PACE-NET Plus Platform
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Observation systems of climate change in South Pacific

PACE-NET PLUS
PACIFIC-EUROPE NETWORK FOR SCIENCE, TECHNOLOGY AND INNOVATION

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Workshop on observation systems of climate change and its impacts in the South Pacific, for a sustainable management of resources and adaptation

on 11-12 June 2015, IRD Centre Nouméa (New Caledonia)

Workshop focused on three areas of research:

- CC and variability, oceanography, ocean atmosphere interaction,
- impacts of CC on marine and terrestrial ecosystems & biodiversity
- impacts of CC on societies and communities

PACE-Net Plus is a project funded by the European Commission to reinforce EU-Pacific cooperation on Science, Technology & Innovation, and to promote the development of mutually beneficial partnerships. Grant agreement n° 609490.

Why this workshop ?

- Specificities of the region and its relevance for major issues (vulnerability of PICTs, health, global climate, CO2 sequestration, loss of biodiversity,…)

- Data and long-term observations are crucial for research (analyse, modelise and predict) and provide expertises to decision makers

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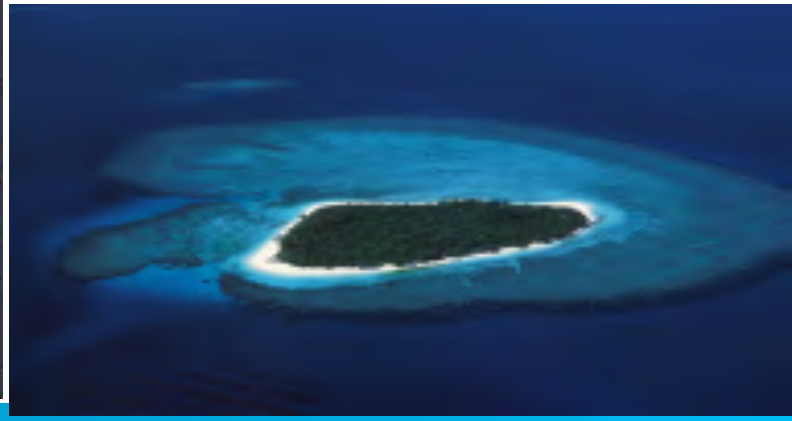
1) Specificities of the region / Importance of ocean for Pacific Islands livelihood

Large EEZs, coastal and offshore resources



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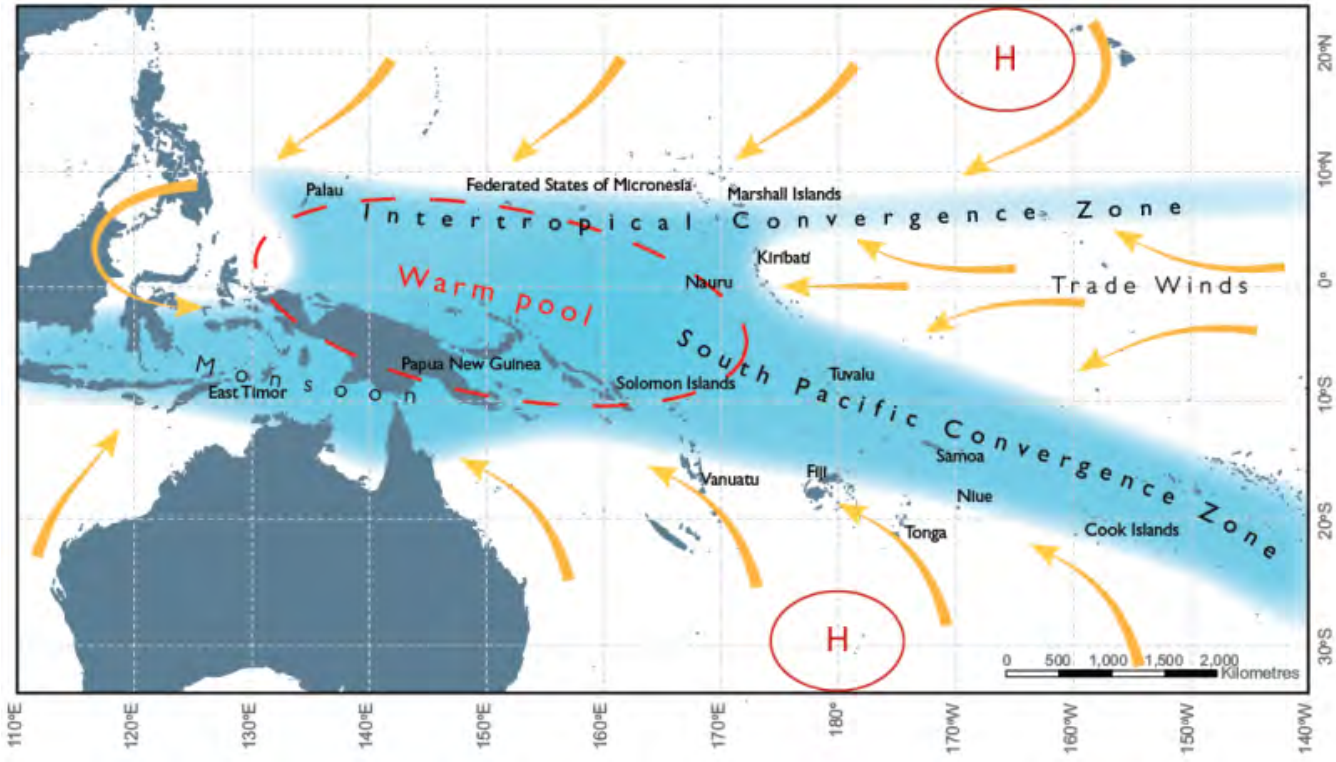
1) Specificities of the region /Relevance of Pacific Ocean for climate study – Major driver of global climate – ENSO…

