Uncertainties in the variation of compound dry and hot events due to differences in drought indices

Sifang Feng and Zengchao Hao
College of Water Sciences, Beijing Normal University, China (fengsf@mail.bnu.edu.cn)

Compound dry and hot events (CDHEs) are commonly defined as the concurrent or consecutive occurrences of the two events, which could lead to larger negative impacts than do individual extremes. The variation of CDHEs has gained increased attention in the past decades. Previous studies have detected changes in the frequency, duration, and spatial extent at regional and global scales based on observations and model simulations. However, these studies mainly focus on a single drought indicator. In the past decades, different drought indicators have been applied to characterize drought conditions, such as Standardized Precipitation Index (SPI), and Standardized Precipitation-Evapotranspiration Index (SPEI), and Palmer Drought Severity Index (PDSI). Due to the difference in these drought indicators in characterizing droughts, evaluation of CDHEs based on different drought indices may lead to a different magnitude of changes (or even opposite direction of changes). However, quantitative analysis of the uncertainties in the variation of CDHEs is still lacking. In this study, we quantitatively evaluate the uncertainties of CDHEs variations over global areas due to differences in drought indices. Results from this study could further our understanding of changes in CDHEs under global warming.