identité. Pour la Nouvelle-Calédonie, en conformité avec l'Accord de Nouméa (accepté avec une large majorité par tous) qui leur propose de se projeter socialement et politiquement dans un " destin commun ", de créer leurs propres signes identitaires, l'enjeu de la gouvernance en matière de patrimoine (conservation, classement, valorisation) est crucial. Dans un contexte et un discours ambiant où trop souvent seul l'écrit est source et support d'histoire la déclinaison, en couples opposés, des patrimoines selon leur nature (bâti/immatériel, écrit/oral) a des effets néfastes et pervers. En effet, en associant d'une part le bâti à l'histoire post coloniale, d'autre part la tradition orale ou les vestiges archéologiques à l'histoire précoloniale, on trace des patrimoines séparés propres à chaque communauté. Or sans histoire et patrimoine communs comment établir un destin commun ? Nous tenterons de montrer qu'en Nouvelle-Calédonie, l'histoire à condition de la construire en problématisant les effets de "mémoires fragmentées " ou partisanes peut permettre de mettre en place une gouvernance et une politique patrimoniale commune et pas communautaire.

Tu. 15:00 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

The Waigani seminars

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In 2008, UPNG revived the Waigani seminars in which academics and practitioners conducted a three day introspective analysis of plans laid in 1975, and why PNG had not achieved these goals after thirty-three years of independence. The sequence of Waigani seminars reveals that PNG confronted new levels of intensity and change in the political, economic and social domain, and that a sense of being overwhelmed was real, but challenged with enthusiasm and confidence. Other Pacific nations have not followed the annual academic-practitioner talk-fest approach, although regional meetings are ubiquitous and conferences, symposia and workshops are a daily occurrence across the region. This paper looks at one attempt to equip Pacific islanders with tools to manage modernity - the setting of constitutional national goals and directive principles in PNG, and compares that-impact to a regional project to equip school teachers and students with means to develop national histories - the TTPF/HistoryCops project - and develop a greater sense of national identity, cohesion and purpose. Is change, modernity and globalisation best tackled through lofty epistemological or constitutional discourse, or through plain old fashioned classroom chalk and talk?

Tu. 16:00 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Maui's Genealogy: the Island Web

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Long before globalization was re-invented or re-discovered, Southeast Asia, the whole of the Pacific and South America were united in a pre-European mythological closed set of a hundred variants of the same myth encoding the cultural acknowledgement of the El Nino phenomenon. The first 'whale rider' took to sea from the shores of Taiwan, his descendants soon fished in the waters of Micronesia, Melanesia and Polynesia to eventually land on a continent which brought their giant hunt to a halt but also granted them the tuber which allowed them to tame altitude in Hawai'i and latitude in New Zealand: the Amerindian sweet potato. As revolutionary in their islands world as the potato was to become in Europe much later.

This paper thus buckles the Asian circle of the widest ocean on earth, the Pacific. Rather than merely chronicle the passing of an age, it draws its inspiration from Finney's Hokule'a which in 1976 resurrected the maritime mastery of the double canoe by reconnecting Hawai'i with Tahiti. The 5000 year old cultural background of the ocean, bridging Chinese Liangzhu culture to the Amerindian's must be celebrated as a counter to the contemporary economic wracks. Jade carving in China and Taiwan, myth and agriculture invite us to look at the settlement of the pre-European Pacific in glaring new light. One fitting way to honour Claude Lévi-Strauss' hundredth birthday consists in pursuing Finney's materialization of the oral Austronesian past so used to juggle with both time and space that it even helps NASA plot our earth- centered way into the interstellar realms.

Tu. 16:12 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Cacophony on 'The Isle of Voices'The cultural and political stakes of modernity in the Pacific according to Robert Louis Stevenson.

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Robert Louis Stevenson probed into the stakes of modernity in the Pacific as early as the 1890s. The renowned Scottish author of Treasure Island (1882) had by then turned an intensely committed Samoan resident. Like the anti-imperialist articles he wrote for The Times and his sulphurous Samoan historical chronicle: A Footnote to History (1892), his Pacific fiction expresses strong political opinions. I suggest to examine some of them in his short tale, "The Isle of Voices" (1993). My approach is both anthropological - relying on turn of the 21rst century anthropology findings - and literary - plying the tools of literary criticism. Stevenson's tale illustrates the many mutations that resulted from a century-long Western presence in the Pacific at the end of the 19th century. Like traditional tales, it is based on three initiatory journeys. The first journey puts the Polynesian hero in close contact with the West, which fascinates him. The next two journeys proceed along the line of a double katabasis, the hero crisscrossing the seas in search of founding father figures. His second epic takes him to the heart of imperialist darkness, close to the source of white men's original secrets. As a counterpoint, his third epic leads him to the heart of Polynesian darkness, close to his forefathers' sacred dwelling places. By setting his narrative both in Hawai'i - the most Westernised of the Pacific archipelagos - and the Tuamotu - then one of its most isolated ones - Stevenson depicts a society that is torn between two cultures, a mutating people in search of their identity. Stevenson's tale prophetically tackles issues which confront early 21rst century Pacific islanders: what may be the Pacific's political and cultural future? How to strike a balance between independence - including its most extreme form, isolationism - and dependence to a society of consumption and to imperialist/postcolonial powers?

Tu. 16:24 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

La mutinerie manquée de la baleinière 'l'Albatros' (1837-1840) ou la modernité en échec

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Dans le contexte de l'essor de la pêche baleinière dans le Pacifique sud, la longue campagne du navire havrais L'Albatros entre 1837 et 1840, relatée par le Docteur Nel, chirurgien du bord, est la métaphore d'un impossible passage à la modernité, c'est-à-dire, en l'occurrence, à une urgente remise à jour de l'ordre des choses, à une adaptation fonctionnelle, matérielle et morale à une réalité devenue autre. C'est un triple échec. D'abord, parce qu'on ne passe pas à la franche mutinerie : même si les incidents se multiplient, l'insupportable et rétrograde pouvoir monarchique du capitaine Hurtel n'est pas renversé ; ensuite parce que les résultats de la campagne de pêche ne sont à la mesure ni des efforts déployés, ni des attentes ; enfin parce que Nel et l'équipage de L'Albatros ne peuvent que subir la puissance navale et religieuse anglaise dont les défaillances et les abus sont présentés, pourtant, comme criants. Or, ce triple échec est imputable à un double problème. D'une part, Nel ne parvient pas identifier clairement et surtout à mettre en relation les différentes temporalités déterminant les événements qu'il observe : celle de la durabilité des ressources baleinières comme moteur économique et facteur d'enrichissement (déclin dès 1840, accéléré à partir de 1844) ; celle, ensuite, de l'action politique (rencontré par l'équipage de L'Albatros, le contre-amiral Dupetit-Thouars est à l'origine de l'établissement du protectorat français en 1842 alors que la Monarchie de Juillet, en France, renversée par la Révolution de 1848, fait place à la République puis au Second Empire) ; celle, enfin, de l'acculturation des Polynésiens (concurrence entre missionnaires protestants anglais et missionnaires catholiques français : la Mission catholique du Père Caret débutant à Tahiti, le 31 décembre 1841) ; d'autre part précisément, Nel, ne reconnaît pas ceux qu'il appelle les " canaques " : Polynésiens disqualifiés alors même qu'ils sont indispensables pour compléter l'équipage étiolé par les désertions et surtout qu'ils sont l'incontournable étalon autant que le nécessaire miroir des manières européennes.

Tu. 16:36 Culture and Politics session room
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The Uses of Modernity and Counter-Modernity in the Re-negotiation of Contemporary Identity in the work of Kanak writers

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One of the most evident stakes of contemporary Kanak writing and publication of literary texts is the renegotiation of Kanak identities and the affirming of heir distinctive value. This renegotiation occurs within the context of the binary polarities and hierarchies of Metropolitan Centre or French State and island 'country' and peripheral communities. The opposition between local traditions and 'universal' or global economies appears to be part of these binaries. This paper considers the primary hypothesis that this literary enunciation constitutes a 'performance', incorporating elements of tradition, but ultimately challenging the notion of any single and agreed canon or authority. The global and the local, it then argues, as in Baudrillard's metaphor of the game of 'paper, stone, or scissors,' are less in competition, less mutually exclusive, than they are simply dynamic layers of a single and hybrid cultural phenomenon, constantly jostling for the pre-eminent position. The published texts of Jean-Marie Tjibaou, Dewe Gorode, Pierre Gope and the young 'rap' poet, Paul Wamo, in particular, will be examined.

Our paper will examine both the local and the universal aspects of these texts, their colonial/postcolonial or French/ Francophone character, to determine the position they allow current and future processes of modernity and globalization.

Tu. 16:48 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Penser le politique aujourd'hui dans la région Pacifique : contributions de l'anthropologie politique, de la politique de la littérature et de la géocritique

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La recherche a essentiellement pour objectif d'analyser comment les derniers apports théoriques en sciences humaines et sociales peuvent contribuer à une meilleure connaissance des enjeux de la modernité dans le Pacifique, grâce à l'éclairage qu'ils fournissent pour comprendre les productions esthétiques. Seule l'interdisciplinarité peut permettre de rendre compte des réalités sociétales et politiques, car elle seule peut établir une appréciation moins imbue d'ethnocentrisme. L'effacement de la critique d'inspiration marxiste d'une part et les difficultés théoriques du lien entre la sociologie bourdieusienne et la critique littéraire des textes n'émanant pas de l'espace européen d'autre part, ont amené les chercheurs s'intéressant aux productions culturelles dans les sociétés contemporaines du Pacifique à faire une large part aux recherches en anthropologie. A partir d'une problématique d'historicisation des structures sociales on pose le postulat que les littératures et les arts contemporains sont les laboratoires des évolutions symboliques, des conflits, de l'avenir. Depuis Edward Saïd, les études culturelles explorent la portée sociopolitique et géopolitique des réalisations culturelles. Jacques Rancière parle de Politique de la littérature qui " suppose qu'il y a un lien essentiel entre la politique comme forme spécifique de la pratique collective et la littérature comme pratique définie de l'art d'écrire". Bertrand Westphal, quant à lui pose la question de l'interaction entre le milieu, l'histoire et la littérature, en envisageant " la foncière mobilité des espaces humains et des identités culturelles qu'ils véhiculent " , ainsi que les va et vient constants entre l'espace et ses représentations culturelles, allogènes ou autochtones, utopiques ou dystopiques. Ainsi, l'analyse interdisciplinaire du récit en particulier permet-elle une vision à la fois globale et prospective de la modernité.

Tu. 17:00 Culture and Politics session room
L'héritage culturel aujourd'hui et demain 1.2 Hawaï, Nouvelle Zélande, Samoa, Nouvelle Calédonie, Vanuatu, Papouasie Nouvelle Gu

Lieux de pouvoirs dans les Pays d'Outre-Mer : la négociation des identités ?

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La Nouvelle-Calédonie et la Polynésie Française, sociétés pluriethniques et laboratoires d'innovations politiques, incitent à la réflexion sur les représentations que la métropole véhicule sur son administration, ainsi que sur la part de l'héritage océanien, de l'acculturation républicaine, du substrat pré-colonial et de la tradition réinventée dans la perception du pouvoir. Alors que la première fête ses "Vingt Ans de Concorde" (1), lors desquels le Président de l'assemblée de la Province Sud, P. Gomès déclare : " Il faut conjuguer les légitimités et les signes identitaires [sont] une manière de les conjuguer ", la seconde change six fois de gouvernement depuis 2004. Depuis une vingtaine d'années, îles et états d'Océanie s'affrontent à la bonne gouvernance. Dans la filiation de M. Agulhon pour qui l'" histoire politique et l'histoire visuelle s'éclairent réciproquement ", et qui montre " que la représentation [...] de la République française est passée du champ politique au champ identitaire " (2), la représentation des lieux de pouvoirs en Océanie sera étudiée, notamment par les images car elles sont au cœur de la conscience et de l'identité des sociétés. Par-delà, se pose la question fondamentale de la construction de lieux de ralliement et du sentiment d'appartenance à la nation. On poursuivra ainsi une recherche historique (3), portant sur la culture matérielle (4) et les représentations en Océanie. 1. Colloque "1988 : les Accords de Matignon-Oudinot, 1998 : L'Accord de Nouméa, Textes fondateurs de la Nouvelle-Calédonie d'aujourd'hui, 25, 26 avril 2008", Palais du Luxembourg. Sous presse, www.reseau-asie.com. 2. République en représentations, autour de l'œuvre de M. Agulhon, 2006, p. 405, 414-415. 3. Fayaud V., Brosser le mythe et l'histoire d'après les œuvres de Lejeune, Radiguet, Giraud, Pierre Loti, la Polynésie orientale avant Gauguin (1800-1890), thèse d'histoire, 2005. 4. Colloque Identités, Altérités, Paysage, Tahiti, UPF, juin 2006.

Tu. 17:30 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

'Heritage': the New Cultural and Institutional Challenge of Environmental Governance in the Pacific Islands

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•***Integrated Management of the Environment: Globalization of the 'Heritage' Concept***

The environmental challenges becoming global, everyone agrees on the need for promoting their integrated management at all scales. The Environment is now conceived as a 'Heritage' that is to be transmitted to the next generations as a necessary condition for Human sustainability. These concepts seem obvious and universal. In fact, they are developed by dominant world ideologies and impose new gaps and issues.

•***Governance and Environment: the Complex Equation***

Importing external concepts, Environmental programs in the Pacific Islands face cultural and institutional gaps. Different governance risks then occur. Many examples show that they, consciously or not, promote social and cultural changes and modify the legitimacies in decision systems, at all scales from village to national organizations. Some tools can be useful to fill gaps, such as information sharing between stakeholders, but the lack of investments in Environment management, as a sustainable development basis, remains a critical issue.

•***International labels, networks and 'development brokers': how to regulate the Big Pacific Islands Environmental Market?***

The pressure put by the environmental programs on the South Pacific states governance is a real issue. The Pacific Islands Environment becomes a big and wild Market, and all the environmental stakeholders are de facto involved in the international cooperation arena. The need for synergies, integration of scales and states control and monitoring requires funds, especially on social and cultural monitoring capacity.

Tu. 17:35 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Approaches in integrating traditional, local, and scientific knowledge in the management of Papahānaumokuākea Marine National Monument

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Conventional marine management approaches have largely failed to stem the tide of decline in the world's oceans. Increasing attention is directed to marine ecosystem-based management as a new paradigm for oceans governance that, among other challenges, is charged with integrating various knowledge systems in managing both human and ecological aspects of the oceans. Based on research in the highly-cross cultural setting of the Kona Coast, Hawai'i Island, this paper presents new approaches in integrating "ocean expertise" of a multiplicity of perspectives - including indigenous, local, and Western scientific experts. It presents the historical ecology of the Kona Coast coral reef social-ecological systems from the experts' observations, perceptions and responses to coral reef ecological change and demonstrate a methodological framework for assessing ecosystem resilience and change, without legitimizing one perspective over another. Findings include biophysical, human, and social-ecological aspects of change spanning 6 knowledge systems, 80 years, and nearly 300 species across a 50-mile region. Finally, this paper describes how the Papahānaumokuākea Marine National Monument, one of the world's largest marine protected areas, is implementing such techniques to achieve one of its central management goals - seamlessly interweaving Native Hawaiian, local community, and Western management frameworks.

Tu. 17:40 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Outcomes to Our Sea of Islands: A Regional Forum on Marine Managed Areas and World Heritage

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In 2007, the National Oceanic and Atmospheric Administration (NOAA) through Papahanaumokuakea Marine National Monument was a co-sponsor of "A Regional Forum for Oceania on Marine Managed Areas and World Heritage" which brought together participants from over 20 countries, states and territories across the Pacific to highlight ongoing efforts to protect important marine areas in Oceania, to share and expand technical expertise, and to develop balanced management practices by incorporating science and customary marine management techniques. In addition, the Forum was an opportunity to build upon established marine managed area networks across Oceania and collaborate with these ongoing efforts.

As part of the Our Sea of Islands Regional Forum, a communiqué was developed by the participants which included, marine managers, practitioners, community and traditional leaders, and outlined a collective set of recommendations and call for action to further marine protection across the region.

The communiqué recognized that people and communities of the Pacific are deeply connected to natural resources and that indigenous Oceanic cultures and traditions have adapted and evolved over many generations despite profound environmental, social, cultural and geopolitical changes.

The 11th Pacific Science Inter-Congress presents an opportune venue and follow-up to Our Sea of Islands Regional Forum to reconnect Oceania and address the challenge of managing marine resources in a locally and globally changing climate. This presentation will highlight key activities and initiatives that taken place since Our Sea of Islands Regional communiqué with an emphasis on not only what has been accomplished, but what needs to be improved to sustain Oceania's people and communities while furthering marine protections across the region.

Tu. 17:45 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

L'apatride climatique et la disparition d'Etat dans le Pacifique Sud

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L'environnement est devenu l'une des préoccupations majeures de notre ère, de par la multiplication de prévisions scientifiques alarmistes. La transversalité du droit de l'environnement permet au juriste de prendre en considération certaines des plus probables hypothèses scientifiques pour théoriser de nouveaux concepts. Le réchauffement climatique et surtout les conséquences que ce phénomène risque d'entraîner sur la communauté internationale sont d'ailleurs à la source d'un important travail de réflexion juridique sur la compréhension et la gestion des crises pouvant survenir dans un futur plus ou moins proche. Les Petits Etats Insulaires du Pacifique Sud (PEIPS) font partie des sujets d'études prioritaires, non seulement pour le droit international de l'environnement mais aussi pour le droit international public, car leur très grande vulnérabilité face aux changements climatiques risque de favoriser des conséquences pour le moins originales. L'exemple de l'Etat du Tuvalu est particulièrement révélateur des interrogations qu'il est possible de se poser. En effet, en réponse aux prévisions scientifiques, le Droit international public et sa doctrine ont très bien développé les notions relatives aux mutations Etatiques et aux réfugiés climatiques. Or, l'Etat du Tuvalu n'est lui pas seulement menacé, mais en véritable " sursis " du fait de l'élévation du niveau de la mer et des risques liés à ce phénomène. Ainsi pour la première fois, il sera possible de constater non pas une simple mutation mais disparition d'Etat, à laquelle va s'ajouter le problème d'un déplacement d'une population composée d'apatrides écologiques, ces derniers ayant perdu tous liens avec leur Etat d'origine. La compréhension de ces notions totalement nouvelles en droit international est plus que nécessaire pour tenter de trouver des solutions adaptées aux problèmes qui pourraient se poser.

Tu. 17:50 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Traversing the science-policy divide: The translation of scientific impact studies into climate change adaptation strategies in the Pacific

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Considerable international funding has been devoted to the development of scientific studies to examine the impacts of climatic variability in the Pacific region. Pacific Island nations are responding to the outputs of these studies in varying ways. Increasing social and ecological resilience is essential if these vulnerable states are going to be flexible in the face of environmental change, but there are many barriers to making this transition and sustaining community adaptive capacity. This study examines how effective international funding and subsequent impact studies have been in informing policy and attitudes toward adaptation among Pacific countries. The research focuses on the extent to which Pacific Island nations have incorporated climate change impacts assessments and recommendations from the past 20 years, by evaluating the degree to which adaptation strategies have been implemented through policy and management frameworks. Focusing on coastal management systems and fresh water resource development, a case study from Kiribati is used to understand the factors that underpin the uptake of scientific information for these critical biophysical resources. Rather than underscoring the need to adapt to climatic variability, as many scientific reports do, the research identifies critical barriers to becoming adaptive, providing insights as to how these hurdles may be effectively overcome.

Tu. 17:55 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Eruptive Discourse: Cultural translation of volcanic knowledge in Vanuatu

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Because of their activities the volcanos of Vanuatu are an attractive subject of study for geologists; international programmes are becoming more numerous especially on the islands of Ambrym and Tanna. Fieldwork within Melanesian communities requires a specific type of interaction and collaboration with the people and institutions. The centralisation of political decisions, and the lack of effective dissemination, often means that people living on these volcanic structures very rarely see the scientists' results and often feel that work by foreigners is an intrusion into their cosmological reality. Thus we suggest mapping the relations between the actors involved in the scientific study within the context of village-level decision-making and we propose developing a reciprocal cultural translation. Using the island of Ambrym as an example, we will bring the expectations of the local people to the forefront of the study along with the requirements necessary for work to be carried out effectively while respecting local values.

Tu. 18:00 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Climate Change and Social Change: Vulnerability and Adaptation in Rural Vanuatu
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What is the nature of vulnerability and resilience to climate change at the community scale? What approaches to climate change adaptation are most appropriate at this scale? These questions are examined in the context of rural Vanuatu, a Melanesian least developed country susceptible to changes in climate variability and extremes. Fieldwork in Tangoa village (Santo) and the Mangaliliu/Lelepa Island community (Efate) interpreted vulnerability by beginning with local perceptions and experiences of dealing with climate risks. Vulnerability to climate arises from a context of rapid social change. Predominantly 'non-climate' factors such as historical western influences, population growth, land issues, changing traditional governance and eroding traditional knowledge are linked to changing agricultural practices, natural resource degradation, and increasing reliance on imports. These factors and processes affect the ways and degree to which communities are able to cope with climate stresses such as tropical cyclones, drought and heavy rain. However, research findings challenge the common notion that Pacific Island communities are inherently vulnerable; each community engages complex endogenous mechanisms of resilience. Aspects of this resilience may be threatened however, especially where resilience depends on flexibility and self sufficiency, and particularly given potential changes to climate in the coming decades. In this context therefore, 'adaptation to climate change' requires communities to adapt to both changing climatic and social situations; it is argued that maintaining and building on existing structures of resilience is particularly salient in a rural community context. Instead of requiring entirely new and discrete approaches, increasing the priority and outreach of existing institutional initiatives under the rubric of community development and natural resource management can go far in addressing local priorities for community-based adaptation in rural Vanuatu.

Tu. 18:05 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Politics and Matrilineal Culture in Contemporary Micronesia
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In my forthcoming book, Traditional Micronesian Societies: Adaptation, Integration, and Political Organization in the Central Pacific, I argue that Micronesian matriliny originally provided adaptive solutions that promoted survival in societies settling, occupying, and developing island environments regularly subjected to typhoons and El Nino-driven droughts. I go on to suggest, however, that as the adaptive characteristics of matriliny became less relevant in a number of Micronesian societies, other aspects of matrilineal organization proved to be so useful in on-going sociocultural life that matrilineal organization was retained throughout the region. I described these aspects as "spandrels," borrowing Stephen Jay Gould/Richard Lewontin's terminology. This paper suggest that these matrilineal spandrels-in particular, classic forms of conical clans, lineages, and the hierarchical leadership of chiefs that is rooted in them-have enabled Micronesians to successfully retain significant aspects of their traditional political organizations even while embracing the constitutional processes of American-modeled democracy. Counter-intuitively, the hierarchical organization of chieftainship and the importance of lineage organization actually provide important counterweights to the centralizing tendencies of the modern Micronesian states. This paper explores the continuing relevance of matrilineal social, cultural, and political organization in contemporary Micronesian life.

Tu. 18:10 Culture and Politics session room
L'Environnement et les questions de société - Society and Environment

Green Theory and Environmental Justice

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There is a growing understanding that the natural earth system with the biosphere and ecosystem, as well as the multiple systems created by humanity, including international relations, interact with each other and this interrelationship demands new ways of policy analysis. The dictionary defines the word environment in such a way that it includes the complete range of external situations and socio-cultural aspects, as well as a powerfully encompassing political economy, into which implanted, as it were, the whole food supply, the soil, and significantly, the climate. The mental part of the compound word environmental, refers to the mind, or the intellectual capacity of a human being; nevertheless, it can also refer to the inner state (inner or spiritual harmony, or lack of it) of a person. The production of environmental inventions and solutions can be enhanced by the rationality and incentives of the free market; nevertheless, it is obvious that the environment as such cannot really be privatised. Who could buy or privatise the air, sunshine or water resources as a whole? Would it not be absurd to imagine that some people might buy planet Earth (or part of it) and try to put it up as leverage in a hedge fund or use it as some collateral? Instead, it is environmental justice, which could create insight to show the way towards a global solution. Ideally, only those principles should have privileged status, which create and increase peace and harmony amongst human beings, from within and without, whilst they facilitate a perfect compatibility with the environment. Realistically, the way of the world is different, so the best is to aim for a substantial process of correction, or a paradigm shift in order to implement global environmental protection and justice, as well as - if it is still possible – to try to avoid the looming global environmental catastrophe.

Tu. 8:15 Economy session room
Keynote lecture on Governance and the Economy: Future Challenges for the Pacific

Achieving Growth through Increasing Connectivity: Lessons from the South Pacific

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Connectivity is an important driver of economic growth and many developmental outcomes in all countries, but is arguably even more important in small island developing states. It facilitates trade, enables governments to better govern, keeps communities in touch, promotes tourism and makes doing business easier. Three important elements of connectivity are shipping, aviation and telecommunications. South Pacific developing country achievements in each of these areas will be examined during the lecture. The relative isolation of these countries will be demonstrated, and lessons will be derived from those countries that have achieved most in recent years in increasing telephone usage, promoting greater air travel and making ports operate more efficiently. Implications for competition, the strategic, use of public funds, resource pooling and regional co-operation will be addressed. The lecture will be based on the AusAID Pacific Economic Survey 2009.

Tu. 9:00 Economy session room
Topics in Microeconomics

Which Institutions are Good for Your Health?
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A literature has developed over the last decade or so which empirically analyses the effect of institutions on economic development across countries. This literature has become known as the deep-determinants-of-development literature. Within this literature, proximate determinants of development are defined as those that appear in the aggregate production function, such as physical and human capital per worker. Deep determinants, by contrast, are the variables that explain differences in the proximate determinants; hence they are the underlying, or deep, determinants of development. Several of these papers analyse whether institutions or geography is the more important deep determinant of cross-country income differences. Within this literature it is standard, with a small number of exceptions, to use income per capita as a proxy for economic development. In addition, the focus is almost exclusively on the role of formal, rather than informal, institutions in explaining cross-country differences in the level of development. Following North (1990), formal institutions can be thought of as written rules and regulations, for example property and contract law, whereas informal institutions include norms, conventions and the level of trust and cooperation within society. This paper extends the existing literature in two ways. Firstly, we focus on life expectancy as an alternative indicator of economic development. Secondly, we examine the role of informal, as well as formal, institutions as a potential deep determinant of development. We use data from the World Values Survey to proxy for informal institutions. Our empirical results suggest that both formal and informal institutions are statistically significant in explaining cross-country differences in life expectancy. We also find evidence that formal and informal institutions are substitutes for each other.

Tu. 9:30 Economy session room
Topics in Microeconomics

The Transnationalism of Shell Money: New Regional Trades of the Langalanga, Solomon Islands
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Many Pacific Islanders have experienced the impacts of globalization on their culture and economy. The degree of devaluation of state currencies in the past few decades is among one which strongly influences everyday life in Melanesia. Feeling that global economic and financial market is far beyond their control, some islanders look for alternative ways to sustain the value of currency in their hands.
This paper examines how the Langalanga attempt to maintain their economic and cultural agency through transnational trades of shell money in Melanesia. The Langalanga people of Malaita Island, Solomon Islands, have been making shell money for generations, which is widely circulated in the region, including long distance trade to Bougainville. In recent years, some Langalanga traders expand their trading networks and travel to neighboring countries, including Papua New Guinea, Vanuatu and Fiji. The cultural significance of shell and shell money in traditional sphere of exchange, which is shared by many Melanesians, paved the way for the transnational trade of Langalanga shell money. While neo-liberalism economy moved the world toward the transnationalism of currency, the transnational movements of local and traditional currencies in Melanesia provide an alternative way of thinking in the balance of culture and economy.

Tu. 9:45 Economy session room
Topics in Microeconomics

Economic Well-being in a Subsistence Economy: Micro-finance on Yap Proper and Falalop Islet, Ulithi Atolls

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This paper is based on extensive field research conducted in the Federated States of Micronesia, on Yap proper and Falalop Islet, Ulithi Atoll. The primary focus of this research is a socio-economic assessment of small-scale economic activities which include agricultural and marine activities with a strong emphasis on micro-scale development. Emphasis is on small-scale subsistence agriculture, marine resources, family and island economies, and microfinance as a form of sustainable development. Key elements to this paper include economic and social processes of agricultural and marine activities, families' subsistence activities, and change in bartering, reciprocal and monetary relations. The paper addressing the ways in which community-level development, most notably micro-finance, and its suitability for addressing the monetary problems related to poverty of Yapese, has integrated into family and island economies on Yap proper. A second component of the paper is a needs assessment for small-scale business development, in particular micro-finance, on Falalop Islet.

Tu. 10:45 Economy session room
Topics in Microeconomics

Understanding the Dynamics of Domestic and Global Migration: A Case Study of the Philippines

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As with many developing nations, migration drives economic trends in the Philippines. However, the causes and patterns of both local and global migration are not well understood in the country. We employed a three-pronged approach to examine both internal and international migration in the Philippines: a historical overview of government policies that have influenced migration; an analysis of national data that influences international migration; and a decision analysis case study on rural families in the central Philippines. We conclude that the Philippine government has promoted both internal and international migration for a variety of reasons. International migration is highest in the capital and in regions closest to the capital, Metro Manila - aggravating the income disparity that already exist between the capital and regions further from the capital. At the same time, liquidity is a major driver in both global and local migration.

Tu. 11:15 Economy session room
Topics in Microeconomics

Le travail des enfants dans les économies insulaires du Pacifique : Quelle solution pour résoudre ce problème ?

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Le travail des enfants est un phénomène plantaire n'épargnant aucune économie. Les plus touchées d'entre elle sont les économies en développement (BIT 2006). On recenserait dans le monde 190 millions d'enfants travailleurs âgés de 5 à 14 ans. Si le dernier rapport du BIT montre clairement un déclin du travail des enfants dans le monde notamment le travail dans le secteur dit " nuisible ", il reste cependant à un niveau très élevé. L'Unicef a promulgué le programme d'éducation pour tous afin que les enfants puissent obtenir une éducation. Cependant, ce programme n'a pas remplit son rôle d'extraire les enfants du marché du travail. Cet échec s'explique par le fait que les parents, par manque d'information sur les avantages que peut procurer l'école à leurs enfants et à leur famille, préfèrent les mettre au travail. Dans les petites économies du pacifique où la population représente la seule richesse hormis les ressources maritimes. L'accent doit être mis sur le capital humain pour atteindre un développement socialement et économique durable. Notre article se propose d'étudier les avantages que les ménages peuvent retirer de l'éducation afin de les inciter à investir dans le capital humain des enfants. Ainsi, nous montrerons que les ménages peuvent bénéficier de trois formes d'avantage : un bénéfice monétaire ; un transfert de revenu enfant-parent. Les enfants peuvent ainsi financer la retraite de leurs parents. Le deuxième avantage est un bénéfice non monétaire dans le sens où, l'enfant éduquer peut améliorer de manière indirecte, par un transfert de savoir, la productivité des membres non éduqués de la famille et enfin le troisième avantage se présente sous la forme d'une mobilité sociale pour l'enfant éduqué et pour les parents. Le statut social des parents s'améliore lorsqu'un enfant est éduqué.

BIT (2006), La fin du travail des enfants : un objectif à notre protée, BIT Genève 2006.

Tu. 14:00 Economy session room
Governance

Avantages et risques économiques du statut d'autonomie de la Polynésie française

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Ce travail s'appuie sur les enseignements les mieux établis de la pensée économique moderne appliquée aux effets des institutions sur la croissance pour analyser les perspectives ouvertes par le statut d'autonomie dont dispose la Polynésie française. D'une part, l'économie publique, notamment la branche dite du " fédéralisme fiscal ", a toujours montré l'intérêt de la décentralisation d'un grand nombre de décisions politiques afin que celles-ci puissent s'adapter au mieux aux conditions locales particulières. Le statut d'autonomie au sein de la république française constitue un bon compromis institutionnel de ce point de vue. Toutefois, l'analyse moderne des effets des institutions sur la croissance et le développement (Alesina, Acemoglu, Robinson, Bardhan, Schleifer) conduit à s'interroger sur les risques de mauvaises incitations et de mauvaises politiques qui en découlent lorsque la décentralisation conduit à une " capture de rentes " au niveau local. L'enjeu institutionnel est alors de trouver une sorte d'arbitrage entre les risques locaux et les risques nationaux d'inefficacité de l'action gouvernementale. Quelques propositions en sont dégagées pour un amélioration de la gouvernance de la Polynésie dans un sens plus favorable au développement économique.

Tu. 14:30 Economy session room
Governance

Intégrité et transparence dans les administrations publiques

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Intégrité et transparence dans les administrations publiques : une expérience australienne

Bonne gouvernance et développement sont étroitement liés. L'intégrité et la transparence des politiques publiques, comme l'efficacité des services publics, demeurent des objectifs permanents. La France a une tradition de contrôle interne à l'administration par de grandes inspections centrales, ou externe par le juge. Contrairement aux pays anglo-saxons, elle n'a pas développé de contrôle non juridictionnel indépendant du pouvoir exécutif. Les USA ont expérimenté la fonction de procureur spécial (" special prosecutor "), devenu par la suite " conseiller indépendant " (" independent counsel "). Recrutés par le Ministre de la Justice ou par le Congrès, ils ont pour charge d'enquêter sur les fautes professionnelles commises par les agents d'autorité. L'Australie s'est inspirée de cette tradition plus large des " watchdogs " et l'Etat du Queensland (Australie) a mis en place en 2002 une commission permanente et indépendante, la CMC " Crime and Misconduct Commission " qui contrôle le secteur public. Sa juridiction est si large qu'elle couvre la police, les prisons, les établissements publics, les universités, les tribunaux comme les élus.

Loin de se limiter à une fonction répressive, la CMC encourage les politiques de prévention, rédigeant à l'intention des administrateurs comme des citoyens des manuels de comportement. Ils permettent d'identifier les conflits d'intérêts. Ils fixent des limites très concrètes entre les cadeaux acceptables et les rétributions. Ils définissent les limites de la faute professionnelle et de l'engagement de poursuites pénales. Les citoyens sont informés et leur vigilance est sollicitée. Il existe à leur intention un manuel de révélation (" A guide to whistleblowing ") qui explique les réactions utiles à l'intérêt public.

Cette étude s'appuie sur l'expérience de la CMC de l'Etat du Queensland et s'interroge sur une possible adaptation à la Nouvelle-Calédonie.

Tu. 15:00 Economy session room
Governance

La nouvelle gouvernance financière et l'autonomie financière des collectivités françaises du Pacifique

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La " nouvelle gouvernance financière " de l'Etat, telle qu'elle résulte notamment de la Lolf, a pour ambition de passer d'une vision administrative de la dépense publique à une vision stratégique. Les collectivités françaises du Pacifique disposent d'une large autonomie qui leur permet de se gouverner librement. Elles disposent de larges compétences, notamment fiscales. Les transferts financiers de l'Etat aux collectivités du Pacifique restent toutefois importants. Si l'on s'en tient aux transferts bénéficiant aux collectivités, on peut s'interroger sur le point de savoir comment l'Etat peut atteindre les objectifs fixés par les lois de finances quand les décisions financières prises dans ce cadre relèvent d'autorités autonomes. Comment les transferts sont-ils pris en compte ? Comment les objectifs de l'Etat sont-ils reçus ? Le changement de logique impulsé par l'Etat trouve t-il un écho auprès des autorités financières des collectivités ? .

Le renouveau de la contractualisation entre l'Etat et les collectivités place au cœur des relations entre l'Etat et les collectivités la notion d'évaluation plus compatible que celle de contrôle avec les axes de la nouvelle gouvernance, prenant mieux en considération la complexité.

Tu. 15:30 Economy session room
Governance

Quel(s) modèle(s) d'analyse pertinent(s) de l'action collective dans l'élaboration et l'exécution des politiques publiques à caractère économique ?

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La prise de décision étatique est traditionnellement, en science politique, abordée sous l'angle de l'action collective. En dehors des règles juridiques, qu'elles soient de niveau constitutionnel ou législatif, les politologues français et anglo-saxons ont, en effet, montré qu'il existait une relation d'échange entre un certain nombre d'acteurs non politiques et les autorités constitutionnellement instituées pour déterminer l'intérêt général. Cette relation d'échange, en marge des règles de droit, permet ce que l'on appel un accès au processus décisionnel public par des acteurs privés. Les trois modèles majeurs d'analyse de l'action collective prennent différemment en compte les acteurs économiques.

Partie I. Présentation des trois principaux modèles d'analyse actuels de l'action collective en général (triangles de fer/Iron Triangles, Réseaux de politique publiques/Public Policy Networks, coalitions plaidantes/Advocacy Coalition Framework). Nous présenterons, pour chaque modèle, la place et le poids potentiel des acteurs économiques dans la prise de décision publique et la relation d'échange qui se noue entre acteurs économiques privés et organes publics de décision.

Partie II.

Nous présenterons notre position sur le modèle le plus complet en matière d'analyse des politiques publiques économiques. Pour ce faire, nous discuterons tout d'abord, de la pertinence du modèle des coalitions plaidantes (ACF) en matière économique. Nous discuterons, ensuite, du retour en grâce du modèle des triangles de fer en période d'interventionnisme étatique mais aussi de la pertinence de ce modèle au regard de l'augmentation du nombre d'Agences gouvernementales ayant une compétence sur un secteur économique (ex. en matière de télécommunication, en matière de consommation...).

Enfin, nous discuterons des limites de la pertinence globale des trois modèles d'analyse en matière économique, basée sur des exemples historiques d'interlocuteur économiques uniques et directes de l'Etat mais aussi sur l'exemple polynésien de deux acteurs des NTIC (Mana et Vini), remettant en cause une approche exclusivement basée sur l'action collective.

Tu. 16:30 Economy session room
Governance

Vingt ans de rééquilibrage en Nouvelle-Calédonie

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La Nouvelle-Calédonie fête les vingt ans de la poignée de main historique entre J. Lafleur et JM. Tjibaou, marquant la fin des conflits qui ont secoué le pays entre 1984 et 1988. Cette réconciliation était assortie d'un important dispositif de rééquilibrage économique et social en faveur particulièrement de la population Kanak afin d'installer durablement la paix. Ce papier tente de dresser un bilan de cette politique de rééquilibrage, d'en mesurer les effets et d'en appréhender les enjeux. Une première partie présente les indicateurs de déséquilibre socio-économiques locaux parallèlement aux politiques publiques de rééquilibrage mises en place depuis 20 ans. Si des progrès ont été réalisés pour améliorer les conditions de vie, les déséquilibres demeurent, notamment dans le domaine de la santé et de l'éducation. On assiste à une amélioration des indicateurs de base et donc à un rattrapage selon ces critères, pourtant, l'examen d'indicateurs modernes de condition de vie montre une accentuation des déséquilibres. La construction d'une usine de transformation du nickel en Province Nord, loin de l'agglomération Nouméenne, apparaît alors comme le principal outil de la politique industrielle de rééquilibrage. La deuxième partie présente les effets socioéconomiques de ce grand projet minier qui dynamise une région habitée majoritairement par les Kanak et qui offrait jusqu'à récemment peu de perspectives d'emploi et de développement économique. Il s'agit ici de présenter le processus de négociation politique qui a abouti à la réalisation de ce projet et les impacts socioéconomiques au sein de la population environnante. Ces analyses seront effectuées à partir d'une enquête de terrain en cours sur, notamment, la contribution du projet minier à l'économie provinciale et ses effets socioéconomiques. En présentant les derniers résultats sur les changements locaux et globaux entraînés par ce projet, ce papier permettra de mieux appréhender l'analyse et le suivi (par les indicateurs présentés ici) des politiques de développement des Etats insulaires du Pacifique.

Tu. 17:00 Economy session room
Governance

Observations comparatistes sur quelques conséquences du pluralisme juridique dans le Pacifique Sud : L'exemple de la Polynésie française et de Tokelau

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Le pluralisme juridique qui prévaut dans les pays du Pacifique Sud anglophone ou francophone peut s'expliquer par un double mouvement d'opposition à l'encontre du modèle de pensée juridique coloniale dominant d'une part et dans celui des rapports encore souvent tendus entre les élites locales et les puissances coloniales et post-coloniales d'autre part. Ces oppositions conjuguées forment aujourd'hui le principal dénominateur unissant la quasi-totalité des pays du Pacifique Sud entre eux.

Elles permettent tout d'abord de justifier une volonté commune de se doter de systèmes juridiques autonomes qui accordant une valeur particulière aux notions de 'loi du peuple', de culture et d'identité.

Elles permettent aussi de récuser par avance toutes tentatives d'explication ou de justification du bien-fondé d'autres systèmes ou cultures qui reposeraient exclusivement sur des conceptions occidentales ou européennes rejetant ainsi une conception positiviste du droit et des systèmes juridiques ou politiques à vocation universelle dont ils seraient les conséquences.

Selon la nature des liens qu'elles entretiennent encore avec les territoires du Pacifique, les anciennes puissances coloniales, ont certes prévu des mécanismes susceptibles de répondre aux aspirations des populations qui y vivent. Ainsi s'agissant des rapports entre la France et la Polynésie française, l'article 74 de la constitution française qui forme la pierre angulaire de toutes constructions institutionnelles pour les collectivités d'outre-mer, postule clairement l'existence d'un véritable droit à la différence institutionnelle reconnue à chaque collectivité d'outre-mer.

Il reste que cette double opposition ne peut pas être uniquement conçue comme une simple manifestation d'un repli sur soi-même pour ces pays ou territoires. C'est au contraire, une revendication sans équivoque de la reconnaissance d'un système ouvert ou relativiste dans lequel le droit et les structures qui accompagneront sa mise en œuvre devront parmi d'autres facteurs, aussi nécessairement prendre en compte l'environnement économique spécifique qui prévaut dans ces pays ou territoire. Ainsi, c'est à l'aune de ce modèle que la population de Tokelau, dernier territoire à décoloniser dans Pacifique Sud, a par deux fois en 2006 et 2007 refusé d'accéder à l'indépendance dans la mesure où elle était pleinement consciente de ne pas être en mesure d'élaborer d'alternatives politique et économique viables à celle qui consistait à rester sous la tutelle néo-zélandaise.

Wed. 8:15 Ecosystems session room 1
Keynote lecture on Ecosystems, Biodiversity and Sustainable Development

Oceanic Islands as Model Systems for Human Ecodynamics

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Mangareva, a group of 14 small islands in southeastern Polynesia, has long been noted for its impoverished terrestrial biota, although a record of subfossil terrestrial snails in recent erosional deposits has suggested that the islands once supported a richer biota. Archaeological excavations at the Onemea site on Taravai, second largest island in the group, have yielded a stratigraphically and chronologically well controlled assemblage of both terrestrial snail shells and of bird bones. The Onemea site dates to approximately cal AD 900-1200, and thus represents the initial phase of Polynesian colonization of the island. The zooarchaeological assemblage reveals that at this time period the island still supported significant populations of terrestrial mollusks and a range of seabirds (many extirpated from the island today) and a few species of indigenous or endemic landbirds (all extinct today). Archaeological deposits from other sites dating to cal AD 1200-1500 lack such evidence of native snails and birds, demonstrating that major reductions in the islands' biota occurred within the first two to three centuries following Polynesian colonization.

Wed. 9:00 Ecosystems session room 1
Human Ecodynamics

Wood Charcoal Analysis, Sacred Woods, and Inter-Site Variability in the Late Prehistoric Society Islands

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Anthracological studies have been under-utilized in Polynesia for building social interpretations and this paper address how such data can be used, particularly as a means for documenting inter-site variability related to status difference, site function, and site specialization. The case study provides identifications of wood charcoal recovered from posthole features excavated at prehistoric house structures in the windward Society Islands. The study tests whether late prehistoric house sites of varying social status and function differed in the types of trees used in their construction. Comparative analyses of ethnohistoric data demonstrate that the choice of wood used in house post construction reflects differential access to certain economically important and symbolically charged tree species. The archaeological data provides empirical support that variation in the wood used in prehistoric Society Island house structures has social relevance and can be used as another line of evidence to infer social status and site function. Anthracological studies in Polynesia then provide insights into the political economy and demonstrate how the materialization of status distinction served as a legitimation of power, in addition to their more traditional use as a means for assessing human-settlement systems from an ecological point of view.

Wed. 9:15 Ecosystems session room 1
Human Ecodynamics

Human-induced environmental changes on a fragment of Gondwanaland: the case of New Caledonia (Southern Melanesia)

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Although recognised since the end of the 19th century by a first generation of colonial amateur archaeologists, the long-term effects of human occupation of the large Melanesian Islands have until the 1980s been vastly underestimated. Studies on the southernmost archipelago of the region, the Grande-Terre of New Caledonia, of Gondwana origin, and its coral outliers, have over the past 20 years shed new light about the massive impact of 3000 years of Oceanic settlement. This paper will present a rapid synopsis of the data at hand, ranging from the near-immediate impact on the fauna by the first Lapita groups discovering the archipelago around 1000 BC, to progressive landscape transformations over the succeeding two millennia and its consequences, leading in some instances to abandonment of territories for centuries. Natural climatic fluctuations identifiable at the interface of the first and second millennia AD will be discussed, in light of the rise of the traditional Kanak cultural complex and the emergence of intensified and more efficient ways to organise the landscape during that time period. These data will be placed in regional focus, to see how the New Caledonian case might have been affected by the specific geological substratum and environmental constraints that characterise this archipelago.

Wed. 9:30 Ecosystems session room 1
Human Ecodynamics

Knowledge For the Future: plants and forestlands manipulation by people in the Pacific before European contact. First ethno-archaeobotanical approaches in New-Caledonia

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This paper would like to present some ideas on stakes and perspectives of archaeobotanical research in the Pacific, as a tool for decision making in sustainable development. This reflexion is developped from the firts results of a PhD ethno-archaeobotanical study using anthracology and focusing on forest evolution related to pre-colonial (AD 1000 to 1853) Kanak settlement patterns on New Caledonia's Grande Terre. A comparison of data from regional literature review and results of our anthracological analyses will be presented. It implies that the history of societies and forests in New Caledonia could be regarded through the scope of forest domestication rather than either large scale anthropogenic deforestation or harmony between nature and people. This mediane and more comprehensive point of view has been proposed mainly by ethnobotanical and cultural geography studies based in the Pacific Islands. It highlights that practices of manipulation of plants and forestlands linked with horticultural/arboricultural systems rely on ecological complexity. Consequent modifications of the original ecosystems encompass destructions and "anthropogenisation" but also sustainable management strategies and enrichment of local biodiversity. Such practices, their long-term consequences and the responses of vegetation can serve as a referential for sustainable development projects. These studies are also a source of traditional ecological knowledge that can help to build original orientations for the future, adapted to the ecosystems and the socio-cultural systems developed on the Pacific islands.

Wed. 9:40 Ecosystems session room 1
Human Ecodynamics

Resource Variability and the Rise of Tahitian Chiefdoms: Perspectives from Landscape Variability, Settlement Pattern Studies, and Oral Traditions

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This paper presents an overview of chiefdoms in 4 major locations of the Society Islands (French Polynesia), their late pre-contact importance and their link with exploitation of natural resources. Many sources, ethnohistoric and oral traditions, emphasize the intensity of warfare during the pre-contact period, intensified through the arrival of the 1st Europeans in the archipelago at the end of the 18th century. We examine which factors might have influenced the development of chiefdoms in this specific region and their potential impact on the emergence of territoriality and warfare. We look at several examples of settlement patterns in four islands of the Society archipelago, identified as important chiefdoms (Tahiti, Moorea, Raiatea and Huahine) and their relationship with various environmental factors such as topography, soil types, hydrology, distance to water access, rainfall and wind patterns, spatial distribution of agricultural complexes, etc. We also use ethnohistoric sources and oral traditions documenting the emergence of the Teva in Tahiti, the Tamatoa in Raiatea as well as the chiefdoms of Maeva in Huahine and the Marama in Moorea. These accounts will be crossed with available archaeological data. While providing a GIS database and sets of maps combining those various factors (archaeology, environment and oral traditions), we expect to highlight some relationship patterns between territoriality, exploitation of resources and power in the Society Islands. We also hope that our perspectives will contribute to set up issues for further archaeological research in the region.

Wed. 9:50 Ecosystems session room 1
Human Ecodynamics

Sorting chronological and spatial variability on the landscape: new techniques for dating surface archaeology on the island of Rapa Nui

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A substantial amount of the archaeological record on the island of Rapa Nui is distributed across the surface of the island. While archaeologists have indeed recognized the potential advantages of the surface record over buried deposits, sorting both chronological and spatial variability remains a challenging task. Much of this difficulty has arisen from inadequacies associated with commonly used dating techniques. Dates are frequently acquired without a clear understanding of the events being dated and how those events relate to the larger research questions at hand. Optically stimulated luminescence (OSL) is a potentially useful technique for directly dating the construction of surface materials, offering considerable advantages over more commonly used methods. In this paper, I briefly describe the technique and highlight its usefulness for documenting changes in subsistence and spatial organization on the Northwest coast of Rapa Nui. Attention is also placed on the application of new geo-spatial techniques, such as the variogram model and local indicators of spatial association (LISA) statistics, which are useful for generating hypotheses regarding feature associations which can then be critically assessed through OSL dating. The research presented here has ramifications for understanding adaptations to environmental variability and changes in the scale of social organization.

Wed. 10:30 Ecosystems session room 1
Human Ecodynamics

Climatic Variability and Human Response, Marquesas Islands, French Polynesia

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Pacific archaeologists have long been interested in relationships between climatic variability and cultural phenomena, including settlement and subsistence patterns; onset of competition and warfare, and socio-political change. New evidence from fossil coral studies, climatic modelling and other sources is now challenging long-held ideas about past conditions in the central Pacific. In particular, recent studies suggest that over the last millennium teleconnections with other regions may not have been as straightforward as once assumed. The emerging model requires reappraisal of sub-regional paleoclimate conditions and revaluation of the impact of climatic variability on prehistoric Pacific peoples. These ideas are explored in the context of the Marquesas Islands, French Polynesia. Palynological, sedimentary, and archaeofaunal records are used to assess local climatic variability and its impact on prehistoric human populations who were well established by the 13th century A.D. if not earlier. Of particular interest is the direction, periodicity, and magnitude of climatic phenomena and human responses.

Wed. 10:45 Ecosystems session room 1
Human Ecodynamics

Subsistence and Environmental History in Central New Britain, Papua New Guinea: Combining Phytoliths, Macrofossils and Use-wear/Residue Studies

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People have occupied the Bismarck Archipelago area of Papua New Guinea for around 40,000 years, but little is yet known about the history of its vegetation and plant food production practices. On the north coast of New Britain, subsistence information is extremely limited at open sites because the highly acidic soils are not conducive to the survival of macrofossils, but phytolith analyses document burning and forest disturbance apparently coinciding with the earliest signs of occupation. In central New Britain macrosfossils from Misisil cave, and phytolith analyses and use-wear/residue studies here and at several open sites provide an outline picture of Holocene vegetation history and subsistence practices. These combined different lines of approach, together with lithic analyses, provide a fuller picture of Holocene history and subsistence practices than could be obtained from one line only.

Wed. 11:00 Ecosystems session room 1
Human Ecodynamics

Pollen Analysis and the Natural Distribution of *Cyrtosperma chamissonis* in the Tropical Pacific

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The documentation of pollen of the giant swamp taro, *Cyrtosperma chamissonis*, dating to prehuman times in two wetland sediment cores on Pohnpei in Micronesia, demonstrates that its natural prehuman distribution was far wider than previously suspected. The implications of this finding are discussed both in terms of earlier notions of the phytogeography of *Cyrtosperma chamissonis* and the previous use this distinctive pollen type as a marker for early human presence on Palau. While pollen studies can be highly informative of natural plant distributions and the progression of human settlement on tropical Pacific islands, care must be taken to validate underlying assumptions.

Wed. 11:15 Ecosystems session room 1
Human Ecodynamics

Land Snails in Pacific Island Archaeology

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Although the land snails of Polynesia, Micronesia, and eastern Melanesia have received occasional mention in the archaeological literature over the last three decades, archaeomalacological data have not received the attention given recent evidence of massive extinctions among the native vertebrates (especially birds) of these islands associated with human settlement and of the introduction and spread of anthropophilic non-native vertebrates. The terrestrial mollusks of the Pacific Islands have undergone a similar process of extinction and replacement with prehistorically and historically introduced alien species. Native species of the families Assimineidae, Achatinellidae, Amastridae, and Endodontidae are particularly susceptible to extinction. Among aliens, several species (e.g., Gastrocopta pediculus, Discocharopa aperta, Liardetia sculpta, and Allopeas gracile (formerly Lamellaxis gracilis)) have apparently been introduced into the Pacific Islands from the west. All of these have been reported from prehistoric archaeological sites within this region, but their history remains uncertain because of the paucity of pre-modern extralimital records; of the species named above, only A. gracile is known from firmly dated pre-modern contexts outside the Pacific (i.e., Bahrain, the United Arab Emirates, and India). Other species (e.g., Lamellidea oblonga, L. pusilla, and Pacificella variabilis) are believed to be endemic to the Pacific islands but have apparently been further distributed within this area by prehistoric human commerce. Still other species (e.g., Gastrocopta servilis, Opeas hannense (formerly O. pumilum), and Paropeas achatinaceum) have entered the region during the modern era. Land snails are often well-represented in Pacific archaeological sites; because of their abundance in favorable locations, they may be more suitable for quantitative analysis of ecological change than are vertebrates. Because many Pacific land snails are minute, however, finer screen sizes (1.0 mm and 0.5 mm) must be employed in their analysis than is usual for studies of vertebrate materials or of marine mollusks in midden deposits.

Wed. 11:30 Ecosystems session room 1
Human Ecodynamics

Stepping stones or barrier: the role of Far Southeastern Pacific Islands in Pacific Ocean prehistory

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The vast ocean of the far eastern Pacific divides two great migratory peoples, the Amerindians and Polynesians. Recent discoveries of chicken bone at El Arenal (Arauco Peninsula, Chile), contentiously attributed to pre-Columbian introductions by Polynesian migrants to southern-central Chile, have added fuel to the debate as to whether or not contact and exchange occurred between these two groups in Pacific prehistory. The few islands that lie between Remote Oceania and the mainland of southern South America represent potential stepping stones for migrants sailing long distances in the region. Here we focus on the islands of the far southeastern Pacific Ocean and examine the palaeoecological and archaeological records to determine the antiquity and nature of the impact of human occupation on these islands. These include the near continental islands of Isla Mocha and Isla Santa Maria that lie adjacent to the mainland archaeological site of El Arenal, and the Juan Fernandez Archipelago, that are some 650 km off the west coast of Chile. We present new palaeoecological data from the islands that highlight the importance of understanding the interplay between short-term climate variability versus human activity in shaping the environment, and in turn shed light on our understanding of human migration across the Pacific.

Wed. 11:45 Ecosystems session room 1
Human Ecodynamics

Population Growth and Sociopolitical Change in Late Pre-Contact Hawaii: Insights from Household Archaeology in Leeward Kohala, Hawaii Island

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Since 2001 the Hawaii Biocomplexity Project, a multidisciplinary team including archaeologists, ecologists, soil scientists, demographers, and quantitative modelers has investigated long-term human ecodynamics in the Hawaiian archipelago. Our current phase of research focuses on the non-linear dynamics of population growth, agricultural intensification, and sociopolitical change. This requires, in part, the acquisition of data on late pre-contact Hawaiian households. We report on the archaeological investigation of households in leeward Kohala, on the island of Hawai'i. Our analyses of marine and terrestrial fauna, domestic animals, and identified charcoal over a 500 year period provide several indices for anthropogenic change in Hawai'i, and also indicate distinct trends in population growth and sociopolitical change. We also discuss how household chronology and settlement patterns can be used to detect the formation of new socioeconomic units (ahupua'a), and how this processes is mirrored in the development of the Kohala field system.

Wed. 12:00 Ecosystems session room 1
Human Ecodynamics

Documenting the Downstream Ecological Consequences of Human Colonisation of the Austral Archipelago (French Polynesia) Using Palaeoecological Records

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The five main inhabited islands of the Austral Archipelago, French Polynesia stretch across the Tropic of Capricorn, a biogeographical divide between tropical and subtropical conditions. The islands vary in age (5-18 ma), size (8-42 km2), elevation (28-620 m asl) and biodiversity but were all colonised by Polynesians within the last 1000 years. These characteristics make this archipelago an ideal test case for assessing the sensitivity of indigenous island biodiversity to human colonisation. Palaeoecological records from swamps across four of the five islands provide rich contiguous archives of the pre-human island biotas and the post human colonisation environments. We demonstrate, using radiocarbon dated pollen, seeds and invertebrate remains, the downstream ecological consequences of human colonisation. This includes the decline and extinction of indigenous plants and invertebrates following the introduction of exotic species.

Wed. 14:00 Ecosystems session room 1
Long Term Monitoring

Real-Time Long-Distance Research and Monitoring of Coral Reefs

Tung-Yung Fan, Kwang-Tsao Shao, Fang-Pang Lin, Hsing-Juh Lin, Larry Smarr, Peter Arzberger, Peter Edmunds, James Leichter, Ruth Gates, Stuart Sandin, Jennifer Smith and Deheyn Deheyn
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Coral reefs are the most productive, beautiful, diverse, and dynamic marine ecosystem, but also is the most threatened and globally endangered. A real-time long-distance research and monitoring platform of coral reef ecosystem is being developed using the combination of coral reef science and information technology. Hypotheses based on field observatory, such as testing the effects of tidally induced upwelling and the roles of alternative states involving corals, anemones, corallimopharians, crustose coralline algae, turf algae and macroalgae, were experimentally tested using controlled environment mesocosms in Kenting, Southern Taiwan. Effects of temperature fluctuation and nutrient loading on the interactions among multiple reef taxa, and the scope of the research has included analyses of the molecular and cellular biology of coral, as well as the settlement and recruitment of coral larvae. Video image and sensor signals from the mesocosms are being streamed to several institutes in Taiwan and the United States for integrated analysis. Interested citizens, scientists, managers and students can access the real-time monitoring of the experimental coral reef system through the internet. This system will contribute significantly to the understanding of the processes and mechanisms maintaining coral reef biodiversity, and will raise public awareness of conservation and sustainable development of coral reefs.

Wed. 14:15 Ecosystems session room 1
Long Term Monitoring

Autonomous Reef Monitoring Structures: A Tool for Monitoring Indices of Biodiversity in the Pacific Islands

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Coral reefs are highly diverse ecosystems that are seriously threatened by climate change. Methods to assess and monitor the biodiversity of coral reefs, especially in small Pacific Island communities, are plagued by limited resources, severe shortages of trained taxonomists, and subjectivity and biases of methods and observers. These challenges are particularly problematic for small and cryptic invertebrate taxa possessing the greatest diversity. Autonomous Reef Monitoring Structures (ARMS) have been developed and are being tested as a standard method to systematically obtain indices of invertebrate biodiversity by using molecular techniques that would otherwise be prohibitive using traditional morphological analyses alone. ARMS are simple structures designed to mimic the complexity of coral reef habitats and attract colonizing invertebrates. In October 2006, 12 ARMS were deployed in four sets of three replicates at a backreef site, a lagoon patch reef site, and two forereef sites at French Frigate Shoals in the Northwestern Hawaiian Islands. The ARMS, which were subsequently recovered and analyzed in October 2007, were most productive in sampling molluscs (28%), ascidians (24%), crustaceans (19%), and bryozoans (11%) in forereef and lagoon patch reef habitats. In addition, DNA barcode analyses were conducted to characterize crustacean biodiversity associated with ARMS in comparison to dead Pocillopora heads from the Line Islands and Moorea. Preliminary results suggest that coupling ARMS with taxonomic and molecular analyses can be an effective method to assess and monitor understudied coral reef invertebrate biodiversity. In 2008, additional ARMS have been deployed across the Pacific in Hawaii, Samoa, Line and Phoenix Islands, and Great Barrier Reef, as well as sites in Brazil and the Indian Ocean. Efforts are underway to develop processing and analysis methods, such as mass parallel molecular sequencing, that are less dependent on availability of trained taxonomists and to increase efficiency and cost effectiveness of this approach.

Wed. 14:30 Ecosystems session room 1
Long Term Monitoring

Time Series Observation of Biological Productivity at 43°N, 141°E in the Western Hokkaido Coast, Ishikari Bay, Japan

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As part of an on going study on the dynamics of primary production process in the Ishikari Bay, subarctic oligotrophic coastal environment of Japan, time series measurements of biological productivity and several biogeochemical parameters were carried out at 43°N, 141°E in the northwestern North Pacific from September, 2007 to December, 2007. Biological productivity was classified as "high biomass" and "low biomass" season when Chl a concentration is $>$ 1.5 μg l-1 and $<$ 1.5 μg l-1, respectively. Temperature average value changed from 8.4 °C in low biomass to 18.4 °C in high biomass season. During high phytoplankton biomass season, there was a corresponding decrease in dissolved inorganic nitrogen (DIN), phosphate and silicate mean concentration from 10.57 μm, 0.44 μm and 14.06 μm during low biomass to 2.52 μm, 0.14 μm and 5.06 μm, respectively. Phytoplankton biomass (Chl a) and primary productivity mean values was 6.92 μg l-1 and 36.12 μg C l-1 d-1, respectively, in high biomass season. In the high biomass season, Micro-size percentage contribution to total phytoplankton biomass and primary productivity were (84%) and (85%), respectively. This result showed that biological productivity has a distinct seasonal variation in an oligotrophic coastal subarctic system.

Wed. 14:45 Ecosystems session room 1
Long Term Monitoring

Recurrent Large-scale Disturbances, Recovery Trajectories, and Resilience of Coral Assemblages on a Coral Reef in the South-Central Pacific

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Coral reefs are one of the most threatened ecosystems on earth, and are particularly vulnerable to future climate change. In this context, a critical research challenge is to determine resistance to disturbances, recovery capacities, and resilience of reef communities. Temporal variability in coral community structure on the outer reef at Tiahura (Moorea island, French Polynesia) was investigated since 1991 to test for the effects of major disturbances. During the study, the reef was impacted by one cyclone (1991), four bleaching events (1991, 1994, 2002, 2003), and an outbreak of Acanthaster planci that started in 2006. We showed that like most other reefs worldwide, coral assemblages at Tiahura were highly impacted by bleaching and cyclone events that occurred in 1991 and which have caused a strong decline in coral cover and a rapid colonization of algae. But in contrast to most predictions, the classical phase-shift from coral to algal dominance did not persist, but instead corals fully recover in a decade despite three severe bleaching episodes. However, the recent Acanthaster outbreak have also caused a dramatic decline in coral cover, particularly for Acropora and Pocillopora. Thus, coral assemblages at Tiahura appear to be characterized by high resilience in terms of coral cover, but fragility in terms of species composition. Our results support the emerging hypothesis that instead of a rapid collapse in response to major stress, coral reef communities will undergo gradual changes in their species composition and structure.

Wed. 15:00 Ecosystems session room 1
Long Term Monitoring

Development of an integrated scientific programme to assess the environmental impact posed by mining on the south lagoon of New-Caledonia

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Mining industry is one of the most important environmental concerns for lagoonal tropical island ecosystems. However, the environmental impact of mining activity is still poorly documented. Over the last century, opencast Ni mines have enhanced erosion of soil and transportation of sediments and metals to the lagoon of New Caledonia. The Ni mining industry is actually booming particularly in New Caledonian which will become the third main Ni producer in the world over the next few decades with the contribution of several recent mining projects. To study the environmental risk posed by one of the large industrial mining projects in the southern part of the island a scientific programme was developed. The programme integrates (i) The complete characterisation of the different environmental compartments (water column, suspended particles and sediments); (ii) geochemistry, reactivity and modelling of the industrial wastes with seawater column (iii) hydrodynamics and modelling of the plume; (iv) models coupling and GIS development and (v) ecotoxicology studies to detect the early potential effects on biota.

Wed. 15:15 Ecosystems session room 1
Long Term Monitoring

Analysis of Land Use Change in Coastal Zone Area of Zhuhai

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Achieved the Zhuhai land use data in 1995, 2000 and 2005 by interpreted the remote sensing image, and acquired the changing disciplinarian by several land use model. The result showed that:1)During this period the area of farmland, meadow and the land unused were decreased, especially the farmland deceased faster in 2000;2)The area of forest, water and construction land were increased in this period, and the area of water increased more faster than the other land use, this is a obvious difference between inland with coastal zone;3) Zhuhai was in its period of developing before 2000, and gone to its wane after;4)It is a important character of coastal zone that its area are increasing all along because of the sediment and Sea Reclamation.

Wed. 15:30 Ecosystems session room 1
Long Term Monitoring

Light Gap Creation, Microenvironment and Turnover of Subtropical Mangrove Forests Near Moreton Bay, Southeast Queensland, Australia

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Light gap creation functions as a renewal agent in mangrove forest. Light gap progresses through various stages starting from the death of trees with the survival and recruitment of seedlings, to the infill of the gap to rejuvenate the forest. These stages define a series of steps for mangrove regeneration providing a means whereby they might naturally replace themselves over time. 25 light gaps were assessed to understand the physical characteristics and microclimate change with the adjacent canopy. Interaction of light with the growth of seedlings are justified by the amount of light received and the regrowth pattern of seedlings in each gap. Luggage Point mangroves is dominated by *Avicennia marina*, hence no interspecific competition involved in the succession process. However, intraspecific competition is obvious between seedlings that survive the creation of gap, most likely caused by lightning, with the seedlings recruited after the creation of the gap. Luggage Point mangroves in Southeast Queensland is being monitored using aerial photographs from 1981 to 2002 to understand the dynamics of mangrove forest via light gap creation. The annual average of new light gaps and annual average of gaps in recovery phases are calculated to estimate the turnover of the forest. The average size of light gaps in Luggage Point is 138 m^2. The average turnover rate of Luggage Point mangroves increases from 0.26 gap per year in 1991 to 0.40 gap per year in 2002. The average forest turnover based on these gaps decreases from 807.7±189.3 years in 1991 to 541.8±120.6 years in 2002. The increase in gap creation rate may be indicative of an increase in storm activity, a possible tangible effect of global climate change.

Wed. 15:45 Ecosystems session room 1
Long Term Monitoring

Anthropogenic change in the terrestrial habitats of the Galapagos Archipelago

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The Galapagos Archipelago has been world-renowned for their very high terrestrial and marine endemism for almost 150 years. Somewhat surprisingly, there has only been a limited effort made on actually mapping and assessing the 'footprint' of human disturbance across the islands. In this paper I provide the first quantification of the impact of anthropogenic activity on the four of the largest islands: Santa Cruz, San Christobal, Isabela and Floreana. I mapped anthropogenic change across the islands how this varied among the 6 habitat zones found on the islands ('bare ground', 'littoral', 'arid', 'transition', 'humid' and 'very humid'). The analysis found that 37041 ha (4%) of the four inhabited islands of the Galapagos Archipelago have been severely disturbed by human activities. Some habitat zones (naturally bare ground, littoral and transition) have been minimally impacted (<1% modification), whereas the humid and very humid zones have been highly modified (28% and 45% respectively). Santa Cruz (20%) and San Christobal (17%) were far more modified than Floreana and Isabella (<1%). When islands were considered in isolation, I found anthropogenic activities has affected 94% of the humid zone and 100% of the very humid zone of San Cristobal and 87% of the humid zone and 76% of the very humid zone of Santa Cruz. Vegetation clearance in these zones on these two islands contributed to >60% of all habitat degradation on the Archipelago. This research points to the urgent need to protect the last remnants of humid and very humid zone forests on the islands of Santa Crux and San Cristobal and also the need for a significant strategic restoration response in these habitats.

Wed. 16:30 Ecosystems session room 1
Long Term Monitoring

Bleaching events: Are spatial and taxonomic patterns consistent among years? A case study around Moorea, French Polynesia

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Mass bleaching events are one of the main disturbances faced by coral reefs. These events display variable impacts among taxa and among locations, even at small spatial scales. To better understand the impacts of successive bleaching events on a coral community in the actual context of increased bleaching frequency, we addressed the issue of consistency of spatial and taxonomic patterns of variation between two successive bleaching events (2002 and 2007) at the scale of the island of Moorea, French Polynesia. These two bleaching events were linked with an abnormally high sea surface temperature (SST, above 29.2°C) for six consecutive weeks, with an average weekly SST of 29.42°C in 2002 and 29.47°C in 2007. Despite similar SST conditions and comparable coral assemblages, the percentage of bleached colonies was significantly lower in 2007 (37 %) than in 2002 (55 %). In particular, the amount of completely bleached colonies was much lower in 2007 (5 %) than in 2002 (18 %). This general decrease in observed bleaching prevalence can be a sign of adaptation and/or acclimatization of coral holobionts. On the contrary, spatial patterns were consistent between the two years studied, as illustrated by a positive and significant correlation for bleaching prevalence at different locations and depths between 2002 and 2007. Taxonomic patterns of susceptibility to bleaching were also conserved among years, the most susceptible genera being *Montastrea* and *Acropora* and the most resistant genera being *Pavona* and *Porites* for both events. These results show that similar SST conditions can produce variable prevalence of bleaching, but similar patterns of variation among taxa or among locations and depths.

