



Analysis of Source Characteristics of LP events at Piton de la Fournaise, La Réunion

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Magmatic and hydrothermal processes play a significant role in generating seismicity at active volcanoes. These signals can be observed at the surface and can be used to obtain an insight into the volcano's internal dynamics. Long Period (LP) events are of particular interest as the mechanisms of these events are still not well understood. LP events typically have peaked spectra ranging in frequencies between 0.5 to 5 Hz, and often precede or accompany volcanic eruptions.

Piton de la Fournaise, La Réunion, is one of the most active volcanoes in the world, however LP events on Piton de la Fournaise are rare. As part of a French Government funded project, UnderVolc, 21 broadband seismometers were deployed on the volcano from November 2009. Since deployment the volcano has erupted five times, but only 15 LP events were recorded in this period. Three of the eruptions were preceded by LP events, and several LP events were recorded during an intrusive phase.

The LP events have dominant frequencies ranging between 2 and 4 Hz and, as typical for LP events, the P- and S-wave phases are difficult to differentiate at stations close to the summit. In this study the source location of each LP event was determined; the events are located at a very shallow depth, near the summit crater. We also investigate the source mechanism of each LP event and the relationship between LP occurrence and eruptive context (size of the eruption, deformation of the edifice, etc.).

In this work we will attempt to address the important question as to why such an active volcano has so few LP events, and what we can learn about the eruption process from these particular events.