Home of major environmental phenomena related to ocean-atmosphere dynamics. The SPCZ, one of the most powerful convective engines on our planet, influences climate on interannual (ENSO) to multi-decadal scale.



with consequent effects on population, infrastructure, food, biodiversity.

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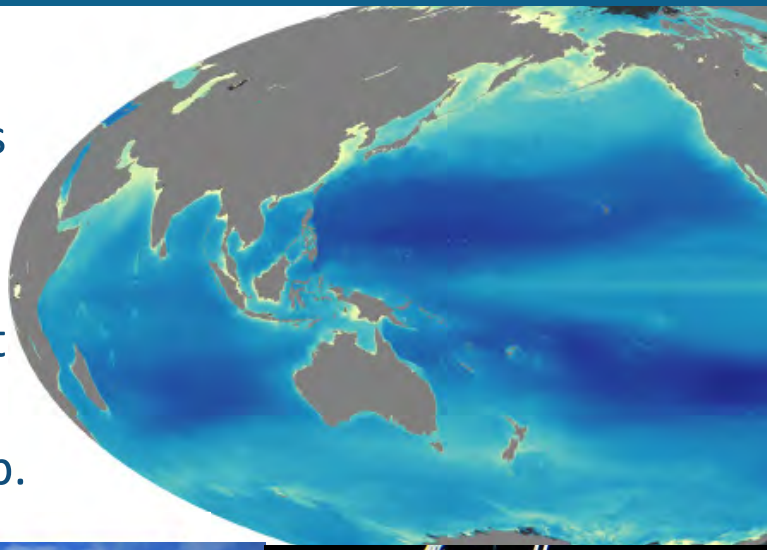
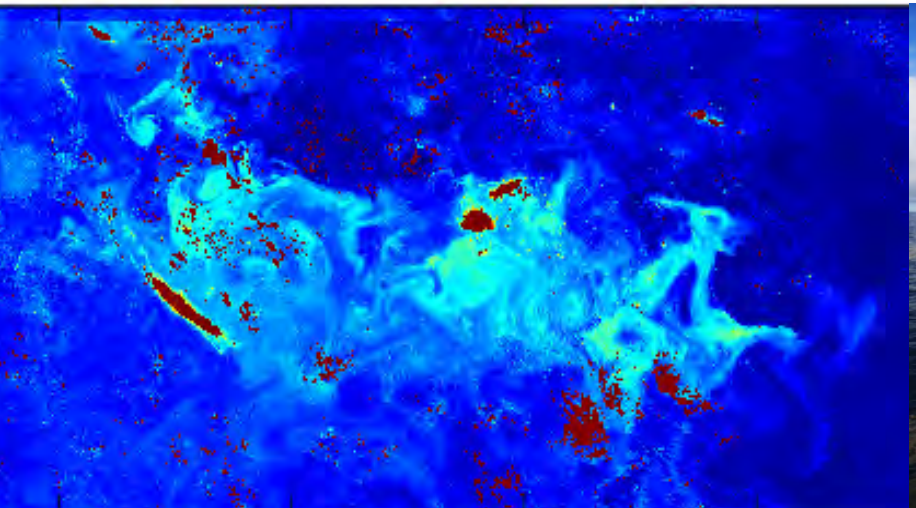
1) Specificities of the region / Relevance of SW Pacific ocean for CO2 sequestration - N2 primed carbon pump

- Ocean - CO2 sink – but 80% oceanic desert
- effectiveness of biological carbon pump depends on availability of N
- Spectacular blooms of the PFT N_2-fixers *Trichodesmium* on SW Pac – Diazotroph- hotspot to fix N_2, to possibly increase the plankton productivity and thus the biological carbon pump.



