

Evaluation of Drought Events Using the Rectangular Pulses Poisson Process Model

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In this study a theoretical drought severity-duration-frequency analysis is performed based on a simple Rectangular Pulses Poisson Process Model(RPPM). Data set with various durations are prepared for a given truncation level, whose statistics are then derived to be used for parameter estimation. These parameters are then used for the theoretical drought severity-duration-frequency analysis. The analysis is considered for two cases; one is to consider the overlap probability and the other is not. The drought severity of considering the overlap probability increases more as the return period increases. However, the overlap probability itself decreases as the duration increases, which is because the occurrence probability of events decreases as the duration increases. Also, if the duration increases, the events rarely or even not occur, since parameters of the model cannot be estimated in those cases, so the drought severity may not be computed. This is an obvious limitation of the simple RPPM. In this study the return periods of the important drought events occurred in Seoul are estimated using the results of the study. If the return period of an event is assumed to be the longest one among those with various durations, the return periods of some important event in Seoul are estimated to be between 14 and 35 years. These return periods are not so long to indicate that these droughts can occur frequently.