



## **Analysis of Annual Precipitation and Extreme Precipitation Change in the Upper Yellow River Basin in Recent 50 Years**

Jianing Ma (1,2) and Yanhong Gao (1)

(1) Northwest Institute of Eco-Environment and Resources, CAS, Key Laboratory of Land Surface Process and Climate Change in Cold and Arid Regions, China (majn11@lzu.edu.cn), (2) University of the Chinese Academy of Sciences, Beijing

Greater attention has been received about the variation and trends in extreme climate events. Based on daily precipitation data recorded at 45 meteorological stations in the upper Yellow River basin from 1970 to 2017, the upper Yellow River basin was distributed into three regions according to topography, elevation, climate and other factors. For each region, wavelet analysis and Mann-Kendall abrupt change analysis were employed to analyze the spatial distribution and temporal trends of annual precipitation and extreme precipitation events. The results show that the distribution of average annual precipitation in the upper Yellow River Basin has obvious regional differences from the southeast to the northwest. The average annual precipitation and extreme precipitation in the upper Yellow River Basin had obvious periodic oscillation characteristics with 22a mostly, followed by 18a and 8a. For the whole region, the extreme precipitation and average annual precipitation were more consistent, but the precipitation in the upper of the Yellow River Basin has been increasing in recent years, while the frequency of extreme precipitation events has been decreasing. It is implicated that the spatial pattern of climate in China has been changed during the past 48 years.