The MASE project

MASE (Mars Analogues for Space Exploration) is a four year collaborative research project supported by the European Commission Seventh Framework Contract. The aim of the project, which kicked-off in January 2014, is to further understand how combined environmental stresses influence the habitability of Mars analogue sites, specifically for anaerobic microorganisms. The MASE consortium includes biologists, geologists, planetary scientists, chemists and engineers.

Analogue sites

The project has so far involved the direct sampling of water and sediments from 1 Grænavatn, an acidic cold lake in Iceland, 2 km-deep subsurface brine seeps at the Boulby Potash Mine in England, and 3 sulfidic springs near Regensburg in southern Germany.

Samples and isolates have also been provided to the project from acidic deep subsurface environments in Spain’s Río Tinto region and from permafrost cores from Herschel Island in Canada and the Lena River Delta in eastern Russia.

The context dataset

In order to support the biological investigations of MASE, and to characterise the overall habitability of each analogue site, astrobiologically-relevant context information is required.

This context dataset is comprised of several subsets, comprising geological and geochemical (including mineral phase identification, standard carbon and nitrogen analyses, and dissolved cation/anion quantification), environmental (including in-situ sulphate, nitrate and pH measurements) and organic and biological (including amino acid, PAH, and DNA extraction and quantification).

Context synthesis

Data obtained from both in-situ measurements and post-sampling laboratory analyses are then combined to obtain a robust characterisation of the mineralogy, organic compounds, and biota of samples from each analogue sites in an environmental context. The respective features of each analogue site are then compared, and trends identified.

This research contributes to the optimisation of the effective detection of biomarkers during future environment sampling campaigns on Earth and Mars (see MASE poster #7302) and improves techniques and protocols that can overcome analytical and other constraints encountered during the exploration of these extreme environments.

For more information on opportunities to collaborate with MASE, see poster #7284 or visit mase.esf.org.