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Habitability: where lo look for life?
Earth analogs to study Mars and Europa´s habitability

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Abstract

Current Mars exploration is producing a considerable amount of information which requires comparison with terrestrial analogs in order to interpret and evaluate compatibility with possible extinct and/or extant life on the planet. The first astrobiological mission specially designed to detect life on Mars, the Viking missions, thought life unlikely, considering the amount of UV radiation bathing the surface of the planet, the resulting oxidative conditions, and the lack of adequate atmospheric protection.
The necessity of the Europa surface exploration comes from the idea of a water ocean existence in its interior. Europa surface presents evidence of an active geology showing many tectonic features that seems to be connected with some liquid interior reservoir.
Life needs several requirements for its establishment but, the only sine qua nom elements is the water, taking into account our experience on Earth extreme ecosystems
The discovery of extremophiles on Earth widened the window of possibilities for life to develop in the universe, and as a consequence on Mars. The compilation of data produced by the ongoing missions (Mars Global Surveyor, Mars Odyssey, Mars Express and Mars Exploration Rover Opportunity) offers a completely different view: signs of an early wet Mars and rather recent volcanic activity. The discovery of important accumulations of sulfates, and the existence of iron minerals like jarosite, goethite and hematite in rocks of sedimentary origin has allowed specific terrestrial models related with this type of mineralogy to come into focus. Río Tinto (Southwestern Spain, Iberian Pyritic Belt) is an extreme acidic environment, product of the chemolithotrophic activity of microorganisms that thrive in the massive pyrite-rich deposits of the Iberian Pyritic Belt. The high concentrations of ferric iron and sulfates, products of the metabolism of pyrite, generate a collection of minerals, mainly gypsum, jarosite, goethite and hematites, all of which have been detected in different regions of Mars [1].
But, where to look for life in other planetary bodies? Planet´s or Icy Moon`s surface are adverse for life. Harsh conditions for life to wheal with. Similar harsh conditions as the primordial Earth ones during the time when origin of life occurred. In the last case, life was originated under high irradiation conditions, meteorite bombardment and high temperature. Some particular protective environments or elements should house the organic molecules and the first bacterial life forms [2]. Terrestrial analogues work could help us to afford its comprehension.
We are reporting here some preliminary studies about endolithic niches inside salt deposits used by phototrophs for taking advantage of sheltering particular light wavelengths. These acidic salts deposits located in Río Tinto shelter life forms which are difficult to localize by eye. Molecular ecology techniques are needed for its localization and study.

Bibliography

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