



Modeling gravity changes and three dimensional displacements at Merapi volcano, Indonesia

C. Gerstenecker (1), C. Tiede (2)

(1) Institute of Physical Geodesy, Darmstadt University of Technology, Germany (gerstenecker@geod.tu-darmstadt.de / Fax: +49 6151 164916), (2) Fraunhofer IPSI, Dolivostrasse 15, 64293 Darmstadt, Germany (carola.tiede@ipsi.fraunhofer.de / Fax: +49 6151 869898)

We analyze gravity changes and displacements observed between the years 2000 and 2002 at Merapi volcano, Indonesia.

Former modelling approaches of the data were only based on an elastic-gravitational source. But it turned out that a single source model cannot explain the measured gravity changes and displacements properly, so a combined modeling approach has been investigated. This model consists of the superposition of a strike-slip and dip-slip fault as well as an elastic gravitational-source, both located at the summit region of Merapi.

Due to the nonlinearity of the objective function a global optimization technique, given by a genetic algorithm, is used to find the model with the best fitness.

F-test statistics is applied to all models and shows that the combined model is statistically more reliable. In addition this model gives physical reliable values and fit with further structure anticipations of this area.