



Assessment of the CMIP5 models and projected the future extreme climate change by the end of 21st century in China

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Projection of future extreme climate changes is important for long-term planning at the national and regional levels, especially for the country like China which is vulnerable to the adverse impact of climate change. This study assesses the Coupled Model Intercomparison Project 5 Phase (CMIP5) history simulation and projects the future climate change under the RCP4.5 and RCP8.5 scenarios. The CMIP5 model is evaluated by observation data from about 700 meteorological stations. It performs well in reproducing the temperature and precipitation in present climate (1970-1999). Overall, the skill is higher and less variable for temperature than for precipitation. In the future climate (2070-2099), the CMIP5 model predicts an annual temperature increase of about 3-5 °C (smaller over the ocean and larger over the land), and an increase of annual precipitation over most of China north of 30°N and a decrease or little change in the rest of China. More than 5°C increase in temperature over Tibetan Plateau makes this area stand out as a “hotspot” of climate change. For temperature-related extreme indicators in the future, the model predicts more extreme hot-related events and less cold-related extreme events. For the precipitation-related extremes, the number of trace rain days is projected to significantly decrease across all of China, while a significant increase is predicted in the number of days of medium rain, large rain, and heavy rain. The light rain days are predicted to increase in northern China and decrease in southern China. The rainfall intensity is projected to increase significantly and the rain events will become much more extreme under the global warming scenario by the end of the 21st century.