Geophysical Research Abstracts, Vol. 8, 04860, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04860

Deflation by fumaroles at "La Fossa" (Vulcano Island, Italy) between 1990 and 1996.

S. Gambino (1), **F. Guglielmino** (1).

Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, 95125, Italy (gambino@ct.ingv.it, Fax 39 95 435801)

Since the last eruption in 1888-90 the volcanic activity of Vulcano Island (Aeolian Archipelago, Italy) is restricted to fumarolic degassing, concentred near the active cone of “La Fossa” crater in the northern sector of the island. Starting from 1987, an EDM network covers the active volcanic structure of “La Fossa” cone and has been periodically reoccupied at four monthly intervals until 1997. Since 1998 the network is measured yearly using static GPS. During the period 1990-1996 the areal dilatation pattern of the network do not show significant variation, on the contrary, the single EDM measurements showed a general extension between the lines connecting the benchmarks positioned on the edifice and the most external ones. In particular a major positive variation (until 6-7 cm) are recorded at all the lines jointing the external benchmarks to the ones on the crater summit area. These measurements seems indicate a general deflation of the volcanic cone which is also confirmed by tilt continuous data and by the high precise levelling along the northern slope of the crater line.

The 21 EDM lines recorded has been inverted using a simple spherical pressure source model (Mogi, 1958) in a homogeneous elastic medium, and to invert the dataset we applied the Genetic Algorithm (GA) by using an optimization algorithm implemented by Nunnari et al., (2005). The results are in agreement to a volume decrease of a spherical source positioned about under the Crater and at the sea level depth. Modeling results suggest that a fluid loss from a shallow geothermal reservoir is a plausible candidate for the continuing deformation recorde during 1990-96. The possibility that deformation can also originate from movements of geothermal fluids has been evidenced in several volcanic areas such as East Mesa Geothermal Field, California (Massonet et al., 1997) and Kuju Volcano, Japan (Nakaboh et al., 2003),

References

Massonnet, D., T. Holzer, and H. Vadon (1997), Land subsidence caused by the East Mesa Geothermal Field, California, observed using SAR interferometry, Geophys. Res. Lett., 24(8), 901-904. Mogi, K. (1958), Relation between the eruptions of various volcanoes and the deformations of the ground surface around them, Bull. Earth Res. Inst., 36, 99-134. Nakaboh, M., H. Ono, M. Sako, Y. Sudo, T. Hashimoto, A. W. Hurst, (2003) Continuing deflation by fumaroles at Kuju Volcano, Japan, Geophys. Res. Lett., 30(0), doi:10.1029/2002GL016047, 2003. Nunnari, G., G. Puglisi, and F. Guglielmino (2005), Inversion of SAR data in active volcanic areas by optimization techniques, Nonlin. Proc. Geophys, 12, 863-870.