



Increasing frequency of hot drought during growing seasons of wheat and maize in China

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Compound events of climate extremes such as extremely high temperature and low precipitation (i.e. hot drought) can greatly affect agricultural production and food security, particularly when such events occur in crop-growing seasons. No study has investigated how hot drought during crop-growing seasons is changing in response to climate warming. Using a percentile-based index for hot drought, we find remarkably different frequencies of growing-season hot drought and upward trends for wheat and maize in China during the historical period 1980-2005, which cannot be seen from an evaluation on annual or seasonal basis, pointing to the need for targeted analysis focusing on crop-specific growing seasons. Based on a suite of projections of future temperature and precipitation from the Coordinated Regional Climate Downscaling Experiment, we find that these upward trends will continue into future. On average over China, the frequencies of hot drought during wheat and maize growing seasons are projected to increase respectively by 95% and 83% by mid-century under the RCP4P5 emissions scenario. These numbers will increase to 157% and 167% under RCP8P5. The projected increases have serious implications for China's food production, adding to the need for resilience planning to limit the impacts of growing-season hot drought.