# New insights into the source mechanism of long period seismic events recorded at Turrialba volcano, Costa Rica

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Long period (LP) seismic events occur at volcanoes across the world, but the source processes generating these events are still relatively poorly understood. LPs often occur in increasing numbers before volcanic eruptions, so a better understanding of the source is a major aim of volcano seismology. Full-waveform moment tensor inversion has been carried out at many volcanoes in order to attempt to constrain the mechanism of LPs. An experiment was carried out in 2011 at Turrialba volcano in Costa Rica, where 25 temporary seismic stations were deployed in addition to the three permanent stations. The aim of this experiment was to perform 3D full-waveform moment tensor inversion as accurately as possible, by using a dense seismic network with stations especially concentrated across the summit of the volcano, which has been shown by previous studies to reduce path effects and therefore improve the solution. Source locations are obtained by implementing a grid search while carrying out the moment tensor inversion. Analysis demonstrates that the LPs are located at shallow depths below the active Southwest and Central Craters and, as in the majority of studies investigating LP source mechanism, a crack mechanism is obtained from the moment tensor inversion. However, this result does not resolve the processes causing the events. Many studies have argued that the events are caused by the resonance of fluid-filled cavities within the volcano. The crack mechanism supports this hypothesis, suggesting that a fluid-filled crack is the resonator. However a crack mechanism could also be generated by the opening or closing of a tensile crack. In order to better constrain the most likely mechanism at Turrialba volcano, we undertake source corner frequency analysis. The results of this analysis suggest that typical earthquake relationships hold for LP events, contrary to what one might expect from a crack resonance model. Detailed results and possible interpretations will be presented.