

**PROJECT TITLE**  
**CREATION OF THEMATIC CARTOGRAPHY OF VOLCANIC AREAS**

**Scientific Coordinator Maria Teresa Pareschi**

Name-Position Dirigente Ricerca CNR

IGG.CNR

Via Santa Maria 53

56100 Pisa

**ACTIVITY REPORT –2nd YEAR**

**PROJECT PARTICIPANTS**

RU#	AFFILIATION	RESPONSIBLE
Maria Teresa Pareschi	CNR	
Massimiliano Favalli	CNR	
Gianni Zanchetta	UNIFI	
Roberto Mazzuoli	UNIFI	
Roberto Sulpizio	UNIBA	
Marina Bisson	CNR	
Ilaria Isola	CNR	
Nicola Strumia	CNR	
Bedin Alessandro	CNR	
Marchetta Antonio	IGM	
Simone Tarquini	CNR	

**GENERAL OBJECTIVES**

*Description of the main objectives must follow the Task scheme container in the approved project..*

*For each task please follow the following scheme: (max 1 page per task)*

- a) **TASK 1** - Creation (or completion) of DEM for the main active Italian volcanoes

• 2nd YEAR OBJECTIVESM

Creation or Completion of the DEM of Italian Volcanoes

• 2nd YEAR RESULTS

The DEMs reconstructed in this second year are those of:

Aeolian Islands

Mt.Etna

Historical Vesuvius

For Aeolian Islands a TIN was reconstructed in VGS 84 and ED50 UTM. New points were added to the previous TIN above all along the coastlines and integrated with the sea bathimetric coastal data (form aerial survey 2002, CGR source, average planimetric error less than 4m). The data have been the morphological support to constrain volcanic-petrographic information. In addition two campaigns (may 2001 and January 2002) were performed in the Northern sector of Vulcano Island (Forgia Vecchia) to monitoring ground movements (a potential collapse could be expected in case of reactivation of the system). A third campaign is foreseen for February 2003 (Bedin-Salemi). About 20 points were monitored with a Wild TC2002 with a SQM of 2mm. Till now, since the differences of the co-ordinates of the monitored points are about 2mm, no movements are detectable.

For the Etnaeian area a new TIN was reconstructed from vector data (contour lines and isolated points) of the Provincia di Catania (nominal scale 1:10000). Since the original data were sometimes incomplete (quotes were missed for some contour lines), the missed information have been integrated with the help of other sources (NATO data and previous DEM). The new DEM has been integrated in a TIN of all Sicily created by MTPareschi within an other project. The DEMs of Etna are used by a numerical code which computes the paths of maximum slope, based on a probabilistic approach. This tool has been used in the recent lava events of Mt.Etna to computed probable lava paths. A researcher (Massimiliano Favalli) reached Catania-INGV to provide probabilistic invasion routes.

Mt. Vesuvius morphologies before the last eruptions have been reconstructed. In particular the morphology of this Volcano pre and post 1906 eruption was reconstructed but that of the last two decades of 1800 are also foreseen. The DEM has been reconstructed starting from and integrating partial surveys of IGM historical maps. An accurate topographic approach guarantees the overlapping of past and actual planimetric data at fixed points.

The present DEM of Vesuvius, included in a DEM developed by us of all the Campania region, has been used to support and constrain with morphological evidences the geological survey of Mt.Vesuvius and the gravity driven mass movements of the Sarno area (for example Santacroce project).

A new more accurate DEM (average precision below 50cm) is foreseen when the GIS project (nominal scale 1:2000) of Vesuvius will be completed (other project financially supported by INGV-OV).

## **b) TASK 2 - Creation of an Internet Site to consult the GIS of the Italian Volcanoes.**

- 2nd YEAR OBJECTIVESM

Creation of an Internet Site to consult the GIS of the Italian Volcanoes.

- 2nd YEAR RESULTS

A site was designed. Data consisting of aerial photos, DEM and IGM cartography is consultable via internet, however the prototype is accessible by authorised users only since no protection tasks have been yet developed. Public domain data are not yet available. The site will be developed in the third year.

- RESEARCH PRODUCTS OF THE PROJECT

- 5 n° of articles published on international journals;
- 4 n° of articles published on national journals, proceedings, technical reports.
- 1 invited papers and talks
- 3 Presentation at international meetings

PUBLICATIONS LIST (inclusive of papers in prints and accepted)

Pareschi M.T., Santacroce R., Sulpizio R., Zanchetta G., Volcanoclastic debris flows in the Clanio Valley (Campania, Italy): Insight for the assessment of hazard potential, *Geomorphology*, 43 (2002) 219-231.

