



University of Zabol  
Graduate school  
Faculty of Water and Soil  
Department of Water Engineering

**The Thesis Submitted for the Degree of M. Sc  
(in the field of Hydraulic Structures)**

**Title**

**Flood frequency analysis of the  
maximum annual discharge of rivers in  
Lorestan province  
(case study: Karkheh watershed in  
Lorestan province)**

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## **Flood frequency analysis of the maximum annual discharge of rivers in Lorestan province (case study: Karkheh watershed in Lorestan province)**

### **Abstract**

Planning and management of Watersheds need discharges of rivers flowing in the watershed. In addition, discharges of river floods is very important. The mean annual discharge with different return periods are required for planning of small and large dams and for estimation of floods. Due to impossibilities, the number of ungauged basins or basins with a short record period are relatively large. Thus, in flood frequency analysis instead of using the data of a basin, the data from a set of homogeneous basins are used. Flood frequency analysis consists of two parts: In the first part the homogeneous basins are determined. In the second part the suitable distribution function for flood frequency analysis is introduced. This model properties include local and regional coefficients for basin. For this purpose, first of all hydrometric stations in the region of Lorestan province, were identified and after reviewing the location, quality of equipment, duration and quality of data among, 21 hydrometric stations in the province, 11 stations were selected. In order to select appropriate distribution function for regional analysis the data of the each station were fitted to normal. Two and three - parameter log normal, two parameter gamma, pearson Type III, log pearson Type III and gambel distribution using Hyfa, Smada and Easy fit. After calculation of goodness of fit test statistics such as chi square, mean relative deviation and relative deviation Mean Square, Pearson Type III distribution was recognized as the best regional distribution and maximum instantaneous flow return periods were calculated. Then, using regional analysis, appropriate regional flood models were derived.

**Keywords: regional flood frequency analysis, Pearson Type III, statistical distribution basins ungauged stations, Lorestan province.**