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Integrating a distributed hydrological model and SEEA-Water for improving water account and water allocation management under a climate change context.

Eduardo Jauch, Carina Almeida, Lucian Simionesei, Tiago Ramos, and Ramiro Neves

MARETEC, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais 1049-001 Lisboa, Portugal. e-mail: eduardo.jauch@tecnico.ulisboa.pt

The crescent demand and situations of water scarcity and droughts are a difficult problem to solve by water managers, with big repercussions in the entire society. The complexity of this question is increased by trans-boundary river issues and the environmental impacts of the usual adopted solutions to store water, like reservoirs. To be able to answer to the society requirements regarding water allocation in a sustainable way, the managers must have a complete and clear picture of the present situation, as well as being able to understand the changes in the water dynamics both in the short and long time period.

One of the available tools for the managers is the System of Environmental-Economic Accounts for Water (SEEA-Water), a subsystem of SEEA with focus on water accounts, developed by the United Nations Statistical Division (UNSD) in collaboration with the London Group on Environmental Accounting, This system provides, between other things, with a set of tables and accounts for water and water related emissions, organizing statistical data making possible the derivation of indicators that can be used to assess the relations between economy and environment. One of the main issues with the SEEA-Water framework seems to be the requirement of large amounts of data, including field measurements of water availability in rivers/lakes/reservoirs, soil and groundwater, as also precipitation, irrigation and other water sources and uses. While this is an incentive to collecting and using data, it diminishes the usefulness of the system on countries where this data is not yet available or is incomplete, as it can lead to a poor understanding of the water availability and uses.

Distributed hydrological models can be used to fill missing data required by the SEEA-Water framework. They also make it easier to assess different scenarios (usually soil use, water demand and climate changes) for a better planning of water allocation. In the context of the DURERO project (www.durero.eu), the hydrological model MOHID LAND (www.mohid.com) was used to model the Douro river basin providing information to the SEEA-Water system for the Portuguese side of the basin. The model was also used to model the Tâmega river watershed, a sub-basin of the Douro basin, with different climate change scenarios, using the results to build the SEEA-Water accounts for this pilot river basin. The aim of the present work was to understand the potential of the integration of a distributed hydrological model with the SEEA-Water framework and how this can help improving water allocation management and water account under a climate change context.