

The Italian Volcano Observatories and Research Infrastructures (INGV)

1. Infrastructure offered for the first call

Name and acronym of RI	Name: Etna Volcano Observatory
	Acronym: Etna Volcano Observatory
Main contact person	Name: Letizia Spampinato
	Email: letizia.spampinato@ingv.it
List of individual installations	<ol style="list-style-type: none"> 1. Laboratory of sedimentology 2. Pool of mobile instruments <ol style="list-style-type: none"> a) LIDAR b) SO₂ equipment and FTIR-MIDAC c) Magnetometer d) Gravimeter e) Mobile multi-parametric station 3. Lithotheque 4. Rock sampling survey 5. Pizzi Deneri Observatory

2. Information of the installations and facilities offered for the first call

Name of the installation	1. Laboratory of sedimentology
Contact person	Name: Daniele Andronico – Antonino Cristaldi
	Email: daniele.andronico@ingv.it ; antonio.cristaldi@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the installation and facilities	Laboratory of sedimentology: the laboratory consists of a CAMSIZER® (Retsch) and a Stereoscopic Zoom Microscope. The access to this installation has been already offered in the frame of ENVRIplus H2020 project.
Scientific support offered	Training for the use of the installation: Offered.
	Duration of the training course: 2 hrs.
	Number of scientists supporting the activity: 1.
	Type of scientific support: Support for data acquisition only.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1hr.
	Safety equipment provided: Gloves and masks for fine dust.
Available accommodation facilities at infrastructure	The city centre is full of accommodation options from hotels to B&B.

or nearby	
Available space/electricity/internet connection access for external users	In INGV-OE.
Administrative support offered	Yes, for having a working station, in INGV-OE main building.

Name of the installation and facility	2. Pool of mobile instruments - LIDAR
Contact person	Name: Simona Scollo
	Email: simona.scollo@ingv.it
Location	Address: INGV-OE, Nicolosi, Catania
	Country: Italy
Description of the facility	LIDAR is suitable for measuring aerosol including volcanic ash. The lidar, named Aerosol Multi-wavelength Polarization LIDAR Experiment (AMPLE), is a compact multi-wavelength Elastic/Raman scanning system with depolarization capability, suitable for mobile measurements and able to carry out 4-D (space and time) imaging of volcanic particle distributions and the optical properties and microphysical characterization. The AMPLE LIDAR is equipped with a doubled and tripled Nd:YAG diode-pumped laser with a repetition rate of 1KHz and average optical power of 0.6W at 355nm, 1.5W at 532nm and 1W at 1064nm. The LIDAR system is able to detect both the elastic LIDAR returns at 355nm and the N2 Raman LIDAR echoes at 386nm. Moreover, the polarization purity of the laser line allows polarization measurements at 355nm.
Scientific support offered	Training for the use of the installation: Offered.
	Duration of the training course: 3 hrs.
	Number of scientists supporting the activity: 2.
	Type of scientific support: Support for data acquisition and analysis.
Technical support offered	Training for the use of the installation: Offered.
	Duration of the training course: 3 days.
	Type of technical support: Vehicles driving.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 2 hrs.
	Safety equipment provided: Protective glasses
Available accommodation facilities at infrastructure or nearby	In Nicolosi, it is possible to stay in different hotels/B&B. The Nicolosi building of INGV-OE can be used as a working office.
Available space/electricity/internet	In INGV-OE Nicolosi building.

connection access for external users	
Other	The LIDAR system cannot be used without the INGV-OE person in charge.

Name of the installation and facilities	2. Pool of mobile instruments - SO₂ field equipment and FTIR-MIDAC
Contact person	Name: Giuseppe Salerno
	Email: giuseppe.salerno@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the facilities	<ol style="list-style-type: none"> 1) SO₂ field equipment. It consists of a setup which includes ultraviolet spectrometer, fibre optic and telescope. The equipment is suitable for carrying out volcanic gas observations. 2) FTIR-MIDAC. It consists of a Fourier transform infrared spectrometer that allows characterising the chemical composition of volcanic gas.
Scientific support offered	Training for the use of the installation: Not provided, users must be expert and confident in the use of the both facilities provided.
	Number of scientists supporting the activity: 1.
	Type of scientific support: Users must be also expert in data acquisition and post-processing.
Technical support offered	Number of technicians supporting the activity: 1.
	Type of technical support: Vehicles driving.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1 hr.
	Safety equipment provided: Helmets. Users should bring their own gas mask.
Available accommodation facilities at infrastructure or nearby	Hotels, B&B, and guest Houses in Catania, Nicolosi, Zafferana.
Available space/electricity/internet connection access for external users	INGV-OE and Nicolosi building.

