

Future Extreme Precipitation Will Be More Widespread in China under Different Global Warming Levels

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Abstract

CMIP6 and single model initial-condition large ensemble (SMILE) simulations are applied to find possible changes in the ratio of coverage (ROC) of extreme precipitation in China. Related results indicate that trend of ROC in the period 1961–2020 for China is underestimated by CMIP6 multi-model ensembles. Then, further analyses point out that the accuracy of model simulations to reveal a trend in observation has been improved based on the two observation constraint approaches and the SMILE-based approach. In addition, the reliability of spatial distribution has also been enhanced. Projected results indicate that ROC increases with the increment of global warming across different approaches. Among them, results based on observation constraint approaches and SMILE-based approach, which show enhanced accuracy and reliability, present larger ROC than directly using CMIP6 ensembles. Thus, it can be concluded that extreme precipitation will be more widespread in China combined with multiple evidence and methods.

Keywords: CMIP6, SMILE, projection, global warming, detection and attribution.

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