European Commission

Global Monitoring for Environment and Security

GMES

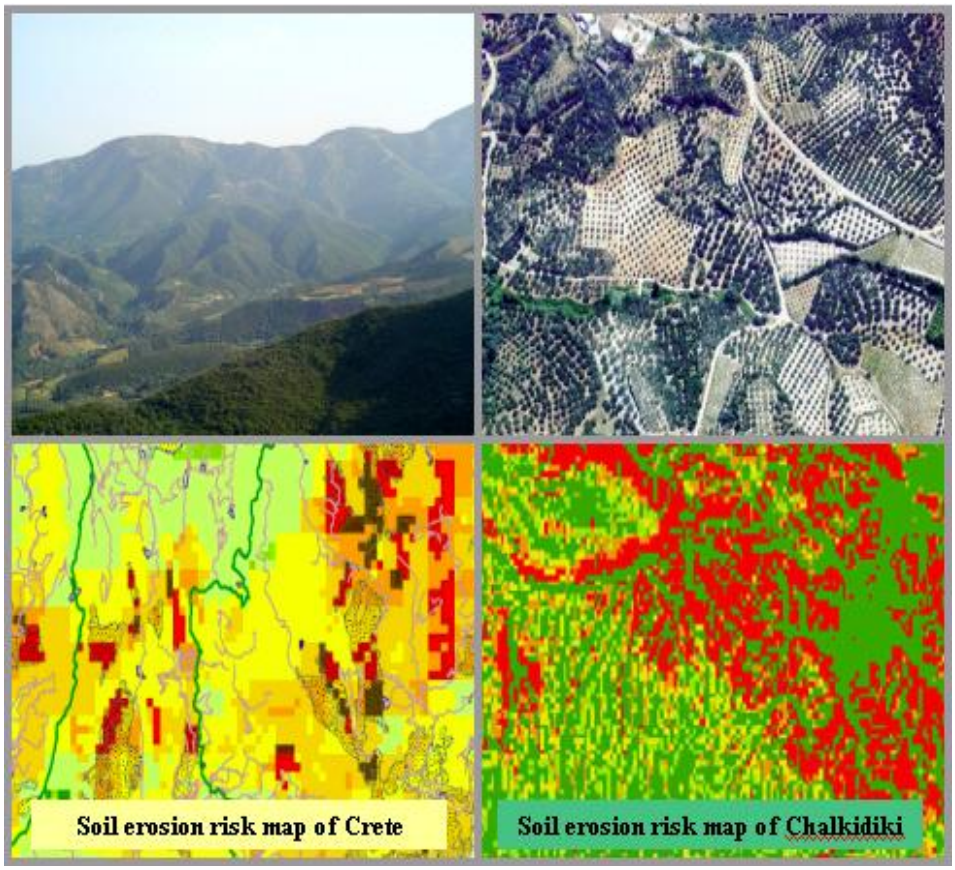
geoland FP-6 Integrated Project

geoland Soil Observatory

Soil, the weathered material between the atmosphere at the Earth's surface and the bedrock below the surface, is a vital, largely non-renewable resource, which ensures a number of environmental, economical, social and cultural key functions. Soil erosion, a natural geological phenomenon resulting from the removal of soil particles by water and wind, affects both agriculture and the natural environment and is one of the most important (yet probably the least well-known) of today's environmental problems.

Although soil erosion has been occurring for several hundred million years, its 'accelerated' nature is a much more recent problem. It is always a result of mankind's unwise actions, such as overgrazing or unsuitable cultivation practices, which leave the land vulnerable during times of erosive rainfall or windstorms. Many centuries of severe human pressure coupled with the local climatic (long dry periods are usually followed by intensive rainfall) and physical (steep slopes, tiny top-soil layers) conditions make the Mediterranean an EU region that is particularly affected by soil erosion phenomena caused by water.

