# Workshop on Observation Systems of Climate Change in the South Pacific 11-12 June2015 IRD Centre, Nouméa, New Caledonia









# Parallel Session 2: Observing impacts of climate change on ecosystems and biodiversity, and on marine and terrestrial resources

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#### Panel:

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What impacts will be addressed by which data?

#### Impacts need to be addressed first:

Changes in environmental abiotic parameters (pH, CO2, T°...)

**Ecological community changes;** 

Phase-shift;

Species distribution changes;

**Ecological functions**;

**Habitat characteristics;** 

**Ecosystem services** 

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#### What types of data are needed?

Pre-request: state of art for visibility and accessibility of the data
Importance of standardisation of metadata to track data for future analysis

Statement: Super set of heterogeneous data of biodiversity

#### Needs:

1- **Abiotic data**: physical and chemical environment: for example CO2, pH, T°, UV, rainfall, carbon cycle, landscape and seascape continuum approach...

#### 2- Biodiversity and biological data:

- a- Species diversity
- b- Biotic interactions
- c- Ecological functions
- d- Ecosystem level
- e Indigeneous knowledge integration

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1- Observations

What types of tools are needed?

#### **Statements**

Good proxies rarely available
Need of standardized methods
Lack of permanent human resources
Lack of computational resources

#### The way forward

Long term monitoring: ecological sites & permanent plots network
Alternative tools for global biodiversity mapping: Omics approaches,
Functional groups /biological traits approach
Diachronic approaches (historical data including indigeneous knowledge + monitoring)

Long time series of remote sensing Landscape/seascape transitions

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What types of tools are needed?

#### 2- Experimentation

Experimental design: model systems (sentinelle islands; mesocosms)

Invasive eradication as reverse experiment

Winners and loosers species approach to define proxy of climate change impacts (functional group approach) – resistance/resilient/adaptation of species and

systems

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How will data be used and model integration will be achieved?

Models are needed for prediction

Ongoing dialog between data providers and modeling people need to be facilitated

Need of real and accurate data to feed the models

Models to be developed for various conditions: downscaling is needed especially in pacific region

Database curation and management for current and future needs

Reinforce computational resources to support modeling needs

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### What partnerships are needed to support and exploit these observation systems?

New partnerships and strengthen existing partnership are needed to collect, document safeguard, synthesize and disseminate information on observed changes

Increase partnership between scientists and local communities

Increase scientific partnership within and across the Pacific rim

Increase scientific partnership with Europe, such as ESA...

Enlarge partnership with other agencies of competencies

Improve dissemination of information through ongoing partnership

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#### **Pacific specifities**

Pacific islands are the heart of the ongoing extinction crisis

Small islands states: among the highest vulnerable countries

High diversity of traditional knowledge

Landscape/seascape continuum

**Patchiness** 

Downscaling required

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#### Recommendations

Improve partnership to overcome policy difficulties to access data

Promote free data access across the region including ESA sentinel program

Crisis situation in the region means urgent need to establish long term ecological sites: low lying coral reef islands (sentinel islands), high island with gradients, sentinel ecosystems network over the pacific region

Promote ongoing programs for local capacity building

Promote stronger links between experts to distinguish between anthropogenic and natural climate change

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Natural selection Allelic diversity Mutation rates Heterozygosis richness Physiology Fecundity Activity rates and rhythms Tsd species sex ratios Disease susceptibility Survival Phenology Migration departure/arrival Budding/flowering Growing season length Hatchling/fledging/dispersal Hibernation/diapause **Dynamics** Recruitment Age structure Sex ratio **Biodiversity component** Abundance Distribution Habitat quantity and quality Ecological niche/microniche Range localization Interspecific relationships Disynchronisation Disequilibrium Uncoupling New interactions Community productivity Biomass quantity Energy flux Disruptions frequency Matter flux Erosion Ecosystem services Composition Function Production Biome integrity Catastrophes frequency

Genetics

Organisms

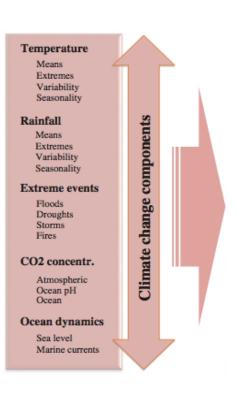
Populations

Communities

Ecosytems

Ecotypes characteristics Distribution shifts Descritification

Complex interactions between effects of climate change and biodiversitu both terrestrizal and marine



Bellard et al . 2012