

INGV OE project of Servizio Civile

“Earth in movement: geodetic monitoring in volcanic and seismic areas of Sicily”.

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Abstract:

The Servizio Civile Nazionale (SCN, born in 2001 - Law 64) represents an opportunity for youth, aged between 18 and 28 years, to dedicate a year of their lives in favor of a solidarity commitment and also enables institutions to rely on a team that, stimulated by the possibility of a qualifying experience, guarantees a continuous and efficient service. The SCN intervention areas can be ascribed to the following sectors: assistance, civil protection, environment, heritage and culture, education and cultural promotion, civil service abroad. The Istituto Nazionale di Geofisica e Vulcanologia (INGV) has been accredited by the SCN for Sector B Civil protection and research. In 2011 the Osservatorio Etneo of INGV has promoted a project entitled "Earth in movement: geodetic monitoring in volcanic and seismic areas of Sicily ". The project’s activities concern the geological context of the whole Sicilian Region, with a particular attention to the main seismic areas (M. Iblei and M. Peloritani) and to the active volcanoes (Etna, the Aeolian Islands and Pantelleria). The main purposes of geodetic monitoring in volcanic and seismic regions are to recognize phenomena that could represent precursors of the eruptive activity and to characterize the deformation fields. The geodetic monitoring system, run by Osservatorio Etneo of INGV, is performed by a network of sensors, installed in Sicily and Calabria, that can be grouped into permanent and discrete GPS stations networks, for continuous and periodic measurements respectively and in, tilt or strain gage stations networks.

Ten volunteers are giving their contribution to achieve the specific goals of the project, which include: enhancing the efficiency of observational systems of the monitored areas, the improvement of archiving and preservation activity of data, better diffusion of the monitoring and surveillance activities carried out by the Sala Operativa of INGV-CT.

The project activities, divided into four working groups, will now be briefly described:

1. GPS permanent networks and web services

Two volunteers are involved in a series of tasks that have, as their ultimate aim, the definition of the cause-effect relations between the volcanic activity of Mt. Etna in the last ten years and the movements recorded by the CGPS network, located on the eastern slope of the volcano. The volunteers will also participate in all the phases of the acquisition-transmission-processing chain of the CGPS network, in order to learn technical and scientific notions, with the purpose of developing and improving specific aspects of the network.

2. GPS discrete networks, remote sensing and web services

One of the three volunteers of this workgroup has the task to handle the SAR data processing and their subsequent storage on a WEB-GIS. The other two volunteers are responsible for the maintenance and improvement of the geodetic networks and instrumentation, with the periodic review of the geodetic benchmarks, the identification of new sites for continuously improving network geometries and collaboration in implementing mobile stations and section web database; they also have the task to

manage, store and process the GPS data of the current and past campaigns relating to the Sicilian Region, converting the files in the universal Rinex format. All three volunteers will support the execution of geodetic measurement campaigns (leveling, EDM, GPS and TLS).

3. Tilt networks and data analysis for “Sala Operativa”

Two volunteers are responsible of the tilt data reorganization, acquired by the permanent tilt networks, in order to optimize the old database and create new database by area and by reference station. They will also realize a report with the tilt variations recorded during the 2011-2012 lava fountaining episodes occurred at Mount Etna also considering their relationship with other data.

4. Management of the informatics structure of the “Sala Operativa” and web services

Three volunteers are involved in the Sala Operativa activities, a strategic functional unit for seismo-volcanic monitoring of the Sicilian Region. The contribution of each volunteer is to promote the diffusion about the activities carried out by the institute, as well as in the implementation of procedures for the data migration, acquired from different monitoring systems.