

## Source constraints of Tungurahua volcano explosion events

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### Abstract

The most recent eruptive cycle of Tungurahua volcano began in May 2004, and reached its highest level of activity in July 2004. This activity cycle is the last one of a series of four cycles that followed the reawakening and major eruption of Tungurahua in 1999. Between June 30 and August 12, 2004, three temporary seismic and infrasonic stations were installed on the flanks of the volcano and recorded over 2,000 degassing events. The events are classified by waveform character and include: explosion events (the vast majority, spanning three orders of pressure amplitudes at 3.5 km from the vent, 0.1–180 Pa), jetting events, and sequences of repetitive infrasonic pulses, called chugging events. Travel-time analysis of seismic first arrivals and infrasonic waves indicates that explosions start with a seismic event at a shallow depth (<200 m), followed ~1 s later by an out-flux of gas, ash and solid material through the vent. Cluster analysis of infrasonic signals from explosion events was used to isolate four groups of similar waveforms without apparent correlation to event size, location, or time. The clustering is thus associated with source mechanism and probably spatial distribution. Explosion clusters do not exhibit temporal dependence.

### Available in:

*Bulletin of Volcanology*, 2006, vol. 68, no 5, p. 480-490.

DOI: <https://doi.org/10.1007/s00445-005-0023-8>

<https://link.springer.com/article/10.1007/s00445-005-0023-8>

