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A 6,700 years sea-level record based on French Polynesian coral reefs

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Sea-level change during the Mid- to Late Holocene has a similar amplitude to the sea-level rise that is likely to occur before the end of the 21st century providing a unique opportunity to study the coastal response to sea-level change and to reveal an important baseline of natural climate variability prior to the industrial revolution.

Mid- to Late Holocene relative sea-level change in French Polynesia was reconstructed using coral reef records from ten islands, which represent ideal settings for accurate sea-level studies because: 1) they can be regarded as tectonically stable during the relevant period (slow subsidence), 2) they are located far from former ice sheets (far-field), 3) they are characterized by a low tidal amplitude, and 4) they cover a wide range of latitudes which produces significantly improved constraints on GIA (Glacial Isostatic Adjustment) model parameters.

Absolute U/Th dating of *in situ* coral colonies and their accurate positioning via GPS RTK (Real Time Kinematic) measurements is crucial for an accurate reconstruction of sea-level change. We focus mainly on the analysis of coral microatolls, which are sensitive low-tide recorders, as their vertical accretion is limited by the mean low water springs level. Growth pattern analysis allows the reconstruction of low-amplitude, high-frequency sea-level changes on centennial to sub-decadal time scales.

A sea-level rise of less than 1 m is recorded between 6 and 3–3.5 ka, and is followed by a gradual fall in sea level that started around 2.5 ka and persisted until the past few centuries. The reconstructed sea-level curve therefore extends the Tahiti sea-level curve [Deschamps et al., 2012, *Nature*, 483, 559-564], and is in good agreement with a geophysical model tuned to fit far-field deglacial records [Bassett et al., 2005, *Science*, 309, 925-928].