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Comparisons of Three Hydrological Models for Floods Simulation in Humid and arid Catchments in China

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Abstract: Floods are one of the most destructive hazards, which have a significant impact on human and natural systems. To reduce the damage caused by floods, various hydrological models have been developed for floods simulation and forecasting. Thus, choosing a suitable model is important as the performance of different models varying from different catchments. Herein, three concept models, the time variant gained model (TVGM), Xin'anjiang model (XAJ model) and Shanbei model (SB model), are used for comparing floods simulation abilities in two typical catchments in China.

In this study, Gaojiayan catchment and Yebaishou catchment, are chosen as the research regions for the humid area and the arid area respectively. The main findings for the study are as bellow. TVGM shows high ability in flood simulation in both humid area and arid area, especially in flood peak simulation as it considering the influence of rainfall intensity and precise modeling on non-linearity relationship of rainfall-runoff. XAJ model does well in floods simulation in Gaojiayan catchment and SB model cannot reach acceptable results in both catchments due to the requirement of precise precipitation data, whose time step is usually less than 10 minutes. Thus, it is recommended to use the TVGM for floods simulation in these two catchments and other catchments with similar properties.