



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 D2.4

Deliverable Title: TA1 PFA 4th Year Report
Due date of deliverable: 31st January 2024
Nature¹: R
Dissemination level²: PU
Work package: WP2
Lead beneficiary: UNIBO
Contributing beneficiaries: VUA
Document status: Final

Start date of project: 01 February 2020
Project Duration: 54 months
Co-ordinator: Prof Nigel Mason, University of Kent

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 communities have continued to demonstrate that they are highly motivated to undertake research at the facilities offered by Europlanet 2024 RI. Four TA calls have been conducted, one Fast Track aimed at younger scientists and three full calls. The results of the final Call (call 3) were disseminated in the first weeks of 2023 and published in February 2023. One hundred and fourteen applications were made to Call 3. The independent peer review panel commented on the high quality of the science and stated that 74 projects were suitable for funding. The TASC-PMC approved 71 applications for funding. This included nine from underrepresented countries. Eighteen PFA visits were approved for funding as part of TA1.

Over the course of the RI a total of 330 applications have been made to the four calls (two in 2020, one 2021 and final call in 2022). Three hundred and nine applications passed the eligibility criteria: i.e., an anonymous application for trans-national access and the applications were considered viable by the host facility. A total of 211 applications were approved by the Project Management Committee. To date 4 projects have either been subsequently cancelled (e.g. Ethiopia, see below) or discontinued by the recipient due to changes in circumstances or sample availability, all linked to delays caused by the COVID-19 pandemic. This leaves 202 TA visits to be implemented in the duration of the project. By the end of 2023, 152 TA visits were fully completed (> 75%). This includes finalised financial and scientific reports. Additional TA visits have been initiated but as yet full reports not been completed.

Seventy-nine applications have been made to utilise the planetary field analogue sites (PFA) of which 45 were approved. Access to the field site in Ethiopia-Eritrea PFA has been suspended due to political events. Unfortunately, this decision is now for the duration of the project. No applications to Qaidam, Mongolia passed the peer review process. The remaining PFA sites all hosted visits in 2023.

A deadline of May 1st 2024 has been set for the completion of all PFA site visits. Dates for future visits have been finalised and approved by the TA management and planning of the implementation of future visits is monitored by the TA office in Amsterdam.

To date 36 reports of PFA visits have been completed and reports validated: The completed reports are 5 to field sites in Greenland, 15 to Iceland, 10 to Botswana, 2 to Spain and 4 to Argentina. The outstanding 10 visits to PFA sites have either already been undertaken and are in the data processing phase (e.g., remaining Argentina visits) or are scheduled to be concluded before the end of April 2024.

Feedback received from 36 visitors reflects the positive experience of and impact of visits to field sites. Impacts ranged from conference papers and journal articles, to collaborative work, including funding bids, to new research questions and ideas. Notably, these impacts were substantial for early career visitors, highlighting impacts of the programme on both current and future scientific research.

Table of Contents

Contents

1. Explanation of TA1 & Overview of Progress	3
---	----------

a) Objectives	3
c. Impact to date	5
d. Summary of plans for the remainder of the Project.....	7
2. Update of data management plan	7
3. Access provisions to Research Infrastructures.....	7
4. Follow-up of recommendations & comments from previous review(s)	7

1. Explanation of TA1 & 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 6 well-characterised Planetary Field Analogues (PFA), located in Argentina (2), Spain, Iceland, Botswana and Greenland, which 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 2024 RI has expanded the facilities available for the TA program through strategic international collaborations during the RI. 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. Both sites are managed by CONICET who were added as a beneficiary in a previous Grant Amendment. Visits were conducted to both sites in 2023 although not all visit reports have yet been finalised. The Qaidam region of Mongolia was also offered as a field site through collaboration with the Chinese Academy of Science. No projects submitted to this facility passed the peer review quality cut-off. Moreover, this PFA appears to have insurmountable administrative issues related to access to a politically sensitive region where there is a large military presence. We were informed at the start of 2023 that a least a year is required to obtain visas for access. This situation was a surprise to the project as we had been assured that there would be no such restrictions or administrative delays. The Qaidam site will not be included in any future RI applications.

Task 2.1 – Management (VUA, UNIKENT, UNIBO, ESF, AU, NHM)

During the fourth year of the project, Task 2.1 has continued to coordinate the provision of access to the 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.

