



» EARTHQUAKES AND VOLCANOES PLATFORM

The E&V Platform provides to the European Civil Protection Units services and products aimed at increasing their operation capability during the risk management cycle of the seismic and volcanic hazard.

Earthquakes occur everywhere in the European Mediterranean region. In the last four centuries, they killed an average of 1000 people per year causing serious destruction and massive loss of life. Moreover, large earthquakes are a great loss in terms of money (several tens to hundreds Billion Euro). European volcanoes are also an important source of hazard. They are concentrated on the margins of the European continent: in the Mid-Atlantic Ridge (Iceland, Azores), the Canary Islands, southern Italy, and the Aegean Sea.

To help the European Civil Protection Units to face the hazard on a more structured basis, the E&V Platform provides services and products aimed at facilitating the risk management during the whole cycle.

Four test sites have been selected to evaluate the performance of the Platform.

Two sites for the seismic hazard:

- » **Greece:** Kephallonia and Lefkada
- » **Turkey:** the city of Adapazari

Two sites for the volcanic hazard:

- » **Italy:** Mt Etna
- » **Spain:** Pico del Teide

The E&V Platform is ...

Expected to offer benefits in every phase of the risk management cycle encouraging:

- » A strong integration of the ground data with the EO (Earth Observation) data.
- » An improving of the early warning system by the utilization of the EO data.
- » The near real-time mapping of the crisis areas during the event.
- » The near real-time mitigation actions to safeguard the population

Based on the following services:

- » **Seismic monitoring and damage evaluation**
- » **Volcano monitoring and damage evaluation**



The Platform provides a range of products

For seismic monitoring (Prevention)

- » Velocity maps by multi-temporal SAR Interferometry.

During a seismic crisis:

- » Surface displacement maps from DIFSAR and damage assessment from SAR
- » Optical remote sensing, space and ground data integration for seismic source retrieval

For volcanoes (all phases):

- » Surface displacement maps from DIFSAR and GPS
- » Thermal anomalies monitoring
- » Degassing plumes Optical Characterization
- » Surface structures mapping

Added products (volcano crisis):

- » Effusion rate
- » Ash clouds optical characteristic

For volcano post-crisis:

- » Lava flow and ash coverage and analysis

PARTNERS: National Institute of Geophysics and Volcanology, Italy; Telespazio s.p.a, Italy; Advanced Computer Systems s.p.a, Italy; Civil Protection Department, Italy; European Mediterranean Seismological Centre, France; Geoapikonisis, Greece; Ist. Rilevamento Elettromagnetico - CNR, Italy; Kandilli Observatory and Earthquake Inst, Turkey; National Observatory of Athens, Greece; Universidad Complutense de Madrid, Spain.

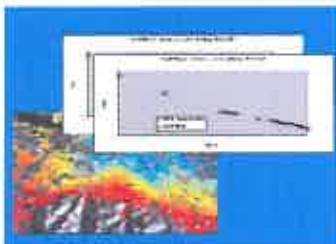
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Technical characteristics

EARTHQUAKES

Seismic monitoring

The service provides the detection of the soil movements by the Differential Interferometry Synthetic Aperture Radar (DinSAR). Multitemporal Din SAR approach provides a crustal deformation map and time series on investigated points with a centimetre or millimetre accuracy.



Seismic damage evaluation

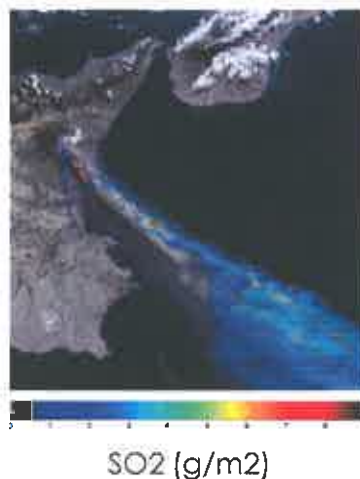
During a seismic crisis satellite based data, both SAR and optical, are combined to generate a damage map of the affected urban



Surface displacement maps are also provided by DinSAR techniques for volcano monitoring.

Degassing plumes SO2 characterization

SO2 gas emissions are related to the volcanic activity state. Remote sensing data are able to detect and measure the content of SO2



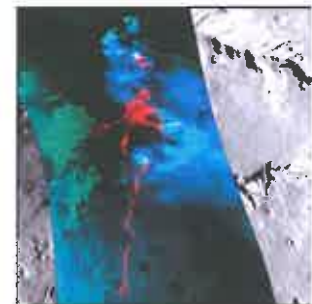
Mt. Etna injects in the upper atmosphere several thousand tons of SO2/year. Data from MISR and ASTER



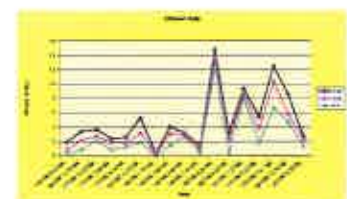
Damage detection map of Golcuk city (Izmit, Turkey, 1999). Two IRS images (before and after the event) are used to classify the damage. Image on the left: in the black circle, the subsident areas.

During volcano crisis

Estimation of effusion rates is important for evaluating flow dynamics and mechanisms of lava emplacement.



True-colour image acquired by airborne MIVIS (Mt. Etna July 2001) and draped over a 10 m resolution shaded relief. High spatial and radiometric resolution provides high quality estimation of effusion rates.

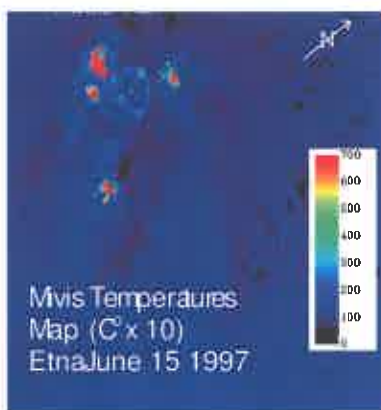


VOLCANOES

Volcano monitoring

Remotely sensed optical and radar data allow monitoring volcanic areas by applying specific inversion techniques.

Thermal analysis: Infrared remotely sensed data are used to estimate the heat flux and thermal features of active volcanoes to detect anomalous areas.



CONTACTS

European Commission Project Officer : Christine BERNOT
 Project Coordinator : Jean-Louis DUCUING (INFOTERRA France)
 Cluster leader : Maria Grazia CIMINELLI (TELESPAZIO)
 Platform leader : Maria Fabrizia BUONGIORNO (INGV)
 Product contact : Tiziana LANZA (INGV)

Christine.bernot@ec.europa.eu
 jean-louis.ducuing@infoterra-global.com
 mariagrazia.ciminelli@telespazio.com
 buongiorno@ingv.it
 lanza@ingv.it