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BETTER OBSERVATION FOR BETTER ENVIRONMENTAL RESPONSE

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Slovenia‘s Experience:
Using EU Cohesion Fund for Upgrading the Monitoring System

GEO Cradle Project Workshop
Novi Sad, Serbia, 14 July 2016

Dr. Silvo Žlebir
Slovenian Environment Agency

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Some basic facts about Slovenia

- Area of 20.273 km^2
- cca 2 million inhabitants
- cca 62 % of area covered by forests
- waters: cca 28.000 km of watercourses (1,4 km/km^2)

- **Juncture of three climatic regions:**

Mediteranean, Alpine and Continental

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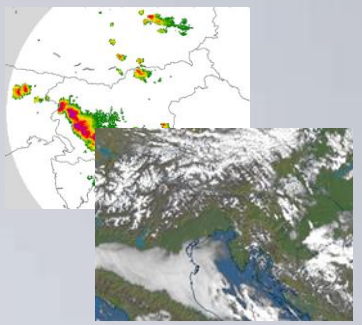
Some basic facts about the Slovenian Environment Agency (SEA):

TASKS

- National Meteorological Service
- National Hydrological Service
- National Seismological Service
- State of Environment Monitoring and Reporting
- Environmental Permitting and Licensing
- Water Management
  - 30 mio EUR annual budget
  - 380 employees



EUMETSAT
European Centre for Medium-Range Weather Forecasts
EUMETNET

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Slovenian Environment Agency

Monitoring activities



METEOROLOGY
HIDROLOGY
WATER QUALITY
AIR QUALITY
SEISMOLOGY

1100 measuring spots

- **3800 masurement systems**
- **330 different types of measuring equipment**
- **204 measured parameters**
- **27.000.000 measured data points/year**

SIQ ISO 9001 Q-629 IQNet

Supporting QA system

- ISO 9001:2008 – Management system of the agency (2004)
- Accreditation of the laboratories – ISO/IEC/SIST 17025 (**WMO RIC** !)

Modelling based on monitoring results !

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Slovenian Environment Agency
PREVIOUS EXPERIENCES WITH PROJECTS, CO-FINANCED BY the EU

During the Slovenian pre-accession period (1998-2004), SEA implemented some projects, co-financed by the EU PHARE fund (cca 5.0 M€):

- Upgrade of the air quality network
- Upgrade of the water quality network
- Upgrade of the ionizing radiation network
- Upgrade of the seismological network

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EU **Cohesion Fund** Project:

UPGRADE OF THE SYSTEM FOR MONITORING AND ANALYSING THE WATER ENVIRONMENT IN SLOVENIA

Boljše Opazovanje za Boljše Ekološke Rešitve

BOBER (BEAVER)

Better Observations for Better Enviromental Response

To implement up-to-date means/tools of monitoring, forecasting and analyses !

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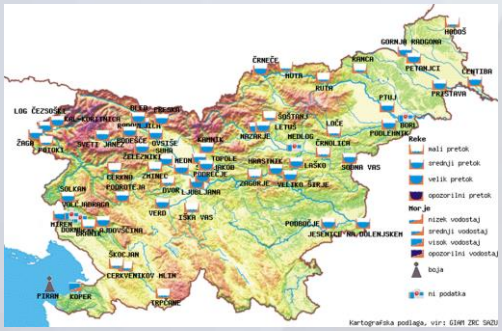
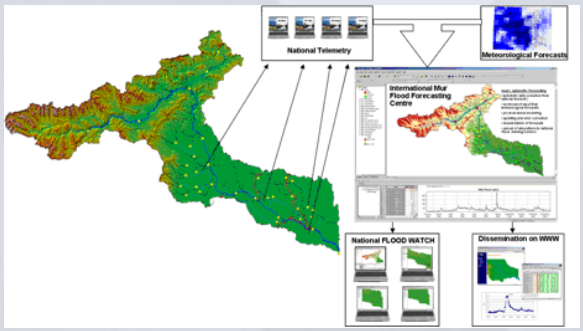
Main Objectives

- **To improve monitoring of the water environment;**
- **To improve knowledge and assessment of the water environment in Slovenia;**
- **To improve hydrological and meteorological forecasts.**





