

Evaluation of IPCC AR4 global climate model simulation over the Yangtze River Basin

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Abstract The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR4) presents 22 global climate models. This paper discusses the accuracy of the models in different temporal and spatial scales and evaluates their performances in simulating the temperature and precipitation over the Yangtze River Basin in China. The results indicate that the models are capable of simulating past climate. However, several climate models underestimate surface air temperatures and overestimate precipitation. Performances vary greatly among the models. Most models need to be improved since only a few produce correct seasonal cycles of climate. The results of scenarios analysis show differences among the models. The predicted tendencies of climate change, indicating the increase of temperature and precipitation in some regions, are consistent among the models. The results also show that the temperature and precipitation increase under different scenarios. The increase in temperature for the A2 scenario is the highest while the increase for the B1 scenario is the lowest. Eight models, that is: BCCR_BCM2.0, CCCMA_CGCM3.1, CNRM_CM3, GFDL_CM2.1, UKMO_HadCM3, MRI_CGCM2.3.2, NCAR_CCSM3 and NCAR_PCM, are able to precisely represent the characteristics of annual temperature and precipitation variations over the Yangtze River Basin. They have been selected to aid forecasting trends in water resources under future climate changes.

Key words IPCC AR4; simulation evaluation; Yangtze River Basin; temperature; precipitation