Proposal form for Multi-domain Access to RI platforms

1. Project Information

Project title:	**Design of a light multi-parameters station based of the GEOCUBE+ architecture**			
Project acronym: (20 char. max)	**GEOCUBE+@Etna**			
Integration in ENVRIplus ENV domains (min. 2)**:**	X Atmosphere	☐ Bio-Eco sphere	☐ Hydro / Marine	X Solid Earth
Selected multi-disciplinary RI platform:	☐ SMEAR II – HYYTIÄLÄ	☐ OSUR (LA REUNION ISLAND)	☐ USRL Cyprus	
	☐ SOERE-ACBB	X INGV ETNA	☐ P2OA-Drones	

Main contact of RI platform: (see guidelines)	Giuseppe PUGLISI	**Email:**	Giuseppe.puglisi@ingv.it
Planned project dates:	**Start date:** *04/07/2018*	**End date:**	*26/10/2018*[5]
	Potential flexibility of project dates? (in case of unforeseen/unexpected events or logistic conflicts)	☐ Yes ☐ No *… (give details if necessary) …*	

2. Principal Investigator

First and LAST name:	Pierre BRIOLE	**Gender:**	☐ F X M
Home institution:	CNRS / ENS-PSL - UMR8538 Laboratoire de Géologie de l'ENS		
Postal address:	24 Rue Lhomond - 75005 Paris		
Country:	France	**Phone number**	+33 6 08 60 12 74
E-mail:	briole@ens.fr		

User status:	X EXP	☐ PDOC	☐ PGR	☐ TEC	☐ UND
	☐ SME	☐ OTHER: ……			

3. Recent References *(both PI and key participants, min 5 references / if no references available please provide short CV)*

- Benoit L., P. Briole, O. Martin, C. Thom, 2014. Real-time deformation monitoring by a wireless network of low-cost GPS, Journal of Applied Geodesy, 8, 2, 119-128, doi:10.1515/jag-2013-0023
- Benoit L., P. Briole, O. Martin, C. Thom, J.P. Malet, P. Ulrich, 2015. Monitoring landslide displacements with the Geocube wireless network of low-cost GPS, Engineering Geology, 195, 111–121
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- De Michele M., P. Briole, 2007. Deformation between 1989 and 1997 at Piton de la Fournaise volcano retrieved from correlation of panchromatic airborne images, Geophysical Journal International, 169, 357–364
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- Houlié N., J.C. Komorowski M. de Michele, M. Kasereka, H. Ciraba, 2006. Early detection of eruptive dykes revealed by normalized difference vegetation index (NDVI) on Mt. Etna and Mt. Nyiragongo, Earth and Planetary Science Letters, 246 , 231–240
- Lasri M.A., P. Briole, C. Thom, O. Martin, F. Verluise, A. Bonforte, 2018. Surveillance des déformations des volcans avec des réseaux de Géocubes. Expériences et leçons d'un déploiement sur l'Etna. 27th research days, IGN, 22&23 march 2018

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- Roberts T.J., D. Vignelles, M. Liuzzo, G. Giudice, A. Aiuppa, M. Coltelli, G. Salerno, M. Chartier, B. Couté, G. Berthet, T. Lurton, F. Dulac, J.B. Renard, 2018. The primary volcanic aerosol emission from Mt Etna: Size-resolved particles with SO2 and role in plume reactivation halogen chemistry, Geochemica et Cosmochimica Acta 222, 74-93
- Sellitto P., G. Salerno, P. Briole, 2017. The EtnaPlumeLab (EPL) research cluster: advance the understanding of Mt. Etna plume, from source characterisation to downwind impacts, Annals of Geophysics, Fast Track 6, doi:10.4401/ag-7106
- Sellitto P., G. Salerno, A. La Spina, T. Caltabiano, L. Terray, P.-J. Gauthier,and P. Briole, 2017. A novel methodology to determine volcanic aerosols optical properties in the UV and NIR and Ångström parameters using Sun photometry, J. Geophys. Res. Atmos., 122, 9803–9815, doi:10.1002/2017JD026723
- Terray L., P.-J. Gauthier, G. Salerno, T. Caltabiano, A. La Spina, P. Sellitto, and P. Briole, 2018. A New Degassing Model to Infer Magma Dynamics from Radioactive Disequilibria in Volcanic Plumes, Geosciences, 8, 27; doi:10.3390/geosciences8010027
- Wilkes T.C., T.D. Pering, A.J.S. McGonigle, G. Tamburello, J.R. Willmott, 2017. A Low-Cost Smartphone Sensor-Based UV Camera for Volcanic SO 2 Emission Measurements, Remote Sens., 9, 27, doi:10.3390/rs9010027
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4. Project Participants

