EGU22-5897
https://doi.org/10.5194/egusphere-egu22-5897
EGU General Assembly 2022

The variations of temperature extremes over the wintertime Tibetan Plateau from 1979 to 2018

Yinglin Tian[1], Deyu Zhong[1], and Axel Kleidon[2]
[1]Tsinghua University, School of Civil Engineering, Department of Hydraulic Engineering, Beijing, China
(tianyl18@mails.tsinghua.edu.cn)
[2]Max Planck Institute for Biogeochemistry

The Tibetan Plateau (TP), known as the "World Roof", has significant influences on hydrological and atmospheric circulation at both regional and global scales. As a result, an adequate understanding of TP climate change is of great importance. In this study, the temporospatial variations of temperature extremes over the TP are investigated based on the station and gridded data provided by China Meteorological Administration (CMA) and the Mann-Kendall test. In addition, the typical large-scale circulations along with the temperature extremes are analyzed using the European Centre for Medium-Range Weather Forecasts (ECMWF) interim reanalysis data. It is found that while the frequency of the temperature extremes is observed to have gone through significant variations from 1979 to 2018, the intensity of the temperature extremes has no significant change. On the one hand, the frequency of the warm days and nights is getting higher over the southeastern part and northwestern TP; on the other hand, most area of the eastern TP has witnessed a significant decreasing trend in the frequency of cold days and nights, together suggesting a warming TP. Moreover, the distribution of the long-term changes in the warm days and the cold nights resemble those of the multi-year tendencies of the maximum and minimum temperature. Furthermore, both warm days and nights occur with a significant anti-cyclone over the TP for continuous days, which might allow for more solar radiation arriving at the surface and also favors more adiabatic heating along with the sinking movement of the air parcels. Our results imply a possible linkage between the long-term climate change in the TP, the temperature extremes over the TP, and the large-scale circulations.