Research Guru
Online Journal of Multidisciplinary Subjects (ISSN : 2349-266X)
Volume-13, Issue-1, June 2019
Impact Factor: 4.081
www.researchguru.net

Study of the effect of humidity on flood using a comparative study at the two extreme ends of Kerala

Dr.Nafeesa Baby T.P

Department of Physics, Sir Syed College, Taliparamba, Kannur, Kerala, India

nafeesababy@gmail.com

Abstract

This study examines the variation of weather parameters, temperature and humidity on the sudden climatic changes occurred in the Southern part of Kerala during the month of August 2018 resulted severe flood. The parameters affecting weather are solar flux, wind speed, wind direction, rainfall, temperature, soil temperature, surface wetness, relative humidity etc. In this work the temperature and relative humidity occurred from January 2018 to October 2018 at the two extreme ends of Kerala, Kasaragod and Trivandrum are analysed. The climatic changes is found to have a correlation with the observed weather parameters

Keywords Weather, Relative Humidity, Temperature, flood

Introduction

An atmosphere is a layer or a set of layers of gases which surrounds a planet or other material body, that is held in place by the gravity of that body. Weather is the state of the atmosphere at a particular place during a short period of time [1]. It includes atmospheric phenomena as temperature, humidity, precipitation (type and amount), air pressure, wind, and cloud cover. Most weather phenomena occurs in the lowest level of the atmosphere, the troposphere. Weather is the term related to day-to-day temperature and precipitation activity, whereas climate is the term for the averaging of atmospheric conditions over longer periods of time. Phenomena occurring in upper regions of the troposphere and above, such as jet streams and upper-air waves, mostly affect sea-level atmospheric-pressure patterns—and thereby the weather conditions at the terrestrial surface. Geographic features such as mountains and large bodies of water also affect weather. Recent research has revealed that anomalies in the ocean-surface temperature are a potential cause of atmospheric temperature anomalies in successive seasons and at distant locations.

Weather parameters are the parameters to fix weather. They are Solar flux, Wind speed, Wind direction, Rainfall, Relative humidity, Temperature, Soil temperature and Surface wetness. All these parameters are related to each other.

Relative humidity (RH) is the ratio of the partial pressure of water vapour to the equilibrium vapour pressure of water at a given temperature. Relative humidity depends on temperature and the pressure of the system of interest. Relative humidity

is normally expressed as a percentage; a higher percentage means that the air–water mixture is more humid.[2]

Humidity affects many properties of air and of materials in contact with air. Water vapour is key agent in both weather and climate, and it is an important atmospheric greenhouse gas. A huge variety of manufacturing, storage and testing process are humidity- critical. [3]Humidity measurements are used wherever there is a need to prevent condensation, corrosion, mould, warping or other spoilage of products. This is highly relevant for foods, pharmaceuticals, chemicals, fuels, wood, paper, and many other products.

The condition of weather changes widely in different parts of the world. Weather has a great influence on human settlement patterns, food production, and personal comfort. Extremes of temperature and humidity can cause discomfort and may lead to the spread of disease; heavy rain can cause flooding, leading to the displacement of people and interrupting economic activities; thunderstorms, tornadoes, hail, and sleet storms may cause destruction of crops, buildings, and transportation routes and vehicles. Heavy storms may even kill or injure people and livestock.

Climate is the statistics of weather. It is calculated by comparing the patterns of variation in temperature, solar flux, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time.[4,5] Climate change may occur over long and short timescales from a variety of factors.

From 8 August 2018, severe floods affected the south Indian state of Kerala, due to unusually high rainfall during the monsoon season. Some parameters like humidity, temperature etc. also might have influenced the sudden changes in the weather. It was the worst flood in Kerala in nearly a century. Over 483 people died in the flood. During the pre-monsoon period the temperature was higher compared to that of previous years. So the study of variation of temperature and humidity are much important regarding such climatic changes

Materials and methods

The measurements, temperature and humidity for this work are collected from C.P.C.R.I Kasaragod and I.C.A.R CTCRI Trivandrum the two extreme ends of Kerala. The flood occurred in Kerala during August 2018 was severe at southern end of Kerala (Thiruvananthapuram) compared to that of northern end (Kasaragod). The data has been analysed and the graphs are drawn with the parameters, relative humidity and rain fall using the software Origin8[6]. The effect of flood on these parameters is explained here.

