عنوان مقاله:

Comparison of hybrid regression and multivariate regression in the regional flood frequency analysis: A case study in Khorasan Razavi province

محل انتشار:

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خلاصه مقاله:

Magnitude, rate and frequency of the stochastic and unexpected events are of greatsignificance and importance in hydrology. Nowadays, for economic planning of the projects, the useof analytical methods of unexpected events in hydrology is unavoidable. The aim of this study was tocompare hybrid regression and multivariate regression to estimate flood peak discharge in the provinceof Khorasan Razavi and in the selected water measured stations.Methods: For this purpose, 19 hydrometric stations were selected and analyzed. In the first step, therate of peak discharge was estimated with different return periods and by selecting the best regionaldistribution (lognormal distribution type ΠI). In the next step, independent and important variablesincluding area, mean annual rainfall, the average height of the watershed and its slope were determinedusing functional analysis and using SPSS software version 22. Then, two hydrologically homogeneousregions were determined by homogeneity test using cluster analysis, and accordingly, two models werepresented for the whole area and also for homogeneous areas. To compare and evaluate the accuracyand efficiency of the estimated models, the rates of discharges were estimated and compared withobservational rates using three control watersheds. To compare models, it was used from the averageabsolute values of the relative error index.Results: It was revealed that the hybrid method was more accurate than the multivariate regressionmethod in the return period of 50 years and provides better results of flood discharges for the area.Homogenous areas had a higher coefficient of determination (R2) and lower relative standard error(RSE) compared to the whole area. It was also revealed that with increase of return period, the rates ofR2 decreased but the rates of relative standard error increased.Conclusion: The accuracy of multivariate regression and hybrid methods was the same in the 25-yearreturn period. In the present study, the importance and necessity of homogenous areas compared withthe model of the whole area are completely evident.

کلمات کلیدی:

Floods, Regression analysis, Khorasan Razavi province, Statistical distributions, Hybrid regression