

Integrated risk assessment of volcanoes in Iceland

Melissa Anne Pfeffer¹, Sara Barsotti¹, Sigrún Karlsdóttir¹, Esther Jensen¹, Emmanuel Pagneux¹, Evgenia Ilyinskaya², Guðrún Jóhannesdóttir³, Björn Oddsson³, Armann Hoskuldsson⁴, Ingibjörg Jónsdóttir⁴, Thorvaldur Thordarsson⁴, Davíð Egilson¹, Simone Tarqui

¹Icelandic Meteorological Office

²University of Leeds

³Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police

⁴University of Iceland

⁵Istituto Nazionale di Geofisica e Vulcanologia, Pisa

⁶Ecole des mines d'Alès

⁷Verkís Consulting Engineers

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The Integrated risk assessment of volcanoes in Iceland includes: the eruptive activity and potential hazards of Icelandic volcanoes: the Catalogue of Icelandic Volcanoes is available at <http://futurevolc.vedur.is>; an initial risk assessment of floods triggered by volcanic eruptions: Volcanogenic floods in Iceland: An assessment of hazards and risks at Öräfajökull and on the Markarfljót outwash plain is available from <http://en.vedur.is>; an initial risk assessment of explosive eruptions in Iceland; and an initial risk assessment of volcanic eruptions that may damage infrastructure. Here we describe ongoing work for the final parts of the project. Three scenarios have been considered within the risk assessment project regarding explosive eruptions. They are: medium-sized frequent eruptions at Hekla volcano; large, quite rare eruptions at Öräfajökull (like 1362); and mixed eruptions (gas and ash) as the Laki event in 1783-1784. The Hekla scenario has been addressed and the temporal evolution of eruption intensity has been constrained. A Monte-Carlo approach has been used to produce probabilistic maps for different tephra ground-loading thresholds with variable wind conditions. Results have been already used as a consultancy for the installation of wind-generators. Results will also be used by the Icelandic Civil Protection for defining local impact and reviewing evacuation plans. Vestmannaeyjar and Reykjanesskagi, communities close to active volcanoes, are being considered to assess the risk to infrastructure from eruptions. Event trees for the volcanic systems are being developed based on data collated in the Catalogue. The 1973 Heimaey eruption is being used to test and validate the tephra dispersion model, VOL-CALPUFF, and lava flow model, F-L, being utilized. Tephra measurements made during the eruption have been reanalysed using TOTGS to refine the tephra distribution, and the locations and timing of past eruptive vents are being refined using a new bathymetry map. The load-bearing capacities of homes have been categorized by roof types.