- Gioncada A., Mazzuoli R., Bisson M., Pareschi M.T., Petrology of volcanic products younger than 42 ka on the Lipari-Vulcano complex (Aeolian Islands, Italy): an example of volcanism controlled by tectonics, *Journal of Volcanology and Geoth. Research*, in press.
- Zanchetta G., Sulpizio R., Leoni F.M, Pareschi M.T., Santacroce R., 2001: The destructive power of debris flows: dynamic pressures and structural damages of May, 5-6 1998 event in the Sarno area (Campania, southern Italy), *Journal of Volcanology and Geoth. Research*, in press.
- Bisson M., Cosimi G., Favalli M., Leoni F.M., Mazzarini F., Pareschi M.T., Santacroce R., Sgro S., Sulpizio R., Zanchetta G. 2002. GIS database for the assessment of debris flow hazard in two areas of the Campania region (southern Italy). *Il Nuovo Cimento*, 25, 1-15.
- Pareschi M.T., 2002. Evaluation of volcanic fallout impact from Vesuvius using GIS. D.J. Briggs et al., (eds), *GIS for Emergency Preparedness and Health Risk Reduction*, 101-114. Kluwer Academic Publishers.
- Toyos G., Oppenheimer C., Pareschi M.T., Sulpizio R., Zanchetta G., Zuccaro G. 2003. Modelling building vulnerability to debris flows in the Sarno Area, Southern Italy. Davos conference, in press.
- Zanchetta G., Sulpizio R., Pareschi M.T., Bisson M., Cosimi G., Favalli M., Santacroce R., Sgrò S. 2003. Volcaniclastic debris flows in the Clanio Valley (Campania, Italy). *Fast slope movement prediction and prevention for risk mitigation*, Sorrento 2003, FMS paper n. 036 (5 pp.). in press.
- M. Bisson, M. Favalli, E. Galanti, M.T. Pareschi. “*SitoGeo, a Gis of Italy, as tool for a data base of Cultural Heritage. The case study of Florence*”, Atti del Convegno Electronic Imaging & Visual Arts - EVA 2002 Florence, Vito Cappellini, James Hemsley and Gerd Stanke editors, p.246-251, 18 - 22 Marzo 2002.
- M.Favalli, A. Mori, M.T.Pareschi, L.Sinapi, Surace L., Il modello tridimensionale dell’arcipelago Eoliano, un esempio di integrazione tra rilievo fotogrammetrico e batimetrico, *Bollettino di Geodesia e Scienze Affini*, Rivista dell’istituto Geografico Militare, anno LXI, 1, genn.Feb.Marzo 2002, 17-31.
- Agricola B, Pareschi M.T., A.Venditti, M.Facciorusso, M.Favalli, A.Battistini, Progetto Digitalia, Un modello del terreno a maglia triangolare per il territorio Nazionale, Atti 6° Conferenza Nazionale Asita, Perugia 5-8 Novembre 2002, 71.76.
- Pareschi MT, M.Bisson, M.Favalli, The volcanic fallout impact at Vesuvius, Montagne Pelee 1902-2002, Explosive volcanism in Subduction zones, Martinique, May 12-16 2002, Abstact, pag.87.
- Pareschi MT, R.Santacroce, R.Sulpizio, G.Zanchetta, The volcanosclastic mass flow hazard related to the remobilization of airfall deposits in Southern Campania, Italy, Explosive volcanism in Subduction zones, Martinique, May 12-16 2002, Abstact, pag.87.
- M.T.Pareschi, La simulazione delle colate di lava, Seminario per il Dott.di Scienze della Terra, Univ.Firenze, 8-4-2002.

## PROJECT TITLE

### **RU Responsible Maria Teresa Pareschi**

Name-Position dirigente Ricerca CNR

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## ACTIVITY REPORT-2nd YEAR

### RU PARTICIPANTS

Name-Position	Affiliation	man/month
Maria Teresa Pareschi	CNR	4
Massimiliano Favalli	CNR	4
Roberto Mazzuoli	UNIPI	0.5
Gianni Zanchetta	UNIPI	1
Roberto Sulpizio	UNIBA	1
Marina Bisson	CNR	2
Ilaria Isola	CNR	1
Nicola Strumia	CNR	1
Bedin Alessandro	CNR	2
Marchetta Antonio	IGM	2
Simone Tarquini	CNR	3

- 2nd YEAR OBJECTIVES

- b) Creation (or completion) of DEMs for the main active Italian volcanoes
- c) Creation of an Internet Site to consult the GIS of the Italian Volcanoes.

- 2nd YEAR RESULTS (**max 1 page**)

For Aeolian Islands a TIN was reconstructed in VGS 84 and ED50 UTM. New points were added to the previous TIN above all along the coastlines and integrated with the sea bathimetric coastal data (form an aerial survey 2000-2001, average planimetric error less than 4m). The data have been the morphological support to constrain volcanic-petrographic information. In addition two campaigns (may 2001 and Jenuary 2002) were performed in the Northern sector of Vulcano Island (Forgia Vecchia) to monitoring ground movements (a potential collapse could be expected in case of reactivation of the system). A third campaign is foreseen for February 2003 (Bedin-Salemi). About 20 points were monitored with a Wild TC2002 with a SQM of 2mm. Till now, since the differences of the co-ordinates of the monitored points are about 2mm, no movements are detectable.

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A new more accurate DEM (average precision below 50cm) is foreseen when the GIS project (nominal scale 1:2000) of Vesuvius will be completed (other project financially supported by INGV-OV).

The web site with available cartographic and topographic data of the Italian volcanoes will be fully developed in the third year.

#### • RESEARCH PRODUCTS

- 5 n° of articles published on international journals;
- 4 n° of articles published on national journals, proceedings, technical reports.
- 1 invited papers and talks
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