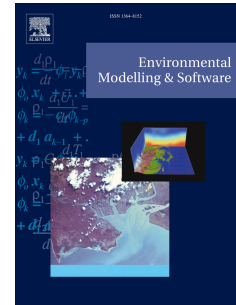


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Coupling land-use change and hydrologic models for quantification of catchment ecosystem services

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Abstract. Representation of land-use and hydrologic interactions in respective models has traditionally been problematic. The use of static land-use in most hydrologic models or that of the use of simple hydrologic proxies in land-use change models call for more integrated approaches. The objective of this study is to assess whether dynamic feedback between land-use change and hydrology can (1) improve model performances, and/or (2) produce a more realistic quantification of ecosystem services. To test this, we coupled a land-use change model and a hydrologic model. First, the land-use change and the hydrologic models were separately developed and calibrated. Then, the two models were dynamically coupled to exchange data at yearly time-steps. The approach is applied to a catchment in South Africa. Performance of coupled models when compared to the uncoupled models were marginal, but the coupled models excelled at the quantification of catchment ecosystem services more robustly.

Keywords: model coupling, ecosystem services, integrated modelling, land and water

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