CONTROL ID: 2257650

TITLE: Field Research and Laboratory Sample Analysis of Dust-Water-Organics-Life from Mars Analogue Extreme Environments

ABSTRACT BODY:

Abstract Body: We describe results from the data analysis from a series of field research campaigns (ILEWG EuroMoonMars campaigns 2009* to 2013) in the extreme environment of the Utah desert relevant to habitability and astrobiology in Mars environments, and in order to help in the interpretation of Mars missions measurements from orbit (MEX, MRO) or from the surface (MER, MSL). We discuss results relevant to the scientific study of the habitability factors influenced by the properties of dust, organics, water history and the diagnostics and characterisation of microbial life. We also discuss perspectives for the preparation of future lander and sample return missions. We deployed at Mars Desert Research station, Utah, a suite of instruments and techniques including sample collection, context imaging from remote to local and microscale, drilling, spectrometers and life sensors. We analyzed how geological and geochemical evolution a ected local parameters (mineralogy, organics content, environment variations) and the habitability and signature of organics and biota. We find high diversity in the composition of soil samples even when collected in close proximity, the low abundances of detectable PAHs and amino acids and the presence of biota of all three domains of life with signi cant heterogeneity. An extraordinary variety of putative extremophiles was observed. A dominant factor seems to be soil porosity and lower clay-sized particle content. A protocol was developed for sterile sampling, contamination issues, and the diagnostics of biodiversity via PCR and DGGE analysis in soils and rocks samples. We compare 2009 campaign results to new measurements from 2010-2013 campaigns: comparison between remote sensing and in-situ measurements; the study of minerals; the detection of organics and signs of life.

References * in Foing, Stoker Ehrenfreund (Editors, 2011) Astrobiology field Research in Moon/Mars Analogue Environments", Special Issue of International Journal of Astrobiology , IJA 2011, 10, vol. 3. 137-305

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