



Status of Operational Flash Flood Forecasting and early Warning Capabilities in National Environmental Agency of Georgia

First Steering Committee Meeting (SCM 1)
Black Sea and Middle East Flash Flood Guidance (BSMEFFG) System
28-30 June 2016 Tbilisi, Georgia

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HYDROLOGY / Surface Water

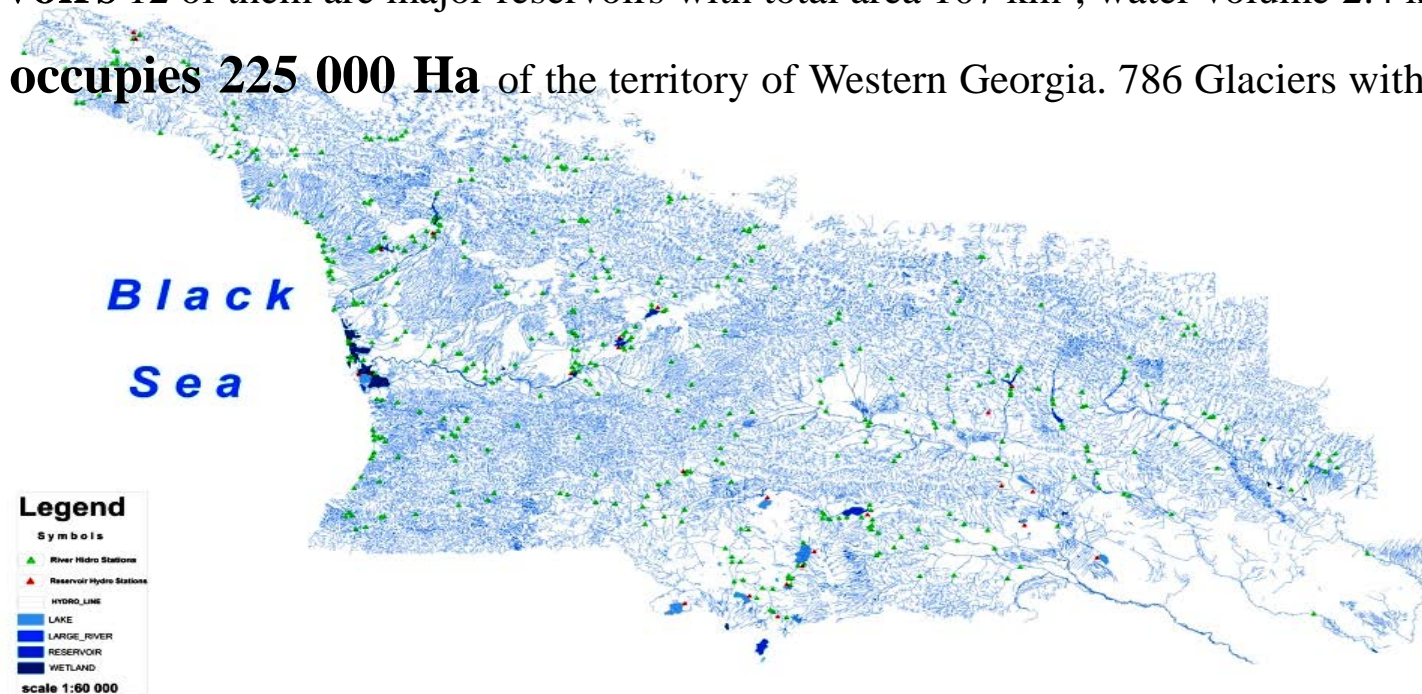
In Georgia exists **26 060 Rivers** and stream with a total length of 60 000 km.

25 075 rivers with total length 54 768 km are small (less than 25 km). nourished through: Precipitation and Swamp; Ground Waters; Glaciers, Continuous Snow.

856 lakes with total area 170 km², Lakes are River, Shore, Karst, Dike and Landslide origin.

44 reservoirs 12 of them are major reservoirs with total area 107 km², water volume 2.4 km³.

Swamp occupies 225 000 Ha of the territory of Western Georgia. 786 Glaciers with total area – 556 km²



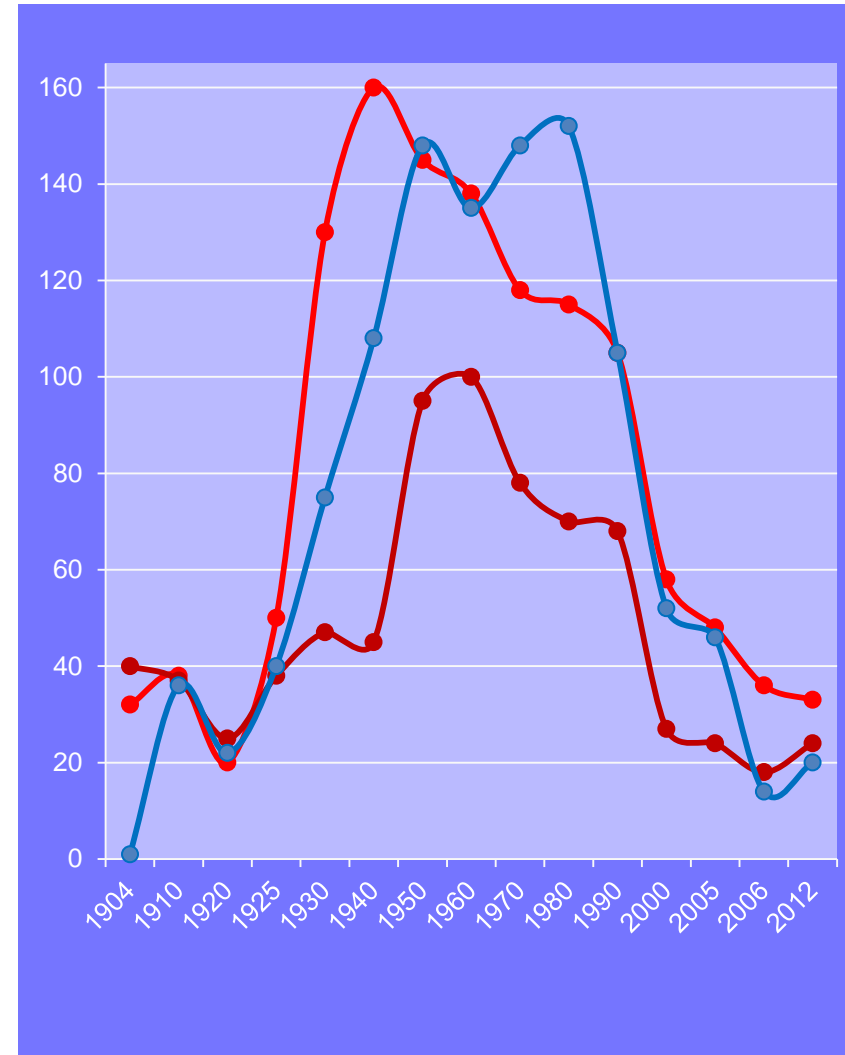
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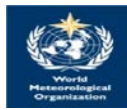


The regular hydrometeorological observations in Georgia started since 1844. Tbilisi hydrological station was established in 1837 year and correspondingly Batumi - 1881 year, Poti Port - 1894 year. By the year of 1916 about 90 meteorological stations and posts were functioning and before the World War II their number reached 200. Some Meteorological stations are located in high mountain areas, difficult to be reached. Among them in Western Georgia Mamisoni Pass (1932) and in Eastern Georgia Kazbegi (1933) are the oldest and the highest meteorological station in Europe.

Until the 1990 the number of Meteorological stations comprised over 100 and posts – 60, Hydrological posts-105.

