

Land-atmosphere interaction and disaster-causing process of drought in northern China: observation and experiment (DroughtPEX_China)

Yaohui Li

Institute of Arid Meteorology, China Meteorological Administration, Lanzhou, China (li-yaohui@163.com)

Drought is one of the most common and frequent nature disasters in the world, particularly in China under the continental monsoonal climate with great variation. About thirty percent of economic loss caused by natural disasters is contributed by droughts in China, which is by far the most damaging weather disasters because of its long duration and extensive hazard areas. Droughts not only have a serious impact on the agriculture, water resources, ecology, natural environment, but also seriously affect the socio-economic such as human health, energy and transportation. Worsely, under the background of climate change, droughts in show increases in frequency, duration and scope in many places around the world, particularly northern China. Nowadays, droughts have aroused extensive concern of the scientists, governments and international community, and became one of the important scientific issues in geoscience research. However, most of researches on droughts in China so far were focused on the causes or regulars of one type of droughts (the atmosphere, agriculture or hydrological) from the perspective of the atmospheric circulation anomalies. Few of them considered a whole cycle of the drought-forming process from atmosphere-land interaction to agricultural/ecological one in terms of the land-atmosphere interaction; meanwhile, the feedback mechanism with the drought and land-atmosphere interaction is still unclear as well. All of them is because of lack of the relevant comprehensive observation experiment.

“Land-atmosphere interaction and disaster-causing process of drought in northern China: observation and experiment” (DroughtPEX_China) is just launched in this requirement and background. DroughtPEX_China is supported by Special Scientific Research Fund of Public Welfare Industry (Meteorological) of China (Grant No.GYHY201506001)—"Drought Meteorology Scientific Research Project—the disaster-causing process and mechanism of drought in northern China". This project aims to establish a complete observation & experiment system for droughts particularly over the arid and semi-arid regions in northern China. Relying on the existing meteorological observation network and experimental bases, the DroughtPEX_China implemented interdisciplinary, comprehensive and systemic drought-scientific experiment including the routine observation, intensive and special observation, and the artificially field control test for the drought forming and reducing. Such large observation & experiment will promote a large step or theoretical breakthrough on the knowledge of the complex dynamic process for the formation and development of drought disasters, the mechanism of the water-energy cycle in the atmosphere-soil-vegetation on multi-scales, and the interrelationship in the atmosphere, agriculture and hydrological droughts. The ultimate purpose of DroughtPEX_China is to make great progress on the technology of accurate drought monitoring, risk assessment and early warning.

This paper will introduce the Drought PEX_China with the scientific goal, experiment design and layout, preliminary results, information sharing, and its promoting role on international cooperation of drought scientific research.

Key words: Disaster-causing process of drought; Observation & experiment; Northern China