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# Contribution of GNSS to monitor and understand Piton de la Fournaise

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## Abstract

Basaltic volcanoes, like Etna (Italy), Hawaiian volcanoes (USA) and Piton de la Fournaise (La Réunion Island, France), are amongst the largest volcanic edifices on Earth. On these huge active volcanoes, the action of magmatic pressure leads to ground deformation, that ultimately controls their structure and topography. These volcanoes exhibit rift zones and mobile flanks, which respond to long-lasting stress field conditions (gravitational stress, magmatic processes and/or regional tectonics...).

On Piton de la Fournaise, Global Navigation Satellite Systems (GNSS) network is now the most dense deformation networks installed in the field, and allow to detect and to track ground deformation. In association with other monitoring networks, GNSS installed on Piton de la Fournaise contribute (1) to evidence eruptive precursors on two time scales (months/weeks and hours/mins), associated with reservoir pressurization and dike propagations, respectively, (2) to model the volcano plumbing system (reservoir / dikes), (3) to evidence slow flank sliding, (4) and to perform a spatially significant analysis of strain at the scale of the active part of the volcano thanks to the high density of the network.

All these works and evaluation provides new insights for the identification of volcano reawakening and for the assessment of potential instabilities.

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