

Comparison of hydrological models in the middle reach of the Yellow River

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Abstract Conceptual hydrological models are often believed to be useful in assessing the impact of environmental changes on regional hydrology. However, the hydrological model selected must be qualified to simulate runoff for the study basins. The principles of six hydrological models: AWBM, SARC, SIMHYD, TANK, SMAR, and YRWBM, are introduced in this paper. More than 10 years of daily rainfall in typical tributaries of the middle Yellow River, as well as daily potential evaporation and daily discharge, were prepared for comparison of the models' performance. The results indicate that all the models can simulate monthly discharge well, while they have poor performance for daily discharge simulation. Compared to the other models, YRWBM and SIMHYD not only have simpler structures and fewer parameters, but also have significant advantages of accuracy, flexibility, and ease of use. Nash-Sutcliffe efficiency coefficients of the two models for monthly discharge simulation are all above 70%, and relative errors are less than 5%. Therefore, the two models are adequate for assessing hydrological effects of environmental change.

Key words hydrological models; model comparison; parameter calibration; middle Yellow River; AWBM; SARC; SIMHYD; TANK; SMAR; YRWBM
