



Mode of deformation of basaltic shield volcanoes as exemplified by the Piton de la Fournaise volcano (La Réunion island): 2- Control of the oceanic lithosphere

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La Réunion island is located east of Madagascar and on the eastern rim of the Mascarene Basin. This island is composed of three shield volcanoes of which only the Piton de la Fournaise is currently active. We carried out a multi-scale analysis to understand the role of the oceanic lithosphere on the deformation of the Piton de la Fournaise and La Réunion Island. Analysis of the eruptive fissures suggests that the magma ascent is controlled by large N30 and N130 fault zones located below the Enclos depression and visible with self-potential data. Outside these fault zones eruptive fissures and dykes predominantly trend in the N80 orientation. Combination of a Digital Elevation Model (DEM) analysis, field observations and the available geophysical data reveals that the volcano is affected by active tectonics. Fault distribution indicates the predominance of a main N65-80 trend. Magnetic data also show that the N80 orientation characterised the remnant part of the presently dismantled Alizés volcano. Such a parallelism demonstrates the control exerted by the underlying Alizés volcano on the Piton de la Fournaise volcano. Furthermore, the parallelism between the crustal orientations and the structures determined in the island suggests a control of the crustal structures in La Réunion volcano tectonic activity. The reactivation of the crustal faults is interpreted as resulting from a crustal uplift related to the thermal erosion of the base of the lithosphere and to large amount of underplated materials.