

FREEWAT, a HORIZON 2020 Project to Build Open Source Tools for Water Management: a European Perspective

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FREEWAT is a HORIZON 2020 EU project. FREEWAT's main result will be an open source and public domain GIS integrated modelling environment for the simulation of water quantity and quality in surface water and groundwater with an integrated water management and planning module. FREEWAT aims at promoting water resource management by simplifying the application of the Water Framework Directive and related Directives. Specific objectives of the project are: to coordinate previous EU and national funded research to integrate existing software modules for water management in a single environment into the GIS based FREEWAT and to support the FREEWAT application in an innovative participatory approach gathering technical staff and relevant stakeholders (policy and decision makers) in designing scenarios for application of water policies. The open source characteristic of the platform creates an initiative ad includendum, as further institutions or developers may contribute to the development. The main expected impacts of FREEWAT are to help produce scientifically and technically sound decisions and policy making based on innovative data analysis tools and to support a participatory approach through all phases of a project, from scenario generation to the final stage of discussion. Core of the platform is the SID&GRID framework (GIS integrated physically-based distributed numerical hydrological model based on a modified version of MODFLOW 2005; Rossetto et al. 2013) ported to QGIS desktop. Current development includes: 1) module for water management and planning; 2) module for calibration, uncertainty and sensitivity analysis; 3) module for solute transport in unsaturated zone; 4) module for crop growth and water requirements in agriculture; 4) tools for investigating groundwater quality issues; 5) tools for the analysis, interpretation, and visualization of time series and hydrogeological data. Activities are carried out on two lines: (i) integration of modules to fulfill the end-users requirements, including tools for producing feasibility and management plans; (ii) a set of activities to fix bugs and to provide a well-integrated interface for the different tools implemented. Through creating a common environment among water research/professionals, policy makers, and implementers, FREEWAT's main impact will be on enhancing a science- and participatory approach and evidence-based decision making in water resource management, hence producing relevant and appropriate outcomes for policy implementation which is critical for sustainable management of water resources.