Geophysical Research Abstracts
Vol. 18, EGU2016-9047, 2016
EGU General Assembly 2016

Combining existing models and the fluid dynamics of slugs to categorise slug bursting events

Tom D Pering (1) and Andrew J S McGonigle (1,2)

(1) University of Sheffield, Department of Geography, Sheffield, United Kingdom (t.pering@sheffield.ac.uk), (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Palermo, Via Ugo LaMalfa, 153, 90146 Palermo, Italy.

A key aspect of basaltic volcanism is that bubbles can move through magmas independently of the melt, largely a result of the low viscosity magmas which they are contained within. This allows processes including bubble expansion and coalescence to grow bubbles to large morphologies, such as gas slugs (or 'Taylor bubbles'). The features and behaviours of gas slugs have been relatively well characterised in the literature and in particular, have received a large amount of focus in a strombolian context. This includes the transitioning between passive and explosive bursting of these slugs (James et al. 2009), and when and how multiple gas slugs can interact (Pering et al. 2014). Here, we demonstrate a model which combines such previous models to categorise bubble or slug bursting events based on their lengths and repose time following an event. This new combined model provides a useful visual output which categorises bursting events into the following categories, including: explosive single events, non-explosive single events (i.e. puffing), explosive rapid events, and non-explosive rapid events, where a single event is termed as one which would not affect following events. This model could be of use in determining sub-surface flow regimes and honing estimates of magma and conduit parameters.