The role of each participant listed must be explained, see also section 5.

Name	Institution	Email	Research status EXP/ PDOC/ PGR/ TEC/ UND/ SME/ OTHER	Gender *M/F*	New user *Y/N*	Access start *dd/mm/yyyy*	Access end *dd/mm/yyyy*	Access days
Pierre BRIOLE	CNRS / ENS-PSL	briole@ens.fr	EXP	M	N[1]	04/07/2018	21/07/2018	16
Olivier MARTIN	IGN	olivier.martin@ign.fr	OTHER (Engineer)	M	Y	04/07/2018	15/07/2018	10
Tjarda ROBERTS	CNRS / LPC2E Univ. Orléans	tjarda.roberts@cnrs-orleans.fr	EXP	F	Y	04/07/2018	15/07/2018	10
Marcello De MICHELE	BRGM	m.demichele@brgm.fr	EXP	M	Y	07/07/2018	15/07/2018	7
Alessandro BONFORTE	INGV / OE	alessandro.bonforte@ingv.it	EXP	M	n/a			
Francesco GUGLIELMINO	INGV /OE	francesco.guglielmino@ingv.it	EXP	M	n/a			
Pasquale SELLITTO	ENS-PSL / IPSL	psellitto@lmd.ens.fr	EXP	M	N	04/07/2018	15/07/2018	7[3]
Luca TERRAY	Univ. Clermont Auvergne	luca.terray@clermont.in2p3.fr	PRG (PhD student)	M	N	04/07/2018	21/07/2018	16[7]
Suzanne CRUMEYROLLE	Univ. Lille	suzanne.crumeyrolle@univ-lille1.fr	EXP	F	Y			
Benjamin HANOUNE	Univ. Lille	benjamin.hanoune@univ-lille1.fr	EXP	M	Y	04/07/2018	15/07/2018	7
Andrew McGONIGLE	Univ. Sheffiled	a.mcgonigle@sheffield.ac.uk	EXP	M	Y			
Giuseppe SALERNO[11]	INGV / OE	Giuseppe.salerno@ingv.it	EXP	M	n/a			
							Total number of access days :	**73**

5. Project Description

Include ample information on multi-domain objectives or how interdisciplinarity can be enhanced regarding the research team, expertise instrumentation, methodology, project results, impact, etc. The proposal should target integration of at least 2 different ENV domains. See guidelines for specific information required on each of the sub-sections.

