

Long term study of biogenic dissolution of reef carbonates in New Caledonia: What assumption for the future?

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An original long term experiment

Although the process of biogenic dissolution due to boring microflora or microborers, is one of the main destructive forces of coral reefs, its dynamics remain poorly known. An experiment was thus carried out in New Caledonia to study microboring community successions and biogenic dissolution dynamics with a monthly, seasonal, and yearly resolution. Experimental blocks of dead coral were exposed to colonization by microborers either in summer (December) or in winter (July) during 1 to 12 months over a 7 year period. Simultaneously, environmental conditions (SST, SSS, pH, [chl_a],...) and some biotic factors (grazing pressure and epilithic cover) were recorded to determine the most important ones controlling biogenic dissolution.

Principal results

Blocks exposed between December 2009 and July 2013 showed that high rates of biogenic dissolution are driven by the speed of replacement of pioneer microborers by the chlorophyte *Ostreobium* sp., the main microboring agent of the process. Such succession depends strongly on the combined effects of the epilithic cover development, grazing pressure, nutrient inputs and SST. Consequently, rates of biogenic dissolution were 3x higher in the 12 months- 'summer' series than in the -'winter' series.

In the context of global warming, coral reef dissolution due to microborers should increase as warmer temperatures speed up the settlement and development of *Ostreobium* in dead carbonates. To confirm this hypothesis, new coral blocks collected at the same reef site between 2015 and 2016 during the major bleaching event that resulted from an important rise of SST are currently analyzed.