

Caribbean coral reef ecosystems: interactions of anthropogenic ocean acidification and eutrophication with bioerosion by coralextravating sponges

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Local conditions such as pollution, overfishing and eutrophication (excess of nutrients) due to discharges of wastewater are threatening coral ecosystems. Climate change is also damaging the coral reefs. More carbon dioxide in the atmosphere is not just causing global warming but a significant amount of the CO₂ is also dissolving in seawater, which is causing changes in the seawater's chemistry. The extra CO₂ in seawater is buffered by a decrease in the amount of dissolved carbonate, a building block of chalk from corals. As a result of these chemical changes the quantity of acid is also increasing and hence the term ocean acidification. All of this is probably enhancing the dissolving of chalk by coral-extravating sponges, the most important eroding organisms of coral reefs. The number of coral-extravating sponges is already increasing due to the extra nitrogen and phosphate nutrients from wastewater. The bioerosion of coral reefs is continuing to accelerate: the growth of the corals is decreasing while the loss of corals due to coralextravating sponges is increasing. This project will measure the joint impact on coral reefs of the changing chemistry of the seawater, the eutrophication and the bioerosion due to coral-extravating sponges. It will also determine the degree of dissolving by sponges at different acidity levels and will try to understand the physiological basis of the dissolving of chalk by coral-extravating sponges.