

Prot. int. n° UFGM-2008/020

07 NOVEMBER 2008 ACTIVITY REPORT

THE ON LINE DATABASE OF GRAVITY AND MAGNETIC DATA RECORDED AT ETNA AND STROMBOLI

Authors: Ciro Del Negro, Gilda Currenti, Agnese Di Stefano, Filippo Greco, Rosalba Napoli, Danila Scandura e Antonino Sicali

The Unità Funzionale Gravimetria e Magnetismo (UFGM) collects gravity and magnetic data for volcano monitoring. We have operating a network of magnetometers and gravimeters on the Etna volcano since 1997 and in the Stromboli Island since 2003. Recently, we have also added some stations for measuring self-potential (SP) signals. All sites telemeter data via wireless and GSM systems to Catania, where these data are processed and analyzed. In order to share the measurements throughout the world we developed an online database at the address "<http://ufgm.ct.ingv.it:8080>".

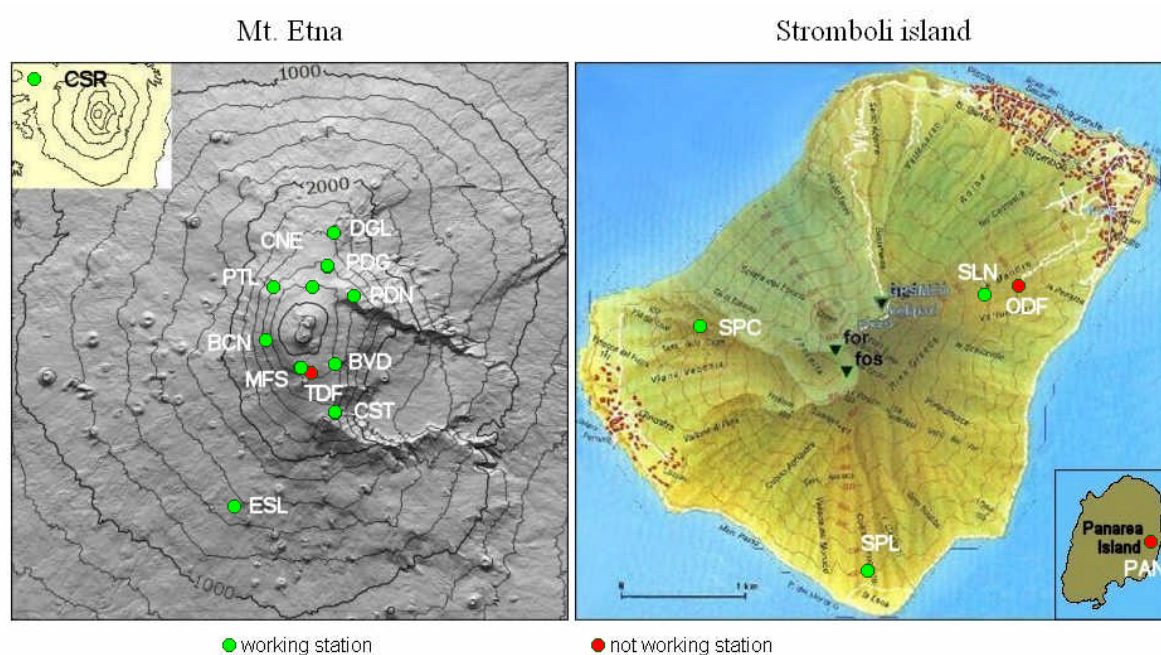


Fig. 1 - Monitoring network on Etna, Stromboli and Panarea.

Gravity, magnetic and SP data are available in near-real time, but they are unprocessed. This means that they have not been cleaned of occasional spikes and step offsets neither explicitly adjusted for long-term baseline drift. The only analysis that is automatically done consists in removing spikes that are not included in the range $[\mu - 3s; \mu + 3s]$, where μ is the mean and s is the standard deviation of the signal.

In the home page the monitoring networks of Etna, Stromboli and Panarea are showed (Fig. 1). Green circles represent working stations while red ones stand for stations that at present are not working. By clicking on the circles a description of the stations is given, including location, coordinates, instruments installed, data available, and photos of the site. The stations that have been destroyed and then re-established are named with the same name but with an increasing number, for example Belvedere station is named BVD in the period 1999-2003 and BVD1 from 2004 until now. This information is given also in the descriptive page of the station.

Clicking on the link “Data available on Etna” or “Data available on Stromboli and Panarea” it is possible to see year by year the data (gravity, magnetic and self potential) collected at the different stations. In Fig. 2 is showed an example at Etna in 2008 where data are indicated with straight coloured lines. This information is updated almost monthly.

