Geophysical Research Abstracts, Vol. 9, 01786, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01786

Double-difference tomography at Mt. Etna volcano

V. Monteiller (1), J.-L. Got (1), D. Patane (2), G. Barberi (2), O. Cocina (2)

1. LGIT, Université de Savoie, France, (2) INGV-Catania, Italy.

Double-difference tomography at Mt Etna volcano was realized by using the tomographic algorithm developped by Monteiller et al. (2005), in which the travel-time computation was performed using a finite-difference solution of the Eikonal equation (Podvin and Lecomte, 1991) and a posteriori ray-tracing. The inverse problem was solved using a probabilistic approach (Tarantola and Valette, 1982). The optimal *a priori* information (correlation length and *a priori* model variance) was found experimentally by performing tomographies for correlation lengths and variances varying in large intervals. This probabilistic approach allowed us to use a sech pdf for representing errors in differential times. Data were travel-times and time delays provided by a set of 329 earthquakes, well-recorded by the INGV-CT seismic network (50 stations) on the Mt Etna volcano during the seismo-volcanic crisis occurring between October 2002 and January 2003. Checkerboard tests realized with this geometry and earthquake pairs showed that the model can be correctly reconstructed in a significant area around Mt Etna volcano. Results of the P and S-wave double-difference tomography clearly evidenced two concentric features: a fast central cylindrical core, probably of intrusive origin, surrounded by a slow annealed body, which could be related to partial melting.