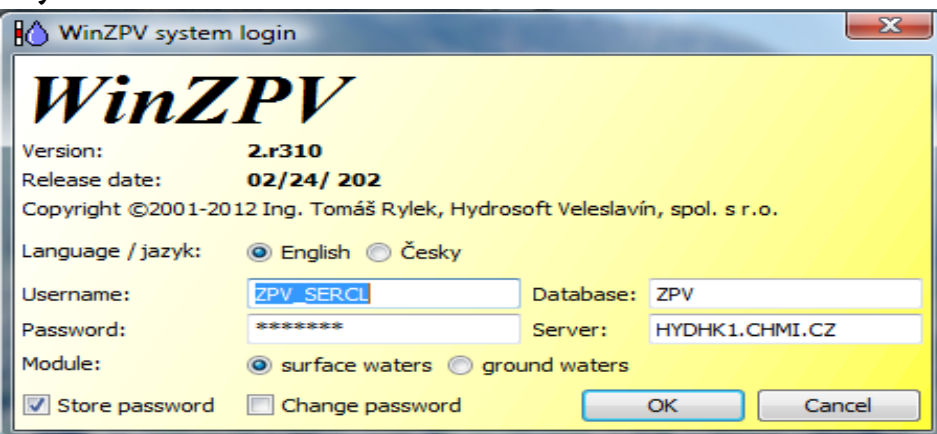
For 2012 the amount of Meteorological stations are 33 (22 automatic) and posts – 24, Hydrological posts - 20. In frame of Adaptation Fund Project it is planed to install 5 Meteorological stations, 20 meteorological posts, and 10 Hydrological stations





Data Availability

- Most of Hydrometeorological data From the establishment of stations until 2006 are processed, quality controlled and are stored in the Department of Spatial Information – archive in electronic version and paper based;
- In 2012 in NEA is implemented WinZPV by the Czech Hydrological Institute to record river water measurements and various additional information used to analyze various aspects of the river network system;
- In 2012 in NEA is implemented The CLIDATA system is primary intended for archiving of climatology data, for the data quality control and for administration of climatology stations and station observations. The System was designed to replace the old CLICOM system.





ADAPTATION FUND

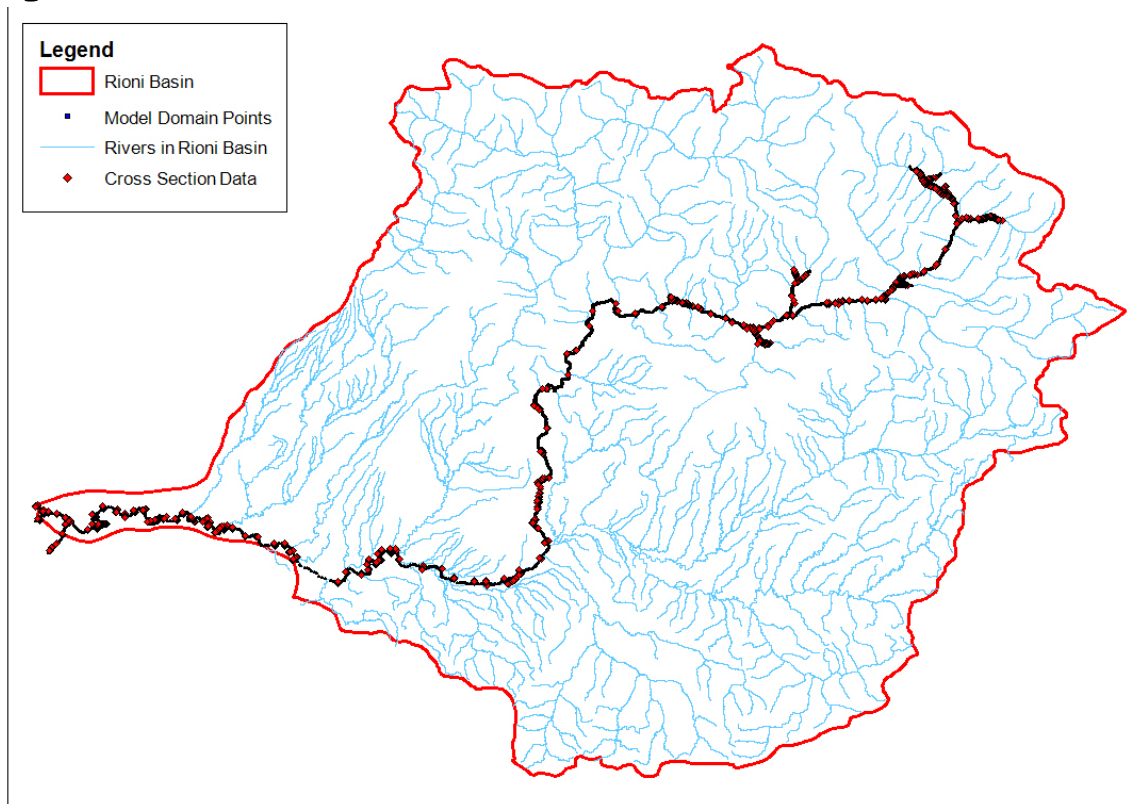


საქართველოს გარემოს
დაცვის სამინისტრო



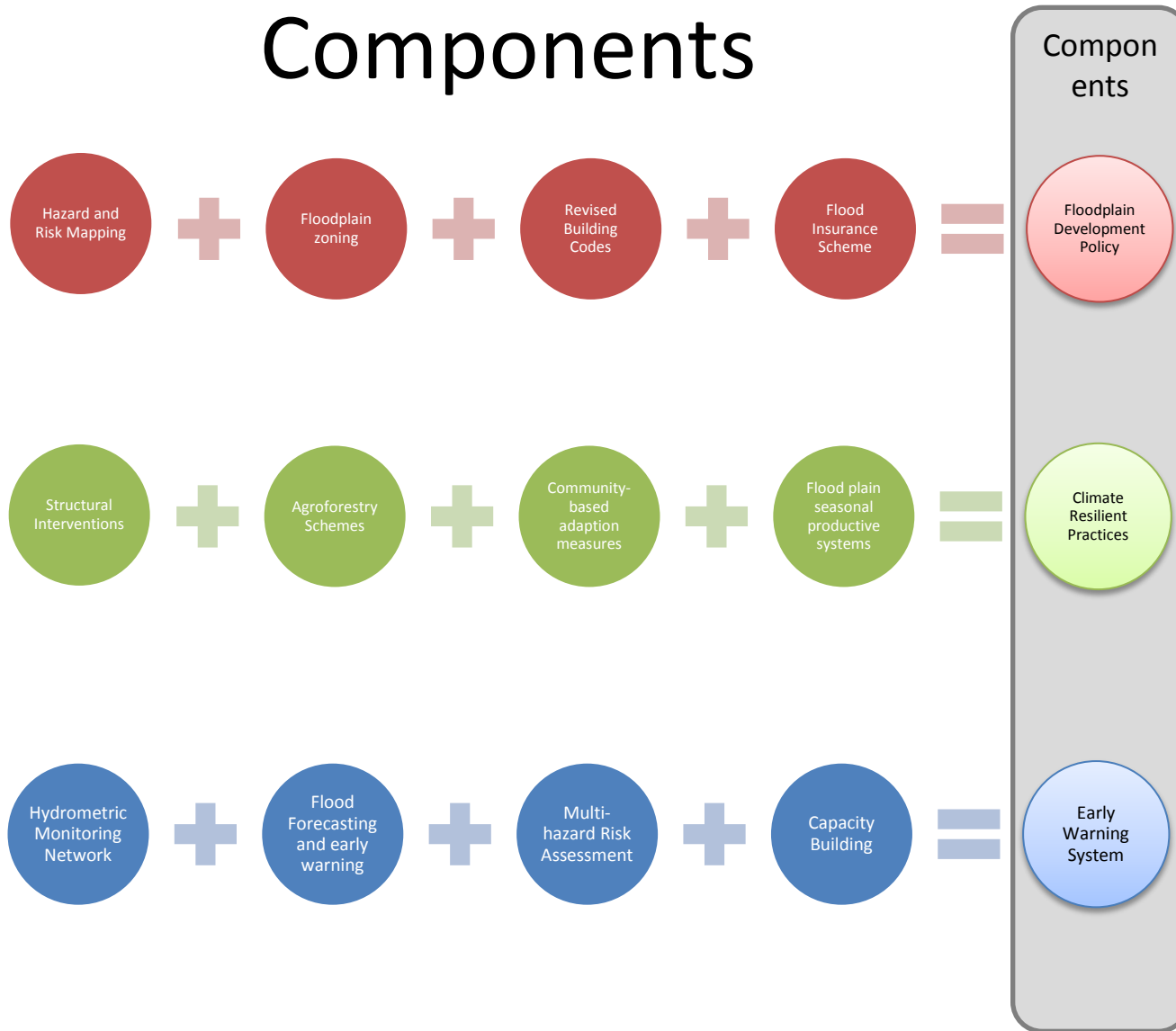
Empowered lives.
Resilient nations.

