

Geochemistry of archeologically important tufa deposits from Cuatro Cienegas, Coahuilla, Mexico: preliminary results

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In 2006, the archeologists of Museo del Desierto (Saltillo, Coah.) discovered ca. 12 human foot prints of at least two different individuals in the tufa deposits from the Cuatro Cienegas region of Mexico. In the Cuatro Cienegas valley, tufa deposits represent lacustrine regimes as they precipitate from calcium rich sub-surface water in topographically closed basins. We report the results of our preliminary investigation of mineralogy and geochemistry of the archeologically important tufa deposits in a shallow depth profile (from human foot prints bearing horizon down to 50cm). The samples are enriched in calcite (CaCO_3) and contain minor but varying abundance of gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). As gypsum precipitates at higher evaporation compared to calcite, the ratio of gypsum to calcite is considered as a proxy for evaporation or aridity. We infer that in a relatively arid environment, the foot prints were preserved in the tufa deposits. A similar event is identified in the sample at 40cm below the foot print bearing horizon. These observations are supported by the geochemical proxies, i.e. Na/Ti, Si/Ti and Sr/Ti. Though the human foot prints are archeologically considered to be of early Holocene (considering the antiquity of humans in the region), efforts are being made to constrain these events by radio carbon (^{14}C) chronology.

Key words: human foot prints, tufa, geochemistry, Cuatro Cienegas, Mexico