

Subsurface mass and density distribution at Soufrière Hills Volcano, Montserrat, British West Indies: a case for muon radiography?

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Introduction

Over the passed few years gravimetric investigations have permitted insights into the temporal variations of the gravity field on Montserrat as a result of the current eruptive period of Soufrière Hills Volcano (SHV). Due to safety considerations these measurements have to be performed well off the active dome complex. As a result neither static nor dynamic data on the distribution of mass beneath the active dome are available.

Problem

Knowledge about the internal dome structure from density distribution models are, however, of immense value not only for research purposes, but also for operational hazard assessment and risk mitigation.

Discussion

Muon radiography could permit vital data on the density structure of the Soufriere Hills edifice to infer parameters such as dome volumes, collapse volumes and assess edifice stability and spatio-temporal density variations in its immediate subsurface as a result of effusive or explosive activity.

Conclusions

In this presentation I assess the viability of muon radiography on Montserrat and explore how such data could be utilized to address outstanding scientific problems in conjunction with established monitoring techniques at SHV.