Name of the installation and facility	2. Pool of mobile instruments - Magnetometer
Contact person	Name: Rosalba Napoli

	Email: rosalba.napoli@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the facility	GSM-19 Overhauser magnetometer, a super-charged proton magnetometer with a sensitivity of 0.22 nT, a resolution of 0.01 nT and fast sampling of up to 5 Hz (GEM Systems). The equipment is suitable for fieldwork.
Scientific support offered	Training for the use of the installation: Training so that users can become conversant with acquisition and analysis of magnetic data.
	Duration of the training course: 2 hrs.
	Number of scientists supporting the activity: 1.
	Type of scientific support: Support for data acquisition and analysis.
Technical support offered	Training for the use of the installation: Training so that users can become conversant with the operation of the magnetometer.
	Duration of the training course: 1 hr.
	Number of technicians supporting the activity: 1.
	Type of technical support: Vehicles driving and fieldwork support.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1 hr.
	Safety equipment provided: Helmets.
Available accommodation facilities at infrastructure or nearby	Hotels, B&B, and guest houses in Catania, Nicolosi, Zafferana.
Available space/electricity/internet connection access for external users	INGV-OE and Nicolosi building.

Name of the installation and facility	2. Pool of mobile instruments - Gravimeter
Contact person	Name: Filippo Greco
	Email: filippo.greco@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the facility	Burriss Gravity Meter™ SN B68, spring-based relative gravimeter, feedback range of about 50 mGal, drifts of less than 1 mGal per month. A metal micrometer screw gives the meter at 7,000 mGal

	range (ZLS Corporation). The equipment is suitable for fieldwork.
Scientific support offered	Training for the use of the installation: Offered.
	Duration of the training course: 1 hr.
	Number of scientists supporting the activity: 1.
	Type of scientific support: Data acquisition and analysis.
Technical support offered	Training for the use of the installation: Offered.
	Duration of the training course: 1 hr.
	Number of technicians supporting the activity: 1.
	Type of technical support: Technical support is offered focused on the use of the facility.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1 hr.
	Safety equipment provided: Helmets.
Available accommodation facilities at infrastructure or nearby	Many hotels and B&B exist in the area of Nicolosi and/or Linguaglossa villages, close to the fieldwork area.
Available space/electricity/internet connection access for external users	Offices, workshops and warehouses are available at INGV-OE. Access to the INGV-OE data base, according to the INGV Data Policy. Access to INGV-OE computer network as guest user. Access to virtual machines and temporary storage.
Administrative support offered	Support from administrative staff with regular office services.

Name of the installation and facility	2. Pool of mobile instruments - Mobile multi-parametric station
Contact person	Name: Salvatore Rapisarda
	Email: salvatore.rapisarda@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the facility	<p>Mobile multi-parametric station. In the framework of the continuous improvement of the multi-parametric monitoring of volcanic activity, INGV implemented a mobile system that integrates a digitizer with several sensors: velocimeter, accelerometer, radiometer, and infrasound microphone. The system is suitable for fieldwork. The current configuration is based on the following equipment:</p> <ul style="list-style-type: none"> – Taurus (by Nanometrics TM) digitizer (3/6 channel 24-bit digitizer. 9 channels available using external Trident 305 digitizer > 141 dB dynamic range); 32GB CF disk drive recording media; Low power, 750mW capable; Embedded Linux OS; Web browser user interface; IP communications

	<p>10/100 base T; Real-time Data Streaming; One/two channels free for custom inputs; Power: 20W solar panel, charge control, 12 A/h battery.</p> <ul style="list-style-type: none"> - Velocimeter: 40s Trillium – 120 Trillium Compact. - Accelerometer: Kinematics Episensor. - Radiometer: CTfast-LT15F by Optris®, 8 - 14 µm (LWIR). - Infrasound: GRAS, type 40AN (50mV/PA sensitivity), 250Hz, 146Db Dynamic range.
Technical support offered	Training for the use of the installation: Offered.
	Duration of the training course: 2 hrs.
	Number of technicians supporting the activity: 1.
	Type of technical support: Fieldwork support.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1 hr.
	Safety equipment provided: Helmets.
Available accommodation facilities at infrastructure or nearby	B&B and hotels in Nicolosi, Zafferana, Linguaglossa villages, and in Catania city centre.
Available space/electricity/internet connection access for external users	In INGV-OE and Nicolosi building.