Wed. 16:45 Ecosystems session room 1
Long Term Monitoring

Découverte de connaissances dans des données spatiotemporelles environnementales

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Depuis quelques années, notre équipe a été impliquée dans diverses actions d'analyse de données environnementales tout en travaillant à la mise au point de nouvelles méthodes dans le domaine de l'extraction de connaissances dans de grands volumes de données. Nos travaux sont porteurs de très nombreuses retombées pour la communauté scientifique en général et le territoire de la Nouvelle-Calédonie en particulier. A titre d'exemple, une grande partie du lagon calédonien vient d'être classée par l'UNESCO au patrimoine mondial de l'humanité. La protection et la sauvegarde de cet environnement unique et fragile en présence d'importants projets miniers et d'une pression anthropique croissante nécessite une approche globale. Notre principal objectif est de développer un processus complet d'exploitation de séries d'images THR (Très Haute Résolution) multi-temporelles pour la compréhension et le suivi d'écosystèmes. La THR induit une densité d'information importante et difficile à appréhender. L'analyse spatiale a joué un rôle prépondérant pour des problèmes décisionnels en environnement nécessitant la télédétection mais elle reste limiteée face à de gros volumes de données. Nous proposons d'investir dans le domaine de la fouille de données spatio-temporelles pour extraire de l'information pertinente. Issue de la fouille de données classique, cette méthode intègre l'aspect spatial et temporel des données afin d'extraire des connaissances implicites, nouvelles, et potentiellement interprétables. Ces techniques de fouille de données s'intégreront dans un processus complet (itératif et interactif) d'analyse des données environnementales faisant intervenir les experts thématiciens des domaines des sciences de la Terre. Deux premières applications ont été identifiées et concernent le suivi de la mangrove et le suivi de l'érosion des massifs calédoniens, incluant des séries temporelles THR, des données météorologiques et des données topographiques dérivées des Modèles Numériques de Terrain (MNT).

Wed. 16:50 Ecosystems session room 1
Long Term Monitoring

La surveillance des récifs coralliens : Reef Check Polynésie

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"Reef Check Polynésie" est une association a but non lucratif qui sensibilise, éduque et forme la population locale à la surveillance de l'état de santé des récifs coralliens en Polynésie française. Environ 60 bénévoles, grâce à une méthode standard, étudient une fois par an, l'évolution des ressources marines sur plus de 55 portions de récifs dans 10 îles appartenant à 3 archipels. Les premiers relevés de terrain ayant débuté en 2000 sur certains sites, il existe une série temporelle de données sur la densité des 13 familles de poissons et 11 espèces d'invertébrés comptabilisés ainsi que sur le pourcentage de recouvrement de 10 catégories de substrat. Le soutien de nombreux partenaires locaux (Ministère de l'Environnement, Air Tahiti...), nationaux (Ifrecor, Fondation total) et internationaux (CRISP, Reef Check Fundation) sont à l'origine du succès de " Reef Check Polynésie " et ont permis de réaliser de nombreuses actions. C'est ainsi que l'association a pu récemment s'impliquer dans le suivi et la lutte du phénomène d'explosion des étoiles de mer épineuses, acanthaster planci (taramea) de certaines îles fautes. L'intérêt d'un tel réseau n'est plus à démontrer, la Polynésie française bénéficie actuellement d'un système d'alerte capable de renseigner la population et les autorités sur toutes perturbations ou modifications de l'écosystème récifal sur une vaste échelle spatiale.

Wed. 16:55 Ecosystems session room 1
Long Term Monitoring

The Polynesia Mana long term coral reef monitoring project

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The Polynesia Mana network is an ongoing sixteen year long monitoring project in twenty islands spread over the four French Polynesian archipelagos (Australs, Marquesas, Society and Tuamotu) and six neighbouring island states or territories (Cook Islands, Niue, Kiribati, Tokelau, Kingdom of Tonga and Wallis and Futuna). The biennial surveys that initially focused on Scleractinian coral communities of the fore reef now also include fish communities. In addition, hydrological parameters (sea surface temperature, sea level, wave height and frequency, pH and dissolved oxygen) are continuously measured using permanent recording sensors. Sixteen years of biological data were compared between the monitored sites in order to determine the factors responsible for temporal changes in coral communities. Cyclones, bleaching events, and crown of thorn starfish outbreaks were the main perturbations altering reef dynamics. Global climate change may also affect the reef ecosystem, yet as its effects are less visually arresting and occur over a longer time period, they remain undetected within the last sixteen years. As we permanently monitor parameters that are predicted to vary abruptly in the future (e.g. cyclone frequency, water temperature, sea level and keystone reef communities), the Polynesia Mana long term monitoring network represents a key sentinel project archiving coral reef changes in the central Pacific in response to disturbances, especially the direct and indirect effects of climate change that may appear in forthcoming decades. Our project also provides the foundation for scientific exchange and collaboration at local, regional and international levels.

Wed. 17:00 Ecosystems session room 1
Long Term Monitoring

Resilience of chronically disturbed coral reef ecosystems: Comparing Bikini and Rongelap Atolls five decades after nuclear testing

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Coral reefs are severely threatened ecosystems; even optimistic scenarios predict a global demise of coral reef ecosystems as we know them within a lifetime. Large scale disturbances as likely to be associated with climate change are unprecedented in history, thus rendering prognosis's of the likely response of coral reef biodiversity and functioning speculation at best. Pacific low-lying islands are particularly threatened, but there are few sites where a ecosystem response to large-scale disturbance can be tested. The atolls of Bikini and Rongelap in the Marshall Islands were both victims of the nuclear testing era. While tests were carried out on Bikini, Rongelap was exposed to nuclear fallout from Bikini tests, making both atolls unsuitable for habitation. We compare the fate of disturbed and undisturbed coral reefs after 50 years of existence without humans, allowing inference about a best-case recovery of coral reefs from large scale chronic disturbances. Five decades after a series of nuclear tests began, we provide evidence that 70% of the Bikini Atoll zooxanthellate coral assemblage is resilient to large-scale anthropogenic disturbance. We found that 28 coral species may be locally extinct at Bikini. Of these losses, 16 species are obligate lagoonal specialists and 12 have wider habitat compatibility. We suggest the highly diverse Rongelap Atoll to the east of Bikini may have contributed larval propagules to facilitate the resilience of coral biodiversity in the absence of additional anthropogenic threats. Coral and fish communities exhibit substantial difference between atolls, indicating that recovered communities may exhibit different assemblages than their undisturbed neighbours, or that 5 decades recovery time is insufficient to restore communities.

Wed. 17:05 Ecosystems session room 1
Long Term Monitoring

Environmental evolution during the last 6800 years story in Efate (Vanuatu): Emaotfer site

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The Efate Island Group is located at 17°40'S and 168°20'E. The studied site, Emaotfer Swamp, lies today at a elevation of around 17m above sea-level on the south coast of Efate Island (985 km2) close to the eastern boundary of the Teouma Graben on the left bank of Teouma River. The vegetation surrounding the swamp is characterized by a swampy margin forest and is dominated by Hibiscus tiliaceus, Barringtonia racemosa, Pandanus tectorius. The more altitudinal vegetation is mainly occupied by dry forest species like: Dendrocnide (Urticaceae), Antiaris (Moraceae), Garuga (Burseraceae), Homalium (Flacourtiaceae)... Lapita remains (Most ancient cemetery in the pacific -3200 to 3300 years B.P.- have been discovered recently near this swamp. It seems important to compare results of this cemetery and results from the Emaotfer core. This core boring spans a period from 6800 cal. yr BP to the present. From the base to the top of core Tfer06, three main lithological sequences corresponding to three types of deposits have been identified: Unit I., from 481 to ca 431 cm, the deposits appear homogeneous and correspond to clayey organic sediments; Unit II., from 431 to ca 151 cm, the sediments present a succession of pinkish to reddish brown level, with light red, dark reddish grey and/or white patches; Unit III., until the top of the core, it appears very homogeneous and corresponds to peat deposits. The first palynological results show that the pollen content can be correlated with the three main parts of the stratigraphy. In the lower part (bottom to 440 cm), we determined the mangrove association and humid conditions. In the second part, the vegetation is represented by an open environment with many Poaceae, Chenopodiaceae ..., and drier conditions. On the contrary, the upper part shows a relatively more humid environnement which evolves to the actual vegetation, the open forest described previously. In regard with the palaeobotanical results, it seems that the "Lapita" population came during or because of drier conditions.

Wed. 17:10 Ecosystems session room 1
Long Term Monitoring

Identification of threats and resiliency on Pacific Reefs through establishment of a long term reef monitoring network in Fiji: The Fiji Coral Reef Monitoring Network (FCRMN)

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The Fiji Coral Reef Monitoring Network (FCRMN), a node of the Global Coral Reef Monitoring Network (GCRMN) includes scientists, tourism operators, and community members. Long term monitoring of reefs across the Fiji Islands for nine years included mass temperature-related coral bleaching events, cyclones, and Crown of Thorns outbreaks.
Survey protocols used variants of Point-Intercept Transects for coral cover, and Belt Transects for indicator fish and invertebrate populations. Percentage hard coral cover was used for regional and time-line comparisons. More detailed protocols allowed comparisons by coral life-form category. Data was compiled through the Coral Reef Initiative for the South Pacific (CRISP).
Coral cover fell dramatically in 2000 - 2002 after two mass bleaching events, plus regional Crown of Thorns outbreaks, but recovered to pre-bleaching levels by 2005. Cyclones affected localised coral health in shallow waters, but caused no large scale or permanent damage, and in some cases served coral recovery by lowering water temperatures and clearing new substrate for settlement.
Overall, Fiji's reefs appear to be remarkably resilient to sudden catastrophic events, a cause for optimism.
Major "chronic" continual impacts on coral reef health in Fiji: o Eutrophication o Siltation (deforestation / coastal development) o Over fishing
Occasional or sporadic "acute' impacts on coral health: o Temperature-related bleaching o Predation and disease o Cyclones
Features contributing to coral resilience: o Geographically remote from major industrialised land masses o Large physical reef diversity o Connectivity of habitats and genetic stocks o Few overtly destructive fishing practices o Network of locally managed marine protected areas

Wed. 17:15 Ecosystems session room 1
Long Term Monitoring

Impact of past and present opencast mining on the lagoon environment of New Caledonia

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Industrial mining activity in New Caledonia is one of the most important environmental concerns for the tropical island's lagoon ecosystem. However, the environment impact of mining activity is still poorly documented. During the last century, in New Caledonia open cast Ni mines have enhanced erosion of soil and the transportation of sediments and metals to the lagoon. The Ni mining industry is currently booming throughout the world and New Caledonian with its abundant lateritic ores will become one of the main global Ni producers for a number of decades. As a consequence, environmental studies are required in order to assess and mitigate the effects of past deforestation (400-500 km2) due to opencast mining industry. Increasing sedimentation rates and metal contamination of the food web may have an adverse affect human. The objective of this paper is to examine the distribution of dissolved and particulate forms of a number of metals, including Ni and Co, in the area around Nouméa (New-Caledonia) and in three distinct bays in the south western lagoon: i) Saint Vincent bay exposed to a watershed where nickel extraction is currently active; ii) Boulari Bay exposed to a watershed where mines were exploited up until recently ; iii) La Dumbea Bay very limited exposure to mining activities.

Wed. 9:00 Ecosystems session room 2
Natural Products and Ecotoxicology

Characterization and Valorization of Polynesian Plant resources: Sandalwood, Tamanu and Metuapua'a

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In recent years, we focussed our research topics on valuable Polynesian plants such as sandalwood (Santalum insulare), "Tamanu" (Calophyllum inophyllum) and "Metuapua'a" (Microsorum scolopendria and Microsorum membranifolium). For centuries, many traditional uses of these plants throughout the Pacific region had been reported. Phytochemical assessment of these plants had been set up. These researches led to determine their chemical composition including discovery of new compounds belonging to different classes of secondary metabolites (terpenoids, flavonoids, ecdysteroids...) and finding of new chemotype. Pharmacological, perfumery and cosmetic properties of these compounds were investigated and so revealed real potentiality and interests of these plants. Investigations of S.insulare essential oil quality were implemented and showed the occurrence of two chemotypes: "santalol" (major) and "nuciferol" (minor). Analysis and odour evaluation of these chemotypes established that both of them could be use as a high grade raw material for perfumery and especially "santalol" chemotype which could be a suitable substitute of Indian sandalwood (S. album). Characterization of French Polynesian "Tamanu oil" had been carried out. Neoflavonoid compounds had been determined as bioactive components. The compilation of "Tamanu oil" physical and chemical characteristics as well as its bacteriostatic effects showed a very interesting quality oil for its use as cosmetic raw material. A chemical survey of the six species of Microsorum from French Polynesia had been performed to establish their ecdysteroid content and pattern. The highest ecdysteroid concentrations were found in M. scolopendria and M. membranifolium which can be considered as rich sources of ecdysteroids, especially of ecdysone which is rarely present as a major bioactive component in plants. Economical development and sustainable management of these valuable resources rely firstly on a better knowledge of their availability, content and properties. From these studies, presentation of short, mid and long-term valorization of these Polynesian plant resources are discussed.

Wed. 9:15 Ecosystems session room 2
Natural Products and Ecotoxicology

Chemical Investigation of an Endemic Marquesan Tree: *Rauvolfia sachetiae* Fosberg

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Rauvolfia sachetiae Fosberg (Apocynaceae) is an endemic plant species growing in the Marquesas archipelago (Nuku Hiva and Hiva Oa), which has been used in traditional folk-medicinal. Because of the excessive removal of the bark for the preparation of macerates, the species was almost extinct and it is now protected with a CR (critical rare) status. However, it was not clear which pharmacological principles are responsible for the use in the past. The aim of this work was the phytochemical investigation of this endangered species in order to get information regarding chemo-ecologically and pharmacologically active compounds- factors that support the urgent need of a future conservation program. For this purpose, we focussed our study on the creation of a chemical profile of the extractable bioactive ingredients of the natural bark as well as an examination of the pharmacologically active principles of the macerate used by the Nuku-Hiva natives. Chemical profiles were determined with modern analytical methods: HPLC-FT-ICR-MS and HPLC-SPE-NMR. As one result, sandwicine-type compounds could be identified as main components of the alkaloidal fraction of the extracts. The first occurrence of sandwicine had been reported from Hawaiian Rauwolfia species (R. sandwicensis and R. mauiensis). This finding establishes a close phytochemical relationship between Hawaiian and Marquesan Rauvolfia species. In addition, the occurrence of N-oxides obviously produced during the maceration process could explain the pharmacological activity. Besides the chemical characterization selected isolated compounds were screened regarding their antimicrobial effects and the structure-activity relationship is discussed.

Wed. 9:30 Ecosystems session room 2
Natural Products and Ecotoxicology

Drug Discovery as an Incentive for the Conservation of Biodiversity

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The island of New Guinea covers less than one percent of the world's land mass. However, it contains more than five percent of global biodiversity which can be translated into genetic and chemical diversity that can potentially developed. The government of Papua New Guinea, through the Department of Environment and Conservation established the Papua New Guinea Institute of Biodiversity (PINBio) which oversees a number of programs encouraging research to add value to the country's biodiversity.

Under the Biodiscovery program our overall goal has been to scientifically explore the biodiversity of PNG for compounds for potential drug development. Papua New Guinea has enormous biological diversity with great potential for discovering new drugs to treat many human diseases. In addition, drug discovery can become an important tool and a powerful incentive for conservation and sustainable use of biodiversity. Our drug discovery program also complies with international agreements including compliance to provisions of the Convention Biological Diversity (CBD). We have an Access Benefit Sharing (ABS) policy that ensures that benefits flow back into the communities should research result in novel discoveries. Benefits may be monetary or non-monetary. Non-monetary benefits include capacity building, infrastructure and technology transfer which has enabled Papua New Guineans to get training at collaborating universities abroad.

Collaborations with partner institutions through the Biodiscovery program have resulted in the discovery of novel compounds from terrestrial plants and marine organisms which have exhibited significant biological activities against a variety of diseases.

A recent study and bioassay guided fractionation of methanolic extract of the leaves and twigs of a PNG plant Rhus taitensis resulted in the isolation of a new triterpene, tetrahydroxysqualene, which showed anti-tuberculosis activity with an MIC of 10.0 μg/mL, while showing moderate Cytotoxicity. The structure of tetrahydroxysqualene was elucidated on the basis of HRESIMS and 1D and 2D NMR spectra.

Wed. 9:45 Ecosystems session room 2
Natural Products and Ecotoxicology

Discovery of a plant cyclotide polypeptide from *Viola betonicifolia novaguinensis*

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A plant cyclotide molecule was isolated from *Viola betonicifolia novaguinensis*, a native viola plant from Papua New Guinea. Its partial sequence indicated that it was a novel member of the plant cyclotides. Based on sequence homology the potential full-length sequences for the peptide were deduced. Assays performed against some pathogenic bacterial strains indicated that the peptide does not demonstrate antibacterial properties at the concentration tested. Structure-activity study revealed hydrophobic disruption to the surface of the molecule by residues Asp22 and Lys23 which are crucial for activity. In this paper, more results and discoveries will be discussed. Also, an overview of the potential applications of cyclotides in both pharmaceutical and biotechnology will be highlighted.

Wed. 10:30 Ecosystems session room 2
Natural Products and Ecotoxicology

Geographical variations in phenolic content and associated antioxidative activities of extracts and semi-purified fractions of *Sargassum* and *Turbinaria* species (Fucales, Phaeophyceae) from the South Pacific

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Sargassaceae represents high biomass in tropical environments. Different species of *Sargassum* and *Turbinaria* were collected within the South Pacific area (New Caledonia, Salomon and Fiji islands) in the aim of finding new ways of applications of these brown macroalga. Phenolic compounds were extracted from the collected and lyophilized biomass and their content were determined using the Folin-Ciocalteu procedure. DPPH radical scavenging and β-carotene bleaching test were carried out on crude extracts to select the active ones. Whatever the geographical area, Turbinaria species produced significantly more phenolic compounds than Sargassum species. Moreover, spatial variations were highlighted within a given species. Purification was lead on the most active extracts using ultrafiltration and dialysis to isolate phenolic compounds by size. Semi-purified fractions of phenolic compounds were also tested using antioxidative tests, in a final aim of finding the size classes of active phenolic compounds. Results are discussed in regard of the size classes of phenolic compounds, the polarity of active phenolic compounds and finally in regard of their significance in the chemical ecology of these brown macroalga.

Wed. 10:45 Ecosystems session room 2
Natural Products and Ecotoxicology

Banana Fiber: Environmental Friendly Fabric

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Banana is one of the rhizomatous plants and currently grown in 129 countries around the world. Different parts of banana trees serve different needs, including fruits as food sources, leaves as food wrapping, and stems for fiber and paper pulp. Historically, banana stems had been used as a source of fiber with the earliest evidence around the 13th century. But its popularity was faded after other convenient fibers such as cotton and silk were made available. As fiber industry has been developing to increase production efficiency, new fibers were then developed to effectively respond the consumers' need, including the production of man-made fibers using petroleum and chemicals to optimize the fiber properties. These chemicals use inevitably cause contamination in every environmental medias - water, soil and air, which directly affects human well-being and environment. In banana plantations, after the fruits are harvested, the trunks or stems will be wasted. Billion tons of stems and leaves are thrown away annually. Such waste provides obtainable sources of fibers, which leads to the reduction of other natural and synthetic fibers' production that requires extra energy, fertilizer, and chemical.The properties of banana fiber are good absorbent, highly breathable, quickly dry with high tensile strength. This research is to study the use of banana fibers, which is available locally, and rarely use in banana harvesting as source of fibers for the textile industry. The focus of the study is to optimize processes of producing fibers in environmental friendly manner and decrease chemical and toxic agents in the process. As banana fiber can provide a wide variety of uses in textile and paper industry, it is highly beneficial to study the application of this locally and widely grown plant species for the sustainable development.

Wed. 11:00 Ecosystems session room 2
Natural Products and Ecotoxicology

Inhibition of Primary Colonizers by Marine Surface-Associated Bacteria

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Surfaces immersed in seawater rapidly accumulate a complex biofouling community and bacteria and diatoms are among the first organisms to foul surfaces. However marine organisms have evolved various defence mechanisms and it has been suggested that green algae of the genus Ulva rely on microbial-mediated defence systems. This study investigated the hypothesis that epiphytic bacteria present on Ulva species have antibacterial and anti-diatom activity that prevent surface fouling on the algae. The antibacterial effects of epiphytic bacteria are well established, but relatively little is known about their anti-diatom properties. Bacterial isolates from Ulva growing in Laucala Bay, Suva, Fiji, were obtained and tested for antibacterial and anti-diatom properties. It was found that 60% of the isolates expressed some antibacterial activity and 80% inhibited growth of the diatom Cylindrotheca fusiformis. The most inhibitory bacteria were members of the Pseudoalteromonas genus. Also showing inhibitory properties were members of the genus Bacillus, Vibrio and Shewanella. In order to determine the anti-diatom properties of marine surface-associated bacteria, a transposon mutant library of Pseudoalteromonas tunicata was generated and screened for mutants lacking in anti-diatom activity. Genetic analysis of transposon insertion sites identified three genomic regions that might be involved in anti-diatom activity. Based on this a hypothetical model of regulation of anti-diatom activity in P. tunicata was proposed. The results presented here suggest that epiphytic bacteria may indeed provide an antifouling defence to Ulva.

Wed. 11:15 Ecosystems session room 2
Natural Products and Ecotoxicology

Investigation of defence-related proteins from native squash plants and their potential applications in pharmaceutical industry and biotechnology

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Knottins are members of a growing class of cysitine knot family of proteins discovered in Rubiaceae, Violaceae and Cucurbitaceae plant families. These are small disulfide rich polypeptides with unique biological activities (anti-microbial, anti-cancer and anti-HIV). In the Indo-Asian and Pacific regions Squash plants (cucurbitaceae) are consumed as food. Recently, it has been speculated that the low incidences of cancer and other genetic diseases in these regions could potentially be attributed to the consumptions of these plants. As part of an ongoing protein discovery program at the Chemistry Strand (UPNG) native squash plants - Mormordica charantia, Tricosanthes pulliana, Tricosanthes papuana (Pulle) and Tricosanthes papuana (Pinga) were screened for knottin-type proteins. The crude phosphate buffer extracts of the fruits of these plants were subjected to LC/MS profiling and based on their retention times and mass data it was observed that they express several knottin-type proteins. An interesting discovery observed from this work involved the differential expression of proteins from two taxonomically related cucurbitaceae plants, indicating an adaptation of two distinctly different defence mechanisms by these plants. In this presentation, more details and an overview of the potential applications of these proteins in both pharmaceutical and biotechnology will be discussed. The need to comprehensively document the genetic resources of our native plant and animal species and to strategize them against evolving pest and diseases as a result of climate change will also be highlighted.

Wed. 11:20 Ecosystems session room 2
Natural Products and Ecotoxicology

Medicinal Plants from French Polynesia: Evaluation of their Free Radical Scavenging and Elastase Inhibitory Activity

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Free radical induced oxidative stress is implicated in many cellular and molecular disorders leading to various pathologies such as neurodegenerative and cardiovascular diseases, cancer or diabetes. Elastase is a serine-endoproteinase responsible for extracellular matrix degradation and inflammation processes. It is also linked to certain types of breast cancer, to COPD and cystic fibrosis. Thirty-three medicinal plant species from French Polynesia were screened for the first time to determine their free radical scavenging activity using the 1-1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging assay. In this study we used butylated hydroxyanisole (BHA) as standard. Extraction was performed in aqueous ethanol, and 15 species were found to be the most active to recombine DPPH; Ascarina polystachia (Chloranthaceae - 267.5 μM), Merremia peltata (Convolvulaceae - 60.5 μM), Weinmannia parviflora (Cunoniaceae - 21.1 μM), Macaranga taitensis (Euphorbiaceae - 23.7 μM), Homalanthus nutans (Euphorbiaceae - 26.3 μM), Ficus prolixa (Moraceae - 71 μM), Myrsine falcata (Myrsinaceae - 35.5 μM), Myrsine sp. (Myrsinaceae - 65.8 μM), Myrsine taitensis (Myrsinaceae - 72.4 μM), Ludwigia octovalvis (Onagraceae - 35.5 μM), Passiflora foetida (Passifloraceae - 158.97 μM), Coccoloba uvifera (Polygonaceae - 71.4 μM), Guettarda speciosa (Rubiaceae - 168.4 μM), Pipturus argenteus (Urticaceae - 63.2 μM) and Premna serratifolia (Verbenaceae - 112.82 μM). The crude extracts were then submitted to fractionation by increasing polarity solvents and the DPPH scavenging activity of the obtained fractions were assessed. Among them, high to medium polarity fractions proved to be the most active. Those extracts and fractions were also screened to assess their ability to inhibit élastase in an enzymatic screening test. Primary results show weak activities of the tested samples against the enzyme and a strong variability in the enzyme activity supposedly due to the broad chemical diversity of each extract and fraction.

Wed. 11:25 Ecosystems session room 2
Natural Products and Ecotoxicology

Sarasinosides of the Sponge *Amorphinopsis excavans* from Solomon Islands

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In the course of the ongoing program of CRISP on the isolation of new bioactive metabolites from marine sponges collected in the South Pacific, the study of the marine sponge *Amorphinopsis excavans* from Solomon Islands afforded a mixture of sarasinosides. Six compounds were isolated and their structures were determined thanks to LC/MS and LC/MS/MS data. Only one of these molecules was new: sarasinoside B_4, which is an isomer of sarasinoside B_1.
The structure elucidation of these compounds, which differ either by the sugar or the aglycone moiety, was carried out on the basis of 2D NMR experiments and MS/MS data. Sarasinosides consist of five sugars, e.g. *N-Ac*-galatosamine, glucose, xylose and *N-Ac*-glucosamine. The aglycone moiety differs in the presence and position of the double bonds. To our best knowledge, sarasinosides have been yet isolated only from marine sponges of the genera *Asteropus* and *Erylus*.[1−4] We report for the first time the isolation of a new sarasinoside; sarasinoside B_4 in the marine sponge species *Amorphinopsis excavans* together with five known sarasinosides.

Wed. 11:30 Ecosystems session room 2
Natural Products and Ecotoxicology

Effects of Polybrominated Diphenyl Ether on Fish: Using Zebrafish (*Danio rerio*) as an Ecotoxicological Model

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Polybrominated diphenyl ethers (PBDEs) have been extensively used as fire retardants in many types of products in the recent two decades and are now considered as emerging persistent organic contaminants. Levels of PBDEs in the environment and wildlife and human tissues continue to rise exponentially, raising concerns about potential ecological and human health risks associated with exposure to these compounds. Among the 209 congeners of PBDEs, PBDE-47 (2,2',4,4'-tetrabromodiphenyl ether) is the most abundant congener found in animal tissues such as fish. Nevertheless, little is currently known about the effects of exposure to PBDE at environmentally relevant levels on fish. In this study, juvenile zebrafish (Danio rerio) were used as an ecotoxicological model to address this issue. The experimental fish were fed food dosed with PBDE-47 or a blank from 20 post hatch (dph) through sexual maturation (∼90 dph). Survival, growth, morphology, swimming behavior, histology, and gene expression of the fish were analyzed. Molecular, physiological, and behavioral effects of PBDE on fish will be further discussed in the presentation.

Wed. 11:35 Ecosystems session room 2
Natural Products and Ecotoxicology

Ecotoxicological impacts of tributyl tin (TBT) and booster biocides (diuron and Irgarol -1051) on the carbon metabolisms of corals Galaxea sp

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Tributyltin (TBT) compound is a possible most toxic chemical intentionally introduced in the marine ecosystems. TBT was mainly introduced in the aquatic environment as a key ingredient in antifouling paints. A prohibition of the use of organotin compounds as active ingredient in anti-fouling systems in ships by the IMO will be effective in 2008. Paint manufactures developed new compounds known as booster biocides (such as diuron and Irgarol -1051) to replace TBT. Numerous studies have reported the occurance of antifouling compounds such as TBT, diuron and Irgarol1051 in marine environments. However, very little is known on the adverse effects antifouling compounds in corals. The main focus of this research is to determine the effects of TBT, diuron and Irgarol 1051 on inorganic carbon production (calcification) and organic carbon production (photosynthesis) of coral reefs. The results show that the photosynthesis rate and calcification rate were significantly reduced by 78% and 72% relative to the control when corals were exposed to 5000 ng/L TBT, respectively. No significant effects were observed when corals were exposed to 1000 ng/L TBT. The Photosynthesis rate of the coral was significantly reduced by 6.5% and 75.7% and 18% and 121% relative to control when the coral exposed to 1000 and 10,000 ng/L of diuron and Irgarol 1051, respectively. The calcification rate dropped to 32.7% and 98.3% relative to control when the corals were exposed to 10,000 ng/L of diuron and Irgarol 1051, respectively. The nominal sensitive concentration of TBT, Irgarol and diuron that causes the alteration of carbon metabolisms of coral are much higher than those currently reported in the coral reef waters. This study reveals that the coral reefs and adjacent aquatic ecosystems around the Ryukyu Archipelago are widely contaminated with antifouling chemicals as a fingerprint of the effects of anthropogenic activities in the coral reefs. While the levels detected in this region do not pose a threat to the carbon metabolisms of corals over a short term exposure, the consequences that might be caused by chronic exposure of the environmental relevance concentrations of these chemicals in coral reef ecosystems remains uncertain.

Wed. 11:40 Ecosystems session room 2
Natural Products and Ecotoxicology

Distribution and Possible Impacts of Toxic Organic Pollutants on Coral Reef Ecosystems around Okinawa Island, Japan

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Organic pollutants have detrimental effects on the environment. In this study we evaluated the current status of contamination with organochlorine pesticides (OCPs), organo-tin compounds (OTCs), and polychlorinated biphenyls (PCBs) in the waters in and around Okinawa Island, Japan. Possible toxicological effects of these pollutants on marine life including corals are also discussed. Concentrations of total OCPs in river water were in the range of 1.02-56.4 ng/L. Among the OCPs, {\alpha}-BHC, {\beta}-BHC, and aldrin were common in river water. OTCs detected in 30 samples of seawater were (mean,SD) monobutyl tin (MBT), 0.44{\pm}0.75 ng(Sn)/L; dibutyl tin (DBT), 1.32{\pm}2.70 ng (Sn)/L; tributyl tin (TBT), 0.722.90 ng(Sn)/L ; monophenyl tin (MPhT), 0.04{\pm}0.42 ng(Sn)/L; diphenyl tin(DPhT), 0.007 ng(Sn)/L; and triphenyl tin (TPhT), 0.013 ng (Sn)/L. Highest concentrations of TBT, 28.5 ng(Sn)/L for water and 172 ng(Sn)/g dry weight for sediment, were detected in samples from Itoman Port. Concentrations of total PCBs were 0.05-0.28 ng/L in open ocean and from 1.59 to 2.48 ng/L in coastal waters. Overall, this study shows that the coral reef ecosystems and their adjacent environments around Okinawa Island are contaminated by toxic organic contaminants (OCPs, OTCs, and PCBs). Levels of these contaminants detected in some sites have exceeded the Environmental Quality Target (EQT), which may pose a risk to health of marine life.

Wed. 11:45 Ecosystems session room 2
Natural Products and Ecotoxicology

Threats to subsistence farming by root-knot nematodes: A Fijian case study

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Root-knot nematodes infect a wide range of plants and reduce the quantity and quality of crop production. A total of 33 crops hosts, 25 good weed hosts and 13 poor weed hosts of root-knot nematodes were detected from a survey of 673 farms around Viti Levu, Fiji. The overall RKN incidence of 41% was detrmined after direct examination of plant root systems and screening of composite soil samples. The most common and damaging species found included Meloidogyne incognita, M. javanica and M. arenaria. The major threats to subsistence farming arise due to lack of awareness by farmers about root-knot nemtodes. The symptoms of root-knot nematode infection are very similar to symptoms of nurtrient deficiency thus farmers end up applying excessive fertilisers to boost agricultural production. The nematode infected plants have a redued nutrient uptake capacity because of root galls thus the excess fertilisers leach into freshwater and marine ecosystems causing more harm than good. The wide range of crop and weed hosts also lower the effectiveness of cultural pest mangement techniques used by subsistence farmers. Farm lands heavily infested with root-knot nematodes have reduced production over sucessive cultivation of susceptibe crops thus farmers leave infested farms fallow and clear up new aeras for cultivation. The nematodes therefore cause direct damage to susceptible crops and indirectly contribute to environmental problems such as soil erosion, increased leaching of nutrients and fertilisers into water ways.

Wed. 11:50 Ecosystems session room 2
Natural Products and Ecotoxicology

Burning characteristics of some preferred fuelwood tree species in Papua New Guinea

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For over 80% of 6.5 million people in Papua New Guinea, fuelwood continuous to be the main source of energy. However, comprehensive data and information on fuelwood tree species are scarce. This paper outlines experimental determination of burning characteristics including calorific values and ash content of some commonly used fuelwood tree species in Papua New Guinea. Total of 31 most preferred species from 15 families cited from 6 study sites and indicated as preferred by local users; each study site provided a list of 5 to 7 species. The calorific values exhibited by these species ranged from a minimum of 13.8 to a maximum of 35.9 kJg-1. This paper describes an investigation of factors which may affect calorific values of tree species such as age, physical and biochemical properties. Finally, the paper also advocates the merits of considering type of tree species with high calorific values during replanting fuelwood tree species in order to meet growing demand of fuelwood supply.

Wed. 14:00 Ecosystems session room 2
Biodiversity Assessment

Biodiversity at risk in freshwater ecosystems of tropical islands

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Among the many causes of biodiversity loss, species introduction is probably the more important. However, it is not easy to determine the biological cost of introduced species. Because of high endemism and isolation, tropical islands are more at risk than continental ecosystems. However, there is still a lack of knowledge concerning general pattern on freshwater fish loss of biodiversity in islands of the tropical zone. Based on a compilation of available data realized in New Caledonia, Papoua New Guinea, French Polynesia, Fiji islands, Reunion Island, Wallis and Futuna and Hawaii, we tried to establish the causes and consequences of species introduction on local fish communities in tropical islands. As predicted by the island biogeography theory, we found a significant relationship between island surface and total number of fish species and number of endemic species. However, more frightening, our results revealed that for one introduced fish species in tropical islands almost one endemic species disappeared independently of the local human population density on the island. This result seems to designate massive tourism and badly chosen introduction plans as the main reasons for diversity decrease in the tropical islands.

Wed. 14:15 Ecosystems session room 2
Biodiversity Assessment

To Sink a Continent: the Fate of Zealandia and Implications for Terrestrial Life in New Zealand and New Caledonia

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In crustal terms, New Zealand and New Caledonia are continental islands, the biggest remnants of a much larger tract of continental crust. They are emergent parts of a largely submerged eighth continent, Zealandia. In terms of area, the 2,500 metre isobath is a proxy for defining the limits of Zealandia. New Zealand and New Caledonia represent about 7% of this area, so about 93% of Zealandia is under the sea.

What happened? Why did Zealandia sink? To what extent did it sink? These questions arose from research exploring the antiquity of the land surface in the Chatham Islands (176° W, 44° S) located c.850 kilometres due east of Christchurch (South Island, New Zealand), on the Pacific Plate, well in-board of the active Australia-Pacific plate boundary that runs through mainland New Zealand.

Subsequent research on mainland New Zealand has shown that the geological evidence for continual presence of land since Zealandia rifted away from Gondwanaland c.83 Ma (million years ago)is inconclusive. Furthermore, a reasonably compelling geological argument can be made for maximum submergence c.23 Ma and acknowledges the possibility of total submergence.

This idea, the possible total submergence of Zealandia, presents a hypothetical but logical new paradigm for understanding the antiquity and origins of native biotas of New Zealand and New Caledonia. The potential implications, geological and biological, are profound. The slow sinking of a continent over a period of c. 60 million years (during Late Cretaceous to Miocene time; 83-23 Ma) is of great significance, especially within a Pacific Ocean context.

It is possible that the modern day native terrestrial biota of New Zealand is entirely the product of long distance chance dispersal and is less than 23 million years old.

Wed. 14:30 Ecosystems session room 2
Biodiversity Assessment

Weighted Linear Combination Technique for Landslide Susceptibility Assessment in the Lower Northern Thailand

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Landslides are a serious geological disaster common to almost every mountainous region in the Lower Northern Thailand. Although landslides typically occur without direct warning, comprehensive study on the understanding of their behavior by systematically collecting the statistical data including current information on environmental status is capable of receiving early warning and predicting the further natural disaster phenomenon to minimize landslide hazards and identify where potential landslides can occur. The May 2006 landslide-debris flow at Lablae district, triggered by unusually extremely heavy rain, has seriously damaged both the life and properties. The major aim of this study is to assess the landslide susceptibility for deriving landslide susceptibility map of in Lablae distric, Uttaradit province, Lower Nothern Thailand using a geographic information system (GIS) based weighted linear combination (WLC) model. The information on the past landslide in May 2006 derives from a landslide inventory map obtained by detailed field surveys and by analysis of SPOT-5 XS images. The degree of land suitability for landslide was determined using a range of geo-pedological, topographical, and climatic factors. The final result of landslide susceptibility map was classified into five classes, i.e., very high, high, moderate, low susceptibility, and area of high slope stability. The mountainous environment of Lablae district was mostly high susceptible area to landslide. Resrults indicate that topographical factors played the key factor contributing to the landslide phenonenon, whereas, the maximum daily rainfall was the triggering variable influencing landslide. Since landslide behavior is varies from place to place, forecasting landslides are concerning difficult to assess the precision and accuracy of the model. Sufficient information on soil properties, lithology, and land management are needed at micro level. The output susceptibility map can provide significant information for providing an appropriate prevention and mitigation strategies in order to minimize the destructive impact of landslide.

Wed. 14:45 Ecosystems session room 2
Biodiversity Assessment

Freshwater Invertebrate Assemblages in Fijian Rivers

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Freshwater ecosystems in Pacific Island countries, like Fiji, are currently under substantial threat from anthropogenic modification of surrounding land. There is a strong and immediate need to raise awareness of the long-term consequences of these actions, and to provide local government agencies with the support and information necessary to enforce regulations and work collaboratively in partnership with local communities. The current project involves surveys of several Fijian rivers to examine freshwater invertebrate assemblages in respect to environmental parameters and surrounding land use. Data was collected utilizing standard methods, particularly those recommended by a Fijian Stream-Health Monitoring & Assessment Kit developed the New Zealand National Institute of Water & Atmospheric Research. The investigations found differences in the invertebrate assemblages in rivers with similar environmental parameters, such as riverbed substrate type, but different surrounding land use. There is also a difference in invertebrate assemblages among rivers where both wet and dry season were investigated. This study indicates that, with appropriate sampling design, freshwater invertebrate assemblages can be successfully used as relatively low-cost bioindicators of Fijian river system health.

Wed. 15:00 Ecosystems session room 2
Biodiversity Assessment

Geographical pattern of diversity in the intertidal fish assemblages of the Ryukyu Islands, Japan

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Geographical variation in diversity and community structure of intertidal fishes were examined in the Ryukyu Islands (28 sites, 12 islands), subtropical region of southwestern Japan. The observation was also carried out in Mainland Japan (5 sites) as the temperate region for comparison with the Ryukyus. In the present study, relatively small tidepools ($<1m^2$ surface area) were observed 20-30 numbers on each sampling site. All fishes in the tidepools were collected by a hand net and species, number and body sizes were recorded. The species and family richness of communities tended to increase towards the lower latitude. Species increase in relation to tidepool surface area and relative abundance patterns (based on number of individuals) were not significantly different between most sites. Although the similarity of family composition did not show any relation to the geographical distance of each site, similarity of species composition was negatively co-related with geographical distances. The trend was emphasised when data included Mainland. However, further analysis revealed that the trend is mainly due to the effect of species replacement between Mainland and Ryukyus rather than the distance decay pattern. In the southern area of the species replacement breakpoint, most temperate species probably cannot disperse due to the barrier of the ocean current. Smaller tidepools in the Ryukyu Islands are considered to have more severe environmental conditions for fishes than those in the temperate areas. In contrast, with the intuitive expectation, the species accumulation analysis showed that some fishes, especially Blenniidae, in the Ryukyu Islands could utilise smaller tidepools than those in the mainland. Such variation in tidepool utilisation may reinforce species diversity in the Ryukyu Islands.

Wed. 15:15 Ecosystems session room 2
Biodiversity Assessment

Submarine Substrate and Biodiversity Mapping using Multiscale Analysis of Bathymetric and Backscatter data - Examples from Cook Strait and the Kermadec Ridge, New Zealand

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The assessment of resources associated with submarine habitat can only be achieve through the processing and interpretation of remote-sensed data acquired at large scale. Because increases in the habitat variety is associated with species diversity, object-oriented seafloor classification based on morphometric analyses bathymetry and backscatter data have the potential to provide information on the fine-scale interrelationships between geology and benthic habitats at local and regional scale. Seafloor complexity is classified by adapting morphometry theory developed by terrestrial ecologists. The fuzzy classification maps are scale-independent and have assigned levels of uncertainty. Physical and biological processes acting on the seabed are highly correlated with bathymetric features, and can be predictors of habitat suitability, community composition and species distribution and abundance. After processing, the calibrated level of backscatter, which is related to grain size and small-scale topography, provides information on substrate composition and roughness. The data demonstrate the potential of quantitative backscatter signal analysis by emphasising topographic and geological features otherwise not recognised with conventional surveying. Backscatter image segmentation from colour, shape, smoothness, compactness and texture are applied at various scales and integrated with Grey Level Co-occurrence Matrix to identify homogeneous regions in terms of acoustical response. The object-oriented technique enables us to map the distribution of marine habitats and generates measures of the classification uncertainty and reliability. The results provide an improved understanding of the utility of different marine biophysical variables as surrogates for benthic habitats, and promote the use of spatial uncertainty techniques to assess the application of the methods for biodiversity assessment. We present examples from Cook Strait and the Kermadec Arc, New Zealand, where multibeam data are augmented by extensive geological data and seafloor photos, which provides opportunity to ground-truth and quantify the integrated use of multibeam bathymetry and backscatter signal. The method has potential to be used for resource evaluation.

Wed. 15:30 Ecosystems session room 2
Biodiversity Assessment

Moorea Biocode Project

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Breakthroughs in ecology are not coming quickly enough to solve the twin crises of climate change and mass extinction. The failure is especially stark when compared to the extraordinary advances in molecular biology and consequent benefits for human health. With the contribution of molecular biology to medicine as its inspiration, Biocode is part of a suite of programs based in Moorea, French Polynesia, aiming to stimulate a similar revolution in ecology for the benefit of conservation. The overarching outcome of the Moorea Biocode Project (MBP) is the acceleration of ecological discovery through the model ecosystem approach, reducing 'biodiversity bias' (towards certain life stages and taxa) in research, and enabling more innovation in conservation.
Specifically, we are genetically barcoding every non-microbial species on Moorea creating a professionally produced, verifiable (vouchered) 'All Taxa Biotic Inventory' (ATBI) of the entire ecosystem, together with the informatics services needed for ATBI and biocode-enabled research in Model Ecosystems.

Wed. 15:45 Ecosystems session room 2
Biodiversity Assessment

Using genetic biocode data to test models of community assembly and speciation with a hierarchical approximate Bayesian computation framework

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Knowledge of island biodiversity and the population-level genetic composition of island species can provide insights into the history of how island ecosystems were established and how species within those ecosystems evolved after they were established. This knowledge of evolutionary and ecological history of island communities can then provide insight into how island species and communities respond to climate change, invasions, and the possible outcomes of combining species into communities that have no current or historic analogs. The Moorea Biocode project will provide a unique opportunity to accomplish these broadly interesting scientific goals by yielding DNA sequence data at the mtDNA CO1 locus from every species of "macro-biota" within the ecosystem of the French Polynesian island of Moorea. The beginning phase of this project has focused on all reef fishes, marine invertebrates and terrestrial arthropods. However, the analysis of DNA biocode data from many multiple individuals of many (i.e., 50 - 500) species presents analytical and computational challenges. Here we present and demonstrate an analytical and computational framework that can handle such large scale data sets while incorporating genetic coalescent variance as well as uncertainty and variability in a suite of important demographic factors that vary in magnitude across taxa (i.e. population sizes, dispersal rates, mutation rates, and island colonization times). This hierarchical approximate Bayesian computation (HABC) framework uses coalescent simulations under a range of demographic models and can yield inferences about colonization patterns across co-distributed island taxa while allowing for demographic differences across these taxa. The HABC approach will be used to test controversial community assembly models by inferring temporal patterns of island colonization and invasion given biocode data from multiple gastropod species that are now co-distributed across parts of French Polynesia and the Marquesias archipelago.

Wed. 16:30 Ecosystems session room 2
Biodiversity Assessment

DNA barcoding approach assesses insects' biodiversity hotspots for conservation priorities in New Caledonia

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Nowadays biodiversity represents a considerable scientific, social, and economic stake. Its study appears as a priority, particularly in regions which count numerous vulnerable and endemic species. In New Caledonia, a worldwide biodiversity hotspot, an interesting point is the rate of endemism, which is extremely important in various groups (plants, vertebrates and invertebrates), whether it is at a regional scale (endemic species to the archipelago) or local scale (micro endemism linked to specific biotopes, often threatened). Scientists recently estimated that in 150 years, more than 70% of original vegetation in New Caledonia has disappeared. Reasons are numerous: multiplication of forest fires, introduction of invasive species, and destruction of biotopes owing to a growing human activity. Forest biotopes have been especially deteriorated; as a consequence only 2% of the original dry forest remains. It is therefore extremely urgent and important to identify forests-relics providing a particular interest in conservation biology. In this context, we propose to use a group of insects as a model system. In Tenebrionidae (Coleoptera), 215 of the 234 known species of New Caledonia are endemic. Within this group, there are several communities (group of species belonging to the same genus) which are specifically linked to forest circles (grubs developing only in wood). Most of these species are extremely vulnerable, because pledged in isolated forested patches potentially threatened by fire; thus studying this group therefore represents a particular interest in conservation biology. Here we propose a DNA barcoding approach (markers: COI, Cyt b, 12S) to (i) identify and delimit relations between endemic species, (ii) estimate species diversity within threatened patches of forest that may serve as a guideline to draw conservation plans. Such molecular studies can be used for other model systems, thus providing a tool that can be generalized to other areas of interest in the Pacific.

Wed. 16:35 Ecosystems session room 2
Biodiversity Assessment

L'analyse éco-régionale du milieu marin en Polynésie française

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L'analyse éco régionale est un outil de réflexion dont l'objectif est d'aider la Polynésie française à établir une stratégie de protection et de gestion du milieu naturel marin. Dans un premier temps, les informations relatives à la richesse biologique et au fonctionnement de l'écosystème marin ont été réunis afin d'identifier les sites d'intérêt écologique prioritaire. Ce travail a été réalisé à partir d'analyses bibliographiques ; d'interviews et d'échanges avec les experts des différents organismes scientifiques, services techniques du gouvernement et de l'Etat ; des ONG environnementales ; des représentants des populations locales et des opérateurs privés ainsi que toutes autres personnes ou structures susceptibles d'avoir accès à des données scientifiques ou des connaissances traditionnelles. Cette synthèse des connaissances a été informatisée par thème dans des couches d'informations superposables dont l'ensemble constitue un Système d'Information Géographique (SIG). Ensuite, le croisement de ces données avec les renseignements socio-économiques relatifs aux pressions et usages qui s'exercent sur ces milieux permettront de localiser des aires prioritaires qui nécessitent une gestion ou une protection particulière. Enfin, la confrontation de ces résultats avec les gestions actuelles et le rassemblement de tout les acteurs permettront d'établir une vision et une stratégie communes pour leur conservation.

Wed. 16:40 Ecosystems session room 2
Biodiversity Assessment

Les cartes cognitives: un outil pertinent pour initier un processus de gestion intégrée des zones côtières pour des écosystèmes lagonaires sous pression : une application en Nouvelle Calédonie

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Les diverses pressions subies par les écosystèmes lagonaires imposent de comprendre leur complexité pour tenter de les gérer durablement. Cette complexité peut être abordée en capturant les perceptions plurielles proposées par plusieurs détenteurs de connaissances scientifiques et profanes. Une méthodologie combinant des cartes cognitives et une ontologie appliquée au lagon nord-ouest de Nouvelle Calédonie a permis de construire et comparer ces différentes visions. Après une présentation de cette méthode et son application, cet article vise à montrer l'intérêt de cette approche comme une aide à la compréhension mutuelle des partenaires publics et privés, phase préalable à toute gestion intégrée de zones côtières. Cette méthode semble convenir plus particulièrement aux îles du Pacifique pour lesquelles les connaissances empiriques et savoirs locaux sont trop rarement intégrés dans les processus de décisions sur le littoral et les ressources halieutiques.

Wed. 16:45 Ecosystems session room 2
Biodiversity Assessment

Mapping Forest Desertification In Bulolo District Of Morobe Province. Papua New Guinea
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There have been a number of studies conducted in the country on Forest Desertification using GIS and Remote Sensing, although there is less information available to verify whether the current logging activities in the country (PNG) has also play a role in the desertification of the forest. The study was focused on Forest Desertification in the Bulolo District of Morobe Province as a result of the continuous logging activities in the area. The aim of the study was to use the Geographical Information Systems (GIS) software to classify and analyze the satellite image of forest cover change due to deforestation through logging activities which is proved to be a contributing factor to desertification in the Bulolo District. The current logging harvesting rate in the area was also analyzed during the research and found to be a great concern.

Wed. 16:50 Ecosystems session room 2
Biodiversity Assessment

Recent Terrestrial Biodiversity Survey of the Northern Lau Group of Islands, Fiji Islands
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A terrestrial biodiversity survey of islands of the Northern Lau Group in the Eastern Fiji Islands was carried out between September 14 and October 2, 2007. A total of 18 Islands were surveyed. Of the twelve species of terrestrial mammals recorded, two native species are listed as threatened. Eleven of 15 reported reptile species were recorded, with Emoia nigra being a new record for the Lau group. A total of 47 bird species were found on 10 island or island groups including 32 land birds, six species that are endemic to Fiji and eight that are regional endemics. Thirteen butterfly species (roughly 30% of all known Fiji butterflies) including three endemic species were found. Prior to this survey, only 219 vascular plant species had been recorded for northern Lau. The 2007 survey identified an additional 120 new records, nine of which have not been identified to the species level and three of which may be new to science. Wailagilala Atoll is an important, relatively pristine atoll, with relatively undisturbed littoral forest and a rich native flora compared to other Pacific atolls. Other important almost pristine raised limestone or makatea islands include Kiboboiloma and Kibobolevu, the three Sovu islets, Evuevu in the Qilaqila Bay of islands, Namalata and Susui, Tuvuca and Cikobia. Based on the survey results, five islands or island groups can be added to Fiji's Sites of National Conservation Significance. These include Tuvuca (based on plants and vegetation), Namalata (plants, vegetation and aesthetic value), Susui (plants, vegetation and turtles), Qilaqila Bay of Islands (plants, vegetation and aesthetic value), and Nukutolu Islets (birds). The outcomes of the terrestrial survey highlight the richness of the biodiversity and endemism of the northern Lau group as well as the threats faced by the region from invasive species, detrimental anthropogenic activities including agriculture and cattle grazing and the use of inappropriate land-use husbandry

Wed. 16:55 Ecosystems session room 2
Biodiversity Assessment

La végétation marquisienne originelle et l'indigénat de certains arbres clés

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Brown, 1931 & 1935 ; Brown & Brown, 1931 ; Decker, 1970 ; Schäfer, 1977 ; Hallé, 1978 ; Florence & Lorence, 1997 ont étudié la flore des îles Marquises et se sont souvent essayé parallèlement à reconstituer leur végétation originelle. Toutefois on remarque que l'essentiel des zones étudiées se concentre dans les basses vallées habitées, dans les montagnes ainsi que dans les petites îles inhabitées. Les formations végétales des zones sèches et des moyenne et hautes vallées des îles principales semblent ainsi avoir été sous prospectées.
A partir de leur analyse de la végétation, ces naturalistes ont développé des hypothèses contradictoires sur l'origine biogéographique des plantes rencontrées et donc sur l'état de naturalité des formations végétales actuelles. Ces hypothèses apparaissent finalement établies sur peu d'éléments et le fait qu'elles soient divergentes confirme l'absence de réelle méthodologie.
L'utilisation de nouvelles sources d'information semble donc pertinente afin de progresser dans nos connaissance sur l'origine des espèces caractéristiques des formations végétales marquisiennes. Il est ainsi proposé de s'appuyer davantage sur les études des zones sèches ou "terres-désertes" des pentes externe des principales îles. En effet, ces planèzes en pente douce du niveau de la mer jusqu'au sommet des îles permettent d'étudier précisément l'étagement. Elles sont également comparativement moins dégradées que les vallées plus humides car n'ont jamais été très peuplées. Par ailleurs, ces investigations botaniques peuvent aujourd'hui être recoupées par d'autres disciplines comme la palynologie, l'anthracologie ou la génétique des populations. A titre d'exemple, les statuts des arbres Hibiscus tiliaceus, Pisonia grandis, Erythrina variegata et Pandanus tectorius sont passés au crible des techniques précitées. Il est à espérer que ces études pluridisciplinaires seront amplifiées à l'avenir dans l'intérêt du botaniste et de l'archéologue, aux interrogations souvent très semblables. Enfin, ces questions constituent aujourd'hui une base de connaissance indispensable pour la conservation des patrimoines naturels et culturels marquisiens, notamment dans le cadre de l'inscription de l'archipel au patrimoine mondial de l'UNESCO.

Wed. 17:00 Ecosystems session room 2
Biodiversity Assessment

Biodiversité des champignons ectomycorhiziens des écosystèmes ultramafiques de Nouvelle-Calédonie : une richesse pour le développement durable de l'activité minière

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En Nouvelle-Calédonie, pour inscrire l'activité minière liée au nickel dans la durée, la restauration des sites miniers après exploitation est nécessaire, cela notamment afin d'éviter la dégradation des écosystèmes liés comme le lagon. Afin de réussir cette restauration, des recherches ont été engagées pour comprendre le fonctionnement du couvert végétal de ces milieux où les conditions édaphiques naturellement extrêmes sont aggravées par l'activité minière. Ces travaux ont mis en évidence l'importance des champignons ectomycorhiziens. Toutefois, l'état des connaissances de ces champignons est extrêmement fragmentaire en Nouvelle-Calédonie et la prise en compte de leur importance n'a débuté qu'en 2001 en partenariat avec le consortium d'exploitation minière KNS. Depuis cette date, cette biodiversité a été étudiée avec des outils moléculaires à partir des fructifications, des ectomycorhizes et du mycélium du sol. Ces travaux ont été réalisés dans les maquis miniers et les forêts denses humides du massif du Koniambo dominé respectivement par Tristaniopsis et Nothofagus. Des prospections mycologiques régulières ont été réalisées dans ces écosystèmes mettant en évidence une large biodiversité des genres: Albatrellus, Amanita, Cantharellus, Cortinarius, Laccaria, Lactarius, Tricholoma, Russula, Xerocomus. Trois espèces communes aux formations a Tristaniopsis et à Nothofagus : Amanita sp., Russula sp. et Xerocomus sp. ont été identifiées dans des zones de fortes pentes où l'accumulation de matières organiques est quasiment nulle. Les autres espèces seraient spécifiques soit des maquis à Tristaniopsis soit des forêts à Nothofagus suggérant un fort niveau d'endémisme. La situation des Cortinariaceae, plus de 50% des espèces suivant les saisons a été étudiée d'un point de vue phylogénétique. Le développement récent du plateau technique de biologie moléculaire de la plateforme du vivant à Nouméa permettra de progresser rapidement dans la connaissance de ces champignons.

Wed. 17:05 Ecosystems session room 2
Biodiversity Assessment

Ecological distribution of Mushrooms in Tung Slang Luang National Park, Thailand

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Mushrooms have wildly been known as sources of nutrition abundant food and used for medicinal purposes. Generally, they can be found in various kinds of ecological system. Therefore, this study aims to investigate ecological distribution of mushrooms in Tung Slang Luaung National park, which composed of five forest types, namely, dry evergreen forest, mixed deciduous forest, deciduous dipterocarp forest, pine forest, and Sawanna. During November 2007 to Semtember 2008, the surveys in forest types were done at height from mean sea level of 200-500, 500-800 and higher than 800 meters. Additionally, biophysical environment of the studied track were recorded and the plots of 20x20 meters were set to study the quantitative biodiversity in variation of plant species, height of tree, diameter at breast height (DBH.), and current condition of ecological system together with environmental factors. The survey results reveal that 65 species of mushrooms were found and their distribution depend on the forest type, elevation, and seasons. In the rainy season, the most diverse species of mushroom were found in dry evergreen forest, followed by mixed deciduous forest with bamboo, pine forest, dry dipterocarp forest, and Sawanna, respectively. The living mushrooms rarely found in Sawanna in winter and summer. However, in this type of forest, the diversity of mushroom species was also less in rainy season. Moreover, living mushrooms could be seen in dried climate only in dry evergreen forest, mixed deciduous forest, and pine forest. This may suggested that the environmental factors, particularly, climate may contribute to diversity of mushroom species and that might effect to the quantity and properties of immunomodulartory compounds. However, future studies on relationship between environmental variables and ecological system are nessessary to understand the spatial patterns of mushroom diversity and communities in tropical forest of Thailand.

Wed. 17:10 Ecosystems session room 2
Biodiversity Assessment

Coral biodiversity and reef condition in the northwest lagoon of New Caledonia

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The lagoons of New Caledonia have been designated as a World Heritage Site. A vital component to maintaining the integrity of the site is effective conservation and management of the coral reefs. To this end, data on coral biodiversity and reef condition is necessary for monitoring and to inform adaptive management. Here we report on the patterns of coral biodiversity and the condition of reefs in the northwestern lagoon area, from Yandé to Koumac. Further, natural and anthropogenic factors are examined that could explain some of the observed trends in coral diversity and reef condition. Sixty-two reef sites covering a range of reef classes were assessed using standard underwater survey techniques including photo-documentation and specimen collection. At each site the number of coral species and indicators of reef condition (e.g. evidence of stress, percent coral cover) were recorded. A total of 322 species were observed with an average of 63.8 species per site and a range of 22 -117 per site. Depth range was a significant factor with inshore reefs characterized by smaller depth ranges having less species. Several trends included a significant increase in coral species diversity northwards and away from the mainland corresponding to a decrease in human impacts. Predictably reef condition followed a similar trend with healthier sites in less populated areas. Percent live coral cover varied across sites and depth, ranging from 6% - 91%. Evidence of fishing activity, noted on 38.7% of the sites surveyed, was the most commonly observed stressor. Although observed on less sites (22.6% of the sites surveyed), sedimentation stress appeared to cause the most extensive damage especially on sites adjacent to mining operations. Further monitoring and management actions are required especially to address the fishing and mining impacts. Techniques to mitigate sediment input from mining activities are urgently recommended.

Wed. 17:15 Ecosystems session room 2
Biodiversity Assessment

Discovering Mesophotic Macroalgae in Hawaii: A Surprisingly Diverse Assemblage from the Deep

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The mesophotic (low light) coral ecosystem in Hawaii ranges from ∼50 to over 200 meter depths. An important component of this ecosystem is the macroalgal flora, ranging in size from microscopic epiphytes to large, fleshy algal blades. The geographic isolation of the Main Hawaiian Islands (MHI) is ideal for studying speciation and endemism. The mesophotic coral ecosystem provides another opportunity to explore these processes in an extreme environment. The high rate of endemism in Hawaiian macroalgae (25%) may be much higher when the deep water flora is considered. We used a combination of submersibles, remotely operated vehicles, and technical diving to survey mesophotic algae at 20 sites around the MHI. The deepest occurring alga was a filamentous green alga (Cladophora sp.) at 212 meters. Expansive macroalgal meadows of siphonous green algae were found at multiple locations around Oahu (Avrainvillea amadelpha, Udotea sp.) and the Maui Nui Island complex (Halimeda kanaloana) to 90 meters. Surprisingly, these meadows were distinct to these specific islands. Numerous new records and species of macroalgae were discovered, suggesting the deep water flora is unique from shallow water. Deep water algae previously described as endemic to the Northwestern Hawaiian Islands (e.g. Kallymenia spp., Codium spp.), were found in the MHI deep flora as well, showing some algal distributions to be fairly continuous across the Hawaiian Island chain. In contrast, other species (Halymenia spp., Grateloupia sp.) appeared unique to the MHI, or represented significant range extensions (e.g. Caulerpa filicoides, Caulerpa mexicana). Overall, the deep water flora appears to be abundant and biogeographically diverse with a combination of cold temperate, subtropical, and tropical affinities. The current study contributes greatly to our understanding of marine biodiversity and biogeography in the Pacific, and has significant implications regarding the unique nature of mesophotic coral ecosystems in Hawaii.

Wed. 9:00 Ecosystems session room 3
Conservation Ecology

Designs for Nature and People: Adapting IUCN guidelines for regional conservation planning to the Pacific context

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Conservation planning is the process of deciding on the location and configuration of conservation areas - places on the land or sea, managed to promote the persistence of natural features and processes. Allocation of resources for conservation is currently constrained by limited funding and time, as continuing pressure from threatening processes including land conversion, climate change and invasive species increases risk of extinction and habitat degradation. Conservation planning supports scientists, managers and policymakers in directing resources to areas in which benefits to biodiversity are maximised while also minimising the impact to local resource users. In the Pacific context, in which regional biodiversity represents centres of global endemism coupled with increasing vulnerability, strategic planning is needed. As part of an IUCN joint-Commission initiative, we have developed a framework, consisting of broad stages and detailed steps, for the whole process of conservation planning. By combining best-practice from the conservation literature and approaches used by organizations and agencies worldwide, we use this framework to list the tasks and decisions required for planning, implementing and managing conservation action on the ground. In this talk, we demonstrate how the framework can be adapted to highlight issues relevant to the Pacific region, particularly reconciling goals for biodiversity and sustainable development, planning conservation areas that maintain ecosystem services such as watershed protection, designing areas resilient to climate change, and considering ecological requirements of endemic species in spatial planning. We emphasize the flexibility of the framework to meet the needs of different users from a national government agency embarking on a regional planning process to a local NGO aiming to improve their own approach of designing local conservation areas.

Wed. 9:15 Ecosystems session room 3
Conservation Ecology

Evaluation de différents scénarios de zonage d'Aires Marines Protégées pour une exploitation durable des ressources halieutiques du Lagon Sud-ouest de Nouvelle-Calédonie

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Le Lagon Sud-ouest de Nouvelle-Calédonie est soumis à divers usages aux premiers rangs desquels figurent les pêches non professionnelles : récréative et de subsistance. Par suite du constat de la raréfaction des ressources halieutiques un certain nombre d'îlots ont été mis en réserve dans les années 1990 (Wantiez et al 1997). Les Aires Marines Protégées (AMP) sont en effet le principal outil de conservation de la biodiversité et de gestion des pêches dans les écosystèmes coralliens. Les espèces exploitées se caractérisent par des traits démographiques (régime alimentaire, reproduction, croissance,...) et des comportements variés, notamment en termes d'occupation de l'espace et de mobilité (Kulbicki 2006, 2007 ; Château et Wantiez 2007a, 2007b). Elles sont par ailleurs ciblées par des activités de pêche distinctes comme la ligne et la pêche sous-marine (Jollit et al. 2007). L'ensemble de ces caractéristiques et la pression de pêche subie déterminent la dynamique de ces populations. La question de l'efficacité du système de réserves actuel et de la pertinence d'envisager un plan de zonage plus global comprenant des zones tampon, des zones de protection renforcée et des fermetures saisonnières, est un enjeu majeur pour la gestion des ressources halieutiques du Lagon Sud-ouest de Nouvelle-Calédonie. Répondre à ces questions nécessite donc une approche intégrée qui prenne à la fois en compte : l'écologie des ressources et les modalités et l'intensité de la pression de pêche subie. Cette approche permet par son modèle de tester des scénarios de zonage, et ce sous différentes hypothèses de travail concernant certains paramètres encore mal estimés de l'écologie des espèces. Compte tenu des distributions, mobilité et dispersion de certaines de ces ressources et du rayon d'action des pêcheurs, le choix d'une approche spatialement explicite est un point central de cette étude.

Wed. 9:30 Ecosystems session room 3
Conservation Ecology

Indicators of Marine Protected Areas performance: a collaborative approach between managers and scientists, and application to contrasted case studies

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Marine Protected Areas (APA) are a key instrument for managing coastal ecosystems. Many international agendas foster the creation of MPA for achieving conservation of marine biodiversity, but also fisheries management and more generally management of coastal uses. Scientific advice together with the provision of adequate tools is needed to assist managers in monitoring and assessing MPA performance. For this purpose, a sound collaboration between science and policy makers is critical. A major objective of this collaboration is to define appropriate indicators in relation with detailed management objectives and actions. Indicators are intended to help setting up appropriate conservation and regulation measures or adapting existing ones. Formalizing objectives, constraints and needs for managers is a first step in this process. The second step is to test and validate candidate indicators from real field data through application to various case studies. In this paper, I present the PAMPA project that develops a specific approach to test and validate indicators of MPA performance. Indicators are related to biodiversity, resources, uses and gouvernance; they are obtained from several observation techniques and pertain to several case studies over the world. We study the relevance and reliability of these indicators for assessing progress toward the achievement of the various objectives linked to MPA management.

Wed. 9:45 Ecosystems session room 3
Conservation Ecology

Simulation of MPA scenarios governance by Bayesian Network

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Marine Protected Areas (MPA) are complex systems dealing with interacting ecological, social and economic phenomena. One of the goals of the Gaius Program is to provide tools to evaluate the efficiency of the MPA for a better governance. A Bayesian Network (or Bayesian Belief Network) is built to achieve this goal.
Bayesian Networks are powerful probabilistic and graphical modeling tools. They can handle quantitative and accurate knowledge as well as qualitative knowledge, provided by experts. They are adapted to represent and model complex systems and to manage uncertain and incomplete knowledge. The model is a causal probabilistic directed graph. The nodes represent key parameters: indicators, states variables, control parameters. They are supported by random variables associated to probabilities tables. The links between nodes represent probabilistic correlations between parameters: the existence of a link implies the existence of a conditional probability of one parameter in relation to the other.
The model will simulate MPA's governance scenarios. Scenarios are defined as combinations of measures aiming at protecting the marine environment and ensurig sustainable use of the resources. The simulation is achieved by instantiation of the nodes corresponding to the MPA characteristics and of the nodes representing the measures This instantiation modifies the probabilities of adjacent nodes, and the modification is propagated throughout the network. The output is the new probabilites tables of each indicator node which represents the ecological and socio-economic answer of the MPA to the measures. Interpretation of these indicators, and comparisons of the scenarios will be achieved thanks to multicriteria analysis.
A first model is being developed in the PGEM (Marine Management Plan) of Moorea. It will be presented and its main results discussed. The possibility of extension of this model to the other Tropical and Mediterranean case studies of Gaius will be proposed and discussed.

Wed. 10:30 Ecosystems session room 3
Conservation Ecology

La protection des lagons de Polynésie française : enjeux politiques et incertitudes juridiques

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La protection et la mise en valeur des lagons polynésiens représentent un défi majeur pour ce Pays d'outre-mer français. L'instabilité institutionnelle de la Polynésie freine le développement de politiques publiques pérennes, ainsi que l'adoption de mesures de suivi et d'évaluation. Ceci ne doit pas masquer, pour autant, la réelle volonté d'action des autorités et de leurs administrations en faveur des espaces lagonaires, conscientes de l'immense richesse qu'ils représentent et des risques liés à un manque de maîtrise et de contrôle des activités qui s'y déroulent. Au niveau juridique, les efforts entrepris se traduisent par l'adoption de nouveaux outils de gestion, complémentaires des normes et principes déjà existants en matière d'accès et d'utilisation des lagons. L'exemple des plans de gestion de l'espace maritime (PGEM) mérite une attention particulière. En effet, un PGEM se présente comme un processus d'intégration, de mise en cohérence des règles en vigueur sur le lagon, dans un but de perfectionnement et d'efficience de la gouvernance de cette zone côtière. Le cœur d'un PGEM réside dans l'instauration d'un zonage ad hoc du lagon, illustrant de la logique suivie pour garantir la conservation du milieu, sa mise en valeur et la durabilité de ses usages. Enfin, les lagons ne peuvent pas être envisagés indépendamment des parties terrestres insulaires, notamment les questions d'urbanisme et d'artificialisation de la côte. Pour ces raisons, l'approche intégrée du PGEM peut également se corréler aux terres émergées et ambitionner une politique globale et homogène à l'échelle d'une île ou d'un groupe d'îles. Ces instruments juridiques sont encore récents ou en cours d'élaboration et les fruits attendus mûrissent peu à peu. Deux cas topiques proposés dans les îles hautes (Moorea) et dans les îles basses (Fakarava) permettront de mettre en lumière des situations concrètes et les difficultés engendrées.

Wed. 10:45 Ecosystems session room 3
Conservation Ecology

Community-Based Biological Indicators and Monitoring the Success of Marine Protected Areas (MPAs): A Case Study of Korolevuiwai District, Viti Levu, Fiji Islands

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This study describes the results of an assessment of the effectiveness of community-based Marine Protected Areas (MPAs) in the Korolevuiwai District in southwest Viti Levu, Fiji Islands. Data was gathered on changes over time in the abundance of biological indicators, which included target fin-fishes, invertebrates and coral cover. The indicators were selected by the communities themselves because of their subsistence, commercial and ecological value. The study compared two datasets: "baseline data" collected in 2004 and data collected in 2007, both of which were collected between July and November during rising to high tides. Preliminary results show that the biological indicators provide valuable information for assessing the effectiveness of local MPAs. Common food fish such as emperors (Lethrinidae), snappers (Lutjanidae) and groupers (Serranidae) increased in numbers within the MPAs over the three-year study period, and herbivorous fishes like rabbitfishes (Siganidae) and surgeonfishes (Ancanthuridae) increased in both the MPAs and non-MPAs, which resulted in significant reduction in algal cover and a corresponding increase in live coral cover. The results have encouraged the local communities to increase their efforts to develop management plans and strengthen village governance related to fisheries management. The studies also show that the selection of appropriate biological indicators is critical for evaluating the effectiveness of village MPAs and that the best indicators are species that are easily identified by the communities, share a common name, have particular value to the communities, or are territorial in the fishing grounds. The MPAs of Korolevuiwai have shown to be an effective tool for managing marine resources and protecting natural wealth for future livelihoods. This goal however cannot be accomplished without proper monitoring and evaluations and the selection of appropriate indicator species for a particular site that can be used for assessing ecological changes in the coastal ecosystem.

