



H2020-INFRAIA-2019-1

Europlanet 2024 RI has received funding from the European Union's Horizon 2020 Research and Innovation Programme under

Grant agreement no: 871149

---

## Deliverable D2.2

---

**Deliverable Title:** TA1 2<sup>nd</sup> Year Report  
**Due date of deliverable:** 31<sup>st</sup> January 2022  
**Nature<sup>1</sup>:** Report  
**Dissemination level<sup>2</sup>:** Public  
**Work package:** WP2  
**Lead beneficiary:** UNIBO  
**Contributing beneficiaries:** VUA  
**Document status:** Final

---

**Start date of project:** 01 February 2020  
**Project Duration:** 48 months  
**Co-ordinator:** Prof Nigel Mason

---

1. **Nature:** R = Report, P = Prototype, D = Demonstrator, O = Other

2. **Dissemination level:**

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

### **Executive Summary / Abstract:**

The Planetary Science and broader scientific community demonstrated they were and remain highly motivated to undertake field-based research at the facilities offered by Europlanet. All facilities received applications and after peer review, funds were allocated to visits to all the TA1 field analogue sites. Political events in Ethiopia-Eritrea resulted in access to the field site being suspended, most probably for the duration of the project. The COVID pandemic initially curtailed field visits as travel was restricted. During this reporting period, however, successful TA visits were completed to the field sites in Iceland (1), Botswana (2) and Greenland (3) and Spain is open for a visit in the near future. New field sites were added to TA1, two sites in Argentina and Qaidam Mongolia.

The TA management recognised the requirement for access to TA facilities particularly by early-stage researchers (ESR) on fixed term contracts. A Fast Track TA Call was set up to allow ESR access to many of the TA facilities. Six applications were made in the Fast Track call to the Puna region of Argentina. Peer review of the proposals was completed in January 2022 and results of the Call will be published in February 2022. The period of time allocated for completion of TA visits awarded in Call 1 & 2 has been extended until the end of 2022.

## Table of Contents

<b>1</b>	<b>Explanation of WP2 Work &amp; Overview of Progress</b>	<b>4</b>
a.	Objectives	4
b.	Explanation of the work carried in WP	4
c.	Impact to date	7
d.	Summary of plans for Year 3	8
<b>2</b>	<b>Update of data management plan</b>	<b>8</b>
<b>3</b>	<b>Access provisions to Research Infrastructures</b>	<b>8</b>

## 1 Explanation of WP2 Work & Overview of Progress

### a. Objectives

**Objective 3: to provide access to well-characterised terrestrial field sites and a unique set of laboratory facilities capable of simulating the wide range of environments encountered on planetary bodies.**

The aim of TA1 is to provide the international community with access to 5 well-characterised Planetary Field Analogues (PFA), located in Argentina, Spain, Iceland, Botswana and Greenland, that simulate the wide range of environments encountered on planetary bodies such as Mercury, Venus, Mars, Jupiter, Titan, Europa, Uranus, Neptune, comets, asteroids and the Moon.

Europlanet aims to expand the facilities available for the TA program through strategic international collaborations. The field sites in the Argentinian Andes (dry-cold, extreme glacial and lacustrine environments of the Andes of Argentina Puna region, and wet-cold environments of Patagonia and Tierra del Fuego region are being added through the inclusion of CONICET as a beneficiary in the Grant Amendment. The Argentinian site will be available from TA Fast-Track call onwards. Work carried out in collaboration with NA1 in Year 1 of the project has scoped a reciprocal agreement between EPN 2024 RI and the Chinese Academy of Science, which will allow European researchers access to a number of PFA in China whilst Chinese researchers can access Europlanet 2024 RI facilities.

### b. Explanation of the work carried in WP

#### Task 2.1 – Management (UNIBO, ESF, VUA, BIUST, MU, NHM, CONICET)

During the second year of the Project, Task 2.1 has coordinated the provision of access to five planetary field analogue sites that offer a comprehensive range of acid-saline environments comparable to those found beneath the surfaces of icy moons and are responsible for the origin of sulphate and carbonate sedimentary deposits on Mars.