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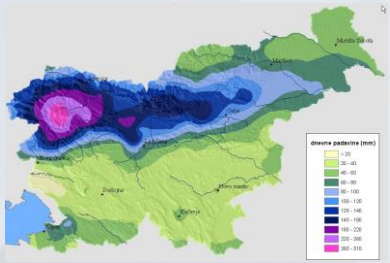
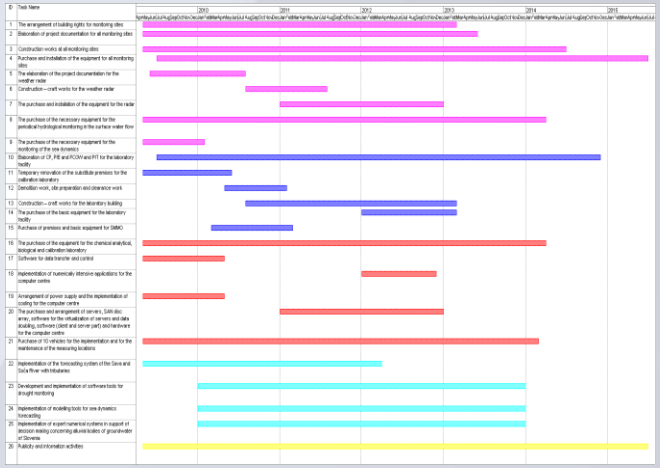
Timing of the project:

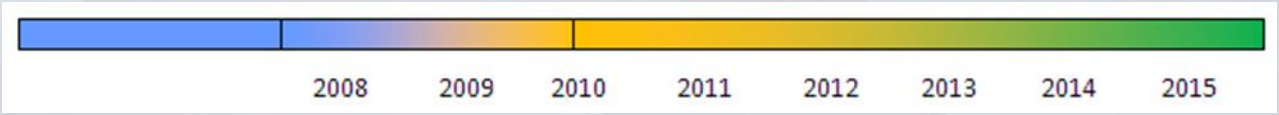
- First activities started in 2005
- 2008 - Feasibility Study completed
- May 2010 – EU Commission endorsed the project
- End of 2015 - Completion of the project.





Severe flash floods in 2007 !

- to improve monitorng network and forecasting tools to mitigate similar natural disasters!



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Funding

Total cost estimated to 32.962.821 EUR (including VAT).

Two sources:
- **EU: 85% funded by EU Cohesion Fund;**
- **National: 15% funded by the SEA (naional budget)**

but:
- **Staff costs of the SEA not included in the above figure**
- **More than 20 people permanently involved in the project during the implementation phase**

Economic analysis

- **Direct and indirect benefits**
- **Benefits, which can not be estimated financially**

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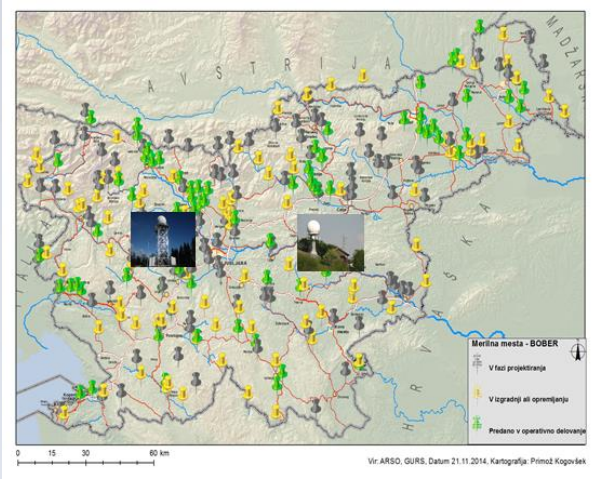
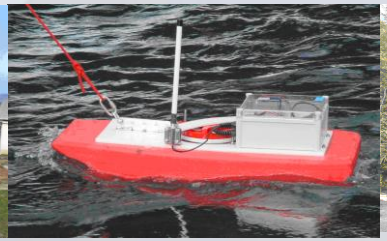
Results - Monitoring network:



- 248 upgraded or new measurement locations (meteorology and hydrology)
- Upgraded equipment on 33 existing locations (meteorology and hydrology)
- New radar site installed and radar network upgraded;
- New equipment for hydrometric and sea dynamics measurements.



