

Growth-rate influences on coral geochemical proxies tested by a long-term culture experiment

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Corals are rich archives of climatic changes in tropical seas covering from the recent to distant past. The isotope and elemental compositions of coral skeletons reflect physicochemical parameters of the ambient seawater. Because the long-lived colony of hermatypic coral can live several hundred years with clear annual growth-bands, the coral skeletons have great potential to provide environmental archives. From previous calibration researches, the skeletal oxygen and carbon isotope ratios depend on factors such as the temperature, isotope ratios and light intensity of the ambient water, making coral skeletons useful for palaeoenvironmental reconstruction. Although many studies have utilized oxygen and carbon isotope ratios in corals for proxy calibration, there has been much debate over its controlling factors. In this study, we examine the magnitude of growth-rate influence on coral oxygen and carbon isotope and Sr/Ca ratios in a long-term common-garden culture experiment of *Porites australiensis* corals. The aim of this study is to evaluate the intraspecific variability of the skeletal isotope signals, the usability of the carbon isotope ratio as an environmental proxy, and accuracy of reconstructed seawater temperature.

Keywords: Coral, Climate, Oxygen isotope ratio, Sr/Ca ratio