



## Habitability & Astrobiology Research in Mars Terrestrial Analogues

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We performed a series of field research campaigns (ILEWG EuroMoonMars) in the extreme Utah desert relevant to Mars environments, and in order to help in the interpretation of Mars missions measurements from orbit (MEX, MRO) or from the surface (MER, MSL), or Moon geochemistry (SMART-1, LRO). We shall give an update on the sample analysis in the context of habitability and astrobiology.

**Methods & Results:** In the frame of ILEWG EuroMoonMars campaigns (2009 to 2013) we deployed at Mars Desert Research station, near Hanksville Utah, a suite of instruments and techniques [A, 1, 2, 9-11] including sample collection, context imaging from remote to local and microscale, drilling, spectrometers and life sensors. We analyzed how geological and geochemical evolution affected local parameters (mineralogy, organics content, environment variations) and the habitability and signature of organics and biota. Among the important findings are the 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 significant heterogeneity. An extraordinary variety of putative extremophiles was observed [3,4,9]. A dominant factor seems to be soil porosity and lower clay-sized particle content [6-8]. A protocol was developed for sterile sampling, contamination issues, and the diagnostics of biodiversity via PCR and DGGE analysis in soils and rocks samples [10, 11]. We compare the 2009 campaign results [1-9] to new measurements from 2010-2013 campaigns [10-12] relevant to: comparison between remote sensing and in-situ measurements; the study of minerals; the detection of organics and signs of life.

**Keywords:** field analogue research, astrobiology, habitability, life detection, Earth-Moon-Mars, organics

### References

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