Geophysical Research Abstracts
Vol. 19, EGU2017-223, 2017
EGU General Assembly 2017

Nonsignificant change of drought in China during 1982-2011 and application of PDSI in monitoring interannual variations of agriculture drought area

Hao Yan
China (yanhaon@hotmail.com)

Inspired by concerns of the effects of a warming climate, drought variation and its impacts have gained much attention in China. Arguments about China's drought persist and little work has addressed the relationship between drought index and agricultural drought from a perspective of drought area. Based on a newly revised self-calibrating Palmer Drought Severity Index (PDSI) model driven with ARTS E0 [PDSI_ARTS; Yan et al., 2014], spatial and temporal variations of drought were analyzed for 1982-2011 in China. The results indicate that there was nonsignificant change of drought over this interval but with an extreme drought event happened in 2000-2001. However, using air temperature (Ta)-based Thornthwaite potential evaporation (EP_Th) and Penman-Monteith potential evaporation (EP_PM) to drive the PDSI model, their corresponding PDSI_Th and PDSI_PM all gave a significant drying trend for 1982-2011. This suggests that PDSI model was sensitive to EP parameterization in China.

Annual drought-covered area from agriculture survey was initially adopted to evaluate PDSI's capacity in monitoring agriculture drought area in China. The results indicate that PDSI_ARTS drought area (defined as PDSI_ARTS < -0.5) correlated well with the agriculture drought-covered area and PDSI_ARTS successfully detected the extreme agriculture drought in 2000-2001 for 1982-2011, while PDSI_Th and PDSI_PM drought area had no relationship with the agriculture drought-covered area and overestimated the uptrend of agriculture drought, which contrasted with agriculture drought survey. Overall, PDSI_ARTS model had a potential to monitor interannual variations of agricultural drought area and was preferred to EP_Th and EP_PM-driven PDSI models in drought research of China.