
Abstract

The frequency analysis of extreme events has a wide application in hydraulic structure designs and engineering works. It's also being used for non engineering applications like natural hazard planning and disaster management. The purpose of the analysis is mainly to derive reliable estimates of extreme events corresponding to a series of return periods, so they can be used wherever they are required. This study relates with the At-site frequency analysis of annual maximum monthly total rainfall in Pakistan. Data records of monthly total rainfall ranging from 45 to 78 years of record have been taken from 60 gauging stations (till year 2010) from all over Pakistan. Maximum values for each year were obtained and used for At- site frequency analysis. Thirteen distributions including Normal, Weibul, Generalized Logistic, Generalized extreme value, Extreme value type-I, Generalized Pareto, Log normal-II, Log Normal-III, gamma, logistic, exponential and Pearson type three were selected as candidate distribution. Also three estimation method i.e. Method of Maximum Likelihood, Method of Moments and Method of Probability weighted moments were applied to estimate the parameters of candidate distributions. Goodness of fit tests including Chi- square test and Kolomogrov- Smirnov test along with the were used to select the fitting distribution. A single Distribution satisfying the goodness of fit test and giving the least standard error of quantile estimates was selected for each estimation method. Parameters and Quantile estimates of the selected distribution corresponding to return periods of 10, 20, 50, 100 and 200 years were found. Finally the standard errors of quantile estimates of each method were compared. Results revealed that method of probability weighted moment gave the lowest standard errors for each case and hence proved to be best of the three for selected data.