Scientific objectives *(max 350 words)*

We develop a light, portable and rugged multi-parameter station (GEOCUBE+) that can be installed in the near field of volcanic vents. This station will acquire geochemical, atmospheric, seismic and deformation data. Near field observations are needed to understand the dynamics of volcanic eruptions and their impact in the atmosphere and in the ground. During the last decades 50+ paroxysms occurred at Etna with projections inducing a threat kilometres away from the crater. Documenting and modelling the preparatory phase of paroxysms is of the highest importance for science and for security. The paroxysms are preceded by a range of precursory signals, *e.g.* tremor, ground motions, changes of the plume chemistry. We want to better decipher those signals and develop models to progressively forecast not only the events but also their strength. Our approach is multi-disciplinary, bridging solid Earth and atmosphere sciences. Indeed the physics of the paroxysms involves both the mechanical structure of the volcano and the physical and chemical properties of the fluids that circulate in it before signing its atmospheric effluents ([13]). There is also a meteorological and climatic impact of the paroxysms at long distance, due to the transport of gas of aerosols in the atmosphere. The GEOCUBE+ field observations we will coupled with remote sensing observation made from satellites and from the ground. The real-time data transmission and remote control of our systems is embedded in our project. The GEOCUBE+@Etna system will be designed so as to be compliant with the monitoring array of the INGV-OE. INGV-OE will be able to access immediately to the GEOCUBE+ data, and vice-versa our system will be able to assimilate a stream of routine monitoring data of INGV-OE. Our project is built in synergy with EDUMED (http://edumed.unice.fr) which is an education driven project. This will give more impact to our research and technologies in the educational and academic community from Europe. As one of the characteristics of the GEOCUBE+ (and its sensors) is a relatively low cost, it might be of interest for educational purposes. Our project is open to students at Master level. We aim to contributing to their experimental culture and expertise in geophysical and geochemical observations (atmosphere and solid Earth) in real field conditions. Such expertise is of course transferable to other fields, *e.g.* the monitoring of urban pollution for example.

State-of-the-art / Novelty *(max 100-150 words)*

This project inherits from the expertise acquired with five proto-Geocubes (GPS only) installed on Etna in 2016-2017 (http://volcano.iterre.fr/etna-geocubes). Previously tested in the Alps, Etna was, for those systems, the first experimentation in harsh volcanic environment with snow, ice, wind, lightning, ash, gas. All hardware components working well after one year. The main failures came from the energy (solar panels) and the telemetry antennas. Our 2018 project is multi-disciplinary, gathering scientists from the solid Earth, the atmosphere, experts of micro-sensors, satellite remote sensing, geodesy, seismology. Our approach is built on the concepts of the EMEWS project (http://emews.eu), the first pan-European project designed for the deployment of light inter-operable arrays of sensors on volcanoes. We will make an inventory of the other light portable systems deployed at Etna by other teams in recent years and establish contacts with them. Some of them were involved in the MEDSUV project. Our project is open and we look forward other groups joining us.

Technical description of work to be performed *(max 350 words)*

This is a three years project 2018-2020 and here we describe the 2018 work plan. The GEOCUBE+ will handle multi-parameter GNSS, geophone, meteorological, gas, particle sensors. Our work is built on solid technical know-how and the exigency of robustness. The system will include low consumption telemetry to-from a “coordinator” hosting 3G internet telemetry, installed in the INGV-OE shelter of Montagnola. Then, in 2019, we plan installing 3G telemetry directly inside the GEOCUBE+, which will require advanced power management. Our main 2018 test site will be the “Geocube miracolato” site, 150m north-east of the Cisternazza, near the Valle del Bove crest. We expect the plume to pass sufficiently often and dense there. To monitor SO_2, we will use SO2-AE-A4 sensors with low-noise AFE electronics boards (http://www.alphasense.com/index.php/products/sulfur-dioxide-air/), using our earlier proof-of-concept ([6]). With respect to past deployments, the GEOCUBE+ will enable longer-term plume exposure and composition monitoring. We plan also 4 days of observations at a site to be set-up near the summit, either near the former Torre del Filosofo, or Pizzi Deneri observatory, under the control and instructions of INGV-OE for the security aspects. There we will connect H_2S and HCl sensors to the GEOCUBE+. For particles, we will operate, during temporary sessions, two optical particle counters (OPC), developed at Univ. Lille. In 2019, we will add the version 2 of the Light Optical Aerosol Counter (LOAC) of the LPC2E-CNRS-Univ. Orleans. In 2018, we will not integrate gas and particle sensors directly in the GEOCUBE+ electronic board, but use their native interface as gateway. We plan further direct integration of sensors onboard the GEOCUBE+ for the 2019 and 2020 experiments, to simplify the system and optimize power consumption and robustness. Using our experience of the 2016-2017 EPL-Radio project, we will perform sun-photometer observations at the GEOCUBE+ site, and investigate the possibility of automation in 2019. Coupling SO_2, OPC and sun-photometer data will give constraints on the atmospheric processes of volcanic aerosols formation at short distance from the vents. The GEOCUBE+ will be also operated in synergy with remote sensing observations. It will incorporate a small corner reflector designed for Sentinel-1 waves backscattering and we will perform observations with the portable radar interferometer of INGV-OE. Ground radar and atmospheric data can be coupled to study the presence and evolution of particles of diameter > 1 mm and liquid water in the plume that will sign the radar phase and attenuation. Finally, the analysis of the radioactive aerosols Pb/Bi/Po collected at the GEOCUBE+ will be analyzed by Univ. Clermont Auvergne (PhD thesis of L. Terray).

