

The $\delta^{34}\text{S}$ characterization of sulfur sources and sinks in a karstic environment, a proxy of volcanic activity in stalagmites?

O. PEREZ-ARVIZU¹, BERNAL, JP. BERNAL¹, L. CORONA-MARTINEZ¹, R LÓPEZ-MARTÍNEZ²

¹Centro de Geociencias, UNAM, Quertetaro, México

operez@geociencias.unam.mx

²Instituto de Geologia, UNAM, Mexico City, Mexico

It has long been suggested that sulfur concentration and isotopic composition in stalagmites can be used as a proxy for past volcanic activity, however, due to the difficulty of measuring $\delta^{34}\text{S}$, this potential proxy is yet to be fully characterized. Moreover, due to the complexity of the sulfur's biogeochemical cycle, a robust characterization of the potential sources and identification of sinks is required to identify their potential contribution to the $\delta^{34}\text{S}$ in the stalagmite.

To test the potential use of sulfur and its isotopic composition as a proxy for past volcanic activity, we collected water (rainfall, drip, and surficial) soil and rock samples collected in a karstic catchment near Volcan de Colima, an active volcano in western Mexico. The samples were analyzed for sulfur concentration by ICP-QMS and their $\delta^{34}\text{S}$ composition with MC/ICPMS using a purpose-specific high precision methodology (0.08-0.2‰ 2sd).

Local rainwater collected weekly over a 2-year period has $\delta^{34}\text{S}$ values ranging between 8-12‰/VCDT, and surficial waters range between 0 and 15.5‰/VCDT whilst dripwaters in the cave range between -9 to 2‰/VCDT, consistent to the isotopic composition of soils from above the cave that show a consistent $\delta^{34}\text{S}$ value of -2.8 ± 0.09 ‰/VCDT. This initial values suggest that aerosol sulfur contributions to the catchment are not very significant, and suggest that rock weathering and soil leaching might be modulating the isotopic composition and abundance of sulfur in the epikarst.