# EPN2020-RI

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## Deliverable D2.10
## 4th call for the TA1 Facilities

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| **Dissemination level** | | |
| **PU** | Public | **X** |
| **PP** | Restricted to other programme participants (including the Commission Service) | |
| **RE** | Restricted to a group specified by the consortium (including the Commission Services) | |
| **CO** | Confidential, only for members of the consortium (excluding the Commission Services) | |

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**Abstract:**

This deliverable provides the additional details on Transnational Access to Planetary Field Analogue Sites provided by EPN2020-RI through the TA1 call.

It complements D1.8 that provides detailed call information.

# TA1: Planetary Field Analogue Sites (PFA)

**Planetary Field Analogues (PFA)** offer access to 5 well-characterised terrestrial field sites that have been selected so as to provide the most realistic analogues of surfaces of Mars, Europa and Titan, to which planetary missions have either recently been directed or are planned. Access is provided for scientists to perform high quality scientific research and test instrumentation for space missions under realistic planetary conditions and undertake comparative planetology research.

The five PFA sites are:

**Rio Tinto Field Site**, Spain. Managed by INTA-CAB. Contact Felipe Gómez


*Rio Tinto*

**Ibn Battuta Centre**, Morocco. Managed by International Research School of Planetary Sciences; IRSPS. Contact Gian Gabriele Ori

*Ibn Battuta*

**The glacial and volcanically active areas of Iceland**, Iceland. Managed by Matis. Contact Viggó Þór Marteinsson. Matis has an extensive track record of managing field related research on Iceland, particularly with respect to surveys of life in young and extreme geological environments. They aim to provide the infrastructure to facilitate access to the glacial and sub-glacial environments, and young volcanic areas and active hydrothermal systems. Some examples of the research that the Icelandic PFA site is especially suitable for include:

- Field testing of equipment and methodologies that are supposed to be employed in future Mars Missions, e.g. sampling of putative biological specimens and tracers, remote-controlled vehicles, sensors and analytical instruments, etc.
- Physical, chemical and biological analyses and sampling in extreme, Mars-analog environments to understand the capabilities and limits of microorganisms to exist under these conditions (e.g. extreme heat & cold, inside and on volcanic surfaces or hot springs, etc.)
- Research into geological and geo-chemical interaction between rocks and microorganisms and how this might influence biosignatures/-markers on other planetary bodies."

*Drilling to sample the Skaftarkatlalon sub-glacial lake.*

*Source of the Morilla sub glacial river.*

**Danakil Depression**, Ethiopia (available from early 2017). Stretches from the Dallol Volcano to Lake Assal. The plain is one of the most impressive depressions in the Afar and one of the most inhospitable areas on Earth. A large number of extreme environments form an intricate complex geological and biological setting comprising volcanoes, hydrothermal systems, slat flats and deposits, and extreme microbial communities. Volcanic activity started more than 5 million years ago and continues today in the form of hydrothermal vents and the active Erta Ale volcano. Further research is planned by IRSPS to fully characterize the region (geological and hydrological maps and a reconnaissance study of the biota). The field site will be managed by Professor Ori (IRSPS) who works closely with Professor Mirtus Hagos of the University of Mekele and Barbara Cavalazzi University of Bologna.

*Small pond at the margin of a hydrothermal system depositing a variety of sulphates and iron oxides.*

**Tírez Lake**, Spain (*available from early 2017*). It has been proposed to have hydrogeochemistry and geochemical features comparable Europa's ocean, a satellite of the Jupiter system. Tírez waters comprise Mg-Na-$SO_4$-Cl brines with epsomite, hexahydrite and halite as end mineral members. Frozen Tírez brines are comparable to Galileo spectral data obtained from Europa. Calorimetric measurements have constrained the pathways and phase metastability for magnesium sulfate and sodium chloride crystallization from these waters, which may aid in understanding the processes involved in the formation of Europa's icy crust.
The lake undergoes major seasonal changes but life is prolific in this hyper-saline environment. Tirez contains two different microbial domains: a photosynthetically sustained community represented by planktonic/benthonic forms and microbial mats, and a subsurficial anaerobic realm in which chemolithotrophy predominates. Further research is planned by INTA-CAB Madrid to fully characterize the region so that it becomes a site available for access in the second part of the research infrastructure. For examples, on-going work is examining how the halophiles tolerate the extreme environmental stress and in some cases protect themselves against some damaging radiation using salt minerals. Dr Felipe Gomez is the contact person in relation to this planetary field analogue site.