Durham University

MSc by Research (Volcanology)

Characterisation of a widespread Plinian pumice fall deposit, Tenerife, Canary Islands

Supervisors: Dr Rich Brown (Earth Sciences); Dr Madeleine Humphreys (Earth Sciences); Dr Pablo Davila Harris (IPICYT, Mexico City)

Background: Tenerife is a large, long-lived ocean island volcano with a protracted history of explosive volcanism driven by generation and triggering of phonolite magma beneath Las Canadas caldera. Over 40 Plinian eruptions are recorded on the island between 1.9 and 0.1 Ma. 18 of these eruptions produced pyroclastic density currents that swept out over large parts of the island. The older part of this sequence is comparatively less well known, and research has focussed on those eruptions with preserved ignimbrite sheets. Intervening Plinian pumice fall deposits, lacking ignimbrite sheets, have not been studied, and contain information that can be used to refine understanding of the magnitude, frequency and hazards of explosive volcanic activity at Las Cañadas caldera.

Figure 1. The Coroco pumice fall deposit, southern Tenerife.

Project Aims and Methods:

This project will investigate one of the lesser known Plinian fall deposits: The Coroco pumice fall deposit, ~0.8 Ma old. This is exposed extensively around the SE of the island. The project will provide a full documentation of its stratigraphy, composition and thickness and grainsize variations in order to reconstruct the eruption.

The student will spend 2 x 3 weeks in the field mapping out the deposit, constructing sedimentary logs and undertaking sieving and grainsize analysis. Samples will be analysed in the lab for composition (variations in lithic content and lithic type, pumice type). Thin sections of juvenile material will be examined using optical microscopy and scanning electron microscopy (SEM). Representative samples will be analysed for major and trace element compositions.

Training and skills development:

Throughout the MSc project the successful student will be integrated into the vibrant, active volcanology research group within the Durham Earth Science Department. Training will include:

- Field description and interpretation of pyroclastic rocks.
- 2D textural analysis of volcanic rocks using optical microscopy and SEM.
- quantitative assessment of particle size distributions and composition of tephra fall deposits.
- major and trace element analysis.
- writing and presentation skills via the weekly volcanology group meetings
- optional one-week residential volcanology field course in Tenerife
- excellent preparation for PhD research.

Pre-requisites:

The successful candidate will:

- have an undergraduate degree in earth sciences; and an interest in volcanology;
- quantitative skills in geoscience data analysis.
- Full clean driving licence will be beneficial.
- Willing to undertake extended fieldwork.

Research costs:

Basic research costs associated with this project will be met by the supervisor. The student will be liable for costs associated with the optional field course (around £600).

References and further reading

Apply: www.dur.ac.uk/earth.sciences/postgraduate/

Contact: Richard.brown3@durham.ac.u

Earth Sciences