Name of the installation	3. Lithotheque
Contact person	Name: Rosa Anna Corsaro
	Email: rosanna.corsaro@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the installation	The Lithotheque is located at the INGV-OE building and offers a collection of 30 volcanic rocks erupted by Etna from 2000 to 2013.
Scientific support offered	Number of scientists supporting the activity: 1.
	Type of scientific support: Scientific support is provided, if requested, for the discussion of analytical data acquired by users.
Technical support offered	Type of technical support: The support includes the dispatching of the sample(s) for the accepted proposals.
Administrative support offered	Arrangement of the dispatching of samples.

Name of the installation	4. Rock sampling survey
Contact person	Name: Rosa Anna Corsaro
	Email: rosanna.corsaro@ingv.it
Location	Address: Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo (INGV-OE), piazza Roma, 2, 95125 Catania
	Country: Italy
Description of the installation	Rock sampling survey provides a top-level service for users who want to carry out geological/volcanological fieldwork and sampling at Etna. The users are accompanied by the OE researchers during field survey. The INGV personnel expertise allows to optimize the fieldwork and lead to the collection of samples whose geological setting, stratigraphic position and lithology are well constrained.
Scientific support offered	Training for the use of the installation: Training activities on the geological, volcanological and structural background of volcanic areas that will be surveyed. Training activity concerning techniques of sampling can be provided under specific request of the users.
	Duration of the training course: 1 day.
	Number of scientists supporting the activity: 2.
	Type of scientific support: The scientific support concerns fieldwork, including sampling of volcanic rocks. Scientific support is provided, if requested, for the discussion of data acquired by users.
Technical support offered	Type of technical support: Use of vehicles for carrying out fieldwork.
Safety	Training offered: Yes. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1 hr.
	Safety equipment provided: Helmets.
Available accommodation facilities at infrastructure or nearby	Hotels, B&B, and guest houses in Catania, Nicolosi, Zafferana.
Available space/electricity/internet connection access for external users	In the INGV-OE building.

Name of the installation	5. Pizzi Deneri Observatory
Contact person	Name: Salvatore Consoli
	Email: salvatore.consoli@ingv.it
Location	Lat.: 37° 45' 52"; Long.: 15° 01' 00"; Altitude: 2800 m a.s.l.
	Country: Italy
Description of the installation	Pizzi Deneri Observatory. The building is located close to the summit craters of the Mt. Etna volcano. It consists of two main blocks with

	offices, bedrooms, workshops, warehouses, kitchen and restrooms. It is suitable to support experiments and fieldwork for limited teams. The Pizzi Deneri Observatory is included in the ETNA-INGV LAN. Due to the location of the building (in the natural park area and close to the summit craters) the access to the installation is available only for authorized people and subjected to the volcanic activity; thus the final organization of the TA activities should be agreed with the hosting institution, which has the necessary authorizations for the vehicles and personnel and is continuously in contact with the authorities in charge of the management of the access to the restricted area. The access to the observatory includes the lodging for the hosted research teams and the support of technicians and operators for managing the local facilities and transferring the hosted scientists to/from the observatory.
Scientific support offered	Number of scientists supporting the activity: 1.
Technical support offered	Number of technicians supporting the activity: 2-3.
	Type of technical support: INGV personnel for the management of the Observatory during experiments/fieldwork; vehicles for carrying out fieldwork in the Park area and for round-trip travels from Catania to the observatory for scientific teams and instruments.
Safety	Training offered: Offered. A health/life insurance is mandatory to access this installation.
	Duration of the safety training course: 1hr.
	Safety equipment provided: Helmets.
Available accommodation facilities at infrastructure or nearby	The installation itself offers hot-water heating, underground water container, bedrooms, kitchen, and restrooms.
Available space/electricity/internet connection access for external users	The installation itself offers electric generators, Internet access, workshops and warehouse.

3. Access modalities and call parameters of the services offered only for the first call

Please note that of the six facilities of the Pool of mobile instrument installation, only two per project will be offered. Moreover, for ‘working day’ is intended a day from Monday to Friday excluding feast days.

