Paper ID: 176

Integrated inversion of numerical geophysical models using artificial neural networks

Agnese Di Stefano[1,2], Gilda Currenti[1], Ciro Del Negro[1], Luigi Fortuna[2], Giuseppe Nunnari[2]

[1]*Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, Italy*
[2]*Dipartimento di Ingegneria Elettrica, Elettronica e dei Sistemi, Università di Catania, Italy*

A unified modelling procedure is proposed to jointly interpret the variations observed in geophysical data and to properly take into account the relationship between the intrusive processes and the geophysical variations expected at the ground surface. We focus on the joint inversion of geophysical data by a procedure based on Artificial Neural Network (ANN) for the estimation of the volcanic source parameters. As forward model, we developed a 3D numerical model based on Finite Element Method (FEM) for computing ground deformation, piezomagnetic and gravity changes caused by magmatic overpressure sources, with the aim to consider a more realistic description of Etna volcano, including the effects of topography and medium heterogeneities.