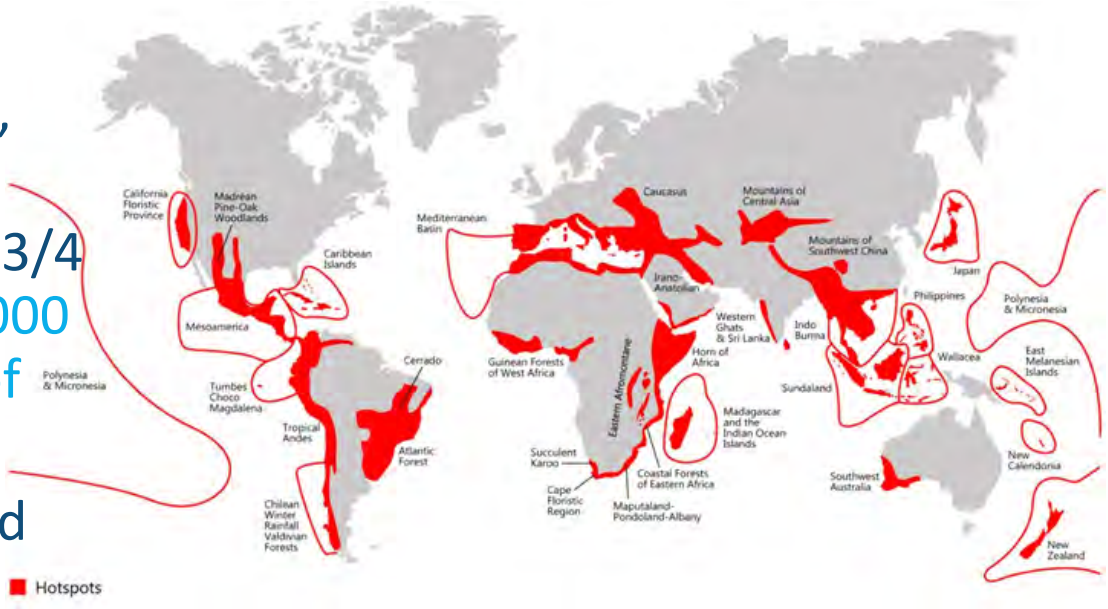


1) Specificities of the region / Hotspots of biodiversity and at the heart of the ongoing extinction crisis

- 10 hotspots are insular among the 35 recognised
- 4 are in the Pacific region (NC=the smallest in size with very high level of endemism, 3000 species of flowering plants/1000 Hawaii)

Insular ecosystems

- 180000 isl., 5% land surface, 20-25% biodiversity
- 65-80 % recent extinctions (3/4 linked to invasive species, 1000 bird species in Pacific, 70% of vegetation in NC)
- 40-50 % critically endangered species



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1) Specificities of the region / High diversity of culture, language and traditional knowledge

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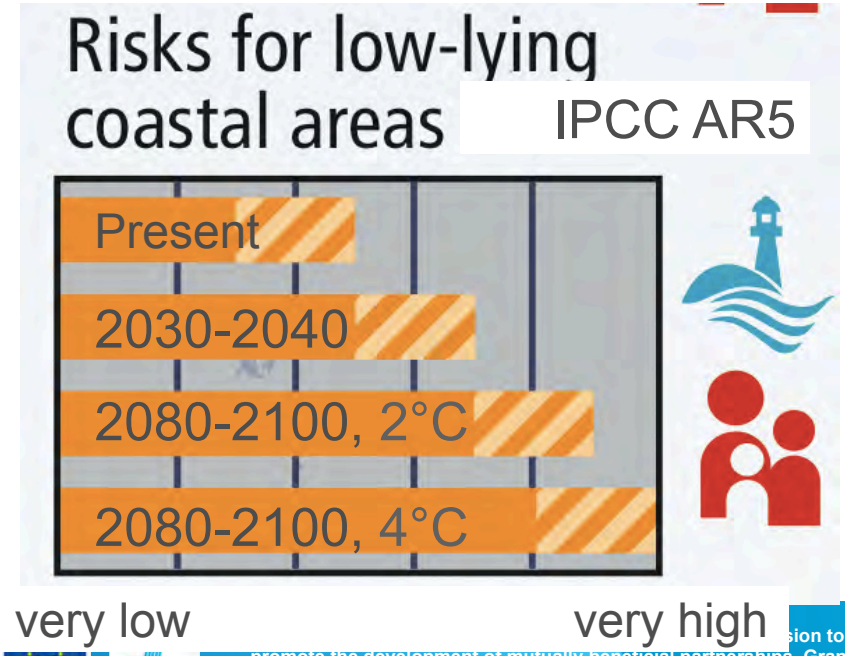
1) Specificities of the region/ highly-vulnerable countries to climate change

- PICTs Highly vulnerable and already impacted by CC due to physical (location, geology) and socio economic (smallness, isolation) factors.
- This concerns the low-lying islands, and nations that are entirely atolls (Tuvalu, Kiribati, Tokelau and Marshall Islands), but also hight islands.