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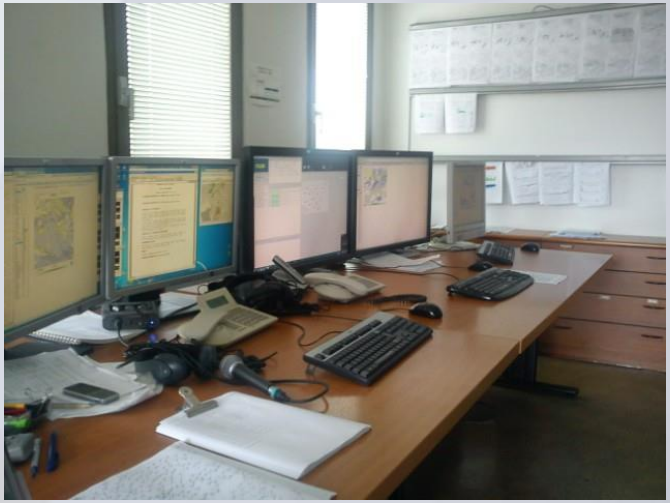
Results: New premises with equipment

- Meteorological and hydrological forecasting service
- Monitoring: maintenance and development services
- Calibration laboratory (**WMO RIC** !) – incl. new equipment
- Analytical laboratory (water quality analyses) - incl. new equipment



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Results: Computer infrastructure modernized

New servers for data menagement and high performance computer cluster installed.

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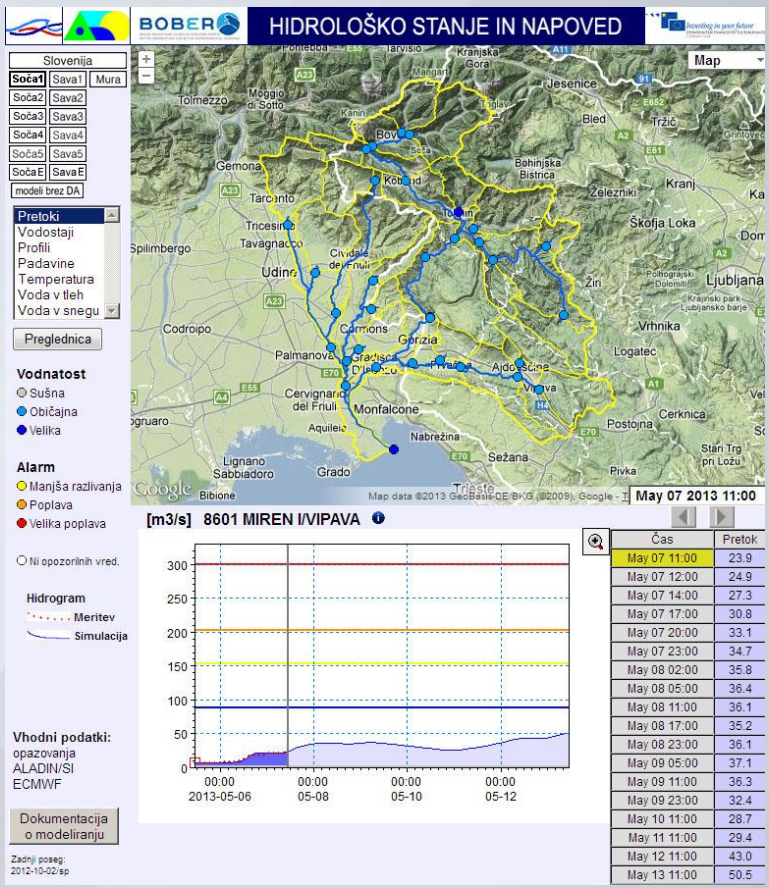
Results:

Forecasting systems for Sava and Soča rivers set-up

- monitoring, modeling, fotecasting…



Additional outcome:

Transfer of knowledge to the members of the *International Sava River Basin Commission*

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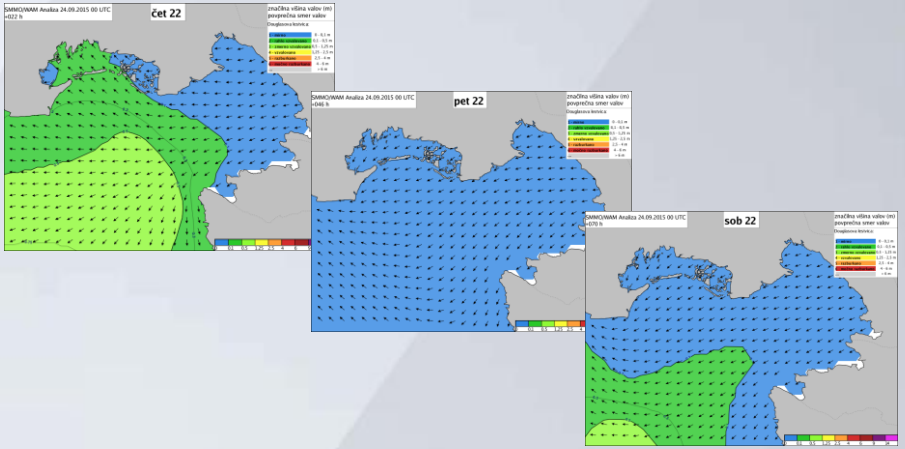
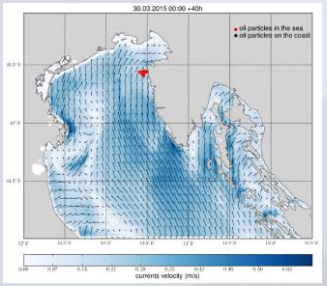
Results: Modelling tools for the sea dynamics