*Table 1: TA1 Planetary Field Analogue (PFA) Facilities offered during RPI*

PFA site	Description
1. <a href="#">Iceland Field Sites, Matis</a> , Iceland.	The highly volcanic environments of the Iceland PFA include surface morphologies that vary in age from zero to 16.5 My. Access to subterranean lava caves and highly varied and active geothermal systems in Iceland will help prepare for future lunar and Martian missions.
2. <a href="#">Rio Tinto, CAB-CISC</a> , Spain.	The unique nature of Rio Tinto in Spain is caused by rock-water-biology interactions that produces a river with a pH of ~ 2.3 over a length of ~ 100 km. The acidic iron-sulphate rich PFA at Rio Tinto includes the estuarine region where the interaction of highly acidic river water with salt-rich marine waters results in major

	environmental change every ~12 hours. This places the local biota under extreme stress and makes the region ideal for the study of survival-adaptive mechanisms.
3. <a href="#">Danakil Depression</a> , University of Mekelle, Ethiopia (Call 1 only)	The exotic Danakil Depression PFA in Ethiopia is one of the hottest places on Earth, being below sea level and 14°N. It contains a huge variety of geological environments including active volcanoes and hydrothermal vents that produce acidic and saline lakes with a huge variety of evaporitic deposits, mineral assemblages, and diverse bacterial communities.
4. <a href="#">AU Kangerlussuaq Field Site</a> , Greenland.	The Kangerlussuaq PFA in western Greenland provides access to the glacial ice sheet, regions with permafrost, glacial sediments and glacial run-off which enters the ocean. The ice sheet includes features such as melt-water lakes, shear-planes, fissures and ice compaction effects. Such features make Kangerlussuaq an excellent analogue for icy ocean worlds, such as the moons studied by the missions to Saturn and Jupiter (e.g. JUICE).
5. <a href="#">Makgadikgadi Salt Pans</a> , BIUST, Botswana.	The Makgadikgadi Salt Pans PFA in north Botswana is the world's largest terrestrial saline lake system, with a surface area of 16,000 km <sup>2</sup> and variable Ca/Na/K water compositions.
<a href="#">6. , Argentinian Andes CONICET, Argentina</a>	Argentina Puna region: Dry-cold environments. The high-altitude Puna Plateau (4000-6000 m) of NW Argentina is characterized by hundreds of hypersaline lakes, ice and rock glaciers, hydrothermal systems, and environmental extremes with high-UV influx, extreme daily temperature fluctuations (> 40°C), strong winds up to 400 km/h), and volcanic-dominated geological settings. All ideal as a planetary analogue for Mars and other icy planets/moons environments.  Patagonia and Tierra del Fuego region: Wet-cold environments. The Southern Patagonia Ice field (48-52° SL) is the largest extra polar ice mass (13,000 km <sup>2</sup> ) in the Southern Hemisphere (40-60 km wide and 120 km long). Glaciers on the windward site are fed by high precipitation from Southern Westerlies. Precipitation decreases sharply on the eastern side of the Andes generating arid condition in the Patagonian steppe.

Visits to TA1.1 Iceland and TA1.4 Greenland have taken place during Year 2. Access to the Danakil Depression was not offered during TA Call 2 due to the political instability in the region. However, the suite of planetary field analogue sites offered by TA1 has been expanded during this year.

The Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) Córdoba, Argentina was unable to complete the administration in time to join the Europlanet 2024 RI project in February 2020. However, it rejoined as a beneficiary in the Grant Agreement of March 2021 and will offer access to field sites from the fast track call and TA Call 3 onwards. The Puna Plateau PFA in Argentina is characterised by

hundreds of hypersaline lakes, glaciers, rock glaciers, hydrothermal systems, and environmental extremes with high-UV influx, low water activity, extreme daily temperature fluctuations ( $> 40^{\circ}\text{C}$ ), strong winds (gravel dunes due to winds up to 400 km/h, Puruya and Carachi Pampa areas) and volcanic-dominated geological settings. All these features make the region ideal as a planetary analogue for Mars and other icy planets/moons environments. The Patagonia region shows records of glacial activity since the late Miocene (c. 7 My). Numerous temperate outlet glaciers flow from the ice field and terminate on land, sea or lakes. Glaciers on the windward side are fed by high precipitation from Southern Westerlies. Precipitation decreases sharply on the eastern side of the Andes generating arid condition in the Patagonian steppe where numerous small endorheic lakes develop.

