

Considerations for the study of deep biosphere on Mars taking as reference terrestrial analogs. J. A. Torres¹, H. H. Bolivar-Torres², H. J. Durand³, L.E. Servin-Garcidueñas⁴ ¹Instituto de Geofísica Universidad Nacional Autónoma de México (joatorresc@igeofisica.unam.mx). ²Grupo de Microbiomica. Laboratorio Nacional de Análisis y síntesis ecológica LANASE UNAM ENES Morelia. (hhbolivart@unal.edu.co). ³Instituto de Geofísica Universidad Nacional Autónoma de México (durand_manterola@igeofisica.unam.mx). ⁴Grupo de Microbiomica. Laboratorio Nacional de Análisis y síntesis ecológica LANASE UNAM ENES Morelia (lservin@enesmorelia.unam.mx).

According to recent studies, the surface of Mars is hostile for the life [1], However, the subsurface of the red planet could be a more comfortable place for the existence of live beings [2].

On the Earth, the evidence of microorganisms living in underground habitats has been raising in the last years, these microorganisms have different adaptations for survive in those places, for example, a chemolithotroph metabolism and tolerance to oligotrophic environment [3].

The study of this kind of ecosystems could help us to understand how we can explore the Martian subsurface in search of signs of life. For this reason, the aim of this poster is showing the importance of the study of underground ecosystems on the earth and the lessons for the exploration of the subsurface on Mars.

For the study of the physical environment of the deep biosphere we must start from the comparison between the physical properties such as the geothermal gradient, the pressure gradient and the variation in porosity as a function of depth. factors that favor the presence of liquid water and the possible development of life.[4]. The terrestrial geothermal gradient by means of averages is averaged at 25 ° C [5], in contrast the geothermal gradient for Mars is calculated between 10 to 20 ° C [4], this is essential to understand the presence of liquid water as a function of depth [6] and until depths we should contemplate the presence of life, in the case of the earth, bacteria have been found in wells at depths of 2.5 km [7].

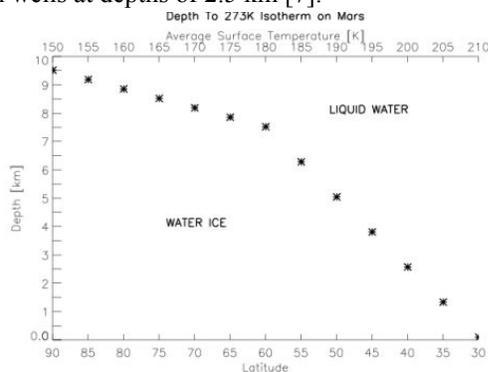


Image 1. water stability as a function of depth on Mars, taken from [6].

The principal tool of the exploration of life on the deep biosphere is the use of independent culture methods e.g. metagenomics [7] but, it's possible use another biosignatures, such as Lipid biomarkers, product of biological activity [8].

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