



Recent deformation at Campi Flegrei Caldera (Italy) detected by DInSAR and levelling techniques

M. Manzo (1,2), **E. Trasatti** (3), C. Giunchi (3), F. Casu (1,4), I. Aquino (5), P. Berardino (1), S. Borgstrom (5), C. Del Gaudio (5), M. Manunta (1,4), G. P. Ricciardi (5), E. Sansosti (1), P. Tizzani (1)

(1) Istituto per il Rilevamento Elettromagnetico dell'Ambiente, IREA – National Research Council of Italy (CNR), via Diocleziano 328, 80124 Napoli, Italy

(2) Dipartimento di Ingegneria e Fisica dell'Ambiente, Università degli Studi della Basilicata, Viale dell'Ateneo Lucano 10, I-85100 Potenza, Italy.

(3) Istituto Nazionale di Geofisica e Vulcanologia, via di Vigna Murata 00100 Roma, Italy.

(4) Dipartimento di Ingegneria Elettrica ed Elettronica, Università degli studi di Cagliari, Piazza d'Armi, I-09123 Cagliari, Italy.

(5) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, via Diocleziano 328, I-80124 Napoli, Italy.

The Campi Flegrei caldera, a volcanic and densely populated area located to the west of Napoli (Italy), was characterized by rapid ground deformation during 1970-72 and 1982-84, for a total amount of 3.5 m in the city of Pozzuoli. Since 1985 a slow deflation was active, with episodic microcrises of uplifts.

A new and consistent uplift event is now going on, beginning in November 2004, as revealed by spatial and terrestrial geodetic techniques.

In particular, we adopt almost all the available ENVISAT ASAR data acquired from both ascending and descending orbits during 2002-2006, to generate mean deformation velocity maps and time series with spatial resolution of about 100 m. The maps are computed following the Small Baseline Subset (SBAS) approach (Berardino et al., 2002), that implements an appropriate combination of differential interferograms generated from SAR data pairs (60 SAR images for this work).

In addition to satellite observations, we show data from the high precision levelling

network of the INGV-Osservatorio Vesuviano, consisting in about 320 benchmarks. Levelling measurements are regularly carried out on both the whole network and along the coast line; in case of a bradyseismic crisis, the temporal sampling is strongly increased.

Both DInSAR and levelling data evidence the maximum value of the vertical displacement near the city of Pozzuoli.

We model the observed deformation by means of 3D pressurized point-source and extended source, performing inversions to constrain their shape and location. The resulting sources are also compared with that inverted for the 1982-84 unrest.

References

P. Berardino, G. Fornaro, R. Lanari and E. Sansosti, "A new Algorithm for Surface Deformation Monitoring based on Small Baseline Differential SAR Interferograms," IEEE Trans. Geosci. Remote Sens , vol. 40, pp. 2375-2383, November 2002.