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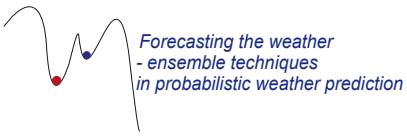

Trend Analysis in Climatic Parameters to Investigate Flow Regime of Ubaye River in Barcelonnette, France

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In this research trend analysis in precipitation and temperature have been analysed base on monthly data recorded within a 52 years period (1961-2009). The main aim was determining the type and the time of changes in precipitation and temperature time series in relation to the discharge in the Barcelonnette basin of Alpes de Haute Province, Southeast of France.

The test of randomness was performed by drawing the autocorrelation functions *(ACFs).* At the aim of homogeneity test of time series parameters, the *"run test"* was applied. In the next step, to detect for either increasing or decreasing monotonic trend at p significance level, *"Mann-Kendall"* statistics has been estimated to test randomness against trend of climatic and hydrologic time series. Finally to see change of trend with time and confirm an abrupt change, sequential values, $u(t)$ and $u'(t)$, from the progressive analysis of the Mann-Kendall test were calculated.

The results of this research revealed that all autocorrelation coefficients are within 95% confidence levels which provide evidence of the randomness of monthly precipitation, discharge and maximum temperature. The homogeneity test and their significant levels showed that all parameters in significant level of 5% are homogeneous.

The trend analysis determined that the null hypothesis (H_0) is rejected in precipitation and maximum temperature time series because the absolute value of Z is greater than $Z_{1-p/2}$, where $Z_{1-p/2}$ is obtained from the standard normal cumulative distribution tables. It means that there is a significant downward trend in precipitation and a significant upward trend in maximum temperature in Barcelonnette station. On the other side, the p-values of monthly discharge was greater than the significance level alpha=0.05, then one cannot reject the null hypothesis (H_0). It means that there is no significant trend in the series of discharge. The sequential Mann-Kendall test showed an evidence of individual abrupt changes in the magnitudes of precipitation from 1985 to 1989 and 1998 to 1999 and in temperature data set from 1993 to 1995.

From the results, it could be conclude that although there is a significant downward trend in precipitation and inversely an upward trend in maximum temperature but there is no significant trend in observed discharge data. Additionally, the results of investigation of land use changes at the same period showed an increase of 139.78% in urban area.

As a consequence it could be assume that the land use change and anthropogenic activities are the most important factors in the fluctuation and changes in the discharge and flow regime of Ubaye River. So there is need for continuous monitoring.

Keywords: Climatic Parameters, Flow Regime, Mann-Kendall Statistics, Trend Analysis.