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Relation to business & innovation (max 50-100 words)

The project 2016-2017 was supported by the company Kylia (http://kylia.com) who provided the equipment and supports the PhD thesis of Amjad Lasri (defence in early 2019). Kylia will continue to support technically the 2018 activity. Since the 2016-2017 experiment, INGV-OE has been considering using the GEOCUBE technology for routine multi-parameter monitoring at Etna and for landslides in the Peloritans mountains. Our project provides technical and scientific elements to INGV-OE for adopting of not this technology in its future operational arrays.

Expected results and deliverables (max 100 words)

This is a demonstration project tailored to be useful to INGV-OE and enhance its observational capability. Our 2018 action will focused on a pool of new sensors attached to the GEOCUBE+. We are a multi-disciplinary team, with experience and a mix of young and senior scientists and engineers. Our system will be interoperable in bidirectional way with the permanent INGV-OE array, *i.e.* exporting data to the INGV-OE array, and importing data from it. We look forward to having full collaboration with INGV-OE for implementing the project. Our strategy includes synergy with space and ground radar systems. We will deliver data, products and reports at http://geocube-etna.emews.eu with data mirrored on the web portal of INGV-OE. The project pages will be also accessible at http://volcano.ens.fr

6. *On-site requirements during access*

On-site support needed by user group at/by the infrastructure: (see guidelines for details)	**Administrative/ Logistic:**	- One 4WD car to access every day (also week-end of July 7-8[4]) to the working area during the access period - Access to the INGV-OE facility of Nicolosi to put our equipment and tools and work every afternoon after fieldwork (also week-end of July 7-8) - Availability of the INGV-OE ground based radar during the access period - Basic tools (e.g. driller, generator, …) needed to install the new site in the summit area + 1 inox pole (similar to those of the proto-Geocubes sites) - 2 portable GNSS receivers (*e.g.* Topcon Hiper-pro)
	Technological/ Scientific:	- One partner scientist from INGV every day during the access period (also week-end of July 7-8)
	Training:	- We would welcome one or two students from the University of Catania, at master level in Geosciences, Physics or Chemistry course, who would be interested in participating to the campaign. Our Universities can host students in Erasmus leave.
	Other:	

7. *Data management*

It is mandatory that data from measurements at ENVRIplus platforms will be provided for long-term storage and access, to make it available for use across domains and to foster cross-domain collaboration.

If additional instrument(s) are deployed during the project, please include a list of instruments you plan to bring to the site during the access: (expand table if necessary)

Additional instrument(s)	Resulting variable(s)	Principle investigator (Name, E-mail[12])
GNSS	see text	Bonforte / Briole
Geophone	see text	Martin
Temperature	see text	Martin
Pressure	see text	Martin
SO2	see text	Roberts
H2S	see text	Roberts
HCl	see text	Roberts
OPC	see text	Hanoune / Crumeyrolle
Corner reflector	see text	De Michele / Guglielmino
Sun-photometer	see text	Sellitto / Terray / Salerno
Portable SAR interferometer	see text	Guglielmino / Bonforte
Low-Cost Smartphone Sensor-Based UV Camera for SO_2 measurements	(planned for 2019, preliminary tests possible in 2018)	McGonigle

Do you agree to make available the measurement data resulting from your access to the corresponding ENV

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domain data centre? *(E.g., from other additional measurements at the site or from additional instrument(s) deployed during the access.)*

X Yes[2] ☐ No. *If No, please justify:* ….

