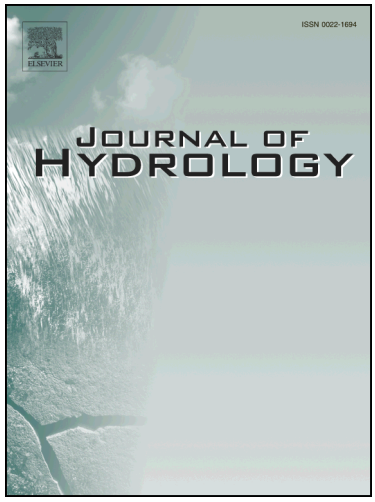

Research papers

Flood hydrograph coincidence analysis for mainstream and its tributaries

Kangdi Huang, Lu Chen, Jianzhong Zhou, Junhong Zhang, Vijay P. Singh

PII: S0022-1694(18)30603-6
DOI: https://doi.org/10.1016/j.jhydrol.2018.08.007
Reference: HYDROL 23021

To appear in: *Journal of Hydrology*

Received Date: 26 February 2018
Revised Date: 21 June 2018
Accepted Date: 3 August 2018

Please cite this article as: Huang, K., Chen, L., Zhou, J., Zhang, J., Singh, V.P., Flood hydrograph coincidence analysis for mainstream and its tributaries, *Journal of Hydrology* (2018), doi: https://doi.org/10.1016/j.jhydrol.2018.08.007

Flood hydrograph coincidence analysis for mainstream and its tributaries

Kangdi Huang[1], Lu Chen[1*], Jianzhong Zhou[1], Junhong Zhang[2], Vijay P. Singh[3]

1. *College of Hydropower & Information Engineering, Huazhong University of Science & Technology, Wuhan, 430074, China. ;*
2. *South - Central University for Nationalities, College of resource and Environment, Wuhan, 430074, China*

** Corresponding author. E-mail address: chen_lu@hust.edu.cn*

3. *Department of Biological & Agricultural Engineering and Zachry Department of Civil Engineering, Texas A&M University, College Station, Texas 77821-2117, USA*

Abstract: Flood coincidence risk analysis is of great significance for reservoir operation and flood control. Traditional research only focuses on the coincidence of flood peak. Actually, when half or more than half of flood hydrographs of two rivers are overlapping, the flood event should be defined as flood coincidence. Thus, during the flood coincidence analysis, the whole hydrograph information should be considered. This study proposes a flood hydrograph coincidence analysis method in which flood magnitudes of two flood hydrographs and flood interval time are taken as three reference variables. The Pearson Type III distribution and the mixed von Mises distribution were selected as the marginal distributions for flood magnitudes and flood interval time, respectively. Then three-dimensional copula functions were used to establish the joint distribution of these variables. Selecting the upper Yangtze River in China as a study, the characteristics of flood interval time were analyzed and the coincidence probabilities of flood hydrograph for different return periods were calculated. Results showed that the selected marginal and joint distributions fitted the observed flood data well. For floods occurring in the Jinsha River, Min River and Jialing River, the coincidence probabilities between any of those rivers were higher. The coincidence probabilities between the Wu River and the other three