Geophysical Research Abstracts
Vol. 16, EGU2014-8295, 2014
EGU General Assembly 2014

Coupled pulsing of lava fountains: Video monitoring reveals systematic height and velocity variations of adjacent vents

Tanja Witt and Thomas R. Walter
Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Germany (twitt@gfz-potsdam.de)

Lava fountains are a common eruption form at basaltic volcanoes. Many of the lava fountains occur at fissure eruptions, associated with the alignment of active vents. We observed that the lava fountain pulses may occur in chorus at several adjacent vents, implying that activity at these vents is coupled. The mechanisms behind such a coupling of adjacent lava fountains and the underlying connection between the different craters are not fully understood, however.

Here we employ video images to measure the height, width and velocity of the ejecta leaving the vent. With a Sobel edge-detection algorithm, our aim is to measure the height of the different fountains occurring along fissure eruptions. Video data acquired from Puu'oo (Hawaii) and from Eyjafjallajökull (Iceland) are showing major similarities in fountaining behavior. Based on the fountain activity times series we estimate the sign and degree of correlation of the different vents. We find that the height and velocity of adjacent lava fountains are often in chorus. The velocity is calculated by a correlation in the Fourier space of contiguous images. We observed that episodically and sporadically the correlation regime can change. Despite these changes, both the frequency of the lava pulses and the eruption and rest time between the pulses remain similar for adjacent lava fountains, implying, a controlling process in the magma feeder system itself.

We interpret the initial vertical velocity at the vent to be proportional to the extent of bubbles, and layers of bubbles rising. Lateral migration of fountains and their dynamics, in turn, is associated to lateral magma and gas flow or inclined layers of bubbles developing along the fissure at depth. Systematic recording and analysis of video data from different volcanoes hence result in a better understanding of the mechanisms of parallel and non-parallel lava fountain pulses.