- Waves
- Currents
- Salinity
- Temperature
- Tide
- Dispersion of oil





Inclusion of satellite data: COPERNICUS !

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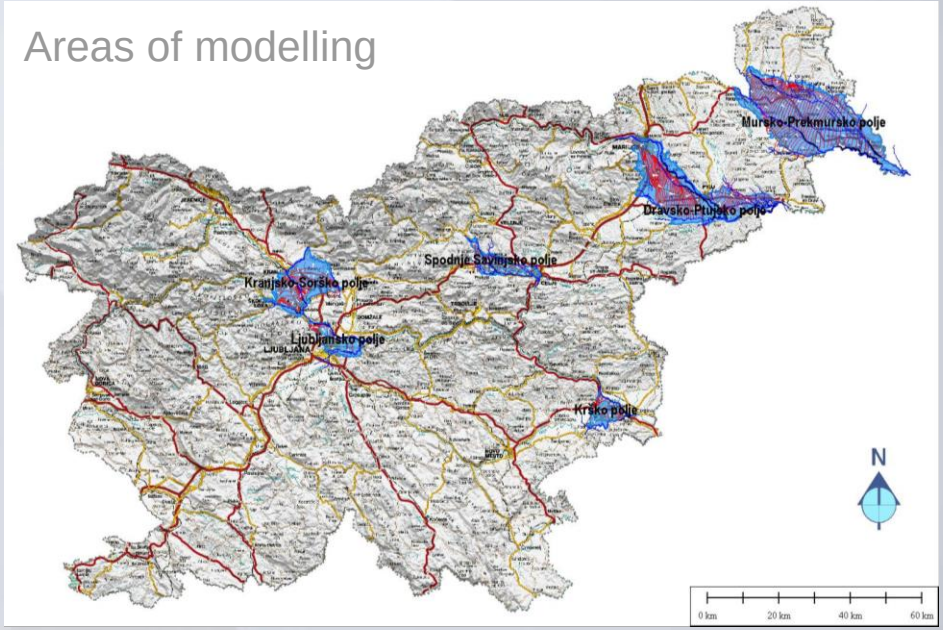
Results:
Expert system to support decision making processes on shallow alluvial groundwater bodies in Slovenia includes:

- Numerical expert system for decision support on the alluvial groundwater bodies;
- Model assessment of the available groundwater quantities;
- Model-based environment to simulate the effects of abstractions.

Areas of modelling



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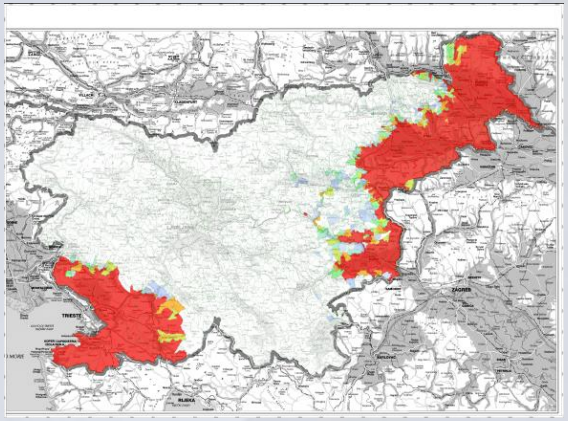
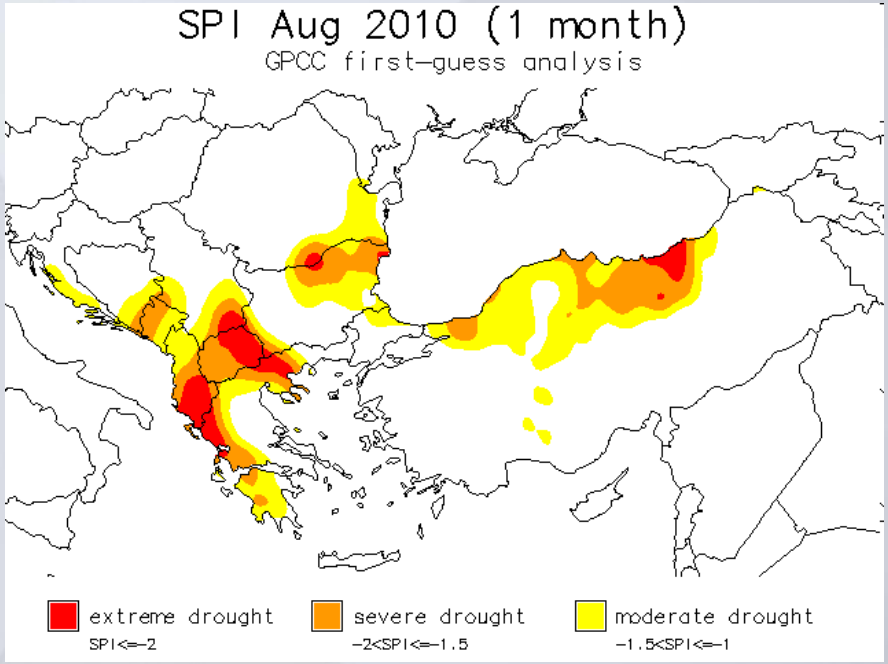
Results:
Expert system to support drought monitoring:

