



Eruption parameters elicitation for volcanoes in Ethiopia and Kenya Informing a World Bank GFDRR project on volcanic threat in sub-Saharan Africa

Susanna Jenkins (1), Murray Lark (2), Sue Loughlin (3), Karen Fontijn (4), Tamsin Mather (4), David Pyle (4), Elias Lewi (5), Gezahegn Yirgu (5), Charlotte Vye-Brown (3), and Steve Sparks (1)

(1) University of Bristol, Bristol, United Kingdom, (2) British Geological Survey, Nottingham, United Kingdom, (3) British Geological Survey, Edinburgh, United Kingdom, (4) University of Oxford, Oxford, United Kingdom, (5) University of Addis Ababa, Ethiopia

Despite large numbers of very visible active volcanoes in sub-Saharan Africa, data about eruptions are limited compared to elsewhere in the world. We present the method and findings from elicitation carried out to characterise likely future eruptions in the region as part of a World Bank GFDRR risk profiling project for sub-Saharan Africa. The purpose of the elicitation was to better understand the characteristics and frequencies of explosive eruptions at volcanoes in Ethiopia and Kenya. The elicitation will provide source parameters for tephra fall modelling at select volcanoes in Ethiopia (Aluto, Corbetti, Fentale) and Kenya (Menengai, Longonot, Suswa).

There were two stages of elicitation: 1) a 'sanity check' of initial assumptions around likely eruption style, magnitude and frequency for the six selected volcanoes; 2) a formal SHELF (SHEffield ELicitation Framework) elicitation that centred round establishing frequency-magnitude relationships for the volcanoes.

The elicitation suggested that explosive eruptions at Aluto and Corbetti were less likely than at the other volcanoes, although the uncertainty was significant. Menengai and Rungwe volcano in Tanzania (elicited as an analogue for Fentale, Longonot and Suswa volcanoes) were characterised by approximately similar probabilities of eruption. However, Rungwe was considered more likely to produce larger explosive ($VEI \geq 4$) eruptions than Menengai.

Elicitation discussions highlighted the knowledge and data gaps for African volcanoes and raised important questions around whether gaps in the eruption record were real and related to changing regimes at the volcanoes over time or if they were a function of under-recording or lack of preservation. Further investigation is therefore needed to validate the findings of the elicitation. It is hoped that continued collaboration with local partners and studies within the ongoing NERC-funded RiftVolc project will address these issues and help to improve our knowledge and estimates of hazard for volcanoes in Ethiopia and Kenya.