

Evaluation of the best fit distribution for partial duration series of daily rainfall in Madinah, western Saudi Arabia

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Abstract Rainfall frequency analysis is an essential tool for the design of water related infrastructure. It can be used to predict future flood magnitudes for a given magnitude and frequency of extreme rainfall events. This study analyses the application of rainfall partial duration series (PDS) in the vast growing urban Madinah city located in the western part of Saudi Arabia. Different statistical distributions were applied (i.e. Normal, Log Normal, Extreme Value type I, Generalized Extreme Value, Pearson Type III, Log Pearson Type III) and their distribution parameters were estimated using L-moments methods. Also, different selection criteria models are applied, e.g. Akaike Information Criterion (AIC), Corrected Akaike Information Criterion (AICc), Bayesian Information Criterion (BIC) and Anderson-Darling Criterion (ADC). The analysis indicated the advantage of Generalized Extreme Value as the best fit statistical distribution for Madinah partial duration daily rainfall series. The outcome of such an evaluation can contribute toward better design criteria for flood management, especially flood protection measures.

Key words rainfall frequency analysis; statistical distributions; L-moments; goodness-of-fit tests; arid region; Madinah, Saudi Arabia