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Modelling the effects of land-use and land-cover change on water availability in the Jordan River region

L. Menzel^{1,*}, J. Koch¹, J. Onigkeit¹, and R. Schaldach¹

¹Center for Environmental Systems Research (CESR), University of Kassel, Germany

*now at: Department of Geography, University of Heidelberg, Germany

Abstract. Within the GLOWA Jordan River project, a first-time overview of the current and possible future land and water conditions of a major part of the Eastern Mediterranean region (ca. 100 000 km²) is given. First, we applied the hydrological model TRAIN to simulate current water availability (runoff and groundwater recharge) and irrigation water demand on a 1 km×1 km spatial resolution. The results demonstrate the scarcity of water resources in the study region, with extremely low values of water availability in the semi-arid and arid parts. Then, a set of four divergent scenarios on the future of water has been developed using a stakeholder driven approach. Relevant drivers for land-use/land-cover change were fed into the LandSHIFT.R model to produce land-use and land-cover maps for the different scenarios. These maps were used as input to TRAIN in order to generate scenarios of water availability and irrigation water demand for the region. For this study, two intermediate scenarios were selected, with projected developments ranging between optimistic and pessimistic futures (with regard to social and economic conditions in the region). Given that climate conditions remain unchanged, the simulations show both increases and decreases in water availability, depending on the future pattern of natural and agricultural vegetation and the related dominance of hydrological processes.

Full Article in PDF (PDF, 948 KB)

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