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A New Approach to Determine IETD Considering Runoff Characteristics of Urban Watersheds

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As rainfall is a basic parameter for the hydrologic analysis, understanding the statistical characteristics of rainfall is crucial to obtain accurate results. The difficulty found in extracting statistical parameters from the rainfall data is because they are recorded in form of time series in different time spans such as hourly or daily. For this reason, the IETD (Inter Event Time Definition) is used to separate rainfall events from measured rainfall data and then the statistical parameters are estimated (Adams et al, 1986). Thus, the determination of the accurate IETD is very important to analyze measured rainfall data to obtain the statistical characteristics of rainfall. This study explores the existing methods to determine the IETD and suggests a new definition of the IETD to overcome inappropriate aspects in the existing methods when they are used for urban watersheds. In this paper, we suggest a new method to separate two adjacent rainfall events for urban watersheds. In the current methods, only time period of rainfall is considered but it is not proper for urban watersheds since IETDs currently used for urban watersheds are much longer than the urban watershed's short rainfall-to-runoff time in that two separate runoff hydrographs generated from a single rainfall event, in fact, it is two adjacent rainfall events but is considered as a single rainfall event because of a long IETD used, can be observed at an outlet. Considering time period and direct runoffs of two adjacent rainfall events, the suggested method determines whether rainfall events should be separated or not. If direct runoffs from two rainfall events are superimposed in the outlet, they should be considered as the same rainfall event. If not, they are considered as independent rainfall events. Thus, in the new method suggested, the IETD is defined as the time period from the end of a rain event to the end of the direct runoff to reflect the characteristics of urban watersheds. Using the new definition, IETDs of subbasins in Korea ranged from 50 to 4, 400 hectares are determined. Also, using the results, an Area-IETD relation curve from the Joong-Rang basin, Seoul Korea, is developed by the regression analysis. The Area-IETD curve can be used to determine IETDs for ungaged watersheds. This study was supported by the 2003 Core Construction Technology Development Project(03-SANHAKYOUN-C01-01) through the Urban Flood Disaster Management Research Center in KICTTEP of MOCT KOREA.