Magmatic and Hydrothermal Activity in the East African Rift

Juliet Biggs[1], William Hutchison[2], Matthew Wilks[1], Elspeth Robertson[1], Andrew Nowacki[1], David Pyle[2], Tamsin Mather[2], Marie Edmonds[3], Michael Kendall[1], Atalay Ayele[4], Elias Lewi[4]

[1]University of Bristol, UK, [2]University of Oxford, UK, [3]University of Addis Ababa, Ethiopia, [4]University of Cambridge, UK

E-mail: juliet.biggs@bristol.ac.uk

The caldera volcanoes of the East African Rift are among some of the most dangerous volcanoes in the world (Aspinall et al, 2011), since they have had eruptions within the very recent past, are close to densely populated areas and are un-monitored. However, they also contain significant geothermal resources and are therefore subject of large infrastructure investment. There is a critical lack of understanding of the current activity of the magmatic and hydrothermal system, and the potential volcanic hazards. To address this we are engaged in active research projects on two young volcanoes, Alutu, Ethiopia and Longonot, Kenya. Both of these volcanoes are currently undergoing active deformation, identified by InSAR during the period 1997-2010 (Biggs et al, 2011). Alutu is currently the location of the only major geothermal power plant in Ethiopia and drilling is about to start at Longonot, Kenya. Naturally occurring changes in the volcano affect the operation of the plant while the production itself may change the state of stress in the reservoir and surroundings, influencing the seismic and volcanic hazard. This project involves seismic monitoring, MT and geodetic measurements and well as airborne imagery , field mapping and sampling. The opportunity to obtain such a multi-disciplinary dataset offers the potential to transform our understanding of the status of ongoing magmatic and hydrothermal activity associated with these active volcanic systems and their current and future volcanic hazards.