



Mineral Microbiomes Entombed in Great Salt Lake Gypsum: Considerations for Martian Evaporites

Oral

Halophilic microorganisms in space and extreme analogues , Hypersaline environments as analogues for extraterrestrial life

Paulina Martinez Koury ^{1, 2}.

(1) Westminster University, Great Salt Lake Institute, 1840 S 1300 E, Salt Lake City, United States.

(2) University of Utah, School of Biology, 201 Presidents Circle, Salt Lake City, United States.

Paulinamtz90@gmail.com

Modern Great Salt Lake, UT, United States, is the evaporative remnant of Pleistocene Lake Bonneville, making this site an appropriate analog to ancient martian lacustrine systems. Today, evaporite minerals, including recently formed displacive gypsum selenite, surround the lake. We hypothesized that hydrated clay inclusions within the gypsum could harbor microbial life by providing water, nutrients, and protection from UV radiation and temperature extremes. Our results reveal a diverse microbial community that thrives in these clay-rich inclusions, including archaea, fungi, and numerous bacterial species from Actinobacteria, Bacteroidetes, Firmicutes, and Proteobacteria. The presence of primary producers (cyanobacteria and microalgae) capable of varied metabolisms indicates a potentially self-sustaining, entombed ecosystem. X-ray diffraction analyses of the sediment in which the gypsum formed show that the clay fraction associated with gypsum formation is dominated by illite and smectite, with smaller amounts of kaolinite and chlorite. The methods developed here for modern gypsum can be applied to ancient terrestrial minerals and hydrated sulfate deposits on Mars.

Palabras Clave

(1) Great Salt Lake, (2) Gypsum., (3) Mineral inclusions, (4) Mars analog, (5) Extremophiles.

Financiamiento:

NSF GRFP, McNair Scholars Program, Utah NASA Space Grant NNX15A124H, FRIENDS of Great Salt Lake.

Agradecimientos:

Thanks to the Utah Department of Natural Resources, Division of Forestry, Fire, and State Lands for sampling permissions.