

Potential evapotranspiration, SPI, SPEI and surface humidity change over China during 1961–2011

WEN WANG, RENGUI XU & XI CHEN

State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai University, Nanjing 210098, China
w.wang@126.com

Abstract Using monthly meteorological observation data at 649 sites in China for 1961–2011, potential evapotranspiration (PET), standardized precipitation index (SPI), standardized precipitation evapotranspiration index (SPEI) and land-surface humidity changes are investigated. PET calculated using the Priestley-Taylor formula shows that the southeast half of China, mostly humid to semi-humid areas, exhibits a significant decrease in PET, whereas the northwestern half of China, mostly arid to semi-arid, exhibits significant increase. SPI and SPEI exhibit different spatial and temporal characteristics over China, in some parts even presenting opposite directions of changes, especially on the Tibetan Plateau where SPI shows a decrease in drought severity but SPEI shows an increase in drought severity. There was no significant change in humidity in most parts of China, except in the northwest, and on the central and northeastern Tibetan Plateau where significant increase in humidity is detected. However, there was a significant decrease in the area of the hyper-arid zone and a significant increase in the area of the semi-arid zone in the past 51 years.

Key words potential evapotranspiration; standardized precipitation index; standardized precipitation evapotranspiration index; land-surface humidity; drought