Flood forecasting and Early Warning systems in Rioni river basin



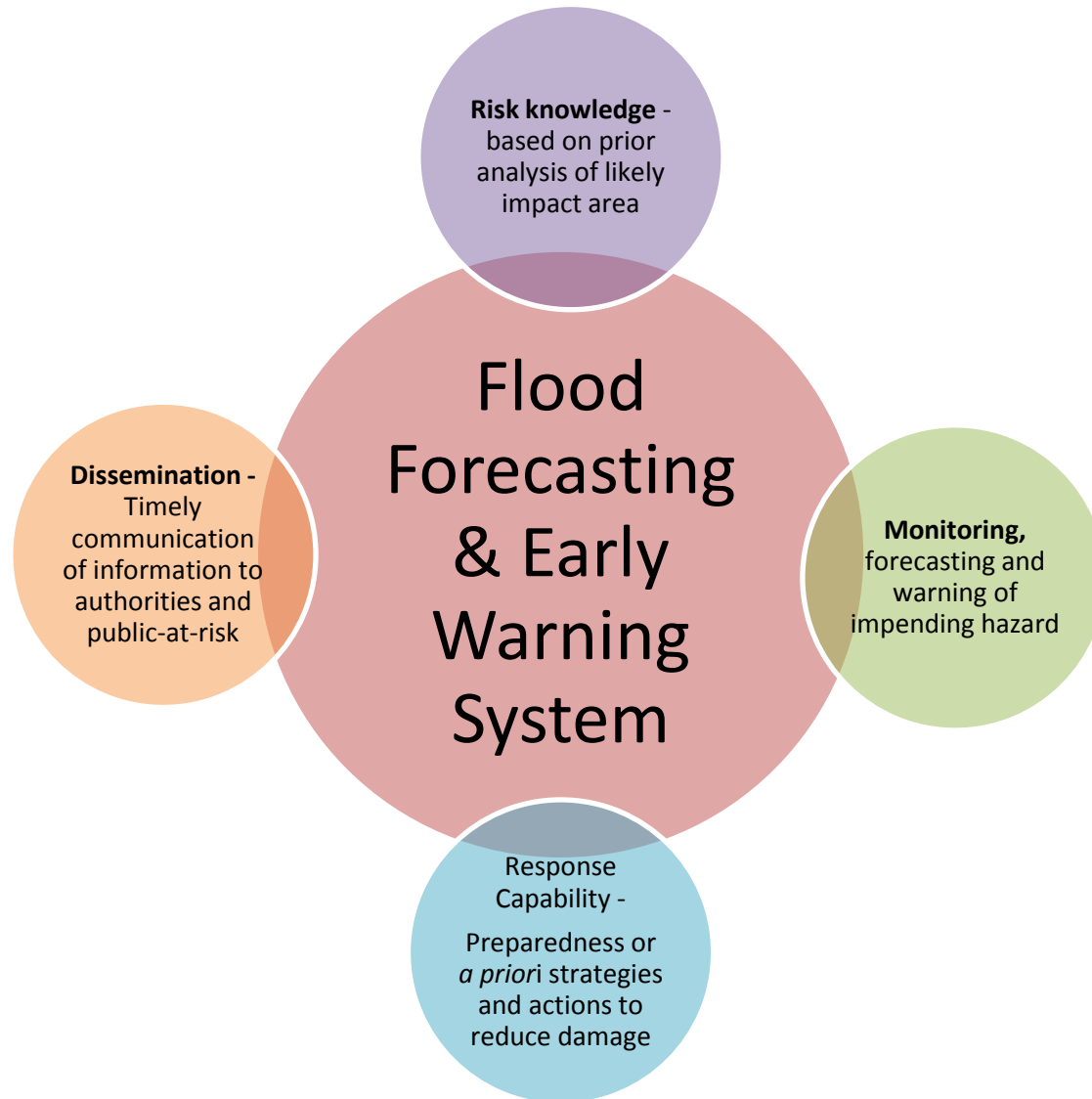
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Overview of Project Components

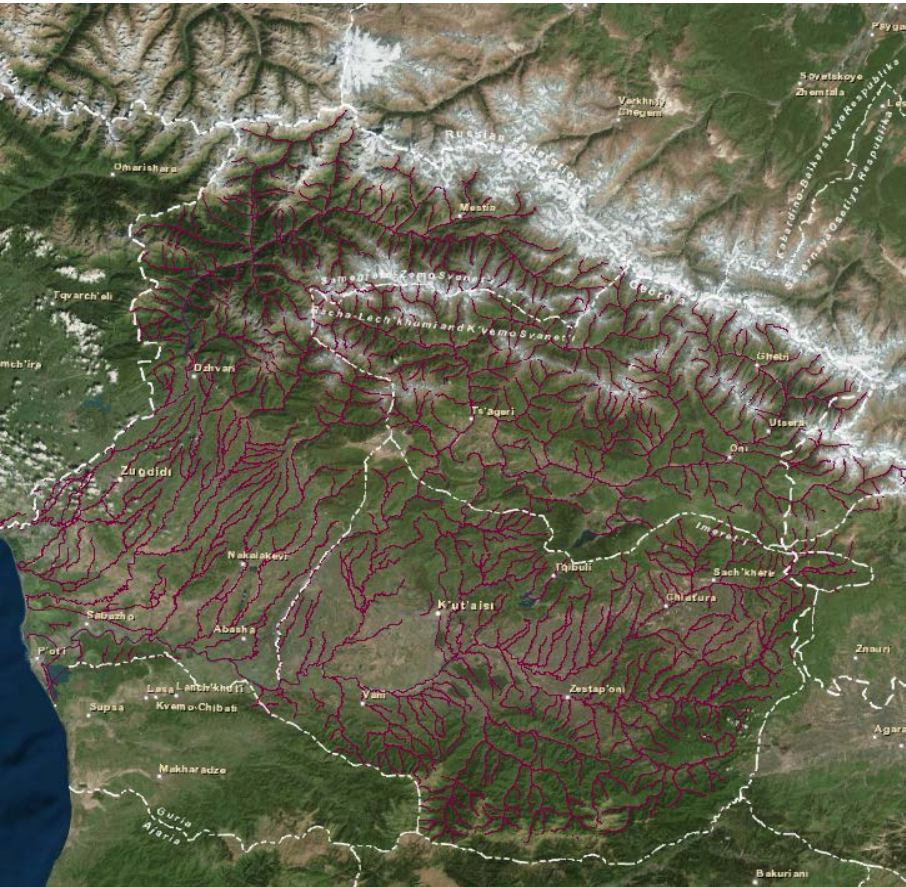




Flood Forecasting & Early Warning System Elements



HYDROLOGICAL SITUATION IN THE RIONI RIVER BASIN



Total length - 327 km;
Average inclination 7,2‰;
Catchment area 13 400 km²;
Average height 1084m;
More than 380 tributaries;
30 tributaries length 10-140km;
Network density of rivers 0.99km/km²
Swamp 350-400 km² area.

