

Frequency Analysis Using Multiple Parameter Probability Distributions for Rainfall to Determine Suitable Probability Distribution in Pakistan

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Abstract : The study of extreme rainfall events is very important for flood management in river basins and the design of water conservancy infrastructure. Evaluation of quantiles of annual maximum rainfall (AMRF) is required in different environmental fields, agriculture operations, renewable energy sources, climatology, and the design of different structures. Therefore, the annual maximum rainfall (AMRF) was performed at different stations in Pakistan. Multiple probability distributions, log normal (LN), generalized extreme value (GEV), Gumbel (max), and Pearson type3 (P3) were used to find out the most appropriate distributions in different stations. The L moments method was used to evaluate the distribution parameters. Anderson darling test, Kolmogorov- Smirnov test, and chi-square test showed that two distributions, namely GUM (max) and LN, were the best appropriate distributions. The quantile estimate of a multi-parameter PD offers extreme rainfall through a specific location and is therefore important for decision-makers and planners who design and construct different structures. This result provides an indication of these multi-parameter distribution consequences for the study of sites and peak flow prediction and the design of hydrological maps. Therefore, this discovery can support hydraulic structure and flood management.

Keywords : RAMSE, multiple frequency analysis, annual maximum rainfall, L-moments

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