



## UK Hazard Assessment for a Laki-type Volcanic Eruption

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Following the impacts of the Eyjafjallajökull eruption in 2010, two types of volcanic eruption have been added to the UK Government's National Risk Register for Civil Emergencies. One of these, a large gas-rich volcanic eruption, was identified as a high impact natural hazard, one of the three highest priority natural hazards faced by the UK. This eruption scenario is typified by the Laki eruption in Iceland in 1783-1784. The Civil Contingency Secretariat (CCS) of the UK's Cabinet Office, responsible for Civil Protection in the UK, has since been working on quantifying the risk and better understanding its potential impacts. This involves cross-cutting work across UK Government departments and the wider scientific community in order to identify the capabilities needed to respond to an effusive eruption, to exercise the response and develop increased resilience where possible.

As part of its current work, CCS has been working closely with the UK Met Office and other UK agencies and academics (represented by the co-authors and others) to generate and assess the impacts of a 'reasonable worst case scenario', which can be used for decision making and preparation in advance of an eruption. Information from the literature and the findings of an expert elicitation have been synthesised to determine appropriate eruption source term parameters and associated uncertainties. This scenario is then being used to create a limited ensemble of model simulations of the dispersion and chemical conversion of the emissions of volcanic gases during such an eruption. The UK Met Office's NAME Lagrangian dispersion model and the Centre for Ecology and Hydrology's EMEP4UK Eulerian model are both being used. Modelling outputs will address the likelihood of near-surface concentrations of sulphur and halogen species being above specified health thresholds. Concentrations at aviation relevant altitudes will also be evaluated, as well as the effects of acid deposition of volcanic species on ecosystems.

Modelling results from a preliminary study have suggested a risk to both human health and the environment in the UK and across other parts of Europe from harmful levels of sulphate aerosol (as previously recognised from modelling of a Laki-type eruption by Schmidt et al (2011), amongst others), but also sulphur dioxide, which has not received as much attention.

The presentation will discuss the UK's national assessment of risk and how the Government works to prepare for newly identified high impact hazards. We will show how this is benefitting from innovative approaches being taken in the research community and more detailed modelling findings will be presented. We will demonstrate that this work is a good example of practical hazard assessment through collaboration of scientists with decision makers.

This work also has wider reaching links back to Supersite and observations initiatives such as the FUTUREVOLC project, as improved monitoring of source characteristics will enable the UK to refine its models (both numerical and procedural) for better risk management.

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