Geophysical Research Abstracts
Vol. 20, EGU2018-4083, 2018
EGU General Assembly 2018

Detection of changes in runoff regime in the Lancang River basin

Ping Xie (1,2), Jiangyan Zhao (1), Ziyi Wu (1), Yan-Fang Sang (3), and Jie Chen (1)

(1) State Key Laboratory of Water Resources and Hydropower Engineering Science, Wuhan University, China (pxie@whu.edu.cn; zhaojiangyan@whu.edu.cn; wuziyiyou@foxmail.com) , (2) Collaborative Innovation Center for Territorial Sovereignty and Maritime Rights, China, (3) Key Laboratory of Water Cycle and Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China (sangyf@igsnrr.ac.cn)

The Lancang River is the upper reach of the Lancang-Mekong River, as the largest river in Southeast Asia. Over last decades, many hydropower constructions (including Manwan, Dachaoshan, Xiaowan, etc.) have been established and operating in the Lancang River basin since 1986, which promoted economic and social development in Southwest China. The impact of rapid hydropower development on water security in the region and the Southeast Asia is attracting wide attention. However, changes in runoff regime and their response to the hydropower development are still not clear. In this article, we used the streamflow data measured from 1956 to 2014 at the Yunjinghong station, and investigated the changes in runoff regime, aiming at clarifying the problem. The Yunjinghong station is located at the outlet of the Lancang River basin. The indicator of hydrologic alteration (IHA) was used to describe the runoff regime and its changes. Considering the impact of dams, here we detected the abrupt changes and trends of runoff process, quantified by the IHA time series, but did not empirically divide the data into pre- and post-impact period for comparison. Moreover, the changes in both mean magnitude and variance degree of runoff data were detected. Results indicated the significant abrupt changes in the time series of some IHA indicators, which occurred in around 1992$\sim$2002. Comparatively, both abrupt changes and trends were detected in the variance of various IHA indicators, reflecting that hydrologic variables increasingly fluctuated along with year. However, physical causes of abrupt changes of runoff process should be determined by considering different hydropower development periods together. As a result, how to coordinate the ecological and economic benefits through reasonable reservoir operation and strong transboundary cooperation is a big challenge for the synthetical management of the Lancang River basin.