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WINTER SEASON TEMPERATURE TRENDS IN THE 20TH CENTURY OVER THE RAJOURI DISTRICT, INDIA

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ABSTRACT

The present paper analyse the trends of maximum and minimum temperature in the winter season over the Rajouri district of Jammu and Kashmir UT during the 20th century. Climatic data for the analysis was collected from India water portal organization website. Results stated that climate change took place in the study area during the winter season. Both maximum and mean minimum temperature has been increased, thus warming took place in the study area.

KEYWORDS: ***Climate, Change, Maximum Temperature, Minimum Temperature, and Warming etc.***

INTRODUCTION

The average surface temperature of Planet Earth has been increased by above 1°C since the beginning of the 20th century and half of the increase in temperature occurred after 1970 due to rapid industrialization (Cicerone and Nurse 2014). The concentration of greenhouse gases such as carbon dioxide, methane and nitrous oxide has been increased since the industrial revolution. For example, the CO2 concentration measured at the Mauna Loa Observatory in Hawaii has risen from 316 parts per million (ppm) in the year 1959 to more than 411 ppm in the year 2019. Similar rates of rise in CO2 concentration was recorded at numerous other stations worldwide. Since preindustrial times, the atmospheric concentration of CO2 has increased over 40 per cent, CH4 has increased more than 150 per cent and N_2 O has increased 20 per cent. Half of the rise in CO2 has taken place since 1970. Increases in gases leads to warming of Earth. Changes in climate over the surface have bad consequences and disturbed the ecosystems (Roy and Balling 2005).

Climate change led to extinction of many species of flora and fauna, population migrations, and changes in the land surface and ocean circulation (IPCC 2015). It is seen that the pace of current change in climate is faster than past events, making it tougher to adapt and adjust with this change. The present paper studied climate change over the Rajouri district of Jammu and Kashmir.

METHODOLOGY

Research used secondary data, the climatic records from 1901 to 2002 was retrieved from India Waterportal organization website. For the identification of outliers, methodology given by Zhang et al. (2005) was used. District Rajouri was taken as a study area, Rajouri shares international border with Pakistan on the West, district Punch on the North and district Reasi on the East and Jammu on the South. Maize, rice and wheat are the chief crops grown in the area, whereas maize is the staple food. Research studied the change over temperature regime in the winter season. The import terms used in the research are as below:- Meteorological seasons in India are winter season (January and February), Monsoon season (March to May) followed by Southwest Monsoon season (June to September) and Post Monsoon season which includes the months of October, November and December (IMD 2019). Maximum Temperature refers to the highest temperature attained during a day. It often occurs during the afternoon hours. Minimum Temperature refers to the lowest temperature recorded which usually occurs during the early morning hours. (IMD 2019)

DATA ANALYSIS

Trends in maximum temperature and minimum temperature over the study area has been analysed in this section with the help of diagrams.