Wed. 11:00 Ecosystems session room 3
Conservation Ecology

Management priorities for 700 of New Zealand's most threatened species: a cost-effectiveness approach to priority setting

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The cost-effective management of threatened species is usually limited by the lack of a systematic framework for prioritising actions. The academic literature dedicated to systematic priority setting usually recommends ranking species on level of endangerment, evolutionary distinctiveness, ecological importance or social significance. These approaches make the unrealistic assumptions that all management actions cost the same and have equal likelihood of succeeding. These assumptions will result in the misallocation of scarce conservation resources and, potentially, unnecessary losses. Here, we present a formal and systematic framework to optimise resource allocation among threatened species where cost of management, the technical capacity to manage, and potential for species' recovery are considered simultaneously. We present the results of ranking management actions for 700 of New Zealand's threatened species. We demonstrate that efficiency in spending is substantially improved and, hence, the number of species managed and the expected overall benefit to threatened species is increased remarkably. In addition, we identify generalities in the management plans within taxonomic groups and threat categories. No work of this scale has been undertaken in any country using optimal resource allocation theory, yet all countries face similar issues in determining how to make best use of limited resources.

Wed. 11:15 Ecosystems session room 3
Conservation Ecology

Distance makes diversity grow stronger?

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The economic resources for biodiversity conservation are limited, which often forces managers to choose strategies that maximize conservation outcomes within financial constraints. Threatened species often exist in a small number of isolated subpopulations and a strategic approach for management may be to allocate limited funds to only a subset of these subpopulations. A good example of this is the need to manage individual islands within an archipelago that support colonies of threatened endemic birds. One approach for choosing a subset of areas to manage is the use of genetic divergence indices, allowing the greatest genetic diversity to be protected for a given budget. However, these methods can be costly, both in terms of time and money. In this project we investigated whether geographic distance between islands can be used as a surrogate of genetic diversity enabling managers to choose which island subpopulations to invest in to maximise genetic diversity of a protected threatened species. We explore this problem using divergence data on subpopulations of the Vanuatu white-eye (Zosterops flavifrons) within the Vanuatu archipelago. Initial results show that we can retain very similar levels of diversity using maximal geographic distance to choose which subset islands to protect as using genetic divergence indices, suggesting that maximal geographic distance may be an effective surrogate for costly genetic approaches. The identification of such a simple and inexpensive surrogate is a significant step forward for the management of threatened species on islands worldwide, especially under the current climate of limited money and the urgency of most conservation problems.

Wed. 11:30 Ecosystems session room 3
Conservation Ecology

Advancing Island Conservation and Sustainable Livelihoods: IUCN Islands Initiative and The Pacific Ocean 2020 Challenge

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IUCN's World Conservation Congress, held in Barcelona in October 2008, resulted in a new approach from IUCN that aims to advance island conservation and sustainable livelihoods through the IUCN Islands Initiative and The Pacific Ocean 2020 Challenge.The IUCN Islands Initiative aims to contribute towards island conservation and ecosystem management through knowledge and experience of its global membership, the expertise of its Commissions, and the technicalskills and capacities of its staff and partners. The Initiative will work with islands across the world, although with a particular focus on the Caribbean,Indian Ocean, Mediterranean and Oceania regions. The Islands Initiative will complement and support The Global Island Partnership (GLISPA) activities of IUCN and GLISPA partners.Building upon the Islands Initiative, IUCN Oceania is leading an ambitious project to identify the threats and impacts to the Pacific Ocean and develop and implement solutions. The Pacific Ocean 2020 Challenge recognises thePacific Ocean as a single ecosystem, comprised of many parts, a common resource for all parties and a natural asset with huge global value. The Challenge aims to raise the resources and commitment required to develop and implement along-term, comprehensive and cohesive strategy and action plan to curb the impacts on the Pacific Ocean ecosystems and the resulting negative impacts on the Pacific Ocean region and the globe. Facilitated by IUCN Oceania and key partners, the Pacific Ocean 2020 Challenge will work together with regional organisations, government decision-makers, the private sector and non-government organisations with a stake in the Pacific Ocean. Key targets of The Pacific Ocean 2020 Challenge will be highlighted,including: (a) the Pacific Scientific Consensus Statement, (b) The Pacific OceanReport, (c) Pacific Ocean Trust Fund, and (d) Biennial High Level Summit for the Pacific.

Wed. 11:35 Ecosystems session room 3
Conservation Ecology

Distribution, motivations and perceptions of informal users in a coral reef Marine Protected Areas (MPA): Survey methodology and analysis

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Under an appropriate design, MPA can meet several objectives of coastal ecosystem management: biodiversity conservation, fisheries management ant management of recreational uses. Each of these uses may impact biodiversity and resources, directly or/and indirectly. MPA design must ensure that the practice and spatial distribution of these uses is compatible with MPA objectives. The increased frequentation around protected areas resulting from MPA existence may counteract expected MPA benefits. Thus the assessment of MPA efficiency for biodiversity and resources conservation, must account for MPA effects on uses. This study is part of the PAMPA project (Indicators of Marine Protected Area Performance for the Management of Coastal Ecosystems, Resources and their Uses), which objective is to validate indicators of MPA performance that related to biodiversity, resources, uses and gouvernance. It was carried out in the "Parc du Lagon Sud" located in front of Noumea, New-Caledonia. We propose a comprehensive methodology to evaluate and characterize lagoon frequentation incorporating reserves and to analyse users motivations and perceptions and to derive corresponding indicators of MPA impacts on uses. Surveys were designed and realized from March to September with the boat and crew from the Service de Protection du Lagon (Direction de l'Environnement, Province Sud) and from IRD. The survey includes an assessment of lagoon frequentation and interviews of recreational users encountered on islets and for fishers. Questionnaires deal with user motivations and perceptions and fishing activities. Surveys were realized in protected and unprotected islets and the lagoon in between. Results provide a comprehensive picture of lagoon frequentation by recreational users and informal fisheries. They inform about the knowledge about MPA and fisheries regulations knowledge, and users perceptions in this respect. Users' motivations were analysed with respect to several factors include MPA existence. Finally, fishing activities could be characterized.

Wed. 11:40 Ecosystems session room 3
Conservation Ecology

High Definition Video System for monitoring biodiversity in Marine Protected Areas

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Marine Protected Areas (MPA) are considered as appropriate management tools for the conservation of the marine biodiversity. However it is necessary to evaluate their effectiveness in this respect and to propose adequate tools for monitoring biodiversity. Monitoring and assessment of biodiversity in and around MPA requires non-destructive observation methods. This is generally achieved by underwater visual census (UVC) made by divers. Advantages and disadvantages of this method have been reported in several papers, e.g. some species are not recorded well and fish behaviour with respect to the diver. In this paper, we show a recently developed unbaited rotating High Definition video system, which we tested in the lagoons of New Caledonia. Four hundred video stations were realised both within and outside marine reserves and in a variety of habitats. We compare this technique to UVC in terms of biodiversity indices, implementation costs and constraints. The analysis of video images shows that the technique enables to observe and count the abundance of a large fraction of the fish assemblage and to quantify substrate cover and habitat. Video and UVC techniques appear complementary to monitor biodiversity, particularly in coral reef ecosystems.

Wed. 11:45 Ecosystems session room 3
Conservation Ecology

Testing coral reef habitat maps as surrogates for species representation in MPA networks. A Wallis Island case study

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To reach effective coral reef conservation, new strategies are required to increase the pace of implementation of marine protected areas (MPA). MPA are now implemented at various management and decision-power levels, from local customary decisions at village-level up to governmental national-level decisions, but all levels need decision support tools and information to optimize the process. The criteria leading to the definition of a network of MPAs can be very different and sometimes in conflict. However, it is widely recommended that the network should conserve a vast array of biological species selected for their intrinsic value in terms of representativeness, rarity, endemicity, etc... The problem is that knowledge on spatial distribution of these species remains scarce. Gaps are unfortunately far more frequent than data occurrences. The increasing availability and affordability of remotely sensed habitat maps offer the possibility to design relevant spatially explicit management scheme without using directly species-level information, but geomorphological, structural, architectural and benthic cover information instead. However, to still fulfill the required species-level criteria, it is necessary to test the surrogacy power of habitats and habitat maps in representing species-level criteria. Demonstrating the efficiency of this approach could drastically change the current approaches for coral reef conservation and enhance MPA implementation worldwide. We tested this approach for Wallis Island using a unique array of recent biological field data provided by numerous collaborators and compiled into a GIS, and a unique set of remotely sensed habitat maps of various complexities. Habitats appear as effective surrogates, but the patterns are not systematic for different taxa and scale of analysis. We review and discuss the results achieved using three different types of statistical analysis.

Wed. 11:50 Ecosystems session room 3
Conservation Ecology

Introduction to the SEA-WP project: Biodiversity conservation strategies based on regional reef connectivity and environmental load assessment in the South-East Asia - Western Pacific (SEA-WP) region

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The biodiversity hotspot of the SEA-WP region is deeply threatened, especially due to human impacts on environment and global climatic change. But, the richness of its coral reef ecosystems presents a strong interest for both global biodiversity conservation and local human community development. Then, their conservation became a primary concern. However, marine biodiversity management in SEA-WP region requires the elaboration of a global management plan based on international coordination, due to connectivity existing across this island-studded region which results especially from the pelagic larval phase of many species. This project aims to provide useful information concerning larval dispersal pattern and reef connectivity in the SEA-WP region, and then to contribute to the elaboration of global management and conservation strategies, especially by potential Marine Protected Areas (MPAs) identification. This project, funded by Ministry of the Environment in Japan for a 3-year period from summer 2008 to March 2011, is based on numerical simulations of larval dispersal with bio-physical models and genetic analyses of meta-population dynamics using both microsatellite and mtDNA markers. An extended collaboration network facilitates us carrying out sampling campaigns and environmental experiments in numerous countries: Japan (Okinawa Archipelago), Taiwan, Philippines, Indonesia, Papua New Guinea, and French Polynesia (control region). We chose to work on marine invertebrates and identified 10 target species: 7 holothurians, 2 starfishes (Acanthaster planci and Linckia laevigata), and 1 coral species (Heliopora coerulea). We may add an additional coral species (spawner type) to the project in a near future. The bio-physical models for numerical simulations of larval dispersal are based on a newly developed multi-nesting Indo-Pacific Ocean Circulation Model and combined with a marine ecological model, terrestrial run-off model and others. We will show some results both on numerical simulations of larval dispersal and genetic population analyses at the presentation.

Wed. 11:55 Ecosystems session room 3
Conservation Ecology

Intermediate acclimatization structure to restock the red sea urchin (Loxechinus albus) in Caleta Maitencillo (32°39'S y 72°26'), Chile

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Loxechinus albus is an important benthic fishery resource in Chile and during the past decade went through a strong exploitation, producing impairment and diminishing in the natural bank. Due to this, many institutions focused their line of research on the development of seed-production techniques in a controlled environment, for the seeds to be used later in restocking. One of the important factors that have had a negative influence in the survival rate is the poor acclimatization to the environment. The goal of this research consisted in the development of an intermediate culture system, similar to an artificial reef system for Management Areas, in order to adapt young L.albus (<20mm) before their release in to their natural environment, thus reducing the mortality rates during and after the process of seed release. To achieve this, four experiences were made (2004-2006): the first one with laboratory organisms, the other with organisms from the natural environment and the pre-acclimatization structure (LIMA=Linterna-Maitencillo), one with a protective netting and laboratory organisms in the LIMA structure, and the other one without protection filled with young organisms from the natural environment. The permanence of the young ones (<7mm) in the rocky intertidal system was low (13%), compared to the pre-acclimatized ones (>50%). In the LIMAs case, the organisms with protection showed a mortality rate of 60% in the first month of searching due to failure in proper maintenance. In the second experience, we got a better permanence in the survivorship of young ones of bigger size [>25mm (46%) and <25mm (30%)]. The restocking system with intermediate acclimatization structures must follow a basic protocol: Seeding the young ones (size 10-20mm) in LIMAs with protective netting; weekly maintenance of the protective net; Feeding with algae every two weeks; Removal of the protective net when average size is >25mm.

Wed. 13:45 Ecosystems session room 3
Conservation Ecology

Ethnobiodiversity, Taxonomy and the Future of Marine Biodiversity

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Ethnobiodiversity (knowledge, uses, beliefs, management systems, taxonomies and language that different cultures, including modern scientists, have for biodiversity) constitutes a critical foundation for conservation and sustainable use of biodiversity. A synthesis of indigenous and modern scientific taxonomies for some 1200 coral reef-related finfishes, corals and other vertebrates and invertebrates in Melanesia, Polynesia and Micronesia is presented. It is based on over 15 years of study with local communities, master fishers and fishmongers on the conservation status, uses, local names and taxonomies of marine biodiversity in New Caledonia, Solomon Islands, Fiji, Tonga, Tuvalu, Tokelau, Kiribati and French Polynesia. The studies have been a collaborative effort between The University of the South Pacific (USP), Université de Polynesie Française (UFP) in Tahiti, Institute for Research in Développement (IRD), Secretariat of the Pacific Community (SPC), University of Copenhagen Insititute of Geography and funded by the MacArthur Foundation, the Total Foundation, Coral Reef Initiative for the Pacific Islands (CRISP) and the Danish Galathea Expedition. Emphasis is placed on the need for methodologies for recording, conserving and promoting the use of indigenous ethnobiodiversity and taxonomy as an integral component of all biodiversity surveys. Such efforts will make research more useful to local communities and enrich our bio-cultural understanding of Pacific biodiversity-dependent societies. To do so requires a strong synthesis between indigenous and modern ethnobiodiversity, in particular the emerging body of up-to-date modern scientific knowledge on the status of marine and island ecosystems, processes, taxa and interlinkages between ecosystems. Without such an approach, we will probably lose most of the indigenous knowledge that has evolved over millennia in close contact with islands and the ocean. It this knowledge is lost, there may be no future for "island and ocean life", both human and non-human, as we know it today in the Pacific Islands!

Wed. 14:00 Ecosystems session room 3
Conservation Ecology

Obstacles and Prospects for Community-based Biodiversity Conservation: The Case of Solomon Islands

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Solomon Islands constitute a hotspot of rich cultural and biological diversity. The landscapes are extreme, ranging from high elevation cloud forests and mountains exceeding 2000m, to extensive areas of lowland and coastal swamp and rainforest, mangroves and some of the most extensive systems of coral reefs and lagoons in the world. These habitats also support extremely high levels of endemism and indigenous cultures that depend on the health of biodiversity. Sadly, economic and industrial developments have impacted greatly on this rich heritage. Deforestation resulting from commercial logging is a major problem, the knock-on effects of which seriously impact on local community sustainability and the health of all ecosystems, terrestrial, freshwater and marine.

Because the nature of land tenure with more than 80 percent customary ownership and a form of private land, extractive industries like logging have been able to manipulate the system to extract resources from native lands. This challenge poses both constraints and opportunities for conservation. Conservation International (CI) is working with partners in Solomon Islands to ensure that these biological treasures, and associated knowledge, are preserved and used sustainably for the benefit of future generations. Community Conservation Agreements (CCAs) are attractive alternatives that provide economic benefits from the preservation of forests and the sea. CCAs are partnerships that depend on social trust and commitment on the part of landowners and partners like CI. A CCA may agree to protect landscapes, for example Tetepare Island, or a threatened species, like leatherback turtles. Our efforts to date show that CCAs, in a society that for countless generations has depended on the environment, are effective and show promise, and build on social investment by gaining the confidence of landholding communities and on their interest in the preservation of the environment and commitment to a sustainable future. This paper describes these efforts and their conservation outcomes in the Solomon Islands.

Wed. 14:15 Ecosystems session room 3
Conservation Ecology

Characterizing and Comparing Coral Reef Fish Assemblage Inside and Outside a Marine Protected Area

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Coral reefs are a dynamic and diverse ecosystem that provides shelter and food to marine plants and animals. The main aim of the present study is to characterize and compare coral reef fish assemblage inside and outside a marine protected area in Kubulau qoliqoli. Fish assemblage includes abundance and biomass, species richness, and diversity that are influenced by different habitat characteristics. Point intercept transect (PIT) and Underwater Visual Census (UVC) techniques were used to sample 116 sites for substrate and fish respectively. The sampling effort was stratified by depth zones and habitat types. The substrate categories were classed into 5 different strata. Fish abundance and biomass were grouped into guild types based on information from FishBase. Shapiro-Wilcoxon test was used to test the normal distribution of the data. The distribution was not normal therefore fish abundance and biomass were ln(x+1) transformed and percentage benthic cover was arcsine square root transformed prior to statistical analyses. Despite the transformations sample data did not conform to normality and non-parametric techniques were used for further analysis. ANOVA was used to determine the response of trophic fish abundance and biomass to habitat types and management regimes. PRIMER (cluster, nMDS, PCA and ANOSIM) was used to characterize and compare the data on substrates and fish communities. The results showed mean trophic abundance were highest in MPA forereef habitats compared to control forereef habitats. However control backreef habitats have high abundance compared to MPA backreef habitats. This corresponds to high percentage of coral and reef matrix cover, low algae and low unconsolidated sediments cover. The fish biomass was generally higher in MPA forereef habitats compared to control habitats, except control backreef habitats compared to MPA showed high biomass. This information can be used to design marine reserve networks which have proved to assist the replenishment of degraded reefs.

Wed. 14:30 Ecosystems session room 3
Conservation Ecology

Participation, usages, appropriation : la gestion des ressources marines côtières dans la région de Koné (province Nord, Nouvelle-Calédonie)

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La préservation de la biodiversité et l'usage des ressources naturelles interagissent différemment avec les enjeux de développement selon les contextes économiques et sociopolitiques. En Nouvelle-Calédonie, le dynamisme de l'industrie du nickel soulève de nouvelles questions sur la gestion des espaces maritimes et côtiers. Des recherches pluridisciplinaires ont été réalisées dans trois communes de la Province nord, afin d'anticiper les conséquences de la construction d'un vaste complexe minier sur l'exploitation des ressources halieutiques. A partir d'enquêtes auprès de différentes catégories d'acteurs, l'analyse des enjeux de gestion met en évidence une régulation et un zonage de la pêche qui fonctionnent sur un mode informel et tacite, via une série de normes et de principes partagés. Cette vision commune définit une communauté d'appartenance à un espace structuré, malgré la pluralité des usages et des représentations. Les sources de conflits identifiées par les acteurs locaux portent surtout sur l'arrivée de nombreux usagers qui ne partageraient pas les mêmes grilles cognitives et normatives. Ces craintes s'expriment aussi en termes de pression accrue sur la ressource et d'impacts de l'immigration sur des filières de pêche en structuration. L'évaluation quantitative, qualitative et spatiale de la pêche conduit à des résultats convergents sur l'organisation de la fréquentation du lagon, la diversité des pratiques de pêche et les scénarios d'évolution des activités à court terme. Parallèlement, des initiatives impulsées par la province Nord et des usagers locaux s'inscrivent dans une logique de gestion active de la ressource et de mobilisation de l'expertise scientifique autour de questions et de zones spécifiques. Ce cas d'étude révèle les différents leviers qui pourraient être actionnés pour faire émerger une politique concertée de gestion des ressources marines locales capable de prendre en compte les normes et savoirs locaux et de répondre à des enjeux multiples.

Wed. 14:45 Ecosystems session room 3
Conservation Ecology

Social Impacts of Locally Managed Marine Areas on Coastal Communities in Fiji

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Locally managed marine protected area has been implemented in most of Fiji's customary inshore fishing areas in the last decade to address the decline in fish stocks. Despite all this effort, however, there is very limited knowledge on the impacts of these marine reserves on the livelihood of coastal communities; the group directly affected by the implementation of this management approach. Recently, a study was conducted in Fiji to gauge the impacts of these managed areas on the socioeconomic and governance levels of the local people. It also identified the critical socioeconomic and governance determining factors to the achievement of these impacts. Overall, there have been notable positive outcomes of these locally managed marine areas. The resource management through the locally managed approach has created better overall outcomes at present than those of the former system and period. For instance, there is increase in social cohesion amongst the community members and income level has increased. However, there are also challenges such as conflicts and equitable sharing of benefits that need to be addressed. The critical determining key conditions for the achievement of the positive impacts are: political support through the recognition of the rights of the community to make decisions regarding the fishing ground, availability of alternative sources of income, active participation of the community in project coordination and continuous support from outside agencies. Findings from this study can provide the basis for the design of effective marine resource management strategies in Fiji.

Wed. 15:00 Ecosystems session room 3
Conservation Ecology

Large Marine species research in Tuvalu: marrying science and local knowledge for conservation

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The diversity of large marine species, including marine mammals, is poorly understood in Tuvalu waters. Our collaborative study between the Environment departments of Tuvalu and New Zealand was initiated to address this gap in information. Multi-species cetacean, shark, turtle, and ray surveys were carried out by marine experts from New Zealand, SPREP, local government staff and traditional fishermen. Additional tagging, sighting and tagging data were collected by an in-country turtle and cetacean network that was established as part of this project. In addition, an invaluable aid to survey design and baseline knowledge was the consultation process undertaken with local fishermen to discern their knowledge of large marine species hot spots in Funafuti lagoon, species distribution, fishermen-large marine species interactions, species behavior, cultural value and initial perceptions of Tuvaluans towards large marine species sightings. The study was able to confirm numerous large marine species, including: four definite and three possible cetaceans, two different types of turtles, three rays, and five species of shark. Interviews with fishermen and locals indicated strong cultural ties and reliance on these species. Among other things it was noted that: turtles are largely hunted for cultural occasions and sale, the shark fining company may be posing a conservation threat to certain species, cetacean interactions are generally noted as positive, and sharks are the species primarily involved in fishing depredation events. This project was a positive demonstration of capacity building as noted by the active participation of Tuvaluans in data collection, planning, implementation, and monitoring. In addition this project worked towards increasing the current understanding of large species biodiversity and was inclusive of traditional knowledge. Coupling traditional and scientific knowledge is a cost effective and important approach in both increasing our understanding of biodiversity and also to aid in conservation of large marine species in Tuvalu.

Wed. 15:15 Ecosystems session room 3
Conservation Ecology

The Conservation Status and Options for the Sustainable Use and Restoration of Biodiversity on Kiritimati Atoll, Republic of Kiribati

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Kiritimati Atoll in the Line Islands of Kiribati, the largest atoll in the world, is endowed with unique, but highly threatened, habitats and living resources. It is a migratory and seabird rookery and international flyway of international significance; its limited wild and exotic plants are the basis for food, traditional medicine, and raw material security for some 6000 I-Kiribati who have been resettled on the island; and its abundant fisheries resources have been the target of sportfishers, scuba divers, longline fleets, the aquarium trade and local fishers. It is particularly renowned for the vast abundance of seabirds and bonefish, and its biodiversity and unique habitats have great the potential for ecotourism. This biodiversity inheritance has, however, been seriously degraded, first since the establishment of copra plantations in the late 1800s; secondly during the military occupation of the island and testing of nuclear devices in the 1950s by the British and Americans; and most recently due to overexploitation of resources by foreign fishing fleets, aquarium traders and for consumption by local communities. Since Kiritimati was designated the urban center for the Line and Phoenix Groups in the 1980s and a major resettlement area from the overpopulated atolls of Kiribati there has been increasing exploitation of the atoll's rich, but limited, biodiversity. Infrastructural development; continued poaching of avifauna and marine resources from protected areas; the persistence of rats and feral cats in areas of rich biodiversity; public ignorance; inadequate capacity and financial support for biodiversity conservation; and limited enforcement of existing laws are serious problems. In order to address these problems, effective management and financial mechanisms must be put in place, appropriate international initiatives engaged and public awareness of the importance of biodiversity enhanced. This study, based on studies in 2006-7, assesses the value, conservation status, unsustainable development practices and options for the protection and restoration of the biodiversity of Kiritimati Atoll, Republic of Kiribati.

Wed. 15:30 Ecosystems session room 3
Conservation Ecology

Analyzing spatial structure of recreational coastal reef fisheries in New Caledonia for management purposes

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The coral reefs in New Caledonia have long been used by local populations for nutritious, economical and recreational purposes. The recreational fisheries produce one of the most impacting effects on coral reef ecosystems, especially in the south west lagoon around Noumea the capital and economic center of the country. Indeed, in this area are concentrated 70% of private boats, 75% of them practise recreational fishing. The aim of this communication is to analyze three recreational fishery geosystems in the South West lagoon and test their suitability for environment management purposes, including AMP management.
Fishery geosystems depend on social, natural and management environments. Their identification was based on questionnaires and maps filled by fishers themselves. In 2005, 500 questionnaires and maps were collected. These data have been compared to aerial observations implemented in 2006. Spatial analyses were conducted on both methods within a Geographical Information System. Statistics such as active fishing fleet, fishing effort and total catches... were estimated on an annual basis which permitted to generate a typology of fishers. The ways of life (rural, peri-urban and urban) of fishers were found to be a major structuring factor in the spatial distribution of the activity and in the fishers' behaviour. Our observations suggested that they have been shaped by socio-economic changes since the 1900s.
Eventually, the analysis of recreational fishery geosystems validated the suitability of spatial approaches to coral reef fisheries management. These analyses provide local stakeholders with original management clues for marine resources sustainability. The experience gained in the south west coast could then be profitable to the management of the coral reef ecosystems including the monitoring of AMP and local ongoing nickel mining project. The need for management is all the more important since part of the lagoon has recently been classified as UNESCO World Heritage sites.

Wed. 15:45 Ecosystems session room 3
Conservation Ecology

Copper mine wastes disposal on coastal ecosystems: can past errors be reverted by assisted ecological restoration?

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Only few decades ago, the effect of indiscriminate and uncontrolled mine wastes disposal to the environment was not a major concern in the industry or governments, particularly in developing countries where the main focus was the economic benefits of the operations. This situation gave origin to some unprecedented modifications of both aquatic and terrestrial ecosystems, where the physical degradation of habitats was accompanied by sharp declines of biodiversity. One of these cases occurred in a coastal area of northern Chile which for decades was directly affected by initially untreated copper mine wastes, and then by sediment-free but metal rich clear waters. Efforts have been done to diminish the direct impact of those wastes, but several square kilometers of artificial tailing beaches and modified marine bottom, tens of meters deep, remain as an important part of those ecosystems. Recent findings suggest some natural recovery and the arrival of several species of algae and invertebrates, absent since the late 40's, has been recorded. However, the area is far from its native state, with most of the re-colonizing species remaining at low densities and bare rock persisting as a major difference with pristine areas in the region. A key seaweed species, the brown kelp Lessonia nigrescens, remains absent from the impacted area. Our group revealed the poor dispersal capacity displayed by the propagules (i.e. spores) of this kelp but, simultaneously, developed a system which allows "transplanting" a rocky shore with fully developed individuals, which increases the chances of restoring normal stands of *L. nigrescens*. Data supporting the benefits of an already undergoing assisted ecological restoration of the copper impacted area will be presented and discussed in terms of the foreseen drawbacks, particularly in the context of rapid copper accumulation in the tissues of both algae and invertebrates. Funded by FONDAP 1501 0001.

Wed. 16:30 Ecosystems session room 3
Conservation Ecology

Turning plans into reality: bridging the gap between region-scale conservation designs and local-scale implementation in the Asia-Pacific region

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Systematic methods for marine conservation planning are now widely applied by governments and non-government organizations around the world at a variety of spatial scales. Increasingly, these approaches are guiding investments in conservation and lifting the expectations of diverse stakeholders about what is required to adequately protect marine biodiversity. These methods have several advantages: explicit objectives; the ability to identify systems of marine conservation areas that achieve those objectives efficiently in terms of costs to people; and decisions that are transparent and defensible, especially if based on interactive, participatory decision-support software. Systematic methods are, however, still limited in several ways. Importantly, there has not been a widespread translation of regional-scale plans into local-scale effective implementation. This is particularly challenging in the Asia-Pacific region where customary tenure and other local governance arrangements must be understood and accommodated if marine biodiversity is to be effectively protected. In 2007, a new research program was established in the ARC Centre of Excellence for Coral Reef Studies. This is Program 6: Conservation planning for a sustainable future. The new program, in collaboration with other Centre programs and JCU Schools, government agencies and non-government organizations, is developing innovative, practical approaches to some of the crucial challenges for marine conservation planning. One of these challenges is the effective implementation of conservation action. We are taking bottom-up and top-down approaches to improving the connections between regional-scale marine planning and local-scale implementation. Bottom-up approaches involve understanding customary tenure and other local governance arrangements and identifying ways in which locally managed marine areas (LMMAs) can be better integrated to form complementary, connected systems that achieve regional objectives. Top-down approaches involve investigation of how data, objectives and areas of interest for regional-scale planning can be translated into effective LMMAs with the participation of local communities.

Wed. 16:45 Ecosystems session room 3
Conservation Ecology

Ecosystem-Based Management of Papahanaumokuakea Marine National Monument

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As one of the world's largest marine managed areas, the Papahanaumokuakea Marine National Monument offers an unprecedented opportunity to take incremental and informed steps toward ecosystem-based management at a large scale. To progress consistently toward an ecosystem approach to management, new information and data must be used to inform and refine management strategies and activities. This adaptive management approach is a continuous learning cycle designed to inform management actions and decision- making and represents the foundational framework for managing Papahanaumokuakea.

There are many similarities between managing at an ecosystem level and the traditional knowledge and practices implemented by Native Hawaiians to manage their natural resources. Both approaches share the view of nature as a holistic and dynamic system of interrelated parts and emphasize the need for long-term sustainability and health of our natural resources.

Understanding the Native Hawaiian worldview of ecosystems and relationships, along with traditional approaches to resource management is a fundamental concept underlying the management of Papahanaumokuakea marine ecosystems. Native Hawaiian traditional knowledge and worldview is valued for its rich base of empirical knowledge and practical methods of resource management, developed over hundreds of years of living and interacting with the lands and ocean waters of Hawai'i. These core principles include viewing ecosystems holistically, recognizing variations in space and time, and continuously building a knowledge base to inform management and successfully care for the environment.

This presentation will highlight several of the key initiatives recently undertaken by managers at Papahanaumokuakea to seek out traditional knowledge alongside western scientific perspectives to learn, adapt and manage the biodiversity and abundance of ecosystems within Papahanaumokuakea. Several case studies will be presented along with lessons-learned, outcomes and recommendations for incorporating traditional knowledge in marine conservation.

Wed. 16:50 Ecosystems session room 3
Conservation Ecology

Te Mehani 'ute'ute : un haut point de la biodiversité polynésienne menacé

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Te Mehani 'ute'ute est un des deux plateaux trachytiques de l'île de Raiatea en Polynésie française. Cette spécificité géologique majeure de l'île, soumise à des conditions climatiques rigoureuses, a permis la formation, sur des sols très fragiles, d'une végétation de type montagnarde inhabituelle à cette basse altitude (400 à 805 m).
Sur les 80 ha que couvre ce plateau bordé de falaises, la moitié des plantes vasculaires de l'île de Raiatea se développe dont 48 % sont endémiques de Polynésie française et 10 sont protégées par la réglementation du Pays. L'isolement géographique allié à des conditions écologiques particulières a, de surcroît, donné naissance à 26 plantes endémiques de ces deux plateaux, dont la plante emblématique de Raiatea, le Tiare Apetahi (*Apetahia raiateensis*) en voie de disparition, victime de sa cueillette. Par ailleurs, ce plateau abrite des colonies de pétrels de Tahiti (*Pseudobulweria rostrata*), oiseau protégé et de nombreux insectes endémiques.
Encore préservé avec seulement 16 % d'espèces végétales introduites, en comparaison avec l'ensemble de l'île où elles représentent 61 % de la flore, ce milieu sensible fait face à un début d'invasion par 7 plantes envahissantes dont le redoutable *Miconia calvescens*.
Les cochons sauvages, introduits lors des migrations polynésiennes et croisés avec des races européennes, constituent aujourd'hui la plus grande source de dégradation de l'écosystème. Ils sont à l'origine de l'érosion des sols (fouissage, souilles), de la prédation des espèces constitutives des habitats remarquables (fougères arborescentes, *Pandanus temehaniensis*) ou de la faune (oiseaux). Enfin, ils introduisent et dispersent les plantes envahissantes dans un milieu dégradé par leurs actions répétées.
En cours de classement en aire protégée, ce plateau nécessite des mesures de gestion à long terme. Sa végétation montagnarde à si basse altitude, sa flore et sa faune exceptionnelles en font un site unique et particulièrement sensible aux changements climatiques.

Wed. 16:55 Ecosystems session room 3
Conservation Ecology

Protection des Oiseaux Marins par l'Eradication de la Population de Rats du Pacifique (*Rattus exulans*) de l'îlot Teuaua, Archipel des Marquises

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Les écosystèmes insulaires sont très sensibles aux introductions d'espèces animales et végétales. Parmi les mammifères introduits, les rats représentent des prédateurs à l'origine de nombreuses extinctions locales d'espèces insulaires indigènes. La Polynésie française a été successivement colonisée par le Rat du Pacifique (*Rattus exulans*), très probablement introduit volontairement* par les Polynésiens, puis par le Rat noir (*Rattus rattus*) et le Rat surmulot (*Rattus norvegicus*), introduits par les Européens. De nombreux îlots de l'archipel des Marquises hébergent le rat du Pacifique, dont l'îlot Teuaua (5 ha), situé à 400m de l'île de Ua Huka et qui accueille l'une importante population de Sternes fuligineuses (*Sterna fuscata*). La présence en forte densité du rongeur menace la reproduction de ces oiseaux qui nichent au sol. La Société d'Ornithologie de Polynésie, qui œuvre pour l'étude et la protection des oiseaux de Polynésie française, a entrepris en 2008 l'éradication de la population de rats du Pacifique de l'îlot, en collaboration avec les équipes du projet ALIENS (Assessment and Limitation of the Impacts of Exotic species in Nationwide insular Systems). L'opération vise à collecter des informations destinées à établir la place du rongeur dans la chaine trophique micro-insulaire, et à l'éradiquer en utilisant successivement le piégeage et la lutte chimique. Cette opération, soutenue par la commune de Ua Huka et la Direction de l'Environnement de Polynésie française, a également pour but la sensibilisation, la formation et l'implication de la population locale qui sera chargée de faire respecter les règles de biosécurité nécessaires à la réussite et à la pérennité de l'éradication. Un suivi à long terme des composantes de l'écosystème qui a été précédé d'un état zéro est destiné à évaluer les conséquences de la disparition du rongeur sur le fonctionnement de l'écosystème.

*Matisoo-Smith, E. & Robins, J. H. (2004). Origins and dispersals of Pacific peoples: Evidence from mtDNA phylogenies of the Pacific rat. Proceedings of the National Academy of Sciences of the United States of America, 101, 9167-9172.

Wed. 17:00 Ecosystems session room 3
Conservation Ecology

Giant swamp taro (*Cytosperma chamissonis*) roles in food security, cultural maintenance and health in the Pacific Islands: the past, present and future

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Giant swamp taro (*Cytosperma chamissonis*) is a very important staple food crop in many of the smaller islands in the Pacific region. However, its very existence is being threatened by lifestyle changes and by climate change. Concern for both the loss in genetic diversity and associated traditional knowledge prompted a study to assess the conservation status of this crop and to identify strategies. The study was conducted in Tuvalu, Fiji and Pohnpei (Federated States of Micronesia) and focused on identifying morphological descriptors for the crop utilizing farmers' knowledge to facilitate distinguishing the different varieties. Traditional knowledge of cultivation, utilization and distribution pathways was also documented. Analysis of the traditional knowledge surveys suggested that several factors affect the choice of variety selected by farmers for cultivation, namely, food security, cultural occasions and soil type. Salt tolerant and early matured varieties were also identified to have potentials to combat the adverse impacts of climate change.

Furthermore, the study showed that limited diversity exists and cultivation is affected by the seeming preference for the more convenient imported foods. Despite the importance of this crop for food and nutritional security, cultural significance, and medicinal value, it has not been the focus of research and development, as with many crops of the Pacific. However, this study highlights that the valuable traditional knowledge associated with the cultivation and utilization of giant swamp taro will be lost without the timely recognition of the importance of this crop for the region and the implementation of appropriate interventions to ensure safe and effective conservation as well as promoting use.

Wed. 17:05 Ecosystems session room 3
Conservation Ecology

Aspects des relations entre plantes, microorganismes et métaux en milieu serpentinique. Conséquences en termes de restauration écologique en Nouvelle-Calédonie

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Les milieux serpentiniques de Nouvelle-Calédonie, caractérisés par une biodiversité exceptionnelle, sont aujourd'hui de plus en plus menacés. Une des spécificités de ces milieux est la dynamique de certains métaux (Fe, Mn, Mg, Co, Ni) dont les teneurs dans les sols sont très élevées. Cette dynamique conditionne partiellement l'originalité de la biodiversité de cet environnement. Les plantes développent différentes stratégies pour s'adapter aux sols métallifères. Certaines tendent à absorber faiblement les métaux; d'autres les absorbent normalement puis les complexent pour les inactiver, d'autres encore sont des hyperaccumulateurs de métaux. Dans tous les cas, le rôle des microorganismes de la rhizosphère et des symbiotes fongiques est déterminant. Certains groupes de bactéries de la rhizosphère agissent directement (oxydation, réduction) ou indirectement (libération d'acides) sur les métaux, en augmentant leur disponibilité dans le sol, d'où une toxicité potentielle plus grande. L'influence des bactéries sur le fer, le manganèse et le magnésium est connue et a été confirmée dans les sols ultramafiques; mais leur influence sur la disponibilité du nickel et du cobalt dans les sols n'a été mise en évidence que récemment. Cette toxicité accrue des métaux liée à l'activité microbienne rhizosphérique est un facteur sélectif à la fois pour les plantes et pour les micoorganismes associés. En plus des mécanismes physiologiques qui leurs sont propres, les plantes utilisent les champignons mycorhiziens pour lutter contre la toxicité des métaux. Ces champignons semblent, en effet, neutraliser une partie des métaux libérés dans la rhizosphère, notamment Ni. Pour assumer une telle fonction ces symbiotes se sont eux mêmes fortement adaptés aux concentrations élevées de Ni dans le sol. La connaissance de ces relations entre plantes, microorganismes et métaux permet d'orienter les techniques de restauration écologique des milieux serpentiniques dégradés par l'activité minière.

Wed. 17:10 Ecosystems session room 3
Conservation Ecology

Integrating social opportunities and constraints for conservation action into conservation planning
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A network of Marine Protected Areas (MPAs) is thought to be one of the most promising approaches to managing marine resources and protecting biodiversity. The most effective conservation outcomes, within the Coral Triangle and elsewhere in the Asia-Pacific region, have emerged from communities working together to set aside parts of their fishing grounds or areas of cultural importance, recognized though traditional knowledge to have high biological value (e.g. spawning sites). Although this ad hoc approach has enabled effective conservation action at local scales, these protected areas will have limited value to biodiversity and ecosystem services if they are small, unrepresentative of all marine habitats, and isolated from other healthy habitats. Community-based MPAs that are integrated into systems of complementary, interacting areas to achieve regional-scale objectives are more likely to provide long-term benefits for fisheries, livelihoods, biodiversity and ecosystem services. We present here a new planning approach that aims to design implementable and effective MPA networks that achieve both local and regional goals. By taking a bottom-up approach, this planning process prioritizes investment in conservation action based upon social opportunities (e.g. strong customary tenure and agreed boundaries, leadership, high social capital) and constraints (e.g. conflicts, lack of resources) as well as the biological values of areas in a regional context.

Wed. 17:15 Ecosystems session room 3
Conservation Ecology

Quelle Stratégie pour la Gestion de la Diversité Botanique de la Nouvelle-Calédonie ?
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La Nouvelle-Calédonie est reconnue comme un "hot spot" mondial de la biodiversité terrestre. Sa flore retient l'attention des botanistes depuis 150 ans, et plus récemment celle des spécialistes de la conservation. Cette flore est riche et originale (3300 espèces autochtones, de cryptogames vasculaires, endémisme 74%). A titre de comparaison Fiji, pour une même superficie, comprend 1628 espèces végétales dont 50% sont endémiques. La flore de la Nouvelle-Calédonie se distingue en outre par des phénomènes de micro-endémisme, et de fragmentation des populations d'espèces, qui compliquent considérablement sa gestion et conservation. Cette flore est encore incomplètement connue, des taxons restent à décrire, d'autres à identifier (espèces cryptiques) ou à réévaluer du point de vue génétique moléculaire. La conservation de la flore implique nécessairement la préservation des milieux qui l'abritent. A l'exemple de la forêt sèche, d'autres milieux menacés mériteraient une grande attention. C'est le cas des forêts denses humides, qui globalement renferment la plus grande part de la biodiversité néo-calédonienne (ex. 2000 espèces végétales, dont 76% sont endémiques). La réduction et la fragmentation de certaines catégories de forêts, en particulier celles de basse et moyenne altitudes sur terrains ultramafiques, dans le sud de la Grande-Terre, comme dans les massifs isolés du nord-ouest, mettent en péril la pérennité de nombreuses reliques forestières et du même coup celle de la biodiversité spécifique et génétique qu'elles contiennent. La gestion et la conservation de certaines catégories de maquis (les plus diversifiés, et ceux possédant des capacités d'évolution vers des stades forestiers), sont également à prendre prioritairement en compte. De plus, une meilleure connaissance du fonctionnement et des interactions des différentes composantes biologiques de ces milieux menacés, serait nécessaire pour élaborer des stratégies, adaptées aux particularités néo-calédoniennes, pour la gestion et la conservation de sa flore.

Wed. 17:20 Ecosystems session room 3
Conservation Ecology

Exploitative Degree Evaluation of Bay Based on PVS Framework

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The bay area as one of the most important parts of coastal zone, has endure strong human activities. Nevertheless, as the finite resource it possesses, the bay can't be exploited infinitely. Therefore, the knowledge of the exploitative degree of bay is meaningful for the further exploitation of bays, and the planning scheme setting of the remainder resources of bays. This paper aimed at the exploitation of bays, a PVS framework was proposed for the evaluation of exploitative degree of bays. In the PVS framework, P stands for Pressure which represents natural or artificial factors affected by human beings in offshore land area, intertidal zone area and offshore sea area. V stands for vulnerability; it means the sensibility of bays to pressure, and the enduring ability of changes, destruction and unuseful impacts to bays. S represents states of each component of bays, including water quality, environmental habitat and so on. Unlike the normally used PSR, DSR, and DPSIR framework, PVS framework takes the vulnerability of bays into account, and can better reflect the complex characteristics of bays. The evaluation procedure is as follows: Firstly, to choose indicators of each components of bays level by level, namely, in a sequence of pressure, vulnerability and state. Secondly, by the usage of remote sensing, statistic data, vector data and other data source, quantify or half-quantify processing was made with mathematical or experiential model. Thirdly, Delphi method was used for the further filtering of indicators, and the whole framework of indicators was formed. Fourthly, gray correlation analysis method was used to identify the weight sequence of indicator, and the Delphi method was combined to identify the final weight of each indicator. In the last of the paper, the exploitative degree of Daya Bay during 1980s and 2005 was evaluated by the method proposed.

Wed. 17:25 Ecosystems session room 3
Conservation Ecology

L'approche génétique des populations : un outil de gestion durable des ressources naturelles et de l'environnement pour la Nouvelle-Calédonie

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La gestion durable de la biodiversité des milieux naturels est tributaire d'une compréhension approfondie des "processus du vivant". Cette forme de gestion s'est aujourd'hui imposée comme un enjeu central du développement économique et humain à l'échelle mondiale. La Nouvelle-Calédonie, connue internationalement comme l'un des 10 "hot spot" de la planète avec une flore naturelle très riche dont 77 % des espèces sont endémiques, est elle aussi soumise à une activité humaine croissante à l'origine d'impacts négatifs sur ses biotopes. C'est ainsi, entre autres, que : exploitations minières, activités agricoles, et dynamiques urbaines sont à l'origine d'une dégradation des paysages, d'une perte de la biodiversité, et d'une érosion de la diversité génétique qui par relations de causes à effets mettent en danger des processus fonctionnels vitaux des écosystèmes calédoniens. Aux regards des complexités fonctionnelles et organisationnelles du monde du vivant, le suivi évolutif et adaptatif d'entités génomiques, parties constituantes des écosystèmes, apparaît aujourd'hui être une approche indicatrice pertinente des dynamiques des milieux. L'analyse au cours du temps des distributions spatiales des gènes, ainsi que de leurs expressions phénotypiques, devient donc indispensable. C'est au travers d'exemples issus de projets en cours que serons abordés les problématiques : - de dynamiques spatiales, avec le Niaouli, Melaleuca quinquenervia, plantes opportunistes des milieux récemment ouverts, - de structuration spatiale de la diversité génétique couplées à la production d'huiles essentielles, avec le Santalum austrocaledonicum, - de conservation d'espèces menacées en milieux miniers, avec le cas du Neocallitropsis pancheri, plante riche en huile essentielle qui a été fortement exploitée, et dont aujourd'hui l'aire de distribution se voit réduite du fait de l'exploitation minière.
La conduite de ces travaux a été rendue possible grâce à la mise en place d'un plateau technique de biologie moléculaire, partie prenante de la " Plate-forme du vivant de Nouvelle-Calédonie ".

Wed. 17:30 Ecosystems session room 3
Conservation Ecology

Social and Ecological Interactions of Ancient Maohi Production Systems

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Discussions about people's roles in shaping and interacting with Pacific island ecosystems, as elsewhere in the world, tend to be dichotomized in part depending on the source of the data informing the discussion. On the one hand, archaeologists and paleoecologists focus on detrimental human-induced landscape changes associated with colonization and subsequent elite-driven demands on production. On the other hand, ethnobiologists working with indigenous peoples today focus on traditional ecological knowledge and the sustainability of human interactions with the land and sea. In the Society Islands, archaeological and ethnohistoric evidence supports both models of human-landscape interaction. In this presentation, we explore the evidence for these ideas and present a model of the social and ecological interactions between the elite and non-elite based production systems of the Society Islands.

Wed. 17:35 Ecosystems session room 3
Conservation Ecology

Dating the human colonisation of Mangaia, southern Cook Islands, using the commensal Pacific rat (*Rattus exulans*)

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An accurate age for initial human settlement in East Polynesia is the key to understanding the timing and patterns of human dispersal from West Polynesia, and the ecological and social transformations that followed on each island. However, the age for initial settlement on many islands in East Polynesia remains poorly resolved and highly debated. The southern makatea island of Mangaia in the southern Cook Islands provides one such example. Whereas charcoal curves and vegetation disturbance documented in sediment records from Mangaia have been radiocarbon dated to ∼500 BC and attributed to earliest human activity, the oldest archaeological material excavated from Tangatatau, the largest rockshelter sequence on Mangaia, only dates to ∼1000 AD. This discrepancy between the different dated records has not been adequately explained, and has resulted in proposed settlement chronologies for the Cook Islands that vary by as much as 1500 years. To resolve the debate about the date of settlement in Mangaia, we use AMS radiocarbon dating of Pacific rat (*Rattus exulans*)-gnawed woody seeds of native trees, and high resolution charcoal analyses from new sediment records to pinpoint the timing of initial arrival of people on the island.

Wed. 8:15 Climate Change session room
Keynote lecture on Climate Change and Ocean Acidification

Pacific Acidification - Past, Predictions, Perceptions, and Preventions
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Ocean acidification refers to the relatively rapid change in seawater pH as the oceans absorb excess carbon dioxide from the atmosphere. The paleontological record indicates that the oceans have not experienced a similarly rapid change in pH for millions of years. While we can confidently predict future changes in ocean chemistry, we cannot yet confidently predict how marine ecosystems will respond to these changes. Therefore our perceptions of how ocean acidification will affect our ocean ecosystems are sometimes driven by untested assumptions. This presentation will address the continuum of what we know about the effects of ocean acidification on marine organisms, through what we suspect but have little evidence for. I will focus on changes in the Pacific Ocean, and will present a few untested hypotheses about what can be done to slow the process, at least locally, on coral reefs.

Wed. 9:00 Climate Change session room
Ocean Acidification

Reconstruction of paleo-pH in the sub-equatorial Pacific Ocean using boron isotopes in recifal corals *Porites* sp.: results of a seasonal field calibration in the New Caledonia Lagoon
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To better predict the ocean acidification due to industrial era and exponential increase of CO_2 releases into atmosphere and its potential impact on marine ecosystems, different works were conducted these last years to precisely constraint the past pH changes due to Ocean-Atmosphere CO_2 exchange. Among these studies, a recent laboratory work highlighted the interest of boron isotopes in tropical corals such as *Porites* sp. or Acropora sp. as a powerful tool to reconstruct with accuracy the past changes of sea surface pH (Hönisch et al., 2004). We present here preliminary results regarding a "pHseawater - δ11Bcoral" field calibration at seasonal timescale involving modern Porites sp. and surface seawater samples monthly collected outside and inside the lagoon of New Caledonia during 18 months. Seawater temperature and pH are monitored to calibrate the technique and the isotopic composition of boron is systematically analyzed for each water sample. Our results strengthen the high potential of boron isotopes to reconstruct with accuracy the seasonal changes of seawater pH on the seawater scale (SWS) with a precision of $\pm$ 0.02 pH-unit including analytical uncertainties. Thus, using mass spectrometer MC-ICPMS, the external reproducibility obtained from boron isotope measurements in 36 seawater samples is inferior to $\pm$ 0.2 o/oo. Calculations of pH were performed with a seawater boron isotopic composition of 39.9 o/oo and an isotopic fractionation factor of 0.981. Such results reinforce the potential of tropical corals *Porites* sp. to reconstruct with accuracy the paleo-pHs at high temporal resolution especially to quantify the ocean acidification due to industrial era at the tropical latitudes.
Hönisch, B. et al., 2004. Assessing scleractinian corals as recoders for paleo-pH: Empirical calibration and vital effects. Geochimica et Cosmochimica Acta, 68(18): 3675-3685.

Wed. 9:15 Climate Change session room
Ocean Acidification

Impact of Anthropogenic Carbon Penetration on pH in the Eastern South Pacific Ocean

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Using data from the 2004 BIOSOPE cruise in a highly oligotrophic area of Eastern South Pacific Ocean, we estimates of the anthropogenic carbon (C_{ant}) distribution in the upper 1000m of this region using the TrOCA method. In spite of the high variability in the anthropogenic carbon distribution, due to the complex interactions between biogeochemical and hydrographic processes in the Eastern Pacific Ocean, this work illustrates that, anthropogenic carbon is now present in the upper layers of the ocean at significant level even in oligotrophic areas and/or in CO_2 source areas for the atmosphere. The highest concentrations of C_{ant} are located around 13°S 132°W and 32°S 91°W, and their concentrations are higher than 80 μmol.kg^{-1} and 70 μmol.kg^{-1}, respectively. The lowest concentrations are observed below 800 m depth ($\leq$ 2 μmol.kg^{-1}) and at the Oxygen Minimum Zones (OMZ), mainly around 140°W (<11 μmol.kg^{-1}). The impact of such anthropogenic carbon penetration corresponds to a significant acidification with an averaged pH variation larger than 0.1 in the upper 200 m. This study unequivocally points out the importance of ocean circulation in storage (or outgassing) of anthropogenic CO2 in the ocean. As the anthropogenic CO2 penetrates into the ocean, the acidification of the ocean especially of the upper ocean becomes significant and will have in turn a large impact on marine living organisms.

Wed. 9:30 Climate Change session room
Ocean Acidification

Changes in the Oceanic Carbonate System due to Anthropogenic and Natural Changes

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Total dissolved inorganic CO_2 (TCO_2), total alkalinity (TA), pH and partial pressure of CO_2 (pCO_2) are the four parameters that are used to study the oceanic carbonate system. The World Ocean Circulation Experiment (WOCE) and the Joint Global Ocean Flux Study (JGOFS) Hydrographic Program in the 1990s and the CLIVAR/CO_2 Repeat Hydrography Program in the 2000s provide data that are used to examine the effect of changing CO_2 levels in the oceans. The results from these studies are used to quantify the effects of the uptake of anthropogenic CO_2 on the chemistry of the oceans. In addition, CO_2 levels in the ocean are affected by the distribution of water masses, by primary production and by the oxidation of organic matter. To elucidate these effects, we chose to identify the water masses using an optimum multi parameter analysis (OMP). This allows us to attribute the changes in the distribution due to the different factors. In this paper, transects in the Atlantic (A16), Pacific (P16) and Indian (I9) oceans are used to show how the pH of ocean waters is decreasing in different water masses. The decreasing pH results in shoaling of the aragonite saturation horizon. Changes observed in the thermocline are affected by oxidation of organic carbon and the dissolution of anthropogenic CO_2.

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Ocean Acidification

Calcification rates in bleached *Montastraea faveolata*: carbonate budgets under possible future scenarios

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Reef-building corals harbor symbiotic dinoflagellates of the genus Symbiodinium which influence many aspects of coral physiology, including coral calcification. Under normal physiological conditions, zooxanthellae perform photosynthesis during the day and translocate more than 95% of the net fixed carbon to the host. In *Montastraea faveolata*, one of the most abundant reef- building coral in the Caribbean, changes in photosynthesis and light utilization have been described during a bleaching event and subsequent recovery. In the present work, calcification rates in healthy and bleached *Montastraea faveolata* were measured over a daily cycle in order to estimate the extent to which bleaching affects calcification rates. Carbonate production rates largely determine the calcium carbonate budgets on reefs (balance between calcification and erosion) and it is well known that environmental changes can affect these budgets. Normal rates of deposition are much higher than rates of growth, suggesting a huge rate of physical and biological erosion. It has been suggested that a decrease in the rate of calcification as little as 5% will lead to a net loss of calcium carbonate. Here, the drastic reduction in calcification rates during the diurnal cycle in bleached *Montastraea faveolata* is discussed in the context of the increase of coral bleaching events. We will present a model of the possible effects of coral bleaching on carbonate budgets under different climate change scenarios.

Wed. 10:30 Climate Change session room
Ocean Acidification

Are all zooxanthellate scleractinian corals sensitive to ocean acidification?

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Atmospheric CO_2 partial pressure (pCO_2) is expected to increase to 700 ppm or more by the end of the present century, which will cause an increase in seawater temperature. Since pCO_2 was shown to inhibit calcification in zooxanthellate, reef-building corals, it might also affect temperate corals, such as those living in the Mediterranean Sea. Colonies of the Mediterranean coral Cladocora caespitosa were maintained under normal and elevated temperature (T and T+3°C, respectively) and pCO_2 (400 and 700 ppm, respectively) levels, alone or in combination. Temperature (13-22°C) and light (20-60 μmol m^{-2} s^{-1}) varied seasonally while pCO_2 was kept constant. Rates of photosynthesis and calcification as well as symbiont parameters were measured during two short-term (one month) experiments carried out in summer 2006 and winter 2007. Additionally, coral growth and the effective quantum yields ($\Delta F/Fm'$) were measured during a long-term (1 year) experiment from summer 2006 to summer 2007. While temperature (13-25°C) was the predominant factor controlling the physiology and growth of C. caespitosa, a doubling in pCO_2, alone or in combination with elevated temperature, had no significant effect on photosynthesis, photosynthetic efficiency and growth. This result differs from that obtained on reef-building corals which exhibit lower rates of calcification at elevated pCO_2. The lack of sensitivity of C. caespitosa to high-pCO_2 levels might be due to its slow growth rate, which seems to be more dependent on temperature than on the saturation state of calcium carbonate. These results suggest that the conventional belief that a doubling in pCO_2, alone or in combination with elevated temperature, could reduce calcification rates may not be widespread in temperate corals.

Wed. 10:45 Climate Change session room
Ocean Acidification

Effects of Ocean Acidification on Early Life Stages of Scleractinian Corals (Genus *Acropora*)

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Ocean acidification is predicted to progress with increasing atmospheric carbon dioxide concentration emitted by human activities. It is one of important future threats for marine calcifying organisms including scleractinian corals. Decalcification of corals with lowering ocean pH has been reported but the study on effects of ocean acidification on early life stages is still in its infancy. In the present study, we examined the effects of increased CO2 followed by lowered pH in seawater on (1) fertilization [sperm motility, fertilization, and embryonic development], (2) planktonic larvae [larval survival], (3) pre-settlement [completion of metamorphosis], and (4) post-settlement process [primary growth, and uptake of symbiotic algae] about *Acropora* spp. Experiments were conducted with CO2-controlled seawater (pH8.0[control], pH7.6, pH7.3, pH6.6 on total hydrogen ion concentration pH scale). Sperm flagellar motility decreased with slight decrease of ambient pH (-0.2). Fertilization was significantly low at pH6.6 but embryonic development showed similar trends among treatments. Concerning planktonic larval phase, there was no significant difference in larval survival after 7day-breeding in CO2-controlled seawater. Regarding settlement, completion of metamorphosis induced by Hym-248 was significantly higher at ambient pH level than other lower pH levels and any metamorphosed larvae were not observed at pH6.6. Primary polyp growth also decreased at lower pHs. Polyps exposed to lower pH tended to uptake symbiotic algae slower than other treatments. These results suggest that ocean acidification negatively affects not only calcification but also early life stages of corals.

Wed. 11:00 Climate Change session room
Ocean Acidification

Ocean acidification rises dissolution of dead corals by the boring microflora

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By 2100, the atmospheric pCO2 should double, increasing pCO2, decreasing pH, and reducing both carbonate ion concentration and the aragonite saturation state of seawater (Ω). Several authors suggest, based on laboratory experiments, that decreasing Ω will decrease coral calcification (30% on average). Maintenance of a coral reef ecosystem depends on the equilibrium between calcification and bioerosion. To better understand impacts of ocean acidification on coral reefs, effects of elevated pCO2 and low Ω on the activity of a major agent of bioerosion - the boring microflora - were studied on dead coral rubble, in tanks under controlled conditions and natural light (Kaneohe Bay, Hawaii) for a few days or 3 months. Two types of methods were used to obtain an elevated pCO2 and a low omega: by bubbling gas and by adding acid in tanks respectively. Before and after each treatment, dissolution rates were quantified by using microscopy and image analysis, or by measuring seawater alkalinity and pH. Results obtained under controlled conditions after 3 months of exposure revealed higher dissolution rates at elevated pCO2 (i.e. 750 ppmv) than at ambient pCO2 (0.63 kg m-2 of planar reef y-1 and 0.45 kg m-2 y-1 respectively). Results obtained under natural light during the day, revealed higher dissolution rates at $\Omega < 4$ than at $\Omega > 4$ (i.e. at high pH); these rates were similar to those obtained under controlled conditions. We estimate thus, that carbonate dissolution by the boring microflora can increase up to 50% with a doubling of aqueous pCO2 and low saturation state of aragonite. We conclude that biogenic dissolution by boring microflora can be a dominant mechanism of carbonate dissolution in a more acidic ocean and could have major negative consequences on the maintenance of coral reefs in a near future.

Wed. 11:15 Climate Change session room
Ocean Acidification

Recurrent coral bleaching in Moorea: Are thermally-sensitive corals adapting or disappearing?
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One of the most conspicuous impacts of global climate change in nature is the increasing occurrence of mass-bleaching of reef-building corals. Coral assemblages on the north coast of Moorea, French Polynesia, have experienced recurrent mass-bleaching for the last 25 years, with mass-bleaching reported in 1983, 1987, 1991, 1994, 2002, and 2007. The Adaptive Bleaching Hypothesis (ABH) proposes that corals which bleached but survived during previous episodes of thermal stress may be more resilient to similar future stresses. The purpose of this paper is to explore evidence for thermal adaptation among coral communities in Moorea. The first step of this process is to investigate the temperature profiles (the rate of warming as well as the maximum temperature experienced) of thermal anomalies that have been linked to mass-bleaching over the past 25 years. If thermal stresses are become more sever then it is unlikely we will find any clear evidence of adaptation. It is apparent that the most recent bleaching event (in 2007) resulted in only moderate bleaching and limited coral mortality, but this is more likely due to changes in coral assemblages towards bleaching-resistant corals, rather than adaptation by individual species. In the absence of thermal adaptation, it appears likely that certain corals (e.g., Acropora species) will disappear from central Pacific reefs, which will have significant consequences for reef structure and biodiversity.

Wed. 11:30 Climate Change session room
Ocean Acidification

Mollusc shells from the eastern and western tropical Pacific as recorders of environmental conditions
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Sclerochronological and geochemical analyses of mollusc shells can be used to reconstruct past environmental conditions. Variations in shell growth rate are partly related to environmental conditions. The variations of the shell geochemical composition provide high resolution data on several oceanographic factors including the sea surface temperature (SST) using $\delta^{18}O$ and rainfall / productivity using Ba/Ca. Knowledge of past SST, productivity and rainfall variations document seasonal and interannual climate variability, especially the El Niño Southern Oscillation (ENSO) mode, both in the eastern and western Pacific. The Peruvian and Chilean coasts are particularly affected by ENSO conditions (both El Niño and La Niña) and these ocean-climate perturbations can be detected in the shells of *Protothaca thaca* clams. Such growth anomalies in fossil shells can be used to identify past El Niño occurrences. In this same region, the $\delta^{18}O$ variations measured in the shells of *Concholepas concholepas* (gastropod) can be used as a SST recorder. In the western Pacific, the $\delta^{18}O$ changes in the shell of giant clams, which live in the same reef habitats than the massive corals Porites commonly used as environmental recorder, also provide reliable SST records, of similar quality than those obtained in Porites skeletons. We analyzed the $\delta^{18}O$ variations in a *Hippopus hippopus* shell collected in an archaeological site from Vanuatu dated at around 3600 year BP. Preliminary results reveals SST slightly higher than the modern ones, which might indicate an increase of El Niño events at that time with respect to the present situation.

Wed. 13:45 Climate Change session room
Ocean Acidification

Impact of ocean acidification on Hawaiian coral reefs in the 21st century

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Levels of ocean acidification reaching twice present day pCO_2 will occur during this century unless extreme measures are taken to reduce fossil fuel combustion. The environmental consequences to Hawaiian coral reefs have been demonstrated experimentally. Recruitment and growth of coralline algae (CCA) will be reduced by up to 80-90% and calcifying communities will undergo net dissolution caused by initial loss of the more soluble high magnesium carbonate component. Coral calcification will decrease by 15% to 30% under acidified conditions. Skeletal formation in corals is impaired, but other functions such as coral spawning and coral settlement show little or no response. The impact of ocean acidification is insidious and is not marked by dramatic and highly visible mortality events such as occurs with temperature-induced coral bleaching. Rather, ocean acidification leads to decreasing resilience and structural collapse of reefs communities. Quantitative models show that increasing frequency and intensity of bleaching events due to global warming during mid-century will be the dominant cause of reef decline, but ocean acidification becomes increasingly important near the end of the century. Corals in certain geographic regions can tolerate temperatures of 36°C, so adaptation to higher temperature does occur over evolutionary time scales. However, observations on the chemical requirements for calcification indicate that adaptation to seawater conditions is not possible, so ultimately ocean acidification and not global warming will lead to the end of coral reefs on our planet.

Wed. 14:15 Climate Change session room
Ocean Acidification

Influence of Rapid Environmental Changes on a Scleractinian Coral-Dinoflagellate Symbiosis: a Genomics Approach

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Tropical marine ecosystems based on scleractinian corals are among the most productive and biologically diverse marine ecosystems on Earth. At the heart of the success of corals as ecosystem is their mutualistic symbiosis with dinoflagellate algae which provides large amounts of energy to the anthozoan host. This largely explains the ability of corals to build the framework of coral reefs, in which as many as a million species may live. This framework supports a biodiversity that ultimately underpins tourism, substance gathering and fishing in at least 100 nations including most of the Pacific islands. Since 1979, scleractinarian corals have been affected increasingly by mass coral bleaching, which involves the breakdown of the symbiosis between the cnidarian host and the dinoflagellate symbionts. This event has been shown to be one of the major factor of coral mortality and thus of reef degradation. Previous studies have established a causal link between environmental stresses related to climate change and the disruption of the symbiosis between corals and dinoflagellates. More recently, functional studies have suggested the key role of multiple cell death pathways, such as apoptosis and autophagy, in the bleaching process. However, despite the importance of bleaching phenomenon, the interconnectivity between these major cellular pathways and physiological responses to environmental stresses remains unresolved in the case of coral-dinoflagellate symbiosis. The present study aims to specify the influence of elevated temperature on the physiology of the reef building coral Acropora millepora by investigating for the first time the molecular regulation of apoptotic and autophagic cellular processes during different hyperthermic stresses. Increasing our understanding of these cellular pathways controlling coral-dinoflagellate symbiosis will offer key insights into the effects of environmental and climate history on acclimatization and susceptibility of coral reef to bleaching.

Wed. 14:30 Climate Change session room
Ocean Acidification

An Ecological Microarray Study of Coral Bleaching

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Reef building corals live close to their upper thermal tolerance limit and prolonged exposure to temperatures exceeding 31°C induces coral bleaching - the expulsion of Symbiodinium sp. which is often the first step toward mass mortality. Current projections suggest that average tropical ocean temperatures could warm by 1-3°C by the end of this century, so unless corals have the capacity for adaptation to anthropogenically induced climate change, those species that survive are likely to undergo dramatic shifts in distribution patterns. To investigate coral stress responses at a fundamental level we used microarrays of approximately 17,000 expressed sequence tags (ESTs) from the hermatypic coral Acropora millepora to attempt to identify genes responsible for individual fitness and the capacity to survive. Bleaching responses have traditionally been investigated largely by subjecting corals to acute thermal stress in vitro. Our approach has focussed on several coral colonies growing in a single bay that have been sampled in situ through a natural bleaching episode and the subsequent recovery period. During the sampling period, water temperature was continuously monitored (at 15 min intervals) and symbiont density recorded at monthly intervals as a measure of bleaching status. Individual colonies differed dramatically in their overall responses to similar environmental conditions - the extent of reduction of symbiont density varied considerably and, whereas some colonies recovered after the summer period, others died. Microarray experiments on a subset of colonies, which showed similar patterns of symbiont loss, identified a large number of genes with expression significantly correlated to decreases in symbiont density. The implications of these experiments in terms of understanding the mechanisms by which corals respond during bleaching episodes will be discussed.

Wed. 14:45 Climate Change session room
Ocean Acidification

Preliminary Plans to Assess Ecological Impacts of Ocean Acidification on Coral Reefs Ecosystems of the Pacific Islands

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The impacts of climate change on coral reef ecosystems will affect human societies that rely on them for sustenance, protection, and recreation. This will particularly affect indigenous cultures of the Pacific Islands that depend on the reef resources for their livelihoods and survival. Although oceanic uptake of both naturally produced and human sources of CO2 helps moderate the rising atmospheric concentrations, the associated changes in the oceanic carbonate chemistry system, commonly termed 'ocean acidification', are predicted to have potentially severe biogeochemical consequences on calcifying marine organisms and coral reef ecosystems. Continued CO2 forcing in the ocean may reduce calcification rates to levels at which reefs cease to maintain a positive balance between reef accretion and bioerosion. Understanding the biological responses to ocean acidification is critical for predicting and conserving reef ecosystem health in the face of climate change. Efforts to examine the response of marine calcifying organisms to future changes in carbonate chemistry have been mostly limited to controlled laboratory experiments and models, with limited research to date examining the impacts of ocean acidification on the community structure of coral reef ecosystems in the real ocean. A critical prerequisite to understanding the future biological responses and devising adaptive management strategies to ocean acidification is establishing a baseline characterization of the variability of carbonate chemistry in natural reef environments. Since 2005, the Pacific Reef Assessment and Monitoring Program of the National Oceanic and Atmospheric Administration has been conducting in situ seawater carbonate chemistry measurements at reef locations across diverse gradients of biogeography, environmental conditions, and anthropogenic stressors in the Pacific. Together with concurrent monitoring of benthic community structure and accretion rates,

this will improve prediction of the critical thresholds that will be the consequence of ocean acidification and will aid in the development and implementation of regional strategies to enhance resilience.

Wed. 15:00 Climate Change session room
Ocean Acidification

Science-based Management of the Impacts of Climate Change on Rainforests, Reefs and Human Communities: a synthesis from the Reef and Rainforest Research Centre (RRRC)

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The Reef and Rainforest Research Centre (RRRC) is a non-profit consortium of over 300 scientists working to solve the problems facing north Queensland's key environmental assets: the Great Barrier Reef, Wet Tropics rainforests, and the Torres Strait. I will present a synthesis of the latest RRRC-managed research into the likely impacts of climate change on these highly interconnected ecosystems, and the human populations that depend upon them, with a focus on the management and policy options being generated by this solution science - many of which are directly transferable to problems faced elsewhere in the Pacific. These include clear recommendations for management actions that will help reduce the impacts of more frequent, more intense cyclones on fragmented rainforest ecosystems; improving the outcomes of rainforest revegetation programs; the consequences of predicted shifts in rainforest productivity as the climate changes (carbon sinks becoming sources); identification and protection of likely climate refuges for biodiversity; the development of robust indicators of aquatic, estuarine and marine ecosystem health, and their incorporation into long-term monitoring programs; mechanisms for bolstering reef resilience during this period of rapid environmental change, including management tools such as the Reef Atlas; and the development of innovative, participatory approaches to biodiversity conservation.

Wed. 15:15 Climate Change session room
Ocean Acidification

Ocean acidification impacts on Southern Ocean calcareous zooplankton

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The Southern Ocean presents a unique opportunity to observe marine calcifiers' responses to ocean acidification driven by the absorption of anthropogenic CO_2 by seawater, as CO_2 uptake rates are at a maximum at mid-to-high Southern latitudes.

Through in situ sustained monitoring using sediment traps deployed in the Southern Ocean, we infer a reduction in calcification of one morphotype of shelled pteropod of $\sim 35\%$ over the past decade, consistent with the continuing lowering of aragonite saturation.

Through a comparison of surface-sediment foraminifera, representing pre-industrial conditions, and modern foraminifera collected in sediment traps, we estimate a $\sim 38\%$ reduction in foraminiferal calcification since the industrial revolution. Planktonic foraminifera preserved in sediments are the same species living in the modern ocean, and provide a pre-industrial baseline to estimate the effects of acidification on shell formation in the modern high-CO_2 ocean. As the magnitude of the anthropogenic CO_2 increase is similar to deglacial increases in CO_2, the geological record provides a means of scaling for the ecological response to ocean carbonate chemistry changes. The recent reduction in calcification is similar to deglacial calcification changes during the Late Pleistocene.

