Comparison of Annual Maximum and Partial Duration Series for Derivation of Rainfall Intensity-Duration-Frequency Relationships in Peninsular Malaysia

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The use of partial duration series (PDS) with generalized Pareto (GPA) distribution in hydrological frequency analysis has been popular during the last few decades because PDS is capable of including more extreme events than annual maximum series (AMS). In Malaysia, the most updated rainfall intensity-duration-frequency (IDF) relationships that serve as the official hydrological design guideline are based on the fitting of AMS to the generalized extreme value (GEV) distribution. The purpose of this paper is to identify the statistical model that best represent Peninsular Malaysia for deriving rainfall IDF relationships. Besides GEV and GPA distributions, other distributions such as generalized logistic (GLO), Gumbel (EV1), Logistic (LN2), and log-Pearson type III (LP3) are also included in this study. Rainfall data with record length varying between 10 and 41 years from 60 rainfall stations in Peninsular Malaysia are computed into AMS and PDS, and fitted to the selected distributions. The Z1-moment ratio diagram is used to determine the appropriateness of these frequency distributions, then Anderson-Darling tests are performed to compare the goodness of fit of the selected models, and the estimated rainfall intensities are observed. The results show that the PDS-GPA model performs better in goodness-of-fit tests, which encourage the use of the PDS-GPA model for generating rainfall IDF relationships in Peninsular Malaysia.