

Session: S01.26 - Volcanic ash: from monitoring to impacts

# The Vespa-system: Real-time estimation of eruption source parameters

Corresponding Author: Þórður Arason | email: arason@vedur.is

Author: Þórður Arason (1) | Sara Barsotti (1) | Mattia de' Michieli Vitturi (2) | Sigurður Jónsson (1) | Bryndís Ýr Gísladóttir (1)

Affiliation: (1) Icelandic Meteorological Office, Bustadavegur 9, IS-108 Reykjavík, Iceland | (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, IT-56126 Pisa, Italy

We describe attempts to automatically estimate time series of plume height and mass eruption rate during explosive eruptions in Iceland. The Icelandic Meteorological Office (IMO) is responsible for monitoring over 30 active volcanic systems, and operates two fixed position C-band weather radars and two mobile X-band radars, which are crucial in monitoring plume height, due to their independence of daylight, weather and visibility. These data are available in real-time to the natural hazards specialists and meteorologists on duty in the IMO's 24/7 monitoring room. In case of an eruption the data are also communicated to London VAAC to support their ash transport simulations for aviation safety purposes. The newly developed VESPA software uses automatically derived plume height estimates from the radar data to calculate the eruptive source parameters (mass flow rate, vertical velocity and vent radius) through an inversion algorithm using PlumeMoM, which solves the 1D plume model equations, and atmospheric profiles from the ECMWF numerical weather prediction model. Furthermore, the estimate of mass eruption rate calculated by VESPA are used to initialize the VOL-CALPUFF dispersion model to forecast the local impact on the ground due to tephra fallout. In this study we describe the VESPA-system and discuss estimated eruption source parameters for the eruptions of Grímsvötn 2004, Eyjafjallajökull 2010 and Grímsvötn 2011.