



Pacific Europe NETWORK for Science and Technology

Christophe Menkes et al. (IRD)



Seventh framework programme

CAPACITIES specific programme Activities of international cooperation



Grant Agreement for: Coordination Support Action
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Report of Outcomes from the Expert Workshop on Climate Change Held in Brisbane (Australia) on July 5-7 2011

Sub-groups:

Climate Variability & Climate change and their impacts

Water

Energy

Work Package 4: Deliverable Report 4.1.3

Prepared by expert sub-group chairs:

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And PACE-Net Project consortium members:

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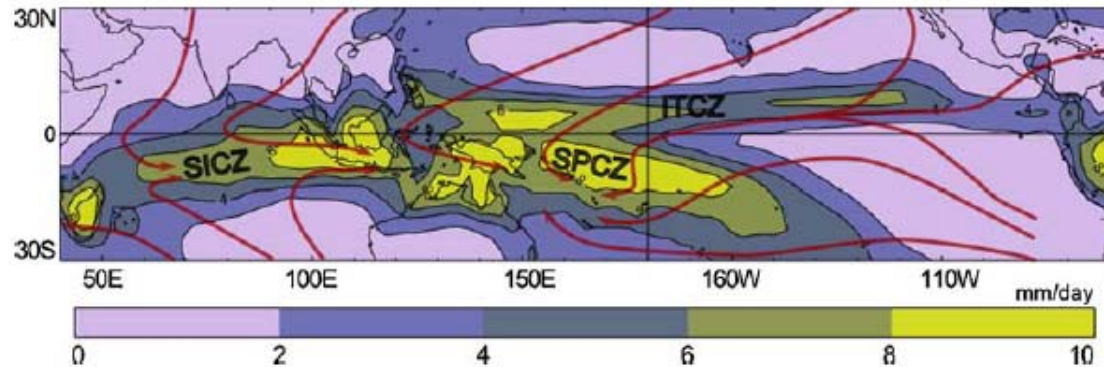
& Fadhila Le Meur (PACE-Net Project manager)

Date: 10.10.2011

- Justification for research in the priority area
- Previous project/research insights
- Research questions
- Proposed methodology
- Project partners
- Required funding and timeframe
- Key expected outcomes
- Other opportunities for collaboration in interest area (networks, conferences, exchange programs)

Regional background on the theme area

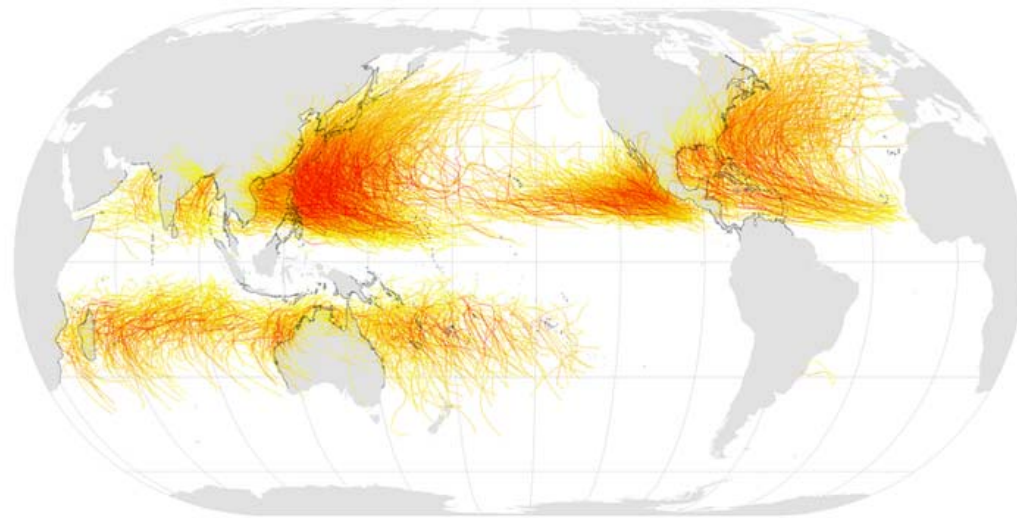
- In the South Pacific, Pacific Island countries and territories (PICTs) are highly vulnerable to extreme events but also to a number of large-scale climate drivers that create variabilities.
- PICTs lie in a region of oligotrophic, warm oceanic waters, where atmospheric conditions are intimately related to the South Pacific Convergence Zone (SPCZ)



