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Extreme droughts over northern Africa, India and northern China: Role of Indian Ocean sea surface temperature and atmospheric moisture flux

Zengxin Zhang (1), Chong-Yu Xu (2), and Xi Chen (3)

(1) Joint Innovation Center for Modern Forestry Studies, College of Biology and the Environment, Nanjing Forestry University, Nanjing, Jiangsu, China (nfuzhang@163.com), (2) Department of Geosciences, University of Oslo, Norway (c.y.xu@geo.uio.no), (3) State Key Laboratory of Hydrology-Water Resources and Hydraulics Engineering, Hohai University, Nanjing 210098, China (xichen@hhu.edu.cn)

Drought is a recurring extreme climate event over land characterized by below-normal precipitation over a period of months to years. In recent years, the increase of the frequency and intensity of droughts has aroused wide concern. Evaluation of drought conditions in a particular area is the key step for planning water resources. The purpose of this paper is to explore the spatial and temporal distributions of extreme droughts in the northern Africa, India and northern China by using the methods of SPI (Standardized Precipitation Index) and EOF (Empirical Orthogonal Function) for the period of 1956-2013, and discuss their relations with SST and atmospheric moisture flux of Indian Ocean. The results show that: 1) similar pattern of the droughts in the northern Africa, India and northern China can be found during the past 60 years, especially the droughts of the1980s; 2) there are good relationship between the SST over Indian Ocean and the droughts in the northern Africa, India and northern China; 3) the atmospheric moisture flux over Indian Ocean can be viewed as the key linkage between the Indian Ocean SST and droughts in the northern Africa, India and northern China. So the objectives of this study are to exam the relationship between the droughts in the above mentioned areas and atmospheric moisture flux over Indian Ocean. This research has the potential to help to improve our understanding of the relationship between Indian monsoon, African monsoon and East Asian monsoon and their impacts on regional droughts.