

Bulgarian contribution to the EnviroGRIDS project "Building Capacity for a Black Sea Catchment Observation and Assessment System supporting Sustainable Development"

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The Black Sea Catchment area is one of ecologically unsustainable development and inadequate resource management which has led to severe environmental, social and economic problems. The EnviroGRIDS project addresses these issues by bringing emerging information technologies that are revolutionizing the way we are able to observe our planet. The project is in compliance with the goal of **Group on Earth Observation System of Systems (GEOSS)** to build a data-driven view of our planet that feeds into models and scenarios to explore our past, present and future.



EnviroGRIDS project aims at building

- the capacity of scientists to assemble such a system in the Black Sea Catchment,
- the capacity of decision-makers to use it
- the capacity of the general public to understand the important environmental, social and economic issues.

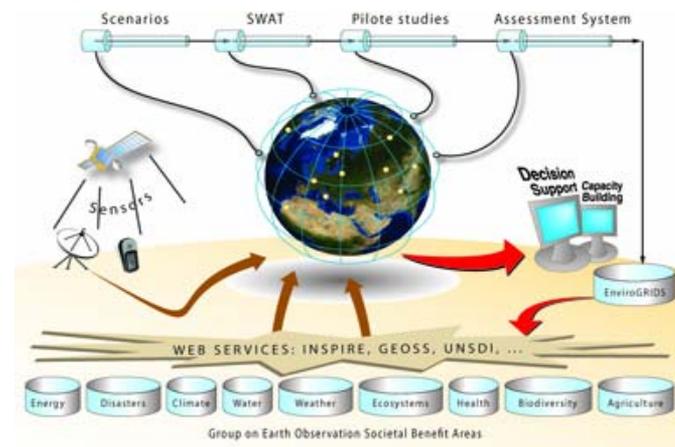
The main objectives of EnviroGRIDS are:

- development of a Black Sea Catchment Observation System that will store, analyze, visualize and disseminate information on past, present and future states of the region to assess and predict its sustainability and vulnerability. This system will incorporate a shared information system and an early warning system able to inform in advance decision-makers and the public about risks to human health, biodiversity and ecosystems integrity, agriculture production or energy supply caused by climatic, demographic and land cover changes on a 50-year time horizon;
- capacity building based on a networking platform to raise public and decision makers' awareness on key environmental issues and observation system technologies by organizing live and virtual trainings.

To achieve its objectives, EnviroGRIDS will build an ultra-modern Grid enabled Spatial Data Infrastructure (GSDI) as a component of the GEOSS, and compatible with the EU Directive on Infrastructure for Spatial Information (INSPIRE). For this purpose, the following main tasks will be realized:

- A gap analysis will identify specific areas where most efforts are needed. As climatic and hydrological changes are of concern, their impacts on several societal benefits areas of **Group on Earth Observation (GEO)** - environment and health, energy, water, ecosystems, agriculture, biodiversity and environmental risks, will be evaluated. EnviroGRIDS will rely on GSDI to serve as a benchmark for the implementation of the INSPIRE Directive and for the development of GEOSS.
- Spatially-explicit scenarios of drivers of changes such as climate, demography and land cover will be created. A web-based observation system including attractive visualisation tools will warn target populations about environmental risks and help regional/governmental agencies to prepare the most adequate responses.

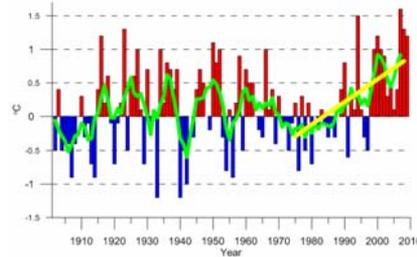
The project's implementation is illustrated below.



The Bulgarian contribution

National Institute of Meteorology and Hydrology (NIMH) participates in four work packages (WP). In **WP3**, the NIMH' team contributes to the performance of a reference run based on ERA40 reanalysis (1961-2000) by providing meteorological GRID data for the Danube catchments area and the East part of Black sea. For the same area and resolution, climatic runs are performed using ALADIN and REMO regional climatic models for the period 2020-2050.

Results from the team's work on these issues are illustrated below.



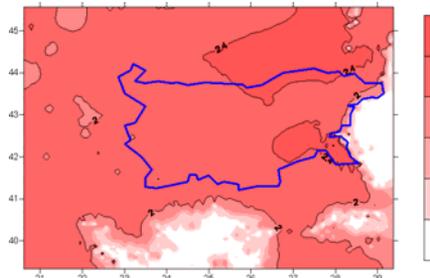
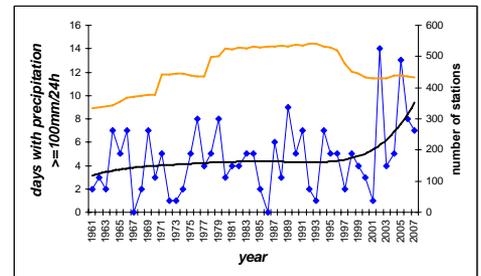
Air temperature anomalies with regard to the norm in Bulgaria (1901-2009)

Tendency towards warming during last decade

Decrease of the amplitude minimal-maximal temperatures

Days with precipitation $\geq 100\text{mm}/24\text{h}$

An increasing number of days with heavy rains



Mean annual temperature variation for 2020-2050 against 1960-1990

Raise of mean annual temperatures with 2°C (2020-2050)

In **WP4**, the Bulgarian team will prepare girded input and flow data needed to run and calibrate the SWAT model and will take part in the verification, calibration and comparison of the model results. The model will be applied for Bulgarian sub-basin with sensitive environmental problems.

In **WP6**, the team works towards creation and strengthening National GEO committees so that to elaborate a Strategy for Earth Observation and an Action plan for resources mobilization of GEO activities in the Black Sea region.

In **WP7**, NIMH will organize thematic workshops on climate change scenarios, hydrological models, risk assessment and early warning, sustainability and vulnerability in the GEO Societal Benefit areas.

Conclusion

In the course of its realisation, through the combination of all these activities, EnviroGRIDS project will improve data access and use in the Black Sea basin, and build regional capacity in Observation Systems to favour the region's sustainable development.

References

- <http://www.envirogrids.net>
- <http://www.earthobservations.org/>