Could global warming affect the marine algal flora of French Polynesia?
The case of Rapa iti

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French Polynesia

Rapa

1 240 kms south from Tahiti

27° 37’ S
140° 120 W

sea T°

19°C to 23°C

Rainfall

Around 250 cm per year
Marine biodiversity programme in Rapa

BIODIV 2002
Shallow benthic programme

French Polynesian fundings
Geomorphology and coral reef formation

Coral reef formations are located in the bays and along the outer slopes.

Large outer-slope (3 kms wide) around the island weakly incline down to 55 m, then a deep shelf down 80m

1. Remote high volcanic island
2. No lagoon & no barrier reef
3. Shores open to the ocean
4. Notches and benches
5. Numerous bays and caves
6. Corals patches
7. Algal beds
Sampling sites

64 sites 0-78 m deep

RAPA 2002
Habitats

- >60 m
- Corals
- Algal beds/corals
- Algal beds
- Bay bottom
- Island
Number of algal species from Rapa (exclusive of crustose corallines)

Overall: 152 species

- Rhodophyta: 65%
- Chlorophyta: 20%
- Pheophyceae: 15%
Rocky littoral
Sargassum Benches
Algal beds. Brown algae assemblage
Deep habitat: Red algae domain

- *Platoma cyclocolpum*
- *Peleophycus multiprocarpium*
- *Dudresnaya hawaiensis*
- *Gibsmithia larkumi*
- *Predae weldii*
Algae from Rapa are different from the other French Polynesian islands.
Some species present in Rapa absent in the other FP islands (about 15 sp)
Common Genera completely absent in Rapa

*Halimeda*  

*Turbinaria*
Biogeographical patterns

- 80% species are Indo-Pacific
- 6.8% are known only from Rapa
- 6% are known from Hawai’i and Rapa
- 73% are tropical/subtropical
- 7.5% are temperate/temperate cold

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- 80% species are Indo-Pacific
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- 73% are tropical/subtropical
- 7.5% are temperate/temperate cold
Large beds *Sargassum obtusifolium* present in Hawaii
absent in Tahiti

**WHY?**
Sargassum obtusifolium

22°-26°C

A. Ganachaud courtesy
Species know from temperate-cold waters

Gloiosaccion brownii

Cladosiphon neo-caledoniae

Rhodymenia leptophylla
Species know from temperate waters 18-22°C

A. Ganachaud courtesy
What will happen with global change and temperature elevation?
C02 Low emission scenario  C02 High emission scenario

MULTI MODEL MEAN 20-YEAR AVERAGE WARMING PROJECTIONS

A. Ganachaud courtesy
The forecast global increase in sea temperatures could affect the diversity of the flora:

1- species whose distributional limits occur in the south of the archipelagos could disappear

2- brown algal beds could disappear in favour of undesirable species such as the invasive *Turbinaria ornata*

3- repercussions on the species linked to the algal beds, key resources for local populations.
Kyphosus pacificus
QUESTION?
Disappearing or adapting??

SUGGESTION
Long-term monitoring of these temperate or even cold affinities species is needed, and a locality such as Rapa could be a good candidate for a regional South Pacific observatory for studying vulnerability and response of the species.
Thank you