Management of TA1 along with TA2 is overseen by the [Transnational Access Subcommittee](#) (TASC) and supported by the TA office at the VUA. A Code of Conduct was drawn up by the TASC and this has been signed by all TA Facility Heads. The TASC has also provided input to the Europlanet 2024 RI Data Management Plan. A post-visit evaluation form was drawn up in collaboration with the Evaluation Officer, and all participants are requested to complete this after visiting a TA facility. Key Performance Indicators (KPI) have been agreed with the Evaluation Officer (including meetings, training, inter-disciplinary collaborations, industrial partnerships) and a reporting system has been put in place.

The TASC has provided input to the text of the two TA calls issued during RP1 and has supported PFA leads in interactions with potential applicants.

Work carried out in collaboration with NA1 during RP1 has scoped out a reciprocal agreement between Europlanet 2024 RI and the Chinese Academy of Science, which will allow European researchers access to a number of PFA in China and Chinese researchers to access Europlanet 2024 RI facilities from TA Call 3 onwards.

-.

### **Task 2.2 Provision of Access to PFA (MATIS, CAB-CISC, MU, AU, BIUST)**

The second TA call, offering access to 4 TA1 field facilities, was opened on 10<sup>th</sup> November 2020 and closed on 6<sup>th</sup> January 2021. The peer review of applications by experts independent from the Europlanet 2024 RI project was managed by the ESF. The peer review and normalisation of the evaluations of the sub-panels was completed on 18<sup>th</sup> March 2021, discussed and approved by the Project Management Committee (PMC) and published 19<sup>th</sup> April 2021.

In Call 2, there were 23 applications for TA1 facilities, of which 17 were funded. The outcome of the Call can be viewed in Deliverable [1.6](#).

The Covid-19 outbreak has had a huge impact on the implementation of TA visits. In agreement with the field site leaders, all the field visits from 2020 were postponed and we are pleased to report that many were undertaken in 2021. Protocols for providing remote access to the TA1 sites have been given serious consideration. However, the poor or non-existent internet connections in the remote areas of the PFAs have to be taken into account, and expertise of the awarded scientists cannot be replaced in the field. Thus, no remote access to TA1 facilities has been provided

to date. However, the first four TA visits to Greenland and Iceland took place in July 2021 and visits to Botswana will be undertaken in 2021.

Furthermore, the political instability in Ethiopia at the end of 2020 has meant that the Danakil Depression site was not offered in Call 2. The feasibility of field visits to this PFA was re-evaluated in autumn 2021 and a decision was made not to include the site for the foreseeable future. The implementation period of all TA visits will continue to be monitored in light of the ongoing pandemic.

A fast-track TA Call was offered in November 2021. Due to the impact of COVID 19, not all facilities were able to offer access. The emphasis of the Call was to allow early-stage researchers (ESR) whose research funded by fixed length grants, were prioritised. Non ESR applicants were required to provide a justification why the proposal represented very high impact research. After extensive publicity at EPSC and on all forms of media, the Call opened on the 6th October and closed 3rd November. Thirty applications were received. Three applications were ineligible or considered not viable by the proposed host facility. ESF conducted the peer review process in a single panel and drew up a ranking. The PMC will set the cut off for funding and the result of the Fast Track Call will be announced in February 2022.

### **c. Impact to date**

Covid-19 has caused significant delays in RP1 to the expected impacts for the TAs. Extensive discussions and planning have been conducted to develop remote access procedures to the TA2 facilities and several remote visits have now taken place. Remote access remains challenging for TA1 but the first field visits were able to take place before the end of RP1. A major development in respect of TA access has been the addition of 11 new TA2 facilities at KBSI to be included in TA Call 2, and addition of TA1 field sites in Argentina and China.

The visitors who have conducted TA visits to date have all committed to make presentations of their results at EPSC and also have plans for journal articles as well as conference papers and wider outreach/dissemination based on their visits.

This also reflects the ongoing impact from the Europlanet 2020 RI, which will enhance the impact of 2024 RI. In addition to publications from the 2020 (and even 2012) RI that continue to come out, there have been multiple communications in popular media (e.g. interviews on television, radio and in national newspapers, particularly in the UK and the Netherlands). There have also been research collaborations that originated in TA visits, including participation in an interdisciplinary bid focused on art conservation (Davies), a UK Space Agency funded fellowship for a visitor to PMCF (bid supported by PMCF), and multiple co-authored papers between an NHM scientist and two-time visitor (Mohr-Westheide).

#### d. Summary of plans for Year 3

The outcome of the fast-track TA call is due in February 2022. The peer review process was completed in January 2022 and a ranking list produced. Funding will be determined in February after consultation with the TA facilities to establish the number of visits that they are able to host and a check that sufficient finances are available. Some facilities received more successful applications than they are scheduled to host.

