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Spectroscopic and microscopic study of microbial mats in the Ojos del Salado area in Chile, a (possible) analogue environment for habitats on Early Mars

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As much is still unknown about the conditions for life on Early Mars, extreme environments on Earth that resemble Early Martian conditions are particularly useful for planetary scientists and astrobiologists to understand Early Mars environments. As biosignatures could be preserved in the Martian mineral record, Mars analogue environments on Earth also provide useful points of reference for measurements gathered by Mars rover missions.

One of the best Martian Analogue Environments on Earth is the dry high-altitude desert in the area of the Ojos del Salado volcano in Chile. The Ojos del Salado is the highest point of the Puna de Atacama plateau in the Andes, characterized by extremely dry periglacial conditions, high UV radiation levels, low oxygen pressure, strong winds and the presence of volcanic and hydrothermal activity. High altitude lakes in the area feature polyextremophile microbial ecosystems that are adapted to these unique conditions and which provide a valuable insight into ecosystems that might resemble life on Early Mars. We report research results from Raman spectroscopy, UV-Vis spectroscopy and optical microscopy, gathered in-situ during the joint interdisciplinary Universidad de Atacama/LICA UDA/EuroMoonMars field campaign to the Ojos del Salado area in February/March 2022.