Conditionally the Rioni river basin can be divided into four zones:

The first-upper zone is located above the 3000 m height;

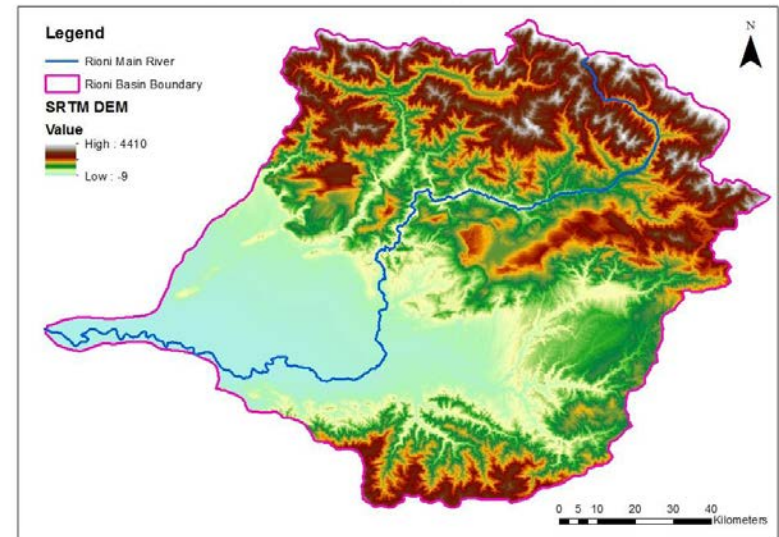
The second zone of the river Rioni basin belongs to the mountain range located between 3000-1000m height;

The third – foothills zone is located at the 1000-250m;

The fourth zone is located on territory of Kolkhetti lowland at the 250-0m height above sea level.

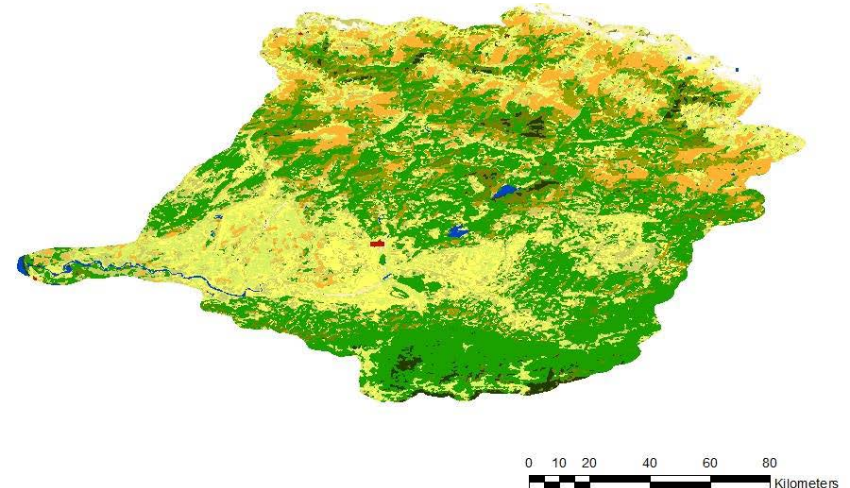
DATA AVAILABLE FOR HYDROLOGICAL MODELLING

Rioni Basin Elevation - SRTM Digital Elevation Model



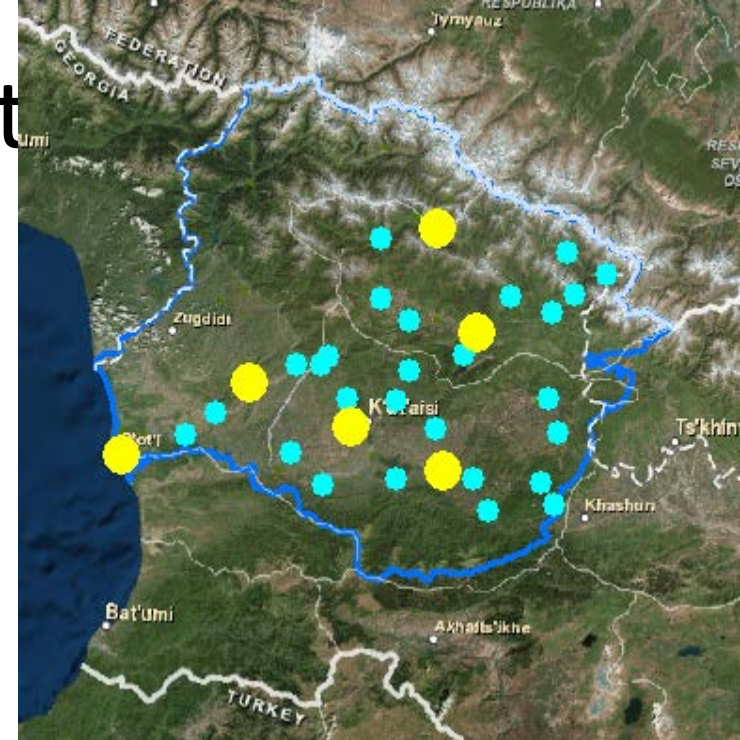
- Catchment Topography;
- Land use;
- Geology and Soil Type
- Hydrometric datasets;

- Rainfall Data
 - Design Rainfall
 - Catchment Rainfall
 - Flow and Level Data
 - Temperature data



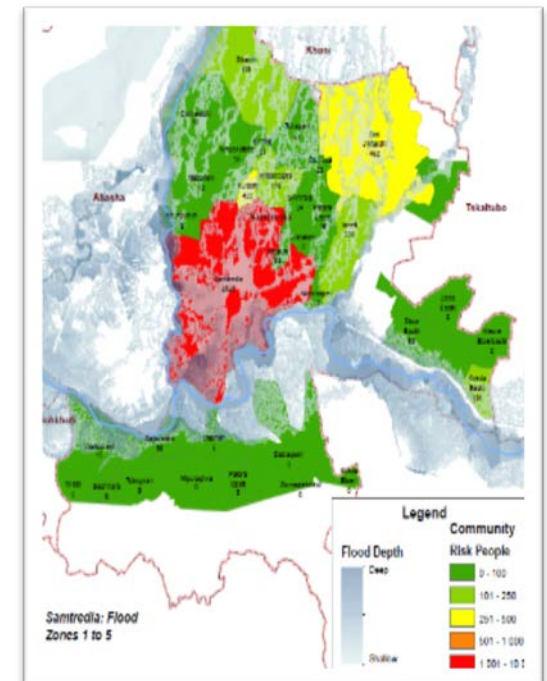
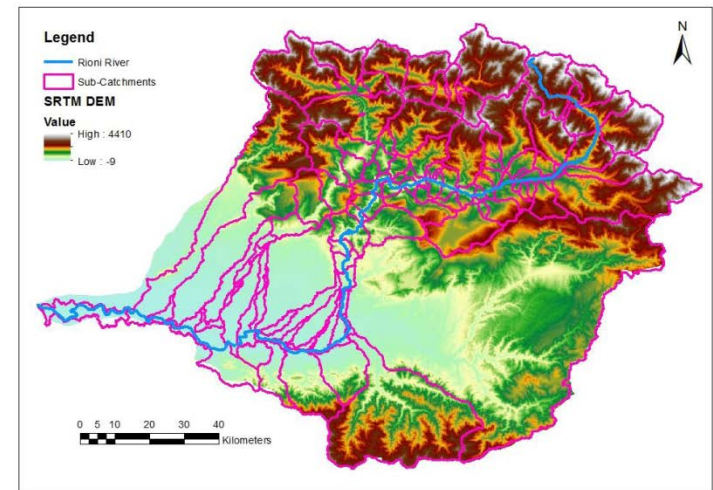
Monitoring - Telemetry

- Installed/Rehabilitated 25 new Meteorological Stations (5) and Post (20)
- 6 Old Meteorological Stations and Post
- Temperature and Precipitation Data imported in XML
- 10 Hydrological Stations
- Water level Data imported in XML
- Scripts developed for the importing process.