The responses of these Southern Ocean calcifiers represent some of the earliest field evidence of the impacts of CO_2 on pelagic ecosystems. The Southern Ocean contains a disproportionate amount of the oceanic inventory of anthropogenic CO_2, and will experience undersaturation for aragonite earlier than other areas of the ocean, so ecosystems responses there may represent a biogeochemical precursor for the impacts of acidification in the lower-latitude Pacific. Our results point to the importance of field observations on marine ecosystems as the ocean continues to absorb CO_2, as a means of detecting impacts as early as possible.

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Ocean Acidification

Coastal Marine Animals in High CO_2, Acidified Oceans: Impacts on Early Development, Growth and Reproduction

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Increasing atmospheric CO_2 has been diffusing across the ocean surface, acidifying the whole neritic ocean, and thereby driving all marine organisms to live in lowering pH environments. Research interest pertaining to potential biological impacts of CO_2-driven ocean acidification has been centered on calcification of marine organisms, and much less is known about how ocean acidification would affect other aspects of marine faunal life. In this paper, we present our recent results on the CO_2 effects on early development of the oyster Crassostrea gigas and the mussel Mytilus galloprovincialis, gonadal development of the sea urchin Hemicentrotus pulcherrimus, and growth and survival of the marine shrimp Palaemon pacificus. Shell formation of oyster veliger larvae was severely affected within 24 h by exposure to 2,260 μatm PCO_2 (present atmospheric PCO_2 380 μatm), and by 48 h only 5% of larvae developed into normal D-shaped larval stage in high CO_2 conditions, as compared with ca. 70% in the control conditions. Similarly, all veliger larvae of the mussels showed morphological abnormalities such as convexation of the hinge, protrusion of mantle and malformed shells under high CO_2 conditions (2,000 μatm). Larval height and length were 26 ± 1.9 % and 20 ± 1.1 % smaller in the high CO_2 group than in the control at 144 h, respectively. Gonadal development of sea urchin was negatively affected by 1,000 μatm PCO_2, and the impact was further aggravated by a simultaneous elevation of seawater temperature by 2 °C. Survival, growth and molting of the shrimp were significantly affected when reared for 15 and 30 weeks in 1,000 and 1,900 μatm CO_2 conditions. These results suggest that ocean acidification projected by the end of this century and during the next few centuries has devastating effects on biological productivity of coastal oceans.

Wed. 15:45 Climate Change session room
Ocean Acidification

Recent Advances in FOCE Technology: Building a Better Sea Floor CO_2 Enrichment Experiment

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There have now been many laboratory experiments on the impacts of rising ocean CO_2 levels (lowered pH) on marine life, and in particular on the reduced capacity to form carbonate shells. But there have been few field studies in which a complex ecosystem response can be observed. Biologists have responded to questions concerning the impact of rising levels of atmospheric CO_2 on land plants by initiating a series of free-air CO_2 enrichment (FACE) experiments. Yet no similar set of experiments have been undertaken in the ocean despite rising concerns.

We have begun developing the technology needed to perform free ocean CO_2 enrichment (FOCE) experiments at MBARI, with the object of carrying out experiments in local waters, and of providing a useful tool for experiments in regions of critical concern such a coral reef environments. Atmospheric CO_2 enrichment experiments are far easier to carry out since CO_2 has no atmospheric chemistry, and simple mixing is all that is required. In marked contrast CO_2 has a complex ocean chemistry with slow reaction kinetics, so that sufficient time must be allowed between CO_2 introduction into the system and the emergence of the fluid into the experimental volume for the chemical reactions to occur. Without this allowed time we create a fluid of very high pCO_2 but only slightly changed pH, and thus do not make valid observations. Care for reaction kinetic limits has not often been imposed on studies to date.

Our final system design consists of a multi-meter long flow path between the point of CO_2 introduction and the experimental chamber. We formally solve the CO_2-H_2O kinetic equations, and provide local water velocity feedback to vary the flow. We observe pH changes in the experimental region and use a set of control algorithms to maintain a near-constant ΔpH in the control region.

Wed. 16:30 Climate Change session room
Ocean Acidification

Predicting impacts on coastal marine organisms based on long-term precise simulation of future ocean acidification

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The chemical property of inorganic carbon of the surface sea water has been changed in association with the increase of atmospheric concentration of carbon dioxide (CO2). By the middle of this century, this phenomenon (ocean acidification) is predicted to reach the level that sea water will be under the saturation for aragonite as well as dolomite. In such condition, marine organisms may be serous impacted because these minerals are major components of hard skeletons produced by calcifiers such as reef-building corals, mollusks and echinoderms. Many works have been done to evaluate the impact experimentally using seawater PCO2 of which is artificially increased. However, most works have been done at PCO2 level that is far above the level of future atmospheric condition. Also, considering that organisms will be exposed to the raised PCO2 condition for years, most experiments carried out for only weeks or months may not be long enough to evaluate the future impact. To predict future biological impacts associated with ocean acidification, we made a system that can simulate future PCO2 condition in the experimental seawater tank precisely. Major properties of the system are: 1) producing 3 L/hr of seawater adjusted at given PCO2 condition continuously, 2) producing seawater at 4 different PCO2 conditions, 3) reflecting the ambient daily and seasonal fluctuation of PCO2, 4) establishing equilibrium among PCO2 of the seawater and bubbling air by using counter current long pipe system, 5) certifying equilibrium among PCO2 of the seawater and bubbling air by measuring PCO2 of the adjusted seawater. We report results that evaluated the specifications of the system. In addition, preliminary results of the biological experiment using the system as well as other system that also tried to simulate the daily and yearly fluctuation of ambient seawater will be presented.

Wed. 16:45 Climate Change session room
Ocean Acidification

Thermodynamic Constraints Imposed by Ocean Acidification on Respiration by Marine Animals

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Ocean acidification from the invasion of fossil fuel CO_2 at the sea surface and from climate induced reduced ventilation (increased respiratory CO_2) at depth poses a challenge to marine life. The most obvious effect is from the reduction in dissolved carbonate ion affecting carbonate shell formation, and coral reef impacts are widely predicted. But higher oceanic CO_2 levels can also impose a stress on general metabolic capacity of all higher animals, yet we have no formal numerical means of expressing the combined impacts of elevated CO_2 and lower O_2 levels. We suggest that the simplest form of the energy balance of the basic respiration equation:
$\Delta G = \Delta G^\circ$ - RT $*$ ln $\{[fCO_2]/[Corg]*[fO_2]\}$
provides a useful tool for quantifying this stress. From this we define a simple respiration index:
$RI = Log_{10}(pO_2/pCO_2)$
in which the pO_2:pCO_2 ratio defines the ability to gain energy from the respiration process from a constant food source.
The greater part of the world's ocean waters are sufficiently well oxygenated that the anticipated higher CO_2 levels will not cause significant stress. But in already oxygen deficient regions this term becomes significant. We show that sub-oxic and anoxic conditions will not only expand laterally, but vertically as well. These expanding sub-oxic zones will present an ever increasing challenge to the diurnal vertical migration of all organisms from zooplankton to fish. And where these areas intersect the coast and the continental shelf, the so called "dead zones" inhospitable to aerobic life will greatly expand.

Wed. 17:00 Climate Change session room
Ocean Acidification

Ocean Acidification Leads to Rising Noise Levels in the Sea

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Through the burning of fossil fuels humans have released over 1200 gigatons of carbon dioxide to the environment since the beginning of the industrial revolution. As this CO_2 invades the ocean from the atmosphere dissolved carbonate ion is consumed and sea water pH is reduced. Until substitute forms of power generation, or CO_2 capture, are employed on a global scale, the acidification of the ocean will continue unabated. At the same time warming of the ocean has already slowed the over turning circulation sufficiently that loss of oxygen and thus additional CO_2 input at depth from increased bacterial oxidation of organic matter is now detectable. These two processes operate in concert to significantly reduce oceanic pH.

One significant consequence of this pH change result is a decrease in ocean sound absorption at frequencies up to about 10 kHz. This effect is due to relaxations in the $B(OH)_3/B(OH)_4$ and HCO_3/CO_3 systems which absorb sound at these frequencies, and which are pH dpendent. With the change in surface ocean pH change today of -0.12 from the + 105 ppmv increase in atmospheric CO_2, decreases in sound absorption (α = db/km) exceeding 12% have occurred. Under reasonable projections of future fossil fuel CO_2 emissions a pH change totaling 0.3 units or more will occur by mid-century, resulting in a decrease in the sound absorption coefficient of about 43%, or an effective increase in transmission of 70%. Ambient noise levels in the ocean within the auditory range critical for environmental, military, and economic interests are set to increase significantly due to the combined effects of decreased absorption and increasing sources from mankind's activities.

Wed. 17:15 Climate Change session room
Ocean Acidification

How Will Rising Sea Level Impact Fringing Coral Reefs?

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Sea level is predicted to rise 2.2 to 4.4 mm/y, and perhaps more, this century. During the Holocene, both the magnitude and rate of sea level rise were sufficiently high to inhibit shoreward migration of most reefs throughout the tropical Pacific and Caribbean (e.g. Montaggioni, 2005; Neuman and Macintyre, 1985). What effect, if any, will the relatively small increase forecast for the 21st century have on fringing coral reefs? Our results in Hawaii indicate that if fringing reefs are unable to keep pace with rising sea level, increased turbidity is a likely outcome. Even small increases in sea level will increase wave energy on reef flats and adjacent coasts. The increase in wave energy has the potential to increase turbidity on some coral reefs by increased resuspension of sediment in shallow reef areas, and erosion of fine sediment deposits on the adjacent coastal plains.

On many shallow fringing coral reefs, such as our study site on Molokai, Hawaii, sediment is resuspended daily by waves generated by trade winds. Suspended sediment concentrations are primarily related to wind velocity and water depth (tide stage). Even small increases in sea level over fringing reefs (e.g $\sim$10 cm in the next decade) will lead to enhanced bottom stresses; this in turn may lead to an increase in both the duration and magnitude of suspension events. Water depths critical for resuspension will be reached earlier during rising tides and be maintained longer during falling tides, resulting in longer and more intense turbidity conditions. Sedimentation and suspended sediment are leading contributors to reef degradation on fringing coral reefs in the Pacific and Caribbean; increases from rising sea level may lead to increased degradation.

Wed. 17:30 Climate Change session room
Ocean Acidification

Natural basin-scale decadal regime shifts of global-ocean phytoplankton

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Phytoplankton are the first link of the ocean ecosystem, and they affect ocean and atmosphere CO2 levels. They grow when a number of physical constraints are optimally combined so that the photosynthetic process fully develops. However, although decadal changes in the ocean physical environment are now demonstrated, parallel changes in the ocean ecosystems are less understood essentially because available global-scale observations do not span enough years. A recent work from Antoine et al. (JGR, 2005), using a comprehensive and consistent reprocessing of the CZCS and SeaWiFS satellite data sets, showed an average increase of chlorophyll (Chl) by ∼20%, with a high spatial heterogeneity and changes of the Chl seasonal cycles in many areas. In this context, our goal is to use satellite remote-sensing observations to look for concomitant changes in sea-surface Chl and temperature (SST), the former being used as an index of phytoplankton abundance. Here we show that the combined use of historical (1980's) and recent (2000's) Chl and SST observations allows identification of changes in global-ocean phytoplankton that are mainly related to the natural oscillations of large-scale physical properties of oceanic basins. The Pacific Ocean particularly well illustrates this result with a strong Pacific Decadal Oscillation signature, known to have widespread impacts on natural ecosystems and many marine fisheries. Our results do not support that recent global phytoplankton changes will inevitably continue in the same path due to climate-driven warming of surface ocean waters as hypothesis by Berhenfeld et al. (Nature, 2006). They demonstrate how challenging is the identification of Chl trends that would result from recent and anthropogenically-induced changes in the ocean physical environment. Because decadal regimes can alternately offset or emphasize the regional effects of global warming, they have to be understood before possible longer-term climate variability can be identified and ocean carbon budget be deduced.

Wed. 17:45 Climate Change session room
Ocean Acidification

Assessing the Impact of Climate Change on Fisheries and Aquaculture in the Pacific

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Climate change threatens to derail the plans of Pacific island countries and territories to optimize the benefits of fisheries and aquaculture. Policy-makers need to understand the extent of these threats, identify their implications for national revenue, food security and livelihoods, and adapt fisheries and aquaculture to maintain their vital contributions to the region.

The key threats to fisheries and aquaculture in the Pacific from climate change appear to be: 1) changes to the distribution and abundance of tuna; 2) decline in coral reefs and associated fisheries; 3) damage to infrastructure; 4) safety at sea; and 5) difficulties in planning development of freshwater aquaculture.

To assist the region to understand its vulnerability to these threats, the Secretariat of the Pacific Community has launched a project to assess the impact of climate change on Pacific fisheries. This project will determine: the observed and projected changes to Pacific climate and oceanography; the effects of these changes on the ecosystems that support fisheries; and the projected changes to fish stocks themselves. Collectively, this information will provide a sound basis for assessing the vulnerability of oceanic, coastal and freshwater fisheries, and aquaculture, to climate change. The project is guided by a Technical Working Group, comprising relevant experts and representatives from CROP agencies and national fisheries departments.

The key outputs of the project will be: 1) a comprehensive assessment of the vulnerability of fisheries and aquaculture in the Pacific to climate change; 2) a guide for policy makers and managers about how best to build resilience to climate change to maintain the productivity of fisheries; and 3) an authoritative book that compiles all the relevant information on the likely impacts of climate change on oceanic, coastal and inland fisheries and aquaculture in the Pacific. The book will provide an important regional input to the 5th Inter-governmental Panel on Climate Change Assessment Report.

This presentation will summarise the progress of the project to date.

Wed. 18:00 Climate Change session room
Ocean Acidification

Climate Change Effects and Reef Fishes

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Reef fishes face considerable challenges from climate change effects upon coral reef systems in which they live. This is true of reef fish assemblages found in both the coral-rich and coral-poor systems of the tropics and subtropics. The effects may include the negative impacts of habitat loss from coral bleaching, and threats to habitat, trophic systems, and larval/post-larval development because of increased ocean acidification. These impacts may be direct in that fishes will experience a loss of obligate or facultative microhabitat, food supply, and breeding sites, or larvae/post-larvae may fail to develop skeletal systems properly because of decreasing pH levels that may inhibit the assimilation of calcium ions during bone formation. The impacts may be indirect also in that community phase shifts from coral to algal domination may occur, with corresponding effects upon fish assemblage structure, or populations of non-obligate coral reef species may decline because of the loss of prey associated with corals. In addition, cumulative negative effects upon reef fish diversity and abundance from other sources may accrue. Over-exploitation of target and by-catch species are expected to continue regardless of local and regional declines in their diversity and abundance from climate change effects. The sum of impacts will promote extinction risk and have a profound effect upon human users of reef resources. The application of methodologies that can be used to gain an understanding of how species respond to negative impacts, as well as how we might minimize extinction risks and conserve species at various scales, is necessary.

Wed. 8:15 Public Health session room
Keynote lecture on Health Challenges in the Pacific: Infectious Disease, Non-Communicable Disease and the Health Workforce

Global changes and health in French Polynesia

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French Polynesians are intimately connected to their environment which nourishes their daily life and culture. Over the last decades, islanders had to face major changes in their environment and their society. Dietary changes probably explain the emergence of chronic diseases and their associated risk factors.

In order to evaluate the most important health impacts associated with these global changes, we conducted 3 separate epidemiologic studies over the last 4 years. The first study included 195 adults aged 18 yrs and over from Tahiti and Moorea. The second one aimed to evaluate exposure to toxicants and nutrients from fish consumption during pregnancy and the last and most recent one included 306 participants aged 12 yrs and over from Papeete and the Australes archipelago. From these studies, we learned among other findings, that (i) fish consumption still provides extremely high body burden of key nutrients such as selenium; (ii) that a shift from reef fish to pelagic fish consumption probably due to ciguatera fears and also modernization are responsible for a high exposure to toxic mercury in adults and pregnant women. We also found (iii) that high intakes of natural omega-3 fatty acids found in fatty fishes are now challenged by intake of harmful industrial transfatty acids, especially among youth. We even observed (iv) an increase in cardio vascular risk factors among the young generation compared to the oldest. Finally, we found (v) that young participants from Rapa are in better health condition than teenagers from other islands.

Polynesians are already in a transition phase characterised by a shift from a traditional diet towards a more western diet, mostly among young people and the emergence of chronic diseases risk factors is already seen. These data raised serious public health concern for future generations if public health policies are not implemented.

Wed. 9:00 Public Health session room
Population Health and Health Care Systems

A development of low cost telemedicine environment using broadband network

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Telemedicine is being tried as a means of eliminating the gap which exists in regions that lack sufficient medical services. This process involves providing medical care through communication between a patient and medical physicians who are located in distant places. Research into telemedicine has been focused primarily on determining the extent of medical care that can be provided through the use of network communications, and sufficient consideration has not been given to the network infrastructure. On this time, we tried to implement some actual telemedicine systems using DVTS (Digital Video Transport System) application as free software and general-purpose equipments. One trial is "inter-campus consultation system". Kyoto University has three major campuses at central and near Kyoto. All campuses have health service but medical doctor is not sufficient, so all medical doctors go the rounds to all campuses. We constructed using DVTS system and few civilian goods, for example Sony DV camera, electronic stethoscope and audio distributor to eliminate location gap. Consequently, Medical doctors could do consultation and listen heartbeat. A breath sound could be heard, but this sound was not used to diagnosis because there are timing issues between body motion from video picture and breath sound from video sounds. Other trial is that join to international conferences using APAN (Asia Pacific Advanced Network). We send a live surgical video to conference site and we accepted voice of the conference room at our surgery room. We could establish a two-way communication. Of course, we were not use special equipments.

Wed. 9:20 Public Health session room
Population Health and Health Care Systems

For Further Global Diffusion of eHealth: Application of Japanese Experience to the Pacific

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Approximately one hundred Japanese local governments are already implementing eHealth systems, utilizing totally 11,000 devices. The eHealth system transmits health-related data of its users such as blood pressure, ECG, and blood oxygen to a remote medical institution via telecommunications networks. Although this is a simple system, we analyzed that it actually reduced medical expenditures of life-style related illness such as diabetes, strokes, high blood pressure, and cerebral infarction. In other words, we proved that eHealth does not cure diseases but it prevents illness. How does eHealth make this possible? From our field research, it has the following effects to users: (1) less anxiety in day-to-day life, (2) stabilization of illness, and (3) enhancement of health consciousness. In addition to the above effects, eHealth saves medical staffs and medical facilities by making use of ICT (Information Communications Technology) and provides the same health services to people live in mountainous areas and isolated islands. Japanese local governments which utilize eHealth are located in such areas. The factor which makes handicapped regions to provide services lies in the financial scheme, which is referred to as "Public Policy Model". Existing systems are mainly supported financially by subsidies from the central government. These are exactly public policy of implementation. For the further development of this system, stronger financial basis should be introduced. This paper suggests reimbursement to the system from medical insurance. Regarding the Pacific Region, Japanese public policy model can be interpreted in the global framework. In this analysis, we propose "Universal Service Fund of eHealth," in which developed countries contribute funds to developing countries at the certain amounts. This financial scheme and an international organization which support the operation of the eHealth system will be able to provide the same quality of health services to people in the Pacific.

Wed. 9:40 Public Health session room
Population Health and Health Care Systems

The Pacific Open Learning Health Network (POLHN): Continuing Professional Education for Health Workers in Pacific Island Countries

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In 1999-2001, the Ministers of Health of Pacific island nations asked the World Health Organization's Regional Office for the Western Pacific (WPRO) to help increase continuing professional education (CPE) for doctors, nurses and other health workers in the region. High costs and long distances between countries impeded development and uptake of traditional face-to-face CPE programs. In response, with support from the countries, WPRO and Japan and the cooperation of several leading Pacific region training institutions, the Pacific Open Learning Health Network (POLHN) was established. In 2003, 10 POLHN learning centers were established in 10 countries: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Republic of the Marshall Islands, Republic of Palau, Samoa, Solomon Islands, Tonga and Vanuatu. Seven more centers have since been established, in Fiji, Federated States of Micronesia, Nauru, Republic of the Marshall Islands, and Tuvalu. The centers, located in hospitals and nursing schools for convenient access by health professionals, are managed by Ministry of Health (MOH) selected local Country Coordinators and supervised by senior MOH officials as members of Country Task Forces. Each center provides computers with internet access, materials for on-line and off-line (e.g. CD-ROMs) computer-based learning, and relevant WHO-selected textbooks and print materials. Most important, however, they provide access to highly relevant instructor-led courses developed and offered for health workers in the region, and over 44 such courses have been offered to date. This presentation will first introduce POLHN and evaluate its progress and current status – highlighting and updating the findings of a comprehensive external evaluation carried out in 2004 and tracing developments since then including responses to the evaluation and recommendations – and then discuss the purposes, plans for and potential broader relevance and importance of another comprehensive POLHN evaluation to begin in early 2009.

Wed. 10:30 Public Health session room
Population Health and Health Care Systems

Social Network Analysis (SNA): Key Tool in Evaluation of the Pacific Open Learning Health Network (POLHN)

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Social Network Analysis (SNA) - mapping and measuring relationships and information flows between people, groups, and organizations - will be a key tool in ongoing evaluation of the Pacific Open Learning Health Net (POLHN). We will present SNA plans, instruments and preliminary findings/lessons learned. The following examples, for each of POLHN's primary objectives, also relevant to other Pacific networks, indicate how SNA will be used to assess progress and develop recommendations for continued development and potential expansion:
1. Provide access to continuing education opportunities for health care workers. * SNA: Network mechanisms through which health workers learned about POLHN courses, to help increase participation. * SNA: Interactions among POLHN students, and between students and teachers, to evaluate effectiveness, beyond providing information, in creating dialogues. 2. Assist health care workers in upgrading education qualifications. * SNA: Current network of universities and institutions involved with POLHN, to identify those that could provide education qualifications and certifications and to ascertain how they and others could collaborate in providing them. 3. Provide access to health related information for health care workers in the region and globally. * SNA: Flows of POLHN-provided health information between students and their colleagues, to help understand how POLHN students share information and to help evaluate the true reach of POLHN. * SNA: Flows of health promotion information provided by POLHN between students and their patients, to help evaluate the dissemination and potential effectiveness of that information in promoting health (for example, of the courses on reproductive health counseling, diabetes and its clinical management in the Pacific, and risk communication). 4. Provide a facility for inter-country consultations and learning opportunities. * SNA: Current network of institutions and universities involved with POLHN, to find opportunities for POLHN's participating and supporting institutions, students, teachers, and administrators to further tie into and contribute to the broader Pacific health network.

Wed. 10:50 Public Health session room
Population Health and Health Care Systems

Healthy Okinawa: A Problem and a Program

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Okinawa, known since ancient times for the longevity and vibrant health of its people, was internationally recognized just a few years ago as having the world's highest proportion of centenarians. Dietary and lifestyle factors were credited with having important roles in that health success. Now, epidemiological and demographic evidence indicates that with health and lifestyle changes recent generations of Okinawans, and especially Okinawan men, have slipped down from that first-place status, at least among the prefectures of long-lived Japan. In 2000, the prefectural government of Okinawa, concerned with those observed declines and with their implications, inaugurated a program called "Healthy Okinawa 2010". The program is designed to increase the awareness of Okinawa's people, and especially of men and of young people, of the importance and personal relevance to them and their families of lifestyle changes including diet, exercise and attitudinal/cognitive shifts, as well as appropriate preventive and general medical care. The presentation will highlight the epidemiological studies and social surveys of the Okinawan population that led the way to and now guide the Healthy Okinawa program, the trends they revealed, progress thus far, and plans for the future of the program and of health in Okinawa.

Wed. 11:10 Public Health session room
Population Health and Health Care Systems

Empirical Analysis of Reduction of Medical Expenditures by eHealth in the Aging Society

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This paper analyzes how and how much the eHealth system reduces actual medical expenditures by examining Nishiaizu Town, Fuikushima Prefecture, Japan as a case study. The eHheath system connects senior people at home and medical or health institutions via telecommunications networks, and the town office has been implementing it since 1994 and keeps monthly receipts in paper form on medical expenditures of approximately 4,000 residents paid by National Health Insurance for five years from 2002 to 2006. The methodology of the analysis is to choose two groups (i) users; and (ii) non-user of the eHealth system, and compare the medical expenditures. As for the former, we selected 412 from the list owned by the office, and as for the latter, we chose 450 from the list of National Health Insurance. We send questionnaires on their personal characteristics and diseases. We obtained 311 from users, while 239 for non-users. Then we examined receipts of these 550 people, and made a database on age, diseases, the first dates of visiting medical institutions for the first time, the number of visiting medical institution, and medical expenditures. Based on this database, we conducted a regression analysis, and obtained the following results:
- Result 1: Users of the eHealth system have lower medical expenditures of lifestyle-related illness than those of non-users. - Result 2: Users of longer practicing the eHealth system have lower medical expenditures of lifestyle-related illness than those of non-users. - Result 3: Users of longer practicing the eHealth system reduce medical expenditures larger than those who use it shorter years, if they extend usage one more years. - Result 4: The eHealth system there has more effect to people who have diseases than those who do not.
The analysis and results we obtained provide the rigorous economic foundation of the eHealth system.

Wed. 11:30 Public Health session room
Population Health and Health Care Systems

Ministry of IT Health net's Telemedicine Rural Support program- Pakistan - Lessons Learnt

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The Government of Pakistan has taken a bold initiative to utilize ICT for transforming delivery of public services by making such services more effective, inclusive, efficient and available at the door steps of common man. Offering quality advanced health care services to rural and remote areas of Pakistan through the use of telemedicine is one such endeavor in this direction. Setting up rural telemedicine centers will enable rural population to seek consultation, advice and treatment from specialist doctors in urban center hospitals, without having to travel hundreds of kilometers and spending their meager financial resources on related transportation and accommodation costs.
"MoIT-Health NET" is a telemedicine project meant to assist the government in transforming delivery of health care services and making them available at the door-steps of a common man, through the use of Information and Communication Technology. The project has demonstrated the use of technology as a solution for overcoming the lack of quality health care infrastructure in rural/remote areas of Pakistan. The objective is to be achieved through setting up a telemedicine hub, in Holy Family Hospital Rawalpindi, connected via PAKSAT-1 to 4 telemedicine centers each to be set-up in rural hospitals, by utilizing and complementing available national resources and infrastructure. The project is designed to offer Basic telemedicine services including Tele-Diagnosis/Consultations: Specialists in hub hospitals have been able to examine patients remotely and provide diagnosis and consultation Diseases covered include ENT, Skin, Chest, Cardiology, and Psychiatry. Teleconsultations in : Surgery, ENT, Plastic Surgery, Orthopedics'. Beside Teleconsultation regular teaching sessions and CME PROGRAMS, participation in Grand rounds is a regular feature for remote hospitals and cliics. Experience from 12 remote centers in the country will be shared and lessons learnt during implementation of the program will be shared. This experience can easily be replicated in Pacific islands.

Wed. 11:50 Public Health session room
Population Health and Health Care Systems

Virtual Hospital and Telemedicine for Telementoring of the Health Workforce

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Implementation of emerging information and communication technologies into healthcare have lead us to the e-Health era, characterised by new ways of healthcare delivery through a broad range of teleservices. However, to fulfil the promise of e-Health and Telemedicine, namely ubiquitous access to high-level healthcare for everyone, anytime, anywhere (so-called ubiquitous Health or u-Health) it requires the real integration of the various technological platforms and medical services. This contribution will showcase various modules for u-Health and proposes a global strategy for integration into Virtual Hospitals. The Virtual Hospital (VH) will provide a heterogeneous integrated platform supporting medical services, such as e-learning, real-time telemedicine and medical assistance. The VH will put special emphasis on the education and training of young medical doctors in clinical and scientific organisations of the network. This will allow young medical doctors even at a remote or isolated location to develop and gain experience in a multicultural and multidisciplinary environment. The Virtual Hospital will foster region-wide cooperation between the leading medical centres of the participating countries by establishing a permanent medical and scientific link. Through the deployment and operation of an integrated interactive communication platform, it will provide for medical professionals in the whole area access to the required quality of medical service depending on the individual needs of each of the partner. The development of Virtual Hospitals and digital medicine helps to bridge the digital divide between different regions of the world and enables introduction of evidence-based medicine for better disease management.

Wed. 14:00 Public Health session room
Population Health and Health Care Systems

The Complex Telemedicine projects to provide medical and social services to remote communities to address the spread and treatment of infectious diseases

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The "National Telemedicine Agency" Research-and-Production Union for today is leading in Russia developer and producer of telemedicine systems, based on modern information and communication technologies. The key element of this systems is Mobile Telemedicine Laboratory (MTL) equipped with necessary medical diagnostic and communication equipment for transmitting data of examination to the central clinics in the country or abroad. The laboratory is rigged on chassis with cross-country capacity or other mobile vehicle (for example on the boat). Between various modifications of this system are: 1. Telemedicine network SCAESNet (Satellite Communication AntiEpidemic Screening Network). SCAESNet project is considerable increase efficiency in fight with HIV, tuberculosis, malaria and other diseases, it also allows to accomplish a medical care break-through in the countries. This system can be adapted to fight against a various epidemics, in particular, against the avian influenza pandemics. It's possible to say that using of telemedicine systems for fight against the avian influenza is a direct way for decision of this problem.
2. Multi-Functional Mobile Social Complex "CyberTwin". Designated to render universal compete set social services to the population of rural, remote and hardly accessible regions, including a complete set of mailing services, Internet access facilities, package of telemedicine service, banking services, commercial services. "CyberTwin" Complex is installed in a special-purpose isothermal van mounted on a cross-country frame and has workplaces for a mailing operator, collective access points "CyberMail" and a telemedicine point with appropriate equipment. "CyberTwin" Complex workplaces have access to telecommunication networks, Internet and telemedicine networks via special info-communication equipment, including a computer-aided VSAT satellite communication station.
Thank you.

Wed. 14:20 Public Health session room
Population Health and Health Care Systems

The complex Telemedicine project of medical services in emergency situations

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The complex Telemedicine project of medical services in emergency situations
Mikhail Ya. Natenzon, Deputy Head of the Working Group for Telemedicine of the ITU-D sector of the International Telecommunication Union (ITU), Deputy Head of the Working Group for Telemedicine of the Regional Commonwealth for communication of the CIS Countries, Chairman of Board of the "National Telemedicine Agency" Research-and-Production Union,
Taking into consideration the growing threats of natural cataclysms and others emergence situations, the Russian "TANA" group of companies and RPU "National Telemedicine Agency" developed Complex telemedicine system (CTS) of Disasters Medicine Survey for the relief actions in a course of elimination of emergency situation consequences. Based on up-to-date digital and info-communication technologies allowing fundamentally to change the situation in the sphere of medical services to the population, especially living in rural area, remote and hard-t-get-to regions. Combining the principle of mobility and telemedicine technologies, the system provides for management of different rescue teams and coordinates the work of medical personnel both in the injury area, and in hospitals where the injured are placed for treatment. Capable of durable stand-alone operation the CTS is equipped with all the necessary medical facilities for rendering medical aid in case of mass population injuries. The key element of this system is Mobile Telemedicine Laboratory (MTL) equipped with necessary medical diagnostic and communication equipment for transmitting data of examination to the central clinics in the country or abroad. The laboratory is rigged on chassis with cross-country capacity or other mobile vehicle (on the boat for example). Operating samples of Mobile Telemedicine Laboratory have been demonstrated to the international community and aroused great interest of specialists in many countries. This is confirmed by diplomas and golden medals of international forums and exhibitions. The lack of similar systems in countries of the Indian Ocean region that suffered as a result of the 26.12.2004 disaster largely increased the number of victims of the catastrophe.

Wed. 14:40 Public Health session room
Population Health and Health Care Systems

Study of Communication Accessibility in Pacific Islands

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In WSIS (World Summit on the Information Society) from 10 to 12 December 2003 in Geneva, it was declare that "Our common desire and commitment to build a people-centered, inclusive and development to oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life." In order to comply the declaration in WSIS, ITU (International Telecommunication Union) advocated to use DAI (Digital Access Index) for evaluating communication accessibility, where a selection of indicators compiled into an index gives a better overview than any singly indicator. The DAI measures the overall ability of individuals in a country to access and use new ICTs (Information Communication Technologies). The DAI is built around four fundamental vectors that impact a country's ability to access ICTs: infrastructure, affordability, knowledge and quality and actual usage of ICTs. The DAI has been calculated for 181 economies where European countries were among the highest ranked. The DAI allows countries to see how they compare to peers and their relative strengths and weaknesses. The DAI also provides a transparent and globally measurable way of tracking progress towards improving access to ICTs. This paper intends to specifically study the communication accessibility in Pacific Islands, with introducing the DAI, and using the DAI for evaluating communication accessibility in Pacific Islands with comparing to major countries, and to propose how enhancing the communication accessibility in Pacific Islands in view of the DAI.

Wed. 15:00 Public Health session room
Population Health and Health Care Systems

Health Workforce and Infectious Disease Control in Post-World War II Okinawa

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Although Okinawa's economy and infrastructure were in ruins after the U.S. invasion in 1945, infectious diseases such as malaria and diarrhea were quickly suppressed. In the years and decades following World War II, the islands' people, health workers and health system leaders were able to effectively control tuberculosis and major parasitic diseases, all of which earlier had reached high levels. This presentation first analyzes how health workforce policies, decisions, programs, and effective leadership played key roles in those accomplishments, then suggests specific lessons learned that could be of use now, in the 21st Century, in Pacific countries. The analysis and lessons also consider, as an example of transfer of technology (with significant adaptation and innovation), the interplay between Okinawan health leaders and U.S. government representatives until 1972 when Okinawa once again became a Japanese prefecture after 27 years of post-war occupation by the U.S. The concluding section will briefly summarize points raised by health officials and staff of various Pacific Island countries who have reviewed several aspects of the research, with particular attention to the importance of mid-level health workers, the accelerated epidemiological transition that took place in Okinawa and the adjustments made to deal with those changes, and the implications for countries that, like Okinawa today, need to deal with increasingly complex mixtures of infectious and other diseases, plus new disease threats, aging populations, changing lifestyles, and health workforce shortages, changes and maldistribution, in a globalized context.

Wed. 15:20 Public Health session room
Population Health and Health Care Systems

Anthropometric Factors in the Risk of Differentiated Thyroid Cancer in French Polynesia: a Population Based Case-Control Study

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Objective: Our aim was to study the risk factors of thyroid cancer in French Polynesia where one of the world's highest incidence rates of thyroid cancer is observed.
Design: A case-control study among native residents of French Polynesia included 225 cases of differentiated thyroid cancers diagnosed between 1979 and 2004 (201 women / 24 men) matched to 368 population controls (324 women / 44 men) on the date of birth. Participants under 18 (6 women cases and their 9 controls) were excluded from the analysis. Anthropometric factors, categorized into quartiles among women and according to the median among men were analyzed by conditional logistic regression. Odds ratios (OR) were adjusted for ethnicity, education level, interviewer, height, number of births, and menopausal status.
Results: Risk of thyroid cancer for women in the highest quartile of body mass index (BMI) at age 18 was 2.3-fold higher compared to the lowest quartile. Women in the highest quartile of BMI before diagnosis had a 2.3-fold higher risk compared to the lowest quartile. These results did not depend on ethnicity. Among men, thyroid cancer risks were 4.5 and 7.4-fold higher when BMI at age 18, respectively before diagnosis, were elevated. Individuals who were overweight (BMI=25-29.9 kg/m^2) or obese (BMI$\geq$30 kg/m^2) at age 18 and before diagnosis had a higher risk compared with those who had a normal BMI both at age 18 and before diagnosis (OR=3.2 for women and OR=30.4 for men).
Conclusions: An elevated height, and elevated weight and BMI at all ages were associated to an increased risk of thyroid cancer among men and women in our study. This study shows the important role of anthropometric factors in the risk of thyroid cancer in Pacific island populations.

Wed. 15:40 Public Health session room
Population Health and Health Care Systems

Etude des facteurs alimentaires sur le risque de cancer de la thyroïde en Polynésie Française

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INTRODUCTION : En 2000, l'incidence du cancer de la thyroïde était de 20 pour 100 000 femmes en Polynésie Française (2ème taux le plus important enregistré à travers le monde, après celui de la Nouvelle-Calédonie). Les causes du cancer thyroïdien sont multiples, mais à l'exception des rayonnements ionisants, elles ont été peu étudiées et sont mal connues.
OBJECTIF : évaluer le rôle de l'alimentation dans le risque de cancer de la thyroïde.
MATéRIEL ET MéTHODES : L'unité 605 de l'INSERM a réalisé une étude cas-témoins sur le cancer de la thyroïde en Polynésie Française de 2002 à 2004. Les données alimentaires ont été recueillies par questionnaire de fréquences et l'analyse des facteurs alimentaires a été effectuée à partir de la table de composition des aliments du Pacifique Sud élaborée par la FAO (Food and Agriculture Organization of the United Nations).
RéSULTATS : L'analyse a été réalisée sur 589 individus (224 cas et 365 témoins). En moyenne, les témoins hommes consommaient 3 975 kcal/jour et les témoins femmes en consommaient 3 000. Or, pour une activité intense, l'apport énergétique journalier recommandé par l'OMS est de 3 400 kcal/jour pour les hommes et 2 400 kcal/jour pour les femmes. Chez les cas et les témoins, la consommation moyenne de poisson était de 64 g/jour. De plus, la consommation moyenne de fruits de mer chez les cas (4,7 g/jour) était inférieure à celle des témoins (7,8 g/jour) (p=0,04).
CONCLUSION : Les résultats de cette étude suggèrent un rôle de l'alimentation dans le risque de cancer de la thyroïde. Des études plus approfondies sont prévues, notamment sur l'interaction entre les facteurs génétiques (Glutathion-S-Transférase et RET) et l'alimentation (en particulier, les crucifères et l'apport alimentaire d'iode qui sont des facteurs de risques suspectés du cancer thyroïdien).

Wed. 16:30 Public Health session room
Population Health and Health Care Systems

Pacific Islands Familes Study: Overview & selected findings

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The Pacific Islands families Study (PIF) is a large scientifically and culturally robust longitudinal study that is following a birth cohort of over 1000 Pacific children and their families. To date, parent interviews and child assessments have been carried out at 6-weeks, 12-months, 24-months, 4-years and 6-years of age. The overall aim of the PIF Study is to determine the pathways leading to successful adaption as the cohort and their families negotiate critical developmental transitions, notably the key developmental stages of infancy and childhood, transitions to early education and school, and the influence of the sociocultural context and family environment on the health and wellbeing of Pacific children. The rich longitudinal data provides a unique opportunity to examine multiple exposures on a range of health and developmenta; outcomes, contibuting significantly to public health and environmental epidemiology and the health of New Zealand children. In this seminar we will give an overview of the PIF Study and present selected findings about the health and wellbeing of Pacific children and their mothers living in New Zealand.

Wed. 16:50 Public Health session room
Population Health and Health Care Systems

Pratiques alimentaires et représentations corporelles en Polynésie

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La montée préoccupante de l'obésité en Polynésie française, avec un taux moyen de prévalence très supérieur à celui de la métropole, et celle des pathologies liées (diabète, hypertension artérielle, maladies cardio-vasculaires...), ont été mises en évidence depuis une dizaine d'années, ne prenant toutefois en compte que l'aspect nutritionnel de la question. Nous nous attacherons à mieux comprendre le développement de ces pathologies par la considération des déterminants culturels de l'alimentation et des facteurs sociaux, grâce à la prise en compte des pratiques et représentations issues de la culture polynésienne au moment du contact avec les Européens, et du triple impact de la christianisation de la société, de la colonisation et la modification des modes de production, et de la " corne d'abondance " matérielle déversée depuis l'implantation du Centre d'Expérimentation du Pacifique. Nous montrerons que la permanence des modes d'alimentation et des représentations de l'aliment et du corps issues de la période pré-européenne, ainsi que la transformation rapide des pratiques alimentaires polynésiennes vers un modèle occidentalisé ont joué un rôle important dans ces pathologies. Nous replacerons ainsi l'obésité en Polynésie française dans son contexte " éco-systémique ", c'est-à-dire intégrant des facteurs politiques (les intérêts variés des différents acteurs, les modes d'organisation de la production et de la distribution des aliments) et économiques (les décisions prises localement en matière de taxation de certains produits, les statuts des différents groupes) et leur évolution historique respective. Notre propos est d'éviter l'écueil d'une vision strictement culturaliste qui au mieux ferait de l'obésité un pattern propre aux Polynésiens, et au pire en rejetterait la responsabilité sur les individus en risquant la stigmatisation d'un groupe social donné, sans remettre en causes les inégalités socioéconomiques ni se poser la question de la pertinence des interventions de santé publique.

Wed. 8:15 Culture and Politics session room

Conférence plénière Culture et Politique : les défis de la modernité - Keynote lecture on Culture and Politics: The Stakes of Modern

Identité, communication et mondialisation

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La mondialisation est synonyme d'ouverture. Même si les vingt dernières années ont surtout été marquées par la domination de l'économie, dans la perspective d'un marché global, avec la crise financière comme résultat. Cependant, le monde ne se refermera jamais. Mais après le triomphe de l'économie, il va y avoir le retour du politique et de la culture. La politique pour introduire un peu de coopération, et domestiquer la globalisation. La culture pour respecter un peu la convention pour " le respect de la diversité culturelle " signée à l'Unesco en octobre 2005, et sortir d'une vision beaucoup trop technique du village global. Le grand changement est l'émergence de l'identité culturelle comme enjeu politique, accéléré par la mondialisation de la communication. Interagir et se voir plus facilement n'est pas synonyme de meilleure compréhension. Et de toute façon plus il y a d'ouverture plus il faut respecter les identités. Les hommes veulent bien échanger, mais à condition de conserver leurs identités culturelles collectives. Plus la communication s'impose, par le mode de vie et les techniques, plus la question de l'identité devient centrale. Le monde est certes plus visible, mais pas forcement compréhensible, car en supprimant les distances les différences s'imposent. Il faut donc apprendre à cohabiter et pour cela se respecter. Revaloriser les identités culturelles collectives ce n'est donc pas enfermer le monde dans les réseaux communautaires, c'est au contraire repenser les identités culturelles collectives pour éviter le communautarisme. Et organiser la cohabitation culturelles, sans laquelle il n'y aura pas de paix possible. On le voit déjà dans les conflits aujourd'hui religieux, demain liés aux langues, patrimoines, symboles, territoires et frontières et qui tous concernent la place de la culture dans les sociétés ouvertes. C'est l'enjeu politique de la troisième mondialisation, celle qui concerne les rapports entre identité, culture et communication et qui vient après la première mondialisation politique avec l'ONU comme cadre de référence, et la deuxième mondialisation, avec l'économie et l'OMC comme horizon. Le défi ? Apprendre à concilier ces trois logiques de la mondialisation, économique, politique, culturelle, souvent antagoniques, mais dont aucune ne peut être sous évaluée. Les enjeux de la troisième mondialisation sont les plus récents, mais indispensables à prendre en compte si l'on veut éviter des sources d'inégalités et de conflits au moins aussi difficiles que celles liées aux inégalités économiques et politiques.

Wed. 9:00 Culture and Politics session room

L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Anchorings: how to communicate singularities and existential territories through digital tools

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Anchorings is a collective anthropological program exploring new links of social alterity, a major challenge for social sciences. The purpose is to understand and to put across how the communication techniques and technologies are re-appropriated by marginalised populations whose actions of social link creation escape recognition as much as cognition. The issue at stake is to analyse, within a conjuncture of indifference or hostility of the public space (political, media-related or even scientific), the ways in which certain marginalised human groups (Indigenous peoples, stigmatised urban populations...) enounce and construct their subjective singularity and existential territories in the process of social transformation and displacement. Audiovisual material will be presented, especially from Australia and across the Internet to enhance local expressions of agency and the politics of cultural claims projected as new systems of knowledge for the future.

Wed. 9:12 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Determining NGO Science Communication Capacity Building Needs

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This abstract relates to work in progress for a Masters in Philosophy (Science Communication) on the topic of determining Science Communication Capacity Building needs for Pacific NGOs.
Investment in scientific technical knowledge is lost if a recipient country does not have the ability to uptake, manage and embed the knowledge into their economy.
The capacity challenge is fundamentally a governance challenge. NGOs can offer a viable alternative to bring about change that ensures local ownership, respect for culture and reduction of political influence.
The Organisation for Economic Co-operation and Development (OECD) has highlighted a fundamental change to the way funding is provided. In response to this there will be a large demand for practical ways that NGOs and other local organisations can improve their science communication activities.
UNESCO's active role in the Pacific and the desire to implement a new strategic direction from 2008 has provided a clear mandate and strategic need for my research. It has also shaped my research (in particular the aims and scope) from that originally proposed in November 2006.
The aim of my research is to identify the science communication capacity building needs of Pacific NGOs. Anticipated benefits of this research project are:
- Provision to UNESCO of a new piece of research that addresses a current strategic issue for the Pacific; - Increased coordination and information sharing between Pacific NGOs, UNESCO and science communication organisations; - Realignment of either UNESCO Pacific activities in response to NGO strategic needs or realignment of Pacific NGO activities to cater for the new UNESCO direction; - Enhanced resources for Pacific science communication from other capacity building resourcing organisations; and - Increased accountability of the investment of science communication activities in the Pacific region.
The Tahiti Conference is an opportunity to exchange information relating to science communication capacity building.

Wed. 9:18 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Taking a more strategic approach to science communication

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The need to improve the communication of a global issue like climate change demands that a focused and strategic approach be developed and used.
To address a current deficiency in strategic communication planning, the Centre for the Public Awareness of Science within the Australian National University now offers a specific subject in Strategic Communication planning. This subject is part of the Masters Science Communication course and has been developed by a CPAS Visiting Fellow.
The objective of this subject is:
To provide participants with a thorough and practical understanding of the process used in developing a communication plan, including developing a strategic framework and an action plan that allocates resources and timeframes.
The subject is delivered over one semester and is now in its fifth year. It provides science communicators with practical skills on how to establish a Communication Strategic Plan. This highly successful approach was originally developed by the Murray-Darling Basin Commission in South West Australia and is now used in science projects in Australia.
Once a strategic approach has been developed, a clear foundation is provided for the creation of an Action Plan where resources are allocated and timelines established. An interactive workshop has now been developed that minimises time spent on word smithing; increases agreement from stakeholders on performance measures and priority tactics to be deployed; and easily prioritises communication tactics.
Feedback from Science Communication students confirms that this new subject provides a practical way for Science Communicators to approach communication. It has also been the basis for communication planning in a current global climate change initiative; it is not just theory but can be a process to unify actions.
This approach could be considered as a keynote address as it provides a unifying tool for scientists and is relevant to all the themes in the conference.

Wed. 9:24 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

The Austronesian Basic Vocabulary Database: bioinformatics meets Pacific languages

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As the poet Ralph Waldo Emerson noted, languages are the "archives of history". However, basic comparative data on the languages of the Pacific are often widely dispersed in hard to obtain sources. Here we outline how our Austronesian Basic Vocabulary Database (ABVD) helps remedy this situation by collating wordlists from over 550 languages into one web-accessible database (see http://language.psy.auckland.ac.nz/austronesian/). We describe the technology underlying the ABVD and discuss the benefits that an evolutionary bioinformatic approach can provide. These include facilitating comparative linguistic research, answering questions about Pacific prehistory, enabling syntheses with genetic data, and safe-guarding fragile linguistic information. In contrast to research projects conducted by isolated academics that concentrate knowledge in libraries that are only accessible to a small number of specialists, the ABVD is a collaborative project with input from linguists, evolutionary biologists and native speakers. It is accessible to anyone connected to the web. We will emphasise the critical role open web databases can play in documenting linguistic and cultural diversity.

Wed. 9:36 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Geographical Factors of Political Structure of Oceania states

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In the paper an attempt was made to analyze fundamental factors which exert influence on political processes in Oceania. The following levels of geographical causality of political processes are offered: 1. vertical - position and quality of an element is determined by the quality of elements, situated in the same point 2. horizontal - position and quality of an element is determined by its relations with other elements, i.e. its position in the element system 3. mediate - elements which have spatial characteristic determine the quality of the element which lacks this characteristic . A detailed analysis of factors of vertical causality: geological, hydrological, atmospheric (climatic), political, economic, demographic, cultural etc. is provided in the paper. The impact of these factors on the states and territories of the region was asymmetric. The area of the region is regarded as a group of elements of three types: barriers, transmissive channels, and centers. The location of the center vs. barriers and transmissive channels is explained by the following regularities. . The importance of the center rises in the following geographical configurations: 1. The center is located at the intersection of transmissive channels; 2. The center is located at the point of maximum convergence of transmissive channels; 3. The center is located at the point of channel direction change; 4. The center is located in line with two barriers between them; 5. The center is located in line with a barrier in close proximity to it; 6. The center is located on the border of two areas with different geographical characteristics. Centers are characterized by gravitation and its vectors, moreover there is a constant of gravitation between centers in the region, that is why the reinforcement of one center inevitably results in weakening of the other. So, the location of one center vs. the other centers is determined by balance between centripetal and centrifugal forces, influencing the center. In the conclusion it is stated that the political structure of Oceania is determined by geographical factors to a greater extent compared to other world regions, and it is proved by multiple examples provided.

Wed. 10:30 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

L'autonomisation, un processus de gouvernance polynésien

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L' " autonomisation " en Polynésie Française exprime l'interaction permanente entre un mode de gouvernance propre à la société et à la culture polynésiennes traditionnelles et les effets nécessaires de l'appartenance à la République française et un monde plus vaste. Ces influences réciproques aboutissent à une gouvernance autonome spécifique. L'autonomisation est ainsi un processus syncrétique. Il permet tout d'abord la défense de certaines normes jugées essentielles à la survie de l'identité polynésienne, de son territoire insulaire et de sa population polynésienne. Ainsi la maîtrise du domaine foncier et de l'emploi local permet une certaine paix sociale. Mais il permet également une évolution prenant en compte les changements globaux à travers les influences culturelles, techniques et socio politiques diverses. La baisse des flux financiers en provenance de la métropole suite aux arrêts des essais nucléaires ou l'omniprésence de la culture américaine ont ainsi des répercussions importantes. Le changement peut également être d'origine locale. L'autonomisation de la Polynésie Française est en effet un processus dynamique de gouvernance prenant en compte tout d'abord les textes d'origines diverses (d'origine territoriale, nationale, Pacifique, européenne ou internationale), mais plus encore leur application par les politiciens locaux et leur compréhension par la population polynésienne. L'accent mis sur les acteurs polynésiens permet ainsi d'observer les changements locaux. La loi organique portant statut d'autonomie de la Polynésie française, en date du 27 février 2004 est ainsi dotée d'une autorité juridique certaine pour l'Etat, mais elle reste un instrument, dont il ne faut pas omettre la puissance symbolique, à disposition des acteurs politiques locaux. Les changements locaux récents importants sont ainsi le vote aux élections territoriales du 23 Mai 2004 révélant une volonté de changement de gouvernance, une instabilité de la vie politique polynésienne désormais chronique et la multiplication des alliances entre des personnages et des partis politiques polynésiens historiquement et idéologiquement antagonistes.

Wed. 10:42 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

La Gouvernance en Polynésie Française

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La Polynésie française dispose d'une véritable vie politique depuis 1945. Cependant, cette vie politique oscille entre une tradition fortement ancrée et des règles démocratiques modernes. L'apprentissage de la démocratie fut conditionné par la présence du Centre d'Essai du Pacifique et par l'absence de certaines valeurs, fondements de la culture républicaine. Il s'agit d'étudier les particularités de cette culture politique et de présenter de nouveaux modèles de gouvernance conformes à la culture politique locale dans un contexte de mondialisation.

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L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

L'établissement du CEP : étude d'un processus de décision et de ses effets

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Le choix de l'établissement du CEP (Centre d'Expérimentations du Pacifique) s'est fait selon des critères essentiellement techniques, si le départ d'Algérie procédait d'un calcul politique. La volonté du général de Gaulle de se débarrasser de l'hypothèque algérienne pour établir sa "-grande politique-", qui renversait le patriotisme traditionnellement impérial de la France, depuis la IIIe République, au profit d'une contestation de l'impérialisme américain, a néanmoins réintroduit la problématique coloniale dans le Pacifique. La création du CEP, suite à la perte du terrain d'expérimentation saharien, a en effet provoqué dans le Pacifique anglo-saxon (Nouvelle-Zélande et Australie notamment), une dénonciation de l'arrogante diplomatie française, unilatérale et obtuse. Le général de Gaulle, sans peut-être percevoir la contradiction avec le rôle anti-impérialiste qu'il assignait à la France dans le monde, réaffirmait en Polynésie l'ambition impériale avec laquelle il rompait en Afrique du Nord. Il est vrai qu'il se frottait aux anglo-saxons dans une région du monde où l'influence française demeurait marginale, alors que l'éventuel sentiment de culpabilité coloniale française y était largement occulté par le souvenir des cuisantes humiliations subies depuis l'affaire Pritchard. La création du CEP n'a pas seulement altéré l'image de la France dans le monde-; elle a également modifié la relation entre Paris et ses territoires polynésiens. Les élites locales ont protesté contre l'unilatéralisme de la décision et l'opacité des expériences et de leurs conséquences sanitaires. Si bien que la revendication d'indépendance et la dénonciation du néo-colonialisme français, s'est nourrie des combats contre le CEP, non sans justifier une nouvelle forme de dépendance, qui prend la forme actuelle d'une revendication d'assistance financière, au nom de la "-dette-" française. D'une façon plus générale, la dénonciation écologique et politique du CEP alimente le discours identitaire polynésien, que ce soit dans la définition du sol polynésien, souillé par le nucléaire, et réinventé en fonction d'une pureté perdue, de l'ethnie polynésienne, démarquée de l'occupant par un discours racialiste, dont les catégories sont importées de l'Occident, sans parler du discours anti-colonialiste, qui perpétue une forme d'aliénation en même temps qu'elle la dénonce.

Wed. 11:06 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Gouvenance des aires marines protégées et institutions politiques et administratives en Polynésie française

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La mise en place des aires marines protégées en Polynésie française se réalise dans un contexte institutionnel, juridique et administratif particulier. L'adoption récente d'institutions politiques polynésiennes autonomes modifie également le processus de décision et de gouvernance de ces opérations laborieuses et complexes. Le Plan de Gestion des Espaces Maritimes de Moorea (Tahiti) et le classement en réserve de biosphère de Fakarava (Tuamotu) constituent deux cas dans lesquels les modèles de gouvernance sont mis à l'épreuve dans une période de transformation profonde de la société polynésienne. Dans le cadre du programme ANR/GAIUS appuyé par l'Agence française des Aires Marines Protégées, le fonctionnement administratif de ces deux opérations a été étudié. Les difficultés de la gouvernance locale y apparaissent.Elles soulignent la nécessité de prolonger avec tact et pédagogie l'appui et le soutien de l'appareil d'Etat aux institutions locales et de gestion. Celles-ci apparaissent à la fois démunies et plongées dans le désarroi pour réaliser des missions de gestion qu'elles ont du mal à assumer. Sans mettre en cause la légitimité de leurs buts, l'étude s'interroge également sur la conception et les principes de ces dispositifs institutionnels.

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Menaces naturelles et anthropiques sur le Patrimoine Archéologique Polynésien
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Alors que de nombreux sites archéologiques polynésiens n'ont, pour des raisons de moyens disponibles, pas encore fait l'objet d'études et de fouilles, leur statut de domaine privé, souvent en indivision, rend les mesures de protection " administratives " quasiment impossibles à faire respecter. La dispersion des îles sur un espace plus grand que l'Europe, l'isolement de certaines îles et atolls, l'éloignement par rapport à Tahiti,... rendent difficile l'application d'une législation qui existe pourtant. Conjointement, les sites ne présentant généralement pas un caractère grandiose et étant plus ou moins ruinés, et les croyances et autres interdits à leur sujet ayant fortement régressé, cette situation a pour conséquence que les éléments naturels (climat, érosion, végétation,....) et les activités humaines le plus souvent liées au développement (aménagements, construction, agriculture, élevage,...) font peser sur les vestiges archéologiques une grave menace de destruction partielle, voire même totale. Dans le même temps, des initiatives associatives, menées avec enthousiasme, traduisant une prise conscience de ce patrimoine et souhaitant le valoriser, aboutissent, par manque de connaissance à un résultat similaire. A partir de quelques exemples pris dans différents archipels de Polynésie Française (île de Eiao aux Marquises, atoll de Tatakoto aux Tuamotu, ...), on se propose de montrer les conséquences de ces différents risques sur un patrimoine fragile que l'introduction de matériels de terrassement puissants (bulldozer, Case,.) rend encore davantage vulnérable. Si les menaces naturelles sont à combattre avec des moyens techniques, un effort d'éducation et d'information vers les populations et en particulier vers les jeunes pourrait être entrepris et renforcé afin que tous prennent conscience que les vestiges qui subsistent sur leur terre valent peut-être mieux que quelques noix de coco supplémentaires ou une jolie pelouse, et que la législation mise en place ne reste pas qu'un joli texte inappliqué.

Wed. 11:30 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Samoa's chiefly system: The deregistration of chiefly titles and possible repercussions
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The social, economic and political affairs of Sāmoa had been governed under its chiefly system by the time of European contact in the 19th century. When Sāmoa became an independent country in 1962, elements of its chiefly system were incorporated into its constitution. The country's electoral act permits only those with chiefly titles to contest parliamentary elections, which are held every five years. Furthermore, at least 80 per cent of the country's population is still governed under the chiefly system on a day-to-day basis. However, over the years some holders of chiefly titles have abused their traditional privileges, and/or behaved in ways unbecoming of chiefs. Recently, a consultancy report which reviewed the Land and Titles Act, 1981, which provided the legal basis of the chiefly system, has recommended giving family members the legal right to strip the title off a holder who has not lived up to the expectations of his/her family, among other behaviour considered unbecoming of a chief. This paper discusses possible repercussions if the said recommendation were to be accepted into law.

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The Faa-Samoa: From Canoes to Internet Surfing

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The presentation focusses on the impact of development, understood mainly in an economic sense, on the customs and traditions of Samoa. It will attempt to explain how, why and to what extent certain aspects of the faa-Samoa have changed as a result of European intrusion. These aspects will include social, economic, religious and political relations. It will also look at current trends in these areas and the forecast for the future.

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American Samoa. A specific form of governance faced with globalization

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American Samoa, like the whole Pacific islands, faced all kinds of influences from the West and as the territory passed, and remained, under US administration, the Samoan culture and identity slowly became tinged with Americanism. Traditions have adapted themselves, some technics have disappeared however the fa'asamoa, the core of the culture, continues to be strongly claimed and defended by the entire population. Globalization has become more intensified recently, vigorously touching American Samoa, notably at the economical and political level. On the politic scene the globalization pressure can be felt too. Since the beginning of the US administration, the protection of the Samoan identity and culture is inscribed into the territory's Constitution. The matai system is also aknowledge as source of authority since one of the two executive chambers, the Senate, is only composed of matai, elected by matai only. Nevertheless, over the last century, several attempts were borne to evolve the political system to a less customary way. Despite these moves the form of governance did not change. More recently, migrants who lived many years in the USA mainland, started to return to American Samoa. They are highly educated, had their career in the US military or the administration, and although those men and women remain strongly attached to their Samoan culture and identity, they want to develope American Samoa toward a more democratic state and so came up against the "old-school" political leaders. In fact politicians try better to keep the political scene on the status quo and use references to indigenous epistemology to do so, like focusing on the importance of fa'asamoa to Samoan identity and the predominance of the matai system. Consequently adaptation to the new order of globalization does not look like it so much comes from the Samoan governement as from the private sector as well as from the legal system. Indeed the High Court is another important actor of evolution, as it tends through its judgements to make the Samoan society adjusted to new realities and codes of globalization.

Wed. 13:35 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Transformation of the Fijian Chiefly system 1970-1999

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The traditional Fijian chiefly system is a colonial artifact. It has been undergoing radical changes in response to a human rights constitution, pro-democratic movements, and a market driven education and economy. Not only is it changing, but in some respects, it is actually buckling under the onslaught of globalized forces. The most obvious area of weakness is in parliamentary elections. How is this cultural artifact of colonial origin faring in modern political culture?

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Between Coups and Democracy: The Political Role of the Fiji Military

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Fiji is, amidst the Pacific Island States, singular for the political role of its servicemen. The first military coup d'Etat was conducted in 1987 by Lieutenant Colonel Sitiveni Rabuka, then number three in the Royal Fiji Military Forces. The more recent was carried out in December 2006 by Commodore Frank Bainimarama. But the various coups have been operated with opposite aims: twenty-one years ago, the soldiers declared that they intervened to protect the interest of the Melanesian Fijians, which were seen by the nationalists as threatened by the first multiracial government. In December 2006, in contrast, the Commander of the Republic of Fiji Military Forces affirmed that they took action to establish a truly democratic system, taking a stand against the ethnic-based, pro-Melanesian policy of Prime Minister Laisenia Qarase. It is certainly paradoxical to conduct a coup in order to enhance democracy. Still, in the historical, social and political context of Fiji, such an attitude has certain coherence. Fiji as always been characterised by militarism. The pre-colonial society was largely based on warfare. The British administration, from 1874, as well as the Christian missions, ended the armed conflicts, but the Fijians, heirs to a powerful war tradition, sought its maintenance, adapted it and used it to strengthen their political power; first under the framework of colonisation, then to prepare independence and to provide their sovereign country with a noteworthy place on the international scene. Recognised and valued for their successful participation in multinational peacekeeping missions since 1978, the Fijian soldiers surprised the world by also conducting coups in their own country; and, moreover, by coups that are definitely contradictory in their objectives.

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L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Aperçus critiques sur l'histoire du Nagriamel au temps des Nouvelles- Hébrides
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Dans une perspective historique et critique, Marcellin Abong présente le rôle déterminant de Jimmy Stevens, le fondateur du mouvement Nagriamel, qui prit après guerre la défense des Mélanésiens des îles du nord de l'archipel de Vanuatu contre les spoliations foncières dont ils étaient victimes. Depuis sa fondation en 1966 à Vanafo sur l'île de Santo, jusqu'à la répression de sa tentative de sécession en 1980, les péripéties du Nagriamel permettent de démystifier le roman national de l'accession a l'indépendance de la République de Vanuatu.

Wed. 14:11 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

New electoral process in Papua New Guinea
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For the first time Papua New Guinea officially trialed a new electoral process nationwide through its scheduled 2007 general elections. There had been prior widespread skepticism however, over its ability to ensure fairness and success. The main areas of concern were at the implementation level starting with the Electoral Commission and all its technical support through to the susceptibilities of officers, candidates and voters alike largely stemming from their own biases and corrupt predilections. Despite all the misgivings however, PNG went through a fairly smooth election event with minimal technical setbacks, which perhaps only time will uncurl. While describing the author's experience and observations as a first time candidate in national elections, the paper highlights some principal technical applications of LPV that should require subsequent attention and improvement at policy level. In so doing, a full and fair (i.e. democratic) electoral process may become a reality for PNG through the Limited Preferential Voting method. Applied as it is however, election results are still vulnerably plagued by the ugliness of abuse through vote buying, rigging, and an increasing exploitation of the poverty-stricken rural voters as was previously experienced in the First Past the Post (FPP) electoral method hence, its prostitution! This is a subjective-objective commentary of the author's experience as a candidate in the 2007 election in Papua New Guinea."

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La démocratie dans le Pacifique : de l'héritage colonial à la recolonisation ?

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Les états et territoires du Pacifique insulaire se caractérisent par deux traits : ils se réclament tous de la démocratie et tous connaissent une instabilité politique chronique et une dépendance croissante vis-à- vis des bailleurs de fonds étrangers. Est-ce parce que le modèle démocratique n'est pas adapté à leur organisation sociale et à leur culture traditionnelle ? Quelles seraient donc les causes de cette inadéquation, de plus en plus criante au fur et à mesure du retrait des anciennes puissances coloniales ? En allant plus loin, on peut se demander si, en raison du repli progressif des puissances européennes de cette région, la quête chaotique de l'idéal démocratique ne prédisposerait pas ces micro-états à subir une " nouvelle colonisation ", plus pernicieuse parce qu'elle sera acceptée, voire sollicitée ? En effet, les deux Chines se livrent à une lutte d'influence dans la région, multipliant les aides financières et les financements d'infrastructures ; malheureusement, leur aide " amicale " a pour première conséquence, pour les micro-états, l'accroissement inéluctable de la demande d'assistance financière et donc de leur dépendance.

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La juridicité de la coutume autochtone dans quelques systèmes juridiques du Pacifique sud : entre respect des traditions et recherche de modernité

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De nombreux autochtones des états du Pacifique sud ont su conserver leurs traditions et coutumes qui, du point du vue de l'observateur juriste, peuvent s'analyser comme des règles générales et impersonnelles d'organisation de la vie en société. C'est le cas notamment en Australie, en Nouvelle- Calédonie, à Wallis-et-Futuna, en Polynésie française, au Vanuatu, aux îles Salomon, à Fidji, en Papouasie Nouvelle-Guinée. À côté de ces traditions, l'état définit et organise son propre système juridique et juridictionnel.

Coexistent donc au sein de ces états deux systèmes normatifs, voire plusieurs si l'état est fédéral et les coutumes plurales. Pour autant, la place qui est réservée dans le système juridique de l'état à ce " droit autochtone " n'est pas toujours la même. Si les traditions et coutumes peuvent être pleinement vécues d'un point de vue sociologique, elles ne sont pas nécessairement douées de juridicité, c'est-à-dire reconnues et sanctionnées par une autorité juridictionnelle étatique. Le " droit autochtone " peut être dépourvu de juridicité (Polynésie française) sinon reconnu de façon très limitée (Australie) ; il peut être à égalité avec le droit étatique (Nouvelle-Calédonie, Wallis-et-Futuna).

L'analyse de ces rapports entre droit commun et " droit autochtone " est souvent délaissée par les juristes. Elle est pourtant nécessaire à côté des études d'anthropologie et d'ethnologie juridiques. Car si la rencontre de cultures juridiques différentes est souvent difficile, source d'incompréhensions de part et d'autre, elle permet leur acculturation juridique réciproque à mesure que sont acceptées leurs spécificités et que sont définis des outils juridiques propres à les combiner de façon harmonieuse. L'étude, analysant cette rencontre juridique parfois conflictuelle, tend à définir quelques uns de ces outils d'acculturation.

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Opérateurs miniers, politique locale et gouvernance des ressources en Nouvelle-Calédonie. Le cas de Thio

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L'histoire de la Nouvelle-Calédonie porte l'empreinte de la mine et le développement du pays a partie liée avec celui du secteur minier. On doit replacer les grands projets actuels (KNS, Goro-Nickel) dans cette perspective historique si l'on veut comprendre comment la mine s'inscrit dans les dynamiques locales et les trajectoires individuelles et collectives. A cet égard, le cas de la commune de Thio est significatif en raison de la profondeur historique de l'exploitation minière (années 1870) et de la diversité des relations qui ont pu se nouer entre l'opérateur principal (Société-Le-Nickel/SLN) et les acteurs et institutions de la localité. La démarche ethnographique adoptée ici permet de saisir les modalités de construction et de transformation des interfaces entre industrie minière et arènes locales. On peut ainsi mettre au jour les multiples collusions et collisions entre acteurs (partis politiques, autorités coutumières, associations, entreprises, administrations, notables locaux et courtiers) et référents et répertoires de justification (autochtonie, développement économique, contrôle des rentes, logique de compensation, environnement, etc.) locaux et extra-locaux. Les formes institutionnelles et juridiques des relations que la SLN entretient avec les acteurs locaux et la commune ont-elles-mêmes varié dans le temps en fonction des transformations de l'institution communale, des changements politiques, des flux de force de travail et des mouvements sociaux. L'enjeu est ici celui des multiples fonctions (économiques, politiques, aménagistes, environnementales...) des opérateurs miniers dans une gestion communale marquée par un dualisme juridique qui place les terres coutumières hors d'atteinte des outils communaux d'aménagement du territoire et par un pluralisme institutionnel et normatif marqué par le poids croissant de référents et d'acteurs exogènes. Ce passage obligé par la politique locale de la mine permet de renouveler la réflexion sur le thème à une échelle plus large, dans une double optique de développement durable et de construction nationale.

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Intégrité et transparence dans les administrations publiques

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Ce sujet peut correspondre a la session 4 ou 5. Ma preference personnelle va au theme 5 Economie et gouvernance. L'eclairage sera adapte a la session retenue.

Bonne gouvernance et développement sont étroitement liés. L'intégrité et la transparence des politiques publiques, comme l'efficacité des services publics, demeurent des objectifs permanents. La France a une tradition de contrôle interne à l'administration par de grandes inspections centrales, ou externe par le juge. Contrairement aux pays anglo-saxons, elle n'a pas développé de contrôle non juridictionnel indépendant du pouvoir exécutif. Les USA ont expérimenté la fonction de procureur spécial (“ special prosecutor ”), devenu par la suite “ conseiller indépendant ” (“ independent counsel ”). Recrutés par le Ministre de la Justice ou par le Congrès, ils ont pour charge d'enquêter sur les fautes professionnelles commises par les agents d'autorité. L'Australie s'est inspirée de cette tradition plus large des “ watchdogs ” et l'Etat du Queensland (Australie) a mis en place en 2002 une commission permanente et indépendante, la CMC “ Crime and Misconduct Commission ” qui contrôle le secteur public. Sa juridiction est si large qu'elle couvre la police, les prisons, les établissements publics, les universités, les tribunaux comme les élus.

