# Evaluation of the Feasibility of Recovering the Magma Chamber's Parameters by 3D Bayesian Statistical Inversion of Synthetic MT Data

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A b s t r a c t

Feasibility of recovering the magma chamber's parameters by 3D Bayesian statistical inversion of magnetotelluric data is estimated for the simplified conductivity model of the Vesuvios volcano. The results indicate that in the lack of prior information and data, the most efficient approach may consist in successive estimation of the geometry and the depth of the anomaly followed by estimation of the electric conductivity distribution in it. The horizontal boundaries of the target could be outlined by the high gradients of the impedance determinant phase pseudosections determined by the upward analytical continuation of the anomalous electromagnetic fields from the relief surface to the artificial reference plane located above the summit of the volcano. The vertical boundaries and the target extension as well as the electric conductivity could be estimated successively by means of 3D Bayesian statistical inversion of the collected magnetotelluric data carried out in the domain delimited by the estimated horizontal boundaries.

**Key words:** magma chamber, magnetotelluric, 3D inversion, prior information and data "trade-off".