Rioni Risk Knowledge

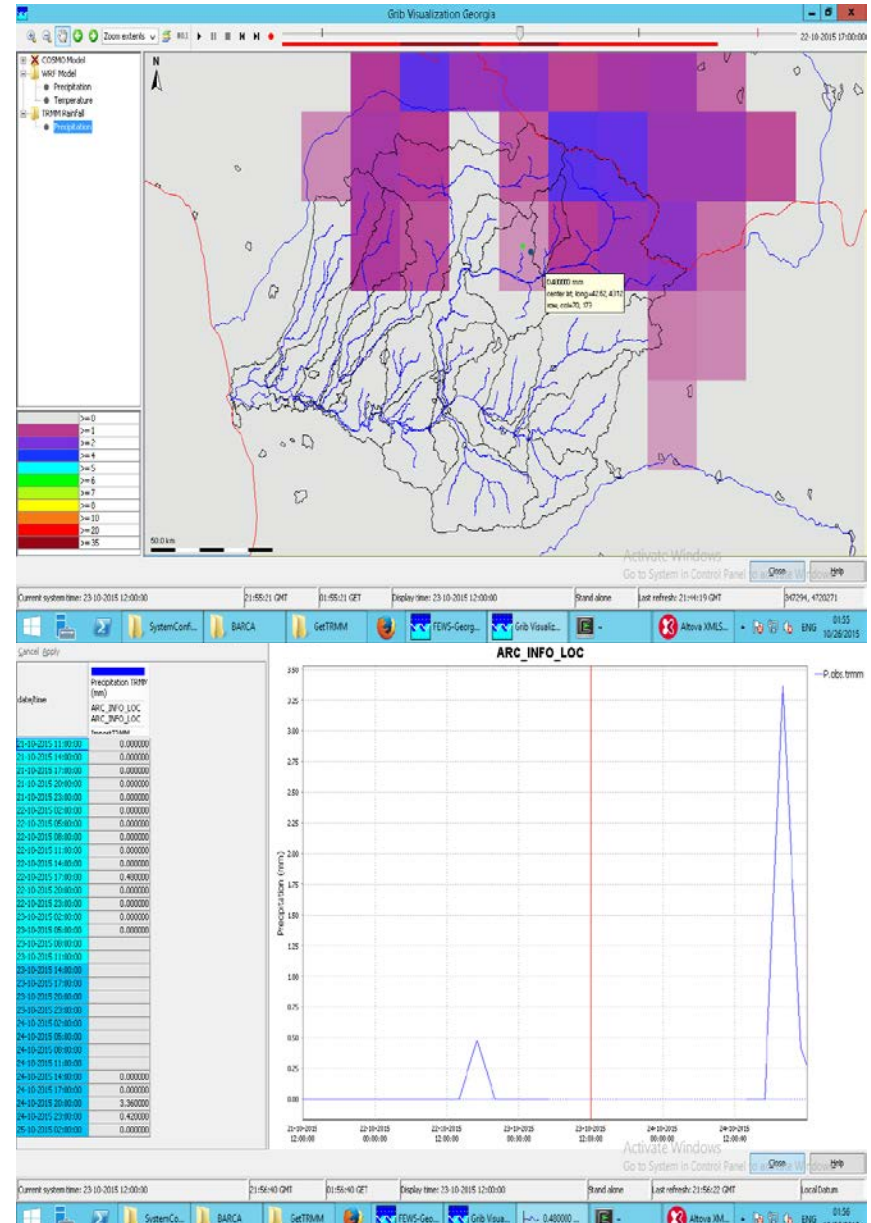
- Flood and landslide hazard mapping
- Develop GIS-based socio-economic risk and weather index insurance models
- Develop Weather Index Insurance Scheme
- Develop Building Codes review and propose new codes
- Develop Draft floodplain zoning policy
- undertake Extensive capacity building in hydraulic modelling and GIS



