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Department of Marine Sciences
Presents a Seminar by

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Testing controls on trace element proxies in cold-water corals cultured under decoupled carbonate chemistry conditions

Culture experiments are uniquely suited for uncovering the fundamental factors controlling skeletal geochemistry because it is possible to explore conditions beyond what is found in the modern ocean and to decouple parameters that co-vary in nature. We cultured juvenile individuals of a cold-water coral (*Balanophyllia elegans*) in a set of experiments that decoupled carbonate chemistry parameters over a wide range of pH, DIC and carbonate ion values. We then analyzed cultured skeletons for U/Ca, which has been proposed as a potential proxy for seawater pH and carbonate ion concentrations, as well as Sr/Ca, and Mg/Ca. We find that U/Ca and Sr/Ca ratios in cultured *B. elegans* are most strongly correlated with solution DIC and not pH or carbonate ion. We also confirm previous observations that Metal/Calcium (Me/Ca) ratios follow the same correlated relationships between and among individuals across different experimental conditions. Interpretation of these robust Me/Ca patterns within the framework of a geochemical model of biomineralization allows us to identify rules of skeletal growth for *B. elegans*. Our study has implications for the recently developed Sr-U paleothermometer because it refines our understanding of the environmental parameters affecting this proxy. Our model further demonstrates that U/Ca is not a robust indicator of seawater pH or carbonate ion. Instead, U/Ca may record how calcifying fluid carbonate ion responds to changes in the environment or calcification dynamics, which may be useful in evaluating how corals respond to changes like ocean acidification. Measurements of U/Ca and additional Me/Ca ratios in other coral species, evaluated within a similar framework, may elucidate how those species respond to environmental change.

CANCELLED

Host: Julie Granger
Time & Date: 11:00 am, Friday, December 10, 2021

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