

The H2020 FREEWAT platform for water resource management

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ABSTRACT [330 Words]

During the last decades, degradation of ground- and surface-water resources is matter of concern in terms of quantity and quality, mostly due to intense human exploitation and climate changes, especially in the EU.

The EU HORIZON 2020 FREEWAT project (FREE and open source software tools for WATER resource management; www.freewat.eu) aims at promoting the application of EU-water related Directives. This is achieved providing an open-source and public-domain, GIS-integrated platform for the simulation of water quantity and quality in ground- and surface-water, with an integrated module for water management and planning. Such platform is expected to help in producing scientifically and technically sounding decision and policy making based on innovative data analysis tools, and a participatory approach not only in the final stage of result discussion, but also during the phase of scenario generation.

The FREEWAT platform is integrated within the open source QGIS GIS, allowing the simulation of the whole hydrological cycle and the analysis of several water data, where input and output data are managed through a SpatiaLite Data Base Management System (DBMS).

The FREEWAT hydrological model is based mainly on the open source USGS MODFLOW family integrating MODFLOW-OWHM.

FREEWAT capabilities include:

- solute transport in groundwater flow systems and in the unsaturated zone;
- tools for the analysis, interpretation and visualization of hydrogeological data;
- tools for dealing with groundwater quality issues through analysis of hydrochemical data;
- time-series processing to support advanced model calibration;
- a whole module for sensitivity analysis, calibration and parameter estimation;
- a dedicated module for water management and planning, with particular focus on rural environments.

As such, the FREEWAT platform is conceived as a canvas, where several simulation codes, based on the hydrological cycle, hydrochemical or economic-social processes, might be virtually integrated.

Due to the open source characteristics of the platform, contributions to further development by research institutions, private developers etc. are welcome, in the view of an initiative "ad includendum".