A review will be undertaken at Easter 2022 of the outcome of the Fast Track TA applications and progress on the implementation of TA visits of Call 1 & 2. At that stage a decision will be taken as to if a second Fast Track call is viable/required in the late spring. The current plan is to launch a full TA call immediately after EPSC (October 2022), by which time it is expected that all labs and field sites will have reduced the backlog of funded TA visits.

We specifically note the need to widen participation and will follow up on the successful workshop held in 2021 where advice was given on how to prepare and submit successful TA proposals. Based on the current COVID situation, this is most likely to be a virtual meeting.

## 2 Update of data management plan

An update of the Data Management Plan is due Feb 2022. This will include details of the data storage repository developed for data generated during TA visits that will be managed by the TA office at VUA.

## 3 Access provisions to Research Infrastructures

Six TA1 visits have taken place during the 2<sup>nd</sup> year of the Project:

1. **TA project 20-EPN2-046: Dust-carbon-climate feedbacks tested through detailed independent dating of Arctic wind-blown dust sequences.** [TA1.4 AU Greenland Kangerlussuaq Field Site \(Greenland\)](#). 19-29 July 2021. Thomas Stevens and colleagues from Stockholm University and Uppsala University (Sweden) took part in a field campaign to investigate the dynamics of aeolian mineral dust activity and organic carbon burial in western Greenland. [Read more](#).
2. **TA project 20-EPN2-089: UPSIDES – Unravelling icy Planetary Surfaces: Insights on their tectonic DEformation from field Survey.** [TA1.4 AU Greenland Kangerlussuaq Field Site \(Greenland\)](#). 19-29 July 2021. Costanza Rossi, INAF - Astronomical Observatory of Padova (Italy), carried out successful fieldwork to identify tectonic structures in representative areas of the Isunguata Sermia (southern margin) and Russell glaciers (northern margin and terminus). The Isunguata Sermia and Russell glaciers represent optimal analogues for the study of deformation in glacial environments and their comparison with deformation that affects the icy satellites of Jupiter and Saturn. [Read more](#).
3. **TA project 20-EPN2-044: Investigating molecular and isotopic fingerprints of life on Greenland Ice Sheet (GRIS) cryo-ecosystems with astrobiological**



- interest for icy worlds. [TA1.4 AU Greenland Kangerlussuaq Field Site \(Greenland\)](#). **19-29 July 2021**. Laura Sánchez-García, CAB, CSIC-INTA (Spain), investigated molecular and isotopic fingerprints of life in Greenland Ice Sheet (GrIS) cryo-ecosystems with astrobiological interest for icy worlds. [Read more](#).
4. **TA project 20-EPN-017: LITRASV – Life in TRAvertine-Sinter Veins: a possible key to recognize extra-terrestrial life in tectonically-driven depositional systems. [TA1 – Iceland Field Sites, MATIS](#). 4-10 July 2021**. Enrico Capezzuoli, University of Florence and Andrea Brogi, University of Bari, carried out a detailed study of travertine and sinter depositional systems and related feeder conduits (veins) in cold desertic setting (Lýsuhóll and Hveravellir sites- Iceland), as possible repositories of subsurface life to be observed in extra-terrestrial setting. [Read more](#).
  5. **TA project 20-EPN2-065: Characterizing dust lifting events using the ground-based Mars-2020-RDS and ExoMars 2022-SIS radiometers. TA1 – Botswana Field Sites, BIUST. 28 September –7 October 2021 (In-Person)**. Daniel Toledo Carrasco and colleagues from Instituto Nacional de Técnica Aeroespacial (INTA), performed a study dust lifting events (dust devils or dust lifting by wind gusts) using the spare units of the Radiation and Dust Sensor (RDS) and the Sun Irradiance Sensor (SIS). These instruments are part of the NASA Mars 2020 and ESA/Roscosmos ExoMars 2022 missions, and they are designed to study the optical properties of the airborne dust on Mars. [Read more](#).
  6. **TA project 20-EPN2-121: Constraining the movement of groundwater and fluid expulsion within playa environments on Mars. TA1 – Botswana Field Sites, BIUST. 19-28 October 2021 (In-Person)**. Gene Schmidt, Università degli Studi Roma Tre, imaged the subsurface of a Martian analogue to better understand how water processes on Mars might have continued as the Martian global climate became drier. [Read more](#).