

## **Abstract for an oral presentation:**

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University of Mauritius

### **Topic/submission / theme:**

Environmental and Climate Vulnerability, Resilience & Adaptation

This theme focuses on research on the impacts of climate change and climate variability on the coastal and marine environment, as well as people and infrastructure. The theme also includes research on mitigation, adaptation, resilience and vulnerability.

### **Title:**

**How using the exceptional long term coral reef monitoring data for assessment and management of the Reunion island marine reserve (Southwest Indian Ocean).**

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## **Abstract**

### **Background and Methods**

Monitoring of coral reefs has become a major tool for understanding how they are changing and for managing them in a context of increasing degradation of coastal ecosystems. The LIT methodology for benthic communities associated with belt transects for fish (GCRMN protocols) has been used to assess coral reef communities through a monitoring environmental conducted since 20 years ago.

Benthic and fish community structure were regularly studied before and after the implementation of the Reunion Marine Reserve in 2007, providing an overview of the major environmental trends affecting the benthic communities on the different coral ecosystem for the West coast.

### **Results**

The main results of this long-term monitoring show trends on benthic cover occurred during the last 20 years with different population “shifts” linked to specific anthropic disturbances or /and global change responses.

For all stations, algal assemblages became dominant after 2000 and progressively increase on the reef slope of St Gilles, St Leu and Etang Sale. On the over way the South sites of St Pierre outer reef slopes show a progressive increase of coral cover during 17 years (from 40% in 2000 to 65 % in 2016)

dominated by *Acropora abrotanoides* communities, and a slow decrease after 2018.

Benthic communities become relatively homogenous after 2010 through the different St Gilles sites. On outer reef slopes, temporal trends are associated with a strong decrease of coral cover (from 56 % in 1998 to 30 % in 2007 and 25% between 2008 and 2018) and a progressive shift of coral communities characterized by an homogenization of species and a decrease of *Acropora* replaced by *Astreopora myriophthalma*, *Pocillopora grandis*, *P. verrucosa* and *Porites lutea*.

St Leu outer reef slope sites are characterized by high live coral coverage for Reunion Island (75 % to 68 % between 2000 to 2008) followed by a small decrease during the next period (2008-2016). Local disturbances associated to mudslides have been noticed for “La Corne” stations during the two last years (42 % of coral coverage in 2018 for the reef slopes; less than 1% of coral coverage in 2019 for the reef flat) showing the sentinel nature of these stations affected by anthropic disturbances.

For fish communities, in all sites they are dominated after 2002 by herbivores with more than 60% of individuals censused on the reef flat and 40% on the outer slope. Very few piscivores were recorded, less than 3% on all sites mainly on MPA sanctuaries. Total mean biomass (all areas combined) has increased significantly since 2007 (average from 380 kg/ha in 2006 to 510 kg/ha in 2013). This trend is explained by an increase of biomass on the sanctuaries (5% of MPA surface) for surgeonfish (Acanthuridae), groupers (Serranidae) and more broadly commercial fishes. Nevertheless fish biomass of the Reunion reefs is still low, very far from the typical levels of protected areas in the western Indian Ocean such as Iles Eparses where the biomass can be 7 times higher (eg. Europa).

## **Conclusions**

All these results displayed contrasting spatial and temporal situations of Reunion island coral reef ecosystems. They may be correlated with global change responses and several natural disturbances (as hurricanes) associated with chronic anthropogenic pressures on coastal zones as well as urban and agricultural activities on watersheds that affect coral reef communities. In this context, the role of the marine reserve is essential to restore reef communities and manage human activities that take place there.