

BOISE FUND END OF AWARD REPORT

Name	Karen Fontijn
Year of award	2014
Project title	The geochemistry of volcanic products in the Main Ethiopian Rift: applications to archaeological and palaeoanthropological studies
Amount awarded	£3000
Amount spent	£2946.52
Briefly restate the research objectives	<ul style="list-style-type: none"> - Development of a database of geochemical composition of tephra and obsidian erupted from volcanoes in the Main Ethiopian Rift throughout the Pleistocene-Holocene - Sampling campaign between Corbetti and Fentale volcanoes

In the following space please summarise your results. All text must be confined to this page. Any figures or diagrams can be attached on separate sheets.

The target area for this study is the Main Ethiopian Rift (MER) between ca. 7 and 9 °N, and includes the central volcanoes of Fentale, Kone, Boset, Gedemsa, Bora, Aluto and Corbetti, in addition to numerous small basaltic cones (see attached Fig 1). In this project, we focus on deposits from large explosive eruptions and obsidian lava flows from most of the MER's central volcanoes. We aim to geochemically fingerprint deposits and obsidian lava flows, and improve their potential to be used as marker horizons to correlate sedimentary sequences studied for archaeological and palaeoanthropological purposes.

Samples of deposits from explosive eruptions at Aluto volcano were already collected by Will Hutchison (Dept. Earth Sciences, University of Oxford) in previous years. In this study a total of 11 samples was geochemically characterised for major and minor element composition using electron microprobe analysis at the Research Laboratory for Archaeology and the History of Art (University of Oxford). I had originally requested funding for Laser-Ablation Inductively Coupled Plasma Mass Spectrometry analyses, to fingerprint glasses for their trace element composition. However, due to the small amount of samples already available, and the field sampling campaign only planned in November-December 2015, I decided to invest more time in rigorous fingerprinting of major and minor element composition instead.

The majority of the analysed samples are from a reference section displaying nine different pyroclastic units, dated to the Late Pleistocene. The remaining samples correspond to the Qup deposit, the youngest in the sequence, which originates from a major Plinian eruption from Aluto volcano, and which had not previously been characterised for its glass composition. This unit is thought to be an important marker horizon on the central MER. This first dataset shows that Qup, and two other units, each have a unique chemical composition slightly different from that of other, smaller, Aluto units (see attached Fig 2). The chemical compositions of one of these units (Al1-B, see attached Fig2), the second-youngest one in the reference section, is significantly different to that of other Aluto deposits, and may be sourced from neighbouring Corbetti volcano.

Comparison with the limited geochemical data on tephra deposits from the Gademotta Formation presented by Morgan and Renne (2008) suggests Aluto to be the most likely source for their Unit 15 and Unit 10. Their Unit D is chemically more similar to our Al1 and may originate from Corbetti. Additional geochemical data on samples from both Corbetti and Aluto will be required to confirm these correlations.

In November – December 2015, a 4-week field sampling campaign was organised as part of the RiftVolc project. The sampling campaign was led by myself, and assisted by several researchers from the UK (Universities of Oxford, Bristol and Edinburgh). We visited the following volcanoes: Corbetti, Aluto, Gedemsa, Boset and Kone. Bora and Fentale were not visited due to time and/or security constraints. At all of the visited volcanoes, stratigraphic sections of volcanic deposits were described and samples were taken from pumice and ash deposits as well as (obsidian) lava flows where found. Geochemical analysis on a selection of samples from all visited volcanoes will be carried out in early 2016 and will add valuable information to our dataset.

MER Field Area

Write a description for your map.

