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Effects of topography on maximum daily precipitation in Golestan province (Iran)

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Precipitation is one of the most important and the most variable climate parameters. This parameter is not only linked to the meteorological and hydrological conditions of a region, but it is also being affected by some spatial conditions such as: geographical latitude, geological and topographical conditions, sea distance and others. The quantity and intensity of the precipitation are the two most important factors considered in the climatological and hydrological studies. The knowledge about the precipitation quantity, as well as the risk of an extreme rainfall presents the basic requirements for a broad range of considerations in risk management and hydrology. But, this parameter can also be affected by the topography of the catchment. Golestan province is located in the north of Iran close to the Caspian Sea. The province is surrounded by the Caspian Sea and low level flat area from West and Northwest while on the East and South, forests, hills and high mountains prevail. In the North of the province there is Turkman desert and low level land with a dry climate conditions. In order to predict the characteristics of extreme rainfall at gauged and ungauged sites, the statistical data of maximum daily precipitation for 20 rainfall gauges in the province for a period of 30 years have been analyzed. After initial statistical tests, homogeneity and adequacy tests were done. The results show that in low level areas the amount of maximum daily precipitation can not be considered as a function of elevation, while in the highly elevated regions, there is a correlation between the amount of maximum daily precipitation and the site elevation. However, in some regions this relation is more significant than in other regions.

Keywords: Maximum daily precipitation; risk management; spatial variability; topography; Golestan; Iran.