Loin de se limiter à une fonction répressive, la CMC encourage les politiques de prévention, rédigeant à l'intention des administrateurs comme des citoyens des manuels de comportement. Ils permettent d'identifier les conflits d'intérêts. Ils fixent des limites très concrètes entre les cadeaux acceptables et les rétributions. Ils définissent les limites de la faute professionnelle et de l'engagement de poursuites pénales. Les citoyens sont informés et leur vigilance est sollicitée. Il existe à leur intention un manuel de révélation (“ A guide to whistleblowing ”) qui explique les réactions utiles à l'intérêt public.

Cette étude s'appuie sur l'expérience de la CMC de l'Etat du Queensland et s'interroge sur une possible adaptation à la Nouvelle-Calédonie.

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Good Governance and Accountability: whether Niue should develop law and policy for an ombudsman service or freedom of information?

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Integrity institutions in the Pacific have a potential to become increasingly relevant in modern governments. A variety of integrity institutions include ombudsman offices, financial intelligence units, anti-corruption commissions and the like. Ongoing work under the Pacific Plan encourages the establishment of these institutions among Forum Island countries that are yet to offer such services. In 2003 the Forum Leaders adopted Principles of Good Leadership. Leaders were committed "uphold a just, fair and honest government through establishing and empowering bodies...to independently investigate public complaints against government actions".

A number of Pacific Island members that do offer ombudsman and ombudsman like services require strengthening and support. A Pacific Ombudsman Network about to become formally established as the Pacific Ombudsman Alliance will increase the sharing of experience and support among Pacific Island Ombudsman services. Members that are contemplating such services are encouraged and included in the Network.

A parallel work similarly advocated by the Pacific Islands Forum (PIF) is the promotion of freedom of information (FOI). Apart from Australia and New Zealand, the Cook Islands became the first PIF member to pass an FOI law. In the case of Niue, it has neither an ombudsman service nor FOI law. Aspirations to ensure good governance and accountability could be achieved by the enactment and execution of an Ombudsman and FOI law.

Access to official information, encouraging complaints against public institutions and investigating complaints against government actions promotes an open and responsible government. The rules and protocols of Pacific cultures may be partially responsible for the reluctance of Pacific governments to embrace the services executed under Ombudsman and FOI laws.

This paper will explore the experience of Niue and other PIF members in their aspiration to lead better governments.

Wed. 15:23 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Public participation in science policy: a model for engagement

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Local communities can feel disempowered in the face of change, particularly in regions like the Pacific where scientific and technological advances are often imported rather than developed locally. The use of deliberative democracy can help overcome this sense of disempowerment and overwhelm. Public engagement with science can benefit not only participating laypeople and scientists but also policy makers in areas relating to science and technology, through more informed citizens able to take an active role in decisions involving risk and uncertainty. This presentation will focus on a method of public participation in decision making in science that has been trialled successfully, though hypothetically, in the UK and Australia. It will look at the benefits and shortcomings of this particular model of engagement and what potential options for deliberative democracy could be useful for science and technology policy making in the Pacific.

Wed. 15:35 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

La Jeunesse Wallisienne : Entre Traditions et Modernité

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Cette communication s'appuie sur les résultats d'une recherche collective menée en 2007 dont l'objectif était d'éclairer l'activité d'identification des jeunes wallisiens au sein d'une société en mutation.

Les analyses présentées ici sont celles d'entretiens et d'observations menés auprès de jeunes wallisiens, de leur famille ainsi que de représentants d'institutions locales en charge d'encadrer la jeunesse à Wallis. Cette collecte d'information visait à saisir l'identité " en train de se faire " de ces jeunes hommes et femmes à partir de leur discours sur eux-mêmes et les autres, l'ici et l'ailleurs, la " coutume ", l'avenir du territoire puis de les confronter à ceux de leur famille et des institutions locales.

Nous souhaiterions révéler quelques caractéristiques de cette jeunesse wallisienne. Qu'impliquent en effet les processus d'individualisation et de modernisation sur les rapports intergénérationnels, au territoire, à l'argent, à la religion, à la coutume, au pouvoir, à l'éducation... que changent t-ils des relations entre les hommes et les femmes ?

Cette communication, dont l'originalité est de donner la parole aux jeunes, fait apparaître leur capacité à construire des combinaisons et des syncrétismes identitaires originaux, qui dépassent certaines catégories historiquement antagoniques à Wallis. Ainsi au-delà des discours sur l'opposition entre tradition et modernité, cette jeunesse wallisienne pourrait bien contribuer à développer ce territoire tout en y maintenant certaines références traditionnelles.

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Wed. 15:47 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Mobilités sociales et itineraires de vie en Nouvelle Caledonie

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Après avoir développé une recherche collective sur les conditions de la réussite des néo-calédoniens dans les différents champs de la vie sociale (économie, sport, industrie, culture etc...), nous restreignons ici notre interrogation aux conséquences du hiatus entre la culture mélanésienne et la culture scolaire ou occidentale aujourd'hui.

En effet, lorsqu'il s'agit de questionner les fonctions de l'institution scolaire, les idéologies - qu'elles soient politiques ou scientifiques - et les croyances, abondent : haut lieu de la reproduction sociale ou bien ascenseur social... ou bien les deux en même temps ; et la bonne volonté ne suffit pas toujours.

En Nouvelle-Calédonie, au moins autant qu'ailleurs si ce n'est davantage, différents niveaux doivent être interrogés : les conditions historiques du développement de l'institution scolaire ; les relations contemporaines entre les familles et l'école, la capacité de mobilisation individuelle face aux attentes et exigences collectives. C'est sur cet aspect que porte notre questionnement, celui de l'individuation, permise ou non par la communauté.

Nous souhaitons interroger les conditions du dépassement de l'affrontement, formulé lors de nos entretiens, entre deux matrices culturelles, celle de la tradition mélanésienne et celle sous-tendue par la modernité scolaire.

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Wed. 16:20 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Développement du tourisme en tribu, un enjeu identitaire pour les mélanésiens de Nouvelle-Calédonie
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Touristes locaux et métropolitains sont souvent déçus par l'accueil qui leur est réservé en Nouvelle-Calédonie. Leurs critiques se focalisent plus précisément sur trois éléments: une hospitalité en demi-teinte voire une hostilité à leur encontre, l'absence des prestataires à leur arrivée, le manque de rigueur de l'organisation des activités de découverte culturelle. Ces remarques sont récurrentes quelques soient les Provinces visitées ou les structures d'hébergement choisies (gîtes ruraux, tribaux ou hôtellerie de luxe). Dans le cadre d'une thèse de doctorat,entretiens qualitatifs et observation participante révèlent la complexité relationnelle qui s'instaure entre les visiteurs et la population locale de Hienghène qui les reçoit en tribu. L'expérience touristique s'inscrit dans un échange interculturel où les pratiques et représentations du voyage sont hétérogènes. Plus précisément, la rhétorique de l'exotisme construit chez les voyageurs occidentaux un imaginaire où les mélanésiens seraient enfermés dans un carcan "traditionnel". Alors que les touristes sont déçus de percevoir en tribu ce qu'ils considèrent être des signes de la "modernité",les prestataires s'interrogent: comment minorer les insatisfactions des visiteurs sans folkloriser leur propre culture? Sachant qu'au delà de cette appréhension, les crispations se situent aussi au niveau des modifications que peut entraîner le développement touristique-c'est à dire- les hiérarchies coutumières en place, les statuts, rôles et rapports sociaux. Il s'agit alors de savoir comment accueillir l'étranger chez soi sans que cette altérité ne devienne une menace?

Wed. 16:32 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Culture occidentale et culture kanak : Equilibre ou rééquilibrage ?
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Thème : Culture et Gouvernance : les enjeux de la modernité - Questions d'identité, acculturation et nouvelle gouvernance.
Titre article : Culture occidentale et culture kanak : Equilibre ou rééquilibrage; Stratégies ?
Résumé
Revendiquées par les indépendantistes, la culture et les langues kanak sont reconnues politiquement et culturellement, constituant ainsi un acquis sans précédent. La venue de nouveaux projets économiques a tendance à renforcer cette revendication. Cette accentuation constitue un indicateur de recherche d'intégration participative au dynamisme de développement économique. Dans le discours kanak, il est fréquent d'entendre,... être placé à la position qui convient au pouvoir conféré, ... juste là où il faut... pour tous objets intégrant l'espace insulaire. Expression souvent attribuée à l'implantation des structures administratives et scolaires en milieu kanak. Peut-on parler de phagocitage des objets de la culture occidentale par la culture kanak ou plutôt une recherche de symbiose entre culture exogène et locale ? L'exigence du rééquilibrage, affermit-elle implicitement une des ces apparences ? Laquelle ? Aujourd'hui les Kanak ne cherchent-ils pas à contraindre de hauts responsables politico-économiques, syndicaux et associatifs à produire une stratégie circonspecte et à opérer une adaptation à rebours ? Il serait alors opportun, d'analyser les discours du coutumier, du politique, du syndicaliste et de ceux impliqués dans ce rapport biculturel valorisant; entre culture exogène et culture locale à travers une enquête ethnographique et cela quelque que soit leur appartenance idéologique.
Mots clés : Culture Kanak, langue kanak, coutume, Nouvelle-Calédonie.
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Wadrawane W., E Emplacement et déplacement des écoles en milieu Kanak : Un analyseur anthropologique de la place faite aux institutions de savoir occidental dans une situation coloniale. In : Les Sciences de l'Education pour l'ère nouvelle..., Revue Internationale, Caen, 2008, pp. 115-139.

Wed. 16:44 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Living Va Fealoaloa'i: 'Governing Concepts of Work among Teine uli in Samoa
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Much has been said in academic and policy-related spheres about Pacific Island women and work. Yet, a whole lot more remains unsaid and not well understood. This is true for the case of Teine uli (Melanesian-Samoan women) in Samoa whose work experiences as recent settlers in peri-urban Vaitele in Apia, mirror the persistence of cultural meanings that underpin their understanding of work. This paper argues that the Samoan concept of va fealoaloa'i (social space between people) is central to Teine uli's world of work. It is through this concept that one gains an understanding of women's preference for 'working in groups' and their reciprocal approach to waged labor. Awareness of and respect for va fealoaloa'i not only governs the women's work practices but also defines their continuity.

Wed. 16:56 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Modernity, culture & autonomy
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2008 saw the culmination of several years of effort on Rapanui to achieve a better position in the Chilean nation. The arguments for achieving this were cast in historical terms, to 1888, when there was a voluntary agreement signed between the government of Rapanui and the government of Chile. The paper discusses the ambiguous terms of this agreement that was bi-lingual as were many such documents in Eastern Polynesia at that time. Those who argued for autonomy within the Chilean state did so on the basis of the Spanish terms of that agreement whilst those opposed them did so on the basis of the Rapanui language side of the same document. The paper details these debates, including why Chile constantly is willing to change the status of Rapanui within its French republic inspired constitution. Rapanui in the 19th century consistently had sought a protectorate from France, but equally consistently, France refused. Chile did not offer a protectorate, but annexation after which that South American state proceeded to suppress any local form of governance.

Wed. 17:08 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Constructing Identity at a distance: the Rapanui community in Santiago, Chile

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At the last Chilean census 4647 people declared to belong to the Rapanui ethnic group; 51% of these resided on Easter Island, 49% on the Chilean mainland, and 26% of these in Santiago, the Chilean capital. This fact is the starting point for our analysis on the cultural and identity consequences that this territorial dispersion has on contemporary Rapanui society.

In this setting Rapanui individuals have strived for the maintenance of cultural practices through the flows which connect the island with its inhabitants living on different continents. Remittances of money or valued goods as well as the flows of people that come and go from one place to another characterize today's Polynesian cultures.

In the present work we will show how the links between continental Chile and Easter Island throw light on the contemporary Rapanui identity. We propose that migration has shaped the Rapanui people into a translocal culture. In order to reproduce their culture and identity they have resorted to construct a network of linkages and flows which connect their place of origin with their places of residence. The Rapanui residence in Santiago, Chile, has resulted in a reflective process on their own identity. The Rapanui way of life in an urban setting, their family relationships, their territorial residency, their work, their feasts and even their way to dress, remind them on an everyday basis, that cultural differences are an everyday topic to think about. The difference between being Rapanui and living on Easter Island, of being Rapanui and living on the continent, or of being non-Rapanui, are questions that surround the everyday experience of the urban Rapanui in Chile/Santiago. The ethnic Rapanui identity is always shaped by the tension between growing roots and mobility, between the place of residence and the place of origin.

Wed. 17:20 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Measuring Perceptions and Attitudes of Guam's Micronesian Immigrant Community with regard to Guam's Network of Marine Preserves

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One challenge of managing resources associated within the coastal zone is ethno-culturally diverse sub-populations that may or may not share the same fundamental resource management values of the governing bodies, as reflected in governing polices. Understanding differences in stakeholder attitudes, perceptions and knowledge toward the marine environment and coastal resource management is crucial for successful implementation of public outreach programs, ultimately resulting in the overall acceptance and success of management decisions made by government natural resource agencies as measured by positive stakeholder behavioral changes. This study investigates a "community", specifically a sub-population of Guam's community: Micronesian immigrants and their perceptions and attitudes toward Guam's network of marine preserves. Although culturally, the region referred to as Micronesia also includes Guam, the Commonwealth of the Northern Mariana Islands, Nauru, and Kiribati, for the purposes of this study, the term "Micronesian immigrant population" includes only those who migrated to Guam from the Republic of Palau, the Federated States of Micronesia (FSM), and the Republic of the Marshall Islands (RMI) after the implementation of the Compacts of Free Association (1986 for the FSM and the RMI and 1994 for Palau). This study attempts to determine impacts, if any, of the Micronesian immigrant population on Guam's near-shore reefs and coastal areas. It also attempts to ascertain awareness levels of Guam's marine preserves and its boundaries, regulations, and associated regulatory government agencies. It also provides a political, social, and economic context of Micronesian immigrants in Guam. Finally, this study examines the positive and negative impacts of current management measures, specifically with regard to public outreach and environmental awareness and whether the natural resource agencies are effectively conveying necessary information about Guam's marine preserves in a manner that Micronesian immigrants generally understand.

Wed. 17:32 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Making Guam One's Home: The Story of the Taiwanese-Chinese 'Old-timers' in Guam

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This research utilizes the island of Guam as a case study to demonstrate ways in which Taiwanese have successfully established themselves in businesses and applied their entrepreneurship within the last three decades of their settlement on Guam. Apart from being astute business people, their attachment to the island of Guam is asserted in various ways, and their sense of home grows stronger, with reference to the time they live in Guam, where their children attend elementary and secondary schools. For many of the second generation of Taiwanese on Guam, having pursued tertiary education, or having married afterwards in the U.S. Mainland, their sense of home with reference to Guam still remains. This research is based on participant observation and in-depth interviews in Summer 2008 with 25 Taiwanese immigrants residing in Guam.

The Taiwanese "old-timers" on Guam are people in between - neither have they totally abandoned their Taiwanese homeland as a result of their long stay abroad, nor have they become transnationals who live in two entirely different social fields. The Taiwanese of Guam have become 'permanent settlers' in Guam. Well-adapted to the Hafa adai lifestyle, they enjoy Guam's multi-cultural non-racialized environment. The Taiwanese on Guam seem to wear a separate identity from 19th century Chinese sojourners on one hand, and New Asian transnational migrants on the other.

Wed. 17:44 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Cultural understanding and misunderstanding between ruler and ruled: US government and Okinawans, from 1945 to present

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The Okinawa Islands are located at the southernmost tip of the Japanese Island chain nearby China. United States forces landed on the small islands of Okinawa in 1945 during the Pacific War. The US government introduced a military government and implemented occupation policies over Okinawa from 1945 to 1972. She realized that the Okinawa Islands were a suitable location for US military bases to maintain peace in Asia. Okinawa reverted to mainland Japan in 1972, but even today about 50,000 US military men and their families live in Okinawa in terms of the Japan-US Mutual Defense Treaty. During the US military government era the rulers and the ruled made efforts to understand each other. However, sometimes both parties failed to understand each other. Even today there is some cultural misunderstanding between Americans and Okinawans. The presentation explains the historical process of cultural exchange between the US and Okinawa, and analyzes cases of culture-based mutual misunderstanding.

Wed. 17:56 Culture and Politics session room
L'Espace de la communication : constructions politiques, droit et coutume, clivages sociaux, minorités - Communication and Social

Quelles identités à l'épreuve de quelles mondialisations ?
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La mondialisation semble menacer la diversité des sociétés en position de minorité, économique, linguistique ou ethnique et, à plus forte raison, celles qui cumulent ces données, comme c'est le cas pour les petits pays du Pacifique. La décolonisation a ouvert le temps d'une parole affranchie, a permis la sortie du mutisme culturel. Une telle affirmation semble couler de source tout comme le fait que cette prise de parole est un acte politique fort qui se fait d'abord sous le signe de la résistance à une autorité enfin discutable. Penser par soi, pour soi, avec ses mots à soi est peut-être la seule souveraineté exigible dans un monde où tout le monde dépend de tout le monde. Pour autant la question est de savoir si les affirmations identitaires sont toujours l'expression libératoire et légitime d'une culture menacée ou, parfois, le produit d'une ancienne planétarisation qui a façonné partout le même discours stéréotypé. Ainsi, même si la question est redoutable, il faut bien avoir la témérité de se demander s'il suffirait d'avoir acquis un cadre de bilinguisme strict, appuyé même par une souveraineté politique, pour que la parole libérée devienne ipso facto une parole libre. La contestation des dérives de l'économie libérale et des tentations fondamentalistes est aussi le fait d'une nouvelle mondialisation qui oppose des valeurs démocratiques et des exigences critiques à l'amoralisme des lois du marché. Ce n'est pas exclusivement dans l'insularité d'un discours local qu'une culture s'exprime ou se respecte.
Le paradoxe ne serait ainsi pas mince s'il fallait constater, en parallèle au processus de globalisation composant un village planétaire, un processus non moins négligeable et ambigu d'émiettement et de miniaturisation du social, s'il fallait attendre d'une mondialisation devenue aussi médiatique qu'économique la meilleure défense des particularités locales.

Wed. 8:15 Economy session room
Keynote lecture on Governance and the Economy: Future Challenges for the Pacific

" Comprendre pour agir : Quels outils pour décider des politiques de développement durable ? "
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Les politiques doivent apporter des réponses aux problèmes du réchauffement climatique via des politiques de développement durable. Mais de quels outils d'analyse disposent-ils pour concevoir ces questions, d'une part, et fonder leurs arbitrages spatiotemporels, d'autre part ? Penser les questions de développement durable oblige à appréhender une incertitude de très long terme pour opérer des choix à très court terme sur des sujets aussi divers que la protection de la biodiversité, la qualité de l'air, la lutte contre le réchauffement climatique ou bien des considérations d'équité intergénérationnelle. Dès lors, des dilemmes éthiques surviennent : faut-il accorder de l'importance à la faible probabilité qu'une catastrophe naturelle majeure ne se produise ou bien à l'ampleur de la catastrophe potentielle ? Le bien-être des générations futures a-t-il la même valeur qu'il s'agisse d'une génération dans cent ou dans trois-cents ans ? Au-delà de considérations techniques sur la fixation d'un taux d'actualisation public, les procédures de révélation puis d'agrégation des préférences des citoyens sur, par exemple, la valeur qu'ils accordent à la biodiversité actuelle ou à son maintien dans le futur, semble aujourd'hui un enjeu majeur pour savoir " ce que nous devons faire ". Les instruments de mesure de la valeur de cette biodiversité vont également jouer un rôle : l'aménité a-t-elle une valeur ? La biodiversité est-elle d'autant plus chère qu'elle est rare ? Au quel cas, les efforts de préservation devraient porter sur les seuls " hotspots " au détriment de la biodiversité " ordinaire ". Et pourquoi dans ce cas, ne pas accorder une valeur d'existence à une espèce en voie de disparition qui n'est actuellement pas encore connue ? Entre les souhaits des populations locales exposées aux conséquences du changement climatique et les choix des gouvernements subsiste un hiatus. Une médiation est à repenser pour reconstruire la continuité entre niveau individuel et niveau politique. Des institutions de développement peuvent jouer ce rôle à travers leurs projets et leur appui aux politiques publiques. Le développement durable est avant tout un concept social et politique.

Wed. 9:00 Economy session room
Trade and Tourism

Australian and American trade policies: do they rock or tango ?

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This paper presents an empirical analysis of the comovements of trade policy between Australia and the United States. We cover both countries' trade policies for the last 100 years, and examine which links exist between each other. We discriminate between two hypotheses: that both policies have been shaped uniquely by national considerations (the "rock" hypothesis) and that there have been strong influences of one country over the other (the "tango" hypothesis). A confirmation of the first hypothesis would give support to the literature on the political economy of trade, which insists on national factors (labor laws, level of wages, degrees of concentration in the industries threatened by imports ...). However, would the second hypothesis be verified, this would give a clue on the degree of constraint globalization imposes on national politicians. Discriminating among both hypotheses is thus important for governance issues, e.g. assessing the degrees of freedom national politicians have in tailoring trade policy to their country's needs. In this paper, we offer an empirical exploration of this issue. As the paper is fundamentally an empirical research, the first part describes the data we use and the empirical methodology to which we resort to, while the second part discusses the result of estimates. The most important piece of data is computations of both countries' tariffs for the last hundred years. We rely on Lloyd's (2008) estimates for Australia [Lloyd P., 2008, "100 years of tariff protection in Australie", Australian Economic History Review, vol. 48, n° 2, 99-145], and on the International Trade Commission for the United States [USITC, 2006, "Value of U.S. imports for consumption, duties collected, and ratio of duties to values, 1891 - 2005"]. The papers' results show that the trends of both trade policies may not be the result of pure chance, but that a causal relationship exists. This matters to assess the prospects of free trade areas projects in the Pacific region, which may have to suffer from external influence.

Wed. 9:30 Economy session room
Trade and Tourism

Australia's trade policy: was it for sale ?

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This paper presents a political economy analysis of Australia's trade policy during the last 100 years. The issue has shaped the political arena in most national elections from the time of the Federation, and still does. Hence the issue is topical, even more given the globalization trend, and deserves careful analysis. The paper offers both a theoretical and an empirical exploration of the issue, and is structured as follows. The first part of the paper is a theoretical exploration of the dynamics of electoral promises, building on an electoral competition model with endogenous policies. We extend the workhorse Grossman-Helpman (1994) model [Grossman G., Helpman E. [1994], "Protection for sale", American Economic Review, 84, 4, 833-850] to include sanctions from the electorate and lobbies when the incumbent does not satisfy the expected performance she promised to deliver. This framework allows to deal with the intertemporal dimension needed to understand the prevalent cycle of promises, disappointment, new promises, new disappointment ... This model is particularly relevant in Australia's case, where lobbies and pressure groups have a prevalent role in shaping electoral issues. The second part of the paper derives an empirical model to estimate the political determinants of Australia's trade policy. Using the recent estimates of the country's tariffs by Lloyd (2008) [Lloyd P., 2008, "100 years of tariff protection in Australie", Australian Economic History Review, vol. 48, n° 2, 99-145], we perform estimates of a discrete choice model (Multinomial Logit) to assess how trade policy has responded to political events, and to incumbents' promises. The main contribution of this paper is to provide an empirical test of the "trade policy for sale" hypothesis in Australia's case, under a long period, showing how elections have shaped trade protection. This notably matters to assess the chances of free trade areas projects in the Pacific region.

Wed. 10:30 Economy session room
Trade and Tourism

Miles and more: A quantitative assessment of the 'food miles' movement

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One aspect of the climate change discussion that has attracted a great deal of media attention, particularly in Europe, is 'food miles'. The concept that the further food has to travel, the worse its impact on the environment is one that - although flawed - is easy for consumers to grasp and for domestic import-competing food producers to support. We investigate the economic implications of food miles-induced preference changes using an economy-wide analysis. We find that welfare losses relative to GDP are largest in New Zealand and several Sub-Saharan African nations. Moreover, for some distance-preference change relationships relative welfare costs are significantly larger in parts of Sub-Saharan Africa than elsewhere.

Wed. 11:00 Economy session room
Trade and Tourism

Developing Tourism in the French Pacific: Issues and Challenges

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Many factors support tourism as a political and economic project in the Pacific. A number of issues need to be problematized as challenges and consequences of implementing tourism. These concern the people who will welcome visitors as well as those who will be affected even though not directly involved. Can/should tourism destinations maintain their local/cultural specificity even as they face the compulsion of integration into the global system? This presentation will address these issues and challenges in the French Pacific (where I have researched for more than a decade) to avoid essentialising conclusions across the Pacific region. It will determine the context (regional and global) that permits considering tourism as a tool of economic development. It will examine who tourism development should be targeting and in what form(s) since subsistence ways of living coexist with modern lifestyles. Recent acceptance of the carbon imprint of economic activities, in particular that of long distance travel, forces careful consideration of the sustainability of tourism. Projects (and their representations on international markets) constructed must be true magnets. The balance sheet must include all costs, for the development to be labelled sustainable, especially hidden costs until now borne by local communities. Different ethnic groups and Indigenous people (whose naming and whose imaging must not obfuscate their existence and their ability to participate) live and use resources in these areas. They have often been exploited as commodified objects. Other times, searching for unique sites (sights) has led to their erasure from tourism's agenda. Durable/sustainable tourism development requires working from the grassroots so that a major part of the population can participate. Any project must also take into account that communities are not homogeneous and that any economic project cannot satisfy all and every member.

Wed. 11:30 Economy session room
Trade and Tourism

Bright tourism:sustainable development in a tourist resort

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The climate change has had big influence not only on deterioration of the atmosphere or water quality but on the tourist attractions of the seashore. We investigated the environmental change along the coastline in a tourist resort, and considered the cause. And the environmental change quantified the influence affect worth of tourist attractions. The beach famous as a tourist resort was selected in our country, and it investigated about the water quality of sea water, the state of sands, and the landscape. Water quality measured the quantity of a coliform bacteria count, COD, phosphorus, and nitrogen. The state of sands investigated the color of sand, the particle diameter of sand, and the feel (a pain is included) given to a leg. Moreover, it analyzed about the picture of both which were seen from the sea and land about the landscape. It was shown as a result of research that there is correlation that it is strong between a coliform bacteria count and the water quality of an inflow river. Moreover, the phosphorus and the nitrogen in sea water caused eutrophication, and clarified the expression of relations between these substance concentration and scene aggravation, and a bad smell complaint. The state of sands and the color of sea water showed that it was the big factor which determines worth of the beach as tourist attractions from the result of having performed potential structural analysis to the questionnaire to a tourist. As a result of measuring the spatial frequency of the picture of the seashore and performing image analysis by FFT, the rate of the sands occupied within the position and view of the horizon found out that it was the dominant factor which determines evaluation of the beach. The fundamental scheme for managing an attractive beach as a conclusion was proposed.

Wed. 11:45 Economy session room
Trade and Tourism

Tourisme et Insularité dans les îles de l'Outre-mer français : Quel lien ?

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Depuis le début des années 1980, les problèmes de développement que connaissent les petites économies insulaires font l'objet d'un intérêt sans cesse croissant. De nombreuses études, dans des domaines variés (économie, statistiques, géographie,...) s'attachent en particulier à saisir les contraintes et les avantages de l'insularité dans la réussite économique des îles. Il est ainsi généralement admis que si celle-ci se présente comme une donnée négative qui génère une série de handicaps difficilement surmontables (exiguïté du territoire, déséconomies d'échelle, surcoûts,...), elle se révèle être un atout majeur pour de nombreuses activités comme le tourisme. En effet, le succès touristique de nombreuses destinations insulaires notamment de l'outre-mer français repose essentiellement sur la symbolique de la rupture permanente de la continuité terrestre. Toutefois, peu de travaux se sont intéressés au lien qui peut exister entre les différentes formes d'insularité et le type d'activité touristique développée. Il faut dire que l'insularité est encore conçue comme une donnée brute et définitive, invariable sur tous les territoires insulaires. Or, depuis la fin du XXe siècle, on a assisté à une véritable révolution en matière de spatialité qui aboutit aujourd'hui à une extrême variété des situations insulaires. Du dédoublement de l'insularité à l'hypo-insularité en passant par la double insularité archipélagique ou la mono-insularité partagée, les îles présentent un panel de configurations extrêmement riche de la Caraïbe à l'Océan pacifique en passant par l'Océan indien. Aussi, ma communication cherchera - sans céder à un quelconque déterminisme géographique - à mettre en évidence le rapport entre les nouvelles formes de spatialités insulaires que connaissent les territoires ultramarins et les contours de l'activité touristique.

Wed. 14:00 Economy session room
Environmental Economics

Requalification des usages et des biens économiques induits par les politiques de conservation : l'exemple des aires marines protégées de Polynésie Française

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Les écosystèmes récifo-lagonaires des îles de Polynésie Française, qui sont depuis longtemps le support d'activités traditionnelles très importantes pour les populations îliennes, sont aujourd'hui l'objet de politiques de conservation qui ont de profondes conséquences sur les relations entretenues entre les sociétés et leur environnement.
La nécessité de freiner l'érosion de la biodiversité marine et la dégradation des habitats a induit des politiques publiques spécifiques parmi lesquelles la création d'Aires Marines Protégées. En Polynésie Française les Plans de Gestion de l'Espace Maritime (PGEM), comme celui de Moorea mis en place en 2006, sont des expériences récentes dont l'étude permet néanmoins d'identifier les principaux effets qu'elles induisent, à côté des objectifs de conservation.
On montrera comment le système d'activité est affecté par ces politiques. Les rapports entre usages extractifs (pêche, collecte des coquillages, etc.) et activités récréatives (tourisme local et tourisme international) semblent particulièrement affectés par les nouvelles régulations induites par les politiques de conservation.
Parallèlement les nouveaux zonages de l'espace lagonaire et les changements de règles d'accès à l'espace et aux ressources biologiques induisent des changements dans leur statut économique. Ces changements seront analysés au moyen d'une grille de lecture inspirée de la théorie économique des biens publics s'appuyant sur des critères d'exclusion et de rivalité. Cette grille sera affinée par des éléments de dynamique institutionnelle et d'anthropologie juridique prenant en compte la spécificité des pratiques et des droits locaux.
On montrera comment une politique visant en priorité la préservation d'une biodiversité menacée peut entrainer des changements importants dans les droits d'accès et d'usage des différents catégories d'acteurs, et aussi dans le système économique diversifié concerné par les ressources lagonaires. Ces changements vont en retour conditionner les perceptions relatives aux politiques de conservation et donc le degré d'adhésion des acteurs économiques.

Wed. 14:30 Economy session room
Environmental Economics

The Greening of Yap: The Transformative Reemergence of Subsistence Agriculture and Its Impact on Rural Community Development In Yap, FSM

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On the islands of Yap, in the Federated States of Micronesia (FSM), in the Western Pacific, subsistence agricultural activities have been practiced since the pre-contact period and they continue to remain an important subsistence activity today. Current estimates place about 80% of the FSM as reliant on subsistence and semi-subsistence livelihoods (ADB 2005, pp. 98). Recently there has been a growing movement to use what were once solely traditional subsistence activities as income generating activities as well. Previous work conducted by Ames and Ames in 2007 on Yap, indicated that while many Yapese still relied extensively on subsistence activities, there was an increasing use of small-scale agricultural production to augment family incomes. Simultaneously, due to current economic conditions between 1990 and 2000 subsistence activities in the FSM have actually increased from 10% to 17% of families being dependent on subsistence activities (ADB 2005, pp.99).
There is, however, a lack of research in Yap, which links the importance of small-scale agricultural and agro-forestry resources to sustainable economic activities and rural community development. This paper combines sociological and economic impact assessments with a cultural geographic analyses of these small-scale agricultural and agro-forestry resources, and addresses how they have been transformed into wage generating activities and their role in sustaining small informal community economies while they have simultaneously reemerged as critical subsistence activities in Yap.

Wed. 14:45 Economy session room
Environmental Economics

Spatial- temporal Evolution of Aquaculture in Pearl River Estuary Coastal Zone

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Pearl River Estuary is experiencing of fast urbanization and industrialization as the most active region in the economic development of our country. The reasonable effective sustainable using of each item of resources there has been an object which is pursued to develop and use spatial resources. According to the 1980s' survey data of national littoral zone, 1995's TM remote sensing image,2005's SPOT remote sensing images and other multi-source supplementary data, information, the spatial- temporal evolution process of cultivation area in the coastal zone of pearl river estuary from 1985 to 2005 is analyzed by using the single land use dynamic index, landscape fragmentation , statistics of region ,and the model on changes of gravity center. The result indicated that the cultivation area increased from 125.49 km2 in 1995 to 2005 345.20 km2 in 2005,and was 2.75 times of which in 1985.The yearly average rate of increment of cultivation area was 14.30%,and it dropped to 1.32% after 1995.The fragmentary degree of cultivation area was increasing gradually during the 20 years(1985-2005) from 0.000015 in 1985 to 0.002824 in 2005. The aquiculture area have a large region difference. The distributed center-of-gravity of cultivation area moved to northwest entirely.

Wed. 15:00 Economy session room
Environmental Economics

Sustainability and adapted product eco-design in Small Island Developing States of the South Pacific: Teachings of the first case studies in Fiji

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The paper starts with situating sustainability in the context of Small Island Developing States (SIDS) of the South Pacific. They are extremely vulnerable to current development trends and severe/acute environmental problems exist such as the impact of climate change and the poor management of solid waste for example. Additionally, these countries are also characterised by a limited human and technical capacity for dealing with such acute problems. Despite the fact that environmental problems should indeed be urgently technically dealt with the use of end of the pipe measures this paper maintains that the best option is to reduce the reliance on waste collection and recovery through the development of adapted pollution prevention measures, in particular through product eco-design. Solid waste management problems caused by imported as well as locally produced products are described and discussed. It is then proposed that eco-design, which has been promoted in developed countries since the mid-nineties, should be adapted to the developing countries context, especially in SIDS. This paper reports results of a project that aims at initiating ecodesign projects in the local industry of SIDS. In order to steer project, a trained international volunteer has been based at the University of the South Pacific and has worked with local professionals to define an adapted methodology and to animate specific projects. The original approach is based on an adaptation of the D4S (Design for Sustainability) methodology published in 2006 by the United Nations Environment Programme. The current sectors that have been approached are textile and cosmetics. The results of the first case study in a textile company as well as the preliminary results of a similar on-going study with a cosmetic company are presented and analysed. Conclusions on SIDS-sound eco-design are derived and the need for institutional and economical incentives such as eco-labels.

Wed. 15:15 Economy session room
Environmental Economics

The Social and Economic Challenges of Marine Protection at Fagatele Bay National Marine Sanctuary
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In American Samoa, the success of Marine Protected Areas (MPAs) is largely dependant on local governance, regional economics, and cultural norms. The support of local communities is essential for monitoring and enforcement while economics and tradition dictate fishing practices and compliance with regulations. To this end, a socioeconomic assessment was completed in the summer of 2008 to evaluate the human dimensions of marine conservation at the Fagatele Bay National Marine Sanctuary (FBNMS). Exploratory variables included stakeholders and users, the extent of their use, income dependent upon sanctuary resources, and local attitudes towards marine conservation. Interviews were conducted with Village Mayors and key informants in four villages adjacent to Fagatele Bay. Following the initial assessment, a survey was distributed to village residents to identify key socioeconomic challenges that may influence marine conservation. The results of the study will contribute to the review of the management plan and instruct the establishment of future MPAs in American Samoa and throughout the South Pacific.

Wed. 15:30 Economy session room
Environmental Economics

Developing a revised Fisheries Law for Niue under the Western and Central Pacific Fisheries Convention (WCPFC)
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The Pacific Ocean is reputedly the largest ocean mass in the world and with it, an abundance of marine resources. By tradition the life, lifestyles and livelihoods of the Pacific Island people is closely tied to the ocean. The Western and Central Pacific Ocean consists of many Pacific Island member countries with limited capacity and resources to ensure the sustainable harvest and management of its fisheries. Increased interest in Pacific fisheries now creates a need to protect the national interests of the Pacific owners and at the same time encourage commercial fishing activity to ensure economic returns for the State.
One such mechanism to 'protect and promote' long term conservation and sustainable use of the fisheries is the Western and Central Pacific Convention (WCPFC). WCPFC recognises the "ecological and geographical vulnerability of the small island developing states, territories and possessions in the region, their economic and social dependence on highly migratory fish stocks, and their need for specific assistance, including financial, scientific and technological assistance, to allow them to participate effectively in the conservation, management and sustainable use of highly migratory fish stocks".
Niue became a full member of WCPFC since March 2004. Legal obligations under WCPFC require domestic legislation at the national level.
This paper explores Niue's experience in the review of its fisheries laws against WCPFC obligations.

Wed. 16:15 Economy session room
Environmental Economics

Translating global climate change discourse into regional scientific knowledge: mapping the production of the science of climatic vulnerability in the Pacific

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The funding of regional climate vulnerability studies by international agencies has shaped the resultant bodies of scientific knowledge. These studies have sought to provide scientific evidence to support the implementation of local climate adaptation strategies. When examining climate vulnerability studies in the context of Pacific communities there is a need to consider what scientific knowledge is considered legitimate, who constructs or defines this legitimacy, and how this knowledge has changed across time. The development of an understanding of how nations, organisations and individuals are applying this knowledge is of importance in determining the extent of the uptake of this research. This study provides an overview of internationally funded scientific work that has been undertaken in the South-West Pacific and maps the shifts in research focus over time. The messages communicated in these studies provide an insight into global shifts in climate change discourse. Importantly, analysis indicates that current discourses may present barriers to effective uptake of adaptation strategies at the local scale. Overcoming these barriers is of critical importance if the scientific messages are to be successfully translated into national adaptation strategies.

Wed. 16:30 Economy session room
Environmental Economics

Environnement, changement climatique et gouvernance, un enjeu stratégique et diplomatique : une opportunité pour les territoires français du Pacifique

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S'il est entré dans l'arène internationale et nationale depuis près de 30 ans, le changement climatique n'a jamais autant occupé l'espace médiatique et politique que ces dernières années. En parallèle, des évènements majeurs (cyclones, inondations...) sont venus marquer les esprits et un sentiment de vulnérabilité s'est donc imposé dans l'agenda politique international et local.

Cependant, face aux enjeux liés à la mise en place d'accords internationaux de réduction d'émissions et les risques crées et amplifiés par le changement climatique lui-même, les milieux socio-économiques et politiques ainsi que la communauté scientifique française du Pacifique se sont relativement peu souciés des liens entre les impacts économiques, sociaux et environnementaux et changement climatique. Or, des travaux récents mettent l'accent sur les risques de ruptures du milieu et d'effets de seuil limitant nos capacités d'adaptation. En outre, est évoquée la notion de sécurité afin de prendre en compte des composantes telles que les sécurités alimentaire, sanitaire, énergétique, culturelle et environnementale.

A titre d'exemple, le caractère eustatique du changement climatique modifiera immanquablement les littoraux, parfois très urbanisés. Ses conséquences ne se limiteront pas uniquement à la mise en danger de l'habitat des populations. Les répercutions climatiques impacteront également les principaux secteurs des économies insulaires.

Gérer les conséquences locales et régionales du changement climatique pour les territoires français du Pacifique pourrait donc devenir nécessaire dans un futur relativement proche. Ainsi, il semble utile de proposer des approches systématiques afin de renforcer la sensibilisation et la planification préalable, l'adaptation et la mitigation au changement climatique par le biais notamment du renforcement de la coopération et des réseaux au niveau régional. Ces approches offrent dès lors une formidable opportunité de dialogue, de coopération et de promotion de nouvelles relations entre les communautés insulaires francophones et anglophones océaniennes.

Wed. 16:45 Economy session room
Environmental Economics

Développement durable, politiques publiques et ruralité en Nouvelle-Calédonie : entre local et global, quels contextes, quels enjeux ?

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Le référentiel du développement durable est a priori fédérateur. L'intégration des principes de performance économique, d'équité sociale et d'intégrité environnementale doit en effet logiquement conduire à une convergence des représentations de la notion de durabilité et des enjeux de développement qui lui sont associés. Or, on constate de fortes divergences pour qualifier le contenu même de l'expression " développement durable ", pour identifier et hiérarchiser les enjeux de durabilité, pour désigner ce qui relève ou non du développement durable, etc. Force est de constater aussi que les politiques de développement durable elles-mêmes sont par ailleurs difficiles à saisir et à identifier au niveau d'un secteur particulier.

A travers les politiques de développement rural en Nouvelle-Calédonie, il s'agit d'explorer les enjeux qui sous-tendent la construction de politiques de " développement durable " confrontées aux caractéristiques et dynamiques d'une petite économie insulaire doublement rentière (rente administrative et minière). Cette contribution s'appuie sur l'analyse des discours des acteurs locaux des politiques publiques et des textes de références des dispositifs en vigueur.

L'une des hypothèses de travail est que la durabilité et la hiérarchisation des priorités de développement relèvent d'une construction politique et sociale puisant tout à la fois dans des références externes et locales. Il importe donc de contextualiser les conditions d'émergence du développement durable. A cette fin, l'apparition de la rhétorique du développement durable en Nouvelle-Calédonie est replacée dans l'évolution sur la longue période des enjeux de développement tels que perçus par les différents corps sociaux. Plutôt que de s'intéresser séparément aux trois pôles (ou objets) du développement durable (environnement, social, économique), puis aux conditions de leur intégration dans des politiques unifiées, nous examinons les priorités et les articulations que les acteurs locaux privilégient a priori entre ces objets et les clivages qu'ils révèlent. Les différentes interrelations entre les trois objets du développement durable sont analysées à la lumière de ce positionnement initial et des conflits et alliances politiques prévalant localement.

Wed. 17:00 Economy session room
Environmental Economics

The Value of Air Access: First Empirical Results of a Contrast Model Comparing Objective Access and Access Perception

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Air access is a critical factor in the development of tourism destinations in Asia and the Pacific. This paper presents the value of access - and specifically the value of air access - as a core concept in destination management and destination marketing. Air access can be evaluated through objective measures, isolating dimensions of access as (1) direct access (direct flight vs. indirect hub connection flights); (2) time access (travelling time from the origin to the final destination); (3) distance access (distance from the origin to the final destination); and (4) price access (air tickets total price); or through the concept of access perception which, since individuals do not generally have full information about the exact values for the objective measures, will probably wield a higher influence on the decision of travelling and on the decision of travelling to one particular destination. The concept of access perception can be measured using symmetrical measures to the objective ones, allowing the comparison between the values considering the following dimensions: (1) perception of direct access (belief that the origin and destination are connected by a direct flight); (2) perception of time access (estimation of the total travelling time from the origin to the final destination); (3) perception of distance access (estimation of the total distance from the origin to the final destination); (4) perception of the price access (estimation of the air tickets total price). The research data was obtained via questionnaire structured interviews over a sample of 600 respondents. The analysis of the results will provide a first test for the model framework along with additional information to be applied in further developments. Finally, the theoretical and operational implications of the study are discussed, exploring possible future research directions.

Thurs. 11:30
Poster session 4

Use of Natural Spices to Boost the Immune System of Cultured Catfish *Clarias gariepinus*

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Intensification of fish production adversely affects the health condition of the fish and leads to the production of poor environment for fish and increases their susceptibility to parasites and infections, and ultimately, the occurrence of disease. Enhancing the immune system to develop the natural disease resistance of fish could be an effective way of increasing the immune competence and disease resistance of fish. Studies on the use of some herbs as immunostimulants to fish resulted in enhancing the specific and non-specific immune response of the test animal. A preliminary study on the effects of garlic *Allium sativum*, ginger Zingiber officinale and onion *Allium cepa* as dietary immunostimulants on the specific and non-specific immune response of African catfish *Clarias gariepinus* was conducted. Catfish fingerlings (1.45±0.23) were fed with experimental diets for six weeks. After the feeding experiment, blood was taken from the caudal region of anaesthetized fish and hematocrit, total lymphocyte count, total immunoglobulin and superoxide anion production were determined. Garlic-fed fish had the highest hematocrit (37.00 % ± 3.19) while the onion-fed group revealed the highest level (1.007 mg/ml) of immunoglobulin. On the other hand, the incorporation of ginger in the diet elevated the production of superoxide anion (1.018 OD at 540nm). However, no difference were found on the levels of hematocrit, total immunoglobulin and superoxide anion production between the control and the experimental groups ($P>0.05$). The total lymphocyte count showed significant difference between the control (10.37 ± 1.96) and onion (17.18 ± 1.72) fed group, but no significant difference with garlic (14.68 ± 1.0 and ginger (12.75 ± 1.20) fed group. The present study revealed that the incorporation of natural immunostimulants like garlic, ginger and onion could possibly increase the immunocompetence of the fish, and hence recommended to be tested for fish culture. The effects of age of fish, duration of feeding and the amount of immunostimulant to be used are to be investigated.

Thurs. 11:30
Poster session 4

Displaying a Geomorphologic map of Pacific islands with various GIS, using a simplified classification and modular symbology

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(nous voulons proposer un poster bilingue ou un exposé en français; les visiteurs trouveront également un lien vers des téléchargements de fichiers qu'ils pourront réutiliser dans leur propre SIG)

The geomorphologic diversity of Pacific islands is seldom shown in a synthetic and comprehensive way. Using specialy designed modular icons and a simplified classification, we present the geomorphology of some Pacific islands within Google Earth and ArcMap with possibility to do the same work for the whole tropical pacific ocean.
La diversité géomorphologique des îles du pacifique est rarement présentée de façon synthétique. Nous présentons sous Google Earth et ArcMap une classification simplifiée et une symbologie modulaire qui permettent de rendre plus visuelle la nature géomorphologique de quelques îles du pacifique, avec la possibilité d'étendre ce travail à une zone plus large du pacifique tropical.
samples/extraits :
image : http://dondeiquando.googlepages.com/archipeldesmarquises.jpg
Google Earth file/fichier à visualiser sous Google Earth : http://dondeiquando.googlepages.com/ArchipeldesAustrales.kmz

Thurs. 11:30
Poster session 4

Factors associated with health professionals advising patients to quit smoking

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Background and purpose: Compared with developed countries, the male adult smoking prevalence is relatively high in Taiwan (39.51%). 40% smokers tried to quit smoking but failed in the past year. Only 27% smokers reported that had ever been advised to quit smoking by health professionals. The purpose of this study was to determine the associated factors with health professionals advising patients to quit smoking. Methods: A cross-sectional study design was conducted in 2008. 100 health professionals were recruited using convenient sampling from four hospitals of northern Taiwan. Structured questionnaires with cronbach's α of 0.92 were self administrated by study participants. Results: The top five obstacle factors of advising patients to quit smoking were 'behavior change of patients are very difficult', 'care of disease is more important', 'smoking needs of patients have to respect', 'lack of training of how to advising patients to quit smoking', 'too busy to advising patients to quit smoking'. Attitude and subjective norms of advising patients to quit smoking was significantly correlated with attempt of advising patients to quit smoking ($r=0.393$, $p<0.05$; $r=0.488$, $p<0.05$). Attempt of advising patients to quit smoking was significantly highly correlated with behaviors of advising patients to quit smoking ($r=0.746$, $p<0.05$). Conclusions: The major obstacle factors of advising patients to quit smoking among health professional were related with low perception of importance of patients smoking cessation. The curriculum of health professionals and on-job training should enhance the role of health professionals on smoking cessation to improve their attitude, attempt and behaviors of advising patients to quit smoking.

Thurs. 11:30
Poster session 4

Effects Of Alternate Coral Reef States On The Attraction, Settlement And Subsequent Survival Of Marine Invertebrates And Fish Larvae

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The biodiversity is declining, and habitat degradation is now commonplace. The degradation in coral ecosystems is usually characterized by coral mortality from natural and anthropogenic stressors. This decrease of coral cover causes substantial increases in macroalgal cover which, in turn, limits the recovery of coral populations and thus modifies fish and invertebrates communities. Thus, areas experiencing perturbance often exhibit declines in adult populations, leading to a higher rate of extirpation than in pristine habitat, and the persistence of species in the area becomes reliant on the rescue effect of recruitment. Yet, we do not know if the decline of marine organisms is due to increased mortality of adults of reef organisms or due to a decrease in the degraded reef's recruitment potential, which could decline if 1) its properties have changed sufficiently to decrease its inherent attractiveness to planktonic larvae; 2) larval ability to locate preferred microhabitats has declined; or 3) newly settled individuals' ability to survive to recruitment has decreased. We will test the hypothesis of effects of alternate reef states on the attraction, settlement, and subsequent survival of marine invertebrates and fish larvae. We will present the first results acquired in French Polynesia (MOM, ANR and CRISP Project). For example, a series of laboratory, in situ and biochemical experiments was conducted to test how marine larvae respond to water-borne chemical cues originating from different reef states (degraded vs un-degraded habitat). This was followed by testing if the auditory signals originating from different reef states impact the selection of reef state by fish and invertebrates larvae. Overall, if the recruitment potential of some French Polynesia has decreased, these meta-populations of reef organisms will continue their rapid decline, as recruitment will not be able to replace and to sustain the adult populations on the reefs

Thurs. 11:30
Poster session 4

Spatial and Temporal variations of coral species diversity in the Pacific during the past 10000 years

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Western Pacific is characterized by the highest coral species diversity, but the long-term ecological history remains poorly studied. Study of past coral species diversity during the Holocene, marked by sea-level rise and stabilization, provide us fundamental information of the natural diversification of coral communities, the potential to develop of coral reefs former the effects of human habitat degradation, and then exhibits an appropriate conservation planning and in situ monitoring. We sampled the species distribution of fossil and living corals from Ishigaki Island in Ryukyu Island and Palau Island that formed during the Holocene. Ecological and sedimentological analyses found that the taxonomic composition kept or increased on these reefs during the sea-level rise. Species diversity in lagoon during the sea-level rise was characterized by the lowest diversity reef, marked by transported composition, and the taxonomic composition after sea-level stabilization increased with time on these reefs. These indicate the environmental conditions in lagoon reefs during the formation period were influenced by transported composition from reef crest, and so, the reefs were subject to extreme conditions, high turbidity and low light level, for example, for survival. Since sea-level stabilization around 6000 years BP, reef crest and edge have limited to upward growth and decreased in production of transported composition to the lagoon, and then, shallow lagoon condition were relatively clear for living corals. This result describes, therefore, sea-level rise has a played important role in reef formation and increase or keep in coral species diversity during the formation period and also that of stabilization was essential to increase in the diversity in lagoon. Coral communities has a high potential to develop the reef and to keep their diversity since sea-level stabilization, but we need observe a change in the biodiversity and sustain the ecosystem during sea-level rise or fall in the future.

Thurs. 11:30
Poster session 4

Spatial and Temporal Use of Algal and Seagrass Beds by Juvenile Fishes in a Coral Reef Lagoon (New Caledonia, SW Pacific)

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We studied the fish assemblages in a coral reef lagoon (New-Caledonia, SW Pacific), in two shallow (2-4 m) vegetated contrasted habitats, i.e. algal beds and seagrass beds. We hypothesized these habitats to be important settlement sites for young fishes belonging to several species. During one year, sampling was conducted monthly at four different stations in each habitat. Algal beds displayed total species richness (i.e. all months pooled together) higher than in seagrass beds, with 183 and 158 species belonging to 38 and 30 families, respectively. The austral summer was clearly characterized by a strong increase in density on both habitats, but at different months. On seagrass beds, the highest densities occurred in January and February and reached 7.7 individuals/m^2, whereas on algal beds, the maximal densities occurred in March-April and reached 3.9 ind./m^2. These trends were due to different families and species according to the habitat. In seagrass beds, Siganidae peaked in January-February, mainly Siganus fuscescens (max. 16447 individuals), but Lethrinidae such as Lethrinus genivittatus and L. nebulosus peaked in February to April and in March-April respectively. Other species such as L. semicinctus and Apogon sp. displayed an unusual settlement peak in October. In algal beds, the highest arrival of new settlers of S. fuscescens occurred in January and in March-April (max. 5368 indiv.) and concerned slightly larger fish than in seagrass beds (5.7 vs. 3.1 cm TL respectively). Arrival of young Lethrinus atkinsoni occurred from March to June and from October to December but with relatively few individuals (max. 209 fish). We thus evidenced that both habitats are widely used for fish settlement, including for species usually found on coral reefs, and at different periods and/or at different size suggesting a spatio-temporal partitioning of these habitats.

Thurs. 11:30
Poster session 4

Another way to appreciate fish

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Background: The Polynesian of French Polynesia, following the example of the island populations of Pacific, always drew the most part of their food from sea products. They remain today even very big consumers of fish: with a 1 kg / person / week average, and it in spite of "multiplication" and "diversification" of food offer due to globalization. This "over consumption" of the Polynesian asks in a critical way the question of the duality of benefits and delinquency of a feeding based on the fish. The "beneficial effects" of the fish are comparatively well known; the fish brings a series of nutriments as selenium and iodine but also polyunsaturated fatty acids which man does not naturally synthesise and that are however necessary to him. He must therefore scoop them out from his feeding. These polyunsaturated fatty acids (PUFAs) of type omega 3 as acid eicosapentanoique made the object of several studies which put in an obvious place the cardioprotective effects of these compounds. The importance of these compounds for an optimum neurobiological development to the fetus was also revealed in other studies. The negative point mainly holds in the presence of methylmercure, source of neurotoxicity for man. To this last, the pollution in the methylmercure comes principally from the fish. Methods: In collaboration with the University LAVAL in Canada and the Laboratoire d'Analyses de la Salubrité des Eaux et des Aliments (LASEA) in the Institute LOUIS MALARDE, over 70 samples of fish were analysis to determine their contents in methylmercure but also in fatty acids. Results: Levels of mercury were very low in reef fish compare to pelagic fish. The PUFAs profile was really interesting in some reef fish species Conclusion: In view of our results and because the consumption of fish remain and must remain important in Polynesia, of you a diet based on the reef fishes for pregnant women but also for young children.

Thurs. 11:30
Poster session 4

Coevolution and Diversification of an Insect-Plant Mutualism (Phyllanthaceae: Glochidion; Lepidoptera: Gracillariidae: Epicephala) Across Eastern Polynesia

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Associations between native insects and native plants on remote oceanic islands offer important insights into the evolution of insular biotas and serve as models for the role of species interactions in the evolution of biological diversity. Trees in the genus Glochidion (Phyllanthaceae; Euphorbiaceae s. l.) have an obligate pollination mutualism with moths in the genus Epicephala (Lepidoptera: Gracillariidae), in which the moths actively pollinate Glochidion flowers and then oviposit in the flowers so that their larvae may feed on the developing seeds. The roughly 300 species of Glochidion are distributed widely in the Asia-Pacific region, from the Indian subcontinent east to the Pitcairn Islands, and has notably radiated both in Malesia (insular Southeast Asia and New Guinea) and in the Pacific archipelagoes of Fiji and the Society Islands. Glochidion is the fourth-largest radiation of endemic plants in French Polynesia, with 22 described species, nearly all of which are endemic to single islands or archipelagoes. Here we report the discovery of the Glochidion-Epicephala mutualism in the Society Islands of French Polynesia and speculate on the manner in which these two free-living yet obligate mutualists may have colonized some of the youngest and most remote landmasses on the planet. We also report a survey of phytophagous, non-mutualistic insect lineages found on Glochidion on five archipelagoes in Eastern Central Polynesia (Societies, Marquesas, Australs, southern Cooks, Tuamotu-Gambier), at least several of which are specialized to feed on Glochidion both in Polynesia and in continental Asia, indicating the conservation of host specificity during the dispersal of a phytophagous insect community from continental sources onto Pacific islands. Finally, preliminary molecular phylogenetic analyses offer both insights into the biogeography of Eastern Central Polynesia as well as the manner in which these two mutualistic taxa have codiversified across these islands.

Thurs. 11:30
Poster session 4

Genetic improvement strategy in small aquaculture industries: the New Caledonian shrimp experience (Stratégie d'amélioration génétique dans les petites filières aquacoles : l'exemple de la crevette calédonienne.)

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Shrimp farming in New Caledonia relies on the culture of a domesticated strain of Litopenaeus stylirostris introduced from Mexico at a time when genetic principles were of little or no consideration. Since then, advances in agriculture and for some aquatic species of importance led caledonian shrimp farmers to reconsider the appropriateness of a genetic improvement strategy adapted to local biotechnical and economical constraints.
This questioning involves many different and interrelated aspects: scientific and technologic (genetics, biosecurity, quarantine,), economic and organizational (financing, diffusion of genetic improvement) and pedagogic (awareness of farmers). Local institutions, producers associations, research centre and sanitary services associated to carry on the test of a first improvement strategy based on the crossing of different strains of L. stylirostris. This conceptually simple approach aimed at eliminating inbreeding, the first genetic limitating factor of improvement in captive populations.
A second domesticated strain was obtained from Hawaii by the caledonian farmers, imported through a quarantine under the control of the zoosanitary local authorities, and reproduced and tested as pure or crossbred stocks by Ifremer within the framework of an interdisciplinary research project financed by caledonian institutions. Present results for hybrids (better growth and survival in the absence of virus) demonstrate the validity of this approach. They also bring out the importance to simultaneously integrate in a development scheme, a breeding centre to maintain and reproduce disease free breeders.
This strategy and organization, tested in New Caledonia, could possibly be of benefit to other small scale aquaculture activities in the pacific islands.

Thurs. 11:30
Poster session 4

Chemical study on natural products from the isolated nematocysts and tentacles of the deadly box jellyfish, *Chiropsalmus quadrigatus*

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Some cnidarians are known as marine dangerous animals with their venomous stings. In Japan, the box jellyfish *Chiropsalmus quadrigatus* causes serious stinging cases to sea bathers in Okinawa area. It has been officially reported three human deaths attributed to *C. quadrigatus* stings in Japan. Cnidarian has venom in its nematocyst. Nematocyst is a specific organ responsible for stinging. Therefore, it is plausible that many bioactive compounds (include toxins) exist in the nematocyst. We have already reported the main proteinaceous toxin, CqTX-A, from *C. quadrigatus* nematocysts. Under preliminary experiments, we have also found a lot of low-molecular weight compounds existed inside of the isolated nematocysts. Until present, the isolated nematocysts have not been targeted as the source of searching bioactive organic compounds except polypeptide toxins. Thus, we have started to study of the natural products from the isolated nematocysts. Extract from the isolated *C. quadrigatus* nematocyst was partitioned with Hexane, EtOAc, BuOH and water. Each fraction was further purified using HPLC. Also, we partitioned and purified the extract from tentacles, in the same way. The structures of isolated compounds were analyzed with spectroscopic methods. Some major compounds were isolated and the structure elucidation is now in progress.

Thurs. 11:30
Poster session 4

Study of the bioactive substances from deep-sea jellyfishes

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There has not been any study on bioactive substances from the deep-sea jellyfishes so far to the best of our knowledge. However, it has been revealed that cnidarians (include shallow-water jellyfishes) are rich sources of new bioactive substances in late years. Therefore, we pursued the study on the bioactive substances from the deep-sea jellyfishes.
The nine deep-sea jellyfish species collected in Sagami-bay (JAPAN) were used in this study. The sample was homogenized with 10 mM phosphate buffer (pH 7.0). The homogenate was centrifuged and the supernatant was obtained as a crude extract. The crude extract of each sample was tested with cytotoxicity test (L1210 cell line) and hemolytic activity test (0.8% sheep-RBC). The results clarified that all of nine deep-sea jellyfishes' crude extracts had cytotoxicity or hemolytic activity or both activities.
Additionally, we have tried to purify the bioactive substances from three jellyfishes, *Atolla wyvillei*, *A. vanhoeffeni* and *Arctapodema* sp. The results of purification study indicated that *Atolla wyvillei* and *A. vanhoeffeni* have proteinaceous cytotoxins (20-30 kDa), and *Arctapodema* sp. has hemolytic protein (15-20 kDa). In the future, we will elucidated the chemical nature of these toxin that isolated from each crude extract.

Thurs. 11:30
Poster session 4

Ecology of the pearl oyster (*Pinctada margaritifera*) larvae in a semi enclosed atoll lagoon (Ahe, French Polynesia): I. Spatio-temporal variability of the trophic resource

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Atoll lagoons are usually described as very stable environments. Nevertheless, the space-time variability of pearl oyster spat yield on collectors is very high and pearl farm needs cannot always be satisfied. Thus, since the larvae development and dispersal are respectively depending on the environmental parameters (i.e. trophic and temperature) and meteorology (i.e. wind), it appears essential to evaluate the spatial and temporal variation of these parameters in order to evaluate their influence on larval development. Trophic resources descriptors have been followed in the plankton communities of a semi-enclosed atoll lagoon. The water properties were analysed with an increasing degree of precision from the chlorophyll-a in vivo to the pico and nano-plankton communities using flow cytometry. Three spatial levels were studied : the vertical distribution (0 to 50m), the local structure (100m) and the lagoon scale. The temporal scales were adapted to the spatial levels with a nychthemeral survey at the vertical scale and a daily dynamic at the large scale. Four sampling campaigns were conducted from April 2007 to March 2008 allowing a seasonal approach. The plankton appears dominated by the picoplankton communities : Synechococcus (62%), picoeukaryots (14%) and Prochlorococcus (7%). Two nanoplanktonic communities have also been identified (8% and 9% of the total biomass). These communities represent the main part of the larval food and present the largest variation levels at the three spatial scales (mean variation coefficient of 27%, 30% and 23% at the lagoon, transect and vertical scale respectively). The vertical scale shows a succession of mix and stratification, mainly related to the wind velocity, with a positive gradient of food from the surface towards the bottom. In addition, large scale sampling presents significant variations at a daily time step with some specific spatial patterns.

Thurs. 11:30
Poster session 4

Assessment of nutritional requirements of the oyster *Pinctada margaritifera* according to the temperature

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The reproduction of bivalves is driven by temperature and nutrition. *Pinctada margaritifera* is a very efficient filter feeder. In the objective of conditioning, this study aimed to determine the influence of temperature at different trophic level on clearance rate and absorption efficiency in controlled conditions.
The experiments were carried out at three temperatures: 21, 26 and 30°C in controlled flowthrough tanks where algae (*Isochrysis galbana* (T-Iso) and *Chaetoceros gracilis* (v/v) were distributed at a constant rate. An automated sampling device allowed to monitor algal fluorescence at a rate of 3per hour. Since ingestion is a saturating function of algae concentration, clearance was modelled by a hyperbolic function adapted from the Michaelis-Menten function. Assimilation of organic matter was estimated according to the method of Conover.
At 21°C, maximum clearance value was Imax=62.67 10^6 cell.h^{-1}.g^{-1} dw, half-saturation coefficient Xk=4728 algae cell.ml^{-1}; at 26°C Imax=175.42 10^6cell.h^{-1}.g^{-1} dw and Xk=12732 cell.ml^{-1}; and at 30°C Imax=130.49 10^6 cell.h^{-1}.g^{-1} dw and Xk=23191 cell.ml^{-1}. Absorption efficiency (AE) evaluated by biodeposits analysis appeared to be independant of the trophic level. Average AE were 64 ± 7% at 21°C, 52± 13% at 26°C and 74% ± 3% at 30°C. Optimal temperature for clearance rate for *P. margaritifera* appears to be close to 26°C. Estimation of AE should be improved by separated analysis of feces and pseudofeces.

Thurs. 11:30
Poster session 4

Ecology of the pearl oyster (*Pinctada margaritifera*) larvae in a semi enclosed atoll lagoon (Ahe, French Polynesia): II. dispersal and recruitment

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The pearl oyster culture plays a major socio-economic role in French Polynesia. The seed supply to the farms of 30 islands and atolls depends entirely on spat collection on artificial supports, managed in 10 atolls only. The space-time variability of spat yield is very high and pearl farm needs cannot always be satisfied. With the objective of optimizing the collection strategy, bivalve larvae dispersal and pearl oyster recruitment were followed in the lagoon of Ahe. The vertical distribution, the local structure and the lagoon scale dynamic of bivalve larvae populations have been studied. The temporal scales were adapted to the spatial levels with 24 hours cycles at the vertical scale and a daily sampling at the large scale. Four campaigns were conducted from April 2007 to March 2008 allowing a seasonal approach. Recruitment of pearl oyster spat occurred all year round (mean of 40 spats per collector) with a significant interaction between spatial and seasonal variation. Spat settlement occurred at every depths with a maximum at 5 meters depth. Bivalve larvae were distributed mainly from 10 to 40 meters depth with a migration from the bottom towards surface at night. The large scale distribution showed two zones more concentrated in the west and east parts of the lagoon. The populations appeared less dense in the middle part. Since hydrology and hydrodynamic of lagoons are mainly wind driven, the relation between larvae concentration and meteorology is discussed (i.e. hydrodynamic structuring and diluting effect of the pass). Moreover, the relation between hydro-biologic parameters (i.e. trophic resources and temperature) and larvae development will be explored.

Thurs. 11:30
Poster session 4

Effect of food conditioning on the gonadic activity of *Pinctada margaritifera*

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The control of reproduction is required for the domestication of any species. It is necessary to understand the physiological mechanisms controlling the gonadic activity for conditioning broodstock for reproduction in laboratory. Preliminary experiments allowed defining basic requirements of *P. margaritifera* for somatic and gonadic growth in controlled conditions. This study was continued by observation of the gametogenesis at a cellular level.

In April/May 2008, 125 oysters were conditioned for 30 days in 25 tubular tanks (30 L). Water was renewed 4 times/hour. A mixed (v:v) diet of *Isochrysis galbana* (T-Iso) and *Chaetoceros gracilis* was distributed to an average concentration of 15000 cell.mL^{-1}. A control batch of 125 oysters was maintained in trays in the lagoon. An initial sample of 30 individuals was made. Gonadic changes were first characterized using a gonadal index (GI) based on the ratio of the gonad area to the total visceral mass area on a sagittal section of the body. Histological sections were made to analyse gametogenesis cellular lines.

Initial and final GI distribution of control oysters did not vary and followed the normal law. In conditioned oysters GI distribution appeared flattened. Analysis of GI data showed that reproductive effort was significantly lower ($P<5\%$) in conditioned oysters. Histological analysis of female gonad revealed that oocyte size increased significantly in conditioned females but not in controls. Male cell lines observation showed that only spermatozoa remained in conditioned oyster. Gametogenesis process appears then to have been stopped or slowed down in conditioned animals. This experiment showed that the techniques allowed to finish the development of already present germinal cells but seemed to put an end to gametogenesis. Further studies will focus on the incidence of season on the capacity of *P. margaritifera* to maintain its gonad activity in captivity.

Thurs. 11:30
Poster session 4

Gamete cryopreservation, an asset for a sustainable pearl farming in French Polynesia

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Cryopreservation is a useful tool for genetic improvement which has been applied to several bivalve mollusk species. It would allow to keep the gametes of selected individuals and to preserve ex-situ the biodiversity of wild populations of the black-lip pearl oyster *Pinctada margaritifera* threatened of standardization by the seed transfers between the islands in French Polynesia. The ability to cryopreserve gametes would bring about significant benefits to the cultured black pearl industry.

Sperm freezing supposes the control of different steps: preparation of breeders, sperm collection, evaluation of sperm quality and the freezing process itself. Broodstock conditioning in hatchery allows to obtain gametes from the pearl oyster. Sperm quality is evaluated using a motility index and bioluminescence ATP measurements of spermatozoa. The following cryoprotectant additives (CPA) mixture were evaluated : (1) 0.41 M trehalose and 0, 0.45, 0.91, 1.36 M dimethyl sulfoxide (Me_2SO), (2) 0.7 M trehalose and 0.8 M Me_2SO and (3) 0.10 M trehalose. Freezing was made in two steps, in nitrogen vapor followed by direct plunging of spermatozoa in liquid nitrogen.

Total motility was best retained when spermatozoa were cryopreserved with 0.41 M trehalose and 0, 0.45, 0.91, 1.36 M Me_2SO and 0.7 M trehalose and 0.8 M Me_2SO. Bioluminescence ATP measurements showed that spermatozoa conserved their energetic stock. Moreover, fertilization efficiency of thawed sperm was demonstrated using artificially matured oocytes, which allowed the development of embryos and D larvae.

This study could lead to the development of a cryobank to preserve pearl oyster genetic inheritance.

Thurs. 11:30
Poster session 4

The Spread of the *Zygothrica samoaensis* group (Drosophilidae, Diptera) over the Pacific

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The Zygothrica genus has diversified in South America where about 100 species have been recognized. It is closely related to the Hirtodrosophila genus that is particularly abundant in Asia. The two genera are so closely related that their respective delimitations are still not well defined. Moreover two plesiomorphic Zygothrica species have been described from Africa, suggesting a possible african origin of the genus. The geographical route followed by the members of the genus between the different continents is quite enigmatic. In that context the study of the Z. samoaensis group is interesting. Indeed the Z. samoaensis group is constituted of a few species distributed over the Pacific, from French Polynesia to South-East Asia, and shows a possible link between Old and New worlds. Our revision of the Z. samoaensis group leads to the recognition of 17 species. We have proposed its subdivision into three subgroups based on the morphological characters. We clearly observe a gradient of plesiomorphy between the three subgroups suggesting their individualization at three different times along an evolutionary trend. Interestingly the geographical distribution of the three subgroups is mainly overlapping, suggesting a parallelism in the migration route. They may have spread over the Pacific by three successive waves or simultaneously. According to the similar degree of morphological differentiation observed in each subgroups it is suggested that their diversification and spread over the Pacific has been simultaneous. However we cannot reject a phenotypic stability due to adaptive selection. It is however unclear if the colonization of the american continent is related to the same migration event. Considering the degree of morphological diversification on the continent this scenario seems unlikely and should be therefore more ancient, except if we consider a relaxation of the selective pressure. Further collecting and molecular analysis will be necessary to resolve this issue.

