Geophysical Research Abstracts
Vol. 14, EGU2012-5516, 2012
EGU General Assembly 2012

Insights into the dynamics of Mt Etna volcano from gravity and DInSar observations

C. Del Negro (1), E. Sansosti (2), F. Greco (1), A. Pepe (2), G. Currenti (1), G. Solaro (2), R. Napoli (1), S. Pepe (2), and A. Pistorio (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia (INGV), Sezione di Catania, Osservatorio Etneo, Italy, (2) Istituto per il Rilevamento Elettromagnetico dell'Ambiente, CNR, Napoli, Italy

18-years (September 1994 – October 2011) gravity and ground deformation sequences, recorded at Etna volcano along an East-West trending profile of 19 stations on the southern flank at a quasi-monthly sampling rate, are presented. Over the last two decades, frequent fountaining events and several flank eruptions occurred at Mt Etna. We use the SBAS DInSAR technique to analyze the temporal evolution of surface displacements by inverting a sequence of interferograms to form a deformation time series. Height changes, evaluated by DInSAR data during the entire period, show modest vertical variations unable to produce significant gravity changes. However, the gravity data set was corrected for the small height variations using the experimental free-air gravity gradients measured at two stations of the profile. The residual space-time gravity image displayed some gravity increase/decrease cycles, mostly affecting the central and eastern stations of the East-West profile. We attributed these gravity cycles to mass redistribution processes mainly located at a depth of 2-4 km bsl in a region recognized to be a preferential pathway of magma rising and an intermediate zone of magma storage/withdrawal. In the latter period 2008–2011, when several paroxysmal events occurred from the South East crater, the gravity and height deformation patterns show many similarities with the previous period 1995-2000 encompassing a long series of paroxysmal episodes that preceded the violent and dramatic explosive/effusive eruptions of 2001 and 2002-2003.