FREEWAT

Free and Open Source Software Tools for Water Resource Management

EU HORIZON 2020 Project

The FREEWAT platform

Key Policy Messages

✓ The FREEWAT platform: a free and open source solution for WRM

✓ FREEWAT guarantees high accuracy and operability thanks to the structural integration of GIS and modelling tools

✓ The additional advantage of the free and open source license makes FREEWAT a helpful tool for decision makers, to share modeling results aimed at improving water management plans

WHAT H2020 FREEWAT is

FREEWAT is an HORIZON 2020 project financed by the EU Commission, aiming at promoting water resource management through innovative ICT tools and participatory approach.

Main result of the project is the free and open-source FREEWAT software: a QGIS integrated environment, where several simulation codes, based on the hydrological cycle, hydrochemical or economic-social processes, are integrated in a unique GIS project for conjunctive use of surface- & ground-water.

This Policy Brief is part of series of seven whose goal is to illustrate the FREEWAT approach and achievements.

FREEWAT as effective ICT tool for a data-driven decision making

When a water resource management analysis is carried out, the usage of GIS instruments is a must, because of the inherent spatial nature of all the input data needed. Being a plugin of the well-known QGIS platform, FREEWAT inherits several tools for processing raw data, with the possibility to import a lot of different format, also from remote servers and services. Furthermore, for the post-processing activity, QGIS allows to produce maps and presentations with limitless options, guaranteeing very good translation and visualization of model results.

The latter is a crucial point whenever models are used as effective tool to boost data-driven decision making: results of modelling can be "translated" in suggestions and decision guidelines only if they are readable and understandable also by non-technical people.
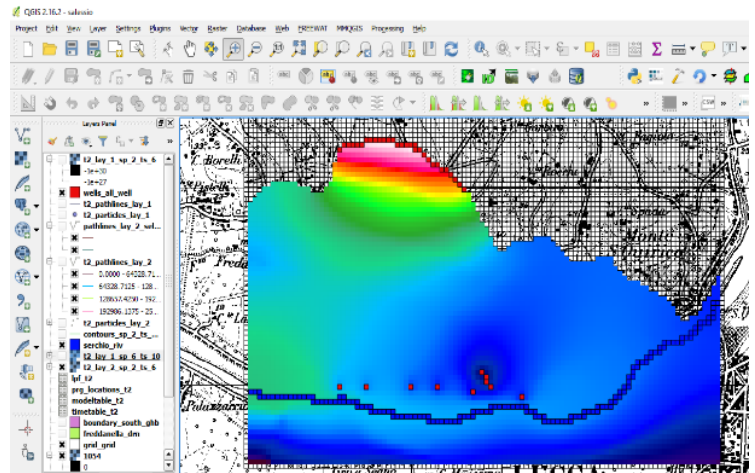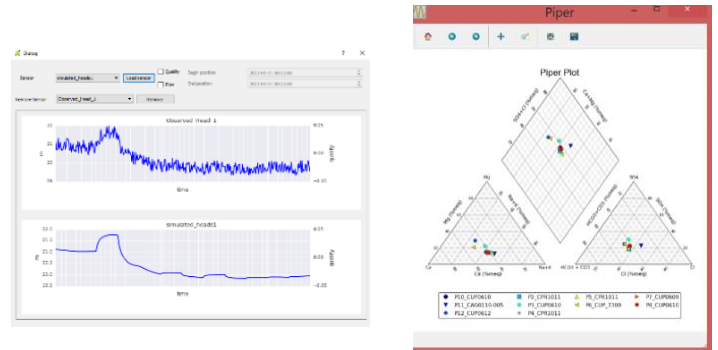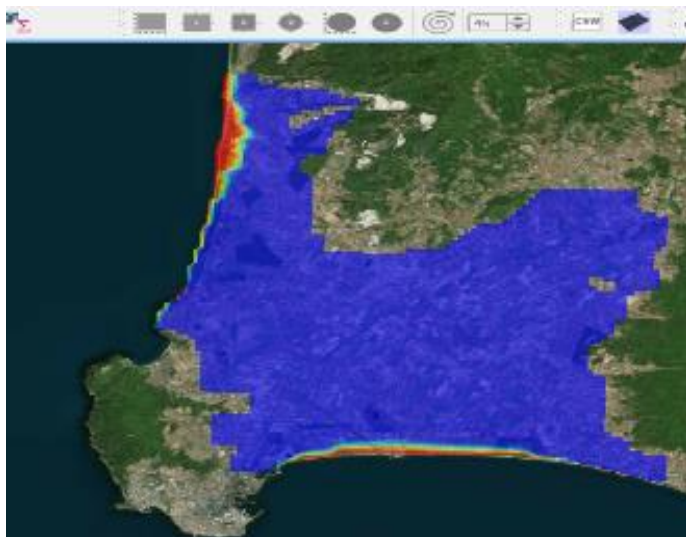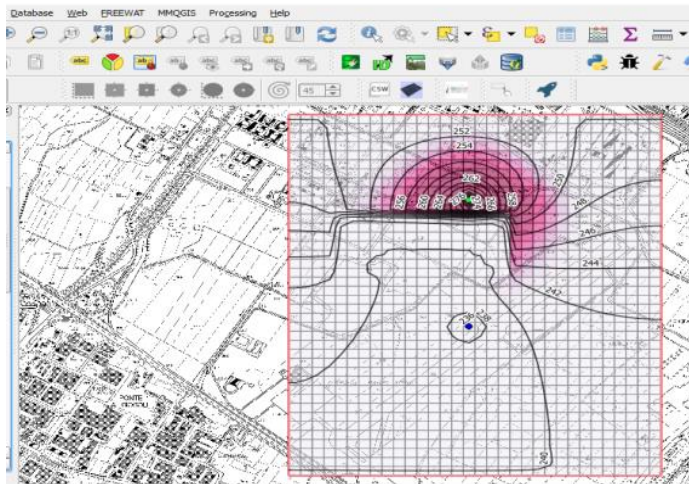
FREEWAT capabilities

