



Evaluation of climate change on flood event by using parametric T-test and non-parametric Mann-Kendall test in Barcelonnette basin, France

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The existence of a trend in hydrological and meteorological time series is detected by statistical tests. The trend analysis of hydrological and meteorological series is important to consider, because of the effects of global climate change. Parametric or non-parametric statistical tests can be used to decide whether there is a statistically significant trend. In this paper, first a homogeneity analysis was performed by using the non-parametric Bartlett test. Then, trend detection was estimated by using non-parametric Mann-Kendall test. The null hypothesis in the Mann-Kendall test is that the data are independent and randomly ordered.

The result of Mann-Kendall test was compared with the parametric T-Test for finding the existence of trend. To reach this purpose, the significance of trends was analyzed on monthly data of Ubaye river in Barcelonnette watershed in southeast of France at an elevation of 1132 m (3717 ft) during the period from 1928 to 2009 bases with the nonparametric Mann-Kendall test and parametric T-Test for river discharge and for meteorological data.

The result shows that a rainfall event does not necessarily have an immediate impact on discharge. Visual inspection suggests that the correlation between observations made at the same time point is not very strong. In the results of the trend tests the p-value of the discharge is slightly smaller than the p-value of the precipitation but it seems that in both there is no statistically significant trend. In statistical hypothesis testing, a test statistic is a numerical summary of a set of data that reduces the data to one or a small number of values that can be used to perform a hypothesis test. Statistical hypothesis testing is determined if there is a significant trend or not. Negative test statistics and MK test in both precipitation and discharge data indicate downward trends. As conclusion we can say extreme flood event during recent years is strongly depending on: 1) location of the city: It is situated in an elongated form extending below mountain slopes and along a river channel. 2) Seasonal Changes: During spring, the melting of snow result in an increase water level in river channels and this will be amplified whenever a warm rainfall occurs. Then it could be conclude that climate change did not has a significant effect on flood in case study area

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