



Non-linear explosion tremor at Sangay, Volcano, Ecuador

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Abstract

A detailed analysis of discrete degassing pulses, chugs, at Sangay volcano, was performed on seismic and infrasonic records to determine the physics of the conduit. Infrasonic chugging signals appear as repetitive pulses with small variations in amplitude and time lag. An automated time-domain analysis was developed to measure with high precision time intervals and amplitudes at different wave arrivals, reducing the possibility error associated with hand picking. Using this automated method, a strong positive correlation of acoustic amplitude with repose time between individual pulses on chugging signals of Sangay was found on numerous oscillating sequences. Frequency gliding of apparent harmonic frequencies generally trends from high to low frequency at Sangay, in contrast to trends at Karymsky Volcano, Russia. A new description of chugging events using wavelet transform methods, appropriate for non-stationary signals, shows subtle changes in the waveforms relate to physical processes in the volcano. A system of non-linear feedback, based on choked flow at the vent, is postulated as the most likely source of this volcanic tremor.

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