



Flood Frequency Analysis For Partial Duration Series In Ganjiang River Basin

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Accurate estimation of flood frequency is key to effective, nationwide flood damage abatement programs. The partial duration series (PDS) method is widely used in hydrologic studies because it considers all events above a certain threshold level as compared to the annual maximum series (AMS) method, which considers only the annual maximum value. However, the PDS has a drawback in that it is difficult to define the thresholds and maintain an independent and identical distribution of the partial duration time series; this drawback is discussed in this paper. The Ganjiang River is the seventh largest tributary of the Yangtze River, the longest river in China. The Ganjiang River covers a drainage area of 81,258 km² at the Wanzhou hydrologic station as the basin outlet. In this work, 56 years of daily flow data (1954–2009) from the Wanzhou station were used to analyze flood frequency, and the Pearson-III model was employed as the hydrologic probability distribution. Generally, three tasks were accomplished: (1) the threshold of PDS by percentile rank of daily runoff was obtained; (2) trend analysis of the flow series was conducted using PDS; and (3) flood frequency analysis was conducted for partial duration flow series. The results showed a slight upward trend of the annual runoff in the Ganjiang River basin. The maximum flow with a 0.01 exceedance probability (corresponding to a 100-year flood peak under stationary conditions) was 20,000 m³/s, while that with a 0.1 exceedance probability was 15,000 m³/s. These results will serve as a guide to hydrological engineering planning, design, and management for policymakers and decision makers associated with hydrology.