Establishing a Composition Rainfall Index for Flash Flood Warning in Mountainous Ungagged Areas

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Characterized as short response time and intense rainfall, flash flood is one of the most severe natural hazards in China, particularly in ungauged mountainous areas. The timely and exact flash flood warning is essential for flash flood prevention. In this study, two catchments in China were selected for case study, i.e. Beizhangdian catchment in Shanxi province located in semi-arid regions, and Hedun catchment in Fujian province located in humid regions. the composition rainfall index（CRI） for flash flood warning took into account more rainfall characteristic value than FFG and other rainfall index for flash flood warning, it was deduced by rainfall intensity, cumulative rainfall and antecedent precipitation index(API). The statistical method was using for the CRI derived in the two catchments, based on historical rainfall records and Chinese Rainstorm Statistic Parameter Atlas (CRSPA), respectively. The CRSPA is a national level outcome based on the statistics of historical data of 24,000 nationwide rain gauges and recorded duration from 1956 to 2001, and includes much rainstorm information with typical frequencies and durations. The critical CRI was derived based on CRSPA using statistical frequency analysis. Results showed that CRI was more sensitive to rainfall intensity than cumulative rainfall and API, rainfall intensity is a key factor. The CRI derived based on CRSPA was consistent with the CRI based on historical rainfall records. The CRSPA approach was approved to an easy, convenient and effective alternative for determining CRI in flash flood warning in China, especially in ungauged regions. This study provided experiences for flash flood warning in semi-arid and humid ungagged areas.