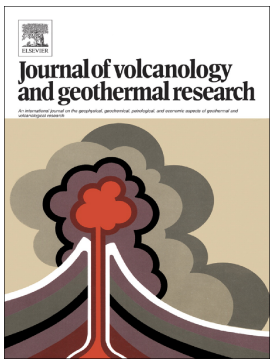

Complex structure of Piton de la Fournaise and its underlying lithosphere revealed by magnetotelluric 3D inversion

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Complex structure of Piton de la Fournaise and its underlying lithosphere revealed by magnetotelluric 3D inversion.

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Abstract

La Réunion is a large volcanic construction resting on Paleocene oceanic crust. Through the 3D inversion of a large set of magnetotelluric (MT) soundings, our results reveal the general resistivity structure of the western part of Piton de la Fournaise volcano down to its base and the first ten kilometers or so of the underlying lithosphere. The resistivity pattern shows a general stratification of the resistivity values. An upper resistive layer corresponds to unsaturated and water-saturated lava flows. This layer is thinner (a few hundred meters) in the Enclos and Plaine des Sables/Fond de la Rivière de l'Est areas than on the NW flank where it reaches 2000 m. Below, the rest of the edifice is distinctly more conductive and shows highly conductive patches. The origin of the globally weak resistivity of the lower part of the construction is not established but can be tentatively attributed to a higher degree of alteration. The case of the highly conductive patches is different. Resistivity values of a few ohm.m imply the presence of highly conductive fluids and/or minerals that, in this context, are