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The H2020 FREEWAT platform for water resource management

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FREEWAT — Free and Open Source Software Tools for Water Resource Management

European Commission

ict4water.eu

EIP Water Online Market Place — Matchmaking for water Innovation

MAR Solutions - Managed Aquifer Recharge Strategies and Actions (AG128)

INSTITUTE OF LIFE SCIENCES — Scuola Superiore Sant'Anna

CONCEPTS AND MOTIVATIONS

Decisions on water management and planning do not often consider spatial and time variability of relevant hydrological factors. Furthermore, even if extensive monitoring activities are carried on, information content of the available data is not properly exploited. This because they are often analyzed with simple algorithms, thus providing limited insight into the dynamics of the systems.

The value of using ***advanced ICT-tools*** for spatially- and temporally-based analysis will help to exploit the information content of such data and to get a better insight on water bodies behavior. In this view, ***GISs*** being able to store, manage/analyze and visualize large spatial datasets are perfect candidates to widespread the use of complex modeling environments.

THE FREEWAT PROJECT

FREEWAT is an ***HORIZON 2020*** project financed by the EU Commission under the call WATER INNOVATION: BOOSTING ITS VALUE FOR EUROPE.

FREEWAT aims at simplifying the application of EU water-related Directives by means of an innovative ***GIS-integrated open source and public domain ICT tool*** (the ***FREEWAT platform***) for the simulation of water quantity and quality in surface- and ground-water with an integrated water management and planning module.

The FREEWAT platform aims at producing scientifically and technically sound decisions and policy making based on data and innovative data analysis tools. Policy makers may benefit from its application adopting a ***participatory approach***, by involving stakeholders not only in the final stage of result discussion, but also during the phase of scenario definition.

The open source characteristics of the platform allow to adopt an ***initiative "ad includendum"***, as further research institutions and private developers may contribute to its development.

FREEWAT CONSORTIUM AND CASE STUDIES

Partners

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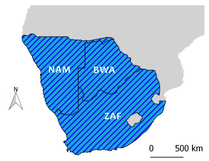
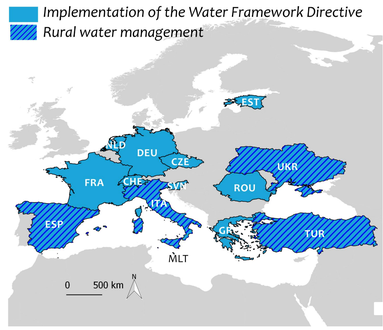
Institute of Life Sciences, Scuola Superiore Sant'Anna (Italy)

DURATION: 30 months
started April 2015 – to September 2017

- 19 Partners
- 14 case studies (9 devoted to the application of the Water Framework Directive; 5 devoted to rural water management)
- More that 220 stakeholders involved
- About 60 institutions involved
- About 100 people trained so far

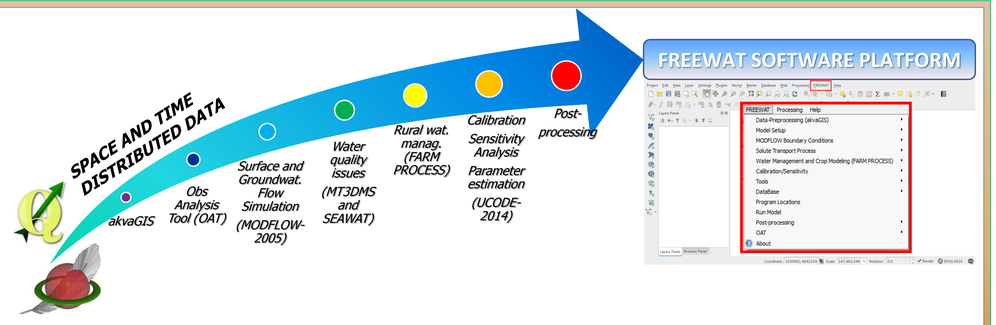




FREEWAT CAPABILITIES

The FREEWAT platform includes:

- a pre-processing tool for the analysis of hydrochemical and hydrogeological data (akvaGIS);
- a pre-processing tool for the analysis of time-series (OAT);
- modules for the simulation of groundwater flow and solute transport;
- a module for water management;
- a module for sensitivity analysis and calibration.



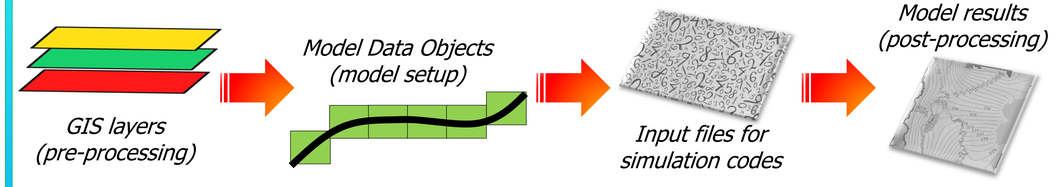
The FREEWAT hydrological model is based on fully distributed and physically-based numerical codes, mainly from the open source ***USGS MODFLOW*** family.

A spatial database is designed using ***SpatiaLite*** DBMS.

FREEWAT APPROACH

The FREEWAT platform, developed as a plugin integrated in QGIS, is conceived as a canvas, where several simulation codes, based on the hydrological cycle, hydrochemical or economic-social processes, are virtually integrated in a unique GIS desktop, coupling the power of GIS geo-processing and post-processing tools in spatial data analysis to that of simulation software.

Coupling is guaranteed in FREEWAT through a ***tight coupling approach***, where GIS and hydrological model engines work separately, but the first provides the interface where data are pre-processed, run and then visualized.



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