Water Change – an integrated modelling system for long term water resource management and _Global Change_ adaptation

Water resources management is facing major challenges due to increasing changes and their associated uncertainties, such as changes in climate, water demand or land use, which can be regrouped all together under the term *Global Change*. One objective of the *Water Change* project (LIFE+ funding) is to develop a modelling system to assess the *Global Change* impacts on water availability for water supply and water use, thus helping river basin agencies and water companies in their long term planning and in the definition of adaptation measures. This paper describes the *Water Change Modelling System* (WCMS), in terms of user requirements and functionalities.

The expression *Global Change* was recently introduced to talk about all the environmental changes resulting from human activities. Population growth and increase in individual environmental footprint are the *Global Change* drivers that will finally impact on the water cycle (precipitation, evapotranspiration, aquifer recharge), on the water demand growth rates and on the priority rules in water supply.

Although *Global Change* may have important impacts on water resources and its management, it is hardly ever considered in current management plans by the river basin agencies and water companies. The reasons are the complexity to generate coherent *Global Change* scenarios and the difficulty to apply and compare these scenarios using the planning tools owned by those organizations.

To address these needs, a flexible modelling system is being created, which can link a wide range of models, such as hydrological, water quality, and water management models. Users can integrate their own models to the system, which can then exchange information among them automatically. Therefore, it will be possible to simulate the interactions among multiple components of the water cycle, and define complete scenarios of *Global Change*. These scenarios will be elaborated through the graphical user interface. Users define which models to run and link, and results can be compared via graphics, tables and GIS viewer. Pre and post processing codes make the link between the models and store result files in a central database.

As a conclusion, the *Water Change Modelling System* allows studying the possible impacts of *Global Change* and assessing the implications of a variety of water management and land development strategies for adaptation.