

EGU21-2643

<https://doi.org/10.5194/egusphere-egu21-2643>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



## The driving processes of concurrent hot and dry extreme events in China

**Fangxing Tian**, Nicholas Klingaman, and Buwen Dong

Reading, Meteorology, Reading, United Kingdom of Great Britain – England, Scotland, Wales ([fangxing.tian@reading.ac.uk](mailto:fangxing.tian@reading.ac.uk))

Sub-seasonal heatwave-driven concurrent hot and dry extreme events (HDEs) can cause substantial damage to crops, and hence to lives and livelihoods. However, the physical processes that lead to these devastating events are not well-understood.

Based on observations and reanalysis data for 1979-2016 over China, we show that HDEs occur preferentially over central and eastern China (CEC) and southern China (SC), with a maximum of 3 events year<sup>-1</sup> along the Yangtze Valley. The probability of longer-lived and potentially more damaging HDEs is larger in SC than in CEC. Over SC the key factors of HDEs—positive anomalies of surface air temperature and evapotranspiration, and negative anomalies of soil moisture—begin two pentads before maximising at the peak of the HDEs. These anomalies occur south of a positive height anomaly at 200 hPa, associated with a large-scale subsidence anomaly. The processes over CEC are similar to SC, but the anomalies begin one pentad before the peak. HDE frequency is strongly related to the Silk Road Pattern and the Boreal Summer Intraseasonal Oscillation. Positive phases of the Silk Road Pattern and suppressed phases of the Boreal Summer Intraseasonal Oscillation are associated with positive height anomalies over CEC and SC, increasing HDE frequency by about 35-54% relative to the climatological mean. Understanding the effects of sub-seasonal and seasonal atmospheric circulation variability, such as the Silk Road Pattern and Boreal Summer Intraseasonal Oscillation, on HDEs is important to improve HDE predictions over China.