

EANA Athen, Oral presentation

Mars Analogues for space exploration - from anaerobic field site to culture collection

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Astrobiology seeks to understand the limits of life and to determine the physiology of organisms in order to be able to better assess the potential habitability of other worlds and improve our ability to assay them for the presence of life. To successfully achieve this we require representative microorganisms from environments on Earth that in physical and/or chemical conditions approximate to extraterrestrial environments. The most challenging of these environments with respect to the sample collection and follow on isolation and cultivation of microorganisms are anaerobic environments. Here we describe a systematic approach to this challenge and aim to provide a guideline for future fieldwork and sampling campaigns. We selected a number of anaerobic environments based on characteristics that make them analogous to past and present locations on Mars (Icelandic lakes, sulfidic springs, deep hypersaline environments, acidic iron-rich environments, and permafrost). We implemented a culturing approach to enrich organisms from these environments under anaerobic conditions using a defined medium that would allow for all organisms to be grown under identical culturing conditions in future physiological comparisons. We then isolated anaerobic microorganisms, carried out a study of their basic physiology and deposited these organisms in the DSMZ (Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH) culture collection to make them available to astrobiologists and microbiologists. This project represents the first attempt to implement a coordinated effort from the selection of extraterrestrial analog sites through to the isolation and the characterisation of organisms and their deposition within a culture collection.

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References

(1) www.mase-eu.org