Installation	Accesses per call (in unit)	Max n. of users per project	Max n. of projects per call
1. Lab. sedimentology	5 working days	1	1
2. Pool of mobile instruments - LIDAR	5 working days	2	1
2. Pool of mobile instruments – SO ₂ equipment	5 working days	2	1
2. Pool of mobile instruments – FTIR-MIDAC	5 working days	2	1

2. Pool of mobile instruments – Magnetometer	5 working days	2	1
2. Pool of mobile instruments – Gravimeter	5 working days	2	1
2. Pool of mobile instruments – Mobile multi-parametric station	5 working days	2	1
3. Lithotheque	10 samples	1	1
4. Rock sampling survey	5 working days	1	1
5. Pizzi Deneri Observatory	5 working days	3	1

4. Financial support offered to the users

Installation	Max reimbursable travel cost (in euro)	Max reimbursable daily subsistence cost (in euro)
1. Lab. sedimentology	650	120
2. Pool of mobile instruments – LIDAR	650	120
2. Pool of mobile instruments – SO ₂ equipment	700	120
2. Pool of mobile instruments – FTIR-MIDAC	700	120
2. Pool of mobile instruments – Magnetometer	700	120
2. Pool of mobile instruments – Gravimeter	700	120
2. Pool of mobile instruments – Mobile multi-parametric station	650	120
3. Rock sampling survey	700	120
5. Pizzi Deneri Observatory	700	400*

*€400 is not the daily subsistence costs as reported for the other items (i.e. calculated over all the number of accesses), in fact, the accommodation is considered for only two nights (the rest of the stay is in the observatory).

5. Risk management

a. Expected conditions that can make the installations/facilities unavailable/inaccessible:

For the LIDAR - conditions could be related to possible damages to the instrument and software analysis, bad weather conditions, and in case of eruptive crisis.

For the SO₂ field equipment and FTIR-MIDAC - weather conditions, volcanic activity, INGV unscheduled duties. For the Magnetometer - unexpected technical malfunction.

For the gravimeter - in case of eruptions at the summit craters or in the upper parts of the volcano, bad weather conditions, and in the case of sudden malfunction of the instrument.

For the Mobile multi-parametric station - in the case of Mt. Etna's eruptive crisis, seismic crisis, and unforeseen technical problems with the instrumentation.

For the Rock sampling survey- bad weather conditions, ongoing volcanic activity, signals of volcano unrest that might expose users to potential danger. Signals of potential danger are evaluated by INGV-OE scientific staff.

Pizzi Deneri Observatory - Pizzi Deneri Observatory will be available only in summertime (approximately from June to September) and depending upon the level of volcanic activity and weather conditions. Indeed further conditions of unavailability might be due to maintenance works if necessary.

- b. Functionality of the installations/facilities offered, before the access:** For the LIDAR – carry out tests the week before the access. For the SO₂ field equipment and FTIR-MIDAC - technical check of the facilities at least one month in advance before the access.
For the Magnetometer - performing regular maintenance and operation checks.
For the Gravimeter - ensure the functioning of the instrument.
For the Mobile multi-parametric station - checking of the instrumentation before the provision of the access to the facility.
For the Lithotheque - the functionality of the lithotheque is ensured by OE staff devoted to its maintenance.
Pizzi Deneri Observatory - accurate checks of the structural and logistic conditions of the building at least three months before the start of the TA activities.
- c. Conditions to re-schedule the access to the same installation due to force majeure:** For the LIDAR - the access depends on the research or technologist who could be busy at the re-scheduled time.
For the SO₂ field equipment and FTIR-MIDAC - the facilities will be available if not already scheduled for other accesses or in the case of eruptive crisis.
For the Gravimeter - check the availability of the instrument, of the people and the accessibility of the places.
For the Mobile multi-parametric station - availability of the personnel involved.
For the Rock sampling survey - the availability of the INGV-OE scientific staff. It largely depends on the kind of activity to be carried out.
Pizzi Deneri Observatory - if the observatory location is crucial, then the activity can be postponed always depending on the volcanic activity and seasonal and weather conditions. Of course, the overlapping of the activities between the 1st and 2nd call could result in difficulty in the TA management (personnel availability and formal activity and financial reporting).
- d. Conditions to plan the access to another location in case the access must be moved due to force majeure:** For the LIDAR - the instrument needs to be in a safety location where people cannot reach it.
For the SO₂ field equipment and FTIR-MIDAC - the facilities are available to be used in other locations.
For the Gravimeter - check the availability of the instrument, of the people and the accessibility of the places.
Pizzi Deneri Observatory - the main conditions might essentially relate to logistics, personnel availability, and financial resources that of course will change.
- e. Other suggestions:** For the Lithotheque - if the characteristics of a sample do not fit the request of the user, the availability of alternative samples can be checked by INGV-OE.