

VARIABILITY AND TRENDS IN TEMPERATURE, PRECIPITATION AND RUNOFF IN A HIMALAYAN BASIN

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ABSTRACT

The detection of trends in hydro climatic data, in particular temperature, precipitation and stream flow, is essential for the assessment of the impacts of climate variability and change on the water resources of a region. Himalayas are known as the highest water source in the world. But the way, the effect of global warming is spreading has negative impact on the glaciers, through reducing them comprehensively and the vagaries and anomalies of rainfall, temperature, snow fall and stream flow are reducing the potentiality of the water resources in the Himalayan region.

This study has been carried out to examine the trends in meteorological time series of various stations in Satluj basin located in Western Himalayan region, India. Historical trends in precipitation, temperature and stream flows have been examined using regression analysis and Mann-Kendall (MK) statistics. The non parametric MK statistical test has been widely applied to asses the significance of trends in hydrological time series. On the basis of regression and MK test, rising and falling trend in temperature and anamolies in precipitation and stream flow at various stations have been analysed. The result shows that many of these variables demonstrate statistically significant changes occurred in last three decades. The analysis shows that rainfall in general is decreasing at most of the stations, however, at some of the stations no trend has been observed.

The temperature shows no significant trend in lower altitude, however there is rising trend in middle to higher altitudes. During monsoon period no trend has been observed in temperature. This change in the climate has influenced the stream flow, which is reflected in the seasonal and annual trend of stream flow. The stream flow at Bhakra gauging site shows a falling trend. During the monsoon season, there is a significant falling trend in discharge. No significant trend is observed during winter and pre monsoon season however during post monsoon again a falling trend is observed in the time series data.