Thurs. 11:30
Poster session 4

Riskscape New Zealand - A Multihazard Loss Modelling Tool

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The mitigation of natural hazards and the management of the response to natural disasters have become increasingly important and complex for local and national authorities in the last decade. This is partly because the frequency of severe catastrophic natural events has increased as a result of global warming. This is exacerbated, however, by a noticeable rise of the overall vulnerability as people are ever more attracted by areas which are at risk from natural hazards such as the coastal zone. Mitigation and management of natural hazards require a clear understanding of potential hazardous events as well as specific tools and decision support system allowing the analysis and comparison of risks from different hazards. RiskScape is such a multi-hazard loss modelling tool, being developed in New Zealand. RiskScape is designed as a decision-support tool that converts existing hazard knowledge into likely consequences, such as damage and replacement costs, casualties, disruption and number of people that could be affected. RiskScape works by running through a sequence of steps which combine to simulate a risk profile for a region or locality. The cycle can be repeated for different hazards (e.g. tsunamis, earthquakes, floods & wind) simulating the way they could impact on the same cluster of communities and their associated assets. This allows a true comparison to be made of the potential consequences of different hazards on the same locality. Consequences for each region presented in a common platform can then form the basis of prudent planning and prioritized risk-mitigation measures that link directly to the severity of the risks. The development of RiskScape New Zealand has been underway for four years of its 12 years funding. This poster will describe the Riskscape tool development and address problems and areas where work is ongoing.

Thurs. 11:30
Poster session 4

Analysis of the genetic variability of Paper Mulberry (*Broussonetia papyrifera*), a culturally important plant of Polynesia

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We propose to initiate a study of genetic variation of Paper Mulberry (*Broussonetia papyrifera*), an economically and ritually important plant in Polynesia. Young leaves were sampled from locations on Easter Island, the Marquesas, Tahiti, Samoa, Tonga, Hawaii and Taiwan. A protocol for the extraction of DNA was developed and genetic analysis of the samples has been carried out using AFLP ("Amplified Fragment Length Polymorphism"), a solid molecular technique based on the selective amplification of restriction fragments that is especially suited to detect genetic variability in species whose genome has not been sequenced. This study is unique and valuable in that it is centered on the east Polynesian dispersal area. The generated data of how much genetic variation there is in paper mulberry in the Pacific will be of value for assessing the biodiversity of existing plants and also to address important questions related to its prehistoric dispersal among Polynesian islands.
Grant: FONDECYT 1080061 from CONICYT, Chile.

Thurs. 11:30
Poster session 4

The 2008 leptospirosis epidemic in New Caledonia: weather context, diagnosis, burden of disease and future research

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Leptospirosis is endemic in New Caledonia, with epidemic bursts after heavy rainfalls, making it a major public health problem. As the local reference laboratory for human leptospirosis, the Institute Pasteur of New Caledonia is studying this disease, notably developing and implementing molecular diagnostic tools. In the first half of 2008, a high incidence of leptospirosis occurred, possibly related to the meteorological context. Under the influence of a "La Niña" event, the rainfall was much higher (sometimes more than 3 times the average) causing a number of floods favoring survival of - and human exposure to - pathogenic leptospires. The temperature, not different from the average, did not contribute to this epidemic.

Because of a simultaneous dengue epidemic, leptospirosis probably went under-diagnosed during the first trimester, until the epidemic was recognized, increasing public and medical awareness. At the end of June, 135 human cases were confirmed, an extrapolated incidence of more than 100 annual cases per 100 000 inhabitants.

The mean age of cases was 35.2 years (4-84) and more than 2/3 were males (93, versus 42 females). Eighty eight patients were admitted at the hospital (65%) for a total of 627 days (7.12 days per hospitalized patient) including 5 in the intensive care unit for 39 days and 5 people died (mean age 60.3).

Within these 135 confirmed cases, real time PCR detection of Leptospira DNA in blood or urine accounted for 53 % of the diagnosis and serology for 56 %. This ratio, together with the ability of an earlier diagnostic highlights the usefulness of PCR as a first-line diagnostic approach of leptospirosis. Future work will focus on identifying circulating Leptospira strains using direct sequencing of PCR products to better decipher the epidemiology of this complex disease and increase the analysis of the cost of this endemic-epidemic disease.

Thurs. 11:30
Poster session 4

Phenotypic and molecular study of antimicrobial resistance in Neisseria gonorrhoeae collected by a New Caledonian sentinel network

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Gonorrhoea, a major sexually transmitted infection worldwide, is an important public health problem, notably because of the antimicrobial resistance of its causative agent, Neisseria gonorrhoeae (NG). It is essential to monitor the emergence and spread of resistance especially because of large disparities between geographic zones. In New Caledonia penicillin is still effective contrary to industrialized surrounding countries; however isolates with decreased susceptibility are regularly reported. Chromosomally-mediated expression of multiple resistance genes and the production of a plasmid-mediated β-lactamase are two independent mechanisms involved in penicillin-resistance. Chromosomally-mediated penicillin-resistance arises by ordered acquisition of resistance determinants (mutated alleles) in a stepwise process involving at least 5 genes. Alterations in Penicillin-Binding Proteins, porin and the promoter of an efflux pump transcriptional repressor accounting for decreased susceptibility to penicillin are well described, allowing us to develop rapid and efficient genotyping methods. We developed different multiplex PCR protocols on the LightCycler® platform with a hybridization probes system allowing an accurate and specific detection of each determinant. Following an evaluation of 400 NG isolates collected via a sentinel network, melting curve analysis correctly evidenced a reproducible Tm shift in all strains harbouring one of these mutations, as confirmed by conventional sequencing. The genotypes obtained with our assays correlated with the pattern of penicillin susceptibility generated with classical antibiograms and have been validated with NG from different countries. Similarly, we validated a protocol for the screening of variations in Quinolone Resistance Determining Regions (QRDRs), both single and double mutants, offering an indisputable means of predicting susceptibility to fluoroquinolones. Our assays, that do not require any shipment of live gonococci, provide molecular data with a predictive value of antibiotic susceptibilities, notably useful to improve surveillance and stem the emergence of multiresistance in gonococci. They could be used as epidemiological tools in collaboration with other Pacific Island Countries.

Thurs. 11:30
Poster session 4

Stylog : base de données pour le suivi des élevages de crevettes de Nouvelle-Calédonie

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Afin de disposer d'une base de données regroupant un maximum d'informations collectées sur les fermes de grossissement de crevettes de Nouvelle-Calédonie, dans un format informatisé et standardisé, un logiciel nommé " Stylog - module ferme " a été développé par l'Ifremer en lien avec les aquaculteurs. L'archivage des données a permis de collecter depuis le début de sa conception (2003) plus de 2 millions de données représentant près de 250 élevages.

Les objectifs principaux de cette base sont d'aider les chercheurs dans la compréhension de phénomènes pouvant survenir dans un bassin d'élevage, d'assurer un suivi de la filière (évolution des pratiques zootechniques, veille clinique...) et de faciliter les échanges d'informations entre les différents partenaires de la filière (aquaculteurs privés, recherche, institutions). Enfin, cet outil d'aide à la décision permet aux aquaculteurs de gérer leurs élevages au quotidien.

Ce poster explique d'une part, la méthode et les outils utilisés pour créer cette base de données, de la réalisation du cahier des charges, en lien étroit avec les utilisateurs finaux, à la mise en place d'une réelle structure projet regroupant les différents partenaires (comité des utilisateurs et comité de pilotage, convention de confidentialité). D'autre part, il présente quelques exemples de résultats en termes d'utilisation de ces données (recherche d'indicateurs de qualité d'élevage, édition de bulletins techniques, analyses de données spécifiques à la recherche...). Enfin, la mise en réseau (Extranet) de cette base semble présenter de réelles perspectives en termes de partage de l'information et de capacité d'analyses.

Thurs. 11:30
Poster session 4

Etudes approfondies de semences de Cypéracées, herbacées pionnières utilisées pour la revégétalisation des terrains miniers néo-calédoniens : le cas de Gahnia aspera

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La Nouvelle-Calédonie est reconnue comme l'un des "hotspots" de la biodiversité mondiale. Cependant, cette dernière est menacée par les effets anthropiques, feu, introduction d'espèces invasives, urbanisation, élevage, agriculture et plus encore exploitation minière du nickel. Les sols ultramafiques qui font sa richesse sont couverts d'une végétation spécifique adaptée aux conditions difficiles du milieu. Après décapage de ces sols, la reconstitution du couvert végétal d'origine est un véritable défi. Dans ce cadre, des programmes de revégétalisation, inscrits dans la droite ligne d'un développement durable, ont été lancés et l'utilisation d'espèces pionnières est requise. L'emploi de Cypéracées, composante majoritaire de la strate herbacée des sols miniers néo-calédoniens, est une des clés de la stratégie de restauration puisqu'elle permet le déploiement rapide d'un couvert végétal qui limite l'érosion, les pollutions des sols et qui favorise l'apparition de niches écologiques, lieux de développement d'espèces ligneuses. Cependant et jusqu'à présent les essais menés avec les espèces de cette famille se sont révélés peu fructueux du fait d'une connaissance trop limitée de la biologie de leurs semences. Nous avons donc décidé d'étudier la structure, la biologie, les conditions de germination et les moyens de l'optimiser, ainsi que les conditions de conservation de ces espèces. En se basant sur l'exemple concret de *Gahnia aspera* (R. Br.) Spengel, espèce autochtone de la famille des Cypéracées de Nouvelle-Calédonie, candidate à la revégétalisation, nous présenterons les méthodes employées ainsi que les différents résultats obtenus. Ces derniers laissent présager des résultats applicables sur le terrain qui conduiront sans aucun doute à l'optimisation des stratégies de restauration écologique et plus particulièrement par la méthode de l'ensemencement hydraulique.

Thurs. 11:30
Poster session 4

The Australasian Pollen and Spore Atlas: Update on a new online relational database

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The Australasian Pollen and Spore Atlas enables online accessibility to the largest collection of pollen and spores information in the Australasian (including the Pacific Ocean) region that is currently located at the Australian National University. This is a searchable database that is accessible over the web and suitable for professional as well as the technical novice involved in pollen and spore identification. Novel approaches to the federation of other smaller existing pollen and spores databases will result in an ever expanding and freely available resource. The information made available will increase research capacity across the through a reduction in duplication and enhanced accessibility to key knowledge available in the Australasian Pollen and Spore Atlas. Key features of the database that are applicable to archaeological research are illustrated in this presentation and an online demonstration will be available during the conference.

Thurs. 11:30
Poster session 4

Anti-plasmodial activity and chemotaxonomy of Pacific *Dysidea* sponges

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We present here the chemical investigation of some *Dysidea* sponges for their antimalarial properties. A deep chemotaxonomy study was also completed on 10 species (over 60 specimens) collected in New Caledonia, French Polynesia, Solomon Islands, Vanuatu and Fiji Islands and main results are discussed there too. The most active extracts showed an IC50 between 0,3 to 3 μg/mL on cultured *Plasmodium falciparum*. The antimalarial testing was performed with the method we previously used for our continuing search for antimalarial marine natural products[1]. The sponges of the genus *Dysidea* also present a real problem of taxonomic identification by morphological and histological analysis, because of their great morphological variability and their depauperate suite of complex characters. We investigated our samples with combined methods of molecular systematics and chemotaxonomy for a more efficient search of bioactive natural products, especially in the field of antimalarial compounds. For molecular phylogenetic analyses on the internal transcribed spacer region (ITS) we extended our taxon set with *Dysideidae* from the collection of the Queensland Museum and additional sequences from Genbank, identified as *Dysideidae*[2,3]. Character positions, which could not be aligned unambiguously were excluded from the alignment. Phylogenetic reconstructions were performed with Bayesian Inference and Maximum Likelihood methods. In the field of chemotaxonomy, the study of different batches of *Dysidea sp.* and *Lamellodysidea herbacea* from different locations, allowed us to find several interesting polybrominated diphenylethers with anti-malarial and other biological properties, but which are certainly produced by the associated microorganisms.

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Thurs. 11:30
Poster session 4

La symbiose de *Pisolithus albus* avec *Tristaniopsis guillainii* : un outil d'étude de la biodiversité fonctionnelle pour le développement durable de l'activité minière en Nouvelle-Calédonie

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En Nouvelle-Calédonie, l'exploitation du nickel, première ressource économique du territoire implique, pour être durable, la restauration des sites miniers dégradés, afin notamment d'éviter la contamination des écosystèmes adjacents comme le lagon. Pour réussir cette restauration, la compréhension du fonctionnement du couvert végétal de ces milieux aux conditions édaphiques naturellement extrêmes est nécessaire. L'importance des champignons ectomycorhiziens dans ces processus a été révélée en 2001. Le modèle d'étude - *Pisolithus albus Tristaniopsis guillainii* a été choisi et développé. Le criblage pour la tolérance au nickel de 67 souches de Pisolithus albus a permis d'identifier 12 isolats hyper-tolérants au nickel (EC50 de 440 à 1100 μM), provenant tous de maquis minier. En dehors de ces écosystèmes riches en nickel, les souches de P. albus présentent des EC50 de l'ordre de 30 μM. Des essais d'inoculation avec une souche hyper-tolérante ont permis d'accroître très sensiblement la tolérance au nickel de la plante hôte par rapport à l'inoculation par une souche sensible au nickel. Le maintien de l'effet bénéfique de la mycorhization d'espèces locales comme *Tristaniopsis guillainii*, à des teneurs élevées en nickel permet d'envisager l'utilisation de ce couple symbiotique à plus large échelle comme outil de réhabilitation des sites miniers, mais également pour l'exploration de la biodiversité des mécanismes moléculaires impliqués dans la gestion des métaux lourds, notamment le nickel par les plantes et leurs micro-organismes associés.

Thurs. 11:30
Poster session 4

Live preys in shrimp culture: nutritional and sanitary aspects of the use of artemia in New Caledonia
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In aquaculture, Artemia nauplii are commonly used as live prey; and represent 40 % of the total aquaculture feed demands in the early stages. However, the production of Brine shrimp is very unstable from one year to another and in the late 90's, only 20 % of the world aquaculture need was covered. An insufficient offer leads to higher prices of the Artemia cysts and consequently, the price of shrimp juveniles from hatchery. In New Caledonia, marine aquaculture is mainly based on the blue shrimp Litopenaeus stylirostris. From Zoea 3 to 10 days old post-larvae (P10), shrimps are mainly fed with live preys. Eleven kilos of Artemia cyst are necessary for producing one million of P10. From a sanitary point of view, Artemia can be a virus carrier and Vibrio population increase is often detected in the larval rearing tank the day after the feeding with live prey. Up to now, Brine shrimp are delivered in excess but with the cost and sanitary problems, Saint-Vincent laboratory has started some experiments in order to optimise the use of Artemia in shrimp larval rearing. The first tests were conducted to determine the effect of the Artemia quantity on the growth and the survival rate at different post-larval stages (P8-P11, P5-P8 and M3-P3). It was shown that four to twelve times fold Artemia was necessary for P8-P11 compared to M3-P3. And it was also noticed that the "optimized"quantity of live food at M3-P3 was twice lower than the recommended amount of the hatchery feeding protocol in New Caledonia. A better knowledge of the real feed requierment in the early life of the blue shrimp will be helpful to decrease the cysts quantities used in shrimp hatcheries but also the associated sanitary impact. And further, these results will give data for developing formulated diets which will replace the live prey and will increase the biosecurity and the sustainability of the production of the blue juvenile shrimp in New Caledonia.

Thurs. 11:30
Poster session 4

L'élevage de la crevette bleue *Litopenaeus stylirostris* en Nouvelle Caledonie : un livre sur ses bases biologiques et sa zootechnie (Blue shrimp *Litopenaeus stylirostris* farming in New Caledonia: a book on its biological and zootechnical basics)
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Les crevetticulteurs calédoniens ainsi que les institutions étaient demandeurs depuis de nombreuses années d'un ouvrage sur l'état de l'art de l'élevage de *Litopenaeus stylirostris* en Nouvelle Calédonie.
L'ouvrage vise à mettre à la disposition des aquaculteurs (et aussi des décideurs/acteurs de la filière), la somme des connaissances dont on dispose aujourd'hui de par le monde et qui seront utiles à un aquaculteur (nouveau ou déjà installé) pour pratiquer, avec les meilleures chances de succès, l'aquaculture de crevette sur le Territoire.
Cet ouvrage traite de tous les aspects des élevages : le contexte général de l'implantation d'une ferme, les principaux facteurs à prendre en compte dans le suivi de l'élevage, les bases biologiques des principales pratiques zootechniques et la conduite des élevages au quotidien.
For many years, state of the art on Blue shrimp *Litopenaeus stylirostris* farming was requested by New Caledonian shrimp farmers and local authorities.
This book compiles the actual worlwide available knowledge, useful for both new and experienced farmers to successfully culture this prawn species in New Caledonia.
This work encompasses all farming aspects:farm set up, main environmental factors to consider when conducting grow out, basic biological information in relation with most important zootechnical practices and routine day to day farming.

Thurs. 11:30
Poster session 4

Three years of experimental and applied research on the use of dietary probiotic *Pediococcus acidilactici* in shrimp culture: overview of the main results

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The New Caledonia blue shrimp *Litopenaeus stylirostris* is commercially produced under semi-intensive rearing conditions. The size of the farming earthen ponds (5-10 ha) and the subsequent production constraints make it difficult to use them as experimental units for random experiments. Moreover, since every pond has its own characteristics, ponds' effects cannot be ruled out, thus making it hard to define true replicates. In order to design future experiments under conditions resembling those used in production, we evaluated the possible use of floating cages as experimental units with the aim of assessing treatment effects with a reasonable statistical power. To this end, two sets of floating cages were placed respectively in two different ponds in a commercial farm. The aim of the study was to evaluate on a technical basis the possibility of rearing shrimps in floating cages set up in earthen ponds and to assess this method from a statistical standpoint. Shrimps reared in and outside the cages showed comparable growth and survival rates. Variability in the zootechnical parameters between cages, expressed as the estimated coefficient of variation (CV) was calculated for survival rate, total final biomass, final body weight, daily increment in body weight and FCR. On the basis of these figures, we calculated for a given statistical power (80%) the number of replicates (cages) that would be required to reveal significant differences between two treatments, at a 5% level of significance. Our results illustrated the within-farm variability among ponds, and confirmed that the specific characteristics of each pond from the same farm make it difficult to use the ponds themselves as experimental units. This study demonstrates that rearing in floating cages is an economical, powerful and sensitive experimental tool for shrimp culture studies specifically carried out under conditions close to semi-intensive production.

Thurs. 11:30
Poster session 4

Meiofauna and foraminiferea: tools for assessment of shrimp pond bottom health status

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Meiofauna is a functional group made of small benthic metazoans 45 to 500 μm in size. Although protista, foraminifera living in this kind of environment are often put into the meiofauna. Meiofauna has been studied in New Caledonia for its double role as biological indicator for monitoring pond health status and as shrimp forage. Suitability of EOM (easily oxidized material) , SOD (sediment oxygen demand) , as new biochemical tools for monitoring shrimp pond health was assessed in an environmental survey aiming to assess the role of the water/sediment interface in the occurrence of the summer syndrome vibriosis. EOM, SOD and redox were correlated with shrimp survivals. Lowest meiofauna biomass and abundance were concomitantly found in the most polluted station. Proportion of abnormal tests over exceeding the one found in areas subjected to natural ecological stress were collected and were positively related to EOM and SOD and negatively to redox. Shrimp pond dominant species are common to estuaries and lagoons. But foraminifera abnormal behaviour indicates specific shrimp pond conditions.

Thurs. 11:30
Poster session 4

Evaluation of floating cages as an experimental tool for marine shrimp culture studies under practical earthen pond conditions

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The New Caledonia blue shrimp Litopenaeus stylirostris is commercially produced under semi-intensive rearing conditions. The size of the farming earthen ponds (5-10 ha) and the subsequent production constraints make it difficult to use them as experimental units for random experiments. Moreover, since every pond has its own characteristics, ponds' effects cannot be ruled out, thus making it hard to define true replicates. In order to design future experiments under conditions resembling those used in production, we evaluated the possible use of floating cages as experimental units with the aim of assessing treatment effects with a reasonable statistical power. To this end, two sets of floating cages were placed respectively in two different ponds in a commercial farm. The aim of the study was to evaluate on a technical basis the possibility of rearing shrimps in floating cages set up in earthen ponds and to assess this method from a statistical standpoint. Shrimps reared in and outside the cages showed comparable growth and survival rates. Variability in the zootechnical parameters between cages, expressed as the estimated coefficient of variation (CV) was calculated for survival rate, total final biomass, final body weight, daily increment in body weight and FCR. On the basis of these figures, we calculated for a given statistical power (80%) the number of replicates (cages) that would be required to reveal significant differences between two treatments, at a 5% level of significance. Our results illustrated the within-farm variability among ponds, and confirmed that the specific characteristics of each pond from the same farm make it difficult to use the ponds themselves as experimental units. This study demonstrates that rearing in floating cages is an economical, powerful and sensitive experimental tool for shrimp culture studies specifically carried out under conditions close to semi-intensive production.

Thurs. 11:30
Poster session 4

Exotic Pet Animals Influencing Biodiversity in the World

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Invasive alien species (IAS) is widely recognized as one of agents causing serious impacts on biodiversity. Especially, in these days, globalization of economy is surely accelerating the spread of IAS. Various species can migrate even for quite a long distance in quite a short time, accompanied with world-wide transportations of a large amount of industrial and agricultural products. For example, the fire ant Solenopsis invicta has expanded its distribution rapidly from South America to Oceanian, South-East Asian, and East Asian countries in turn. It is considered that the invasive ant has been transferred following the transportation flow of organic resources around the Pacific basin countries. On the other hand, intentional introductions of alien species as pet animals and biological agents have also increased. Notably in recent Japan, it is a great boom to breed exotic animals and a lot of alien species have been imported from various countries, which cause many ecological problems, too. For example, we have found the invasion of chytrid fungus Batrachochytrium dendrobatidis into Japan, at the end of 2006. The fungus was attached with the pet flogs imported from South America. As the chytridiomycosis by the fungus has been proposed as the agent causing worldwide declines of wild frog populations, we fear that this discovery of fungus will be an introduction of extinction of Japanese native frogs. In order to prevent biological invasions, the Japanese Government enacted a new law Invasive Alien Species Act in 2005. In this new law, it is severely prohibited to import, breed and release the alien species defined as invasive by the IAS Specialist Group. Over 100 species have been already decided legally as Invasive Alien Species. However, the aim of this low and the importance of biodiversity have not penetrated into the Japanese nation yet. Importation of exotic animals is still increasing. I would like to discuss how we should do in future for conservation of biodiversity in Japan and also in the world.

Thurs. 11:30
Poster session 4

Oxidative Stress Studies applied to the Farmed Shrimp *Litopenaeus stylirostris* in New Caledonia

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Oxidative stress results either from increased exposure or production by the organism of Reactive Oxygen Species (ROS) or from a decrease in the antioxidant defences, resulting in oxidative damage to lipids, protein and nucleic acid. ROS include free radicals and several reactive oxygen intermediates such as superoxide anion (O_2-), hydroxyl radical (OH-) and hydrogen peroxide (H_2O_2). ROS are continually produced in animals during normal aerobic metabolism. However, the rate or amount of ROS production depends on the metabolism rate of the species under consideration and can be increased by environmental stress. In the present case, the exceptionally high oxygen consumption of the shrimp L. stylirostris, farmed in New Caledonia, makes this species particularly sensitive to oxidative stress. In crustaceans, like once a pathogen enters the haemolymph, NADPH-oxidase is activated in the hemocyte of the host, which in turn reduces oxygen and subsequently produces several ROS. This process, known as respiratory burst,has recently been demonstrated in penaeid. Although ROS play an important role in host defence, their over-expression and residual ROS can result in oxidative stress and cause cellular damage. If this occurs, effective and rapid elimination of ROS, largely dependent on antioxidant defence mechanisms, is essential for the good functioning and health of the organism. The focus in regard to the antioxidant system principally examined in aquatic animals has to date been on enzymes: superoxyde dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), and other low molecular weight antioxidant scavengers: glutathiones (GSH), Vitamin A, E and C, and carotenoids. Moreover, oxidative damages can be evaluated by the level of malondialdehyde (MDA), a commonly used indicator to evaluate lipid peroxydation and the level of carbonyl protein, which has recently been used as a biomarker of oxidative damage to protein in fish.

Thurs. 11:30
Poster session 4

Relation of dietary glycemic index, sugar intake and fiber intake to body composition, glucose and insulin profiles in adolescents from French Polynesia

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OBJECTIVES : Observational studies in adults suggest that a diet with a high glycemic index (GI), which is usually related to a high intake of sugary foods or a low fiber intake, may increase the risk of obesity and cardiovascular disease (CVD). We aimed to examine whether dietary GI, added sugar intake, or dietary fiber were associated with body composition, glucose and insulin profiles in adolescents from French Polynesia.

METHODS : We measured dietary GI, sugar and fiber intakes from 113 adolescents aged 12 to 17 years from Papeete (urban; capital of French Polynesia), Tubuai, Raivave and Rapa (rural; Austral Islands), using a 24-hour dietary recall. Bio-impedance analysis was used for the determination of body composition. Physiological measurements (fasting glucose and insulin concentrations) were obtained.

RESULTS : The mean dietary GI was lower in Austral Islands (GI=59±3 for Tubuai, Raivave and Rapa) compared to Papeete (GI=63±3; p=0.01). The 24-hour dietary recall showed higher daily consumption of total carbohydrate (p=0.006) and added sugar (p=0.005) among individuals living in rural communities compared to the urban ones. Higher dietary GI was positively correlated with higher fat mass (p=0.04) and fasting insulin levels (p=0.03) in Papeete, and lower body weight in Raivave (p=0.01). Added sugar intake was associated with lower fasting insulin levels in Rapa (p=0.02) and higher body weight in Papeete and Tubuai (p<0.01). Dietary fiber were associated with elevated fasting insulin levels in Papeete (p=0.02), and lower insulin levels in Rava (p=0.001).

CONCLUSIONS: Dietary GI, added sugar intake and dietary fiber between ages 12 to 17 years appear to influence differently body composition and fasting insulin levels in urban and rural French Polynesian. Potential benefits associated with traditional diet and other favourable lifestyle factors, which are more predominant in rural communities, might induce early protection on cardiometabolic risk factors.

Thurs. 11:30
Poster session 4

Dispersal, survival and population size of male and female *Aedes albopictus* on Reunion Island

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Recent epidemics of chikungunya in the Indian Ocean, and in Italy, have stressed the need for studies on the mosquito vector *Aedes albopictus*. Sterile Insect Technique (SIT) is a putative method for the control of the mosquito on Réunion Island, France. Knowledge of dispersal, survival, and mating behaviour is a prerequisite for SIT programs. We used mouse-baited BG-Sentinel traps to do mark-release-recapture experiments using laboratory reared F0 mosquitoes at three sites in la Réunion (two peri-urban, one residential area). High recapture rates were obtained in peri-urban sites (mean 15%) for both males and females. Recaptures were made up to 100 meters but dispersal was generally limited to 50 m. The mosquito showed a high preference for hedges and vegetation, and reluctance to cross open space. Mean Daily Survival Probability estimates were 0.94 for both males and females, higher than expected, particularly for males. The trap network was extended to 200 m in the residential area and experiments were done during dry and rainy seasons. Recapture rates were much lower than at the other sites (< 5 %), perhaps due to the concurrence of alternate hosts in the area. Dispersal was still limited although mosquitoes appeared to be more active during the rainy season. Daily Survival Probability was also high, 0.96 and 0.95 for males and females, respectively. Mosquitoes were highly abundant and there were twice as many wild mosquitoes in the rainy season as in the dry season. We conclude that SIT programs for control of Ae. albopictus will require releases of large numbers of sterile males at numerous, closely spaced sites. The longevity of males will be an asset for the success of SIT.

Thurs. 11:30
Poster session 4

Provider-initiated HIV testing and counselling in TB clinics in the Pacific

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Low numbers of TB patients co-infected with HIV have been reported so far in the Pacific Island countries and territories (PICTs), but TB-HIV co-infection is an emerging threat.
Surveillance of HIV in TB patients is therefore crucial in order to assess the need for collaboration between HIV and TB programmes on formulation and implementation of a joint TB/HIV strategy and to provide information on the HIV epidemic. HIV prevalence among TB patients is a sensitive indicator of the spread of HIV into the general population.
WHO-recommended surveillance methods include periodic cross-sectional HIV seroprevalence surveys and data from routine care of TB patients.
Organisation of surveys has proved to be complicated, with the main limitations of a recent survey having been lack of time of staff, legislation and ethical issues, and logistical issues.
On the other side, data from routine care of TB patients are also scarce; in most PICTs much less than half of all TB patients were tested for HIV in 2007, the main barriers being lack of clear HIV testing policies, lack of trained counsellors, irregular supplies of HIV-testing reagents, high workload of staff, and lack of adequate space.
Thus, ways to improve surveillance of HIV in TB- and HIV-testing uptake need to be found, and the introducion of a provider-initiated testing and counselling policy should be considered in all PICTs.

Thurs. 11:30
Poster session 4

Vector control limited to dengue positive cases for a cost effective strategy to contain epidemic: New Caledonian experience in 2008

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In New Caledonia, the last dengue epidemic due to serotype 1 occurred in 2003-2004: 3000 confirmed cases and 17 deaths. The Pasteur Institute of New Caledonia (IPNC), the reference laboratory for dengue, centralizes the biological samples from all the territory. The massive use of insecticide spreading around all clinically suspected cases has induced the emergence of Aedes aegypti resistance to deltamethrin, and thus the necessity to use malathion, either alone or associated with deltamethrin. In 2005, the resistance decreased down to 37%. A new strategy to control dengue outbreak has been implemented, based on an effective collaboration between clinicians, Pasteur Institute and private laboratories, health authorities and the local hygiene departments. Since June 2007, 2 new diagnostic tests to detect NS1 antigen (ELISA and dipstick test) have been introduced at the IPNC. NS1 antigen is generally positive during the period of viremia, from day 1 to day 10 after the onset of the disease, The use of a rapid test permitted an early implementation of cost effective control measures such as the spraying of insecticide targeted on positive cases and a better efficiency of the local hygiene departments (human and materials resources concentration on confirmed cases), which probably contributed to limit the disease burden. Another advantage of this strategy is the limitation of the emergence of the resistance of A. aegypti to insecticides.
In 2008, New Caledonia faced with a dengue epidemic due to the serotype 1. About 1000 patients were confirmed positive. No death was directly attributed to dengue and the number of hospitalizations was moderate. The epidemiology of the outbreak will be described. The sensitivity of A. aegypti to deltamethrin is satisfying (only 4-5% of resistance).

Thurs. 11:30
Poster session 4

Functional characterization of biomineralization markers to understand shell and pearl formation in the pearl oyster *Pinctada margaritifera* from French Polynesia

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The aim of this study is to investigate the molecular mechanisms underlying biomineralization processes during pearl formation in *Pinctada margaritifera*. In pearl oysters, shells are subdivided in two calcium carbonate crystal structures: an outermost calcite prismatic layer and an inner nacreous aragonite layer. Both are embedded in an organic matrix framework. The mantle tissue is responsible for the secretion of the organic components necessary for mineralization of the shell as is the graft for the pearls. As central effectors of crystal development, previous studies have mainly focused on the purification of matrix proteins, identification of their primary structure and evaluation of their functions in shell formation. We still know however comparatively little about how the genes coding for these proteins are expressed in the mantle and how the grafting process affects gene expression through pearl formation. To understand this process, we developed (i) a candidate gene approach to elucidate the presence of conserved matrix gene and (ii) a genome-wide approach to unravel regulation and transcriptomic data during pearl formation. Focusing here on the first approach, we show the identification of 3 gene families. Pattern expression analyses of the first gene, called perline, and immunological detection of the protein in mineralizing tissues seem to show its involvement in aragonite formation. The calcine and aspéine genes exhibit an expression pattern specific to mantle cells thought to be the source of the prismatic layer matrix organic molecules. Those genes thus represent good candidates for mineralization biomarkers and the 1st opportunity to get tools to improve pearl quality. Finally, transcriptomic expression analyses of all these genes through the graft process show a strong heterogeneity underlying the high level of complexity of pearl formation. That work offers for the first time the prospect to optimize pearl production to help the sustainable development of pearl farming.

Thurs. 11:30
Poster session 4

Chemodiversity approach of vanilla biodiversity

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Vanilla tahitensis is known for its original aromatic flavour which is strongly appreciated and different from Vanilla planifolia due to an original anise note. Moreover, the beans of Vanilla tahitensis are very attractive thanks to their oily texture and appearance. Two main cultivars are produced in French Polynesia plantations. The morphological traits of their leaves, flowers and beans are different from those of V. planifolia cultivars. In order to assess the chemodiversity of commercial V. planifolia and V. tahitensis beans, different cured vanilla samples were collected in various producing countries (Central America, Indian and Pacific Ocean). The study analysed the aroma and fatty acid content. Aroma extraction was performed in a Soxhlet apparatus with ethanol, and lipids were cold-extracted with chloroform. The aroma and fatty acid content were then assessed by HPLC analysis with external calibration. Fourteen aroma molecules were quantified showing a uniquely high content of anise molecules for V. tahitensis samples and substantial composition differences depending on species, and sample origin. Besides common fatty acids, four very long-chain monounsaturated fatty acids, rarely found in plants, were identified: nervonic acid (24:1), ximenic acid (26:1), octacosen-19-oic (28:1) and lumequeic acid (30:1). Statistical analysis was performed on vanilla samples, using aroma and fatty acids content as variables. Analytical results showed clear discrimination of V. tahitensis from V. planifolia samples which could be explained by genetic and agronomic factors or curing methods. Results of both aroma and fatty acid compositions could be used as a characteristic for the authentication of V. tahitensis enabling its protection as a unique species.

Thurs. 11:30
Poster session 4

Détection de *Vibrio nigripulchritudo* dans les sédiments de bassin d'élevage crevetticole en Nouvelle-Calédonie au cours d'un assec

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Depuis 1997, certains élevages de crevettes de Nouvelle-Calédonie sont affectés en saison chaude par le syndrome d'été, bactériose septicémique due à *Vibrio nigripulchritudo*. Des souches de cette espèce bactérienne, présentant une virulence variable, ont été isolées d'animaux moribonds et de différents compartiments de l'environnement. Lors de l'élevage, les sédiments représentent un des compartiments susceptibles de jouer un rôle de réservoir du pathogène. Toutefois, la variabilité spatio-temporelle de *Vibrio nigripulchritudo* pendant l'assec (période d'assèchement du bassin entre deux cycles d'élevage) demeure inconnue. Des outils de biologie moléculaire ont donc été développés pour suivre la présence de la bactérie dans les sédiments d'un bassin ayant subi par le passé des mortalités liées au syndrome d'été. Après vidange du bassin, des échantillons de sédiments ont été réalisés toutes les 3 semaines en différents points géoréférencés. L'ADN bactérien a été extrait des sédiments de manière directe et après 24 h d'enrichissement sur milieu de culture, pour améliorer la limite de détection. Les échantillons ont été analysés par PCR à l'aide d'amorces spécifiques de l'espèce *Vibrio nigripulchritudo* et d'amorces spécifiques de marqueurs de virulence. Sans enrichissement, la limite de détection au niveau de l'espèce a été établie à 10^3 CFU.g-1 de sédiments et à 10^6 CFU.g-1 en utilisant les marqueurs de virulence. Après enrichissement, ce seuil a pu être abaissé à 100 CFU.g-1 de sédiments pour les deux conditions de PCR. Ces résultats ont permis d'établir, lors d'un assec de bassin, une cartographie spatio-temporelle de *Vibrio nigripulchritudo* au niveau de l'espèce et de la souche hautement pathogène.

Thurs. 11:30
Poster session 4

***Derris malaccensis*, *Tephrosia candida* and *Tephrosia purpurea*: Three plants growing in French Polynesia with pesticide potentiality**

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As part of the bioprospecting projects of the natural resources of French Polynesia in the field of economic potential in plants and biological activities, we intend to contribute to better knowledge and utilization of some three rotenoïd producing plants of French Polynesia, Derris malaccensis, Tephrosia candida and Tephrosia purpurea. These plants could be subject to direct (green fertilizers and pesticides, few processed, usable in remote areas of scattered islands of French Polynesia) and indirect (organic farming, crop protection products developed) recoveries. Bibliographic research and first analytical investigation showed occurrence of rotenoid and flavonoid compounds in these plants. Rotenone was detected in different parts of these plants (root, steam and leaf).

Thurs. 11:30
Poster session 4

First investigation on *Alstonia Costata* var.costata from French Polynesia

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Alstonia species are trees belonging to *Apocyanaceae* family. Ethnobotanical studies indicated that some of these *Alstonia* species are widely used in the traditional medicine and it had been reported to have many uses in the treatment of various ailments. The bark of the plant is the most extensively used part and is reported to have anticancer properties from different cultures and civilizations like India, Admiralty Islands and Thailand. Alstonia species, which is widely distributed in the tropical regions, is a well-known rich source of unique heterocyclic alkaloids having a monoterpene indole skeleton and has attracted great interest from biogenetic and biological points of view such as anticancer, antibacterial, anti-inflammatory, antitussive, and antimalarial properties. French Polynesia have an original flora including many species used in traditional medicine. Plants have great heritage value and many are still used in traditional medicine. Little is known about Alstonia Costata var.costata, a French Polynesian indigen plant, mainly in phytochemical and bioactivity standpoints. The aim of this study is to assess the occurrence of alkaloids compounds in *Alstonia Costata*, using Dragendorff test. After a bibliographic investigation of alkaloids producing plants from Alstonia spp., Dragendorff test screening was carried out on differents parts of *Alstonia Costata* plant extracts. Leaves and bark parts of the studied species, collected in Tahiti, were extracted and the corresponding crude extracts showed respectively high content of alkaloids. Leaf extract was submitted to KB cytotoxic activity assay and to acethylcholinesterase inhibiting activity assay. These two biological assays imply potential pharmacological interests. Alstonia Costata leaves extract showed a high activity in both biological assays. The active extracts will be subjected to further phytochemical studies to identify active components responsible for these shown bioactivities.

Thurs. 11:30
Poster session 4

Improvement of the pearl quality produced by the oyster *Pinctada margaritifera* in French Polynesia: characterization of cellular and molecular processes from the grafting to the pearl formation

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Tahitian pearl farming industry plays a major socio-economic role in French Polynesia with more than one hundred million euros worth of pearls exported in 2007. In the context of a more and more competitive market where the production of high quality pearls becomes essential, research can contribute to secure and ensure durable production. The objective of the "LBQP Laboratory" of Ifremer in close collaboration with the "Service de la Perliculture" (" pearl farming office ", a French Polynesia government agency) is to study by a global approach the mechanisms underlying pearl formation and defects occurrence in *Pinctada margaritifera*. Researches range from the complete exam of the grafting process to the characterization of the cellular and molecular mechanisms of the pearl formation with a specific focus on pathology, grafting optimization and biomineralization. The aim, in accordance with pearl farmers concerns, is to propose methods and tools that will increase superior pearl quality production. This research is part of a large collaborative project on the "Improvement of the Pearl Quality" (GDR ADEQUA) and intend to support sustainable development of pearl farming in French Polynesia

Thurs. 11:30
Poster session 4

Etude des plantes aromatiques de la Nouvelle-Calédonie appartenant aux familles des Cupressaceae et des Myrtaceae

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En raison de l'originalité de sa flore, la Nouvelle Calédonie détient une place à part. Avec plus de 3000 espèces endémiques, cette région se présente comme une source importante dans la recherche et l'utilisation de molécules nouvelles provenant du règne végétal. Les potentialités de ces plantes sont multiples : sources de substances naturelles pour les secteurs de la pharmacie, de l'alimentation diététique, de la parfumerie ou de la cosmétique. Les deux ressources les plus exploitées et utilisées en Nouvelle-Calédonie sont les essences de bois de Santal (Santalum austrocaledonicum) et de Niaouli (Melaleuca quinquenervia) qui représentent à elles seules presque l'intégralité du marché. A ces chiffres, il convient d'ajouter un marché engagé depuis quelques années sur la culture de la vanille (Vanilla planifolia). Des découvertes récentes sur les huiles essentielles de Myoporum crassifolium et Murraya crenulata ont mis en évidence de nouveaux composés et des activités biologiques sur différentes cibles pharmacologiques, antipaludique, cytotoxique, antifongique et antimycobactérienne. Les travaux que nous avons engagés consistent en l'étude du potentiel pharmacologique des huiles essentielles du bois, des écorces et des feuilles de plusieurs espèces de la famille des Cupressaceae (Callitris, Neocallitropsis et Libocedrus) et des Myrtaceae (Xanthostemon, Metrosideros et Sannantha). Un autre aspect de cette étude consiste à comparer différentes méthodes d'extraction des huiles essentielles (hydrodistilation classique, entraînement à la vapeur, prétraitement aux ultrasons) afin d'évaluer leur influence sur les rendements et la composition des huiles essentielles.

Thurs. 11:30
Poster session 4

Dislocations des Barrières Récifales occasionnées par un Cyclone de Forte Energie

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L'examen des images satellitales Ikonos a permis de recenser à travers l'archipel des Tuamotus, sur de nombreux atolls, des portions de récif externe fracturées et disloquées qui peuvent atteindre plusieurs centaines de mètres de longueur. Les fragments du récif ont été ensuite transportés à terre par un phénomène hydraulique, et les blocs coralliens les plus gros, parfois décamétriques, sont encore visibles, abandonnés sur le platier, alors que les fractions plus fines ont été dispersées dans le lagon par les courants. Les dislocations détectées sont très souvent orientées au Nord Ouest et s'alignent à travers l'archipel suivant un axe NO-SE, allant de Rangiroa à Tematangi. L'importance des dislocations décroît en fonction de la distance à l'axe principal de propagation du phénomène. Après avoir éliminé la possibilité d'un tsunami ou d'une lame de fond, le seul phénomène naturel pouvant provoquer de telles destructions serait un cyclone de forte énergie, similaire en trajectoire au cyclone de février 1878, mais dont la date n'a pas pu encore être estimée avec précision. L'accroissement de l'énergie des cyclones engendré par le réchauffement climatique pourrait ainsi mettre en péril l'équilibre fragile des barrières récifales et perturber l'économie insulaire de l'archipel des Tuamotus basée en partie sur la pêche lagonaire et l'élevage des nacres.

Thurs. 11:30
Poster session 4

Modulation of iNOS and cytokines expression by plants extracts traditionally used for the treatment of Ciguatera in the South Pacific: characterisation of their anti-inflammatory activity

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Ciguatoxins (CTXs) are marine biotoxins produced by dinoflagellates and responsible for Ciguatera fish poisoning (CFP), a form of ichtyosarcotoxism prevalent in intertropical areas especially in Caribbean seas, Indian and Pacific Ocean. The primary action of these polycyclic polyether compounds is the fixation to voltage sensitive sodium channels with high affinity. However, this sole action cannot explain the wide range of CFP symptoms, especially the chronic fatigue syndrome, the phenomena of sensitisation, the polymyositis and the Guillain-Barré syndrome, all known to involve inflammatory mechanisms.

In support of western medicines essentially symptomatic, traditional medicine proposes the use of various and numerous plants among them some are able to reduce CTXs effects in vitro and in vivo. The need for enriching the therapeutic arsenal to treat CFP combined to the likely implication of inflammatory mechanisms in this pathology, have led us to characterise the anti-inflammatory potential of these plants.

This study reports on the anti-inflammatory potential of aqueous extracts of plants commonly employed in the South Pacific. The iNOS and cytokines productions were analyzed using a murine macrophage model, the RAW 264.7 cell line and stimulated with a bacterial lipopolysaccharide. The expressions of iNOS gene, pro- and anti-inflammatory cytokines were measured by quantitative PCR (qPCR) and ELISA techniques. Results obtained in vitro were compared with observations of iNOS and cytokines modulation in vivo.

A possible direct application of these results is the study of active compounds isolated from selected plants with the eventuality to propose new specific treatments for CFP.

Thurs. 11:30
Poster session 4

An effective DOT (Directly Observed Treatment)model for controlling tuberuclosis epidemic in Kiribati

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For the past four consecutive years (2003-2006), Kiribati reported the highest annual TB notification rate per capita in the entire Western Pacific region, with an average rate well above 200 active TB cases (all forms of TB) and 133 (sputum smear positive TB) per 100,000 population. Kiribati recorded the highest TB rate ever reported in the Pacific region of 399 per 100,000 in 2006. Rates in Kiribati exceeded rates in the known high TB burden countries in the region such as Cambodia, Vietnam and China. Notification increased 40% (from 243 to 337) and rates 50% (260 to 399 per 100,000 pop) indicating an enormous and rapidly increasing disease burden in the community. Almost 50% of TB cases were young adults in the age group 15-34 years indicating on going active transmission of the disease in the population.

World Health Organisation and the Secretariat of the Pacific Community (SPC) declared TB epidemic crisis in Kiribati in 2005.

A Directly Observed Treatment (DOT) unique model was established by government in October 2006. Fifteen young community members were recruited, trained and established within the government system to assist TB patients swallow their TB medication. A few countries in the Pacific have attempted different types of DOT models with poor outcomes.

Since 2006, notification rates have started to decrease; 363 (2006), 352 (2007) and 254 Jan-Sep 2008) while patient compliance remained at 100% and successful treatment outcome at 97%

Kiribati DOT model made positive impact on TB epidemic in Kiribati

Thurs. 11:30
Poster session 4

PACINET - Building taxonomic capacity for the Pacific Islands

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PACINET is a unique collaboration of organisations and individuals focusing on helping the Pacific region to build its capacity in taxonomic skills, resources and information, needed for conservation and economic development. The acronym stands for the Pacific Islands Network for Taxonomy; an initiative that began in 1994 at the 8th Regional Meeting on Plant Protection coordinated by SPC, and was endorsed by the Permanent Heads of Agriculture and Livestock Production. A formal proposal for its establishment and the operation of a Pacific Locally Organised and Operated Partnership (LOOP) was drafted in 1996, and accepted in 2000. The Pacific LOOP is a technical cooperation network of BioNET-International, and is one of 12 global LOOPs. It is comprised of representatives from SPC, SPREP, USP, SOPAC and Pacific Biodiversity Information Forum (PBIF). The elements of PACINET include raising awareness at levels on the importance of taxonomy and bioinformatics, encourage and recruit young Pacific Islanders to consider a career in taxonomy, assistance in parataxonomic training and encouraging the revitalization and incorporation of vernacular taxonomy in parallel with scientific information in the sustainable management of biodiversity. This presentation will highlight recent achievements and outline plans for the future of PACINET's implementation.

Thurs. 11:30
Poster session 4

Des huiles essentielles de plantes de la biodiversité terrestre pour lutter contre les moustiques vecteurs de maladies en Polynésie française : la dengue et la filariose

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La dengue et la filariose sont deux maladies vectotielles sévissant actuellement en Polynésie française. Les moustiques vecteurs de ces maladies sont Aedes aegypti (L.) ou moustique de la fièvre jaune et A. polynesiensis Marks. Un programme de recherche financé par le Ministère de la Santé de la Polynésie française, l'Etablissement Public Administratif pour la Prévention (EPAP) et le Laboratoire d'Ecophysiologie et de Biotechnologie des Halophytes et des Algues Marines (LEBHAM) a été réalisé au Laboratoire de recherche sur les Substances Naturelles de l'Institut Louis Malardé dont l'objectif global est la recherche de nouveaux répulsifs anti-moustiques et l'optimisation des pièges utilisant des attractifs de moustiques à base de produits naturels de la flore locale. Divers extraits issus d'une dizaine d'espèces de plantes aromatiques de la biodiversité terrestre polynésienne ont été testés vis à du moustique Ae aegyti, en particulier l'activité répulsive spatiale de leurs huiles essentielles par l'utilisation du système à olfactomètre triple cage et l'activité répulsive topique évaluée au moyen du test dit du " tissu imprégné " (cloth patch) avec le N,N -diéthyl -m-toluamide (DEET) utilisé comme standard répulsif de référence. En outre, l'activité attractive des différentes huiles vis à vis de A. aegyti a été appréciée seule ou ajoutée à une solution attractive dite de référence constituée d'un mélange d'acide lactique, d'acétone et de diméthyl disulfide (olfactomètre triple cage). Au total, 10 espèces de plantes ont été collectées à Tahiti pour la production d'huiles essentielles. Des échantillons d'huiles essentielles originaires de Nouvelle Calédonie et de Madagascar ont également été évalués. Les compositions chimiques des huiles essentielles actives ont été réalisées par chromatographie gazeuse couplée à la spectrométrie de masse en collaboration avec le laboratoire de Montpellier. Les composants actifs des huiles répulsives sont en cours d'évaluation tandis que les premiers résultats sont présentés. Les tests d'activité ont été réalisés par le laboratoire de Gainesville. Les bio-essais ont été effectués au moins 5 fois par olfactométrie suivant un échantillonnage randomisé et trois expérimentations conduites séparément et journalièrement. L'activité répulsive (patch) a été réalisée avec le concours d'au moins cinq personnes distinctes afin d'en évaluer la dose minimale d'éfficacité.

Thurs. 11:30
Poster session 4

Analyse écorégionale du lagon de Nouvelle-Calédonie. WWF-CRISP, 2008

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Mi-Novembre 2007, dans la cadre du programme CRISP, le WWF et ses partenaires ont organisé l'atelier " Vision et Stratégie ". Cet rencontre participative est l'atelier conclusif de l'analyse ecorégional (AER) du milieu marin de la Nouvelle Calédonie. La méthode AER vise à catalyser, de part tous les acteurs et parties prenantes, l'évolution d'une vision et stratégie commune des activités de conservation et de la gestion des ressources naturelles à l'echelle de " l'ecorégion marine de la Nouvelle Calédonie " comprenant toute la zone économique exclusive (ZEE) du territoire jusqu'à la mangrove.

En 2005, lors du premier atelier de l'AER, un réseau de Zones de Conservation Prioritaires (ZCPs) d'intérêt majeur pour la conservation de la biodiversité et des ressources marines a été identifiés de façon collégiale par un grand nombre de chercheurs et d'experts. La logique étant que ce réseau permettrait de sauvegarder 90% de la diversité biologique et ressources marines de l'ecorégion. Ensuite, des études supplémentaires ont permis d'identifier les pressions et menaces anthropiques et naturelles majeures qui pèsent sur ce réseau.

Ces informations ont étés partagées avec les plus de 150 acteurs present (chercheurs, techniciens, administrateurs, associations, entreprises, différents métiers liés à la mer et à l'utilisation des ressources marines etc.) pour guider trois jours de débats et d'échanges. Le fruit de dernier est la co-validation d'une série de recommandations et orientations vis à vis des activités de conservation et gestion durable du milieu marin comprenant des volets diverses tel que la gouvernance, la sensibilisation, la réglementation, le suivi et la recherche scientifique etc.

L'ensemble des rendus de l'AER seront mises en forme et présentés aux décideurs et pouvoirs publics des différents collectivités pour faciliter la mise en place du réseau d'ZCP et d'une stratégie harmonisé et adapté à l'échelle de l'ecorégion et du territoire.

Thurs. 11:30
Poster session 4

Nutrient fluxes of seagrasses (*Thalassia hemprichii*) and corals (*Montipora digitata*)

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Bise is currently a seagrass restoration site in Okinawa, Japan. There are distinct seagrass and coral habitats in the different areas of the moat. A laboratory experiment was conducted to investigate the nutrient uptake rates of the *Thalassia hemprichii* seagrasses that grow in the seagrass patches north of the study area as well as of the *Montipora digitata* corals that grow on the reef crest without any presence of seagrasses. These results were compared with the uptake rates of the Thalassia hemprichii seagrasses and Montipora digitata corals that grow together forming a mixed community in the southern end of the moat. The results indicate that the uptake rate of Montipora digitata corals that grow on the reef crest without the presence of seagrasses is quite low. In the treatments with *Thalassia hemprichii* seagrasses only, high nutrient uptake rates were observed, with the above-ground biomass having greater nitrate uptake compared to the roots and rhizomes biomass. Surprisingly, the treatments for the above-ground biomass of the mixed community, consisting of the Thalassia hemprichii leaves and the *Montipora digitata* corals, exhibited very low nutrient uptake rates. The values were comparatively closer to the uptake rate exhibited by corals rather than seagrasses. This indicates that the physiological changes in seagrasses such as greater leaf size and surface area in addition to less epiphytic biomass and the presence of corals may be influencing lower nutrient uptake rates of the mixed seagrass and coral treatments. These results also indicate that the mixed community of seagrasses and corals may be highly susceptible to high nutrient input into this area.

Thurs. 11:30
Poster session 4

Situation de l'espèce *Chelonia mydas* (tortue verte) en Polynésie française, contribution de l'ONG Te Honu Tea à son étude et à sa protection

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L'association Te Honu Tea a été créée en 2001 suite à un double constat alarmant : la très forte diminution du stock de Tortue verte et l'augmentation de la pression de chasse en Polynésie française. Dans les années 1990, plusieurs auteurs ont en effet estimé la diminution de la population à environ 94 % en 25 ans sur l'atoll de Scilly, site de ponte majeur en Polynésie. Les principales menaces sont les prélèvements d'adultes et d'œufs. Leur augmentation résulte des progrès technologiques, d'une connaissance imparfaite de la biologie de l'espèce et de l'abandon des modes de gestion coutumiers des ressources naturelles en Polynésie française. L'efficacité des actions de conservation est compromise par le manque de données chiffrées sur la localisation et l'état des stocks, qui rend également difficile l'élaboration d'une politique locale de gestion de l'espèce. Depuis 2006, Te Honu Tea a développé des actions d'étude et de protection in situ : un premier suivi continu sur plusieurs saisons de ponte complètes a débuté sur l'atoll de Tikehau en 2006. Les premiers résultats de cette étude montrent un niveau du stock très bas ainsi qu'un taux de capture important. Sur les atolls de Vahanga et de Mataiva, des prospections en fin de saison de ponte ont fourni une première évaluation de l'activité de ponte. Te Honu Tea a réalisé en 2008 une étude technique sur la faisabilité d'un programme d'élevage de Tortue verte en Polynésie française qui indique que celui-ci impliquerait des coûts élevés pour un bénéfice écologique pour l'espèce incertain. Te Honu Tea développe également des actions éducatives, du matériel pédagogique et participe à des événements publics. L'association favorise l'implication des populations dans la gestion de l'espèce à travers l'emploi d'agents locaux et des collaborations avec des associations locales.

Thurs. 11:30
Poster session 4

Analyse de la décomposition thermique de l'hydroxyde de magnésium

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Le magnésium est le huitième élément le plus abondant de la croute terrestre. Il s'y trouve à hauteur de 2,3% sous forme de minéraux dans les sols mais également sous forme de sel dans les eaux de surface. La Nouvelle-Calédonie est constituée, en certains endroits de la grande terre, de péridotites dont l'altération supergène conduit à des minéraux riches en magnésiums (magnésite) et à des sols hypermagnésiens. L'hydroxyde et l'oxyde de magnésium sont largement utilisés en médecine et pharmacie mais aussi dans l'industrie et l'agriculture. L'oxyde est obtenu par calcination de l'hydroxyde et ses propriétés (porosité, réactivité chimique) vont fortement dépendre de la température de calcination. Bien qu'elle soit étudiée depuis de nombreuses décennies, la décomposition thermique de nanoparticules d'hydroxyde de magnésium $Mg\,(OH)_2\,(s) \longrightarrow MgO(s) + H_2O(g)$, n'est pas encore complètement comprise. Une synthèse bibliographique sur le sujet montre que la cinétique de décomposition et les valeurs d'énergie d'activation varient, parfois considérablement, d'une étude à l'autre. Ces variations s'expliquent par des conditions expérimentales différentes mais aussi par la nature et la taille de l'échantillon. La méthode classiquement utilisée pour suivre la cinétique de décomposition d'un échantillon est la thermogravimétrie. Dans la présente étude, nous montrons qu'il est possible d'atteindre les mêmes objectifs avec un diffractomètre à rayons X équipé d'un four. Il offre de plus l'avantage de permettre un suivi individuel de l'évolution en température de l'intensité des plans de diffraction et de leurs positions. Associée au diffractomètre, la microscopie électronique par transmission permet d'étudier la morphologie des nanoparticules d'hydroxyde obtenues par voie chimique. Nos résultats portent sur la décomposition à température constante (mode isothermal) d'un échantillon selon 3 températures (300, 305 et 310 °C). Les courbes de cinétiques obtenues sont confrontées à différents modèles de décomposition et nous montrons que le modèle le plus adapté est celui d'Avrami ($1{,}5<n<2$).

Thurs. 11:30
Poster session 4

First record of genetic connection between Indo-Pacific and Atlantic-Mediterranean population groupings of green turtle (*Chelonia mydas*): the Mozambique Channel (Indian Ocean)

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Green turtle (*Chelonia mydas*) populations are organized in two highly divergent groupings: Atlantic-Mediterranean populations, and Indo-Pacific ones. Recent studies showed the existence of 2 contact zones: Guinea Gulf (Atlantic Ocean) and the South-Western Indian Ocean. In the second case, authors showed that individuals from both population groupings can reproduce in the same sites. The present study aimed to infer global structure of green turtle populations in the Mozambique Channel (South-Western Indian Ocean) and to test the existence of genetic exchanges between individuals from the 2 population groupings in this region. Then, thanks to a large collaboration network, 809 tissue samples have been collected between January 2003 and June 2007 in 14 sampling sites along the Mozambique Channel (from South Africa to Kenya). We analyzed mtDNA control region sequence (489 bp) and 4 microsatellite loci. We found 9 mtDNA haplotypes new for Chelonia mydas. Our results demonstrated that the Mozambique Channel constitutes the first hybrid zone known between Atlantic-Mediterranean and Indo-Pacific green turtle population groupings. The origin of this secondary contact was estimated between 100,000 and 200,000 years ago, corresponding to the last glacial period. This study also offered proof of the existence along the Mozambique Channel of a strong mtDNA cline. We assumed this was generated by neutral dispersal of Atlantic-Mediterranean turtles along the Mozambique Channel, which is probably restricted by strong natal homing and foraging site fidelity of green turtles. The cline width is 1,692 nautical miles and its center would take place in the narrowest part of the Mozambique Channel. The presence of cross mating showed the absence of reproductive isolation between these 2 population groupings. Thus, even if we cannot estimate the importance of present gene flow, this region may contribute to the species integrity. This has strong implications in global green turtle management and conservation.

Thurs. 11:30
Poster session 4

Long-term ecological monitoring of human activities impact on the coral reefs of Kenting National Park, southern Taiwan

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Since July 2001, the National Museum of Marine Biology & Aquarium (NMMBA), co-sponsored by the Kenting National Park Headquarters and National Science Council, has launched a Long-Term Ecological Research (LTER) program to monitor the anthropogenic impact on the ecosystem of the Kenting area in southern Taiwan, a subtropical coral reef area facing increasing numbers of tourists and hotel developments. Some major findings were that the seawaters of intertidal zone along Nanwan Bay were polluted by sewage discharge at some monitoring stations, evidence by eutrofication, high chlorophyll a concentration, high BOD5, high turbidity, and high pH values. The suspended solids in Kenting seawater mainly came from seasonal rainfalls and partially caused by typhoons which had affected the health of marine ecosystem. The results indicate that anthropogenic nutrient loads have negatively influenced on the survival of the shallow water corals from a long-term point of view due to degrading water quality of these estuaries. Actually, higher nutrients and suspended sediments have made the algae with abnormal growth in coral reefs, leading to the parts of shallow water corals being covered by algae and buried by sediments. Although sampled data also illustrate that concentrations of these terrestrial materials collected from stream catchments were diluted rapidly in offshore regions, higher nutrient concentrations still make the impacts in shallow water corals. In summary, the water quality in the intertidal zone of Nanwan Bay has been deteriorating and requires greater attention. Our results show that increasing numbers of tourists, suspended solids and ammonia were the dominant factors leading to the drop in coral coverage. The purpose of this project is to find solutions for the impacts of human activities mentioned above on marine environments and to provide information for the authorities.

Thurs. 11:30
Poster session 4

Protective effect of different types of algae and marine extracts on cardiovascular complications and oxidative stress induced by long-term high energy fructose diet in the normal and aged rat

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Rats consuming a high energy fructose (HF) diet develop some of the metabolic modifications similar to that observed in the human polymetabolic syndrome such as insulin resistance, hypertriglyceridemia, decreased HDL cholesterol, and vascular complications such as hypertension and cardiac hypertrophy. In rats a 4-6-weeks high carbohydrate consumption is also associated with oxidative damage involving formation of reactive oxygen species (ROS) including superoxide and hydroxyl radicals. Although these effects of short-term HF diet in rats have been linked to human type 2 diabetes profile HF diet is paradoxically protective to the ischemic myocardium while an increase in the myocardial sensitivity and a decrease of post-infarction survival occurs in diabetic patients. To address this issue we have compared the metabolic changes and blood antioxidant status in rats fed for up to 12 months with either HF (60% w/w) or standard diets (n = 60/group). After sacrifice, differences among groups in cardiovascular indices (functional postischemic recovery of isolated hearts, free radical production of cultured aortic rings), markers of oxidative stress and direct detection of ROS in liver and kidney were assessed using hemodynamic, biochemical and electron spin resonance techniques. The data evidenced that (1) HF diet was overall protective to hearts when it did not exceed 2 months while it became highly detrimental after 6 months duration, (2) the development of impaired insulin activity was not related to hyperglycemia but to the antioxidant activity (i.e., enzyme activity, trace element and glutathione depletion), and (3) supplementation with algae extracts rich in phycocyanins efficiently improved all studied parameters in a 6-months HF diet. These results could be of interest in the field of human nutrition because of the increasing consumption of fructose-enriched foods and beverages in many industrialized countries.

Thurs. 11:30
Poster session 4

Assessment of iodine nutritional status among French Polynesians using urinary iodine concentrations

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Objective: An imbalance in iodine nutritional status can lead to thyroid diseases. Our aim was to evaluate iodine status in the cohort of 'Dietary and health transition in French Polynesia'.
Design: Maohi participants aged 12-97 years (n=304) enrolled at baseline gave spot urine samples. We measured urinary iodine concentration using the ICP-MS technique. We excluded 4 participants with urinary iodine over 600μg/l. To evaluate iodine nutritional status according to WHO standards, we calculated the median, 1st and 4th quintiles of urinary iodine concentrations, and percentage of samples under 50 μg/l. We described the concentrations according to gender, age group and community (urban Papeete, Tubuai, Raivavae and Rapa).
Results: Among the 300 participants, the median concentration was 88 μg/l, corresponding to a mild iodine deficiency, below the optimal iodine range of 100-199 μg/l recommended by WHO. The 1st quintile was equal to 48 μg/l, slightly below the 50 μg/l recommendation, and the proportion of samples under 50 μg/l, which should not exceed 20%, was of 22% (n=65). The median urinary iodine concentration was 89 μg/l among women and 85 μg/l among men, comparable with the French SUVIMAX cohort where the results were 82 μg/l and 85 μg/l respectively. The medians were 67, 89 and 120 μg/l for the 12-17, 18-49 and 50 years and over age groups respectively ($p<0.001$). Proportions of samples below 50 μg/l were 31% (n=35) among teenagers, 20% (n=20) among the 18-49 year-olds, and 8% (n=7) among the 50+ ($p<0.001$). The median urinary iodine concentrations were 88 μg/l for Papeete and 92 μg/l for Tubuai. In Rapa and Raivavae, where only teenagers were enrolled, medians were 52 μg/l and 90 μg/l respectively.
Conclusion: A mild iodine deficiency was observed in our study, mainly among the younger generation. Variations of iodine status across generations could reflect changing dietary patterns.

Thurs. 11:30
Poster session 4

Community Health Through Traditional Fisheries Management

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The current public health crisis in many Pacific Island and coastal communities is in part an effect of the westernization of nutrition. Traditional foods have a big role to play in slowing down or reversing current trends such as the rapid emergence of obesity and diabetes. Many of the ecological challenges both locally and globally are caused by so called modernization. Our research has revealed that several indigenous fishing communities followed resource management strategies that benefited both the health of the community and the health of the resource base. This paper explores how we can help reverse negative human and ecological health trends through a better understanding of the empirical underpinnings of indigenous resource use strategies. It also underlines the benefits of better communication of the empirical evidence supporting traditional management and nutritional systems; within local communities, internationally and between traditional knowledge and western science.

Thurs. 11:30
Poster session 4

Nurses Involved in Research

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L'Institut Louis Malardé lead a health survey which aimed to describe in the general Polynesian population, risk factors of cardiovascular diseases (including diabetes) and more specifically those related to nutrition. This survey was done in collaboration with the Public Health Research Unit of the Laval University Research Centre in Canada, and took place during falls 2007. Four communities were compared, Papeete and those of Raivavae, Tubuai and Rapa in the Australes Archipelago. Six Polynesian nurses trainees were involved in this survey as research nurses and were trained during three days to gain knowledge of this research project, the objectives and tasks, and requested techniques to collect clinical data.

A nurse in research must acquire and develop specific abilities such as: knowledge of the ethics committees requirements and the objectives of the research plan in order to introduce and explain to the participant all information within the inform consent form, and answer to their questions. Moreover, a research nurse willadminister questionnaires related to the survey on topics such as: demographic data, lifestyle habits, medical aspects, nutrition, etc. They also need to be capable to apply techniques and to make the requested tests, and to help in any tasks within the team to reach the targets.

Within this survey the research nurses had the opportunity to work and discover different communities in term of nutrition and dietary transition, and way of life. Their involvement in research and the work abroad surely encouraged their capacities to adapt themselves and create initiatives. Moreover, they worked in a multidisciplinary and international team involving laboratory technicians, senior nurses, epidemiologists, physicians, etc. Such an experience helps these nurses to better understand all aspects of research and might create interest for a career in this area. This poster will describe more precisely the research nurse work and involvement in such a survey.

Thurs. 11:30
Poster session 4

A Tool for Biodiversity Respect: An Artificial Crushing Finger Device for Rapid Evaluation of Essential Oils from Aromatic Plants Leaves

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A decade ago, several treks (NEBLINA, TASTETREK,...) were performed by companies of aromatic industry sector both in South-America,West-Africa and South Pacific area in order to investigate the aromatic potentialities of rare exotic plants for novel flavors and fragrances formulations. Among the plants of interest, several were protected and consequentively their harvasting was restricted or forbiden. Before their hypothetic cultivation, the necessary acclimation phase will be a limiting factor for aroma science. In these cases, sampling appeared as the "weakest link" for both the production of flavors and fragrances (extracts) chain but also for the analytical ones (identification of the key odor compounds for further chemical or biotechnological synthesis). So, in order to take in account biodiversity and bioresources restrictions, a special designed apparatus, i.e. Artificial Crushing Finger (ACF) device, allowing to copy the crushing of leaves between fingers used by farmers or flavorists to sensorially evaluate the odor of aromatic plants, was self-developped. Such system allowed through a controlled dynamic headspace concentration of volatiles emitted by crushing leaves in a mini reactor, to perform a rapid evaluation of essential oil content with only a couple of leaves and remplace the traditionnal hydrodistillation device which is sample consuming. In the present paper, the first results of ACF device applied to several forgotten (aka medieval) aromatic plants were reported. After collection of the aerial parts of wild living plants collected in the fields, a comparative analysis of volatile compounds of fresh leaves were performed by micro-hydrodistillation with a micro Clevenger-type apparatus and by using the ACF device coupled a TENAX GC trap. Major components and odor active compounds of all aromatic extracts were identified respectively by GC-FID and GC-MS-O.

Thurs. 11:30
Poster session 4

Dietary fat transition and weight status among adolescents: a French Polynesian paradox?

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Objective: As a result of the dietary transition, the relative proportion of marine n-3 and trans-fatty acids (TFA) is likely to respectively decrease and rise in the French Polynesian diet, especially in the young. Beyond their being markers of broader dietary changes, their intrinsic anti- and pro-obesity effects are currently discussed. Our aim was thus to investigate the dietary fat transition and its relation to weight status among Maohi teenagers.
Design : Maohi participants aged 12-17 years (n=116) enrolled in the baseline of the "Dietary and health transition cohort in French Polynesia" gave a blood sample. We measured the fatty acid profile of red blood cell (RBC) membrane phospholipids as a surrogate for usual intakes of PUFA and TFA. Dietary fat transition score (DFTS) was determined by the ratio of (EPA+DHA) to elaidic TFA. Body composition was assessed by bio-impedance analysis and weight status defined according to CDC guidelines and growth charts. We performed ANCOVA and logistic regression analysis.
Results: DFTS was lower in Papeete adolescents (age-gender-adjusted means: 22.4) as compared to Tubuai (29.4, p=0.004), Raivavae (29.4, p=0.002) and Rapa (28.2, p=0.008). BMI was higher in the fourth DFTS quartile (adjusted mean: 28.2 kg/m^2) as compared to the third (24.5, p=0.034), second (24.6, p=0.043) and first (21.8, p=0.0005) quartiles. Waist circumference and percent body fat followed the same linear pattern across DFTS quartiles. The age-gender-adjusted-odds-ratio for being at risk of/or overweight was 12.2 [2.7; 54.3] in the fourth as compared to the first DFTS quartile. The OR rose to 14.3 [2.9; 71.0] after adjusting for energy intake, physical activity and n-6 fatty acids.
Conclusion: Overweight was highly prevalent in this group of teenagers and, against expectations, was strongly associated with DFTS. This raises the question of whether DFTS relates to unknown factors which impact weight status among Polynesian teenagers.

