Evaluation of Best-Fit Probability Distribution for Prediction of Extreme Hydrologic Phenomena

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Abstract : The probability distributions are the best method for forecasting of extreme hydrologic phenomena such as rainfall and flood flows. In this research, in order to determine suitable probability distribution for estimating of annual extreme rainfall and flood flows (discharge) series with different return periods, precipitation with 40 and discharge with 58 years time period had been collected from Karkheh River at Iran. After homogeneity and adequacy tests, data have been analyzed by Stormwater Management and Design Aid (SMADA) software and residual sum of squares (R.S.S). The best probability distribution was Log Pearson Type III with R.S.S value (145.91) and value (13.67) for peak discharge and Log Pearson Type III with R.S.S values (141.08) and (8.95) for maximum discharge in Jelogir Majin and Pole Zal stations, respectively. The best distribution for maximum precipitation in Jelogir Majin and Pole Zal stations was Log Pearson Type III distribution with R.S.S values (1.74&1.90) and then Pearson Type III distribution with R.S.S values (1.53&1.69). Overall, the Log Pearson Type III distributions are acceptable distribution types for representing statistics of extreme hydrologic phenomena in Karkheh River at Iran with the Pearson Type III distribution as a potential alternative.

Keywords : Karkheh River, Log Pearson Type III, probability distribution, residual sum of squares

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