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Life Sciences as Related to Space (F)

Astrobiology: Mars Analogue Sites on Earth and Experiments in Earth Orbit and Beyond (F3.2)

Consider for oral presentation.

MICROORGANISMS FROM MARS ANALOGUE ENVIRONMENTS IN EARTH – COULD THEY SURVIVE ON MARS?

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Assessing the habitability of Mars and detecting life, if it was ever there, depends on knowledge of whether the combined environmental stresses experienced on Mars are compatible with life and whether a record of that life could ever be detected. Many combinations of Mars relevant stress factors, such as high radiation dose rates and high UV fluences combined with high salt concentrations, and low water activity, have not been investigated. In particular, the response of anaerobic organisms to Mars-like stress factors and combinations thereof are not known. In the EC project MASE (Mars Analogues for Space Exploration) we address these limitations by characterising different Mars analogue environments on Earth, isolating microorganisms from these sites and exposing them to Mars relevant stress factors alone and in combination. We want to find out, if these bacteria respond in an additive or synergistic way and if they would be able to survive on Mars. So far, eight only distantly related microorganisms are under detailed investigation, e.g. *Yersinia* sp., *Halanaerobium* sp., *Acidiphilum* sp., *Desulfovibrio* sp.. Unexpectedly, a *Yersinia* strain turned out to be quite resistant, especially against desiccation and oxidising compounds, whereas a *Desulfovibrio* sp. strain exhibit a relatively high radiation resistance. The future experiments aim at the identification of the underlying cellular and molecular mechanisms and the comparison to other new isolates from Mars analogue environments on Earth in the MASE project.

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