

## Volcano-seismology of the Irazú-Turrialba volcanic complex

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### Context

The active hydrothermal system of the Irazú Turrialba Volcanic Complex (ITVC), Costa Rica plays host to frequent seismic energy from tectonically driven sources, regional seismicity and by active magma migration. All of this occurs within the diverse and unique volcanic setting of two volcanoes linked by possibly similar magmatic sources but varying in physical state, Irazú being a closed system, and the openly venting Turrialba volcano. A network of 20 seismic stations deployed around the ITVC is combined with the current [OVSICORI](#) and [RSN](#) stations to accurately monitor the seismicity of this system. The network will help to investigate and compare the seismic activity occurring across the ITVC and surrounding regions.

### Objectives and Methods

The objective of this study is to shed light on the seismic sequences taking place at the ITVC and to characterise them in space and in time. The ITVC features a large variety of seismic signals including VT, LP, tornillos, and tremor events [Eyre *et al.*, 2013; Zecevic *et al.*, 2016]. Some of these signals are precursors of volcanic eruptions often occurring at the Turrialba volcanic complex or associated to surface deformation processes (i.e. landslides) driven by intrusive dynamics taking place in the near subsurface.

The candidate will use classical and non-conventional seismic methods to study fluid transport processes occurring at shallow and greater depths and to discuss volcanic processes in a broad geological context.

### Literature

Eyre, T. S., C. J. Bean, L. De Barros, G. S. O'Brien, F. Martini, I. Lokmer, M. M. Mora, J. F. Pacheco, and G. J. Soto (2013), Moment tensor inversion for the source location and mechanism of long period (LP) seismic events from 2009 at Turrialba volcano, Costa Rica, *J. Volcanol. Geotherm. Res.*, 258, 215–223, doi:10.1016/j.jvolgeores.2013.04.016.

Zecevic, M., L. De Barros, T. S. Eyre, I. Lokmer, and C. J. Bean (2016), Relocation of long-period (LP) seismic events reveals en echelon fractures in the upper edifice of Turrialba volcano, Costa Rica, *Geophys. Res. Lett.*, 43(19), 10,105–10,114, doi:10.1002/2016GL070427.



View of the Irazú Turrialba Volcanic Complex (Turrialba in the background).

### Sites WEB

<http://www.unige.ch/sciences/terre/en/research/crustal-deformation-and-fluid-flow/>

### Choice of orientation :

Risk