Please describe the data resulting from the access in more details:
All above data will be primarily available through our project portal (see section 5), in their native format for data and initial products. Then the data will be mirrored to the INGV-OE portal either in the original format or in the local formats used at INGV-OE.

8. Estimated project costs in EUR

a. Travel costs	Travel costs per person (a1)	400[8]	No of participants (a2)	7	Total travel costs (a1 x a2)	2800 €
b. Daily subsistence costs	Daily subsistence costs per person (b1)	85 €[9]	No of access days (b2), cf. #4 above	73	Total subs. costs (b1 x b2)	6715 €
c. Other costs (e.g., shipping)	Provide details:	Rental of 2 cars station-wagon 26 days in total, including full insurance and one with young driver: 2760 € Fuel for the cars: 300 € Various small expenses of consumables in the field: 500 € Equipement/development costs: Consumables and equipment for developing and preparing the sensors in our labs from March to June 2018: ~10000 € (not replicated in the table) Personnel cost (including lab environment): ~10 man x month (preparation, campaign, analysis and delivery of data and products) = 70000 €			Total other costs	3560 €
d. Total costs					(a+b+c)	13075 €
e. Co-financing	Provide details, if applicable:	Percentage requested to Envri+: drops to 43% when taking into account the consumable and equipment supported by the laboratories specifically for this research, and drops to 12% when taking into account the manpower costs			Percentage requested to ENVRIplus (e)	76.5 %
f. Grand total					(d x e)	**10000 €**[10]

9. Comments *(optional)*

([1]) Partner in the ENVRI+ project EPL-Radio, not supported by that project but conversely contributing to its co-financing
([2]) And vice-versa we expect from the host institution to provide us with all observatory data acquired during the access period
([3]) Support not request to Envri+ in 2018 as P.S. was supported in 2016 and 2017
([4]) Our missions are short and expensive and we need to work also during the week-ends
([5]) The mission in the field will be from July 4 to July 21, 2018. Then the GEOCUBE+ will be left in the field and it will be removed on October 26, 2018 by the INGV-OE.
([6]) Roberts et al., 2017, 2018 (see section 3)
([7]) PhD student working on the aerosols of Etna. Travel and subsistence will be co-financed by another funds
([8]) Includes provision for extra luggage and train/taxi to reach the airport with heavy luggage
([9]) Based of experience of 2017 and previous years, staying in B&B at Nicolosi (single rooms)
([10]) Methodology for ventilation of expenses between Envri+ and the partners: In practice as Envri+ supports only the mission costs (travel and per-diem), we will distribute 45 per-diem (CNRS allocates 220 € / day for missions in Italy), thus for a total of 9900 € to five of us (PB, TR, OM, MdM, BH). The regular per-diems are high enough to cover the expenses for car rental. The travels will be paid by our laboratories. This methodology is also the one that simplifies most the administrative management of the campaign for the secretaries in charge of missions at UCA.
([11]) Team also includes A. La Spina, T. Caltabiano, …
([12]) Email in section 4
([13]) Sellitto et al., Annals of Geophysics 2017 (see section 3)

Please respect the text limit indicated in each section.

