Regional floods frequency analysis by linear moments methods in Gilan Province's

Abstract

By using regional flood frequency analysis, a regionalized relationship can be established to estimate flood magnitudes for ungauged and poor data catchments. Regional flood frequency analysis usually includes the identification of homogeneous regions, selection of suitable regional frequency distributions and estimation of flood quantiles at catchments of interest. Among 73 hydrometric stations in Gilan province, 46 stations were selected with an appropriate statistical period. In the preliminary analyses conducted by using the L-moments diagrams and discordancy and homogeneity tests, it was specified that Gilan is hydrologically quite heterogeneous. In this study, five characteristics of catchment area, main channel slope, mean annual precipitation, latitude and longitude were used for cluster analysis. To select the best number of clusters, indicators of Average Silhouette Width, Davies-Bouldin and Dunn were used and finally two clusters were identified to be appropriate. To adjust homogeneity of the created regions, region adjustment procedure of Hosking and Wallis was used in this study. The best regional distribution was selected by the Z DIST goodness-of-fit test. The Generalized Logistic (GLOG) distribution was chosen as the best regional distribution for the regions (1) and (2). The parameters of the selected distribution, probability quantiles and finally annual maximum flood with different return periods were obtained. At last, a regional relation for Gilan province was obtained by using annual maximum flood, catchment area and different return periods.

Key words: Regional Flood Frequency, L-Moments, clustering, Homogeneity Regions, Annual Maximum Flood

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Dissertation for M.Sc
Agricultural engineering
Irrigaion & Drainage science

Title

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september 2011