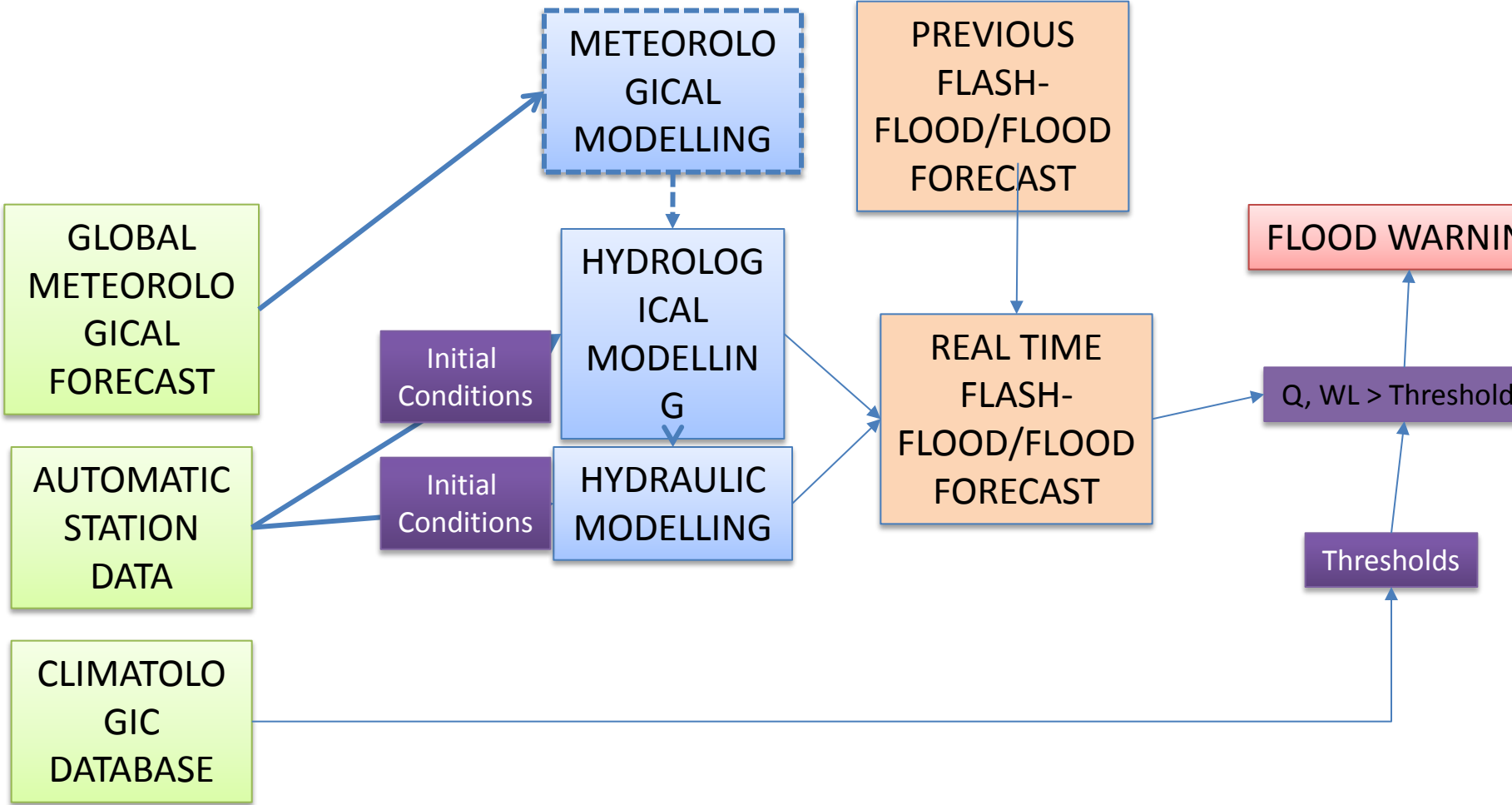
Monitoring - Satellite Data

It is used TRMM and GPM data

These data is being imported daily into the platform



Forecasting - Overview of FFEWS approach

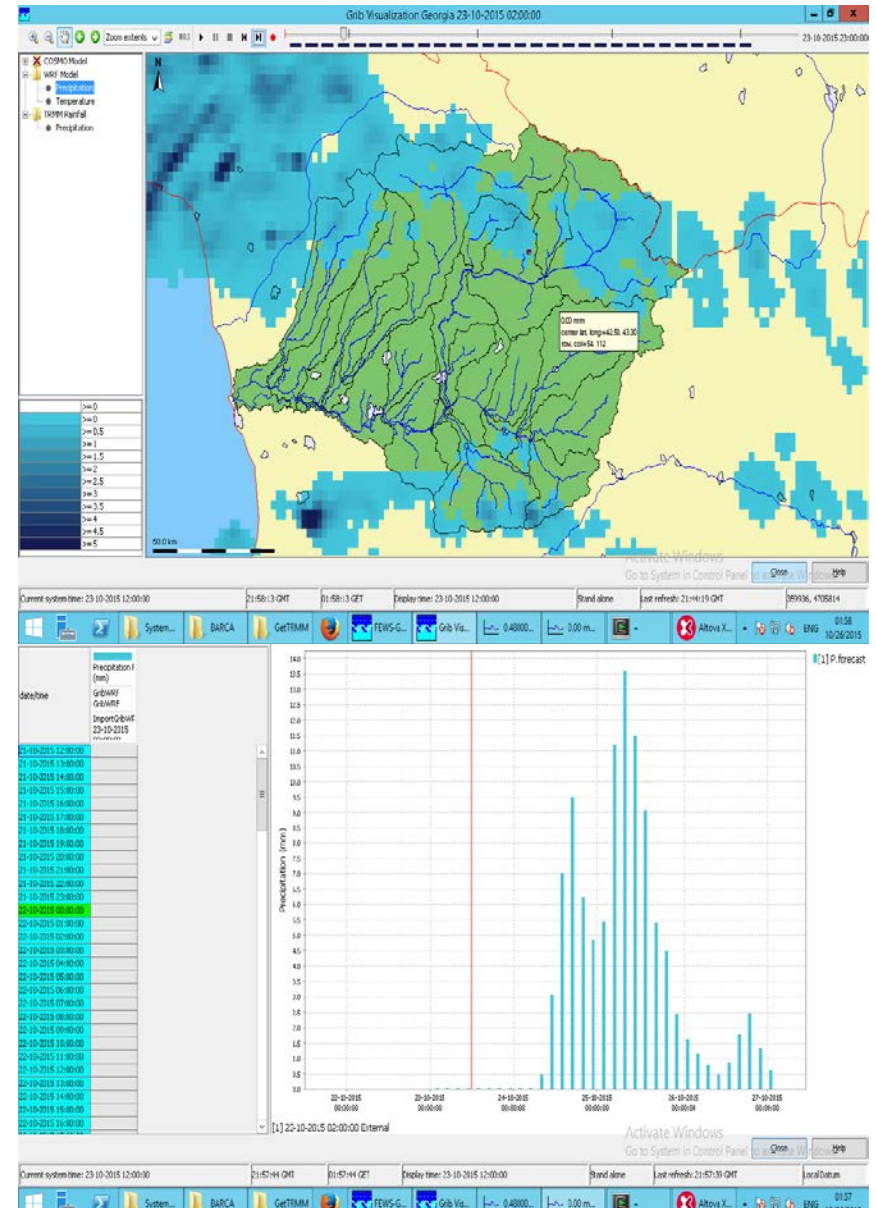


Meteorological Forecast

There are two different regional NWP models implemented by NEA.

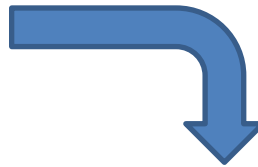
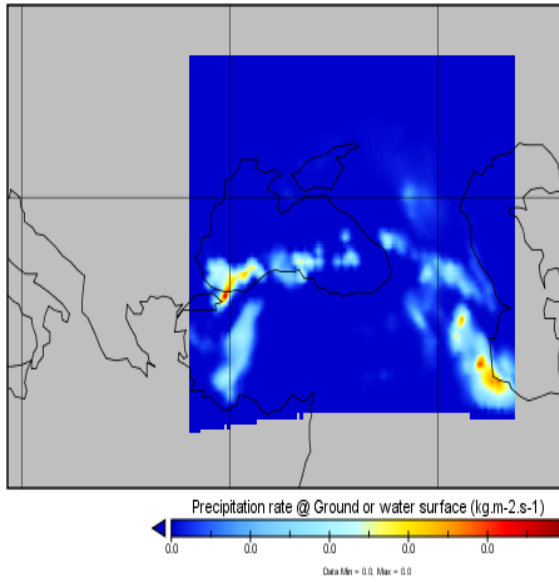
- WRF
- COSMO

The COSMO model has not been operative for the last year.

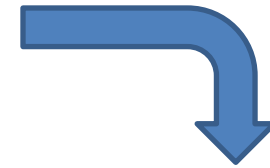
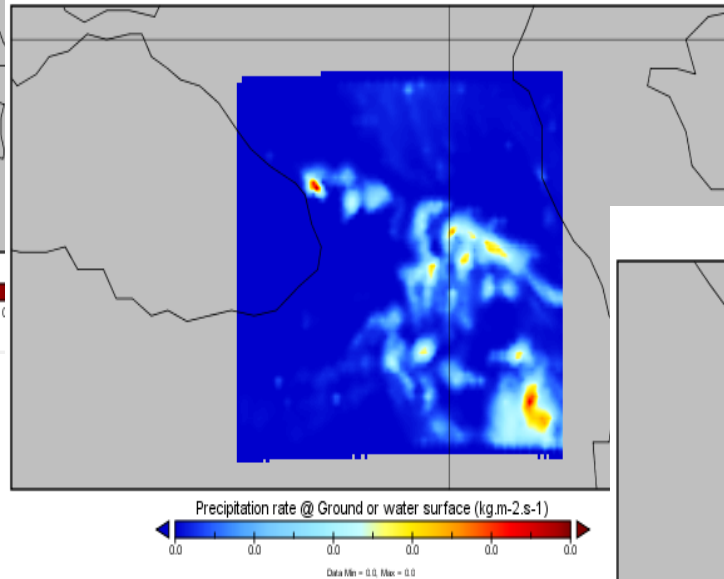


Meteorological Forecast - WRF

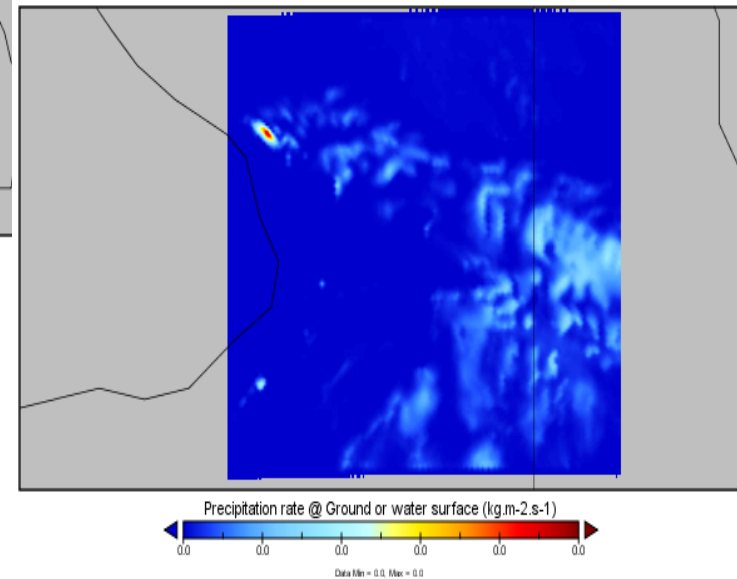
Precipitation rate @ Ground or water surface



