Geophysical Research Abstracts, Vol. 9, 00469, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00469


# Deformation due to an inflation source in a layered half-space: Application to Darwin volcano, Galapagos

**A.Manconi**(1), T.R.Walter(1), F.Amelung(2)

(1) GeoForschungsZentrum Potsdam, Telegrafenberg, D-14473, Potsdam, Germany (manconi@gfz-potsdam.de), (2) Department of Marine Geology and Geophysics, RSMAS, University of Miami, FL33149, USA

The migration and accumulation of magma beneath volcanoes often causes surface displacements that can be measured by geodetic techniques. Usually, deformation data are explained using isotropic elastic models. We study surface displacements due to magma chamber volume change, using heterogeneous finite element models. We first present a systematic analysis of the influence of mechanical layering, showing that the rigidity contrast has important effects on displacement field. Second, as an example we apply the models to interpret ground deformations at Darwin volcano (Galápagos Islands) revealed by InSAR data in the period 1992-98. Compared to homogeneous half-space solutions, our layered models locate the source of deformation approx. 60% deeper. Furthermore, the models show that the volume change within the magma body differs by as much as 70%. This implies that the correct understanding of geodetic data depends on the crust mechanical heterogeneities, which also influences the evaluation of a volcanic hazard potential.