



An hydrogeological web-gis platform for water resource management and consensus reaching at the basin scale

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Water resource management at the basin scale involves a variety of uses of the resource and a multiplicity of different scenarios concerning the schematization of the hydrographical network, representing an interesting issue, also because it is becoming very actual in Mediterranean countries where water contributions to river basins are more and more concentrated in short wet periods followed by longer periods of droughts.

When severe droughts occur, the problem can be split depending whether or not large reservoirs are present in the basin. In the first case, the problem mainly regards long term management of the stored water; in the second case, emergency interventions must be taken into consideration.

However, a management involves three fundamental stages: the first is the evaluation of the available water resources; the second is the integrated management of these resources, with particular attention given to hypotheses for developments in water usage and the occurrence of critical deficit periods and the third is the consensus reaching amongst all the parties concerned.

For these purposes an integrated WEB-BASED system has been designed and developed starting from the principles of an integrated water resources management, information and methodologies sharing and consensus reaching.

The system is therefore composed of three logical areas: the first of the three is the modelling engine for the evaluation of hydrologic indexes and flow duration curves that, starting from the data contained in a wide validated database of hydrogeological, geospatial and administrative information and with the support of a Grass GIS system for terrain analysis, is capable of providing an estimate of the available resource.

The second one is represented by a simulation and managing model that allows the analysis of different and alternative scenarios of water allocation and distribution amongst the uses present in the basin.

Finally a user friendly WEB interface grants access not only to the data and information but also to the simulation, evaluation and managing modules implemented so that stakeholders and facilitators can discuss on the basis of shared data, commonly agreed management hypothesis, evaluation methodologies and the set of alternative solutions provided by the system.

Therefore, the aim of this project is not only to provide a decision support system per se, but an integrated platform in the effort of sharing the entire decisional process so that more effective water resources management plans could be developed and possible controversies could be prevented.

In the present work, the discussion of the designing and technological issues is followed by a case study for the validation of this platform applied to the Upper Tiber River, a large area with many agricultural and municipal water users, and several areas of considerable environmental interest, where two reservoirs (about 150-200 Mcm each) are located.