

## **Impact of climate change on the streamflow in the headwater catchment of the Yellow River basin**

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**Abstract** A coupled system integrating GCMs output, a downscaling model and a distributed hydrological model are proposed in this study. First, the Statistical DownScaling (SDS) model for the simulation of historical climate (1961–1990) and three future scenarios (2020s, 2050s and 2080s) are calibrated and validated. Then the distributed hydrological model, Soil and Water Analysis Tool (SWAT), is applied to simulate the streamflow for headwater catchment of the Yellow River basin. Finally, the coupled system is applied to investigate the hydrological response to climate change in the study area. The results show: (a) the SDS model is successful in reproducing the main features of the observed hydrometeorology from the baseline climate simulation, when it is used to the HadCM3 GCM output; (b) the monthly streamflow simulated by SWAT corresponds well with the measured ones, and the model can satisfactorily capture the seasonal tendency; (c) the hydrological processes in the study area are very sensitive to climate changes in the future.

**Key words** climate change; downscaling; scenario; streamflow; SWAT model; Yellow River

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