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Projected changes of precipitation extremes over China by CMIP5

Y Xu
China Meteorological Administration, National Climate Centre, Beijing, China (xuying@cma.gov.cn)

Using a suite of ensembles simulations from CMIP5 14 models under different RCP scenarios, the results are analyzed to explore possible future changes in precipitation events over East Asia and China. Initially, the models' skills in simulating extreme precipitation during 1961∼2000 were assessed. Projected changes before 2050 under the (RCPs) emission scenario were also analyzed. Results show that although there are some biases in the model results, the three models capture well the geographic distribution of extreme precipitation observed in the last half of the 20th century. Nevertheless, the models tend to show limited skill in reproducing the observed inter-annual variations of such extreme precipitation events, including the dominant patterns and trends. Under different RCPs, for the period of 2011-2050, the simple daily precipitation intensity (SDII) and the fraction of extreme precipitation in total annual precipitation (R95T) will increase significantly in China, while changes in other indices are different. The periodic changes in consecutive dry days (CDD), consecutive wet days (CWD) and the number of days with precipitation 10 mm/day (R10) are expected to be more pronounced in the Huang-Huai-Hai River Basin. In the South River Basin, such periodic changes maintain similar or slightly weakened magnitudes. From 2001 to 2050 in the Huang-Huai-Hai River Basin, extreme precipitation in spring shows no significant changes. In the South River Basin, R95T, SDII and the maximum 5-days precipitation amount (R5D) in summer show an increasing tendency, but in winter a weak decreasing trend is projected. The changes in precipitation-based indices indicate a higher probability of heavy rainfall or flood occurrence, particularly in the river basins in East China.