Permanent GPS network (CGPS) operating at neapolitan active volcanoes (Italy). Data acquisition and processing.

U. Tammaro (1), P. De Martino (1), C. Godano (2), F. Obrizzo (1), V. Sepe (1), M. Dolce (1), G. Brandi (1), S. Malaspina (1), C. Serio (1), F. Pingue (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia - Osservatorio Vesuviano, Via Diocleziano, 328, 80124 Napoli (Italy), (2) Dipartimento Scienze Ambientali, Seconda Università di Napoli, Via Vivaldi 43, 81100 Caserta (Italy)

The Neapolitan volcanic area is located in the southern part of the Campanian plain and includes three active volcanoes (Somma-Vesuvio, Campi Flegrei Caldera and Ischia Island), characterized by an high risk, due to the dense urbanization. Thus, monitoring of volcanic phenomena aimed to risk mitigation is very important and a CGPS network running in this sector play a very important role. This area shows different dynamical behaviours. Campi Flegrei caldera represents one well known and peculiar example of ground deformations (bradyseism), with periods of intense uplift, followed by subsidence phase with rate decreasing vs. time. Contrary, Vesuvius is a substantially stable volcano, with small and localized (around the crater and around the edifice) subsidence. The data collected by CGPS network constitute one of the primary sources for modelling and interpretation of volcanic phenomena, and for alert and forecast purposes. In this work, the entire chain of data acquisition and processing is described. An automatic quality control procedure to allow an improved data analysis is showed. Some results obtained in last years are illustrated. We present also a preliminary analysis of GPS time series, based on Independent Component Analysis (ICA), a method for finding underlying factors or components from multivariate stocastic data. This method looks for statistically independent and non-gaussian components, in the time domain. The results of such studies, although still preliminary, has enlightened the capability of ICA to recognize periodicities as components of the GPS signals. Moreover, this method is able to resolve the deformation trends and could be very useful in a more detailed data analysis.