

Corals as proxies for explosive volcanic eruptions: Can volcanic ash exposure be recorded in the skeleton of the hermatypic coral *Stylophora pistillata*?

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Explosive volcanic eruptions can produce vast amounts of volcanic ash that significantly disrupt ecosystems in their vicinity. Physical ash deposition and its leaching alter the geochemical properties of the seawater column and directly affect coral physiology. The fast skeletal growth rate of reef-building corals allows them to record transient changes in environmental parameters. These records provide more information about volcanic activity than lithostratigraphic profiles can currently resolve. The aim of our study is to expand the function of the coral skeleton as paleoenvironmental archive for volcanic eruptions.

To assess the effect of the volcanic ash exposure on coral skeletons, experiments were conducted with corals maintained under culture conditions. Microcolonies of the scleractinian coral *Stylophora pistillata* were reared in tanks under controlled light intensity, temperature and pH. Corals were maintained under (i) a control condition, and (ii) an experimental condition in which corals were exposed to volcanic ash every other day over a period of 6 weeks. Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) was performed on several apices of control and ash-exposed corals to quantify the trace and minor elements in the newly grown skeleton. Furthermore, elemental maps recorded by electron microprobe (EMPA) show the spatial variability of the skeletal elemental composition within individual anatomical features. The results of our experiments provide first insights into which metals and/or elemental ratios could be employed as potential proxies for explosive volcanic activity and implications for field studies will be discussed.