Version 1.0 of FREEWAT allows exploitation and exploration of several data sources, to get effective analysis of water availability and quality processes, dealing with several issues like:

✓ Data-preprocessing to harmonize, collect, store, manage, analyze , interpret and pre-process the hydrological and hydrogeological data.

✓ Importing data from sensors, to perform various operations with data, display and compare sensor data.

✓ Running coupled surface/ground-water flow numerical models dealing with several water stresses, and get water budgets.

✓ Creating well capture zones.

✓ Solving problems of groundwater contamination, to evaluate several scenarios, in landfills/waste disposal, remediation of contaminated sites, salinization of coastal aquifers cases.

✓ Comparing simulated and observed data, evaluating the effect on the model of selected parameters (sensitivity analysis) and estimating the best value of selected parameters.

✓ Analyzing conjunctive use of surface/ground-water in urban & rural areas, to solve water conflicts and optimize the water supply.
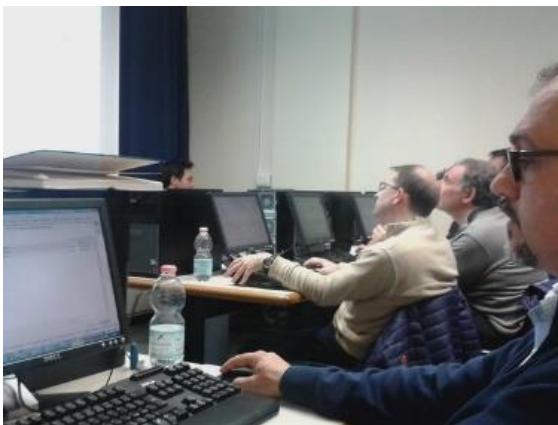
FREEWAT as effective tool to support capacity building

Beside the software itself, FREEWAT is distributed endowed with a rich set of training material.

A User's Manual organized in 6 volumes (each one addressing a specific piece of the modelling platform).

A Reference Manual, to help Users in understanding technical issues and to guide potential Developers in browsing the code and to facilitate further development.

13 Tutorials covering all the principal issues addressed by FREEWAT, ranging from the basic groundwater modelling up to solution of advanced solute transport problems in contaminated sites.

The aim of this material is to support capacity building for a successful application of modelling tools, and to drive towards a knowledge-based decision making process.

A huge number of people trained during the FREEWAT project proved that the coupling of free license, open distribution of the code and a multi-disciplinary team is a winning approach to boost the concept of shared visions in WRM.

FREEWAT: model portability

Another FREEWAT's strength is the model portability: a model made in FREEWAT can be easily ported from one PC to another, just sharing the QGIS project and the archive file including the model database. Using this functionality, model assumptions, settings and results can be shared among different stakeholders involved in the modeling analysis.

