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Seasonal Climatic and Hydrologic Modeling and Prediction in the Yellow River Basin in China

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In order to enhance climatic and hydrologic prediction and assessment ability in the Yellow River Basin, the climatic and hydrologic modeling system is developed based on a joint international research. The system includes two sub-modeling systems, the seasonal climatic modeling system, and the hydrologic modeling system. The seasonal climatic modeling system is composed of a RCM, a GCM and downscaling tools. The regional climate model WRF3.3.1 was developed by PNNL (Pacific Northwest National Laboratory) in 2011, with domain cover whole China and surrounding areas, and horizontal resolution of 30 km. The Global general circulation models NCC-CGCM was developed by China National Climate Center (NCC), providing simulated lateral boundary conditions as long as 10 months in future to WRF3.3.1 for successive seasonal modeling and predictions. Both dynamic and statistic downscaling tools are used for providing detail modeling results in the Yellow River Basin. The hydrologic modeling system is composed of a large scale semi-distributed hydrologic mode VIC and a watershed model DHSVM. VIC (Variable Infiltration Capacity) was modified by PNNL, with domain cover whole Yellow River Basin and horizontal resolution of 50 km. The distributed hydrologic mode DHSVM3.0 (Distributed Hydrology-Soil-vegetation Mode) was also modified by PNNL, with domain cover the headstream of Yellow River Basin and horizontal resolution of 0.5 km. Both VIC and DHSVM3.0 are driven by the outputs of WRF3.3.1 for providing successive seasonal hydrologic predictions.

Key Words: Seasonal climate and hydrology, Modeling and prediction