Avoiding increases of extreme heat events over East Asia by 0.5 degrees C

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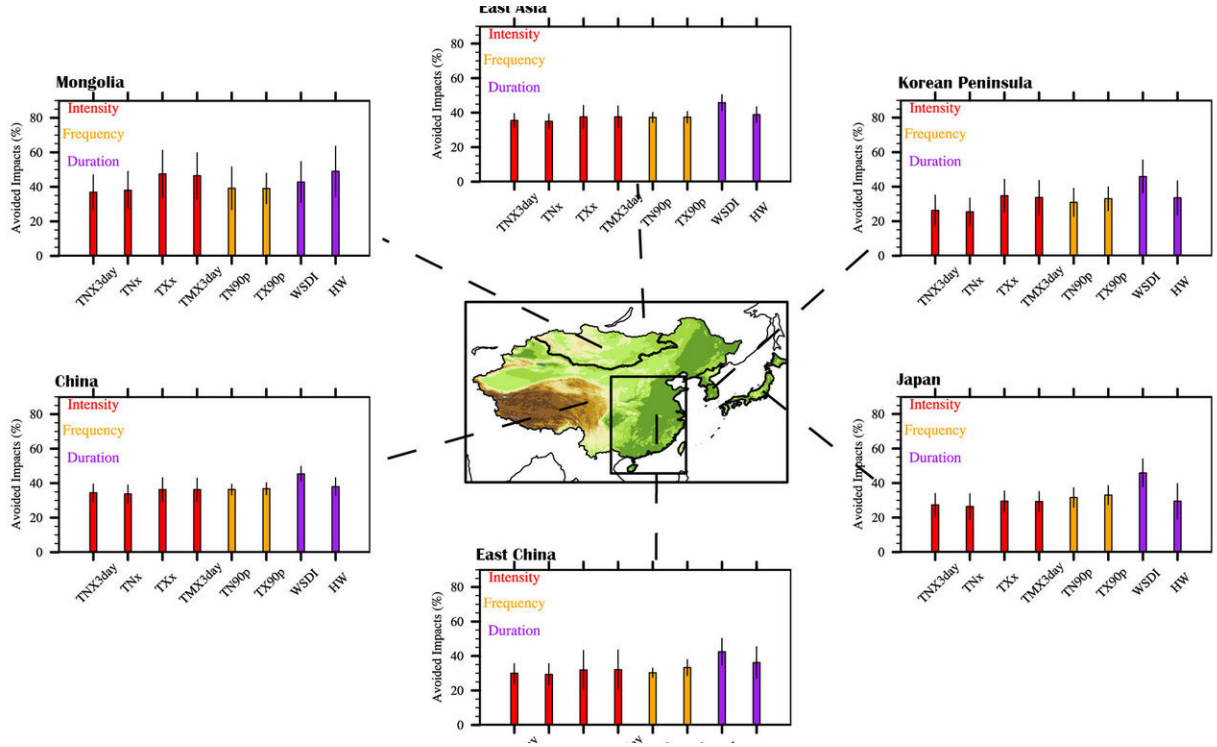

Avoided increase of extreme high-temperature events (units: percent) over East Asia and its subregions in 1.5 degrees C compared with 2 degrees C warmer future. The black vertical lines over the bars show the range of two standard deviations. The red, orange, and purple bars represent the changes of intensity, frequency, and duration of extreme high-temperature events, respectively. Credit: ZOU Liwei

The Paris Agreement adopted by the United Nation Framework Convention on Climate Change (UNFCCC) Conference of the Parties in December 2015 officially included the 2 degrees C Global Temperature Target in the conference results and pursued efforts "to limit the level of global temperature rise to 1.5 degrees C above pre-industrial levels." At 1.5/2 degrees C temperature warming level, changes in global and regional climate are a matter of public concern and relate to the decisions of policies, guidelines and measures on adaptations and mitigation of future climate change. Accurate answers to this question are subject to data constraints, as neither of the available projection datasets under future climate change scenarios is designed for a 1.5/2 degrees C temperature warming levels.

Recently, LI Donghuan, a doctoral student from the Institute of Atmospheric Physics, Chinese Academy of Sciences, along with her mentors Prof. ZHOU Tianjun and associate Prof. ZOU Liwei, used the long-term, impact-relevant coupled climate model data available for stabilization pathways at 1.5 degrees C and 2 degrees C warming levels, which was released by the National Center for Atmospheric Research (NCAR) to investigate the change of extreme high temperature events over East Asia in 1.5 degrees C and 2 degrees C warmer futures. Based on the analysis of changes in multiple indices that characterize the intensity, frequency and duration of extreme high temperature events, they show that the magnitude of warming in East Asia is approximately 0.2 degrees C higher than the global mean in both warming scenarios. Most populous subregions, including eastern China, the Korean Peninsula and Japan, will see more intense, more frequent and longer-lasting extreme temperature events under 1.5 degrees C and 2 degrees C warming. The 0.5 degrees C lower warming will prevent 35 percent to 46 percent of the increases in extreme high-temperature events in terms of intensity, frequency and duration in East Asia with maximal avoidance values (37 percent to 49 percent) occurring in Mongolia. This means that it is beneficial for East Asia to limit the warming target to 1.5

degrees C rather than 2 degrees C.

"In contrast to previous work on transient climate change under different temperature warming levels, we focus on equilibrium climate changes at two temperature warming levels and to quantify the changes of extreme high-temperature events over East Asia at 1.5 degrees C and 2 degrees C warming levels. Our results indicate that the 0.5 degrees C less warming will help avoid 35 percent to 46 percent of the increases in extreme high-temperature events in terms of intensity, frequency and duration in East Asia. As far as we know, this is the first published quantitative estimate of the equilibrium climate response over East Asia under the global 1.5 degrees C and 2 degrees C warming level, "says one of the authors Zou, "I hope the results are useful for the mitigation and adaption of climate change and the associated government decision-making. "

More information: Donghuan Li et al, Extreme High-Temperature Events Over East Asia in 1.5°C and 2°C Warmer Futures: Analysis of NCAR CESM Low-Warming Experiments, *Geophysical Research Letters* (2018). DOI: 10.1002/2017GL076753

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