Results

Maximum and mean Relative humidity from January 2018 to October 2018

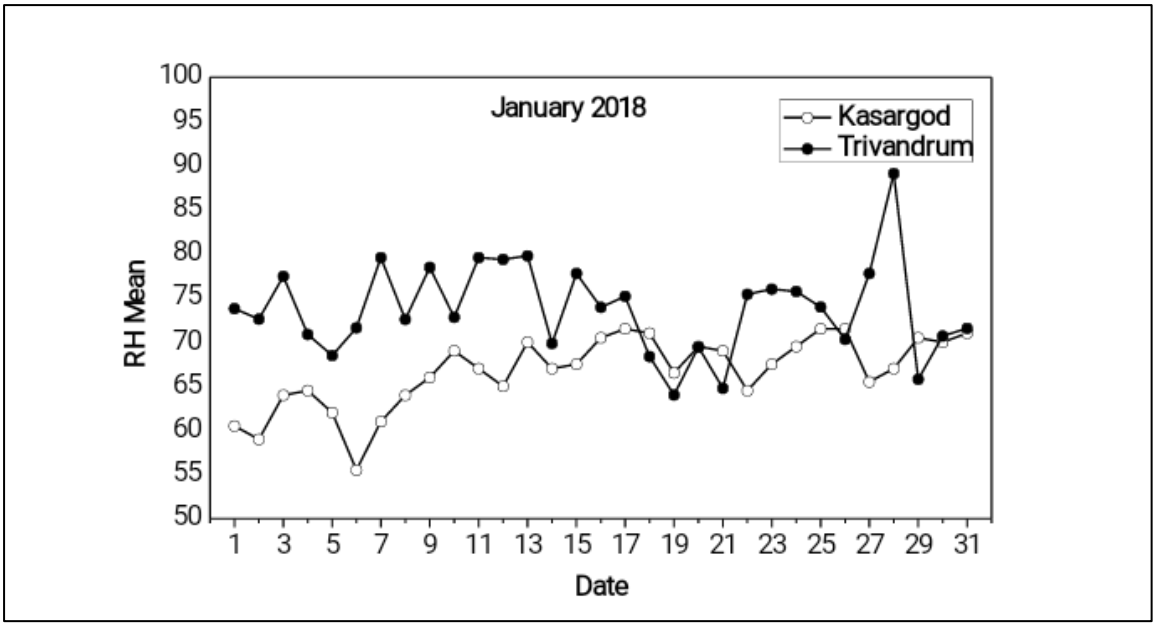