In response to concerns about the degradation of soils in the EU, the European Commission has outlined the first steps in a strategy to protect soils by publishing a communication titled "Towards a Thematic Strategy for Soil Protection", where erosion has been identified as one of the major threats to soil in Europe. It should be noted that this is the first occasion on which the Commission has addressed soil protection for its own sake and therefore the communication is both broad and descriptive in approach as well as charting the way forward.



Since soil erosion processes by water are both varied and complex, several modelling approaches like USLE (Universal Soil Loss Equation), RUSLE (Revised Universal Soil Loss Equation) and PESERA (Pan-European Soil Erosion Risk Assessment) have been developed for a range of temporal and spatial scales. The development of related input datasets involves the measurement of baseline variables (e.g. rainfall and wind intensity, soil moisture, surface roughness, soil erosion rates) over several years. However, in order to identify which approaches are most robust to be used at different scales, existing models need to be compared using datasets from a wide range of environments. In that sense, long-term observations from space provide a practical way of implementing a monitoring system in order to derive broadly applicable and cost-effective information related to soil erosion over large areas.

It is widely agreed on international level that greater understanding of the occurrence, processes and impacts of soil erosion by water, wind and tillage is needed in order to enhance mankind's ability to tackle the resulting environmental problems. However, so far, there is a general lack of suitable soil degradation monitoring methods and services that are robust and accurate enough to assist future actions in planning and guiding anti-soil-erosion activities either at a national or international level.

In the framework of the Geoland project, the

Soil Observatory aims at the development of such pre-operational soil erosion risk assessment services, which are in line with current EU policies and are based in the use of Earth Observation data, image analysis techniques and GIS models.

In particular the specific objectives of the observatory are the following:

- To review the literature in order to select existing soil erosion risk assessment models that are GIS compatible and that could be used operationally.
- To benchmark the selected models at different scales and different test sites in order to define their advantages and disadvantages.
- To investigate how the selected models are affected by:
  - the land cover by adapting different land cover classification schemes at different scales;
  - the vegetation phenology and the way it changes over the year by producing a number of soil erosion risk maps of the same test site at different times of the year.
- To develop methods for the mapping of unexpected events such as forest fires and landslides which affect the cover and the use of the land (hot spot mapping).

Moreover, the observatory contributes in the development of a CORINE-type classification scheme that will be taking into account peculiarities related to the assessment of soil erosion risk.

The following partners and users constitute the Soil Observatory currently:
The Mediterranean Agronomic Institute of Chania (MAICh), the Aristotle University of Thessaloniki (AUTh) and the University of Trieste contribute in the development of the Soil Observatory while European Topic Centre on Terrestrial Environment (ETC-TE), Agenzia per la Protezione dell'Ambiente e per i servizi Tecnici (APAT), the Federal Environment Agency (UBA) and the National Agricultural Research Foundation – Forest Research Institute (NAGREF-FRI) have been identified so far as being the key users operating at European, national and regional-local level.

Apart from the aforementioned users the Soil Observatory is in close collaboration with the Agricultural University of Athens that was heavily involved in the development of the PESERA model and the Greek Ministry of Environment and Public Works who is involved in the implementation of all environmental policies in Greece.

Finally it has to be noticed that Geoland Soil Observatory is linked with GMES SAGE project and profits from the experience gained by this project. SAGE project focused on semi-operational production of environmental information for Water Framework Directive (WFD) and the Soil Thematic Strategy (STS) purposes. This means that SAGE products can be realised immediately as demanded by core users ⇒ State of Practice. Geoland Soil Observatory will enhance SAGE services by allocating significant more time and scientific resources to close existing gaps by straightening service adaption using risk models to address various European environmental conditions and by addressing new features like soil erosion and degradation ⇒ State of Art

For further information, please contact:

geoland – Soil observatory

Mediterranean Agronomic Institute of Chania (MAICh)

Ioannis Z. Gitas

P: +30 2310 992699
F: +30 2310 998897
E: igitas@for.auth.gr

geoland Communications

Infoterra GmbH
Mareike Doepke
P: +49 7545 8 3924
F: + 49 7545 8 1337
E: mareike.doepke@infoterra-global.com

www.gmes-geoland.info

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