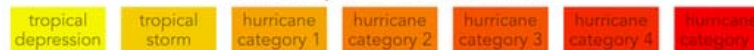


- Cyclones (~15% of the annual world count), Madden Jullian Oscillations (MJOs), seasonal variability, interannual variability driven by El Niño/Southern Oscillation (ENSO), and decadal variability, on top of longer trends

Tropical Cyclones, 1945–2006



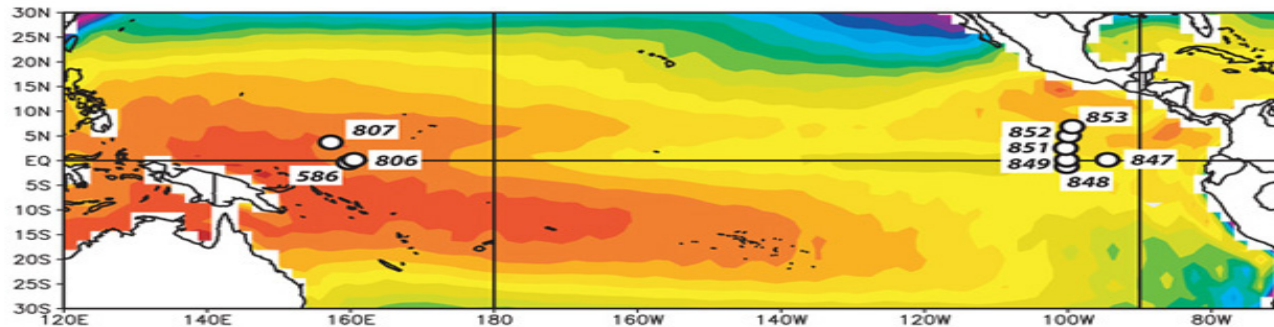
Saffir-Simpson Hurricane Scale:



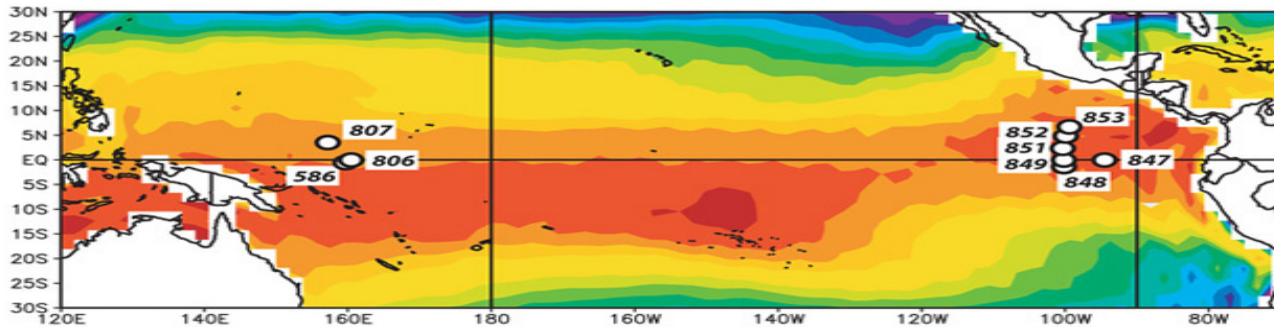


- Impacts of these phenomena include extreme precipitation and destructive wind events (e.g. cyclones), long term droughts (e.g. under the influence of ENSO), and sea-level variations and therefore on-flow effects (e.g. erosion, fire, flood) to urban infrastructure, populations, food security, economies and trade.

