Title: Dissecting an explosion: the case of the 17th September 1996 explosion at Soufriere Hills Volcano.

Headline outline: Using microtextural analysis (SEM, electron microprobe) and petrology to reconstruct the conditions that led to and sustained a large discrete explosive event at Soufriere Hills Volcano. Uses well constrained archived rocks from a well observed eruption.

More Details:

The Soufriere Hills volcano experienced its first explosive eruption on the 17th September 1996. This followed 9 hours of dome collapse activity, punctuated by 2.5 hours of quiescence just before the event. Although explosive activity lasted less than an hour it generated a unique set of varied clasts that was well sampled and archived by researchers at the University of Bristol. The volcanological processes and the distributions of these clasts are well documented in Robertson et al., 1998.

Remarkably the microtextural and petrological character of these clasts have not been examined against this well constrained dataset. Until now. Preliminary analyses show that the dome that followed the explosions likely did not recycle un-erupted 17th September explosive material, but we don't yet understand the processes that generated the four types of clast recognised in the erupted material by Robertson et al., 1998. Our hypothesis is that these represent a snapshot of the heterogeneous processes that led to this larger-than-usual eruption at Soufriere Hills.

During this project you will document the clast inventory at Bristol at the handsample scale and then use this to create targeted analyses of the different samples. You will likely characterise the bubble populations, the textures and the compositions of them microlites and associated glasses to reconstruct differing or changing conditions in the conduit and vent. You will interpret these findings against the established observations of the eruption.

Suggested Reading: The explosive eruption of Soufriere Hills Volcano, Montserrat, West Indies, 17 September, 1996- Robertson- 1998- Geophysical Research Letters- Wiley Online Library

Supervisory Team: Jenni Barclay, Alison Rust and Abigail Metcalfe (Bristol) with Liz Gaunt (MVO)

Skills needed: a firm understanding of igneous petrology and physical volcanology

Skills you will acquire: micro-analytical skills, the capacity to interpret petrological datasets, and to use textural analyses to unravel eruptive histories

Career development opportunities: your findings will be of relevance to several ongoing research projects with ample opportunities to engage with those projects. You will be co-supervised by a team at Bristol, in collaboration with scientists at the Montserrat Volcano Observatory providing excellent opportunities to discuss your work with researchers with a wide range of skills and place these findings in the context of volcano monitoring.