- Follow the relevant quantities of climatological records, automatic measurement, phenological and soil data using specific tools for data analysis;
- Integration of external data sources: abstractions data, satellite data…
- Calculating water balances;
- Processing of data and preparation of grid rasters and maps for publications.





Support to the DMCSEE !

Coupling of Oceanographic and Meteorological Models

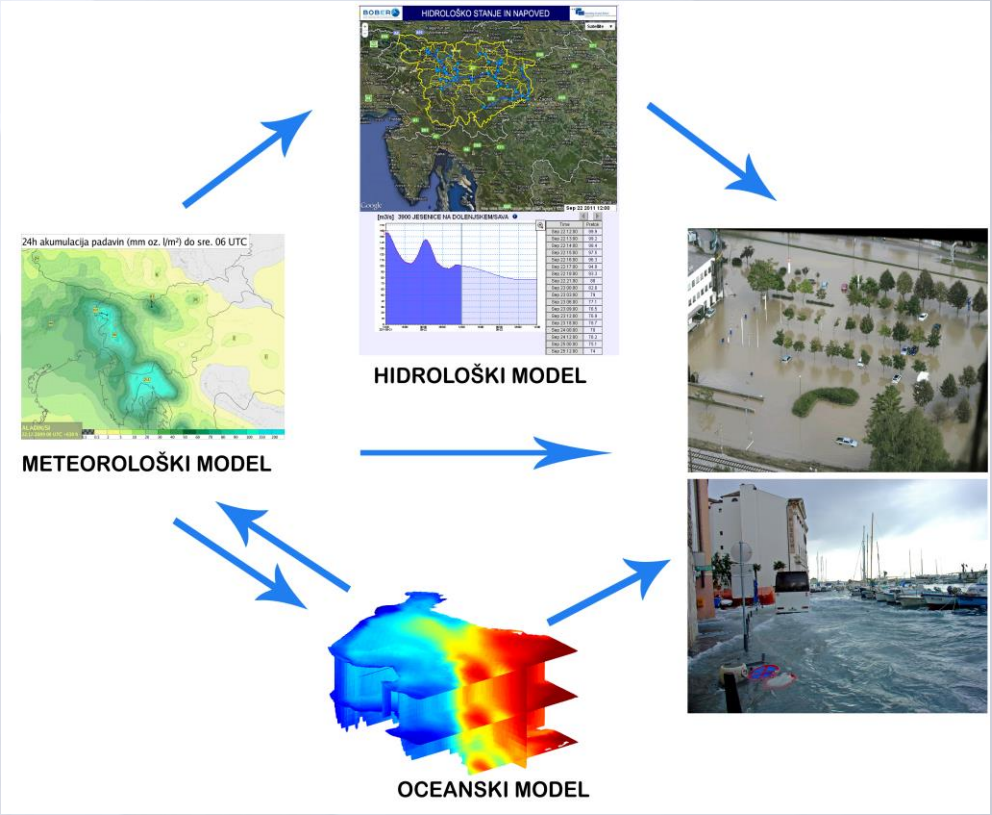
- **Challenge:**

Modelling of the mutual impact of the sea and atmosphere:

- **Solution:**

Coupled modelling chains for the modelling of the sea, atmosphere and river discharges.

First results obtained!



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