Sea-Surface Temperature (°C) Composite: January-March, 1972-2000

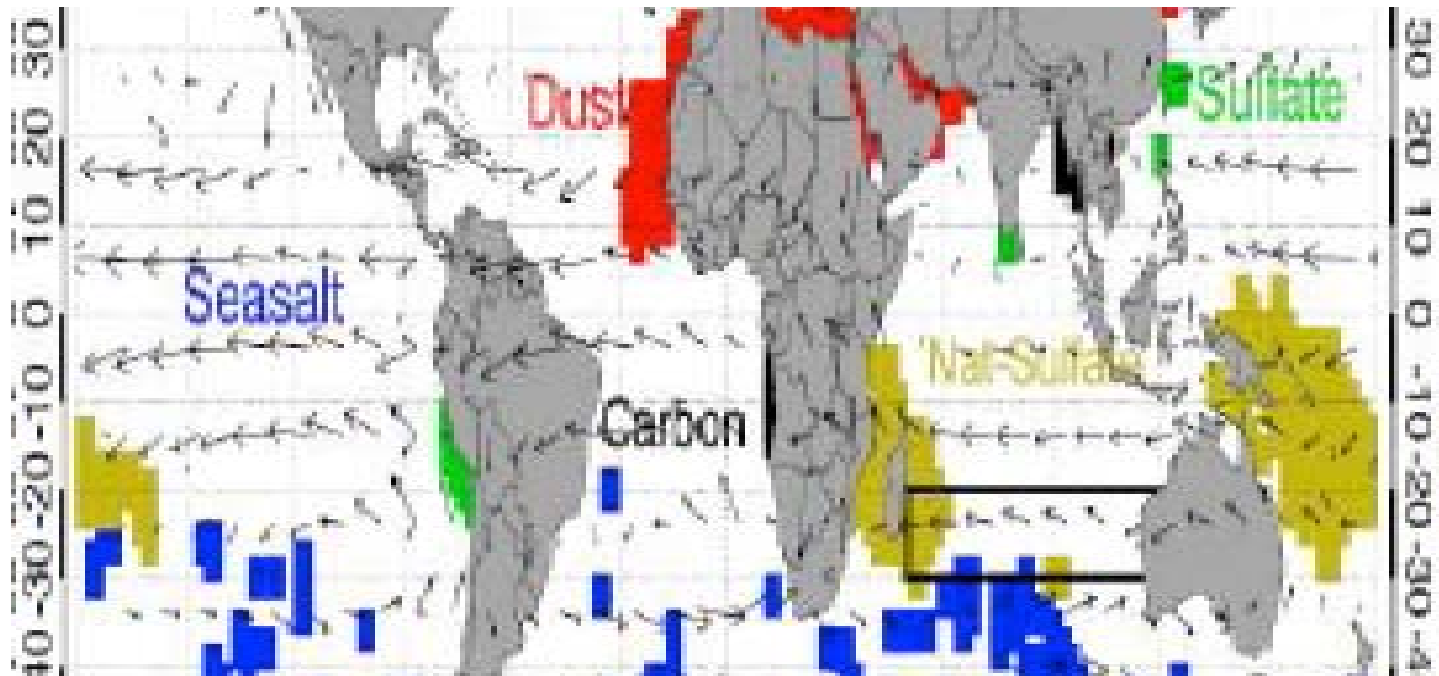


Sea-Surface Temperature (°C) Composite: January-March, 1998





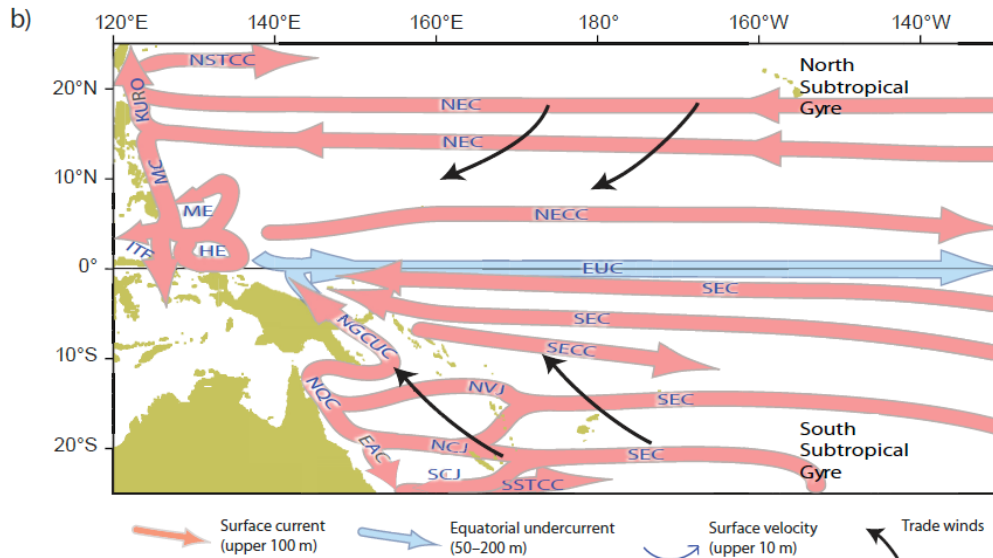
- The winds, whose orientation is influenced by the SCPZ, also transport dust, aerosols, and volcanic ash from source regions to the open ocean and over long distances which can retroact into the atmosphere to change the atmospheric heating and cloud composition (e.g acid rain...)



Geography of aerosol compositions



- The ocean structure and therefore the coastal and open ocean biogeochemistry (e.g CO₂...), ecosystems (e.g top predator resources) are deeply tied to the SPCZ variabilities



Ganachaud et al, 2011- SPC book

- In return, the ocean temperatures interact with the atmosphere and it is recognized that this is a **COUPLED ocean-atmosphere system** that needs to be understood.