2) Workshop organisation and objectives

* 55 participants from Fiji, PNG, Samoa, NZ, Aus., Hawaii, France, FP, NC

* 2 half-days in plenary session and 2 half-days in 3 parallel sessions, including both broad-ranging and focused presentations and time slots for discussions on the following questions:

- What can be observed, how and when? What types of data, tools, products are needed?, What impacts will be addressed?,
- How data will be used and model integration will be achieved?
- What partnerships are needed to support and exploit these observation systems ?

* Objectives: identify priorities and recommend actions

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3) Recommendations session 1: CC and variability, oceanography, ocean atmosphere interaction

- Sustain, support, and further develop climate data-base
- Expand and maintain National Climate Monitoring and Hydrological Observing Networks
- Rescue, digitise, safeguard, homogenise and analyse historical data to document past climate variability and change. Document extreme events and their impacts.
- Develop monitoring (wave buoys, pressure sensors) for coastal inundation, forecasting and coral reef conditions (T, pH).
- Open-ocean. Develop monitoring for ocean acidification and carbon cycle. Establish long-term mooring time series. Sustain and reinforce measurements from ships of opportunity

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3) Recommendations session 2 - impacts of CC on ecosystems and biodiversity

- Urgent need to establish long-term monitoring of ecological sites & permanent plots network on:
  - low lying coral reef islands (sentinel islands)
  - selected ecosystems on elevated islands with environmental gradients and landscape/seascape transition (sentinel ecosystems)
- Long-time series of remote sensing (collaboration with ESA)

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3) Recommendations session 3 - impacts of CC on societies and communities

- Identify and establish better access to historical data including anthropological monographs and case studies from other disciplines
- Identify key indicators (qualitative/quantitative) and links to existing quantitative data sources (censuses,economic data banks)
- Select long-term observation sites
- Establish links to natural science data in existing sites
- Identify potential frameworks or platforms to encourage partnership and build capacity to monitor and analyse the social consequences of climate change in the region (O2C3)

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3) General recommendations

- **Database.** Promote open and accessible databases across the region. Improve partnership to overcome policy difficulties to access data.
- **Modeling**. Promote dialogue between data providers and modeling people. Downscaling at the island scale. Rreinforce computational resources.
- Increase scientific **partnership** within Pacific, across the Pacific rim and with Europe. Facilitate interaction between social and natural scientists (newsletter, annual workshop…).
- **Capacity building**. Sustain dedicated human resources. Increase capacity of islanders to take observations (deployment and maintenance of instruments) and make use of the data.

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Thank you for your attention

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Types of data, tools and products needed – session 1

Needs (Types) : 1- Climate data
2- coastal and offshore data.
3-Rescue of historical data

Needs (Variables) : pCO2, pH, carbon cycle, temperature, salinity, nutrients, rainfall, surface heat flux, waves, sea-level

Needs (Vectors) : 1-Coastal monitoring sites.
2-Offshore sites (buoys, floats and gliders).
3-Ships of opportun. (commercial, research, fisheries or navy)

Needs : Open-access to data
Model

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Types of data and tools needed – session 2

- Visibility and accessibility of the data
- Importance of standardisation of metadata to track data for future analysis
- Set of heterogeneous data of biodiversity, good proxies rare,
- Need for a landscape/seascape continuum approach
- Abiotic data: physical and chemical environment (CO_2, pH, T°, UV, rainfall…)
- Biodiversity and biological data for Ecological community and species distribution changes, Ecological functions, Habitat characteristics, Ecosystem services
- Experimental design: model systems (mesocosms, sentinel islands) to define proxy of climate change impacts

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Types of data and tools needed – session 3

- Baselines ? Processes of change, Indicators of change

Material human security

- Loss of settlement security
  - Household relocation
  - Community relocation
  - Squatter settlements
  - Displacement
- Loss of livelihood security
  - Food
  - Cash incomes
  - Poverty
- Loss of habitat security
  - Health
  - Disaster vulnerability/resilience

Non-material security

- Social change
  - Village structures
  - Kinship
  - Urbanisation
- Cultural change
  - Land
  - Language
- Psychological effects
  - Affect and emotions

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