Thurs. 11:30
Poster session 4

Benthic Cyanobacterial Biodiversity and non-toxic Bioactive Compounds Production : perspectives for a Sustainable Development

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Cyanobacteria synthetize compounds, which could be toxic for different biological compartments of the ecosystem where they grow and for human populations too. Until now the majority of researches on emergence of intoxication were focused more on dinoflagellates than on cyanobacteria. Studies are currently carried out on toxinogenic potential of tropical cyanobacteria and of toxicity determinism (ARISTOCYA program). Other secondary compounds synthetized by cyanobacteria could be beneficial because their possible medical (antiviral, antiparasitic, etc. activities) and cosmetic (antioxydative, moisturizing, UV-sunscreens) applications. The diversity of different cyanobacterial biosynthetized molecules is very large. Among them, the non-toxic Mycosporine-like Amino Acids (MAA) were subject of recent researches which concluded a frequent co-occurrence of toxins and MAA in potentially toxic organisms of which the cyanobacteria. So, what about the co-occurrence of other compounds and the roles of environmental factors on the production and the effect of this co-occurrence ? Cyanobacteria are ubiquist, its biodiversity is very high and these organisms present regularly very extensive developments. Consequently, the knowledge of the phylogeny and biochemistry of this group is low. Biodiversity is not only "the wealth in species in the ecosystems" but it is also "the multiplicity of various and numerous dynamic interactions at different levels". This last concept is according to Sustainable Development which joins economical, environmental and social domains. Study of bioactive compounds production excluding toxins is complementary of researches on cyanobacterial toxinic biodiversity and offers industrial enhanced values perspectives.

Thurs. 11:30
Poster session 4

Impact of predation and competition processes on coral population dynamics: an experimental approach under an *Acanthaster planci* population outbreak

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Coral communities are highly shaped by the combined effect of predation and competition. Intensities of these regulation pathways vary in time and space, occasionally reaching extremes with drastic impacts on corals. *Acanthaster planci* is a major predator whose population outbreak considerably affects coral communities. In order to understand how predation and competition affect coral during such events, an experimental study was conducted on Moorea (French Polynesia) where high *A. planci* densities were observed. Predation and competition were controlled by caging and removal experiments respectively. In order to determine the respective and synergistic impacts of predation and competition on coral assemblages, treatments were applied to colonies belonging to the main coral taxa (*Acropora, Pocillopora, Porites*) following a factorial design. After 100 days, high *Acanthaster* densities resulted in considerable mortality. On control colonies, *Acropora* was the most affected taxa with 92% of colonies undergoing predation, while *Pocillopora* and *Porites* had 80% and 56% of colonies affected respectively. *Acropora* also presented highest total mortality while *Pocillopora* and *Porites* mainly showed partial mortality. Caging enhanced growth for all taxa and total mortality was only observed for *Porites* due to competition with turf algae developing inside cages. Competitor removal significantly increased predation. This pattern was explained by the increased exposure to predators following removal of surrounding colonies. Once again, *Acropora* was most affected with all colonies preyed upon, and only 4% of those survived. *Pocillopora* and *Porites* mainly underwent partial mortality. In the caged and competitor removal treatments, colonies mainly showed growth with no observed mortality. Disturbance by high *A. planci* densities does not affect coral taxa equally possibly due to 1) feeding preferences by predators and 2) different responses of colonies to predation upon species characteristics. Under high predator densities, benthic organisms can benefit from the presence of competitors by reducing exposure to predation.

Thurs. 11:30
Poster session 4

Effects of malaria control and modernization on health across the lifespan: the health transition in Vanuatu

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The health transition, the shift from predominantly infectious to chronic diseases, represents a major health concern in developing regions of the Pacific. The Vanuatu archipelago exhibits gradients of economic development and malaria endemicity, and the health transition is progressing at different rates across islands. As chronic disease burdens increase, individuals suffer continued infectious diseases, holding implications particularly for early growth and development. Infectious disease control is associated with catch-up growth, but obesity rates also often rise after infectious disease control with increasing energy intake, decreasing activity levels, and rapid modernization. Analyses must thus disentangle negative and preventable causes of energy balance shifts from positive effects of infectious disease control, across the lifespan. We collected anthropometric and physiological measurements of 1,200 adults and children in Vanuatu and assessed diet, physical activity, and modernization through a survey. We compared these data across islands, assessed weight-for-age longitudinally (1990-2007) on one island, and compared findings to data from 1972 from multiple islands to illuminate changing health patterns with modernization and malaria control. Wasting was uncommon among children in 2007, but rates of stunting ranged up to 25% and varied over time, with both modernization and malaria control. The island with the highest rates of stunting in 2007 also exhibited the highest rates of childhood overweight (up to 10%), most pronounced among young females and consistent with rapid modernization and increased tourism. Health risks in urban areas were mostly associated with overweight and obesity among adults, which increased over time with modernization. Adolescent and adult health risks were primarily associated with behavioral patterns, and are preventable through intervention programs.

Thurs. 11:30
Poster session 4

Contribution de l'Ifremer dans le développement durable de l'aquaculture en Polynésie Française

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L'Ifremer joue un rôle dans le développement durable de l'aquaculture en Polynésie française par le biais de collaborations avec les services du pays.
Dans le domaine de la pisciculture et de la crevetticulture les collaborations sont établies entre l'Ifremer et le service de la pêche (SPE) au sein d'équipes mixtes basées au centre océanologique du Pacifique.
Ainsi l'action " crevettes en Polynésie " qui a pour objectif d'apporter un soutien et une expertise aux services du pays dans le développement durable de cette filière et qui vise à couvrir les besoins locaux en crevette fraîche de qualité est rattachée depuis 2008 au projet " Développement durable de la crevetticulture, traitement de l'information et observatoire du système en Nouvelle Calédonie (DEDUCTION) " de l'Ifremer en Nouvelle Calédonie.
L'action " filière poissons lagonaires " a pour objectif l'acquisition de connaissances et savoir-faire nécessaires à la maîtrise de l'élevage de Platax orbicularis (Paraha peue en Tahitien). Cette action est intégrée depuis 2006 au projet " Pisciculture Marine d'Outre Mer (PMOM) " qui fédère un ensemble de 8 actions de recherche en terme de pisciculture tropicale dans l'ensemble des collectivités ultramarines françaises.
Grâce à quelques exemples de sujets de recherche communs au sein de ce même projet comme par exemple (1) la mise au point d'un test de détection du Nodavirus multi-espèces ombrine, cobia et platax (Projet TRIDENT), (2) l'évaluation de la qualité des animaux produits et (3) l'évaluation des rejets biologiques de l'ombrine et du platax, nous présenterons les points forts que présente ce schéma de fonctionnement qui intègre des passerelles bien établies entre les collectivités outre mer de la Polynésie, des Antilles et de l'océan indien.
Enfin, nous évaluerons son efficacité dans l'accompagnement du transfert de savoir-faire que réalise le service de la pêche vers le secteur privé pour la mise en place de filières de production de crevettes et de poissons lagonaires dans les conditions d'un développement durable.

Thurs. 11:30
Poster session 4

Biosecurisation and health program for a sustainable aquaculture of *Platax orbicularis* (Ephippididae finfishes) in French Polynesia

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Since 2001, " service de la pêche " (" fisheries office ", a local government agency) has initiated together with Ifremer " the french research institute of research on exploitation of the sea ") a research project on the domestication of a native lagoon species: the batfish *Platax orbicularis*, a Polynesian delicacy. However, this original breeding program rapidly faced mortalities. On the one hand, the Nodavirus, responsible for VNN (Viral Nervous Necrosis), has been associated with massive mortalities being responsible for 100 % lost of larva. On the other hand, ectoparasitoses caused infections and morbidity when juveniles are transferred in the lagoon. As in fish farming (intended for human consumption), few medicines are authorized, we have developed a health breeding strategy based on prevention rather than on treatment. Thus, to avoid any risk on environment contamination, we have initiated a bio-secure program. Our aim is to prevent pathogen introduction in hatcheries. To this end, we consistently decontaminate major incomings such as sea water (by successive filtrations), staff (foot-dips and hand disinfection) and new progenitors (quarantine and molecular screening). These measures are completed by preventive treatments such as fresh water processing to break ectoparasites life cycle. This program allows us to develop a sustainable aquaculture which respects environment and animal welfare. On the other hand, our aim is to avoid extensive curative treatments and enhanced animal welfare on lagoon farms. To this end, we are now developing "eco-friendly" preventive treatments based on baths in situ with low impact molecules such as hydrogen peroxide. This process allows us to develop sustainable production of juveniles which respects environment and animal welfare.

Thurs. 11:30
Poster session 4

Comparison of nuclei proteins pattern extracted from *Amblema* sp and *Pinctada* sp

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Previous results obtained from researchers conducted at the station Ifremer of Vairao (Tahiti) on pearls formation demonstrated the importance of selecting proper nuclei, in the perspective of improving the pearl quality. For illustrating this, we obtained a significantly higher proportion of quality A pearls when using nuclei made from Pinctada sp shell nacre. Although the molecular interaction between the nucleus and cells of the forming "pearl bag" is still not known, we suggest that proteins of the nucleus can be released during the "pearl bag" formation and subsequently act as a triggering growth factor. Furthermore, by using nuclei of the same origin as the implanted oyster, we suppose that the immuno-compatibility is improved. These data led us to investigate the protein content of the different nuclei used for pearl grafting. To this end, cleaned nuclei of different origins (*Amblema*, *Pinctada*) were crushed and their proteins were extracted by cold dilute acetic acid. The acido-soluble extracts were analyzed on ELISA, by using different set of antibodies, then on mini SDS-PAGE gels. Our serological comparisons showed that the antibodies discriminated accurately Amblema protein from that of Pinctada origin. The SDS-PAGE profiles showed that number of proteins have the same molecular weight but two proteins bands from Pinctada sp (P1 : MW = 13 kDa and P2 : MW <10 kDa) are absent on Amblema sp electrophoretic pattern. Future studies are required to characterize these two proteins and to determine whether they play a key role in the development of the "pearl bag" and whether they are involved in the mechanisms leading to a better quality of pearl. At last, our pilot study showed that simple serological comparisons based on a set of appropriate antibodies, constitute an efficient method for tracing quickly the origin of nuclei, without having to use heavy techniques such as SEM.

Thurs. 11:30
Poster session 4

Phylogenetics, life history, and conservation of the Lined Seahorse, *Hippocampus erectus* in the Western Atlantic

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The Lined Seahorse, *Hippocampus erectus*, is widespread throughout the coastal western Atlantic. In 2004, *Hippocampus erectus* was assigned a vulnerable status by the IUCN (World Conservation Union) Red List, a comprehensive inventory of the global conservation status of species. Despite this status, little life history information exists on the metapopulation of H. erectus. Knowledge of the life history of a species is vital for its management and conservation. For *Hippocampus erectus*, behavioral traits such as reproduction, feeding, and habitat preference have received more attention than population health, size and structuring, which are often more difficult to quantify. H. erectus has been known to tolerate a wide range of temperatures and salinities, and has been collected from southern Nova Scotia to Brazil, giving it one of the broadest ranges of any seahorse species. Seahorses are fully developed when newly born and begin feeding immediately, suggesting that they are unlikely to disperse widely as part of the plankton, yet some direct developers (i.e. taxa that lack larval stages), like *Hippocampus erectus*, appear to be widely dispersed. One explanation for this wide dispersal range may be that Gulf Stream currents replenish *Hippocampus erectus* populations by means of long-distance rafting on floating mats of Sargassum weed. To gain insight into this aspect of their life history we will obtain information about basic population structure and estimates of gene flow by addressing the "Gulf Stream rafting hypothesis" (i.e. that genetic composition of northern populations may be genetically mixed with southern populations). Genetic mtDNA analysis will be used to test this dispersal hypothesis. Here we present the preliminary findings from several populations of *Hippocampus erectus* ranging from the Gulf of Mexico to New York State.

Thurs. 11:30
Poster session 4

Conservation du Monarque de Tahiti ou omama'o (*Pomarea nigra*)

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Le Monarque de Tahiti ou omama'o (*Pomarea nigra*) est un passereau classé en danger critique d'extinction avec une quarantaine d'individus estimés (UICN, 2008). Depuis 1998, la Société d'Ornithologie de Polynésie " Manu " mène un programme de conservation du omama'o dans les vallées où il reste encore distribué. De nos jours, quatre vallées sont connues pour abriter des populations, avec des effectifs qui y restent faibles et qui ont été globalement en décroissance jusqu'en 2004. A partir de cette année là, il y a eu un regain des effectifs des Monarques de Tahiti, grâce aux actions de contrôle des rats sur les secteurs de reproduction. Actuellement, 19 individus sont suivis dans les 4 vallées de l'ouest de Tahiti. L'étude du succès reproducteur est utile pour évaluer la réussite des opérations et pour modéliser les tendances d'évolution de la population. De plus, le baguage des individus commence à permettre d'estimer la survie des différentes classes d'âge. Des actions complémentaires de réhabilitation de l'habitat du monarque, très dégradé par les plantes invasives, sont nécessaires pour améliorer la disponibilité des ressources alimentaires. En raison des prédateurs et des qualités de l'habitat, il est indispensable de réaliser une translocation d'individus dans une île exempte de Rat noir (*Rattus rattus*), dans les années à venir. Enfin, un projet éco-touristique de découverte du Monarque de Tahiti permet de sensibiliser les habitants à la fragilité de ce patrimoine unique.

Thurs. 11:30
Poster session 4

Le Pétrel de Tahiti (*Pseudobulweria rostrata*), espèce protégée victime de la pollution lumineuse

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Le Pétrel de Tahiti appelé noha en tahitien (*Pseudobulweria rostrata*) est une espèce protégée et classée " quasi-menacée " par l'UICN (Union Internationale pour la Conservation de la Nature). En Polynésie, cet oiseau marin endémique du Pacifique tropical se reproduit dans les archipels de la Société, des Marquises et des Gambier. Les sites de reproduction ainsi que les paramètres écologiques de cette espèce à nidification hypogée restent cependant mal connus, dû à la localisation des colonies dans des sites d'altitude difficiles d'accès. De par leur activité nocturne, ces pétrels sont très sensibles à la lumière. Le développement de l'urbanisation dans les îles où ils nichent représente donc une menace pour ces oiseaux, du fait de la pollution lumineuse qui en résulte. Malgré le développement urbain encore restreint de Tahiti, une vingtaine de cas de pétrels attirés par les éclairages artificiels a été enregistré chaque année depuis 1992 par la Société d'Ornithologie de Polynésie. En 2008, la mise en place d'une large campagne de communication a permis d'alerter la population et de récupérer ainsi plus d'une centaine de pétrels de Tahiti. Les oiseaux recueillis sont examinés, soignés si besoin, pesés, mesurés, bagués puis relâchés dans les meilleurs délais et conditions. Ces opérations de sauvetage constituent à la fois un moyen de sensibilisation auprès de la population, une action de conservation pour les individus récupérés, et un apport de connaissances sur l'espèce, critère indispensable pour la conservation des populations. A titre d'exemple, les informations collectées lors des récupérations d'oiseaux renseignent sur la période de reproduction et l'emplacement des sites de reproduction. De plus, les mesures et prélèvements réalisés ainsi que le baguage des oiseaux effectué à long terme peuvent apporter des informations sur les paramètres de reproduction et de survie de l'espèce, les tendances démographiques des populations, les zones de prospections et déplacements des individus ou encore les échanges entre colonies. Toutes les informations récoltées à travers ce sauvetage orientent ainsi les actions de recherche et de conservation.

Thurs. 11:30
Poster session 4

Dynamic of dengue quasi-species in vivo in capillary blood and in vitro on mammal and mosquito cell lines

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Dengue fever and the more severe dengue hemorrhagic fever and dengue shock syndrome are caused by an RNA virus, a Flavivirus member of the family Flaviviridae. Like other RNA viruses, because of the non-proofreading nature of the viral RNA polymerase, dengue virus (DV) is a population made of a dynamic swarm of mutants that have genetically different but related genomes known as a quasi-specie. Although at the intra-host level (human or mosquito) the frequency of non-synonymous mutations is high, it remains low at the inter-host level. The global genetic evolution of dengue viruses might be restricted by the occurrence of a strong purifying selection, resulting from the combination of the selection pressures inherent to each host-specie. During human infection DV will be submitted to several constraints: sequence of infection, cellular tropism of the virus, history of infection (anti-dengue memory immunity), genetic factors... Because of these constraints, the viral population might vary in peripheral blood during infection. In natural dengue transmission cycle, up-take of the infectious blood by the mosquito occurs into the capillaries from the dermis. Therefore, the viral population that will be transmitted to the vector is the one present in capillary blood. During replication and dissemination in mosquito tissues, DV will also be submitted to specific constraints, notably due to the midgut infection barrier, the midgut escape barrier and salivary glands. In the present study we compared the structures of dengue quasi-species into the human venous and capillary compartments, and we investigated the dynamic of DV population in capillary blood. Otherwise, to determine the impact of the constraints specific to the host-specie and those related to the alternated replication on two host-species, we investigated the dynamic of DV population during passages on mammal and mosquito cell lines.

Thurs. 11:30
Poster session 4

Stalked and fleshy life forms that thrive under hypersedimentation

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Former research has shown that a 100-km^2 area in the central part of the southwestern lagoon of New Caledonia ('Banc Gail') consists of a field of mud-mounds built on oyster reefs. Banc Gail presently is a zone of intense sedimentation. Erosion caused by land clearing and mining is assumed to have dramatically increased hypersedimentation in a recent past, which in turn is thought to have caused the extinction or near-extinction of Banc Gail's oyster populations. SCUBA-diving exploration of Banc Gail has revealed a peculiar ecosystem dominated by stalked or fleshy, mucus-producing corals. Those characteristics are likely to enhance their survival under hypersedimentation, as illustrated by a selection of underwater photographs.

Thurs. 11:30
Poster session 4

Programme de conservation du Carpophage des Marquises ou Upe (*Ducula galeata*) : une réussite basée sur la sensibilisation des populations locales et la réintroduction de l'espèce sur l'île de Ua Huka

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Le Carpophage des Marquises est une espèce qui était classée en danger critique d'extinction (CR) sur la liste rouge de l'UICN jusqu'en 2008. En effet, cette espèce, victime d'une chasse intensive accompagnée de la perte de son habitat, a disparu des îles des Marquises où elle était présente autrefois pour n'être plus distribuée que sur l'île de Nuku Hiva. En 2000, les effectifs de la population de cet oiseau sur cette île étaient évalués entre 100 et 140 individus. Afin d'améliorer le statut précaire de cette espèce, la Société d'Ornithologie de Polynésie a proposé la mise en place d'un programme de réintroduction du upe sur l'île de Ua Huka. Un total de dix individus y a ainsi été réintroduit en deux temps (5 en 2000 et 5 en 2003). Suite à cela, un programme de sensibilisation s'appuyant sur les enfants scolarisés de Nuku Hiva et Ua Huka a été initié afin de mieux faire connaître cette espèce, les menaces qui pèsent sur elle et les mesures de conservation mises en place. Entre 2003 et 2006, le suivi annuel des populations d'oiseaux des deux îles a permis de constater une progression des effectifs : la population a atteint entre 165 et 185 individus sur Nuku Hiva, et 32 oiseaux sur Ua Huka. Ce doublement des effectifs s'explique sans doute par la baisse de la pression de chasse exercée par les populations locales qui ont désormais en majorité pris conscience de la nécessité de protéger cet oiseau. En 2008, la réévaluation des statuts UICN des espèces réalisée par les experts de BirdLife International a fait évoluer le classement du Carpophage des Marquises en espèce en danger d'extinction (EN), concrétisant ainsi le succès d'un programme de conservation initié par une association polynésienne.

Thurs. 11:30
Poster session 4

Conservation de la Gallicolombe erythroptère ou 'u'u'aira'o (*Gallicolumba erythroptera*) : exemple de projet de restauration de motu dans l'archipel des Tuamotu (Polynésie française)

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La Gallicolombe erythroptère, classée en danger critique d'extinction d'après les critères de la liste rouge de l'UICN est une des espèces aviaires les plus menacées de Polynésie française. Elle n'est plus présente que sur quatre sites : Morane et Tenararo (50 individus sur chacune des îles), Vahanga (trois individus erratiques) et Rangiroa (10 individus). Depuis 2002, la Société d'Ornithologie de Polynésie " Manu " a mis en place un suivi de la population de Gallicolombes de Rangiroa, ainsi qu'un programme de restauration des îlots du Sud de cet atoll, afin d'augmenter la surface d'habitat disponible pour cette espèce. Ce programme propose d'éradiquer les rats, représentés par deux espèces (Rat noir *Rattus rattus* et Rat polynésien *Rattus exulans*), ainsi que la souris Mus musculus sur de petits motu en utilisant la méthode des stations de poison. Le motu Taere ere a fait l'objet d'une telle restauration en 2005 et les motu Hiveu et Tiarao en 2007. Les résultats obtenus sont très contrastés : Taere ere et Hiveu ont été restaurés avec succès tandis que la dératisation de Tiarao a été un échec. Les hypothèses évoquées pour expliquer cet échec seraient soit que quelques individus, n'ayant pas eu accès au poison, ont survécu, soit qu'une recolonisation par les rongeurs a eu lieu après éradication. Une deuxième tentative d'éradication des rats par la technique d'épandage manuel de poison est prévue fin 2008 sur Tiarao. La perspective d'avenir de ce programme est de poursuivre la restauration des motu en évoluant de motu en motu vers l'Est chaque année. Ce type de stratégie correspond au modèle des micro-projets qui nécessite une mobilisation financière annuelle raisonnable et qui garantit la pérennité des actions de restauration en s'assurant du succès d'une éradication avant de mettre en place l'éradication des motu suivants.

Thurs. 11:30
Poster session 4

The Impact of Curriculum on a National Telehealth Program

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Pakistan developed a curriculum for training in telemedicine based upon international experience and regional needs. The curriculum was offered to selected specialists across the spectrum of medicine, policy makers and engineer experts. The curriculum was experience based and hands on. Each participant at the end was asked to develop a telemedicine application based upon their area of practice or expertise. Most of the first 30 graduates are currently involved in telemedicine applications in varied and unanticipated areas of contribution. The first graduates also were instrumental in the national and regional response to the earthquake disaster of 2005. The curriculum offering is now being expanded under government sponsorship to a fully national Telemedicine All trainees completed the course and could demonstrate proficiency in computer use and technical connection to the distant site. All could use the EHR software independently and all produced a proposal for a telemedicine application. These include programs in ophthalmology, psychiatry, pathology, nursing, surgery and a very creative registry program for hemophilia patients. Programs in cardiology, distant learning to Wales, pediatrics otolaryngology, Orthopedics, radiology, emergency medicine and medical informatics followed. The Center has been able to support and see implemented most of the topics proposed and a significant fraction of all proposals. In the year following institution of the course the Pakistani government has committed to a national program with strong funding support and matching funds from the US. Programs for Pakistani Nuclear Agency, Military and other universities are in advanced stages of development or implementation. Conclusions: The program in Pakistan has been successful as determined by tangible outcomes and independent reviewers.

Thurs. 11:30
Poster session 4

Technical Examination of the Monitoring System of Moving with a Wireless IC tag

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Since automatic acquisition of a subject's point passage time is possible for observation of the walk action using an active type wireless IC tag, it can acquire various information, including grasp of an action pattern and walking distance etc. However, since it is a system using electromagnetic waves, there is a fault in which detection performance is influenced by the environment of a setting position. Then, the wireless IC tag was actually used for the hospital ward, and the reliability of the system was examined from the data from inpatient's walk action investigated. In A hospital, which the detected events of point passage were about 311378 in 381585 events, the capture rate were 81.6%, and the system had caught about 42747 in 48100 point passage events,(88.9% of capture rate) in investigation in B hospital. The measurement using a wireless IC tag has high performance, when it is the environment where exact measurement, such as a measurement system of the point passage time in the bicycle road race etc., is given top priority. Setting the system in hospital, since priority of introducing a system is for installing so that neither business nor the existing environment may be affected by observational research etc., a possibility that installation restrictions will arise remains. As for such a problem, it is possible to make it decrease by increasing a measurement point and correction or by combination to other devices. The wireless IC tag which can acquire a subject's action information automatically is applicable in various scenes, and since the information which specifies an individual as the information itself collected as compared with the measurement using a video camera etc. is not included except ID, there is a merit also from a point of a subject's privacy protection. It is necessary to examine not only a technical improvement in accuracy but an aspect of privacy in order to utilize a wireless IC tag safely.

Thurs. 11:30
Poster session 4

Seven years activities of the ITU eHealth Expert Training Course

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For years the ITU/BDT implemented a number of pilot projects in developing countries in order to gain experiences and to identify the suitable technologies and practicing models. In this context, from FY2002, the eHealth Expert Training Course, jointly launched by the ITU and Tokai University in Japan, has offered an excellent opportunity for medical and health care workers from developing countries to understand the current trends and technologies of telemedicine and e-health, and build up the foundation for telemedicine and eHealth services.
There were 14 researchers who have been undertaking this program, came from Indonesia, Pakistan, Bhutan, China, Haiti, Paraguay, Fiji, Nauru and Cook islands.
Ph.D. course (1 -3 years) a. Dissemination of telemedicine research and implementation, especially involvement of Tokai University in telemedicine project. b. To get insight into the advancement of telemedicine equipment. c. To enrich research capacities related to telemedicine. d. To contribute academic papers and a doctoral dissertation
Basic course (3 months) e. Sasakawa Pacific Invitation (Enhancing Distance Education for the Pacific Island Community) The Sasakawa Pacific Island Nations Fund (SPINF) carries out a program of activities aimed at building up achievements already accrued over recent years in promoting mutual understanding and cooperation between Japan and other island nations of the Pacific. This eHealth course is one of the SPINF program.
FY 2006 two from Republic of Fiji FY 2007 two from Republic of Nauru FY 2008 two from the Cook islands
The program was conducted in collaboration with Nakajima Laboratory of Tokai University, which has provided such facilities as telecommunication equipment, measurement devices, internet access, and visit program to various institutions. All of the attendants have gained benefits with this program. It is expected that they will contribute to improve their health care services, as a pioneer in telemedicine development in their country.

Thurs. 11:30
Poster session 4

Ciguatera, From Bloom to Itch Last lessons from French Polynesia

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Background: Ciguatera poisoning is an ichtyosarcotoxism which spare no tropical areas, French Polynesia ahead. Even though this intoxication has been known since the 18th century, many epidemiological aspects remain unclear from its spreading in humans after an algae bloom to time span of the disease. This study will overview briefly some spatio-temporal aspects of this seafood poisoning in French Polynesia then mainly focusing on chronic aspects of the disease. Method & Results: Two studies helped to achieve our goal. First, a retrospective study investigated the temporal link between the growth of Gambierdiscus spp. and declared cases of ciguatera disease in Tahiti Island. Second, a prospective study was used to determine the prevalence of chronic symptoms and describe their rate of disappearance at 15 days, 2 and 6 months after the onset of ciguatera in French Polynesians adults. Results from our model of changes in the incidence of ciguatera disease following algae blooms might be useful for assisting ciguatera risk management initiatives. Indeed, results from the study highlight a clear temporal relation between ciguatera disease and its etiologic agent: Gambierdiscus spp. From a clinical point of view, our results suggest that several symptoms observed in 183 patients at the acute phase of the disease are still persistent 6 months after the onset. Conclusion: results obtained from this French Polynesian studies provide some new highlight 1)-ciguatera outbreak may be predicted by modeling and 2)- ciguatera disease which is similar to a sensory polyneuropathy in French Polynesia may evolve to chronic stage.

Thurs. 11:30
Poster session 4

Réseau de surveillance des huîtres perlières Pinctada margaritifera en Polynésie française

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Etat des lieux
Le développement rapide de la perliculture a nécessité, en 2003, la création d'un réseau de surveillance pathologique par le service de la Perliculture et l'IFREMER. Après 5 années de collaboration, le réseau est désormais sous la seule responsabilité du service de la perliculture. Ses objectifs sont de décrire la situation sanitaire du cheptel d'huîtres perlières et de surveiller l'évolution des agents pathogènes présents.
Les prélèvements, effectués dans 6 atolls ou îles perlicoles, concernent P. margaritifera, mais aussi d'autres Bivalves avoisinants.
Après 6 années d'observations et l'absence d'épisode de mortalité massive, la Polynésie française peut prétendre au statut de pays indemne de maladies à déclaration obligatoire à l'Organisation Mondiale de la Santé Animale (O.I.E.). Les seuls parasites observés sont des Grégarines (Sporozoaires), des Rickettsia-like, des zones d'enkystement de métazoaires et des larves de trématodes.
Perspectives : " Flying vets "
Désireux de garder son statut, le projet vise à mettre à l'abri d'une catastrophe sanitaire et économique la filière perlicole en assurant la détection précoce et l'élimination des foyers infectieux.
De nombreuses maladies graves sont présentes dans les pays du pourtour Pacifique ou entretenant des relations commerciales étroites avec la Polynésie française, comme en témoigne le récent épisode de mortalité massive des naissains d'huîtres creuses en France.
L'option retenue est la création une cellule d'intervention aéroportée offrant flexibilité des horaires, disponibilité des places, emport du fret sensible, réactivité face aux urgences... à un prix comparable au transport public.
L'expérience de la veille sanitaire, la plate-forme technologique et les compétences professionnelles sont désormais réunies pour que le " Flying vets " soit opérationnel en 2009.

Thurs. 11:30
Poster session 4

Education conservation and research on sea turtle in French Polynesia: Three main goals developped by te mana o te moana a local non profit foundation

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Since 2004, biologist, researchers, engineers, educators and veterinarian are gathering their efforts in French Polynesia in sea turtle projects managed by a newly founded non profit foundation called te mana o te moana (spirit of the ocean in Tahitian language). Education, conservation and research are their main focuses. First in education area, a new concept of school program has been developed " Honu Récré". It has targeted components for each school level and is teach either in the class or directly at the foundation location where turtle can be seen and treated. A new tool is underway in the form of an interactive DVD for teachers, it is aimed to be distributed widely in French overseas territories but also in an English version thorough the Pacific region. Our educators also develop seminars for teachers and high school levels. In conservation, a sea turtle clinic has been set up with the help of the Polynesian Government. Its goals are to rescue sea turtles from any archipelagos in the Territory that represent 118 islands on a surface as large as Europe. Up to date 130 turtles have been received, 45 have been successfully released after specific treatments. In research, the team has been involved in sea turtle nesting programs and observation as well as in the set up of an observatory network. Key data are collected to better understand the nesting factors and specificity in French Polynesia, in order to contribute to a better management plan by the local authorities.

Thurs. 11:30
Poster session 4

Bioethical Problems Of Biomedical Research With Native Populations: vulnerability and needs

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Chile is no stranger to the regional problems of the relationship of indigenous minorities with the national state. The asymmetry between the two political actors translates into health vulnerability, in areas with direct access-quality care, and health status of people of various ethnicities.

Is a particularly important event and invisible, the situation surrounding the work of biomedical research that is conducted with indigenous peoples, taking advantage of the situation of insecurity in which they are motivated by the genetic diversity of these stocks. These investigations often threaten the genetic heritage of the communities. It requires increasingly integrated work needed to address issues of public health in the sense either as a cross-interdisciplinary.

This paper shows from the medical anthropology and bioethics, a research work on Easter Island, which serves to illustrate the situation. Considering the state of the art in the field, we propose some basic axes of work on the subject, which form the basis for the same position within the bioethical agenda and serve as a dialogue between what we are doing in Chile and the region Polynesian; with the as to contribute to a process as necessary as urgent, the formulation of public policy culturally relevant.

Thurs. 11:30
Poster session 4

Sexual and Reproductive Health in contemporary Easter Island: vulnerability and potential for public health

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Easter Island belongs to Chile politically is also heir to the ancient Polynesian culture and maintains permanent contact with her; both their chances of development as its fragility common to the status of other islands.

This is observable in the vast field of sexual and reproductive health, which combines a wealth of ancient and modern practices and knowledge on the topic, with a situation of vulnerability and risk increasing and we find ourselves today with a disturbing scenario of disease.

A series of sexually transmitted infections (STIs) bring into several moments of contemporary history at-risk population stability of the Rapa Nui people, and particularly worrisome today is the global epidemic of HIV-AIDS, all of which have an impact on the concepts of body care, sexual practices and the way to be understood as a community and with foreign ¨ ¨ .

This paper-from reviewing the medical anthropology, some features of this phenomenon, referring to the medical system rapanui in this area, the epidemiological history of his exposure, and their cultural and social impact, emphasizing the main axes and challenges has public health today in this regard.

Thurs. 11:30
Poster session 4

Un cas d'histoplasmose disséminée à *Histoplasma capsulatum* en Nouvelle-Calédonie

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Depuis la description du 1er cas d'histoplasmose en 1959 en Nouvelle-Calédonie, cette pathologie évolue de façon endémique sur le territoire tout en restant rare, ne suscitant que des cas sporadiques ou d'exceptionnelles micro-épidémies. La persistance des sites où l'homme peut se contaminer (grottes), colonisés par des chauves-souris dont les déjections contiennent des spores d'*Histoplasma capsulatum*, entretien le risque de survenue de nouveaux cas. La contamination se fait par inhalation des spores ; les manifestations cliniques dépendent de l'inoculum et du terrain sous-jacent du patient : la maladie est ainsi le plus souvent uniquement pulmonaire, les formes disséminées se rencontrant surtout chez les patients immunodéprimés chez lesquels un traitement d'urgence par amphotéricine B ou itraconazole s'impose. Nous décrivons le cas d'un homme de 20 ans, résident dans l'île de Maré et hospitalisé au CHT de Nouméa pour un tableau d'altération rapide de l'état général, asthénie majeure et amaigrissement important, associée à un syndrome tumoral (adénopathies et organomégalie). Le bilan biologique objectivait des signes de dissémination systémique de l'infection avec localisation médullaire (bicytopénie et présence d'éléments levuriformes sur le myélogramme) et surrénalienne (test au SYNACTHENE® immédiat positif associé à une hyponatrémie évoquant une insuffisance surrénalienne aiguë). La recherche de facteurs d'immunodépression n'a pu être réalisée de façon exhaustive, compte tenu du décès du patient 72 heures après l'hospitalisation, dans un tableau de choc septique à pneumocoque. Le bilan initial ne retrouvait cependant qu'une hépatite B chronique non active (Ag HBe négatif) et une sérologie VIH négative. En l'absence de facteurs d'immunodépression ou d'une maladie métabolique chronique connue chez ce patient, a priori bien portant, il s'agit donc d'une forme d'emblée grave d'histoplasmose. Nous discutons enfin les diagnostics différentiels évoqués à l'admission du patient et les méthodes mises en œuvre pour établir le diagnostic positif d'histoplasmose disséminée.

Thurs. 11:30
Poster session 4

Epidémiologie des Pneumopathies Communautaires de l'Adulte responsables d'Hospitalisation en Nouvelle Calédonie

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Une étude sur l'étiologie des pneumopathies aiguës communautaires en Nouvelle-Calédonie a été menée de façon prospective sur 137 patients adultes hospitalisés au Centre Hospitalier Territorial de Nouméa entre décembre 2006 et décembre 2007. Nous avons mis en évidence au moins un micro-organisme potentiellement responsable dans 59,8% des cas. Parmi les étiologies retrouvées, le pneumocoque prédomine (41% des germes identifiés) et présente un niveau de résistance aux β-lactamines relativement faible (5%). Par ordre de fréquence on retrouve ensuite : virus influenza A (22,1%), Haemophilus influenzae (10,2%), Branhamella catarrhalis (5,1%), Mycoplasma pneumoniae (5%) et Klebsiella pneumoniae (4,2%). Nous notons une faible incidence des bactéries responsables de pneumopathies atypiques (Mycoplasma pneumoniae, Chlamydophila pneumoniae, Legionella spp.) puisqu'elles ne représentent que 5,1% des étiologies et que nous n'avons identifié aucun cas de légionellose. Le pic épidémique de grippe durant l'hiver austral s'est traduit par une augmentation du nombre des pneumopathies observées dans notre étude. L'incidence des pneumopathies mixtes est élevée (22,6%) et on retrouve une association fréquente et significative ($p = 0{,}004$) entre le virus de la grippe et le pneumocoque. L'analyse critique de nos résultats et des méthodes de diagnostic mises en œuvre montre l'intérêt de la recherche des antigènes urinaires pour le diagnostic des pneumopathies à pneumocoque (taux de diagnostics multiplié par 2,1 avec une sensibilité de 65,2% si on prend la culture comme méthode de référence). La surveillance de la circulation du virus de la grippe dans cette population de sujets adultes hospitalisés est intéressante compte tenu du nombre de patients positifs (26/137) mais nécessite la mise en œuvre de techniques de biologie moléculaire à partir d'un prélèvement profond de type expectoration (PCR positive dans 57,7% des cas, contre 15,4% pour la recherche directe par immunofluorescence sur écouvillonnage nasal).

Thurs. 11:30
Poster session 4

2008 South West Pacific Status of the Reefs

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Fiji, New Caledonia, Vanuatu, Solomon Islands, Samoa and Tuvalu report monitoring data for this report; Nauru has not conducted recent monitoring. The Coral Reef Initiative for the Pacific (CRISP) has provided funding for monitoring activities in this region.

A broad range of observers (scientists, students, dive guides and communities) assist with reef monitoring. Substrate cover changes from 2003 to 2007 were due to effective management or local disturbances, coral predation and natural disasters. Average coral cover at monitoring sites was: 45% in Fiji; 27% in New Caledonia; 43% in Samoa; 30% in Solomon Islands; 65% in Tuvalu; and 26% in Vanuatu. Densities of edible fish and invertebrates remained generally low (0-10/100m2) in 4 countries reflecting high subsistence and commercial fishing pressure. Butterflyfish, parrotfish, surgeonfish and damselfish were generally most dominant. High densities of parrotfish were reported from 4 countries. A network of temperature loggers has been established within the Node to collect long-term data on temperature relationships with coral bleaching.

There are multiple stressors, including coral predation, temperature variation, coral bleaching, cyclones, tsunamis and earthquakes. An earthquake and tsunami in April 2007 damaged reefs and other coastal habitats in the Solomon Islands. The major human disturbances are over-fishing, pollution, sedimentation, eutrophication and coastal development.

In response, communities and resort owners are managing local marine areas such that coral health and fish populations are improving.

There is a need for long-term monitoring to understand the changes in reefs. Most monitoring is coordinated by Fisheries Departments, without sufficient resources, capacity or funding. The non-participation of Nauru in an example.

Thurs. 11:30
Poster session 4

Nitric oxide production in Pacific ciguatoxin-1B-stimulated RAW 264.7 cells: evidence for the role of NO pathway in the pathophysiology of Ciguatera Fish Poisoning in a mouse model

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Ciguatera Fish Poisoning (CFP), characterized by gastrointestinal, neurological and cardiovascular disorders, is caused by the ingestion of a variety of tropical reef fish which have bioaccumulated ciguatoxins (CTXs) in their tissues. These potent compounds, produced by benthic dinoflagellate Gambierdiscus spp are transferred from benthic feeding herbivorous fish to carnivorous coral reef fish via marine food chain. The primary target of CTXs is the voltage-gated sodium channel and the resulting depolarization of nerve cells is believed to cause the array of neurological and cardiovascular signs. Later on other pharmacological studies revealed a more complex action of CTXs on other voltage-gated ion channels (K+ and Ca2+); however certain unexplained phenomena such as symptoms recurrence could be related to immunologically mediated sensitization to CTXs after initial exposure. Therefore, the multifaceted clinical feature of CFP and its resemblance to the Chronic Fatigue Syndrome (CFS) prompted us to investigate the potential role of nitric oxide radical (NO), a pleiotropic regulator of neuronal, vascular and immune functions, in this pathology. The in vitro effects of the main Pacific ciguatoxin (P-CTX-1B) and bacterial lipopolysaccharide (LPS) were first comparatively studied in macrophage RAW 264.7 cell lines then experiments were conducted on 6-8-week-old OF1 mice of either sex. The overexpression of the high NO output inducible nitric oxide synthase (iNOS) enzyme, was evidenced at the mRNA and protein levels by quantitative PCR (qPCR) and ELISA or western-blot techniques, respectively. These results were confirmed by the measurement of nitrite (a stable metabolite of NO) in the cell culture supernatant by Griess reagent. The implication of NO in CFP paves the way for further exploration of the

inflammatory host response against CTXs in order to help the development of a targeted drug therapy retrieve from the western or traditional medical knowledge.

Thurs. 11:30
Poster session 4

Water Circulation and Transport in Polynesian's Lagoons. A simple Versatile Model

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La connaissance de la circulation dans les baies et les lagons est fondamentale pour plusieurs raisons. En effet, les baies et les lagons jouent un rôle important dans le cycle de reproduction et de croissance des poissons, des crustacés et des coquillages. Cependant, ces derniers sont de plus en plus soumises à l'influence de l'activité humaine. L'influence de l'homme est surtout remarquable par les aménagements côtiers tels que port ou remblais. Les aménagements effectués à l'intérieur de l'île ne restent pas sans effets, notamment lorsqu'une zone est déboisée ou lors des terrassements. Le lessivage de ces zones par la pluie apporte une quantité considérable de sédiments aux lagons et aux baies. Cet apport terrigène est un facteur de stress pour la faune marine. La connaissance de la circulation des courants dans les lagons est alors fondamentale pour savoir et comprendre comment cette eau va être évacuée. Le modèle bidimensionnel hydrodynamique que nous avons développé pour l'étude de la circulation des baies se base sur la méthode des Boltzmann sur réseau (Lattice Boltzmann Method (LBM)). L'algorithme de Boltzmann sur réseau a été conçu pour résoudre le système de Navier-Stokes incompressible. L'algorithme LBM sort du cadre classique (schémas de volumes finis, différences finies etc) et trouve ses origines dans un algorithme de type automate cellulaire(automate de gaz sur réseau). Nous avons adapté cet algorithme au cas de l'étude de la circulation lagunaire. Notre modèle permet de déterminer le niveau de l'eau et les vecteurs vitesses du courant en tout point.

Thurs. 11:30
Poster session 4

Salvianolic Acid B Protects Endothelial Cells from Oxidant-Mediated Damage

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Salvianolic acid B (Sal B) is considered as one of the most active anti-oxidant and the major pharmacological component of the herb, Salvia miltiorrhiza. Its beneficial effects including hepatoprotection, elicitation of endothelium-dependent vasodilation, lowering of blood pressure in hypertension, inhibition of HIV-1 replication and suppressing inflammatory cytokine- stimulated endothelial adhesiveness to human monocytic cells by its strong antioxidant activities.

Our study demonstrated the protective effects of Sal B on hydrogen peroxide (H2O2)-induced injury in human umbilical vein endothelial cells (HUVECs). Treatment with H2O2 significantly decreased the cell viability and increased the lactate dehydrogenase (LDH) leakage that is an apoptotic feature. Pretreatment with Sal B prevented significantly from H2O2-induced cell apoptosis and other damages in a concentration-dependent manner. The mechanisms of Sal B protection was studied with two-dimensional gel electrophoresis (2-DE) coupled to hybrid quadrupole time-of-flight mass spectrometry (Q-TOF) mass spectrometer. Data base searching implicated glucose-regulated protein 78 (GRP78), a central regulator for ER stress, was up-regulated in Sal B-exposed HUVECs. After exposure to Sal B, the level of activating transcription factor 4 (ATF4) was raised, with a transient phosphorylation of the α subunit of eukaryotic translation initiation factor (eIF2α). Knock-down of GRP78 by siRNA significantly reduced protective effects of Sal B. These results suggest that Sal B-induced GRP78 upregulation via phosphorylation of eIF2α and resultant translation of ATF4. And up-regulation of ER chaperones induced by Sal B may play an important role in protecting human endothelial cells from oxidative stress-induced cellular damage.

Thurs. 11:30
Poster session 4

Coral Reef Protected Areas in International Conventions and Programmes

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Two international conventions and one international programme allow states to launch protected areas with different kinds of obligations. The Man and Biosphere Programme of UNESCO (MAB) launched in 1971 with its network of Biosphere Reserves, the World Heritage Convention of UNESCO launched in 1972 and the Ramsar convention adopted in 1971 and come into force in 1975. Coral Reefs Protected areas were set up in these conventions and programme, respectively as soon as 1976 (Everglades, USA), 1981 (Great Barrier Reef, Australia) and 1974 (Cobourg Peninsula, Australia). Since that, MPA on coral reefs developed in the inter tropical zone of the three oceans. An overview illustration of this development is given through time. An up to date census of these coral reef protected areas is capitalized by region and world wide with concerned coral reefs surfaces. Comments will be in the context of what has been achieved and of what can be done in order to protect through governmental agreements the coral reef ecosystem the degradation of which is still acute due to human acticities when climate change will occur

Thurs. 11:30
Poster session 4

Establishment of a pollinic reference collection in the Marquesas islands and palynological analysis of a late holocene site in this archipelago (French Polynesia)

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Numerous archaeological studies have been led in the Marquesas islands since more than 50 years, which those of R.C. Suggs and Y.H. Sinoto. These latter allowed us to understand the first marquesan settlements and the implications of these migrations. Recent works specified the methods and the chronology of these events. These analyses permitted a renovation of the old datings of 2080 + 150 years B.P. for the oldest carbon dating for the site of Ha' atuatua in Nuku Hiva (sand and charcoal taken from the NHaa1 site) to 900-1200 years A.D. for the last radiochronologic studies undertaken on the marquesan archipelago. Nevertheless, the interactions existing between men, the climate and the environment remain poorly defined and require more thorough studies on the environment and its evolution. The Marquesan flora is unique due to its high endemism (48 %) and the dominance of introduced species. The majority of forest ecosystems have been heavily modified as a result of human arrival. Despite such extensive modifications and the importance of the Marquesas in the human settlement of East Polynesia, few palaeoenvironmental studies have been conducted in this region. In this presentation, we show a modern pollen inventory of the archipelago combined with the palynologic analysis of a late Holocene sequence from the island of Nuku Hiva. This coastal lowland site "Upeke" is located at Hatiheu Bay, north of Nuku Hiva. The lithology of the core (depth: 40 cm) is really homogeneous with organic sediments. The core boring spans a period from 390 +/- 40 years B.P. to the present and reveals three distinct palynological units. The first zone is characterized by an open ecosystem with a great part of Cyperaceae while the second unit constitutes a more humid and anthropic environment with species like Ludwigia octovalvis or Cocos nucifera, tree widely used for its properties. The final zone shows a regression of the anthropic impact and a return to an open environment with all the same a few species of trees like Cocos nucifera or Pandanus tectorius. This palynological analysis brings out the human impact on this region and the horticulture, particularly with the coconut trees.

Thurs. 11:30
Poster session 4

Facteurs de risque du mésothéliome en Nouvelle-Calédonie : données épidémiologiques et géologiques
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Présentation. Le mésothéliome est un cancer rare de la plèvre, d'origine plus souvent professionnelle. En Nouvelle-Calédonie (NC), on enregistre en moyenne 5 cas annuels de mésothéliome. Des travaux de l'INSERM ont montré qu'une pratique mélanésienne consistant à revêtir les murs des habitations d'un enduit appelé " Pö ", était associée au risque de mésothéliome. Cependant l'utilisation du Pö n'est probablement pas la seule source d'exposition à l'amiante. Méthodologie. Une première étude éco-épidémiologique à l'échelle des communes a été réalisée sur tous les mésothéliomes enregistrés de 1984 à 2002 en NC, incluant les facteurs de risque : pö, activité minière et présence de serpentinite. Une enquête épidémiologique, géologique et minéralogique est menée autour des cas. L'ensemble des données : histoire résidentielle, Pö, affleurements amiantifères, pratiques à risque... sont rassemblées dans un Système d'Information Géographique. L'analyse éco-épidémiologique sera réalisée à l'échelle des tribus. Résultats. L'incidence du mésothéliome en NC est aussi élevée chez les femmes que chez les hommes, dans toutes les classes d'âge à partir de 30 ans, ce qui correspond à une exposition environnementale à l'amiante dès l'enfance. Deux foyers principaux sont mis en évidence: Houailou-Bourail (risque 12O fois plus élevé qu'à Nouméa) et Koné-Touho-Poindimié. Seule la présence de serpentinite est significativement associée au mésothéliome (p=0.017). Une partie des cas n'a jamais été exposée au pö trémolitique. Le risque d'exposition des populations à l'amiante semble plus élevé autour des zones riches en serpentines. Des affleurements d'antigorite fibreuse ont été relevés dans différents secteurs tribaux et sur mines. L'utilisation de serpentinite pour recouvrir les axes de circulation représente un facteur de risque potentiel. Perspectives. Plus du tiers de la NC comporte des unités potentiellement amiantifères très variées. Un facteur minéralogique (nature chimique, dimensions des fibres) pourrait être associé à leur dangerosité. L'extension de l'étude éco-épidémiologique à l'ensemble du territoire est en cours.

Thurs. 11:30
Poster session 4

Diversity of Streptococcus pyogenes in invasive infections in New Caledonia
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Objectives. New Caledonia, South Pacific is a country with a high streptococcal post-infection sequelae (6.7 acute rheumatic fever cases per 1000 inhabitants). The aim of this study was to characterize clinical and microbiological features of isolates obtained from invasive Group A streptococcal (iGAS) disease in 2006. Methods. Clinical and demographic data were collected prospectively. Isolates were biotyped, emm sequenced, and tested for antibiotic susceptibility. Detection of speA, speB, speC, and ssa genes was also carried out. Results. The estimated annual incidence of invasive GAS disease for 2006 was high with 42.6 cases/100 000 inhabitants in New Caledonia with an over-representation in indigenous Melanesian population (with 70.4 per 100 000 per year). The mean age of patients was 31 years ±24. The sex ratio M/W was 2:1. Invasive isolates were obtained from 91 patients which included bacteraemia (20.9%), (DHN) (45%), myositis (11%), septic arthritis (9.9%), erysipelas (8.8%), and severe pneumonia (2.2%). Two thirds of patients underwent surgery, 14.3% patients required intensive care. Most of associated co-morbidities were skin lesion (70.3%) and obesity (28.6%). 81 isolates represented 28 different emm types but three of them represented 40% of all with emm15 (16%), emm92 (14%), and emm106 (10%). The speA, speC, and ssa genes were present at variable frequencies in different emm types, but the highest frequencies were found in the most prevalent emm15 (speA, 93% and speC, 100%), emm92 (speC, 91%), and emm106 (speC, 100%) Conclusion. This is the first epidemiological study of iGAS in New Caledonia. In indigenous communities, the reported incidence is far greater than in other populations. Much of this difference between populations in New Caledonia reflects probably socio-economic circumstances, traditional behaviour and delay before consultation despite improvements in primary health care.

Thurs. 11:30
Poster session 4

Down-regulation of brain-pancreas relative protein in diabetic rats and by high glucose in PC12 cells: prevention by calpain inhibitors

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Brain-Pancreas Relative Protein (BPRP) is a novel protein found in our laboratory. Previously we demonstrated that it is involved in ischemia and depression. In light of the putative association between diabetes and clinical depression, and the selective expression of BPRP in brain and pancreas, we examined in this study whether BPRP levels are affected by induction of diabetes by alloxan injection in rats and exposure to high glucose levels in PC12 cells. Western blot and immunohistochemical analyses revealed that BPRP levels were decreased in the hippocampal CA1 neurons of diabetic rats 4 and 8 weeks post-alloxan injection and in PC12 cells 48 h after exposure to high concentrations of glucose. BPRP protein levels were not affected by osmolarity control treatments with mannitol. Follow-up pharmacological experiments in PC12 cells revealed that glucose-induced BPRP down-regulation was markedly attenuated by the calpain inhibitors N-acetyl-Leu-Leu-Norleucinal (ALLN) or calpeptin, but not the proteasome-specific inhibitor carbobenzoxy-Leu-Leu-Leucinal (MG132). The ability of calpain inhibitors to specifically counter the effects of high glucose exposure on BPRP levels further suggests that BPRP and calpain activity may contribute diabetes complications in the central nervous system.

Thurs. 11:30
Poster session 4

Résultats du réseau de surveillance de l'IRSN en Polynésie française

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La France a réalisé 166 essais nucléaires en Polynésie entre 1966 et 1996, dont 43 essais aériens entre 1966 et 1974. La Grande Bretagne et les Etats Unis ont aussi réalisés des essais nucléaires dans le pacifique sud. Le LESE (Laboratoire d'étude et de suivi de l'environnement) de l'Institut de Protection et de Sûreté Nucléaire, implanté à Mahina (Tahiti) depuis 1960, maintien un réseau de surveillance de la radioactivité de l'environnement afin d'évaluer la dose ajoutée pour les populations des 5 archipels. Afin de déceler cette radioactivité dans les produits alimentaires, des prélèvements de plusieurs kilogrammes sont effectués tous les mois dans 7 îles et atolls (Tahiti, Maupiti, Tubuai, Mangareva, Hao, Rangiroa et Hiva Oa), et analysés avec les protocoles les plus performants pour la mesure des traces de radioactivité. A l'issue de ces analyses, on constate que la dose ingestion, ajoutée par la radioactivité artificielle, représente en 2008 moins de 1% de la dose associée à l'irradiation naturelle en Polynésie.

Thurs. 11:30
Poster session 4

BioBlitz

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BioBlitz is a 24-hour science event to record as many species as possible in a defined area, e.g. a park, school, university grounds, or reserve. It is an opportunity for biologists from many disciplines and organizations to work informally together, and a wonderful opportunity to engage the community. The event is educational and fun. BioBlitz helps people understand and value local biodiversity and appreciate the free 'ecosystem services' that healthy environments provide.

BioBlitz events were first held in the United States >10 years ago. They gained in popularity and spread to other countries. Since 2004, we have held four BioBlitzes in Auckland and one in Christchurch; and advised on others in Wellington and Hamilton.

At the survey location, a "base camp" in a building or large marquee is established,with space for working scientists, activities, displays and equipment. Species are confirmed and tallied here. Base camp is free to visit, and schools, universities, media and the public are encouraged to come along to talk to the biologists, look down microscopes, participate in short "field trips" (during the day and after dark) and find out about the environment.

Depending on the number and breadth of expertise of participating biologists, >1,000 species can be achieved in just 24 hours. It is not unusual to find an insect or fungus species new to science.

We suggest that a Pacific BioBlitz involving local specialists (e.g., from USP and relevant agencies) could be a good way to raise local appreciation of biodiversity and attract local students into pursuing science careers. It would be interesting to add an 'indigenous' component, involving local elders who might be willing to compile lists by common or traditional name. This would be a way of linking traditional knowledge with conventional science, and also draw attention to the importance of traditional knowledge.

Thurs. 11:30
Poster session 4

Contrast analysis for the landscapes of opposite sides of Pearl River Estuary

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Abstract: During the course of fast economy development and accelerated urbanization and industrialization, the coastal zone of Pearl River Estuary is facing a series of problems: overloading of resource carrying capacity, cultivated land loss, wetland degradation and over sea reclamation. It is important to promote the coastal resources reasonable utilization and harmonize the relationship of the ecological system, to provide theoretical support basing on contrasting analyses on the geomorphological differences and landscapes of opposite sides of the Pearl River Estuary. By extracting landscape information from high-resolution SPOT5 images and calculating different landscape indices, the landscape and geomorphological differences of opposite sides of Pearl River Estuary were analyzed quantificationally. The results indicate that particular landscape structures and functions of two sides of study area were caused by different geomorphological basements and strongly artificial influences.

Thurs. 11:30
Poster session 4

Intestinal load of cestodes in Children in Urban, Semi urban and Rural areas around Suva, Fiji

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Cestode infection occurs in developing countries where there is poor hygiene and standard of living is also poor. Cestodes are harmless but in large numbers can deprive the host of nutrition leading to poor development and growth retardation. Two species that infect humans through the ingestion of infected meat are the beef tapeworm (Taenia saginata) and the pork tapeworm (Taenia solium), which causes taeniasis in humans. This study looked at the rate of tapeworm infection among children between the ages of three and twelve (3-12) years. The children were selected randomly from three different areas around Suva in Fiji. These were the rural location (Rewa), Semi urban (Makoi, Nepani, Narere, Vatuwaqa squatter and Namadi squatter, and Urban area which was Vatuwaqa housing, Fletcher road, Raiwaqa, Nailuva and Milverton road. The children were also selected from the two different ethnic groups, Indians and Fijians. Hundred and two (102) stool samples were obtained from the different locations and replicates of these were carried out and processed using direct smear method with 0.89% saline solution. All of the samples tested negative for the ova of the tapeworms. The lifestyle and dietary habits of the children were taken into account but it coincided with the high rate of roundworm infection caused by Ascaris lumbricoideus. The negative results obtained indicated that the rate of tapeworm infection in swine and cattle is very low as people usually get infected when they consume infected meat. A proper processing technique for the stool samples need to be identified in order to accurately determines the rate of infection in the Suva area.

Thurs. 11:30
Poster session 4

Contribution des différentes unités de végétation à la richesse et à l'originalité de la flore de la Nouvelle-Calédonie

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La comparaison porte sur la flore des plantes vasculaires des principaux groupements végétaux définis d'une part sur une base édaphique (roches ultramafiques, roches acides, roches calcaires, milieux salés, milieux humides) et d'autre part sur une base physionomique (forêt dense humide, maquis, forêt sèche et savane). La flore des roches ultramafiques avec un total de 2145 espèces pour une superficie de 5600 km^2 et un taux d'endémicité de 81,4 % est nettement plus riche et plus originale que celle des roches acides (1890 espèces, pour une superficie de 9000 km^2), avec un taux d'endémicité de 65%. Les flores des roches calcaires (485 espèces pour 3800 km^2), des sols salés (183 espèces pour 500 km^2) et des zones humides (162 espèces pour 100 km^2) sont nettement moins diversifiées avec des taux d'endémicité respectifs de 39, 10 et 10%. La flore de la forêt dense humide, tous substrats confondus, avec 2010 espèces pour 3900 km^2 et un taux d'endémicité de 81,9%, est plus riche mais moins originale que celle du maquis secondaire (sur sols pauvres d'origine ultramafique ou phtanitique) dont le taux d'endémicité est de 88,8%. La flore de la forêt sèche (424 espèces avec un taux d'endémicité de 55%) est plus pauvre et moins originale mais occupe une superficie réduite à moins de 100 km^2. La formation la plus banale est indéniablement la savane entrecoupée de fourrés, qui rassemble seulement 424 espèces (taux d'endémicité 11%) pour 8000 km^2. Ces résultats soulignent que la forêt dense humide ainsi que les substrats sur roches ultramafiques (forêt dense humide et maquis) abritent la majeure partie de la diversité floristique exceptionnelle de la Nouvelle-Calédonie.

Thurs. 11:30
Poster session 4

Artificial Reefs and Reef Restocking for a Sustainable Development

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Professional breeding of reef fishes, resulting from post larvae's ecological collection and intended for local lagoon restocking and for an ecological aquarium trade, started in Bora-Bora at the beginning of 2006. Post larvae's collect is a technique created in French Polynesia and recognized by MAC (Marine Aquarium Council) and ICRI (International Coral Reef Initiative) to protect reef resources. Indeed, according to many international scientific studies, 90 to 99% of reef larvae disappear before reaching adult stage. Breeding allowing a survival of more than 90%, this technique allows us, due to aquaculture techniques, to save animals that would disappear otherwise because of natural predation. It also allows to protect an important variability of genetic composition of reef fishes stocks. Indeed, released fishes come from natural processes of reproduction and colonization and thus preserve a natural variability much superior than animals produced in nursery. During a study undertaken for Fisheries Service, we technically developed breeding of Naso unicornis and carried out first tests of lagoon restocking of this species of halieutic interest. Those tests led to interesting results compared to previous techniques with nearly 14,1% of juvenile's fixation, 10 days after release. Following this study, new protocols of restocking for this species were worked out and are in progress. After two years of work, and by using previous works led by the Fisheries Service and CRIOBE-EPHE, ecotouristic lagoon managements are realized in the hotels of Bora Bora and Moorea: about 10 000 fishes were released in both islands. They allowed to revitalize requiring lagoon zones (works of construction of hotels, development of invasive seaweeds, etc.). Accordingly, a coral nursery was created and we're initiating clams' breeding resulting from collection created in French Polynesia. The objective is to accompany these actions by an ecological plan or a guide of good practices.

Thurs. 11:30
Poster session 4

Distribution and abundance of *Acanthaster planci* and Diadematid echinoids in Suva Barrier Reef

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Suva barrier reef is located south of Suva penninsula, Fiji. The distribution and abundance of the Crown-of-Thorns starfish *Acanthaster planci* (L.) and two species of Diadema, (*Diadema savignyi* and *Diadema setosum*), and two species of Echinothrix (*Echinothrix calamaris*, *Echinothrix diadema*) in the Suva Barrier reef was studied. The invertebrates were studied by using 2 meter wide belt transect method and the substrate cover was determined using point intercept transect. Belt and point transects were conducted at 6 different locations along the reef. The PIT surveys showed 19% live coral cover, 52% sand and rubble and the remainder being mostly macro-algae and seagrass 29) in the study area. The Crown-of-Thorns starfish (CoTs) was found out to be at low density (1.86 CoTs/hectare) whereas the Diadematid echinoid density was comparatively high (10.5 echinoids/hectare). The distribution of the Diadematid echinoids was found to be mostly in the reef flat and back reef zones, where sand, rubble and seagrass-algal cover was dominant. CoTs however, were found to be dominant in areas with live coral cover, especially where Acropora species and Pocillopora species were common. The study area currently does not show signs of an outbreak judging by the density of adults found. However, the site should be monitored on a constant basis to predict future outbreaks which may be detrimental to the health of the coral reef ecosystem.

Thurs. 11:30
Poster session 4

Control of a Mosquito Vector Important to Lymphatic Filaraisis

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Lymphatic filariasis (LF) is the leading cause of disability in South Pacific regions, where >96% of the population are at risk. As part of the current global campaign, Mass Drug Administration (MDA) has reduced LF prevalence, but vector biology can complicate the MDA strategy. Obligate vector mosquitoes provide additional targets to break LF transmission, but existing methods are largely ineffective for controlling the primary vector throughout much of the South Pacific: Aedes polynesiensis. We demonstrate that interspecific hybridization and introgression results in an A. polynesiensis strain ('CP' strain) that is stably infected with endosymbiotic Wolbachia bacteria from Aedes riversi. The CP strain is bi-directionally incompatible with naturally infected mosquitoes, resulting in female sterility. CP males are equally competitive, resulting in population elimination when CP males are introduced into wild type A. polynesiensis lab populations. The results support the continued development of a vector elimination strategy to supplement ongoing MDA efforts.

Thurs. 11:30
Poster session 4

Ubiquitous technology and an idea of life log

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Recently, a "life log" is one of the topics in the field of information science When the person goes around with GPS cellular phone, the photograph taken there is recorded and the movement record is traced on a map The photograph of a meal at each time is taken and eating habits are improved A daily weight change is recorded and going on a diet is in fashion By large scale capacity of a recording medium and low-pricing progressed, even if there is no telling whether record is helpful, recording a security camera and drive recorder are continued. And when it is necessary, it became possible to take out information from the records. If a life log is continuing taking record, extraction and the record method of the information are important. If possible, automatic recording is desirable without being conscious. Furthermore, a place is not restricted but that it can record always anywhere faces. The information always needs to have 5W1H (to which who made what whom how and when where how).. Such information collection technology is being circulated into society as ubiquitous technology. Then, we consider the use in the medical field of such technology. Ubiquitous technology is possible to use for medical checkup in own home. Medical checkup in own home (sickness understood by continuation monitoring, and not only the data at special environment of a hospital but daily data has important meaning) which is impossible in a hospital, is the target of life log medical checkup. For example, the life log of everyday life such as the quality of sleep, the check of a lifestyle (eating habits, a movement week, the rest method, sleep), etc. should be recorded.

Thurs. 11:30
Poster session 4

Application of the Receptor Binding Assay for the evaluation of Ciguatera risk in French Polynesia

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In French Polynesia, the estimated incidence of Ciguatera Fish Poisoning (CFP) in 2007 was 2,2 cases/1.000 inhabitants. Despite significant under-reporting of CFP cases, good epidemiological data remain essential to help identify areas of potential interest for monitoring programs. Moreover, even if local fishermen are generally aware of localities or of fish species with high CFP-risk, the development of local fisheries is strongly impeded and exportation of fish products remains very risky. Since 2004, the Louis Malardé Institute has engaged in large-scale risk assessment programs in various islands of French Polynesia (Moruroa, Fakarava, Tubuai, Raivavae, Nuku-Hiva) to help reduce CFP risk for local populations. Before going to the field, safe and risky areas as well as fish species of a given island are selected with the help of a questionnaire send to the local population and fishermen. Then, the monitoring of both Gambierdiscus populations (the causative agent) and fish species from various trophic levels is performed which is the best strategy to evaluate the toxicity status of a lagoon. In the process, the receptor binding assay (RBA) proved to be a valuable, suitable and sensitive tool for detecting ciguatoxins in all stages of the trophic chain of ciguatera, as our findings regarding potentially toxic areas and fish were consistent with the knowledge of local populations. The potential application of RBA for new biological matrix, i.e., marine cyanobacteria recently identified as potential CFP-toxins producers with transfer of toxins to giant clams, will also be discussed. But, managing CFP risk is a very complex issue due to the absence of an international reference assay, a clear clinically effective dose harmful to human and international or local legislations.

Thurs. 11:30
Poster session 4

Application of high-resolution in vivo-NMR and HPLC-SPE-NMR to phenylpropanoid metabolism studies using cryogenically cooled probe heads

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The plant family Haemodoraceae is endemic in Australia. A prominent species, the kangaroo paws (*Anigozanthos sp.*) are well known all over the world and used for ornamental purposes. However, important secondary metabolites of these plants, the phenylphenalenones, are not completely understood regarding their biosynthesis. Since the phenylphenalenones exhibit antineoplastic, antifungal and antibacterial effects, their biosynthetical origin is of great interest. We would like to present an *in vivo NMR* approach to monitor the incorporation of isotope labelled precursors into the target molecules. For this study, root cultures of Haemodoraceae species (*Xiphidium caeruleum*) were subjected to cryogenic NMR analysis. Two-dimensional ^{1}H-^{13}C heterocorrelation experiments (HSQC) were able to detect well-resolved carbohydrate signals after short acquisition time even from a single root. Since root tips of Xiphidium caeruleum are known to accumulate phenylphenalenone-type metabolites to reasonable levels, this material was used for feeding experiments with [^{13}C]phenylalanine to observe conversion to downstream biosynthetic products. HSQC spectra of excellent resolution were obtained exhibiting signals attributed to precursor-derived ^{13}C-enriched products, which increased in intensity during the incubation time. The identity of products observed under *in vivo* NMR conditions and signal assignment to specific metabolites was verified, after extraction, by cryogenic HPLC-SPE-NMR.

Thurs. 11:30
Poster session 4

Associations between Total Antioxidant Capacity (TAC) and Components of the metabolic syndrome in the Maohi population: Results from the Dietary and Health Transition in French Polynesia Cohort

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OBJECTIVE: Because of geographical peculiar conditions, French Polynesian populations have long respected more traditional food habits including a high consumption of fish, fruits and vegetables. However, French Polynesia food habits have been modified significantly since the beginning of the century and now include reduced intake of fruits and vegetables. As Total Antioxidant Capacity (TAC) is correlated with intake of fruits and vegetables, we examine the relationships between TAC and the metabolic syndrome in French Polynesia. DESIGN: The study population consisted of 232 Maohi men and women aged 18-88 years from the Dietary and Health Transition in French Polynesia Cohort. Physical and socio demographic data, lifestyle characteristics as well as blood samples for the assessment of CVD risk profile parameters have been collected in each subject. TAC was measured through calorimetric test in serum. A value less than 280 μmol/l is considered low antioxidant capacity, while a value of 320 μmol/l or higher is considered as high antioxidant capacity. RESULTS: The mean body mass index (kg/m2) for male and female was 33.84 $\pm$ 8.36 kg/m2 and 31.53 $\pm$ 7.19 kg/m2 and a significant difference was observed between the two groups. Percentage of body fat was higher in women than men (41.82 $\pm$ 8.54 versus 26.67 $\pm$ 6.34). More than 75% of women had an at-risk waist circumference ($>$ 88 cm) compared to 50% of men ($>$100 cm). Additionally, insulin concentrations were higher in women than men (82.28$\pm$ 48.3 versus 76.15 $\pm$ 64.39 mmol/l, p= 0.06). TAC values according to age and gender and correlations between TAC and components of metabolic syndrome will be examined after adjusting for confounders. CONCLUSIONS: We found than women and men from French Polynesia are at high risk of metabolic syndrome and exploring the associations between the components of this syndrome and TAC could give some explanations.

Thurs. 11:30
Poster session 4

Evolution of *Metrosideros polymorpha* across an island-age gradient in Hawai'i

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Island ecosystems, such as the Hawaiian islands, are famous for their diversity of endemic species. Understanding the basic processes that produce these adaptive radiations is important for conservation of biodiversity. The highly variable Hawaiian tree species, 'ohi'a (*Metrosideros polymorpha*), is a dominant and foundational species across most natural communities of the main Hawaiian islands. In this study, we focus on the divergence of the three most common 'ohi'a varieties (*polymorpha*, *incana*, and *glaberimma*) across an island-age gradient. We examined the divergence of morphological and phenological traits and the relative fitness (reproductive output) of varieties and apparent hybrids at six sites representing different ages in the Ko'olau Mountains of O'ahu ($\sim$3.5 million years old), the Kohala Mountains of northwestern Hawai'i Island ($\sim$1 million years old), and young lava flows of eastern Hawai'i Island ($<$200 years old). Under the hypothesis that disturbance (primarily volcanism) promotes introgression among varieties, and that lack of disturbance promotes divergence and potentially speciation of varieties, we expect to find more reproductive isolation (e.g., different peaks in flowering time) and more morphological variation between varieties at older sites. This study highlights the importance of habitat stability on the divergence of sympatric varieties of endemic plants.

Thurs. 11:30
Poster session 4

Développement durable de l'aquaculture lagonaire et biodiversité

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En Polynésie, le service de la pêche conduit en collaboration avec l'Ifremer un programme de R&D dédié à un poisson lagonaire le Platax orbicularis depuis 2001. Pour ce développer de manière durable l'aquaculture lagonaire doit prendre en compte de manière équilibrée la rentabilité de l'entreprise, la demande des consommateurs et le respect de l'environnement. Concernant le Platax orbicularis, la préservation de l'environnement est prise en compte avant même l'installation de ferme d'élevage. Les trois thèmes présentés dans ce document illustrent cette préoccupation : - La prévention zoo-sanitaire axée sur la production d'alevins indemnes de pathologies (cas du Nodavirus) et sur l'emploi de traitements anti-parasitaires préventifs ou curatifs, inoffensifs pour l'environnement (cas du Benedenia sp.). - La gestion optimisée de l'alimentation et le choix des aliments pour minimiser le gaspillage et réduire les rejets biologiques excrétés et fécaux. - Les critères de choix des sites d'élevage pour diluer et disperser les rejets en évitant les effets nuisibles sur l'environnement et en respectant les aires et les espèces protégées.