This is an important aspect to ensure an effective usage of model results: a cooperation in defining the model settings is the effective approach to obtain a model exploitation which is in line with real needs of the model final users. In the meantime, it allows to check/update model assumptions and to run post-audit sessions.
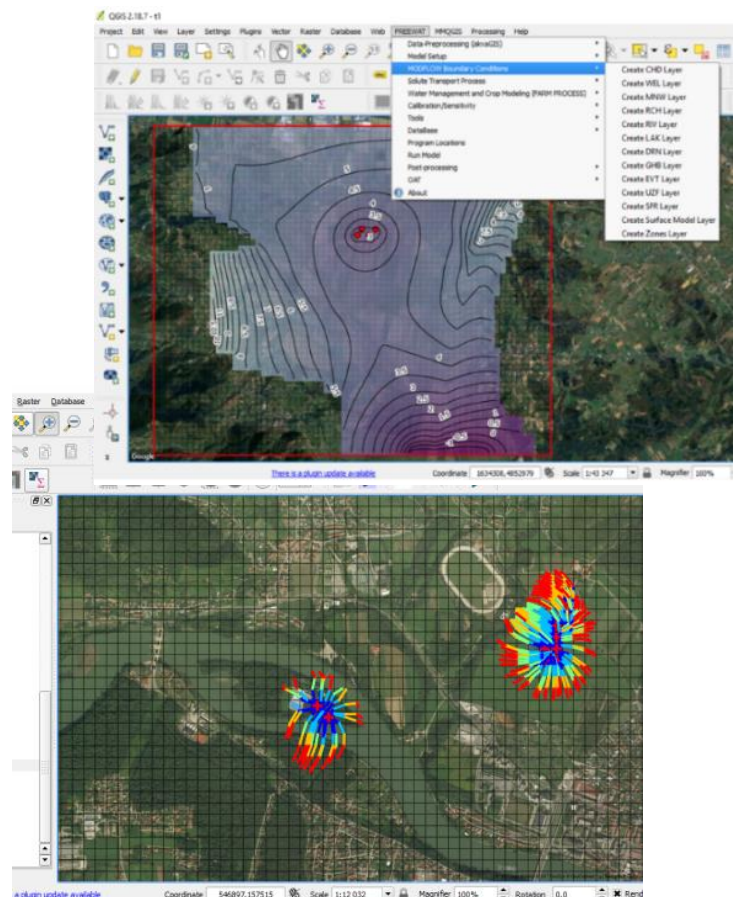
How to get FREEWAT

FREEWAT is available for free download through several channels:

- ✓ From the FREEWAT website:
  www.freewat.eu
- ✓ In Plugin Manager tool within QGIS desktop software or via the Official Plugin webpage:
  http://plugins.qgis.org/plugins/freewat/
- ✓ As source code in the public repository GitLab:
  https://gitlab.com/freewat/freewat

The choice of using various channels allows reaching several User targets, such as beginners modelers, advanced technicians, potential developers.
In turn, this offer enhances the diffusion of FREEWAT and its ecosystem, which is a crucial point to make FREEWAT a living initiative also beyond the achievements of the H2020 project.

FREEWAT Consortium
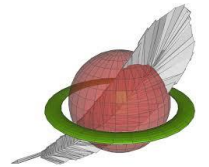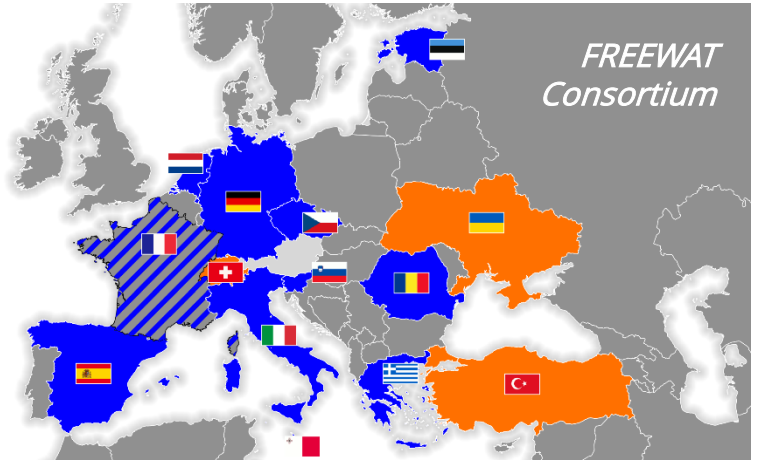
REFERENCES

QGIS Development Team (2017). QGIS Geographic Information System. Open Source Geospatial Foundation Project. http://qgis.osgeo.org

Rossetto, R., Borsi, I., & Foglia, L. (2015). FREEWAT: FREE and open source software tools for WATer resource management. Rendiconti Online Della Società Geologica Italiana, 35, 252–255. http://doi.org/10.3301/ROL.2015.113

Authors: I. Borsi[a], G. De Filippis[b], R. Rossetto[b]
Affiliations: [a] TEA SISTEMI S.p.A., Pisa, Italy
              [b] Scuola Superiore Sant'Anna, Pisa, Italy

More info at: www.freewat.eu