



Infrasound network implementation in Iceland - examples of volcano monitoring in an extreme environment

Kristín Jónsdóttir (1), Maurizio Ripepe (2), Sara Barsotti (1), Halldór Björnsson (1), Dario Del Donne (2), and Kristín Vogfjörð (1)

(1) Icelandic Meteorological Office, Reykjavik, Iceland (kristin.jonsdottir@vedur.is), (2) University of Florence, Florence, Italy (maurizio.ripepe@unifi.it)

The installation of a network of infrasound arrays for volcano monitoring has been initiated in Iceland. In collaboration with the University of Florence (UNIFI), The Icelandic Meteorological Office (IMO) has been operating infrasound arrays since the Eyjafjallajökull eruption in 2010. An important support came through the 26 partner FP7 FUTUREVOLC project which runs from 2012 - 2016. This project which is relevant to the EU "Supersite concept" for long term monitoring in geologically active regions of Europe, is led by the University of Iceland together with IMO which leads long-term monitoring of geohazards in Iceland and is responsible for maintaining instrument networks for this purpose.

As a part of the ground based FUTUREVOLC network, infrasound arrays, are used to monitor volcanic eruptive activity. The arrays are composed of 4 elements with a triangular geometry and an aperture of 120 m where each element has a differential pressure transducer with a sensitivity of 25 mV/Pa in the frequency band 0.001-50 Hz and a noise level of 10-2 Pa. Infrasound is recorded on site at 100 Hz and 24 bits and transmitted via Internet link both to the IMO and UNIFI.

Three arrays are installed in South Iceland, one in Gunnarsholt, one in Þjórsárdalur and one in Kirkjubæjarklaustur. These places were chosen with the aim to optimize wind noise reduction (onsite bushes and trees) and close proximity to volcanoes such as Hekla, Katla, Torfajökull, Eyjafjallajökull, Vestmannaeyjar and the Vatnajökull ice cap which covers four central volcanoes known for explosive eruptions. In September 2014, the fourth array was installed a few km north of Vatnajökull glacier, just north of the large effusive eruption in Holuhraun which started on 29 August 2014 and is still ongoing in January 2015. The eruption is associated with the ongoing Bárðarbunga volcanic unrest and caldera collapse which is being monitored closely by the IMO and FUTUREVOLC partners. The new array has the potential of monitoring an explosive subglacial eruption, which could pose a threat to aviation as well as a flood risk to the lowlands.

We present several examples of data analysis and near-real-time online visualization from the Holuhraun eruption. Since the eruption is mainly effusive it only produces a weak infrasound signal related to the large lava lake- like activity, which is picked up by the two closest arrays. Depending on weather conditions, infrasound monitoring allows to define changes and pulsations in the eruptive activity.