Sulphur springs, sulfates and iron oxides of the Dallol (Danakil Depression, Ethiopia): A spectacular Mars terrestrial analog

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The importance of the Fe- and the S-cycles in generating extreme (acidic) conditions of low pH and high concentration of heavy metals that can, however, sustain an high-level of microbial diversity, show how extremely robust life is, and how rapidly it can adapts to different conditions [1]. In addition, the acidophilic microorganisms are also representing a possible relic metabolism from early Earth's life. Therefore, the presence of vast deposits of (*c.* 4 Ga old) Noachian sulfates and iron oxides on Mars, make the acidic, sulphate-rich environments interesting Mars terrestrial analogs.

The Dallol hydrothermal field is a remote volcanic area of the northern Danakil Depression in Ethiopia. It hosts spectacular (active and inactive) mounds, terraces, metal crusts and concretions resulting from interactions between sulphuric hot springs, salty solutions, and recrystallization processes driven by hydrothermal waters, degassing, and rapid evaporation. Surrounded by a wide saline region, Dallol area is one of the hottest and most acidic places (pH < 1.0) of the globe that can potentially host life.
We present preliminary field and analytical results obtained on samples collected during recent field campaigns. The geological, geochemical and mineralogical features of the Dallol and its location closed to regional basaltic volcanism of planetary-scale importance make it a suitable analogue to ancient Martian environments. It also provides contextual perspective for the interpretation of future Martian rover data. The geomicrobiological and astrobiological potential of the site will be also discussed.

[1] Amils et al., 2014, Life, 4, 511

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