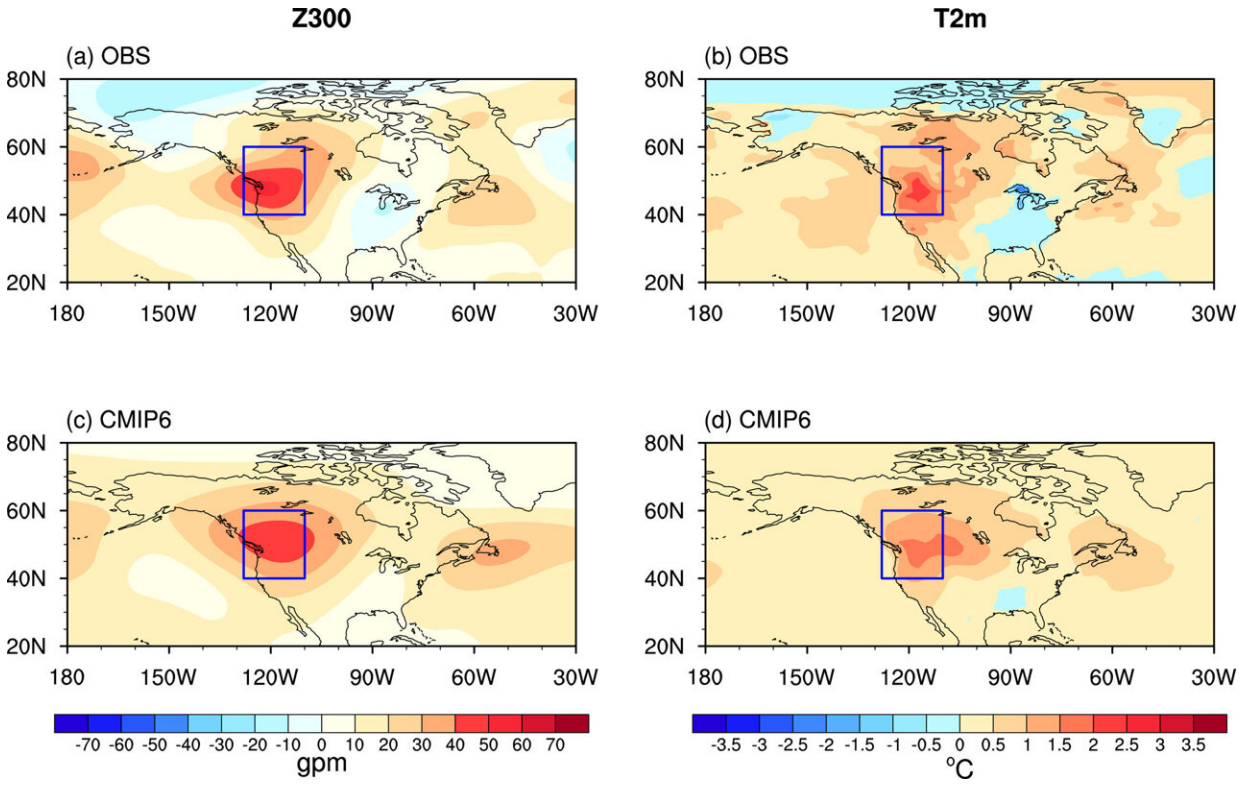
A warmer world will make heat waves more frequent, says study

March 3 2023, by Li Yuan



Composite of (a) 300-hPa geopotential height anomalies [shading, shading interval (SI) = 10 gpm] and (b) 2-m air temperature anomalies (shading, SI = 0.5°C) during the extreme heat summers over Western North America (WNA) in ERA5 data set. (c, d) are the same as (a, b), but for the MME from 15 CMIP6 models. The blue rectangles represent the region over WNA (40°–60°N, 128°–110°W). The anomalies are relative to 1981–2010. Credit: *Earth's Future* (2023). DOI: 10.1029/2022EF003437

From late June to early July 2021, an unprecedented heat wave swept across Western North America (WNA), causing considerable hazards to the regional society and economy. What is the likelihood of a similar heat wave under global warming?

Researchers led by Prof. Wang Lin from the Institute of Atmospheric Physics (IAP) of the Chinese Academy of Sciences, in collaboration with scientists from Yunnan University, have revealed that heat waves similar to the unprecedented WNA one in summer 2021 are projected to become more frequent in a warmer world based on the multi-model simulations from the Coupled Model Intercomparison Project. The project began in 1995 under the auspices of the World Climate Research Program (WCRP) and is now in its sixth phase (CMIP6).

The study was published in *Earth's Future* on Feb. 13.

"Such a heat wave is projected to occur more frequently with increased extreme temperature and shortened return period, making a rare event in the current climate be a common event in a warmer climate," said Prof. Wang, corresponding author of the study, "especially under a high-emission scenario like the Shared Socioeconomic Pathways 585 (SSP5-8.5)."

Moreover, the researchers found a large expansion of areas over WNA that will break the 2021 record in the future with an increasing level of emission scenario. However, some heat records west of the Rocky Mountains are still difficult to break even at the end of the 21st century, highlighting the specific extremity of the observed 2021 WNA heat wave.

"We use multiple climate models that are involved in CMIP6 and consider different emission scenarios and warming levels for the future heat wave projections over WNA," said Dr. Dong Zizhen, first author of

the study.

More information: Zizhen Dong et al, Heatwaves Similar to the Unprecedented One in Summer 2021 Over Western North America Are Projected to Become More Frequent in a Warmer World, *Earth's Future* (2023). DOI: 10.1029/2022EF003437

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