(1) **Project information**:

- A project title and acronym are mandatory. The length of the acronym should not exceed 20 characters.
- The multi-/ inter-disciplinary nature of a research project granted under the ENVRIplus access is mandatory. Thus, only projects integrating at least two or more environmental disciplines (i.e., atmosphere, biosphere, marine, solid Earth domain) will be considered. The cross-disciplinary approach must be addressed and furthermore detailed in the project description under (5).
- **Multi-domain RI platforms**: access is possible to the following observational sites:

  HYYTIÄLÄ is a multi-disciplinary observing station located in background boreal forest site in Finland and having ICOS, ACTRIS, ANAEE components. It consists of a main site and additional sites for flux measurements in wetland and boreal lake environments. HYYTIÄLÄ is operational since 1995 and provides in-situ, photometric, radar and LIDAR instruments for measurements of aerosols, cloud condensation nuclei, trace gases, volatile organic compounds, ammonia, greenhouse gases, as well as instruments to measure forest growth, forest physiology and micrometeorology. Official RI contact / access provider: Tuukka Petäjä (tuukka.petaja@helsinki.fi).

  LA REUNION is situated on la Réunion Island, France and is a multi-disciplinary research infrastructure located in the south-western Indian Ocean (French overseas department). It comprises 4 geophysical stations: i) the Maïdo observatory (2160 m asl) on the north-western part of the island for atmospheric observations, ii) the marine station on the western coast for observations of the reef zone, the coast line, and coastal aquifers, iii) the forest station on the southern coast for forest ecological observations, and iv) the hydrological station in a drainage basin over the northern coast. Official RI contact / access provider: Jean-Pierre Cammas (jean-pierre.cammas@univ-reunion.fr).

  MT. ETNA INGV is a multi-disciplinary observatory, contributing to the EPOS-ESFRI project and managed by INGV. The main observatory is located on the flank of Mt. Etna and equipped with a broad range of instruments to physically and chemically characterize the structure of the volcano and its dynamics. The "Pizzi Deneri" Observatory located at 2800 m of altitude, near the active summit craters of the volcano is suitable for temporary installations. The observatory also supports fieldwork by providing computing facilities, 4WD vehicles and the use of the analytic laboratories. Official RI contact / access provider: Giuseppe Puglisi (giuseppe.puglisi@ingv.it).

  SOERE-ACBB is a multidisciplinary set of platforms involving experiments initiated in 2005. As part of the SOERE-ACBB, the Lusignan platform is designed to characterize the trajectories of key variables such as carbon, phosphorus, potassium and nitrogen and the diversity of plants and organisms in the soil. The platform's instrumentation continuously quantifies a broad range of physical, chemical and biological variables: climate forcing variables, physical conditions in soil, water fluxes and quality, carbon. Official RI contact / access provider: Abad Chabbi (abad.chabbi@lusignan.inra.fr).

  USRL Cyprus is an Unmanned System Research Laboratory consisting of an instrumentation Lab (Cyprus Institute, Nicosia, for UAV development, sensor test and integration, and a runway at Orounda at 30km west of Nicosia for flight operation and field training. The facility includes a professional and highly experienced team of pilots and mechanical/electronic engineers to integrate miniature sensors in UAVs, fly them and train operators (external users). The large fleet of research aircraft comprise fixed and rotary wings offering various payload capacities (from 1 to 8-10kg) that are made available at no cost for external users. USRL operates routine (long-term) profiling for Atmospheric Chemistry monitoring coupled with 2 atmospheric stations (CAO at 500m asl and Troodos Observatory 1830m asl) and 1 remote sensing platform (Lidar, Limassol operated by CUT) and a large suite of atmospheric sensors to perform vertical profiling of gas/aerosols. The UAVs can be operated easily above sea and/or close to the ground with few restrictions. Official RI contact / access provider: Jean Sciare (j.sciare@cyi.ac.cy).