Thurs. 11:30
Poster session 4

Development of a long-term sampling and rearing programme of larval fishes in the coral reef lagoon of New Caledonia, southwest Pacific

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A better understanding of the environmental factors that drive the seasonal and spatial variations of larval fish assemblages requires: a) information gained in a variety of environmental conditions, habitats and periods and b) identification procedures of larval fish to the species level. The present project, which is a continuation of different studies undertaken from 2002 by IRD in the coral reef lagoon of New Caledonia, southwest Pacific, thus aims at 1) designing a long-term sampling programme of fish larvae with light-traps along a coast to barrier reef transect off Nouméa, and 2) developing rearing protocols in captivity of larvae and juveniles from various species in order to be able to document their ontogeny and build identification keys based on high resolution pictures and meristic and pigmentation criteria. Another important outcome of this project will be the opportunity to present to the public some fish species artificially reared from the larval stage when they are hardly acclimatizable when collected as adults. Moreover, rearing individuals caught at the larval stage, i.e. when their natural mortality is still very high, will contribute to reduce the ecological footstep of the aquaria practices.

Thurs. 11:30
Poster session 4

Strengthening Collaboration and Scientific Development through Information Sharing Networks

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The ReefBase Pacific project is a collaborative effort of organisations and initiatives from the region and beyond, acting with the common aim of improving quality and accessibility of data and information for reef fisheries and coral reef research, management, conservation, and education in the Pacific region. Presented will be detail of the way in which multiple agencies and initiatives have cooperated to effectively form a network for information sharing, and develop tools and information products that provide support to both science and education in the region. The role, functions and outputs of associated information sharing networks, namely FishBase and SeaLifeBase will also be presented. There will be displayed the web-based, DVD and printed products designed for an audience of scientists, managers and students in the Pacific. Also discussed will be the ways in which these projects provide a mechanism for improved collaboration and make a direct impact on marine education in the region.

Thurs. 11:30
Poster session 4

Testing some macro-scale patterns of plant diversity and endemism in the southern Pacific

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Island biogeography theory predicts that the size, isolation and age of an environment determine the number of species that are present. These factors are a subset of those hypothesised to control diversity patterns more generally. Factors such as the "small island effect", habitat diversity, disturbance, geology, climate and the dispersal ability of taxa also may be important in determining patterns, sometimes resulting in localised hotspots of diversity. Nevertheless, the species richness of south-western Pacific islands has been regarded to accord in general with theory given the decline in plant and bird diversity with distance from Indo-Malesia. In this study, I conducted a macro-scale analysis of environmental and phytogeographic data across the southern Pacific. The results indicated a general relationship between species richness and endemism, a strong control of island physiography, and that environmental and climatic stability together with heterogeneity contributes to species diversification. Highest richness occurred on or near continental landmasses while endemism was highest on isolated, large continental islands. Islands with continental influences may have rich, relictual floras preserved by the equable, maritime conditions with adaptive radiations where competition by immigrant taxa is low. Greater concordance was found between environmental and floristic patterns in temperate regions and may indicate greater equilibrium or similarity in these environments or a comparative uniformity.

Thurs. 11:30
Poster session 4

Can 'new age' ovitraps be a useful tool for management of dengue (and perhaps filariasis) in the Pacific region?

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Ovitraps, a long-term surveillance tool for Aedes mosquitoes, particularly *Aedes aegypti* the major vector of dengue viruses, have been undergoing development towards becoming effective potential vector control tools. In Australia in recent years, the surveillance attributes of the regular ovitrap have been enhanced with the addition of a sticky plastic insert, and the potential of ovitraps for reducing adult vector populations has been explored with the incorporation of an insecticide impregnated oviposition strip that kills adults visiting to lay their eggs. These 'new age' ovitraps have proved to be significant advancements for the dengue surveillance and control programs in Cairns in northern Queensland, and have reduced the need for domestic residual insecticide applications when there are dengue outbreaks. To counter the logistical problem of retrieving ovitraps that have been deployed during control programs, lest they provide long-term vector habitats, a further advancement has come with the development of a biodegradable ovitrap that ceases to hold water after approximately a month and eventually decomposes entirely. These enhanced ovitraps may offer a sustainable, low cost and environmentally friendly additional tool to the armoury available for vector control during dengue outbreaks in the Pacific region. Also, preliminary investigations have shown potential for use of these ovitraps against *Aedes polynesiensis*, a major vector of bancroftian filariasis as well as being a secondary vector of dengue in the Pacific, and while control of *Aedes polynesiensis* is a much more complicated issue than control of *Aedes aegypti*, such 'new age' ovitraps may prove to be a useful adjunct tool for filariasis control as well as dengue control

Thurs. 11:30
Poster session 4

Seasonal change of ingredient on the seagrass in Okinawa, Japan

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In our investigation the seasonal change of covering percentage, growth rate and ingredient of seagrass was taken in the Kayo bay, Okinawa Island, southwest Japan. The species composition, covering percentage and ingredient of seagrass were examined six times (at intervals of two months) during the May (2003) to March (2004). The fixed 5 points regions of seagrass bed were examined every time using GPS data. The covering percentage was measured following the percent cover standard in 3 quadrats (50cm X 50cm each). These quadrats were launched at random in the point area, from 1 m high. And measuring the covering percentage was a value at the average of each measured value by three persons. The classification of species composition of seagrass was investigated by sampling. Samplings of seagrass were taken at low tide the ebb; the plants with rhizomes and roots were collected by dive. Sampling plants were immediately decided the species composition at boat or on land. The growth rate was measured by number of shoot and number of apex. Ingredient item was fiber content and protein content. Species of seagrass on the confirmed this investigation were as follows (7 species); Halophila ovalis, Thalassia hemprichii, Cymodocea serrulata, Cymodocea rotundata, Syringodium isoetifolium, Halodule uninervis and Halodule pinifolia. The covering percentage of seagrass was highest at May, and then slowly decreased after July with the decline of sea water temperature. Seasonal change of number of shoot was observed different between species. Fiber content and protein content was observed different at season and species.

Thurs. 11:30
Poster session 4

Diversité des bananiers des sous- groupes Maoli, Popoulou, et Iholena uniques de Nouvelle-Calédonie et de Polynésie française

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Des prospections réalisées en Nouvelle-Calédonie (1991-2007) et en Polynésie française (2007-2008) ont permis de constituer deux collections de bananiers de type Maoli-Popoulou-Iholena d'une centaine d'accessions en Polynésie française et d'environ 30 accessions en Nouvelle-Calédonie . Ces variétés ont une aire de diversification spécifique dans le Pacifique d'où la dénomination de " Plantains du Pacifique ". En Polynésie française, ces plantains sont appelés maohi ou mao'i pour les types Maoli, po'u / pa'u pour les types Popoulou et ore'a pour les types Iholena. En Nouvelle-Calédonie, ils sont communément appelés " bananes chef " pour les Maoli et " bananes poingo " pour les Popoulou. Aucun cultivar du sous groupe Iholena n'a pu être mis en évidence. La répartition des variétés est très disparate en Polynésie française. Fortement utilisés dans les plats traditionnels dans les Iles Marquises, les plantains rencontrés sont les seuls types mao'i avec une bonne diversité et les noms sont conservés. Sur Tahiti et Raiatea on observe une tendance à la perte des cultivars en commençant par la perte des noms vernaculaires, mais les 3 types sont présents. Sur Tubuai, seuls quelques spécimens de maohi demeurent. En Nouvelle- Calédonie, la distribution des maoli et popoulou sur l'archipel retrace l'histoire et le déplacement des différents clans de la société mélanésienne ancestrale. Bien que peu cultivés de façon intensive (excepté la banane poingo), les autres Plantains du Pacifique sont réservés pour des échanges, lors des cérémonies coutumiers. Mais ces bananiers hors circuits commerciaux, autoconsommés, contribuent largement à la ration alimentaire de la population. La Nouvelle-Calédonie et la Polynésie française ont développé un méthodologie commune pour la caractérisation morphotaxonomique des plantains présents dans les collections. Une liste de descripteurs morphologiques est utilisé pour discriminer les accessions. Cette mise en commun des informations et des analyses statistiques discriminantes permettront d'identifier les cultivars communs à Nouvelle-Calédonie et à Polynésie française afin de définir les variétés uniques de chaque territoire et d'établir une collection française de la diversité des plantains dans le Pacifique. L'étape suivante consistera à caractériser les différents morphotypes à l'aide d'outils moléculaires puis de les comparer avec les accessions des autres pays du Pacifique.

Thurs. 11:30
Poster session 4

Characterization of Metabolites and Cytochrome P450 Isoforms Involved in the Microsomal Metabolism of Aconitine

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Investigated the metabolism of aconitine and the effects of selective cytochrome P450 (CYP) inhibitors on the metabolism of aconitine in rat liver microsomes. The metabolites were separated and assayed by liquid chromatography-ion trap mass spectrometry (LC/MSn) and further identified by comparison of their mass spectra and chromatographic behaviors with reference substances. Various selective inhibitors of CYP were used to identify the isoforms of CYP, that involved in the metabolism of aconitine. A total of at least six metabolites were found and characterized in rat liver microsomal incubations. Result showed that the inhibitor of CYP 3A had an nhibitory effect on aconitine metabolism in a concentration-dependant manner, the inhibitor of CYP1A1/2 had a modest inhibitory effect, whereas inhibitors of CYP2B1/2, 2D and 2E1 had no obvious inhibitory effects on aconitine metabolism. Aconitine might be metabolized by CYP 3A and CYP1A1/2 isoforms in rat liver microsome.

Thurs. 11:30
Poster session 4

Phylogenetic relationships and phylogeography of two Japanese newts, *Cynops pyrrhogaster* and *C. ensicauda*

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The genus Cynops consists of seven species of fire-bellied newts and is distributed in East Asia. Of these, following two species are endemic to Japan - *Cynops pyrrhogaster* from Japan mainland and *C. ensicauda* from the Ryukyu Archipelago. We surveyed the phylogenetic relationships among populations of these two species using nucleotide sequences of mitochondrial cytochrome b gene. Because their geographic ranges cover almost entire territory of Japan, the results will contribute to our better understandings of historical biogeographical events relevant to formation of the current Japanese herpetofauna. Our investigations revealed a remarkable differentiation between two species. *Cynops pyrrhogaster* consisted of eastern, central, and western clades, of which the eastern clade accommodated samples from Tohoku and Kanto districts. The two local races, previously recognized on the ground of mating behavior, external morphology and allozyme variation within this clade, were not recognized. Likewise, in the central clade from the Chubu - eastern Chugoku region, the Sasayama race, which had been recognized on the basis of characteristic mating behavior and coloration, was not recognized. The western clade, ranging from western Chugoku, Shikoku, and Kyushu districts, was divided into two sub-clades. The southern Kyushu local group, recognized by the previous allozyme study, was not recognized in this study. *Cynops ensicauda*, endemic to the Ryukyu Archipelago, was divided into the Okinawa and Amami clades that correspond to the two subspecies proposed in previous studies. The Okinawa clade was shown to consist of two sub-clades, which coexist with each other in the northern part of Okinawa-jima Island. However, these sub-clades were not recognized in additional allozyme and morphological studies. Such phylogeographical pattern the current Okinawa-jima assemblage is likely to have derived through initial geographic division of a newt population on this island into two assemblages and their subsequent sympatry before acquisition of reproductive isolation mechanisms

Thurs. 11:30
Poster session 4

Recent climatic changes and ventilation of Asian Marginal Seas: a case of the Sea of Japan

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Most of the Asian Marginal Seas has quite isolated from surrounding ocean deep basins. Then a ventilation/renewal of their deep waters to large extent controls by dynamical processes in the sea. In this paper we discuss results of recent series of hydrographic cruise observations in the Japan Sea implemented in 1999-2007. The Japan Sea has three deep basins with depth exceeding 3500 m while it is connected with the adjacent seas by shallow straits of 140 m deep. Over-turning process driven by winter convection is believed a main mechanism of its deep and bottom water formation. Inter-annual changes of winter air-sea interactions as well as variations of surface waters salinity balance and stratification determine intensity of convective mixing and thus renewal of deep waters. A few decades of slowing-down of ventilation process cause by regional climate was interrupted by severely cold winter of 2000-2001 when large amount of bottom water has been renewed by slope convection at the northwestern shelf area. Renewed water distributed over the western part of Japan Basin between 38 and 43 N and formed a layer of 100-300 m thick above the bottom. It is surprising that even such large volume of new bottom water was completely diffused by 2003. The continued decreasing of ventilation has led to increasing of bottom water temperature by 2007. This results show that even such intensive injection of new water does not influence much long term warming trend and confirm active water dynamics in the Japan Sea of bottom layer which may be cause by mesoscale activity.

Thurs. 11:30
Poster session 4

Bio-bleaching Of Wood Pulp: A Promising Approach To Protect The Environment From Chlorinated Pollutants

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Chemical bleaching is a key process to any mill in order to get the paper white. This process uses chlorine and other chemicals to whiten the pulp. Unfortunately, chemical bleaching produces a lot of toxic chlorinated hydrocarbons, which get released into the environment with the wastewater from the mills. These chemicals grab onto other chemicals besides hydrogen, thus creating highly toxic chemicals called "organochlorines", which are basically poisons, such as dioxin. Biotechnology can play a major role in establishing the new, technologically advanced and effective processes in this industry. Present study exploits the capability of laccase secreting bacterium, Pseudomonas Stutzeri, isolated from a forest site (Roorkee, India) to bleach the wood pulp biologically. A plate assay method was developed to screen the isolated bacteria for laccase secretion. The isolated bacterium Pseudomonas Stutzeri produced laccase as the predominant extra cellular phenoloxidase. Syringaldazine (0.20μM) was found as the best inducer for laccase induction. Laccase activity in the crude extra cellular medium and purified sample was assayed by monitoring the oxidation of 2,2'-azinobis-(3-ethylbenzthiazoline-6-sulfonate) at 420 nm.

In a trial to bleach the wood pulp biologically, extra cellular medium of the culture of Pseudomonas Stutzeri was concentrated 20 times and unbleached wood pulp (8% consistency) was incubated in it for 2 hours at 37oC following by 2 hours incubation at 70oC for alkali extraction. Use of laccase secreted by Pseudomonas stutzeri has been found effective to bleach the wood pulp to an extent of 14% brightness as measured spectrophotometrically. Bleaching of wood pulp could be observed when unbleached pulp was incubated at 37oC for two hours in the concentrated extra cellular medium containing enzyme and mediator. Bio-bleaching eliminates the use of chlorine in bleaching process of pulp mills and thus stops the generation of chlorinated toxic pollutants.

Thurs. 11:30
Poster session 4

Invisible invasion by mites and microbes with imported pet beetles from Southeast Asia

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As a first case study to develop a risk-assessment system for small organisms introduced with imported organisms, we investigated parasitic canestriniid mites, which have been imported into Japan via pet lucanid beetles from Southeast Asia. We collected mites from pinned specimens of Japanese lucanid collections before 1999 - when the Japanese government lifted a ban on the import of the beetles - and living mites from imported and native lucanid beetles collected after that. No foreign canestriniid was found on any of the native Japanese beetles. Because the mites collected from imported beetles were different from Japanese species, we conclude that the foreign mites have not yet established wild populations in Japan. However, because the Japanese mites migrate in a lab between hosts without host physical contact, introduced mites are assumed to be able to migrate from one to another in pet shops and at home. The foreign mites reproduced between 15°C and 25°C, suggesting that the mites could survive in southern and central Japan. Furthermore, we collected fungi of Laboulbeniomycetes from both native and foreign canestriniid mites. Thus, we conclude that the lucanid import without quarantine presents a potential risk of mite and fungal introductions to Japanese endemic canestriniids as well as to native Japanese lucanids.

Thurs. 11:30
Poster session 4

Development of new personal tele-health opportunity

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Today, technologies like these that can enable more proactive personal health exist and are being applied. However, lifestyles that leave little time or motivation for fitness and weight management, rise chronic diseases. Empower individuals and patients to better manage their health by providing them with information regarding their fitness and health through personal medical devices and services is critical. To become a central component of the way we manage health, we could monitor our health easily. Therefore, personal health and medical devices must be fully interoperable with each other and with other information sources. However broad interoperability has yet to be achieved, thus it is an emerging priority for health systems and for the medical and information technology industries. Not only those interoperable data help doctors to monitor and diagnose the patient, but also accumulation of those data and its usage help other patient and industry to prevent Chronicle diseases. Development for Interoperability and standardization of data format among stakeholders are sine qua non. Multi Industrial effort of "Continua" health alliance enables medical and fitness device manufacturers to rapidly develop interoperable devices and services using industry developed connectivity standards. As results of Continua effort, professional care givers to more accurately monitor and coach chronic disease patients and elderly individuals living independently and those patients and elderly individuals who live remote place from clinics or hospitals enable to monitor and watch their daily heath. I would like to present how "Continua" formed and worked as well as how to optimize using Continua data in the industries.

Thurs. 11:30
Poster session 4

Sustainable tourism development plans in Kwan Phayao lake rim communities, Phayao province, upper northern Thailand

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The objectives of this qualitative and quantitative research were to study the capacity for sustainable tourism development, and to recommend some sustainable tourism development plans to the Phayao Lake Rim communities. The scope of this research covered the area of communities adjacent to Wiang sub-district, Mae Tum sub-district, Mae Sai sub-district, Ban Toon sub-district, Ban Sang sub-district, San Pamuang sub-district and Ban Tom sub-district of Mueang district, Phayao province. The population was divided into three groups: (1) 367 household heads or representatives in seven lakeside villages and a questionnaire was used to collect the data; (2) 86 village key informants comprising selected household heads, community leaders and tourism-related entrepreneurs; and (3) 5 key informants from tourism-involving state officials. In-depth interviews, focus group discussions and public forums were used to collect data from the two latter groups. The findings were that the communities had four suitable components - tourism resources, accessibility, security and carrying capacity - while the other two components, namely community participation and amenity, were found in need of improvement. The plans consisted of the stakeholder participation, activities and routes, tourism service capabilities of the communities, sustainable tourism marketing, and sustainable tourism resources and environmental conservation. Community development in tourism should be based on self-help principles leading to sustainable development. The related community should learn to understand itself in various aspects such as the community characteristics and as viewed by the community members themselves. Thus, a promotion made for the people to realise their own identity is very important, particularly to understand the community tourism resources, and to be aware of their values with participation in the development process. There are some needs to help the people in adjusting their attitudes and ways of thinking leading to sustainability. Such help could be conducted practically in forms of training, study tours and demonstrations until the people could run their tourism businesses by themselves, developing tourism with quality and simultaneously conserving the environment, thereby leading to sustainable development.

Thurs. 11:30
Poster session 4

Soil's Physical Properties and Removal of Soluble Elements in a Modeled Paddy Field nearby Phayao Lake Wetland, Thailand

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Abstract The modeled paddy fields which imitated the fields near Phayao Lake wetland were constructed in order to study the soil's physical properties and the migration of soluble elements that possibly affect the vulnerability of the lake. The model was made of a large PVC column (40 cm in diameter, 100 cm in height). The model was designed to reproduce the properties of each soil layer in the ill-drained paddy field which showed a closed system percolation. The study of the pressure head profile of the soil in our model showed a positive pressure for every soil layer. The redox (Eh) at the soil surface was in the "oxidation" state but every layer downward was in the "reduction" state. The reduction state highly affected the solubility of numerous elements and thus the migration of these elements to subsoil layer. Fe was found to be dissolved in underground water around 5-30 mg/L when nitrate was dissolved > 1.0 mg/L. In contrast, pH and electronic conductivity (EC) were higher than those of the standard values set for the surface water.

Thurs. 11:30
Poster session 4

The Evaluation of the New Bioartificial Liver Support System in Treating the Acute Liver Failure in Canines

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AIM To evaluate the efficacy and safety of the TECA-I Bioartificial Liver SupAIM To evaluate the efficacy and safety of the TECA-I Bioartificial Liver Support System (BALSS) in treating canines with acute liver failure (ALF).
METHODS 10 canines with ALF induced by 80% partial liver resection received BALSS treatment. Blood was perfused through a hollow fiber tube containing 1x1010 porcine hepatocytes. 4 canines with ALF were treated with BALSS without porcine hepatocytes and 5 canines with ALF received the drugs. Each treatment lasted 6 hours.
RESULTS BALSS treatment resulted in beneficial effects for partial liver resection-induced ALF canines with survival and decreased plasma ammonia, ALT, AST and BIL. There was an obvious decrease in PT level and increase in PA level, and there was no change in count of lymphocytes, immune proteins (IgA, IgG, IgM) and supplementary (C3, C4) levels after BALSS treatment. In contrast, for the canines with ALF in non-hepatocyte BALSS group and the drug group, there were no significant changes in ammonia, ALT, AST, BIL, PT and PA levels. The ALF canines in BALSS group, non-hepatocyte BALSS group and drug group lived respectively an average time of 108.0,12.0h, 24.0,6.0h, and 20.4,6.4h, and 3 canines with ALF in BALSS group surived more than 3 months.
CONCLUSION TECA-I BALSS is efficacious and safe for ALF canines induced by parcial liver resction. port System (BALSS) in treating canines with acute liver failure (ALF).

Thurs. 11:30
Poster session 4

ReefBase Pacific Project

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The ReefBase Pacific project, component of the Coral Reef Initiative for the South Pacific (CRISP), is the first regional focus of the ReefBase Project and provides a unique collection of information for the Pacific region. This Project aims to improve quality and accessibility of data and information for reef fisheries and coral reef research, management, conservation, and education in the Pacific region.

The ReefBase Project have different objectives: - Develop a collaborative and region-wide network of professionals involved in reef fisheries and coral reef research, conservation and management in the South Pacific - Assemble an unprecedented knowledge-base on reef fisheries and coral reef ressources monitoring, conservation and management in the South Pacific - Utilize the network and knowledge-base to establish an easily accessible information system which provides researchers, managers and local stakeholders - Widen the scope, impact, and effectiveness of current reef fisheries and coral reef management, conservation and information sharing activities, across Melanesia, Micronesia, and Polynesia

ReefBase Pacific Project have announced the launch of the ReefBase Pacific website (http://pacific.reefbase.org.fr). This accessible new online database is a wide range of published and grey litterature, images, spatial information (GIS-maps) and Pacific reef project summaries and project contacts. French Polynesia have generously contributed to this project with the support and the help of the different services of the Territories, the Institution and the Research Center whose involved in the protected ressources of the coral reef.

Thurs. 11:30
Poster session 4

A Harmful Algae Bloom (*Prorocentrum gillespii*), Ciguatera, Nutrients and a case of DSP, from Muri lagoon, Rarotonga, Cook Islands

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Ecological ciguatera fish poisoning (CFP) studies in the past have largely ignored the potential for benthic microalgae from the sediment to contribute to toxins in the associated environment, largely concentrating on the macroalgae present and associated micro flora and ignoring this other niche. Ciguatera field studies have also concentrated on the dinoflagellate genus Gambierdiscus , well known to be the producer of ciguatoxin precursors but ignoring the potential of toxins (OA and DTXs) from the genera Prorocentrum to be causative of CFP. This study concentrates on a bloom of Prorocentrum on the sediment (stained brown by the HAB) of a tropical high island (Rarotonga) fringing reef lagoon (Muri) in the southern central Pacific Ocean which was described as a new species by SEM analysis. The field site, Muri lagoon was chosen, as the island of Rarotonga, has a very high occurrence of CFP. Sampling took place from November 2002 to September 2003 for microalgal abundance (*Prorocentrum gillespii* highest monthly count was 13,700 cells/g sand) and water samples were taken for nutrient analysis from the lagoon and catchment streams. Fish were collected from the actual lagoon site for toxin analysis both at the start and at the end of sampling. We surmise that the nutrients are most likely responsible for the bloom of microalgae and those toxins from this bloom could now be responsible for ongoing cases of CFP. Indeed perhaps the first known case in the Pacific of DSP (diarrhetic shellfish poisoning), from a clam (Paua) occurred towards the end of this field study. This is the first investigation in a GEOHAB targeted endorsed research program, titled "Oceania Ciguatera", assessing nutrients and ciguatera causative dinoflagellates.

Thurs. 11:30
Poster session 4

European Project on Ocean Acidification (EPOCA)

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The European Project on OCean Acidification (EPOCA) was launched in May 2008 with the overall goal to advance our understanding of the biological, ecological, biogeochemical, and societal implications of ocean acidification. Its consortium includes 107 principal investigators from 27 institutes. The research efforts of this 4-year long project are divided into four themes. Theme 1 focuses on past and present spatio-temporal changes in ocean chemistry and biogeography of key marine organisms. Paleo-reconstruction methods are used on several archives to determine past variability in ocean chemistry and to tie these to present-day observations. Theme 2 studies the impacts of ocean acidification on marine organisms and ecosystems. Molecular, physiological and ecological approaches are used to study climate-relevant biogeochemical processes, including calcification, primary production and nitrogen fixation. Theme 3 will integrate results from themes 1 and 2 in biogeochemical, sediment, and coupled ocean-climate models to project future responses of the Earth system to ocean acidification. Finally, theme 4 will evaluate uncertainties, risks and thresholds ("tipping points") related to ocean acidification and assess the decrease in CO2 emissions required to avoid such thresholds.

Thurs. 11:30
Poster session 4

Isolation of marine bacterium from Polynesian atypical ecosystems ; valorisation of innovative biomolecules

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La société polynésienne Pacific Biotech a pour but la valorisation de microorganismes d'origine polynésienne. De nombreux écosystèmes présents en Polynésie abritent des micro-organismes très divers et particuliers. Pacific Biotech a localisé et étudié ces dernières années un certain nombre de ces biotopes à partir desquels elle s'est constitué une souchothèque présentant une large gamme d'isolats à fort potentiel de valorisation. Les études les plus abouties sur les molécules produites par ces souches concernent les ExoPolySaccharides (EPS). La présence de groupements chimiques particuliers (acides uroniques, groupements sulfatés et sucres aminés par exemple) en quantité non négligeable suppose des propriétés chimiques et/ou biologiques intéressantes. En effet, des activités telles que la chélation de certains métaux ou encore l'inhibition d'activités enzymatiques ont déjà été identifiées pour plusieurs EPS de la collection. Plusieurs autres études prometteuses ont été initiées sur la biosynthèse de pigments - en particulier la Zéaxanthine, un caroténoïde recherché en Médecine et dans les compléments alimentaires pour lutter contre la dégénérescence de la macula de l'œil -, des Polyhydroxyalcanoates (PHA), plastiques biodégradables (la souchotèque de Pacific Biotech compte à ce jour plusieurs souches bactériennes dors et déjà valorisées pour la biosynthèse de ce type de métabolites) ainsi que d'enzymes d'intérêt industriel (les recherches initiées portent essentiellement sur des enzymes ciblées telles que des dépolymérases, des dé-acétylases et des sulfotransférases, les résultats se sont révélés très prometteurs).

Fri. 9:00 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Legal Framework

Current Issues in International Intellectual Property Rights

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Intellectual property rights (IPRs) have been getting longer, broader, and stronger ever since their inception several hundred years ago. This trend has accelerated greatly in recent decades as many parts of the world have begun to transition from industrial to post-industrial "knowledge" economies. The trend has been reflected in the international treaties of the World Intellectual Property Organization (WIPO), the World Trade Organization (WTO), and other more specific intergovernmental organizations, and implemented through national legislation, regulations, and policies. Although usually developed and adopted first by OECD countries, many developing countries have been implementing the same laws as well. These various laws have been promoted almost exclusively by large multinational industry sectors, such as pharmaceuticals, software, publishing, and film and music. The actual interests and applicability of these laws to less developed countries, or, for that matter, to smaller businesses and consumers in the more economically developed countries, have tended to be disregarded or marginalized in the push for expansive exclusive property rights.

In very recent years, there have been a number of developments at the international and national levels that have sought to balance the interests between rights holders and the public, and between the wealthier and poorer countries. Some of these efforts have taken place within the public law domain of intergovernmental organizations, such as the Development Agenda at WIPO, while others have been sector-specific or nationally focused. One important approach that has emerged in the past few years is in private contract law, which seeks to promote the voluntary adoption of agreements between parties of "some rights reserved", instead of the full restrictions of the statutory IP regimes. Such "common use" contracts seek to preserve the rights that are most important to the owner of the IPRs, while allowing users of the intellectual property greater freedom to access and reuse it in more socially beneficial ways.

This presentation will provide an overview of these developments in public and private law in the intellectual property arena, and particularly as they relate to the interests of developing countries and the non-profit research community. The views expressed in this abstract and presentation are those of the author and not necessarily those of the National Research Council.

Fri. 9:15 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Legal Framework

International intellectual property Law on biotechnology and its relationship with biodiversity

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Biotechnology is defined in the Rio Convention on Biological Diversity (CBD, 1992) as any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use. It involves the development by scientists of biological resources directly extracted from their natural environment or stored for research purposes.

International law protects inventions by the classical system of patents. Article 27 of the Agreement on Aspects of Intellectual Property Rights (TRIPS, 1994) provides that an invention can be protected only if it is new, involves an inventive step (non obvious) and is capable of industrial application (useful). TRIPS is part of the Agreement establishing the World Trade Organization (WTO).

Any WTO Member State may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect ordre public or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment. It is also possible to exclude from patentability, animals, plants and essentially biological processes for the production of plants or animals. Inventions based on mcroorganisms remains patentable and depend on a specific regime of deposit for States parties to the Budapest Treaty (1977-1980).

The Doha Declaration (2001) opens a new path for biodiversity protection since raises the question of the relationship between TRIPS and CBD. In this context, The TRIPS Council coordinates discussions between Member States on the disclosure of the country of origin of biological resources or traditional knowledge used to create a biotechnological invention.

Fri. 9:30 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Legal Framework

Legal aspects of traditional ecological Knowledge

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Since 1970, a call highlights the respet of indigenous'rights and a new offense is now denounced Biopiracy ! As, the new Convention on Immaterial Heritage was adopted in 2003, a question is emerging: is there a place for a new multicultural law on traditional ecological knowledge? Cultural heritage, values and practices strengthen identities and are also a rich and diverse source of creativity and innovation wich are essential in the face of rapid changes taking place in the World and particularly in Pacific Community. But, natural and cultural heritages can not be dissociated. The UNESCO's Convention on World Heritage underscores this reality like the Convention on Biological Diversity (CBD) that puts together Biodiversity and traditional knowledge (Art.8J). Twenty years later, Pacific Islands Ministers of Culture proclaimed "protection of traditional knowledge and culture is a priority" and endorsed the Regional Framework for the Protection of Traditional Knowledge and Expressions of Culture. Behind numerous international instruments, what is the real state of legal art on tradional ecological knowledge? Facing "spontaneous economic law", traditionnal knowledge needs to be understood as a social fonction not only a patentable content.
While discussions are continuing at WIPO IGC on a Sui generis system, the Working Group on Access and Benefit-Sharing of the CBD debates on Certificate of Origin. Relevant and efficient measures need still to be taken to recognize the status and economic support for the indigenous and local communities that are the creators, the repository of traditional knowledge, which have collective ownership. A Model Law is developed under the auspices of the Pacific Regional Environment Programme (SPREP) for the protection of traditional ecological knowledge. At the level of national laws, several States have enacted or are enacting legislation in the area of traditional knowledge protection, for instance Brazil, India and Vanuatu.

Fri. 10:30 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Current Status of ABS Legislation in the Pacific

The Law of protection and reasonable use of marine biodiversity in Melanesia: the cases of Vanuatu, Fiji and Solomon Islands

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The selected states of the juridical part of Component 2-C of CRISP Project are State-Islands that have a democratic western political system and a Melanesian culture. The juridical system is mixed with British common law rules and customary law regulations.
These three States recognize a "customary marine property" until the limit of the border reef. In the particular case of Fiji Islands, a concept of customary fishing zone is observed.
The sample-States are parties to many international conventions focusing on protection and use of marine biodiversity. They ratified the United Nations convention on the law of the sea (1982) and global respect its prescriptions. They are also parties to international and regional conventions concerning fisheries and have special bills on this topic.
Each of them have special recent bills concerning protection of the environment, but regulations are incomprehensive. The particular problem of marine environment protection is lacking. The endangered marine species are included only in the international trade regulation or fishing regulation only.
The protection of marine coastal zones is uncompleted and the marine protected areas system is rarely used.
Acknowledgment : we thank the CRISP and AFD (Agence Française de Développement) for funding this project.

Fri. 11:30 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Current Status of ABS Legislation in the Pacific

Access and Benefit Sharing: Views from the Philippines, A Mega-diverse Developing Country
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The Philippines is one of 17 megadiversity countries in the world and a signatory to the Convention on Biological Diversity (CBD) in 1992. In 1995, it became the first country in the world to develop policies and regulations as well as to implement these with regards to Access and Benefit Sharing (ABS), one of the cornerstones of the CBD. This happened with the issuance of Executive Order 247 (EO 247) which became known as the Philippine Bioprospecting Law. It was implemented for six years and ultimately some of its more controversial provisions were either repealed or amended when a new legislation (the Wildlife Conservation Act) was passed which incorporated lessons learned from the implementation of the EO 247. The EO 247 distinguished between Academic Research and Commercial Research and the appropriate agreements were designed and signed. Throughout its short lifespan, only one academic research agreement and one commercial research agreement were signed. Under the new Wildlife Act, only commercial research was identified as needing stringent requirements while academic research were treated separately but still regulated. To date, no commercial undertakings had been made under the new law. On the other hand, while academic research was treated differently, there were still requirements to secure collecting permits which were contingent on securing Prior Informed Consent (PIC) from the relevant stakeholders. The experience of local and foreign academic researchers from the noncommercial sector in the Philippines on ABS and its impact on academic research will be highlighted, while other issues and concerns will also be discussed.

Fri. 11:45 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Current Status of ABS Legislation in the Pacific

Legal aspects related to marine bioprospection in Melanesia: example of Fiji, Solomon and Vanuatu Islands
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Our study within Component 2-C on marine active substances of the Coral Reef Initiative for the South Pacific focuses on the law which apply to marine bioprospecting in Fiji, Solomon Islands and Vanuatu. Marine Scientific Research (MSR) is subject to and unequal rules which are not necessary appropriate to this specific activity. The three States have adopted the United Nations Convention on the Law of the Sea (1982) without adapting its prescriptions to modern MSR. Solomon Islands' Law on research (1982) deals with research in general. Fijian Marine Spaces Act (1978) regulates MSR only in the Economic Exclusive Zone. In Vanuatu, there is no specific law on the MSR. Vanuatu's Environmental Management and Conservation Act (2002) is composed inter alia of a part on bioprospection which can apply. Despite the good quality of their legislations, the MSR remains poorly identified in this Melanesian States. In practice, this activity is generally considered as a fishing activity or a preliminary exploitation of biological resources. This constitutes an impediment to research and development. Patent Law is heterogeneous. Fijian Patents Act (1879) is outdated and does not always correspond to international standards. Unlike Fiji, Vanuatu is not a member State of the World Trade Organisation but paradoxically complies with its requirements in its Patents Act of 2003. Industrial Property Bill of Salomon Islands (2002) has still not been adopted by the Parliament. All these laws are "market oriented", which does not necessarily correspond to the reality of small island developing countries. The lack of capacity allocated to research and development still hampers innovation and investment, particularly in the biotechnology sector.
Acknowledgment : we thank the CRISP and AFD (Agence Française de Développement) for funding this project.

Fri. 13:30 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Research and ABS

Access and Benefit Sharing in Non-commercial Biodiversity Research
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Two of the most contentious issues associated with the Convention on Biological Diversity (CBD) are the regulation of access to genetic resources and the equitable sharing of benefits associated with the use of those resources. The CBD has set a 2010 goal for creation of an International Regime for Access and Benefit Sharing (ABS) and a series of six meetings are scheduled for 2008-2010 with that goal in mind. There is great concern in the research community that the International Regime might make no distinction between commercial research (such as pharmaceutical bioprospecting) and non-commercial research (biotic surveys, inventories, ecological studies). This could lead to severe restrictions on access to biological specimens and could hamper international research collaborations.
The Consortium for the Barcode of Life (CBOL; www.barcoding.si.edu) held a week-long workshop on ABS in non-commercial research and has prepared reports that will be introduced into the negotiations of the International ABS Regime.
These reports:

- Explore the distinctions between commercial and non-commercial research;
- Describe the benefits and benefit-sharing associated with non-commercial research;
- Consider the risks of lost benefits perceived by developing countries; and
- Outline voluntary compliance measures that could assess and mitigate these risks.

This half-day session will present summaries of the main issues associated with ABS and the development of the International ABS regime. A case study of a non-commercial research project in French Polynesia will be presented, in which the different perspectives of the diverse stakeholders will be explored:

- The researcher;
- The sponsoring university;
- A local government agency; and
- The local community.

Fri. 13:45 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Research and ABS

Intellectual Property Issues Associated with Genetic Resources and Natural Product Development
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Research universities fulfill multiple roles in the innovation ecosystem. While they operate primarily in the early stages of discovery and innovation, universities are in the distinctive positions of collecting unique materials and data, bringing materials into the laboratory for further study, sharing research data and efforts with other researchers within the research laboratory and across borders in other countries, developing new discoveries that may eventually alleviate societal maladies, as well as transferring these discoveries to industrial partners who can bring them to market for the public benefit. In the course of fulfilling these roles, the university enters into research and license agreements that define the myriad relationships with the broad range of partners involved, from research sponsors, material providers, research collaborators and commercial licensees. Careful attention must be paid in particular to the intellectual property terms of the individual agreements as they often interrelate with one another.
Access to unique genetic resources provides an incentive for universities to conduct research and learn more about the basic properties of the material. Intellectual property rights provide an incentive for industry to invest the effort and resources into the lengthy and risky process of developing a healthcare product in the rare event of such a discovery. During the collection process, universities must respect and balance the needs and desires of the material provider remaining mindful of potential future applications of the material that are noted during the discovery process. However, high level discussions in the international arena may significantly impact the university's ability to forge these various relationships for a particular material or product.
This presentation will explore the multiple roles of the research university and the delicate balance of obtaining access to genetic resources and sharing benefits with the source community, while maintaining an incentive for potential

commercial development of a healthcare product that can be utilized by the general public. Such arrangements could benefit developing countries as material providers as well as society which otherwise may not have had access to the material and the creation of new knowledge. Examples of benefit sharing arrangements with Pacific Rim countries will be discussed.

Fri. 14:00 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Research and ABS

Research institutions and ABS

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France has ratified the Convention on Biological Diversity in 1994. Its provisions apply to French Museums and scientific institutions in general. Since then, access to genetic resources in foreign countries can be submitted to prior informed consent on mutually agreed terms by the host country. The goal and the intent of naturalists sampling specimen will thus have to be detailed, according to the national legislation of the sovereign State over its genetic resources. Until now, naturalists normally had free access to natural specimen. The CDB sets two main constraints on the researchers field work. The first one is on access to genetic resources, which may be granted after long and costly proceedings and strenuous administrative work, the second is on exploitation of the specimen. The actual regime and the ways to work it out are still under discussion, but many countries already have adopted a special legislation. Should France adopt such a legislation too, considering that biodiversity is very rich in the Pacific and Atlantic territories, but much less in the metropolitan territory. Several difficulties await researchers on their field work. Terms of reference for an international legal regime are still agreed upon and definitions may cause many a headache... Also, the primary intent of the collector may also not be the same for successive users and tracking of the specimen will have to be monitored and organised. Museums and Botanical gardens should certainly have simplified access rules applied to them, as their mission is precisely among the goals of the CDB. Still, they will have to respect the rules set in the international regime and organise and propose alternative solutions, for example in defining special material transfer agreements, results sharing and capacity building together with the host countries. They could also build a network of institutions working along a code of conduct.

Fri. 14:15 Ecosystems session room 1
Access and Benefit Sharing of the Research on the Biodiversity in the Pacific: Case Study - Moorea Biocode

ABS aspects of the Moorea Biocode Project

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The Moorea Biocode Project (MBP) is a scientific research program intended to make the exhaustive inventory of the genetic resources of Moorea island in French Polynesia using the new "Barcoding" approach. This project aims at complying with the obligations of the Convention of Biological Diversity (CBD) regarding the access to genetic resources and the fair and equitable sharing of the benefits arising out of their utilization (ABS). In 1992, CBD recognized the "sovereign rights of States over their natural resources" with the obligation for them to regulate ABS obligations. According to its 2004 Autonomous Status, French Polynesia has the jurisdiction over its genetic resources but there is no ABS legislation in force even if a draft text is in suspense since 2006. France is not showing the way to its overseas territories without having adopted itself any ABS legislation implementing CBD provisions. In the frame of the Biocode Project, the rights of French Polynesia and of "indigenous and local communities" over genetic resources - recognized by the CBD - are respected through cooperative agreements concluded between French Polynesia and a community based organization with the University of California Berkeley (UCB), administratively responsible for the Gump research Station in Moorea. In addition, a Memorandum of Understanding (MOU) is under discussion between the members of the "Biocode Consortium" and French Polynesia to facilitate the transfer and traceability of genetic resources ensuring the free sharing of the Project's results in making them publicly available. This MOU is intended to pave the way for providing a future model of Material Transfer Agreement (MTA) for the non-commercial research on biodiversity and help French Polynesia to build its own ABS politics with the objective of facilitating scientific research for biodiversity conservation purposes.

Fri. 9:00 Ecosystems session room 2
Coastal Environment

"Sato-Umi";A new concept for coastal sea management

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A new concept for coastal sea management called "Sato-Umi", defined as "High productivity and biodiversity in the coastal sea area with human interaction", is proposed. To establish the Sato-Umi, it is necessary to realize comprehensive material cycling and appropriate fish resource management in coastal sea areas. It is said that "Nature takes its best state without mankind". Would it be true that no environmental problems would exist if mankind was not present on Earth? However, there would be no meaning to a discussion regarding environmental problems without the presence of mankind. Nature does exist that takes its best state under mankind's interaction. In Japan, it is called "Sato-Yama". In Japanese, "Sato" means the area where people live and "Yama" means the forest. Sato-Yama is thus the forest near where people live. In 1987, the area of Sato-Yama in Japan was about 4,500,000 ha making up about 20% of Japan's total area of forest of 25,000,000 ha. In this paper we discuss a new concept for coastal sea management that is based on the ideas of Sato-Yama. Is it possible to create a "Sato-Umi" similar to Sato-Yama? In Japanese, "Umi" means the sea, so "Sato-Umi" is defined as "High productivity and biodiversity in the coastal sea area with human interaction" (Yanagi, 1998, 2006). To establish the Sato-Umi, we first need to understand quantitatively material cycling in the coastal sea area. That is, we need to know the quantity of nutrients that are loaded from the coast, and what are the primary, secondary and tertiary productions in the area. We need to clarify what kinds of actions by mankind are permissible or prohibited in the coastal sea area from the viewpoint of increasing production and biodiversity. The important focus is to establish comprehensive material cycling in Sato-Umi.

Yanagi, T. (1998) To create "Sato-Umi" in the coastal sea area. Journal of the Water Environmental Society, 21, 703 (in Japanese). Yanagi,T. (2006) Sto-Umi. Koseisha-Koseikaku, 102pp. (in Japanese).

Fri. 9:15 Ecosystems session room 2
Coastal Environment

Coastal Zone Health Assessment Calling for International Collaborative Efforts

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Nowadays there are more and more human activities based on or related to coastal zone,such as vacational recreation, mariculture. As coastal zone in many countries is experiencing severe environment degredation, it poses health risk not only to coastal ecosystem but also human being directly and indirectly. We are carrying out a research project on coastal zone health assessment related to public health risk in the nothern China. In situ data collections and comparative analyses shall be performed. Assessment of coastal zone health requires development of a set of comparable state parameters with standardized baseline and increment values. Institutional and International collaborations are required to cope with comparative analyses on variety of coastal zone environments with different health state.

Fri. 9:30 Ecosystems session room 2
Coastal Environment

Modeling of the marine environment in the Pearl River Estuary, South China: Hypoxia events in summer and salt-water intrusion in winter

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A three-dimensional numerical model, EFDC (Environmental Fluid dynamics Code) is applied to the Pearl River Estuary (PRE) in South China to examine the wind impact on salt-water intrusion in winter. A series of model experiments representing base case, remote-wind-induced water level set-up and local winds cases are conducted. The model results suggest that under upriver wind, although salinity intrusion becomes stronger in the downstream portion of the PRE, the landward limit of salt intrusion retreats to lower estuary. Under south wind, tracers at northern shore flow faster downstream than those at the southern shore of the PRE. By contrast, they are transported out of the PRE mainly along the southern shore under north wind condition. The salinity distributions match well with mean age distribution under these two conditions. Hypoxia is one of the major environmental problems in the PRE in summer, which can be caused by coastline, topography, hydrodynamics, tidal dynamics and human activities. Since ecological processes are closely related to dynamic processes, we use a coupled hydrodynamic-ecological numerical model to study the summertime hypoxia in the PRE. The model reproduces the observed hypoxia in the bottom layer in two regions located in west shallow water and around Nei Lingding Island, respectively. The salinity front and stratification greatly influence the range and intensity of low-oxygen water in the PRE.

Fri. 9:45 Ecosystems session room 2
Coastal Environment

Organochlorine pesticides in the atmosphere of northern South China Sea and coastal waters of China

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The South China Sea (SCS) is surrounded by developing countries in Southeast Asia, where persistent organic pollutants (POPs), such as organochlorine pesticides (OCPs), are still used legally or illegally, and are of concern. Yet little is known about the distribution of OCPs in the water and atmosphere over SCS, as well as their air-sea equilibrium status and time trends. In this study, ship-board air samples and surface seawater collected in the northern SCS between September 6-22, 2005 were analyzed for selected OCPs. The measured OCP concentrations in the atmosphere over the northern SCS were influenced by proximity to source regions and air mass origins. The highest atmospheric OCP concentrations were found at sampling sites adjacent to continental South China. OCPs in surface seawater showed significant spatial variations, with the highest concentration observed in a water sample from off Vietnam. The coastal currents were suggested to play a key role in the delivery of waterborne OCPs in the northern SCS. Time trend, land outflow and air-sea exchange of selected OCPs in the SCS were investigated, by comparison of this dataset with historical data.
Besides, The presenter will also report the latest results from an ongoing work on OCPs in the air and coastal water along the coatsal length of China.

Fri. 10:30 Ecosystems session room 2
Coastal Environment

Managing Threatened Fishes in South-Eastern Australia

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Australia has over 3,500 fish species, representing about 25% of the world's fishes, and exhibiting a wide diversity of life histories and ecological requirements. Many of these species are particularly vulnerable to extinction, as they have restricted distributions, low fecundity or are sensitive to impacts on their habitats. Other species, including many of the commercially-exploited fishes, are widely distributed and are highly fecund, producing millions of eggs per individual. In fact, many commercial species are apparently sustainably harvested at populations numbers well below the IUCN criteria for threatened species. To deal with the increasing numbers of endangered fishes, the state and national governments of Australia have a variety of threatened species legislation and definitions. Overall, there are currently about 75 fishes listed as endangered. One species is presumed extinct, a small galaxiid (Galaxias pedderensis) lost when Lake Pedder (Tas) was flooded for a hydroelectric scheme. Another, grey nurse shark (Carcharias taurus), is critically endangered in eastern Australia, with numbers lowered due to fishing in the 1960s, but now impacted by small (accidental) catches in shark meshing programs and by anglers. Major deficiencies exist in data concerning biodiversity and life histories of fishes, even for species found in highly populated areas. This is a significant impediment to fish biodiversity conservation and to the management of threatened species. Managing endangered fish species and ecosystems in a region where many people regularly go fishing and seafood is a multi-billion dollar industry, is sometime problematic and controversial.

Fri. 10:45 Ecosystems session room 2
Coastal Environment

Influences of ocean disasters on coastal environments and marine ecosystems - typhoon monitoring, evaluation, and coastal managements

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Typhoon is one of the most serious disasters in the world that cause huge economic loss in coastal zone of China every year. The present paper investigates influences of typhoon on coastal environments and marine ecosystems, base on satellite remote sensing observations, and also discusses on characteristics and mechanisms of typhoon hazards chains. Two large typhoons Fengshen and Hagubit of 2008 have been compared in teams of forecast, monitoring, influence on coastal zone and marine phytoplankton, and disaster evaluation.

The study show that typhoon can induce large phytoplankton blooms and contribute to primary production by providing nutrients to ocean surface water, and economic loss in the coastal zone can be largely affected by wind-speed, typhoon movement, rainfall, and location of typhoon track and government responses. With the development of space technology, information about the land, ocean, atmosphere and meteorological parameters can be routinely available which will help scientific community in getting information about the damage natural hazards, and therefore one can get information about early warning of an impending natural hazard. This research is supported by the Group Program (Typhoon, 2008) of Natural Science Foundation of Guangdong, China, and also supported by Project of Knowledge Innovation Program of SCS, CAS (LYQY200701). Guangming Zheng and Danling Tang, 2007, Offshore and nearshore chlorophyll increases induced by typhoon and typhoon rain. Marine Ecology Progress Series, 333:61-74; Zhao H, DanLing Tang, Wang Y. 2008, Comparison of phytoplankton blooms triggered by two typhoons with different intensities and translation speeds in the South China Sea. Marine Ecology Progress Series, 365:57-65; Guangjun Sui, Zhangjin Wei, DanLing Tang, 2008, Synthesized resistant and risk management model of typhoon disaster - Comparison and revelation of typhoon Fengshen and Hagubit. The 9th Pan Ocean Remote Sensing Conference (PORSEC2008). Dec 2008, Guangzhou, China. submitted; DanLing TANG, H ZHAO, B. Satyanarayana, GM ZHENG, RP. SINGH,JH LV, 2008, Enhancement of Chlorophyll-a in the Northeastern Indian Ocean after the 2004 South Asian Tsunami, Int. J. Remote Sensing. In press.
URL: http://lingzis.51.net

Fri. 11:00 Ecosystems session room 2
Coastal Environment

Using spatial technologies to assess the risk of sea-level rise to seagrass ecosystems in SE Australia
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Seagrasses are the foundation species in an ecosystem that dominates shallow waterways in SE Australia. These seagrasses support hundreds (perhaps thousands) of species and provide habitat for many economically important fisheries species. Seagrass mapping has been carried out in the region several times since the 1980s and for many sites aerial photography is available at least every decade from the 1950s. This historical remote-sensed data has provided information about long-term declines in seagrass areas and rates of recovery for the key species. In addition, the combination of digitized seagrass maps and accurate bathymetric mapping has been used to investigate the depth limits of the major seagrass species in a large coastal lake in SE Australia. These spatial technologies provide the opportunity to predict the probable impact of sea-level change on the seagrass ecosystems in these coastal lakes and other waterways.

Fri. 11:15 Ecosystems session room 2
Coastal Environment

Oil spill detection from ENVISAT ASAR image near Hong Kong and China Seas
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Satellite-based Synthetic Aperture Radar (SAR) imagery is capable of detecting oil spill events in the marine and coastal environment. In this study, we applied the oil spill detection algorithm and calculate the characteristics of oil bulbs observed by Advanced SAR (ASAR) imagery onboard ENVISAT satellite near Hong Kong and Yantai coastal regions. The results show that the oil spill area exceeds100 km2. In addition, we derive a SAR wind image using the CMOD5 algorithm to show that the wind speed is relatively low at about 4-5 m/s when the image was taken. It is this low-wind condition that the oil spills are effectively detected from ASAR image. The cases demonstrate the potential of using ENVISAT ASAR data for routine monitoring oil spills in the coastal waters of Hong Kong and China Seas.

Fri. 11:30 Ecosystems session room 2
Coastal Environment

World's largest macroalgal bloom caused by expansion of seaweed aquaculture in China

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In late June and early July 2008, just four weeks before the opening of the Beijing Olympics, waters and shores of the Olympic sailing events' Qingdao venue on China's north-eastern coast experienced a macroalgal bloom or green-tide covering $\sim$ 400 km2. Green-tides are a phenomenon usually associated with estuaries or semi enclosed embayments subject to eutrophication from agricultural runoff or urban derived pollution. Despite published evidence of great improvements in Qingdao water quality, the cause of the green-tide was quickly attributed to the pollution of marine environment by the international media and some scientists. Here we attribute the cause of the green-tide to the rapid and extensive expansion of Porphyra yezoensis aquaculture along the coastline of Jiangsu province, China, over 180 km away from Qingdao, and the oceanographic conditions at the time which favoured rapid growth of the bloom and contributed to transport of the bloom north into the Yellow Sea and then onshore northwest to Qingdao. This report documents the largest ever green-tide, the most extensive translocation of a green tide and the first case of expansive seaweed aquaculture leading to a green-tide. Unless steps can be taken to control the green-tide algae at source on coastal seaweed aquaculture farms such large green tides will almost certainly reoccur each summer.

Fri. 11:45 Ecosystems session room 2
Coastal Environment

The Preliminary Research of Ocean Color Data Services System Based on Web Services

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Basing on web services technologies, the Ocean Color Data Services System (OCDSS) is designed to integrate the distributed heterogeneous ocean color data and provide data services through Internet. This paper starts with the introduction to the actualities of ocean color data services, and then elaborates on the concrete implementations of OCDSS and important technologies used. Finally the paper presents the data services provided by OCDSS and discusses its performance. Compared with systems using traditional framework, OCDSS is more extensible and more efficient.

Fri. 12:00 Ecosystems session room 2
Coastal Environment

Free and Forced Rossby Waves in the Western South China Sea Inferred from Jason-1 Satellite Altimetry Data

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Data from a subsurface mooring deployed in the western South China Sea shows clear intra-seasonal oscillations (ISO) at the period of 40∼70 days. Analysis of remotelysensed sea surface height (SSH) anomalies in the same area indicates that these ISO signals propagate both eastward and westward. Time-longitude diagrams of ISO signals in SSH anomalies and wind-stress curl indicate that the eastward propagating SSH anomalies is forced by wind-stress curl. This is also confirmed by lag correlation between SSH anomalies and the wind-stress-curl index (wind stress curl averaged over 109.5°E -115°E and 12°N -13.5°N). Lag correlation of SSH anomaly suggests that the westward propagating signals are free Rossby waves.

Fri. 8:40 Ecosystems session room 3
Health Challenges

Highlight to the Contributions of Electron Microscopy in Identifying New Emerging Viruses

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Public concern of emerging infectious diseases is on the rise. The 21st century began with the emergence and reemergence of zoonotic diseases. The panic of the suddenly outbreaks of SARS was just over, now the world is overwhelmed by the highly pathogenic birds flu (H5N1).

The medical consequences of viral infections of humans have changed our history and resulted in extraordinary efforts to exploring measures for detecting and preventing the newly emerging viral infections, in which electron microscopy is known to be the most rapid and efficient tool for early diagnosis of the pathogens; in the hands of an experienced virologist, a definite identification can be made in a couple of minutes.

Some important viruses identified first by EM and IEM are summarized in the following list: Ebola (EM), F. Murphy, R. E. Kissling, et al, 1968; HBV (EM), Dane particles, Dane et al, 1970; Norwalk, A.Z. Kapikian, 1971; HAV, S. M. Feinstone, A. Z. Karpikian, et al, 1973; Infantile diarrhea (Group A), R. Bishop et al, 1973; HFRS in mainland of China, T. Hung, et al (EM/IEM), 1983; Adult Diarrhea Rotavirus (Group B) in mainland of China (EM/IEM), T. Hung, et al, 1983; HPRS (PCR/ IEM), S. Zaki, 1995; SARS, J. S. M. Peiris, K. Y. Yuen, et al (PCR), 2003. Meanwhile, the diagnosis and differential EM diagnosis of viral infection are also presented here. Very recently, in collaboration with George Luo (University of Kentucky, USA) we have got some novel approaches on the morphology of the HCV particles and some unusual (tubular) structures associated with the HCV virions. Detail description of the HCV morphology and morphogenesis will be reported elsewhere.

Fri. 9:10 Ecosystems session room 3
Health Challenges

Fronteers in Virology: Engeenering viruses to target cancer cells for Destruction

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The development of tools to re-engineer viruses has led to the numerous attempts to positions them as therapeutic agents for selective destruction of cancer cells. The most promising of the agents engineered to date are herpes simplex viruses. The candidate therapeutic viruses forms 2 groups. The first comprises virus mutants that lack the $\gamma_1 34.5$ gene. In essence, a key event in viral replication is activation of protein kinase R (PKR). In the absence of the $\gamma_1 34.5$ gene PKR phosphorylates the elongation factor eIF-2α and shuts off protein synthesis.. The protein encoded by $\gamma_1 34.5$ gene recruits phosphatase 1α to dephosphorylate eIF-2α to enable the synthesis of late viral proteins. A more attenuated version in clinical trials (G207) lacks the gene encoding ribonucleotide reductase and hence it replicates only in dividing cells in which PKR is not activated. Ionizing radiation delivered within 24 h after virus delivery enhances the effectiveness of the virus by activating p38 that in turn, activates late gene promoters thereby enhancing viral replication. The effectiveness of this class of viruses stems in part on the induction of local antitumor activity. Indeed incorporation into the viral genome of genes encoding immune modulators such as IL4 or IL12 significantly increases the antitumor acivity in immunocompetent experimental animal systems. The second group of candidate therapeutic viruses have a wild-type genome except that glycoprotein D has been modified to enable entry into cells solely via novel receptors uniquely present in cancer cells. Current viruses in this group target the IL13α2 receptor commonly present in Glioblastoma multiforme. Other receptors have also been targeted.

Fri. 9:40 Ecosystems session room 3
Health Challenges

How New, Efficient but Inexpensive Biotechnological Techniques Could be Able to Assist Local Islander to Prevent Spreading of Infectious Diseases

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Utilization of fast, sensitive, specific and accurate in-vitro diagnostic systems has become a global trend and has many potential applications in preventing spreading of infectious diseases globally. Pacific island communities are often isolated from the most advanced technologies to diagnose and treat infectious diseases and this could pose a potential threat to the safety of islanders; therefore, there is an imminent need for user-friendly and cost-effective diagnostics in these areas.

New technologies such as nucleic acid sequence-based amplification (NASBA) for RNA detection and enhanced real-time PCR (ERT-PCR) would provide efficient and cost-effective methodologies for detection of many infectious diseases with high sensitivity and specificity. A mobile diagnostic system is also being developed which would effectively and accurately identify any infections, which is particularly essential since modern infectious diseases often originate and spread the quickest in remote or developing areas. The new technologies also allow convenient access and quick diagnosis which could yield accurate result in as little as four hours. Moreover, development of a novel Lab-on-a-chip (LOAC) system is underway which would allow private clinics and local hospitals to conveniently conduct diagnosis.

The new diagnostic systems can be applied on the diagnosis of severe modern infectious diseases such as avian influenza, SARS, Newcastle disease, and foot-and-mouth disease in humans and animals. They have wide range of applications, such as in routine screening in government departments, hospitals, private laboratories, as well as in case of outbreaks, where the infected can be promptly and accurately identified and isolated for proper treatment. Proper application of these inexpensive new biotechnologies could help Pacific Islanders to better equip themselves for emerging infectious diseases.

Fri. 10:10 Ecosystems session room 3
Health Challenges

Arboviruses and relative diseases in mainland China

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Arboviruses are those viruses that can be transmitted by blood sucking insects such as mosquitoes, midges, ticks. They can induce diseases in biting to human or animals. Arboviruses are regarded as the viruses causing communicable diseases common to human being and animals. Today, such as Dengue fever, West Nile virus disease, and Rift valley fever still outbreak in the worldwide. Study of arboviruses not only becomes the important topics of virology, but also appears to be a social problem directly related with the public health. In world, 539 species of arbovirus have been registered in 1999. More than 100 viruses cause diseases in human beings. For a long time, the four species of arboviruses and relative disease have been identified in China, Japanese Encephalitis (JE), Dengue Fever (DEN,1-4 serotype), Tick-born Encephalitis (TBE) and Crimia-Congo Heamarrhagic Fever (XHFV). Over the past years, an investigation of arbovirus have been carried out in China, across 20 provinces of the country, to learn more about arboviruses, or viruses spread by insects. 200,000 insect samples have been collected. More than 200 strains of arboviruses have already been isolated from the samples. JEVs, alphavirus, Bunyavirus, dsRNA virus and DNA virus have been identified.

Fri. 11:10 Ecosystems session room 3
Health Challenges

Genetic Studies of Hepatitis C virus Infection and Replication

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Hepatitis C virus (HCV) infection poses a major global health problem by affecting approximately 4 million people in the U.S. and 170 million people worldwide. The majority (75-85%) of individuals with HCV infection develop chronic hepatitis, which leads to cirrhosis (10-20%) and hepatocellular carcinoma (1-5%). Currently, interferon and ribavirin combination therapy is the only option for clinical management of hepatitis C but its clinical benefit suffers from suboptimal efficacy and severe unwanted side effects. Thus, there is an urgent need to discover and develop more efficacious and safer antiviral drugs and vaccines for controlling HCV infection. HCV is an enveloped RNA virus containing a single positive-stranded RNA genome of approximately 9.6 kb in length. The viral RNA genome is composed of a single open reading frame (ORF), flanked by untranslated regions at both the 5'- (5'UTR) and 3'-ends (3'UTR). Over the years, we have developed robust reverse genetics systems (HCV replicon and infectious virus) that allow genetic analysis of HCV replication in cell culture. HCV RNA replication is an orchestrated biological process occurring in a membrane-bound multiprotein replication complex consisting of viral and cellular proteins acting through protein-protein and protein-RNA interactions. We and others have demonstrated that the highly conserved 5' and 3'UTRs and the core- and NS5B-coding regions contain cis-acting RNA elements important for HCV RNA replication. Additionally, we found that the functions of HCV nonstructural (NS) proteins can be modulated by viral and cellular proteins through specific protein-protein interactions. We have also demonstrated that HCV RNA is efficiently replicated in mouse cells (MEF and hepatocytes), providing a foundation for development of transgenic mouse models of HCV infection and replication. Furthermore, we have recently discovered that HCV is assembled as apolipoprotein E (apoE)-enriched particles and that apoE is required for HCV infectivity and virion assembly, as demonstrated by siRNA-mediated knockdown of apoE expression and inhibitors of microsomal triglyceride transport protein (MTP). More recently, we have discovered that HCV NS proteins also play important roles in HCV virion assembly. These advances will lead to a thorough understanding of the molecular mechanisms of HCV infection and replication and will facilitate discovery and development of more specific and safer antiviral drugs against HCV.

Fri. 11:40 Ecosystems session room 3
Health Challenges

Antibody Based Tumor Markers: Discovery to Practice

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Tumor markers are molecules occurring in blood or tissue that are associated with cancer and whose measurement or identification are useful in patient diagnosis or clinical management. They are either produced by tumor cells or by the body in response to tumor cells. A ideal tumor markers can be used for one of four purposes: (1) screening a healthy population or a high risk population for the presence of cancer; (2) making a diagnosis of cancer or of a specific type of cancer; (3) determining the prognosis in a patient; (4) monitoring the course in a patient in remission or while receiving surgery, radiation, or chemotherapy. The progress in discovering and generating new potential tumor markers was mainly from the completion of human genome sequencing and applications of gene expression profiling with DNA and protein microarrays, Two-dimensional (2D) gel electrophoresis coupled with MS, multi-dimensional HPLC, SELDI-TOF-MS, helped to analyze the potential markers at the protein level. Notably, antibody as specific adaptor molecules is an important tool linking genomic, proteomic and systems biology. A large number of tumor markers were defined or discoved by monoclonal antibodies or polyclonal antisera, such as CA125,CA 19-9,CA 242 came from antibody OC 125, 19-9, C242, respectively. Presently, antibody microarray is a potential way to profile tumor markers. HAb18G/CD147 is a novel hepatoma-associated antigen recently cloned by hepatoma monoclonal antibody HAb18 screening from human hepatocellular carcinoma cDNA library. HAb18G/CD147 is abundantly expressed in human hepatoma tissues and on the cell surface of several highly metastatic hepatoma cell lines as detected by immunohistochemistry using monoclonal antibody against HAb18G/CD147. HAb18G/CD147 is a highly glycosylated protein of 60kDa to immunoglobulin superfamily. HAb18G/CD147 has been identified as a factor that induces matrix metalloproteinases production, and it plays an important role in cell migration and tumor invasion. And we also found the overexpression of HAb18G/CD147 promotes invasion and metastasis via alpha3beta1 integrin mediated FAK-paxillin and FAK-PI3K-Ca2+ pathways. In further, we will verify whether HAb18G/CD147 is a novel cancer-associated biomarker that might be developed as biomarkers and/or therapeutic targets for different types of cancer.

Fri. 12:10 Ecosystems session room 3
Health Challenges

A Study on Experimental Therapy of Rat Model of Stroke by Tissue Engineering with Hyaluronic Acid Based Scaffold

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Stroke causes death and severe disability highly and often result in cavity formation in brain The complexity of the CNS makes efforts to repair injuries very difficult. Tissue engineering in combination with stem cell transplantation has the potential to fill such a cavity and replace lost neurons. In our study, a three dimensional hyaluronic acid (HA) based hydrogel was created as a biodegradable tissue engineering scaffold to mimic the structure and components of the extracellular matrix (ECM) in the brain. The molecules of poly-L-lysine (PLL) were immobilized on the backbone of the hydrogel for improving cell adherence and compatibility with brain tissue. In addition, a pH sensitivity antibody releasing system was developed by covalently attaching the antibody of Nogo receptor (Ab-NgR) to the hyaluronic acid (HA) hydrogel, delivering the antibody to the injured brain ,which can bind to multiple inhibitory myelin proteins, such as Nogo-66,and promote neural regeneration. The modified hydrogel would be suitable for the acidosis in the brain tissue after injury. The antibody delivery system or the modified hydrogel was shown to have strong action to induce the growth of axons from the dorsal root ganglia in vitro, in addition to helping the cell adherence and survival. After implanting to the adult rat model of ischemia with occlusion of the middle cerebral artery, this antibody delivery system showed to have promotion function with regard to regeneration of neural cells in the host brain and improvement of behavior in those ischemic models. After implantation of this polymer hydrogel into the injured area of the brain of rat models, it was clearly shown that the hydrogel had good compatibility with the brain tissue and inhibitory action for genesis of glial scar. Also, the hydrogel could correctly bridge the tissue defects and form a permissive interface with the host tissue to favour axonal ingrowth and angiogenesis. The HA hydrogel scaffolds modified by ab-NgR and PLL are therefore appealing for cell delivery and tissue development in the brain following stroke.

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Fri. 12:40 Ecosystems session room 3
Health Challenges

Mountain Medicine in China

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Plateau is one of the distinct geographical features in China. Recently, deemed necessary in the construction of plateaus, this field has been impactly supported by the government. The focus has changed from acute mountain sickness(AMS) pretection to acclimatization and adaptation. At present, studies are taken out on various levels in this field: At the level of colonia, extensive epidemiologic surveys have been conducted on the different reaction on hypoxia of plateaus resident and people from plains. It has been found that although the former group has better adaptability concerning acute hypoxia, the problem of overcompensation-induced chronic mountain sickness(CMS) existed. After nearly 40 years of discussion, International Society of High Altitude Medicine agreed with our diagnostic criteria as QINGHAI score. Studies on measures promoting acclimation in person involved in the Tibet railroad construction have also been carried out. As a result, there was zero mountain sick mortality in a population of 130 thousand in 5 years. Furthermore, epidemiologic surveys may also discover a novo viewpoint of risk factors. At the individual level, neuro-endocrine mechanisms related to hypoxic acclimation and adaptation have also been studied, demonstrating the critical role of CRF in this process. Studies concerning hypothermic and hypoxic combined actions have shown that acclimation to hypoxia exacerbates hypothermic injury. At the cellular level, studies focused on energy-consuming ion channels, energy-producing mitochondria, and signal pathways involving hypoxia-induced factors. At the molecular level, oxygen-carrier proteins such as neuroglobin etc and molecular markers involved in hypoxic acclimation have been of special interest. Future fields of interest may involve the cognition-related research, de-acclimatization mechanisms and intervention, and the mechanisms of the benefits by intermittent or moderate hypoxia. Key words: Hypoxic physiology; Adaptation; acclimatization; Mountain sickness Acknowledgements This work was supported by the Key Grant of Natural Science Foundation of China (30393130) and the National Key Grant of Basic Research Project (2006CB504100). The results were provided by my respectively Chinese colleagues in this field.

Fri. 13:10 Ecosystems session room 3
Health Challenges

Anti-Aβ1-42 Monoclonal antibody Mainly Binding to Oligomer and Protofibrils May Target the Cytotoxicity and Improve Learning and Memory in SAMP8 Mice

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Amyloid β-peptide (Aβ) plays key roles in pathogenesis of Alzheimer's disease (AD) and the aggregation of Aβ is the central event. In the present study, the Aβ1-42 oligomers has been used as the antigen to immunize BALB/C mice. After subcloning and screening, a monoclonal antibody (A8) was obtained. It has much higher affinity to Aβ1-42 oligomer than monomer, Aβ1-6, Aβ1-12, and Aβ1-28. The isotype is IgG3. The binding ability is higher, with 1:100,000 titers in ELISA, 1: 4,000 in western blot and 1:150 in immuno-histochemistry. When Aβ1-42 oligomer was preincubated with A8, the cytotoxicity was inhibited in SH-SY5Y cell line. Learning and memory ability was improved through intraperitoneal administration in SAMP8 mice. These results suggested that it may have potential application in AD diagnosis and therapeutic studies.

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