Goldschmidt 2021 Abstract
https://doi.org/10.7185/gold2021.5447

Raman Spectroscopic Analysis of Octocoral Skeletal Mg Dynamics Along a Natural Depth Gradient, Kona Coast, Hawai'i

KYLE CONNER[1], SHIV SHARMA[1], RYOHEI UCHIYAMA[2], KENTARO TANAKA[3], KOTARO SHIRAI[3] AND SAMUEL KAHNG[1]

[1]School of Ocean and Earth Science and Technology, University of Hawai'i at Manoa

[2]Hokkaido University

[3]Atmosphere and Ocean Research Institute, The University of Tokyo

Presenting Author: kconner7@hawaii.edu

Octocoral skeletal geochemical parameters are of considerable interest in terms of paleoceanographic proxies and their relationships between vital effects and environmental forcing [1]. In particular, the Mg content of calcitic cold water coral skeletons is thought to be linked to various external and internal factors such as temperature, carbonate ion concentration, seawater Mg/Ca ratio, and vital effects associated with annual growth rates [2]. However, relevant studies thus far have been taxonomically and geographically limited to a few species and regions with even fewer analyses considering broader ecosystem scales. We attempt to address this knowledge gap through the analysis of octocoral skeletal Mg content from samples (N = 28) collected across a natural gradient in depth (221-823 m) and biogeochemical parameters (pH: 7.3-8.1, T: 5-19°C) off the Kona coast of Hawaii island using the Pisces IV submersible [3]. Raman spectroscopy was used to determine the Mg content of the surface skeleton using prior Raman-based calibration studies of inorganic Mg-calcite [4]. Accompanying oceanographic measurements of temperature, salinity, pH, and TA were used to assess the influence of environmental factors on measured Mg content patterns. Octocoral Mg content decreases with increasing depth with differing trends observed between the two octocoral families sampled (Corallidae and Isididae). Additional intra-sample Raman measurements were conducted to quantify Mg variability within selected octocoral samples. A significant relationship between Mg content and octocoral branch diameter was observed with increased Mg within the narrower branch tips signifying the presence of faster growing medullar regions of skeleton.

[1] Roberts et al. (2009) *Cambridge University Press*. [2] Vielzeuf et al. (2018) *Front. Earth Sci.* 6, 167. [3] Grigg (2002) *Mar. Fish. Rev.* 64, 13-20. [4] Perrin et al. (2016) *Am. Mineral.* 101, 2525-2538.