



European volcanological supersite in Iceland: a monitoring system and network for the future

Report

D10.4 - Submissions of articles for publication in EOS and Cordis Newsletter¹

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¹ Additional articles and dissemination activities are reported in the Month 30 WP10 report

Abstract

As part of the dissemination activities Futurevolc included a submission to *EOS* (Earth and Space Science news) publication and Cordis publication. The aim was to publish key parts of the project to a wider scientific community (other than peer review specialist journals) and to the European Community audience through EC publications.

Report

1. Submission to EOS publication

Dr Bernd Zimanowski (Physikalisch Vulkanologisches Labor, Universität Würzburg, Germany) and Prof. Magnús Tumi Gudmundsson (Nordvulk, Institute of Earth Sciences, University of Iceland) led the preparation and submission of an EOS publication in 2014 (revised version submitted 23-10-2014). The article, *Fire in the Hole: Recreating Volcanic Eruptions with Cannon Blasts*, tested high-resolution ash monitoring systems in an unconventional way: by firing cannons packed with ash collected from the Eyjafjallajökull eruption and monitoring how the artificial ash clouds evolve over time.

This article has now been published and is available online:

<https://eos.org/project-updates/fire-in-the-hole-recreating-volcanic-eruptions-with-cannon-blasts>

Citation: Zimanowski, B. and M. T. Gudmundsson (2015), Fire in the hole: Recreating volcanic eruptions with cannon blasts, *Eos*, 96, doi:10.1029/2015EO027703. Published on 7 April 2015

Note:

After submission of the shorter, more general EOS article, it was decided that an extended, more detailed version of the paper with more detail of the experiments undertaken would be beneficial. This is currently in preparation.

2. Submission to Cordis Newsletter

Although initial plans included a contribution to the Cordis newsletter, this deliverable was replaced with several public outreach activities (see Period 2 WP10 report) and an EU wide press release (which was redistributed by EU research office in several countries). The eruption from the Bardabunga system (August 2014-April 2015) provided the opportunity to present work from Futurevolc to a general, international audience. On September 20th, 2014, an article entitled *Increasing our understanding of volcanic eruptions* was published on the EC Horizon2020 news website detailing the work of FUTUREVOLC

<http://ec.europa.eu/programmes/horizon2020/en/news/increasing-our-understanding-volcanic-eruptions>

The article was accompanied by a link to a related press release (see below) (http://europa.eu/rapid/press-release_IP-14-1021_en.htm) and a link to a short film produced by UCD about the project (https://youtu.be/dmy_t7h5MwY)



3. European Commission Press Release

EUROPEAN COMMISSION

PRESS RELEASE

Brussels, 19 September 2014

Better volcano forecasting boosted by EU funding



Caption: Baldur Bergsson from the EU-funded FUTUREVOLC project takes gas measurements at the Holuhraun lava flow in Iceland. Download [here](#) the picture in high quality.

Volcanic eruptions are notoriously difficult to predict. With increased seismic activity at Iceland's Bárðarbunga volcano, and lava flowing at nearby Holuhraun, experts are carefully monitoring and analysing large amounts of data being collected from the area.

Many Icelandic volcanoes are ice-covered, a factor that often contributes to explosive, ash-rich eruptions similar to Eyjafjallajökull in April 2010. Eyjafjallajökull spewed large ash clouds across northern Europe, leading airlines to make costly flight cancellations and disrupting travel for some 10 million people. Financial damage is estimated at up to €3.9 billion.

But this time there is a difference. In response to Eyjafjallajökull's eruption, the EU has been funding research to provide more accurate and timely warnings. The approaches being pioneered by such projects aim is to give civil protection authorities, and economically important commercial groups such as airlines, more time to react effectively – helping to protect lives and reduce damage to Europe's economy.

One example is [FUTUREVOLC](#). Since October 2012, when FUTUREVOLC started, the researchers have added volcanic gas detectors, infrasound sensors, high resolution cameras, seismometers and sensors to detect ground movements across the most active regions of Iceland to complement the existing network. Many of these additional sensors are part of mobile networks, allowing them to be deployed at active sites as needed and to support the permanent network.

New monitors, such as the seismometers, can detect minute movements (seismic tremors), a possible indication of the movement of magma up towards the Earth's surface or of flooding caused by the extrusion of magma under the ice. These floods are a significant threat to local inhabitants and infrastructure.

