



## **River basins as socio-ecological systems: linking levels of societal and ecosystems metabolism**

Violeta Cabello (1) and Barbara Willaarts (2,3)

(1) Department of Human Geography, University of Seville, Seville, Spain (secregeohum@us.es), (2) Water Observatory, Botin Foundation, Madrid, Spain, (3) CEIGRAM, Technical University of Madrid, Madrid, Spain

The Multiscale Integrated Analysis of Societal and Ecosystems Metabolism (MuSIASEM) is an innovative method of integration social and ecological variables into a coherent frame of environmental accountability. Based on the flow-fund model of Georgescu-Roegen (1971) and complex systems theory, its first steps for water-use analysis were centered on the societal scales, through the water flows, time and land budgets, incorporating other relevant variables like energy and monetary costs of the water supply and the labor and monetary productivity. In this work we propose the integration of this water-use analysis method with ecohydrological modelling in order to assess ecosystems requirements and integrity, thus adding ecosystems levels of the metabolism of socio-ecological systems. For this purpose, a semidistributed soil-water balance model, BalanceMed, has been calibrated for a Mediterranean river basin in Almeria (Spain). We will present the integration of both methodologies together with a discussion about how to move in the normative interface between societal and ecological scales.