Geophysical Research Abstracts
Vol. 19, EGU2017-4835, 2017
EGU General Assembly 2017

A Spatial Decision Support System to incorporate hydro-economic modeling results in the management of water resources under decentralized institutional arrangements in a semiarid reservoir region in Brazil

Márcia Alcoforado de Moraes (1), Gerald Silva (1), and Marianna Siegmund-Schultze (2)

(1) Federal University of Pernambuco, Brazil (marcia.alcoforado.ma@gmail.com), (2) Technical University of Berlin, Germany (m.siegmund-schultze@tu-berlin.de)

The integration of economic and hydrological components in models, aimed to support evaluating alternatives of water allocation policies, is promising, though, challenging. Worldwide, these models have been used primarily in academia, and so far seldom by water managers for practical purposes. Ideally, the models should be available through a Decision Support System.
The São Francisco River Basin in Northeast of Brazil has around 48% of its area in a semi-arid region. Irrigation and public water supply are the primary water use sectors, along with hydropower utilization. The water for electricity generation is stored in two large reservoirs, built 30 to 50 years ago under the premise of regulating flows for hydropower and controlling floods. Since 20 years, however, the law stipulates the multiple uses paradigm in a participatory and decentralized way. So far, only few rules laid down. Studies revealed that most of the respective institutions still needed to update their routines to the new paradigm.
A hydro-economic model was developed and applied in order to determine the economically optimal water allocation of main users in that semiarid reservoir region. In order to make this model available to the decision makers, a minimum required is some form of manipulating data entry and output as well as some graphical interfaces. We propose and present the first features of a Spatial Decision Support System (SDSS) with dedicated hydro-economic modules in a web-based Geographic Information System (GIS) environment for integrated water resource management. The open model platform should include geoprocessing tasks and water user related data management. The hydro-economic geoprocessing will link to generic optimization modeling systems, such as EXCEL Solver, GAMS and MATLAB.
The institutions are deliberating or deciding over water allocation at different scales could use the generated information on potential economic benefits as a transparent basis for discussion. In addition, they can use the SDSS to include constraints into the model in order to account for further objectives, such as preference given to specific uses or timing of uses. This information, and corresponding policies, can foster enhanced economic welfare and sustainable water use, as well as help to solve water use conflicts.