Precipitation rate @ Ground or water surface

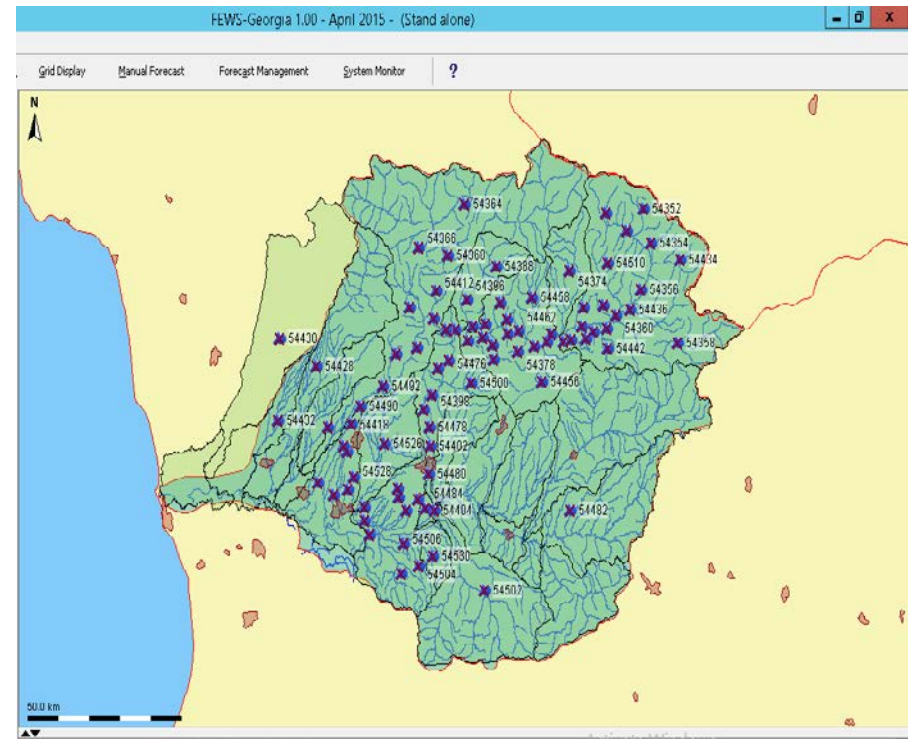


Precipitation rate @ Ground or water surface



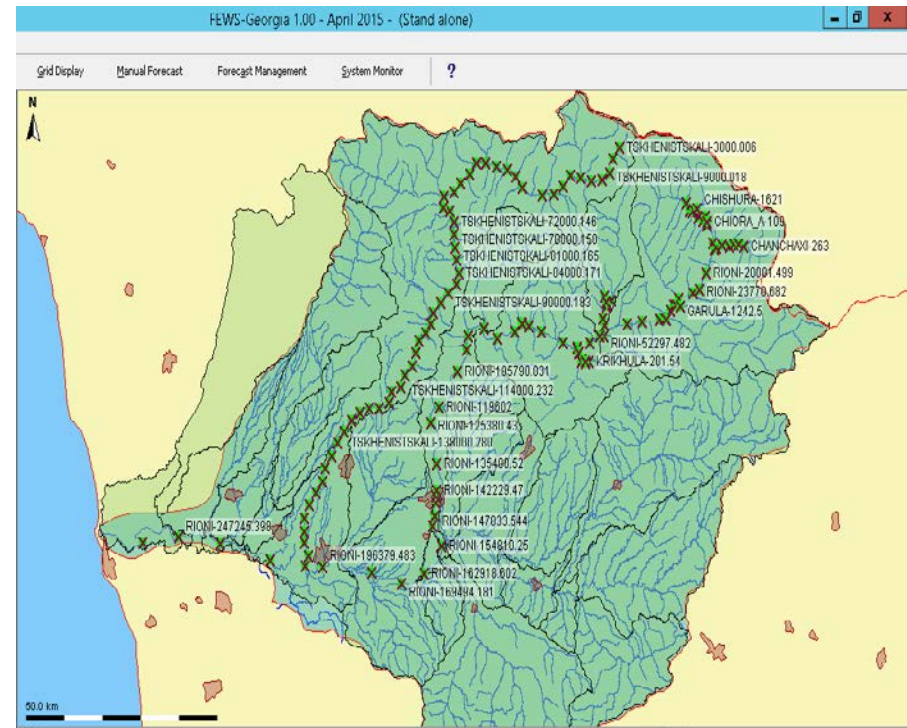
Run hydrological model

- HEC-HMS is the hydrological model used
- Precipitation data from the previous exercise used
- Precipitation input in pre-defined catchment locations
- Initial conditions from antecedent runs
- Gridded precipitation option being explored
- Model adaptor in DELFT-FEWS

