Resilient making decisions for watershed management through modeling ecohydrological-hydroeconomic coupled

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Abstract

A detailed understanding of the systems and environmental strategies for proper management, is gaining increasing importance as we are faced with more complex problems arising from global climate change, population growth and socio-economic development. In order to develop strategies for sustainable use and management of such systems, usually complex interactions of its underlying elements are evaluated from a variety of data from different sources and disciplines, such as remote sensing, hydrology, ecology, geomorphology or economic sciences, which are integrated and managed.

However, the ubiquity of the influence of human activity on the water world, geochemical and biological dynamics, poses many challenges for the maintenance of these natural processes, and thus for the projection of ecosystem services and human societies. To help resolve these significant problems in the hydrosphere an approach that recognizes the human nature united and biophysical systems is required. Thus, the regional programs for watershed management focused the development of its management in multidisciplinary resources that address the change and climate variability, dynamics of the hydrological regime, water availability, management of related risk with water and social vulnerability, among others. However, although different information sources, have not always achieved the diversity that characterizes each of the elements in the scenario generation and decisions are intended to take into account. Thus, diversity is the main characteristic of complex systems and the synergy of its variables is the one that produces the states of a system.

In this line, forecasts of short, medium and long term are defined towards a rational, sustainable and integrated use of water resources, involving a number of synergies that from modeling and evaluation of scenarios, have for aim, in most of cases satisfy increased in the demand without regard to the shortage sensitive parameters, which characterize ecohydrological metabolisms involved in the spatial organization of the hydrological dynamics of the basins and social metabolisms in framework of equitable distribution of water resources, combining the benefits of river networks and economic demands spatially distributed in the basins.
On the other hand, the results of the coupling and/or ensemble ecohydrological or hidroeconómicos models, evaluated the uncertainty and sensitivity of the models which have previously been subjected to a process of optimization in order to establish the state of the system in which the benefits are maximized, but isn't evaluated always equity with which are distributed the main economy activities arising from the use of water resources. Based on this information decision makers and / or planners responsible for making recommendations to policymakers and responsible researchers predict the likely future impacts of possible decisions, which are facing increasing uncertainties the farther you look into the future. However, everyone makes decisions that affect future events that require informed judgments about plausible future, even though are uncertain. Thus analysts present their results on probabilistic descriptions, but getting to interpret the results is not a task that it is easy to understand for the end user. So how to adapt to future decisions propagation of uncertainty and how to generate elements to translate the complexity of a process a posteriori to the decision in simple language, but robust for that its interpretation is done in a simple way by the end user or decision maker?