



Impacts of urbanisation on urban-rural water cycle: a China case study

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Urbanization, which essentially create more impervious surface, is an inevitable part of modern societal development throughout the world. It produces several changes in the natural hydrological cycle by adding several processes. A better understanding of the impacts of urbanization, will allow policy makers to balance development and environment sustainability needs. It also helps underdeveloped countries make strategic decisions in their development process.

The objective of this study is to understand and quantify the sensitivity of the urban-rural water cycle to urbanisation. A coupled hydrological model, MODCYCLE, was set up to simulate the effect of changes in landuse on daily streamflow and groundwater and applied to the Tianjin municipality, a rapidly urbanising mega-city on the east coast of China. The model uses landuse, land cover, soil, meteorological and climatic data to represent important parameters in the catchment. The fraction of impervious surface was used as a surrogate to quantify the degree of landuse change.

In this work, we analysed the water cycle process under current urbanization situation in Tianjin. A number of different future development scenarios on based on increasing urbanisation intensity is explored. The results show that the expansion of urban areas had a great influence on generation of flow process and on ET, and the surface runoff was most sensitive to urbanisation. The results of these scenarios-based study about future urbanisation on hydrological system will help planners and managers in taking proper decisions regarding sustainable development.