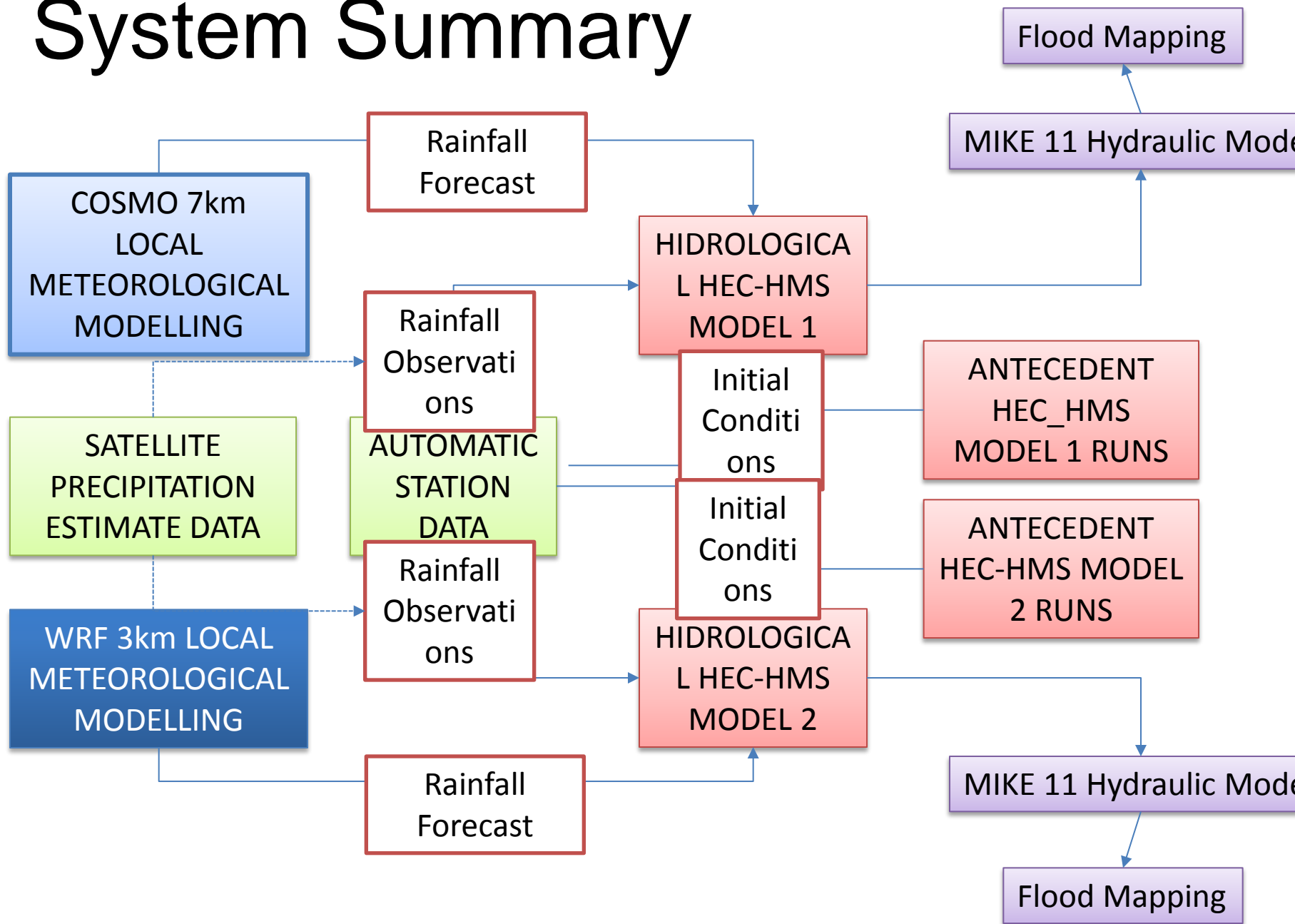


Run hydrodynamic model

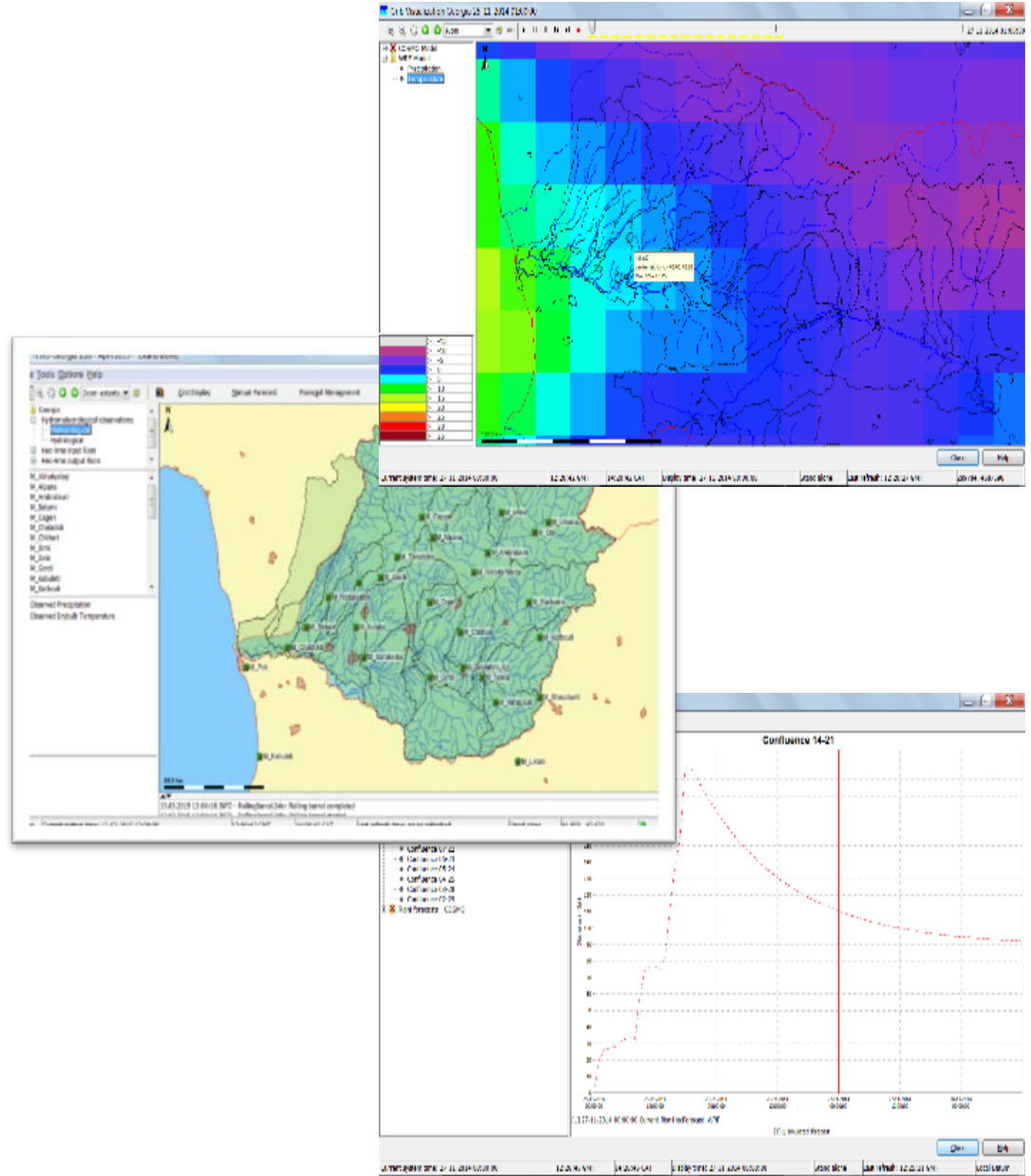
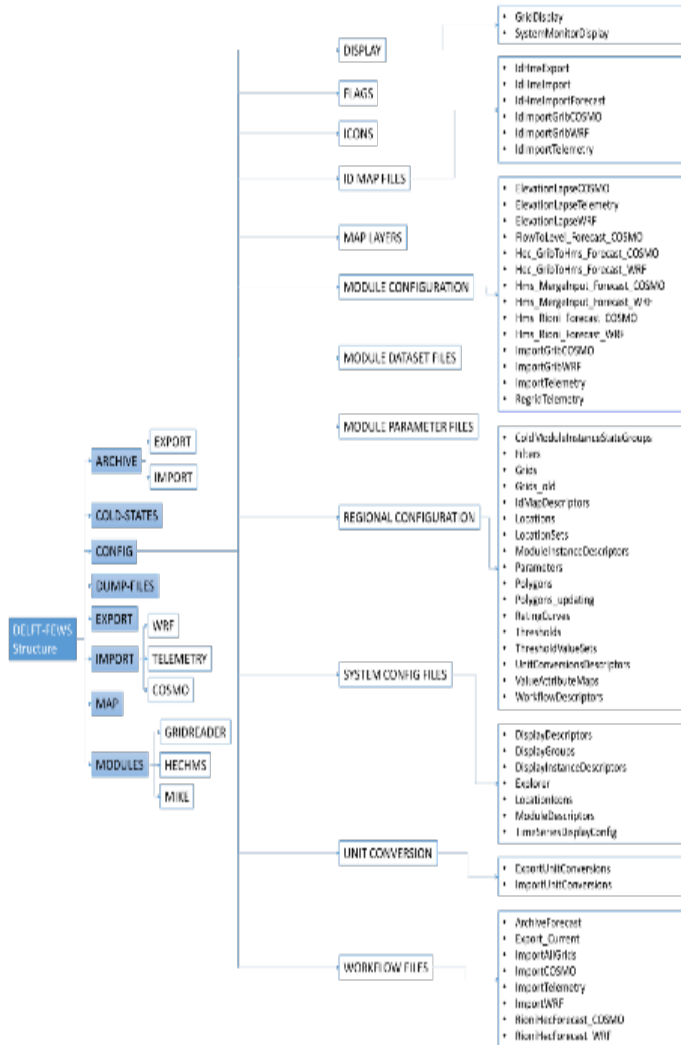
- MIKE 11 is the hydrodynamic model within the platform
- Model adaptor in delft-fews
- Water level information from telemetry being used for initial conditions
- Water levels calculated at specified locations



System Summary



Flood Forecasting Platform





**THANK YOU VERY MUCH FOR YOUR
KIND ATTENTION!!!**