



A new hypersaline habitat in the Atacama subsurface boosts options for life on Mars

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It is generally accepted by the astrobiological community that the search for life on Mars requires the exploration of its subsurface (1-3). The Atacama Desert has long been considered a good Martian analogue for testing instrumentation for planetary exploration. We performed a Mars analogue drilling campaign, "AtacaMars2009", in the Salar Grande (Atacama, Chile) in July 2009 to test life detection instrumentation. Several drill cores and powder samples from up to 5 m deep were analyzed in situ with LDCHIP300 (a life detector chip containing 300 antibodies). Positive reactions with several antibodies (against bacteria, DNA and nucleotide derivatives), PCR amplification and phylogeny of prokaryotic 16S rRNA gene, confirmed the LDCHIP300 results and the presence of a microbial oasis around 2 m below the surface. Geochemical analysis indicate that this subsurface habitat is characterized by the presence of hygroscopic salts like halite and perchlorates, which allow deliquescence events at low relative humidity (4). The formation of thin liquid water films would permit microbes to proliferate by using organic acids (also detected) like acetate, propionate or formate as electron donors, and sulfate, nitrate and perchlorate as acceptors. Our results correlate with the discovery of similar hygroscopic salts (5) and deliquescence processes on Mars (6), opening new options for a light-independent subsurface Martian biota.

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