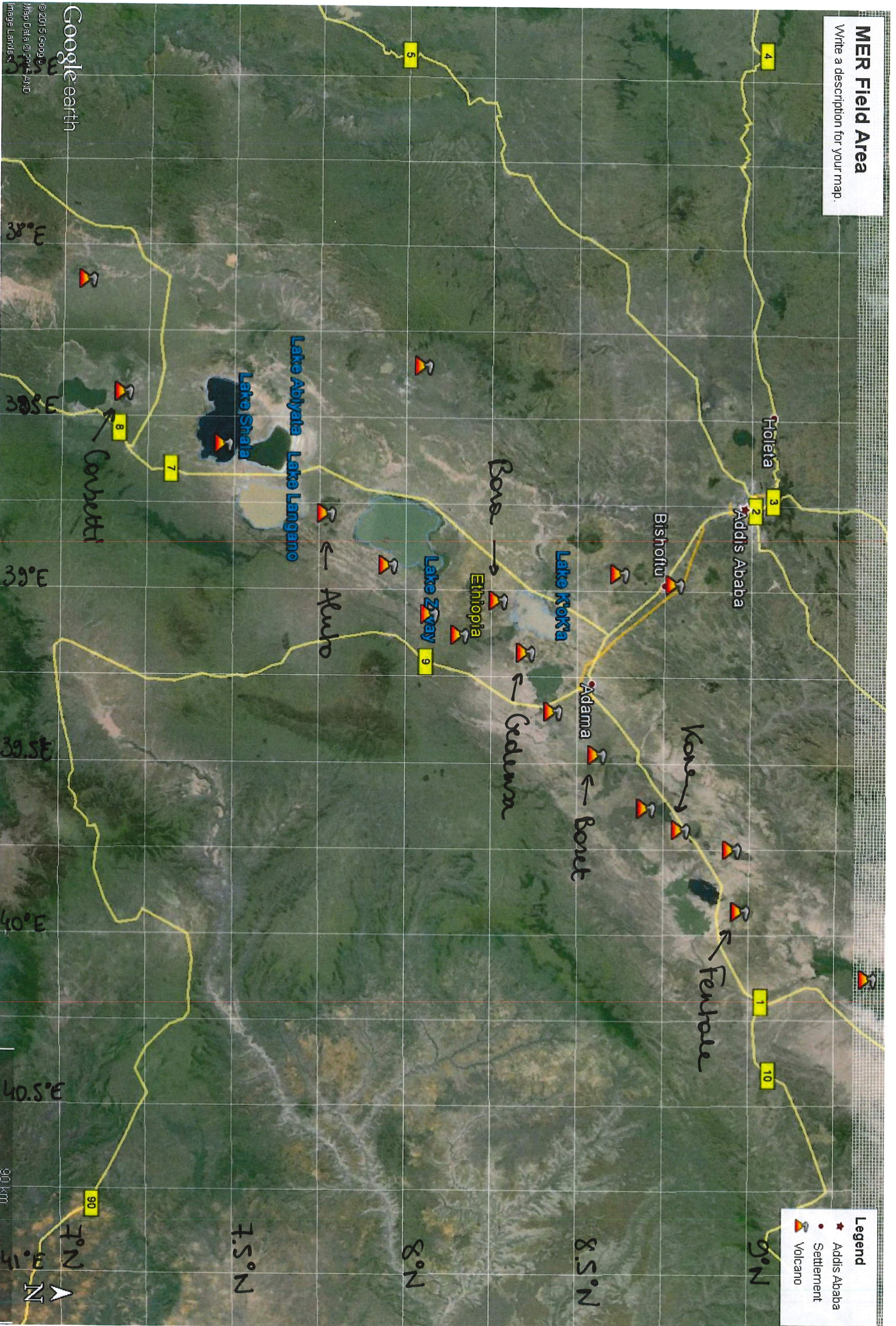


Figure 1.

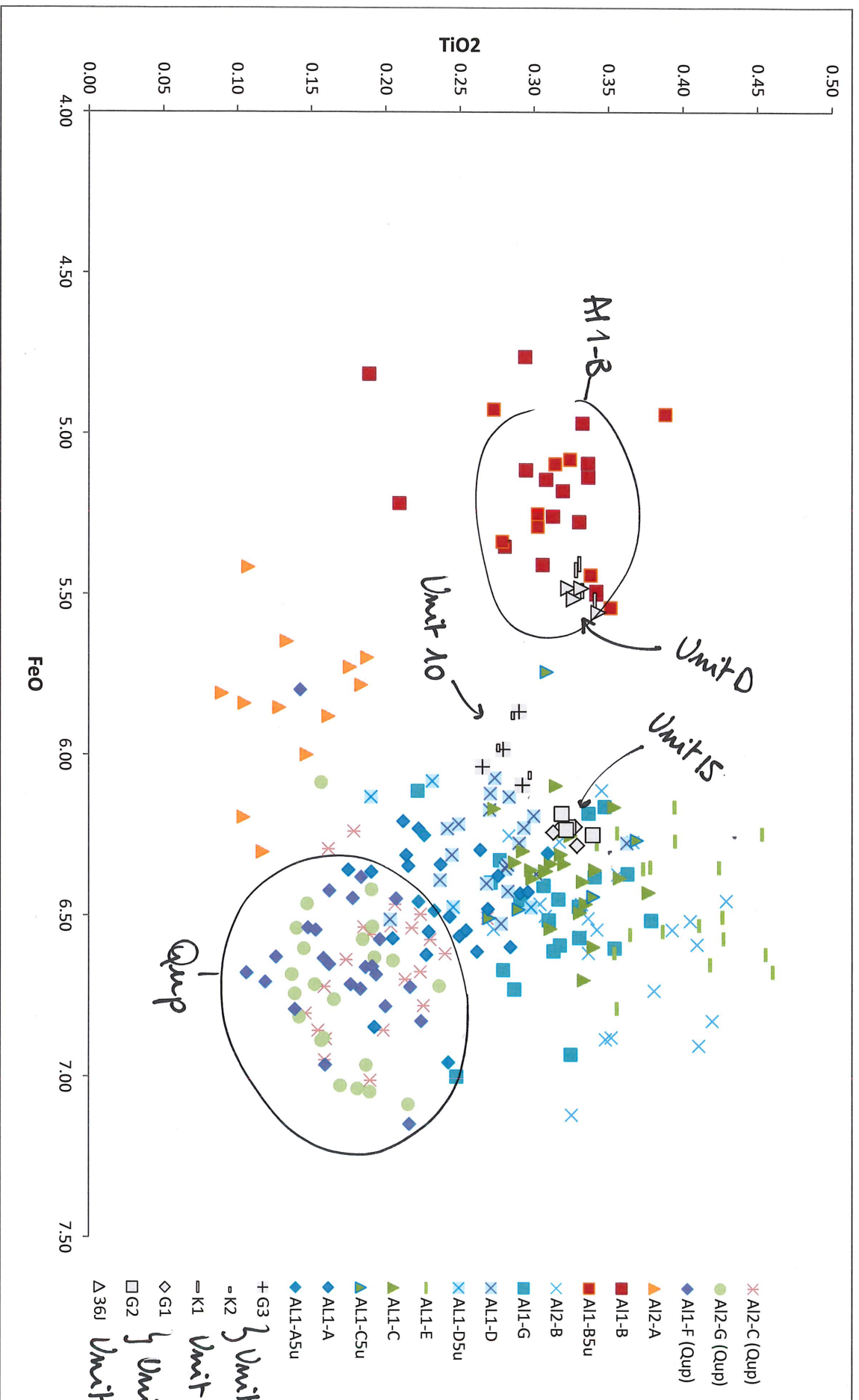


Figure 2.