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Trace Metal Analysis of Coral Skeletons: Anthropogenic Influences on Corals in Ilha Grande Bay (Rio de Janeiro, Brazil)

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Ilha Grande Bay is under increasing anthropogenic pressure with several land-based and marine pollution sources that are potentially impacting marine habitats. It is widely agreed that coral skeletons can record changes of seawater chemistry in the form of chemical signatures recorded in their skeletons, which can be used to trace the origin of contaminants throughout the lifetime of the animals. In this study, we will test a new strategy to evaluate how metal pollution varies spatially and temporally in the Bay using coral skeletons as indicators of coastal pollution. Elemental analysis of coral skeletons and marine sediments will be performed for the evaluation of coastal pollution at present and in the recent past. The challenge is to assess man-induced environmental changes in the Bay using geochemical data to characterize changes in seawater chemistry that might have occurred over time and has been recorded in the coral skeleton.

In coastal areas subject to intense environmental contamination from several sources, for long periods such as Ilha Grande Bay, contributions to marine pollution may include current and previous environmental incidents as well as diffused contamination from multiple sources. The region of Ilha Grande Bay receives wastes derived from an expressive industrial park, which includes the largest steel industry complex of South America and from a large commercial port. In addition, there is a mining terminal that exports and stores ore at the entrance of the Bay. The pollutants released from urban wastes and industrial plants circulate throughout the bay and accumulate in the bottom sediments near the discharge points. The concentrations of Ba, Sr, Cr, Mg, Ni, Sn, Nd, Fe, Cd, Al, Cu, Zn, and Pb in coral skeletons and marine sediments will be measured at University of California, Santa Cruz. Results of metal concentrations in corals from different sampling sites will be discussed as a way to examine the variation of metal uptake with increasing distance from the sources of pollution.