

EUROVOLC

European Network of Observatories and Research Infrastructure for Volcanology

Deliverable Report

D2.4 EUROVOLC international collaboration activities

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Summary

Knowledge sharing between EUROVOLC and other international initiatives in volcanology has been extensive. EUROVOLC participants formed informal working teams that participated in the many international initiatives within volcanology with examples given in this deliverable report. Interaction has taken place, e.g. through focused meetings and sessions at international conferences. COVID restrictions have limited some of the planned collaboration with international initiatives.

The following provides examples collaboration with international initiatives in volcanology. In addition, numerous informal meetings took place of EUROVOLC partners with colleagues outside Europe to present EUROVOLC activities and inclusion of them in international collaborative projects.

EPOS

Some of the leading partners of EUROVOLC are also leading the EPOS Volcano Observations Thematic Core Service (VO- TVS). Therefore, EUROVOLC has collaborated closely with the EPOS VO- TCS. All the efforts towards networking data in EUROVOLC are aligned with the data standards set in EPOS.

WOVO

EUROVOLC partners include all the volcano observatories in Europe, that form an important group within World Organization of Volcano Observatories (WOVO). An important activity of WOVO is the maintaining of WOVodat:

<https://www.wovodat.org/>

A standardized and organized database on volcanic unrest (of past events), intended to provide reference data useful during volcanic crises, for comparative studies, and basic research on pre-eruption processes. Plans were initiated by INGV and IMO for collaboration with WOVodat on sharing of volcanic data and information. For examples, representatives from INGV participated in a WOVodat workshop on optimizing the use of volcano monitoring database to anticipate unrest. Plans are being initiated by the IMO and INGV partners to hold a common workshop with WOVodat at the international IAVCEI meeting in New Zealand in January 2023, which will also be in collaboration with EPOS-SP (Sustainability Phase) partners. On several occasion experience from EUROVOLC partners has been exchanged with other staff from volcano observatories outside Europe, on handling volcano monitoring data, strategizes for improve on monitoring data management and on past unrest data analysis.

ICAO/VAACs

One of the goals of EUROVOLC was to strengthen collaboration between the European Volcano Observatories and the relevant Volcanic Ash Advisory Centres (VAAC) established at nine meteorological offices around the world by the International Civil Aviation Organization (ICAO). The activities supporting this goal were part of WP4.

IAVCEI

Interaction with IAVCEI activities took place during the first period, for example through input from EUROVOLC to IAVCEI commissions. In particular, EUROVOLC partners have contributed to the initial activities of the IAVCEI Commission on Volcano Geodesy:

<https://volcgeodesy.iavceivolcano.org>

INGV member Alessandro Bonforte is a co-leader of the commission, and its steering group includes several EUROVOLC partners. Experience from EUROVOLC has been shared with the commission members.

Two INGV members, Daniele Andronico and Mattia Vitturi are co-leaders of the Commission on Explosive Volcanism:

<https://cev.iavceivolcano.org/>

IMO member, Sara Barsotti is co-Leader of the Commission on Tephra Hazard Modeling:

<https://thm.iavceivolcano.org/>

The president of IAVCEI, Patrick Allard was invited to the EUROVOLC final meeting in Reykjavík in November 2021. Due to the volcanic crisis in the Canary Islands he could not travel to Iceland, but attended remotely the final session of the meeting, where he shared his ideas with the EUROVOLC partners about where the community should be heading and what IAVCEI will be emphasizing in the coming years.

CEOS (Committee on Earth Observation satellites)

Space agencies have a committee on Earth Observation satellites (CEOS), that collaborates with Earth Scientists with the idea of joint use of space and terrestrial data to understand geological processes and hazards. This collaboration is through the so-called “Geohazard Supersites and Natural Laboratories initiative – GSNL”. This is much in line with EUROVOLC activities that promote joint interpretation of data sets in order to better monitor and evaluate volcanic hazards.

CEOS provides satellite data at no costs to volcanic supersites in Iceland and Italy:

<http://ceos.org/ourwork/workinggroups/disasters/gsnl/>

EUROVOLC has been introduced to CEOS at multiple meetings, for example during the 10th meeting of the CEOS working group on disasters held in Naples 5-7 September, 2018. Activities of EUROVOLC to understand subsurface processes make use of satellite data provided by CEOS.

KMT (Krafla Magma Testbed)

Preparation is ongoing for establishment of an international centre for geothermal- and volcanological research in the Krafla volcano area in Iceland (Krafla Magma Testbed - KMT). Krafla is one of the very few places in the world where magma is known to be found in Earth's shallow crust; discovered when a deep borehole was drilled in 2009 and magma was found at the surprisingly shallow depth of 2,104 meters.

Beginning in 2014, an international group of scientists and engineers developed a plan, the Krafla Magma Testbed (KMT), to conduct long-term exploration of a magma body at Krafla volcano, Iceland and its surrounding hydrothermal envelope, including drilling into the magma body. The proposal is to drill into the magma because it is known through previous drilling in IDDP1 and by the Icelandic energy company, Landsvirkjun, that rhyolitic magma at about 900°C exists at only 2.1 – 2.5 km depth. The intention is to sample the magma-rock interface, which is characterised by high-enthalpy aqueous fluids, a transition from brittle to ductile rock, a solidus with first appearance of interstitial silicate melt, and bodies of accumulated silicate magma.

KMT has the vision to drill new research boreholes down to the magma and make use of the unique conditions in Krafla to advance understanding of volcano interiors by “in-situ magma observatory”. EUROVOLC partners INGV Pisa, UI and LV actively participated in promoting and securing funds for the preparatory phase of KMT whose aims are to drill into magma at shallow level at Krafla volcano in Iceland.

Synergy between EUROVOLC and KMT has contributed to the following: Submission of a funding proposal to International Scientific Continental Drilling Program (ICDP) to contribute to costs of preparation for drilling into the magma. Submission to the Ministry of Tourism and Innovation in Iceland to contribute directly to KMT. Support to KMT in Italy has been provided in relation to the EPOS project. A two-day KMT workshop was organized in Reykjavík in November 2018 and again in June 2019.

ECLIPSE

Participants of the New Zealand research project ECLIPSE, which focusses on Taupo volcano and supervolcano eruptions contributed to the EUROVOLC COV10 workshop of Subtask 2.1.1, held in Naples. INGV Pisa also carried out validation and benchmarking of numerical models of volcanic phenomena (e.g. pyroclastic density currents) in cooperation with the ECLIPSE project. A first workshop was organized in Taupo in January 2019 in order to set up the benchmark workplan and the next steps. Results of this activity will be reported in the next periodic report.

IMPROVE Initial Training Network ITN

Based on previous and current international projects and initiatives, IMPROVE aims to train a new generation of volcano scientists to manage inter-disciplinary understanding and knowledge, pursue innovation, and cooperate in an inter-sectorial, open science environment. IMPROVE Early-Stage Researchers will be trained to grow as independent scientists with broad overviews and top-level expertise, able to convert their knowledge, ideas and skills into

scientific advancements as well as economic and social benefits. The IMPROVE ITN, that began in fall 2021, directly builds on EUROVOLC, as the two laboratory volcanic areas to be studied in this ITN are Etna and Krafla volcanoes, both of special focus in EUROVOLC. The underlying research aims of IMPROVE are to define the underground structure and dynamics of volcanic and geothermal systems, with innovative objectives expected to impact significantly on volcano science as well as science-industry relationships. This involves exploration and monitoring methods, disciplines like geology, geophysics, geochemistry, engineering, informatics, and theoretical and experimental approaches.