



Modelling geodetic changes at volcanic areas by extended sources. Model and application examples.

Jose Fernandez and Antonio G. Camacho

Institute of Geosciences (CSIC-UCM), Facultad CC. Matemáticas, 28040-Madrid, Spain. (e-mail. jft@mat.ucm.es, antonio.camacho@mat.ucm.es)

Many times changes in gravity and/or in coordinates are observed associated to volcanic activity. They can be modeled by means of different kind of sources, considering changes in anomalous mass and pressure. Usually point sources, or regular bodies, are used as deformation sources. We describe in this presentation a method for simultaneous non-linear inversion of gravity changes and displacement produced by extended bodies with a free geometry. The approach determines general geometrical configurations of pressured and density source structures corresponding to prescribed values of anomalous density and pressure. These source bodies are described as aggregation of elemental sources for pressure and density, and they fit the whole data (keeping some regularity conditions). The methodology is tested by simulation examples and applied to the interpretation of gravity and other geodetic data at the volcanic areas of Campi Flegrei (Italy) and Long Valley Caldera (California, USA).