  P2OA-Drones is a Pyrenean Platform for the Observation of the Atmosphere situated in an open and large grassland available area, in the central Pyrenees mountains, southwest France, approximately 150 km to the east of the North Atlantic coast and 210 km to the west of the Mediterranean Sea where warm temperate, fully humid climate prevails; it is integrated in a rural environment with unpolluted, surrounded by crops and forests. P2OA-

Drones is favourable for balloon and UAV operations, or for any instrumental validation. It includes a runway and a hangar for flight preparation, and a team of technical and scientific staff permanently present at site for support. The site has a permanent clearance for tethered balloons operations up to 1000 m height and regular ZRT (restricted area) authorizations are obtained for UAVs flights. State-of-the-art equipment on the platform includes a UHF wind profiler (200m-3km), a VHF wind profiler (1.5km-16km), a 60 m instrumented tower (5 levels) with energy balance, ozone, water vapor, CO2 (60 m), weather station, total sky imager, tethered balloon and radiosounding station (subject to conditions), combustion chamber with analysers (CO, NOx, ozone, SO2), atmospheric electricity sensors (precipitation current, electrostatic field, lightnings, sprite camera), atmospheric chemistry. Official RI contact / access provider: Marie Lothon (dir.p2oa@aero.obs-mip.fr).

- Planned project dates: indicate the first and last day the infrastructure is accessed by any person of the research team. Specify furthermore if the project dates are flexible. For various reasons (unforeseen events, logistic conflicts at the infrastructure, or other), the project might be shifted in time and your potential flexibility should be known in order to optimize the access at the chosen platform. Please give appropriate explanations where needed.

(2) **Principal Investigator:** the principal investigator (PI) is the person responsible for the project who acts as contact of the proposal for the research team involved in the planned project. A research team consists of one or a group of several researchers. Note that priority will be given to young researchers participating as project PI.

User status: please use any of the following categories: EXP (experienced, professional researcher, senior scientist), PDOC (Post-doctoral researcher), PGR (Post-graduate, student with 1st university degree), TEC (Technician), UND (Undergraduate), SME, OTHER (e.g., other private sector, public authority, education, etc.)

(3) **Recent references**: List at least 5 relevant references demonstrating the relevant scientific research experience and profile of the PI and key team members (alternatively, a short CV for young researchers who have not yet published; in this case, the targeted research training objectives of the planned activities should be addressed in the project description, section 5).

(4) **Project participants:**

- List all participants needed to carry out the project.
- Trans-national access criterion: access support is limited to participants whose home institution is not located in the same country as the RI platform (trans-nationality aspect).
- Research status: indicate using categories listed under (1) above
- New user: indicate if the user has visited the infrastructure before to carry out research.
- Indicate first and last day of access (dd/mm/yyyy) of the participant concerned. If a participant's access is not continuous, please list periods on separate lines.
- Total access: indicate the participant's duration of access in days (round to minimum half day). Include only the actual days of physical access to the platform and if relevant to the project. The access may include days for installation, tests, dismantling (max 20%). The total access in days is the sum of access days of all participants of the research team.

(5) **Project description: Please limit the text to the recommended length!**

Only projects with true multi-/inter-disciplinary objectives and involving at least 2 different ENV domains) will be considered. Ensure that interdisciplinary is reflected in the scientific objectives, methodology, instrumentation, expertise of the participants involved, project results, impact, etc.

- **Scientific objectives**: Explain in concise and clear manner the scientific objectives of the planned activities; highlight the originality of the project within the multi-/inter-domain context. Identify the gaps the project is intended to fill, state your motivation and potential for using the specific RI platform and why the specific platform has been selected. Particular importance must be given to the multi-domain and inter-disciplinary integrity of the activities: describe the scientific impact and the potential to the project's objectives across domain to acquire new knowledge and contribution to European excellence and competitiveness. The proposal needs to demonstrate how the project will benefit both research and ENVRIplus (http://www.envriplus.eu/mission/).
- **State-of-the-art / novelty**: Describe the state-of-the-art of research and current knowledge in the environmental domains. Will the project help to answer new scientific questions? Identify any open science questions and how the proposed work may help answering them. Describe the innovative nature, what is new and what has been done in the past for this site or other similar sites, or in relation to the objectives of the proposed activity.