Management of TA1, along with TA2, is overseen by the Transnational Access Sub-committee (TASC) and supported by the TA office at the VUA. The TASC has provided input to the text of the four TA calls and has supported PFA leads in interactions with potential applicants. Profs Barbara Cavalazzi and Gareth Davies take the responsibility with maintaining contact with the PFA site leads to ensure successful implementation of visits and the most efficient travel arrangements. As the end of the project approaches, the VU TA office is regularly checking the implementation plans for future PFA site visits and has set the deadline of May 1st for all visits to be conducted.

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

The results of the third and final full call, offering access to 7 TA1 field facilities closed on 20th October 2022. 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 7th December 2022 discussed and approved by the Project Management Committee (PMC). Acceptance and rejection letters were sent in the first week of January 2023. The full outcome of the call was published in February 2023. One hundred and fourteen applications were made to Call 3. The independent peer review panel commented on the high quality of the science and stated that 75 projects were suitable for funding. The TASC-PMC approved 70 applications for funding. This included nine from underrepresented countries. Seventeen PFA visits were approved for funding.

The COVID-19 outbreak initially had a huge impact on the implementation of TA visits. In agreement with the field site leaders, all the field visits scheduled for 2020 and the start of 2021 were postponed. We are pleased to report that the great majority (>80%) of visits to PFA sites have been undertaken and all remaining visits have scheduled dates. Protocols for providing remote access to the TA1 sites are continually being reviewed and tested. However, the poor or non-existent internet connections in the remote areas of most 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 but is an area of research by the TA hosts.

Seventeen reports were finalised for TA visits undertaken in 2023. TA1.1 Iceland hosted 8 visits. Access to the Danakil Depression TA 1.3 was not offered during TA Call 2 & 3 and the fast-track call due to the political instability in the region. Greenland TA1.4 hosted 2 visits in 2023. TA1.5 Botswana has also proved to be in high demand and four TA visits have been finalised and several more started. Three visits to the Puna Plateau PFA in Argentina (TA 1.6) were reported in 2023 and the field visits conducted to the Puna region but the scientific reports have not yet been finalised as sample analysis is ongoing.

Table 1: TA1 Planetary Field Analogue (PFA) Facilities offered during year 4

PFA site	TA visits 2023	Description
1. Iceland Field Sites, Matis, Iceland.	22-EPN3-011 22-EPN3-061 22-EPN3-116 22-EPN3-130 22-EPN3-007 20-EPN2-071 22-EPN3-129 22-EPN3-126	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. Rio Tinto, CAB-CISC, Spain.	No reports in 2023	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.
4. AU Kangerlussuaq Field Site, Greenland.	22-EPN3-049 22-EPN3-105	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. Makgadikgadi Salt Pans, BIUST, Botswana	22-EPN3-070 22-EPN3-024 22-EPN3-026 22-EPN3-041 22-EPN3-006 22-EPN3-024	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 ² and variable Ca/Na/K water compositions.
6a. Argentina Puna Region, CONICET, Argentina	21-EPN-FT1-018 21-EPN-FT1-003 21-EPN-FT1-026 21-EPN-FT1-024	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.
6b. Patagonia, CONICET, Argentina	2 visits conducted but reports outstanding	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 ²) 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.
7. Qaidam Basin, Chinses academy of Science	No successful applications to date	The Qaidam Basin lies in the north of the Tibetan Plateau covering a total area of 120,000 km ² . It is the highest desert on Earth and the largest sedimentary basin in the Tibetan Plateau. Development of the high elevation over the last 20 million years eventually resulted in a hyper-arid climate with a low-mean annual temperatures (as low as 1.9°C) and tremendous diurnal temperature fluctuations (up to 64°C. The Qaidam Basin has many ancient lakes, sedimentary deposits and rich geomorphological features that provide an excellent analogue environment of Mars.

c. Impact to date

COVID-19 caused significant delays to the expected impacts for the TA visits. 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, see below. Thirty-six field visits have taken place and been reported and the visits have been conducted to the Patagonia region of Argentina. Presentation of results at conferences and initial publications have been made.

