

ADRICOSM-STAR

Project description

Adricosm.Star is a project funded by the Italian Ministry of Environment Land and Sea in the framework of the ADRICOSM Partnership. The project main objectives are to study the water cycle of the Montenegro area at large, implement monitoring systems and modelling tools, and assess the impact of climate change on the water cycle and material transports of the area. This objective is important since water resources are deemed to become scarcer in the next decades due to climate change and pollution from local sources need to be managed and reduced. The specific environmental problems of interest are:

1. the coastal area and river basin water quality;
2. the complex surface and underground water system and its influence on the coastal area;
3. sediment transport, sediment quality and distribution in the Bojana river and the coastal area;
4. Management of the water resources and the water-ways (in particular the Bojana river) in climate change scenarios.

The project analyzes four environmental compartments:

- a. atmosphere-climate, in particular for the large Montenegro atmospheric area;
- b. oceanography, for the Montenegro and Albanian coastal areas;
- c. hydrology, for the Bojana river and the Delta area with consideration of the Albanian affluent;
- d. urban waters, for the town of Ulcinj.

Each compartment will be explored via an observational and modelling program that at the end will produce a monitoring and forecasting system for the urban and non-urban waters impinging in the coastal area and the coastal currents. Particular effort will be put into the monitoring and modelling of the atmospheric surface water cycle, the oceanographic coastal current variability, the Bojana river delta area and the modelling of the underground water system (UNESCO-IHP additional contribution).

The project specific objectives are:

- 1) continue and further develop the ADRICOSM forecasting system for the Adriatic Sea and its coastal areas with particular emphasis for the Montenegro coastal area.
- 2) develop the high resolution non-hydrostatic meteorological modelling and the modelling of the surface water cycle;
- 3) design and partially implement a monitoring system for the surface water cycle, the river runoff and the coastal area of Montenegro
- 4) develop and validate modeling tools for the urban, surface, underground water and coastal currents in the Bojana river catchment and Montenegro coastal area, considering the transboundary nature of the system
- 5) produce IPCC climate change scenario impact studies for the next decades in connection with the water and sediment quality in the Bojana river and the Montenegro coastal area

Project Status

The Major achievements of the Project are:

- 1) New monitoring stations have been installed and tested in the Bojana river, the Bokakotorska Bay and the meteo-oceanographic station of Bar. Data are transmitted in real time and they are used to assess water level and environmental conditions in the Bojana river and the coastal area;
- 2) Oceanographic observations have been collected for the Montenegro coastal and shelf area at seasonal time scales. The spatial mapping of coastal currents shows for the first

- time the connection between Buna-Bojana river waters, coastal and offshore currents;
- 3) The Adriatic wave and current forecasting system has been upgraded and short term forecasts are available daily at different Montenegro coastal areas;
 - 4) Numerical Weather Prediction models for Montenegro were coupled to hydrology to forecast surface runoff and water levels on land and rivers. The Bojana river water level and sediment transport models have been calibrated/validated;
 - 5) The Ulcinj town sewer system has been modelled analysing response to precipitation events in the present climate. The underground aquifer system around Ulcinj has also been assessed and modelled.
 - 6) Climate change scenarios for the period 2000-2030 have been analysed and impacts on precipitation and winds, coastal circulation, river runoff, sediment transport and water quality are being analysed.