Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17700

Reconstructing environmental dynamics at shallow water CO_2 vents – A case study with coralline algae from Ischia (Italy)

SEBASTIAN FLÖTER[1], NURIA TEIXIDO[2,3], STEEVE COMEAU[3] AND TOM SHELDRAKE[4]

[1]University of Geneva

[2]Stazione Zoologica Anton Dohrn

[3]Sorbonne Université, CNRS, Laboratoire d'Océanographie de Villefranche

[4]Department of Earth Sciences, University of Geneva

Presenting Author: sebastian.floeter@unige.ch

Volcanic and hydrothermal activity can significantly impact climatic and biogeochemical cycles over a range of temporal and spatial scales. One example of this activity includes shallow submarine volcanic CO_2 vent sites, which are frequently used to investigate the effects of ocean acidification on calcifying marine organisms, such as crustose coralline algae (CCA). To investigate the influence of low pH on CCA biomineralisation, we collected samples from Ischia, a Mediterranean island well known for its submarine CO_2 vents used as natural analogues for future ocean acidification conditions. We followed a two-fold approach to determine the temporal environmental records in CCA, and compare the spatial variability of different vents and ambient sites across depths (from 3 to 40 m). We applied *in situ* analytical techniques such as laser ablation-ICPMS, electron microprobe analysis, and Raman spectroscopy, to infer geochemical and mineralogical information about the calcified cell walls at micrometric spatial resolution. We observed seasonal variability in elements such as Mg and Sr that are corroborated by morphological features including conceptacles. In contrast, some elements like K or Ba do not show a cyclic pattern. These elements are rather connected to the remaining organic tissue in the outer 200 µm of the skeleton or in the case of Ba indicate records of terrestrial run-off. Further, the differences between the sampling sites and the potential influence of CO_2 vents on the skeletal composition and crystal growth are discussed. Our observations will help better understand the biomineralisation of marine calcifiers exposed to low pH at volcanic CO_2 vents sites as natural analogues to understanding the effects of future ocean acidification on the biomineralisation process in marine calcifiers.