

High temperature extremes in China: Observation and Modeling

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With their significant impact on the every aspect of our society, climate extremes have received increasing concerns during recent decades, in order to mitigate risks to society and ecosystems. Using the observation data and climate model outputs, the observed features of high temperature extremes, was investigated, and the performance of CMIP5 models in simulating the High Temperature Extremes over China was then evaluated.

It is found that the Hot Days (HDs) occurs most frequently in Yellow and Huaihe river basin, Southern China, Xinjiang, Sichuan and Chongqing region, with significant inter-annual and inter-decadal variations, the significant trends of occurrence frequency of extreme hot days can also been found in different regions of China. It's suggested the HDs are highly associated with the meridional displacement of the East Asian Subtropical Westerly Jet, with a poleward shift of the summer EASWJ corresponding with high frequencies of HTEs over the Yellow and Huaihe river basin. The performance of the state-of-the-art CMIP5 models in simulating the high temperature extremes in China was then evaluated. Comparisons with observations suggest that the CMIP5 models perform well in simulating geographical patterns of Daily maximum temperature, with a cold bias in the temperature magnitude. Most of the CMIP5 models can capture the increasing trend of extreme hot-day number in most parts of China, especially in North West, northeast China, Sichuan and Chongqing region, but the decreasing trend of HDs in Yellow and Huaihe river basin is poorly captured by most of the models.

Key words: High temperature extreme, occurrence frequency of extreme hot days, East Asian westerly jet, CMIP5 model,