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Seismic monitoring of 2006 Ubinas volcano eruption

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At the end of March 2006, Ubinas volcano (16.355° S, 70.903° W, 5672 m) considered the most active volcano of Peru during the last 450 years begun a new eruption process which is lasting until present. The Geophysical Institute of Peru (IGP) with the cooperation of the Institut de Recherche pour le Développement (IRD-France) has carried out the monitoring and surveillance of seismic activity associated to this eruptive process, at the beginning by 2 digital broadband portable seismic stations and later by a network of 3 digital 1Hz stations which data is transmitted by radio telemetry to Cayma Volcanological Observatory at Arequipa city. Here we present the main characteristics about the evolution of the seismicity during this eruptive process that permitted to us to distinguish, considering also the terrain observations, that there were 4 stages during the process: (1) From March 25th to June 24th : Setting up of intrusive system, opening of the eruptive conduits. During this stage the magma arrive for the first time to the surface on April 19th. The seismic signal includes a few tremors, but they increase with the time. It take place strong explosions with LP precursor events (2) From June 24th to July 16th: Open system functioning, weak flow. Seismic signal have some tremor but the explosions are numerous --until 3 par day—and they do not show LP precursor events anymore. (3) From July 16th to august 31st: Increase of eruptive flow. Seismic signals show a remarkable increase in the last of tremors and especially in their amplitude. The energy of explosions rise and LP precursors appear again. (4) From September to January: probable end of the intrusive episode; magma volume depletion. The intrusion stopped and residual magma remains surrounding the crater area. There are some phreatomagmatic explosions because rainy season. The seismic signals show very few explosions and tremors. The number of LP decrease also, and the daily cumulated energy fall down.

The precursor LP events, which precede numerous explosions, were analyzed and used for to emit explosion warnings communicated to the civil protection authorities.