Figure 1

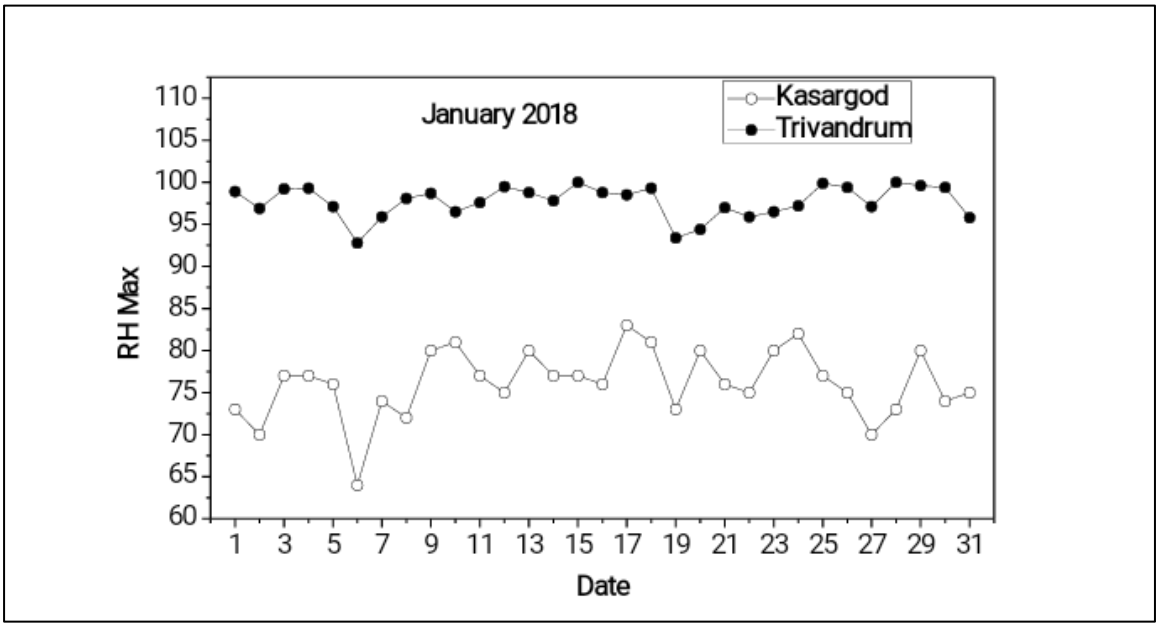
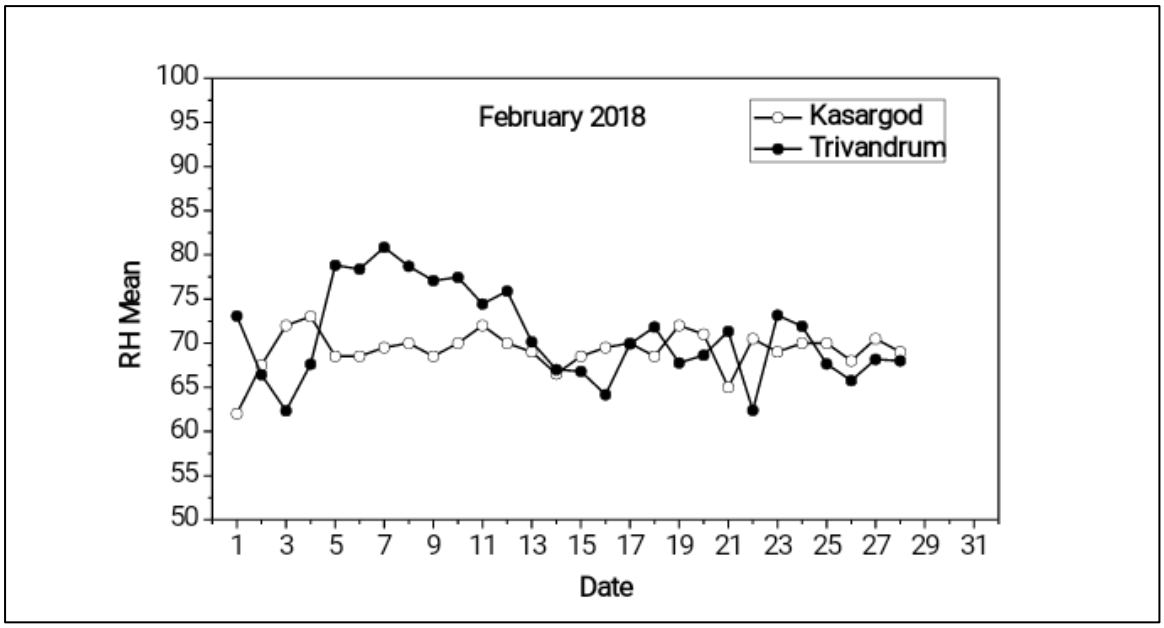


