

Investigation of Drought-Flood Abrupt Alternation in the Yangtze River Basin, China

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(a) Purpose of study or research hypothesis

The drought-flood abrupt alternation refers to a natural phenomenon in which a large area of drought occurs in a certain area or a certain basin, and sudden heavy rainfall occurs, causing flash floods, steep rivers, river intrusion, and difficulty in timely discharge of internal water. The objective of this study is to investigate the drought-flood abrupt alternation in a large river basin.

(b) Key issue(s) or problem(s) addressed

In the context of global warming, the water cycle pattern is undergoing profound changes. The extreme drought or abnormal precipitation events that have occurred in a hundred or decades have continued to increase, further increasing the frequency and intensity of droughts and floods. Drought and flood disasters are important factors restricting economic development in the Yangtze River Basin, China.

(c) Methodology or approach used

To analyze the trend of drought and flood in the Yangtze River Basin, the monthly precipitation data are collected from 1989 to 2018 for the Han River Basin, which is the largest branch of the Yangtze River. In the course of the study, the standardized precipitation index (SPI) and long cycle drought-flood abrupt alternation index (LDFAI) in summer are used, together with Morlet wavelet analysis and Mann-Kendall test, to analyze the characteristics of drought and flood changes in typical years.

(d) Results or conclusions derived from the project

The results show that the frequency of drought and flood events is high in this area. On the seasonal scale, the frequency of flood events in summer is 33.33%, and that of drought events in winter is 41.54%. Drought and drought index changed significantly in 1989 and 2018.

(e) Implications of the project relevant to congress themes

This study comprehensively analyzes the characteristics of drought and flood as well as their temporal and spatial evolution from natural factors, and provides a theoretical basis for predicting the trend of drought and flood disasters.

Keywords : Standardized precipitation index; abrupt alternation; Drought-flood variation; Han River Basin