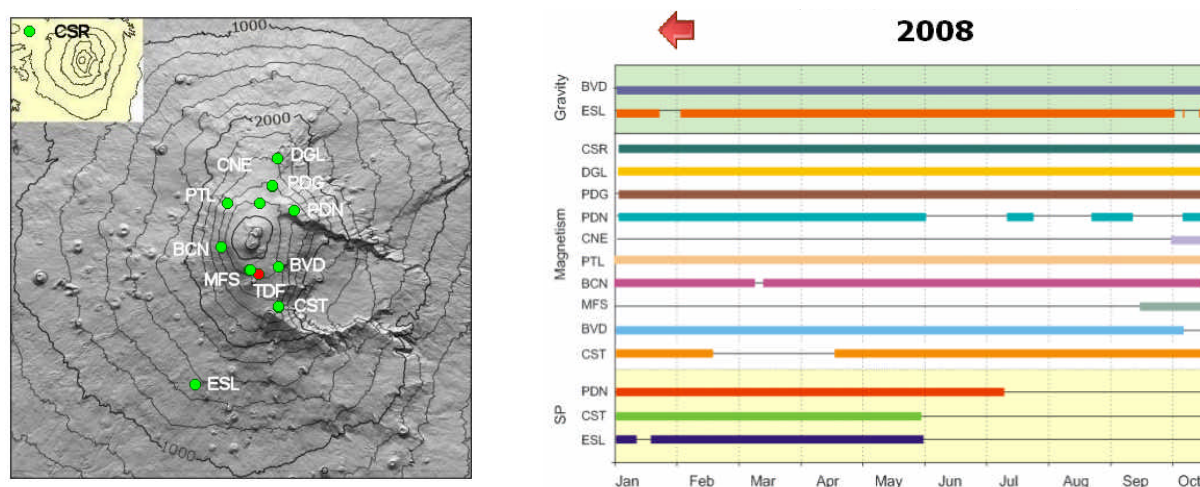


Fig. 2 - Data available on Etna in 2008.

Region	Instrument	Site	Data
ETNA	GRAV	BVD	CORRECTED FOR EARTH-TIDE
Start Date: 2008 June 01		End Date: 2008 June 10	
Sample rate: 60 Seconds		☒ Mean	Submit

Mean option: Checked - data are averaged and the sample rate is the averaging window size; Unchecked - raw data are displayed every sample rate

Fig. 3 - Interface of selection of the signal to visualize.

Using the interface showed in Fig. 3, it is possible to select the volcano (Etna, Stromboli, Panarea), the discipline (gravity, magnetism, self-potential, pluviometer), the station, and the parameter. Moreover, the period of interest and the sample rate can be chosen. When the “mean” option is checked the data are averaged and the sample rate is the averaging window size, otherwise raw data are displayed at the sample rate. The parameters that can be visualized for every discipline and instrument are resumed in the Table 1.

Discipline	Parameter
Gravity	- GRAVITY (Gravity measures) - CORRECTED FROM EARTH-TIDE (gravity data corrected from the effect of earth tide) - XLEVEL-YLEVEL (ground tilt in two perpendicular directions) - INTTEMPERATURE (temperature inside the container where the meter has been placed) - EXTEMPERATURE (temperature in the room where the container has been placed) - UMIDITY - PRESSURE (atmospheric pressure) - GRAVMINPRESS (gravity data corrected from the pressure with a linear factor of correction)
Magnetism	Total field sensors - FIELD (measure of total magnetic field) - DIFFERENTIATED FIELD (differences of total magnetic intensity with respect to CSR station) - TEMPERATURE
	Gradiometric sensors - NORD/SUD (measure of total magnetic field of the two sensors located in the positions north/south) - DIFFERENTIATED NORD/SUD (differences of total magnetic intensity with respect to CSR station) - TEMPERATURE
	Fluxgate sensors - XM, YM, ZM (measures of directional magnetic field in the directions x, y, z) - TILTX, TILTY (ground tilt in two perpendicular directions) - X_TILTCORRECTED, Y_TILTCORRECTED, Z_TILTCORRECTED (data of directional magnetic field corrected from tilt error) - TEMPERATURE
Self Potential	- CH1, CH2, CH3, CH4, CH5, CH6 (measure on the six channels) - ODD/EVEN (sum of the measures of all the odd/even channels)
Pluviometer	- NTIC (number of “tic”, for each raindrop the instrument counts two tics)

The structure of database is the same as that of GEODAP (GEOphysical Data Processing), the software for automated elaboration of geophysical data recorded at active volcanoes (Sicali et al., 2008). Data, consisting of one-minute, hourly-mean, daily-mean values, from UFGM network from the year 1998 onwards are available on demand.

References

Sicali A., Greco F., Napoli R. (2008) GEODAP: a geophysical data processing tool for Volcanoes monitoring, in Budetta G., Carbone D., Ciraudo A., Currenti G., Del Negro C., Ganci G., Giudice S., Greco F., Herault A., Napoli R., Scandura D., Sicali A., Vicari A. (2008). UFGM - 2006 Annual Report, Miscellanea INGV, 01, 75-83.

Copyright

Le informazioni e i dati contenuti in questo documento sono stati forniti da personale dell'**Istituto Nazionale di Geofisica e Vulcanologia**. Tutti i diritti di proprietà intellettuale relativi a questi dati e informazioni sono dell'Istituto e sono tutelati dalle leggi in vigore. La finalità è quella di fornire informazioni scientifiche affidabili ai membri della comunità scientifica nazionale ed internazionale e a chiunque sia interessato.

Si sottolinea, inoltre, che il materiale proposto non è necessariamente esauriente, completo, preciso o aggiornato.

La riproduzione del presente documento o di parte di esso è autorizzata solo dopo avere consultato l'autore/gli autori e se la fonte è citata in modo esauriente e completa.