Additional GPS instruments and satellite data can help detect minute changes. At Bárðarbunga these have been used to estimate the volume of magma intruded into the Earth's crust at up to 10 km below the surface.

The project is also focused on monitoring eruptions once they reach the surface – measuring dangerous gases and lava flow rates, for example. This information can indicate whether volcanic activity is likely to evolve into an eruption similar to that of 2010.

In July the team added three ground-based infrared cameras to Iceland's network to detect silicate particles in volcanic ash. The project has also tested a plane-mounted sensor that was able to detect ash collected from one of Iceland's volcanoes and dropped from the air over France's Bay of Biscay. The sensor, which uses multispectral cameras to distinguish silicate from ice particles, detected the ash from 60 kilometres away. If Bárðarbunga does erupt, the team could deploy the same sensor to monitor any release of ash.

When combined with meteorological data and advanced modelling techniques, FUTUREVOLC's results will help to improve ash dispersal forecasting, said project coordinator Freysteinn Sigmundsson of the University of Iceland.

FUTUREVOLC's research will feed into the [Group on Earth Observations](#) (GEO), part of Europe's contribution to a global effort to improve forecasts on volcanic activity.

European Research, Innovation and Science Commissioner Máire Geoghegan-Quinn said: *"Volcanic activity can affect thousands of Europeans, whether they live close to active volcanoes, or many kilometres away. Horizon 2020, the EU's new €80 billion research programme, will continue to support this type of research for the benefit of all Europeans."*

Satellite monitoring

[EVOSS](#) is another example of EU-funded research on volcanos. EVOSS has developed a new satellite-based system to automatically detect and monitor erupting volcanoes worldwide. The project's "cloud" of specialised computer servers then automatically disseminates the real-time data to the relevant civil protection authorities.

The system measures eruptions in three ways: the heat coming from a volcano, the ash and gases being emitted, and the physical changes on the Earth's surface. These readings can help scientists better anticipate how a volcano is likely to behave in the future – for example, whether activity is escalating or decreasing. EVOSS – or European Volcano Observatory Space Services – is already operational in Europe, Africa and volcanic islands in the surrounding oceans.

Timely warnings

Meanwhile the [VUELCO](#) project has completed a study on six volcanoes in Europe and around the world. The study has led to a database on volcanic unrest and better forecasting models. In parallel, the project team is developing ways to improve communication between volcanologists and civil protection authorities. The aim is to help local communities understand scientific advice on volcanoes and take the appropriate actions. Other EU-funded projects on volcanoes include [MED-SUV](#) and [MARsite](#).

Background

FUTUREVOLC, supported with €6 million in EU funding, brings together researchers from 27 universities, research organisations, public bodies and companies from Iceland, Ireland, Italy, UK, Sweden, Germany, Norway, Switzerland, France and the Netherlands.

EVOSS was supported with €2.9 million in funding and involved partners from France; Belgium, Italy, the UK, Germany and the Netherlands. VUELCO received €3.5 million in funding and involved partners from the UK, Spain, Italy, Germany, Mexico, Jamaica and Ecuador.

Both projects received funding under the European Union's [Seventh Framework Programme for Research and Technological Development](#) (2007-2013).

On 1 January 2014, the European Union launched a new research and innovation funding programme called Horizon 2020. Over the next seven years almost €80 billion will be invested in research and innovation projects to support Europe's economic competitiveness and extend the frontiers of human knowledge. The EU research budget is focused mainly on improving everyday life in areas like health, the environment, transport, food and energy. Research partnerships with the pharmaceutical, aerospace, car and electronics industries also encourage private-sector investment in support of future growth and high-skilled job creation. Horizon 2020 will have an even greater focus on turning excellent ideas into marketable products, processes and services.

For more information

FUTUREVOLC: <http://www.futurevolc.hi.is>

FUTUREVOLC video: http://www.youtube.com/watch?v=dmy_t7h5MwY

EVOSS: www.evoss-project.eu

VUELCO: <http://www.vuelco.net/>

MARsite: <http://marsite.eu/>

MED-SUV: <http://med-suv.eu/>

Horizon 2020 website: <http://ec.europa.eu/programmes/horizon2020/>

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