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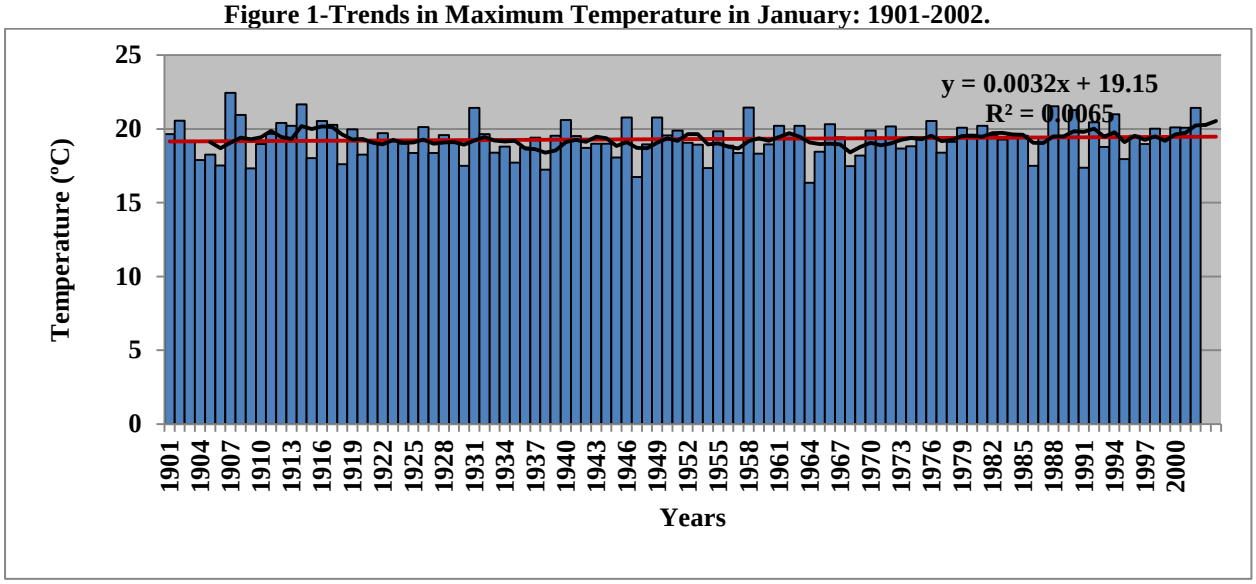
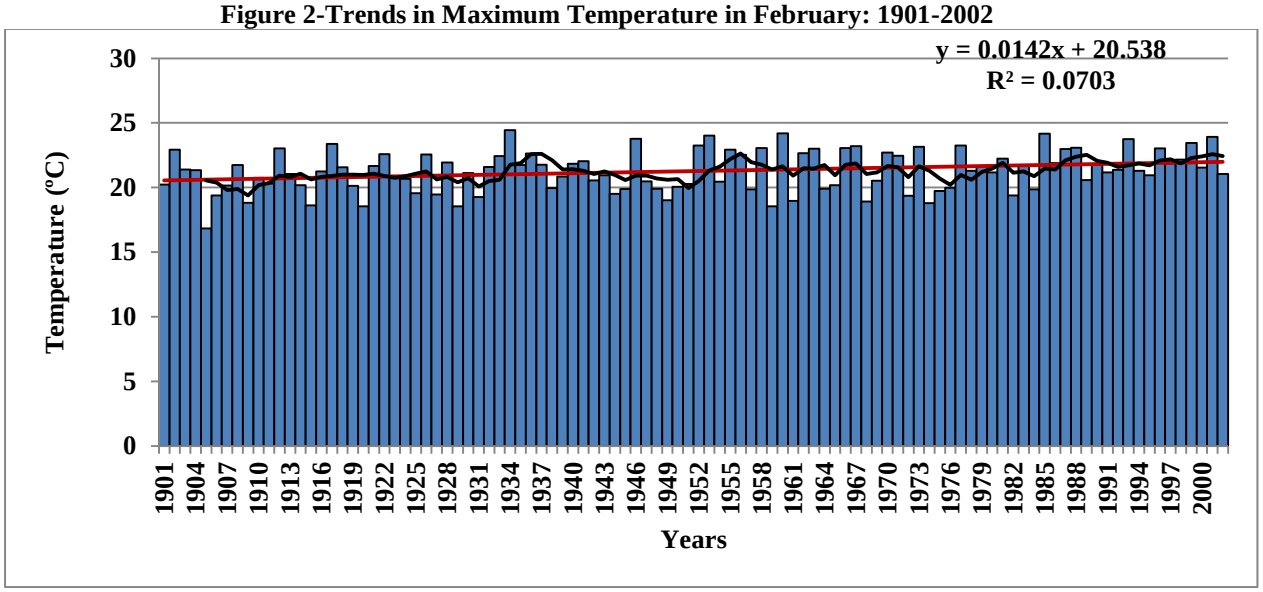
Figure 1-Trends in Maximum Temperature in January: 1901-2002.



The average value for maximum temperature for January was 19.31°C. The minimum value was 16.35 °C for the year 1964 and the maximum value was 22.44 °C in the year 1907 followed by 21.65 °C for the year 1914, 21.52°C in the year 1988. An increasing trend in minimum temperature over the study was observed.

Figure 2-Trends in Maximum Temperature in February: 1901-2002



The average value for maximum temperature in February was 21.27 °C. The lowest value recorded was 16.84°C and the highest value recorded was 24.44°C for the year 1934 followed by 24.20°C in the year 1960. If we look at the trend line there is an increase in warming over the study area has been reported. Thus it is clear from the analysis that maximum temperature during the winter season has been increased in the twentieth century over the study area.

