Distributed hydrologic modelling in Huai River basin with a high density of dams and floodgates

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Abstract In Huai River basin, China, the construction of dams and floodgates has substantially changed the basin’s natural hydrological cycle. In this study, the dams and floodgates discharge simulation module of the Soil and Water Assessment Tool (SWAT) was extended to incorporate the dams and floodgates’ dispatch rules. This upgraded version of SWAT model was applied to simulate the monthly flow at 23 dams and floodgates and 4 hydrological stations for 1991–2000. The evaluation coefficients (i.e. relative volume error, correlation coefficient, and efficiency coefficient) are used to elevate the modelling performance. In the calibration period, the volume errors at 18 monitoring stations are within ±0.15. The average correlation coefficient and efficiency coefficient are 0.75 and 0.41, respectively. In the verification period, there are 13 stations with volume error within ±0.15. The average correlation coefficient and efficiency coefficient are 0.82 and 0.53, respectively. These results show that the modified model can be used as the hydrological modelling tool to provide technical support for the integrated management of Huai River basin.

Key words water projects; hydrological simulation; SWAT; Huaihe River basin