



eur PLANET 2024

Research Infrastructure

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 D2.3

Deliverable Title: TA2 PFA 3rd annual report
Due date of deliverable: 31 January 2023
Nature¹: Report
Dissemination level²: 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:

Despite the impact of COVID-19, the Planetary Science and broader scientific community demonstrated that they are highly motivated to undertake research at the facilities offered by Europlanet 2024 RI. One hundred and fourteen applications were made to TA call 3, including 29 to planetary field analogues (PFA). Political events in Ethiopia-Eritrea resulted in access to the field site being suspended, most probably for the duration of the project. Applications to the Qaidam Basin in Mongolia have so far not passed the peer review threshold. After peer review, funds were allocated to visits to all the other TA1 field analogue sites.

Four TA calls have been conducted by the end of year three, one Fast Track aimed at younger scientists and three full calls. The results of the Fast Track were published in February 2022. The results of the 2022 Call 3 were disseminated in the first week of 2023. The period of time allocated for completion of TA visits awarded in Call 1 & 2 and the Fast track has been extended until April 2023 and the implementation period of the third full call was set at May 2024.

To date 19 reports of PFA visits have been completed and validated. Reports of visits undertaken to Argentina in December 2022 are expected shortly and other completed PFA visits are at the data processing stage. During this reporting period, 13 TA visits were completed to the field sites in Iceland (6), Botswana (4), Spain (2) and Argentina (1).

Table of Contents

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 7 well-characterised Planetary Field Analogues (PFA), located in Argentina (2), Spain, Iceland, Botswana, Greenland and Mongolia, 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 has expanded 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. Both sites are managed by CONICET who were added as a beneficiary in a previous Grant Amendment. The Qaidam region of Mongolia is offered as a field site through collaboration with the Chinese Academy of Science.

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

During the third 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.

Management of TA1, along with TA2, is overseen by the Transnational Access Subcommittee (TASC) and supported by the TA office at the VUA. The TASC has provided input to the text of the four TA calls issued so far and has supported PFA leads in interactions with potential applicants.

The TASC, in consultation with ESF oversaw the TA calls. The TASC has provided input to the Europlanet 2024 RI Data Management Plan and in collaboration with members of VESPA is finalising a data storage protocol for data generated by TA visits. The TASC reviews post-visit evaluation forms in collaboration with the Evaluation Officer, and takes any action deemed necessary to improve the implementation of TA visits.

Due to the remote location of the Qaidam Basin and the necessity to obtain official permission to access it by the Chinese government, a preparation phase of 6 months will need to be taken into account before the visit. The inclusion of this field site is therefore under review as this long lead time, coupled with COVID-19 regulations, is proving impractical.

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

Due to the impact of COVID-19, a Fast Track TA call, offering access to 4 TA1 field facilities, was opened on 1st October 2021 and closed on 3rd November 2021. Due to the impact of COVID 19, not all facilities were able to offer access. The emphasis of the Call was to ensure that 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.

The peer review of applications by experts independent from the Europlanet 2024 RI project was managed by the ESF. The peer review of the evaluations of the sub-panels was completed 13th January 2022, discussed and finalised by the Project Management Committee (PMC) February 2022. Of the twenty-seven applications deemed eligible (three failed), twenty were approved for funding, including 5 for PFA sites.

The third full call, offering access to 7 TA1 field facilities, was opened on 20th September 2022 and 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 will be 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 have been 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 many were undertaken in 2021 and 2022. 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

Thirteen reports have been finalised for TA visit undertaken in 2022. TA1.1 Iceland hosted six visits, TA1.2 Rio Tinto two 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 2021 but did not offer access as part of the fast-track call due to the complications of COVID-19 in such remote areas. Applications have been approved for 2023. TA1.5 Botswana has proved in high demand and four TA visits have been finalised and several more started, with 6 more planned for the next period. The first four visits to The Puna Plateau PFA in Argentina (TA 1.6) were carried out in 2022 but only one scientific report has been finalised as sample analysis is on-going.

Table 1: TA1 Planetary Field Analogue (PFA) Facilities offered during year 3

| PFA site | TA visits 2022 | Description |
|---|---|---|
| 1. Iceland Field Sites, Matis, Iceland. | EPN-003 EPN2-066 EPN2-099 EPN2-105 EPN2-120 EPN2-122 | 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. | EPN2-015 EPN2-020 | 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. | 2 visits in 2021, none 2022; Three approved for 2023 | 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 | EPN-024 EPN-028 EPN-061 EPN2-085 | 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 | FT1-026 plus three additional visit reports being finalised | 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 applications approved for 2023 | 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 has caused significant delays 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. Nineteen field visits have taken place and the first four visits have been conducted to the Puna region of Argentina. Two visits are planned to Patagonia in 2023.

Overall satisfaction with TA visits was extremely high – of the 20 feedback forms returned for TA1, overall visit rating was 5.85 (out of 6). Moreover, interactions with hosts were rated an average of 5.70 and field site environment 5.65. Such high levels of satisfaction were also experienced by the early-stage researchers who went on these visits. In addition, 17 of 20 visitors (including 9 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 \(europlanet-society.org\)](#)). 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 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, among others. The potential for these visits to support collaborative activity is also highlighted by the fact that 16 of 20 visit reports (including seven by early-stage researchers) reflected an intention to pursue 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 early-stage 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 ESRs 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, often 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. For instance, one former visitor described how not only had his visit directly led to his employment at ESA but also led him to create a network of scientists who collaborate around coding glitches, a new way of working in his field. Most if not all of these visits simply would not be possible without Europlanet 2024 RI funding.

d. Summary of plans for Year 4

The outcome of Call 3 has been communicated to the applicants. Some facilities received more successful applications than they are able to host. The focus for the start of 2023 will be ensuring implementation of assigned visits with rigorous monitoring by the TASC to identify any potential bottlenecks. A review will be undertaken in September and a decision will be taken as to whether a final TA call is viable/required in the winter of 2023. Such a call would require a strict implementation plan to ensure that any newly funded visits could be implemented before the end of the project in 2024.

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 finalising 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 2022 can be found in Table 1 above.

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

We note that despite extensive action, 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 follow up on the successful workshop held in 2021, where advice was given on how to prepare and submit successful TA proposals. Such activities will be written into any future RI applications.