Overall satisfaction with TA visits was extremely high – of the 36 feedback forms returned for TA1, overall visit rating was 5.75 (out of 6). Moreover, interactions with hosts were rated an average of 5.61 and field site environment 5.64. Such high levels of satisfaction were also experienced by the early-stage researchers who went on these visits. In addition, 29 of 35 visitors (including 17 early-stage researchers) reported that the visit had inspired them to consider new lines of research activity.

Visitors who have conducted TA visits to date have all committed to make presentations of their results at the Europlanet Science Congress (EPSC) and also have plans for journal articles as well as conference papers and wider outreach/dissemination based on their visits. The successful implementation of EPSC proved a perfect forum to assess the impact of the TA program. Multiple sessions included contributions from TA visitors (TP4,5,6,15,17,OPS3) with some sessions dominated by TA 1 contributions (e.g. TP17).

The success of TA visits from the current and past Europlanet RIs is also reflected by continual output of publications [Europlanet 2024 RI Publications – Europlanet Society \(europlanet-society.org\)](https://www.europlanet-society.org). The RI has also been active with multiple communications in popular media (e.g. interviews on television, radio and in national newspapers). There have also been research collaborations, often with the hosts as well as with other visitors, that originated in TA visits, including participation in an interdisciplinary bid focused on art conservation for submission in Jan 2023 (Davies), as well as funding applications to return to field sites for more comprehensive data collection or to pursue new questions that emerged from the visits, among others. The potential for these visits to support collaborative activity is also highlighted by the fact that 29 of 36 visit reports (including 17 by early-stage researchers) reflected an intention to pursue future collaborative activity with the field site facilities. This most typically included writing papers together, but also included writing bids. Across the TA programme, visits have started to have far wider impacts, such as on the way science is conducted. For instance, one researcher described her efforts – which emerged out of and were reinforced by her visit to Botswana – to support engaged research (or to conduct fieldwork in a way that is supportive of local communities and connects to local knowledge). In another example, visits to Iceland had proved to be a testing ground for instrumentation that is the basis for a successful SME.

The impact of these visits on the careers of ECSs should also not be underestimated. They often allow for significant advances in collection of data for doctoral or post-doctoral projects, thus accelerating and strengthening the research, can increase understanding beyond their immediate fields and, particularly, frequently lead to new insights and even new research questions. But perhaps even more importantly, they enable the formation of networks and connections that are crucial to scientific and career advancement. Most if not all of these visits simply would not be possible without Europlanet 2024 RI funding, and multiple visitors reported that this is particularly key due to the limited funds that are available for ECSs. Additionally, the programme could be regarded as a good investment, because the impact on early career researchers is likely to extend the impact of the visits, scientific and otherwise, for the field well into the future.

d. Summary of plans for the remainder of the Project

The focus for 2024 is ensuring implementation of assigned visits with rigorous monitoring by the TASC to identify any potential delays. Both TA leads and the TA awardees have been informed of the deadlines for completion of the visits and final reports and that funding will only be given to visits that are completed before the end of April 2024. Unfortunately chasing up TA visitors to provide the visit reports is often required.

2. Update of data management plan

The TASC has provided input to the Europlanet 2024 RI Data Management Plan and in collaboration with members of VESPA is developing a data storage protocol for data generated by TA visits.

3. Access provisions to Research Infrastructures

Links to summaries of all the TA visits reported to date can be found on the project website <https://www.europlanet-society.org/europlanet-2024-ri-ta-visit-report-summaries/>

Specific links to the projects completed in 2023 can be found in Table 1 above.

4. Follow-up of recommendations & comments from previous review(s)

We note that despite extensive action that included specific workshops and online training sessions, the number of URS applications remains relatively low (~20%) and that they have a lower success rate (<40%). In any future RI, we will continue to hold workshops where advice and practical examples were given on how to prepare and submit successful TA proposals.

A second issue is the cost of TA visit implementation. Post-COVID-19, travel costs have increased. Moreover, if allowed, TA visitors tend to leave the organisation of travel and accommodation until the last minute, incurring excessive costs. TA leads need to be made more proactive to reduce these costs.

A final action point is to ensure that the role of the Europlanet 2024 RI in PFA site visits is widely disseminated at international meetings and in publications. Regular reminders are sent to both TA leads and awardees to acknowledge the role of the RI in their work.