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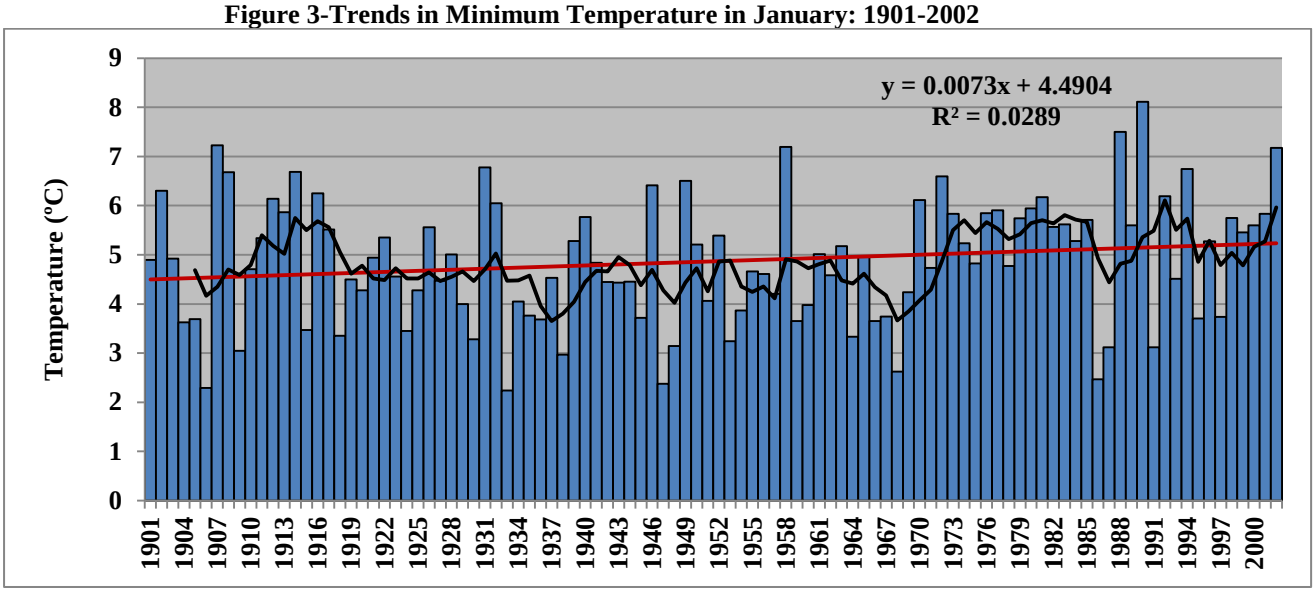
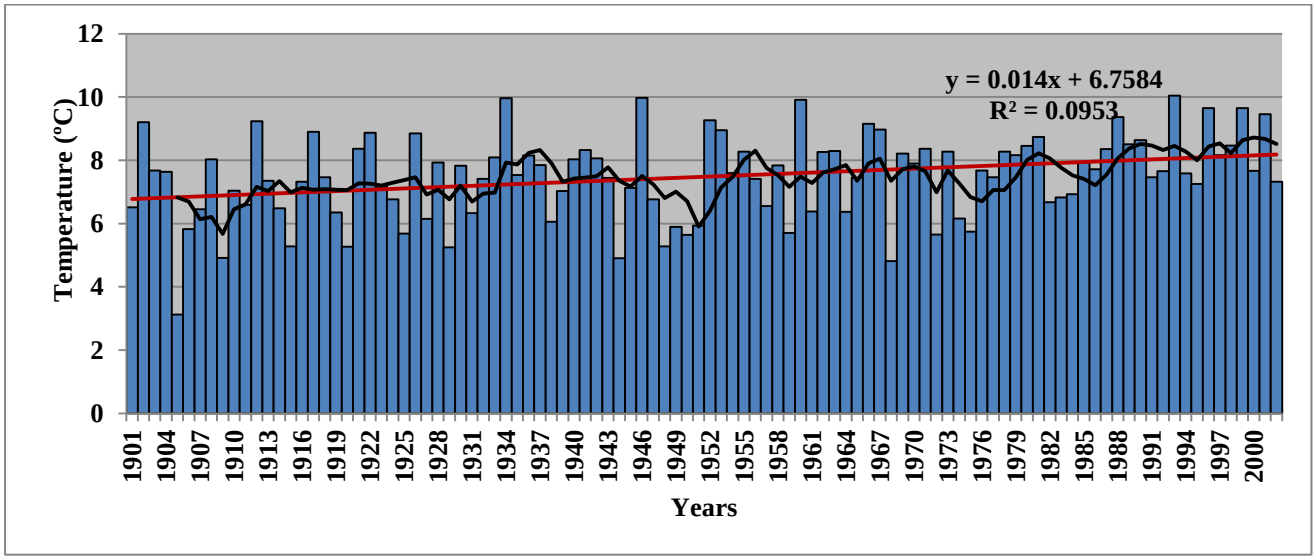
Figure 3-Trends in Minimum Temperature in January: 1901-2002



In respect of minimum temperature during the winter season over the study area it was found that the warming has been increased. The maximum value recorded was 8.11°C and the minimum value recorded was 2.23°C during the century. The trend line shows that there is an increasing trend over the study area throughout the period.

Figure 4-Trends in Minimum Temperature in February: 1901-2002



An increasing trend experienced over the study area throughout the last century in February. The maximum value recorded was 10.04°C and the minimum value recorded was 3.12°C for the year 1905. The average value recorded was 7.48°C.

CONCLUSION

Temperature trend lines shows that both maximum and minimum temperature increased over the century in the Rajouri district which depicted that climate change took place in the study area. If we compare the year 1901 climatic data with the year 2002 climatic data we found that there is a change in mean temperature regime over the study area by 0.5°C in January and 1.5°C in February month. Change in Mean Minimum Temperature was 0.73°C in January and 1.42°C in February month. Change in Mean Maximum Temperature was 0.39°C in January and 1.45°C in February. There were some episodes when decline in Mean Minimum and Maximum Temperature was observed. The highest value recorded in the winter season was 24.44 °C and lowest temperature recorded was 16.35 °C in terms of maximum temperature over the century. Whereas in terms of minimum temperature the highest value recorded was 10.4 and lowest value recorded was 2.23°C. Thus the temperature in the winter season never goes beyond 2.23°C in the winter season and

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highest temperature never goes beyond 24.44°C in the winter season in Rajouri district.

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