Speleothem as archive of past volcanism: Impact of Kikai volcano eruption (7.3 ka) on a remote oceanic island

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Explosive volcanic eruptions have the potential to trigger climate changes in the global scale. Stalagmite is one of the useful archives of past volcanism [1], given the connectivity between the ground surface and cave deposits via dripping waters through the karst system. In this study, the chemical composition of a stalagmite from Minami-Daito Island was analyzed to examine the impact of the Kikai volcano eruption occurred ~560 km north of the sampling site at c.a. 7.3 ka [2]. Age model of the stalagmite was established by U-Th dating at NTU. Trace and minor elements concentration were measured by using a LA-ICP-MS at AORI. Mn/Ca ratio in the stalagmite corresponding to 7.3 ka was enormously higher than the baseline. Besides, this Mn anomaly is not associated with major elements in soils, e.g. Al and Ti, suggesting that manganese was incorporated in stalagmite as dissolved Mn^{2+} ions but not as solid particles. This Mn anomaly at 7.3 ka implies the possibility that the desorption of Mn from clay minerals and/or soil particles occurred in the surface layer of karst due to environmental changes linked to the volcanic eruption. Further investigations are required to provide direct insight into environmental changes in the ground surface caused by the volcanic eruption.

[1] Badertscher et al., 2014 Earth Planet. Sci. Lett., 392, 58-66. [2] Maeno & Taniguchi, 2007 J. Volcanol. Geotherm. Res., 167, 212-238.