



# Spatio-temporal structure of harvested tropical reef invertebrates :

## A case study on New Caledonian reef flats



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### CONTEXT

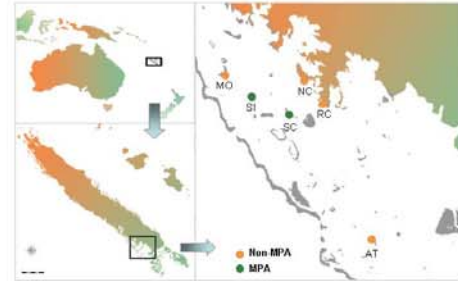
In the south-Pacific islands, the marine invertebrate resource represents a major income for the local populations, but little quantitative data is available about the ecological impacts of harvesting on the tropical reef invertebrate communities.

#### Objectives

This work is part of a PhD-thesis whose main objectives are :

1. To describe the **spatio-temporal structure & functioning** of benthic invertebrates communities in harvested vs. non-harvested reef flats ;
2. To assess the biological & ecological **impacts of harvesting** within the studied systems ;
3. To derive relevant **Indicators metrics**.

### Case Study : New Caledonia

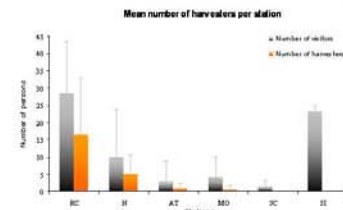
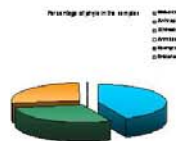
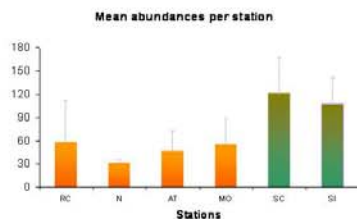


### Material & Methods

- 6 sites located in the south-west lagoon of New Caledonia, South Pacific, were sampled in 2008 : 4 harvested vs. 2 MPAs (Marine Protected Areas).
- All invertebrate including molluscs, echinoderms and crustaceans were counted and their lengths were measured.
- The mean number of harvesters and visitors was assessed for each station using questionnaires.

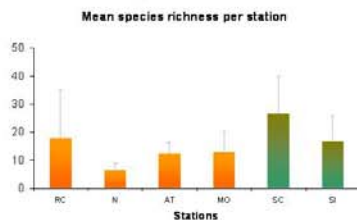
### PRELIMINARY RESULTS

#### Abundances

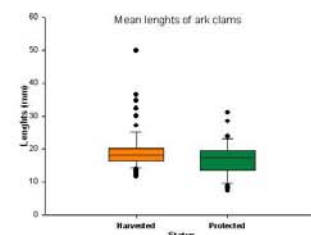
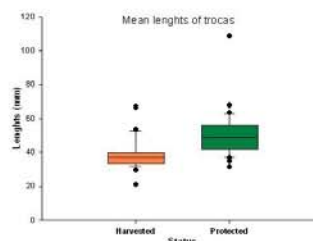


A total of 2044 individuals belonging to 163 species were identified. **Molluscs** were dominant, followed by the crustaceans and echinoderms. The densities of benthic invertebrates were higher on MPAs than on exploited sites for all species whatever the harvesting pressure is.

#### Diversity



#### Sizes



Species richness did not significantly differ inside vs. outside MPAs for all species.

Results highlighted significantly smaller body length for the harvested species outside MPAs, especially for heavily exploited species e.g. trochus shells (*Trochus niloticus*) and giant clams (*Tridacna* spp.). No significant difference in sizes were observed for non-harvested, associated species.

### CONCLUSION & PERSPECTIVES

As suspected, these preliminary results emphasize the influence of harvesting practises on reef invertebrate abundances and sizes. On the other hand, harvesting does not seem to affect species diversity for the considered tropical intertidal communities. Valuable, heavily harvested species such as Trochus shells or giant clams exhibit strong sensitivity in terms of abundance and lengths and therefore constitute relevant indicator of harvesting activities.

While their effects on community structure are well documented, harvesting activities can also affect community functioning through changes in species dominance. This "functional diversity" approach will be investigated so as to define relevant indicators metrics of harvesting-induced disturbance, a potential tool in the context of sustainable management of marine resources.