- **Technical work plan**: Provide a succinct and accurate description of your plan for achieving the goals in the given time frame, the methods employed, the experimental set-up foreseen, planned time-table, and addition information about the role of each participant. In order to ensure efficient use of the infrastructure, the need for specific measurements and data at the platform should be described. The work plan should provided sufficient information needed for evaluating of the project and for verifying its feasibility and credibility.
  Note, information on case specific site requirements during the access should be described in section 6, addition or complementary instrumentation should be listed in section 7. PIs are encouraged to involve the access provider in the planning stage, before submission, to ensure efficient use of the multi-disciplinary platform.
- **Relation to business & Innovation**: describe the innovation potential of the planned research project to contribute to technology development, to promote breakthrough innovation, to provide business with solutions for innovation, to collaborate or build partnerships with the private sector (not mandatory but could be significant added value).
- **Scientific outcome**: Describe the expected results and deliverables and how the outcome may fit with the overall goals of ENVRIplus. Specify the nature of the deliverable evidencing the research work: scientific report, manuscript, conference presentations, etc.

(6) **On-site requirements:** Describe the needs to carry out the planned project.

- **On-site support needed by user group at the infrastructure**: Specify, e.g., which specific instruments will be needed? Which on-site services? Any requirements for aligning and integrating the access into the station operations? Which preparatory work/installation time is required? Is training needed for using the instruments? Do you want to participate in routine measurements? Is there need for space to deploy additional instrumentation, for data from permanent instruments, local transport, customs, travel, accommodations, specific authorizations, etc. Note that local/national procedures and safety regulation might apply when accessing the infrastructure.
- **Instruments brought by the user group to the infrastructure:** please provide sufficient details for planning and integration during the access.

(7) **Data management:** ENVRIplus aims at collecting and curating data from measurements at their platforms in the corresponding environmental domain data centres associated with the platform for long-term storage and access and at making it available to the ENV communities. ENVRIplus supports an open access data policy. For data management, information about additional measurements should, therefore, be indicated. Further, please describe the data resulting from the access in more details. In particular, how are you planning to process and distribute the data? How will you ensure the combine and exploit the multi-/interdisciplinary data?

(8) **Estimated project costs:** List your estimated costs for all participants.

- The amount of financial support to travel expenses will be decided on a case-by-case basis after proposal evaluation, and might also depend on the number of incoming proposals.
- Independent of the size of the research group, financial support is limited to the proposed maximum financial support but will require justification of eligible costs.
- Eligible costs:
  - Travel costs: estimated eligible costs for travel from and to the infrastructure. A maximum flat rate for travel costs might apply. Only those costs are eligible for which proof can be provided (e.g., copy of travel ticket). Short travels on-site, e.g., bus, train, taxi, etc. are not reimbursable. Costs related to the use of personal car or rental car are not eligible.
  - Subsistence costs: the subsistence costs are the estimated eligible costs in relation to the daily expenses of the participant(s) during the visit at the infrastructure. It should be calculated based on the actual daily expenses for accommodation and meals. A maximum daily flat rate might apply.
  - Other costs (shipping, transport, insurance etc.) will only be reimbursed in exceptional cases, please specify. Shipping costs are only eligible if shipping is provided by a carrier (expenses for the use of rental car, personal car or business vehicle will not be covered). Any other costs must be justified and should be kept to a minimum. Any costs related to purchase of equipment or capital investment are not eligible.

- Grand total: specify the percentage requested to calculate the total estimated costs for reimbursement by ENVRIplus. In case the project is co-financed, please provide sufficient details about the added financial value of ENVRIplus and that the co-financing is secured.

- Details for reimbursement of the costs will be provided after proposal acceptance.

Before proposal submission, we strongly invite the PI to contact the access provider in charge of the multi-disciplinary platform for proposal planning and preparation. The 2-stage evaluation includes a first pre-screening of the proposal for scientific and technical feasibility by the access provider. **In no case, any preliminary contacts with the access provider will be considered as approval of the scientific and technical feasibility of the proposals. An independent review panel will decide on the supported projects during the 2nd stage of the evaluation process.**

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