Geophysical Research Abstracts
Vol. 19, EGU2017-6247, 2017
EGU General Assembly 2017

Crustal and tectonic controls on large-explosive volcanic eruptions

Tom Sheldrake and Luca Caricchi
University of Geneva, School of Earth Sciences, Genève, Switzerland (thomas.sheldrake@unige.ch)

Quantifying the frequency-Magnitude (f-M) relationship for volcanic eruptions is important to estimate volcanic hazard. Furthermore, understanding how this relationship varies between different groups of volcanoes can provide insights into the processes that control the size and rate of volcanic events. Using a Bayesian framework, which allows us to conceptualise the volcanic record as a series of individual and unique time series, associated by a common group behaviour, we identify variations in the size and rate of volcanism in different volcanic arcs. These variations in behaviour are linked to key parameters that include the motion of subduction, rate of subduction, age of the slab and thickness of the crust. The effects of these parameters on volcanism are interpreted in terms of variations in mantle productivity and the thermal efficiency of magma transfer in arc crustal systems. Understanding the link between subduction architecture, heat content of magmatic systems, and volcanic activity will serve to improve our capacity to quantify volcanic hazard in regions with limited geological and historical records of volcanic activity.