



Reconstruction of Late Holocene sea-level change in French Polynesia, South Pacific, based on coral reef records

Nadine Hallmann (1), Gilbert Camoin (1), Anton Eisenhauer (2), and Claude Vella (1)

(1) Aix-Marseille Université, CNRS, IRD, CEREGE UM34, Europôle Méditerranéen de l'Arbois, BP80, 13545 Aix-en-Provence cedex 4, France, (2) GEOMAR, Helmholtz-Zentrum für Ozeanforschung, Marine Geosysteme, Wischhofstraße 1-3, 24148 Kiel, Germany

Fossil reefs provide valuable sea-level indicators, which help to improve the understanding of past sea-level fluctuations and the prediction of future changes. Recent sea-level changes were reconstructed from emerged reef platforms of two high islands from the Society Islands (Bora Bora, Moorea) and two atolls from the Tuamotu Archipelago (Rangiroa, Tikehau), French Polynesia. These mid-ocean islands can be regarded as tectonically stable for the past few thousand years. Therefore, they are well suited for sea-level studies because they register Holocene eustatic changes, which are not overprinted by tectonic changes. Furthermore, the study sites are located distant from former ice sheets (far field location), which reduces the influence of the glacio-isostatic rebound.

Several sea-level indicators, such as *in situ* coral colonies, including coral microatolls (*Porites* sp.), bivalves (mainly *Tridacna* sp.), conglomerates, beachrock, and sediments were analyzed in order to reconstruct Late Holocene relative sea-level changes. Microatolls are discoid corals that develop laterally when upward growth is limited by sea-level. Therefore, they are very accurate recorders of past sea-level. This study provides a detailed sea-level history for French Polynesia using high-precision U/Th (TIMS) dating and GPS measurements with a vertical and horizontal precision of 1-3 cm and a few millimetres, respectively. All samples were analyzed by X-ray diffraction and examined petrographically to exclude diagenetically altered material.

The Holocene mean sea level in French Polynesia was thought to have been higher than present (+0.8/+1.0 m) between 5000 and 1250 yr BP, reached a highstand between 2000 and 1500 yr BP and then decreased to the present level (Pirazzoli and Montaggioni, 1988). The highstand has been reported until 1200 yr BP in the Tuamotu Archipelago (Pirazzoli and Montaggioni, 1986). However, sea-level indicators analyzed in this study reveal a highstand of at least 1.5 m above the present sea level. Such high resolution and high precision sea-level data are essential to refine last deglacial sea-level changes and to improve models for the prediction of future global and regional sea-level rise.