ÉCOLE DOCTORALE
SCIENCES DE LA TERRE ET DE L'ENVIRONNEMENT
ET PHYSIQUE DE L'UNIVERS, PARIS

Subject title: Searching for hidden earthquakes: seismicity of Piton des Neiges and Piton de la Fournaise volcanoes

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IPGP- Team Sismologie – UMR7154

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Presentation of the subject: (Maximum 2 pages)

The Piton de la Fournaise Volcano Observatory of the Institut de Physique du Globe de Paris invites application for a highly motivated PhD candidate to investigate volcano-tectonic seismicity at Piton des Neiges and Piton de la Fournaise volcanoes.

Our understanding of faults and volcanoes is limited by the difficulty to detect small earthquakes. In a volcanic environment, the complexity of recorded signals, the temporal clustering of earthquakes and their low signal to noise ratio often hide the link between the observed seismicity and the migrating magma source. In a similar way, the detection of small micro-earthquakes is essential to understand the geometry of faults at depth, swarm and foreshock processes, and the mechanisms at play during the nucleation of large tectonic earthquakes. In the framework of the ERC project PRESEISMIC, we are developing different tools for detecting and analyzing seismicity that are useful both in tectonic and volcanic environments.

The successful candidate will work on a subspace detector method, which can be seen as a generalization of the template matching approach. This tool will first be used to characterize and understand the origin of seismicity under the north flank of Piton des Neiges. It will then be applied at Piton de la Fournaise to characterize the spatio-temporal properties of magma transfer in the volcanic edifice.

A MSc (or equivalent) in Geoscience, Physics or Engineering are required. Some programing skills in languages such as python, fortran and C are also desired.

Application documents: please send a cover letter explaining your motivation for the position, a CV and the names of at least two references to Zacharie Duputel (zacharie.duputel@unistra.fr), Valérie Ferrazzini (ferraz@ipgp.fr) and Olivier Lengliné (lengline@unistra.fr). Review of materials will begin immediately.