



## **Explosive Activity at Tungurahua volcano, Ecuador**

**M. Ruiz** (1,2), J. Lees (1), J. Jhonson (3)

1. Department of Geological Sciences, University of North Carolina  
(mruiz@email.unc.edu)
2. Instituto Geofisico, Escuela Politecnica Nacional, Ecuador
3. University of New Hampshire

Tungurahua volcano, one of the most active volcanoes on the Ecuadorian Andes, began its fifth activity cycle in May, 2004, which peaked in July with frequent explosions, ash columns as high as 5 km, ash falls and minor lahars. During this period, three temporary seismic and infrasonic stations were installed on the southwest, northwest and northeast flanks of the volcano at distances to the active crater between 3.5 to 5.9 kms. More than 2,300 signals were recorded jointly on high fidelity infrasonic and seismic instrumentation. About 95% of these signals are related to degassing processes on the volcano, and are classified by waveform character as - 1) Explosion events: impulsive, short duration blasts on infrasound and spindle-shaped long-duration seismic signals with amplitudes from 0.1 to 180 Pa. About 25% of these signals are followed by a high frequency rumbling signal with pressure amplitudes larger than the explosion blast. - 2) Roaring events, composed of complex seismic and infrasound signals with emergent initiation and broad frequency bands. - 3) Chugging events, composed of saw-tooth shaped infrasound signals in the infrasound records. Cluster analysis classification of the blast explosion signals, the most conspicuous degassing type at Tungurahua, identified four groups of explosions.

Assuming a source located inside a vertical conduit below the active crater, blast event explosions start at shallow depths (< 220 m), followed about 1 s later by an out-flux of gas, ash and solid material through the vent, creating pressure disturbances and a secondary seismic phase.