THIS REGION REMAINS POORLY UNDERSTOOD AND DOCUMENTED. ITS EVOLUTION WITH CLIMATE CHANGE IS PARTICULARLY UNCERTAIN IN THE CURRENT STATE OF THE ART

• Long-term observing and modelling systems of the ocean and the atmosphere in open and coastal ocean is required as there is a need for:

• Theoretical, numerical and observational studies to improve the understanding of the ocean-atmosphere climate variability in the South West Pacific, including the thermodynamics and dynamics of the SPCZ and its characteristics in the next AR5 IPCC simulations.

• A long-term ocean time series to document the physics, chemistry and biology of the South Pacific open ocean.

• Long-term observations of the coastal ocean: biogeochemistry and effects of acidification on ecosystems.

• Assessment of absolute regional sea level (discriminating land versus ocean height variations) on short time intervals, as well as over longer term intervals (e.g., decadal) to understand natural versus man-induced changes. These assessments need to be specific to islands.



Some recent projects/research investigations that have taken place in this priority area include:

- **Southwest Pacific ocean circulation and Climate Experiment (SPICE):** ocean physics and climate, endorsed by CLIVAR (World Climate Research Programme Climate variability and Predictability)

- **PCCSP** funded by the Australian government (Powers et al., 2011) (<http://www.cawcr.gov.au/projects/PCCSP/about.html>)

The objectives of the PCCSP are to *undertake research into climate change and variability, build research capacity in partner countries, disseminate research findings*

- **The USP-EU Global Climate Change Alliance (GCCA) Project** (<http://www.usp.ac.fj/index.php?id=9702>)

- **SPC programs on living resources with PICTS** (e.g, tuna)

- **Integrated Marine Observing System (IMOS) funded by Australian Government**

- **Sea Surface Salinity observation network (French ORE-SSS).** (<http://www.legos.obs-mip.fr/serv.-observations/service-dobservation-de-la-salinite-de-surface-et-des-oceans-sss>).

- **ReefTemp (Australia)** is a mapping product that provides information on coral bleaching risk for the Great Barrier Reef region.

THERE REMAINS A NEED FOR LONG-TERM REGIONAL AND COORDINATED EFFORT FOR UNDERSTANDING THE MAIN SCIENTIFIC ISSUES. BOTH MODELING AND DATA ANALYSES ARE REQUIRED FOR THE PAST, PRESENT AND FUTURE CLIMATES. THIS IS THE PUPOSE OF THE PACE-NET FRAMEWORK FP7.



WITHIN PACE-NET, WE IDENTIFIED KEY PARTNERS. FURTHER COOPERATION IS OPENED.

Partners who could carry out this project

Potential known and not yet identified **key research leaders** (local operational and research organisations among others) from the:

- Scientific community
- Environmental/security/development agencies
- Local met services and universities.

The proposed **research programs** should be in the framework of the existing international programs:

- CLIVAR (<http://www.clivar.org/>) PACIFIC PANEL for climate variability
- IMBER (<http://www.imber.info/>) for marine ecosystem
- LOICZ (<http://www.loicz.org/>) for sustainability of coastal zones

National organisations:

- AIMS (Australia)
- CSIRO (Australia)
- GEOMAR/AWI (Germany)
- IRD, CNRS, IFREMER, University of New Caledonia, University of French Polynesia, Meteo-France, via GOPS (France)...
- JCU (Australia)
- Max Planck Institute (Germany)
- NIWA, New Zealand universities (NZ)
- PCCSP (Australia)
- SOEST/ IPRC (USA)
- University of Melbourne, University of New South Wales (Australia)
- USP (Fiji)

The level of **funding** and **project timeframe** remains to be defined according to the extent of the project.



The proposed time frame is > 5 years and 10 years preferably **because of the necessity to monitor the impact of climate over the long term.**

Alternative project designs could suit different funding instruments. Which funding sources are possible and preferable, remains to explore.

Key outcomes

Key outcomes sought from the project (research and development related):

- Increased scientific knowledge
- Tools to help managers
- Assist policy and development decisions et local and regional scales
- Possibilities for mitigation of climate change effects

Other **opportunities** for international collaboration related to this interest area (existing networks, conferences, exchange opportunities) will be explored (and disseminated among the PACE-Net community).



Conference in Brussels, 20-23 March 2012

**Focus on climate change issues: impact on
agriculture, fisheries, water and natural hazards
and
Innovation and research policies**

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THANK YOU FOR YOUR ATTENTION