Figure 2



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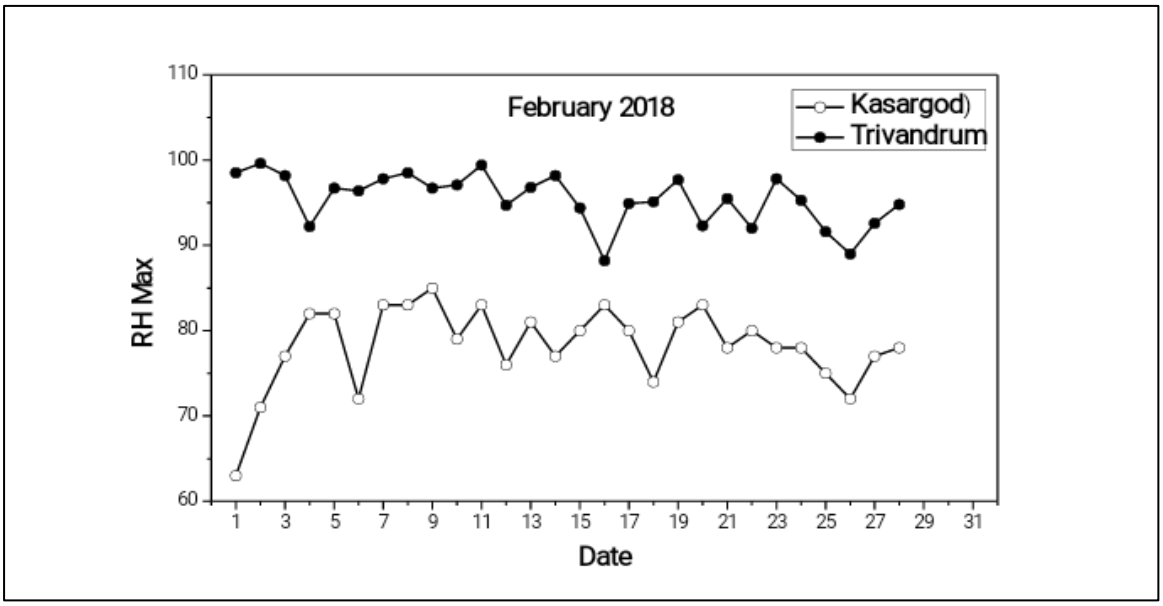

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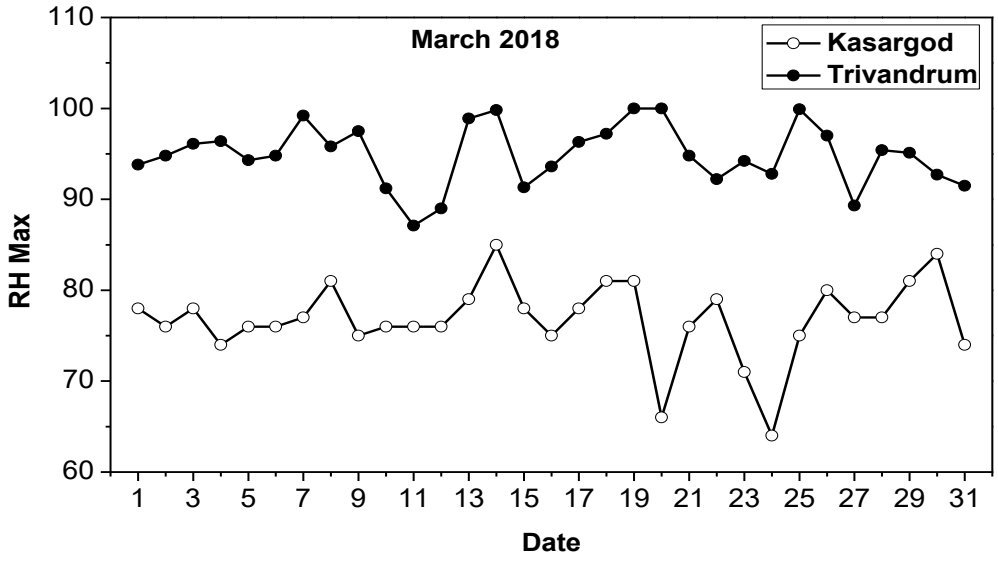

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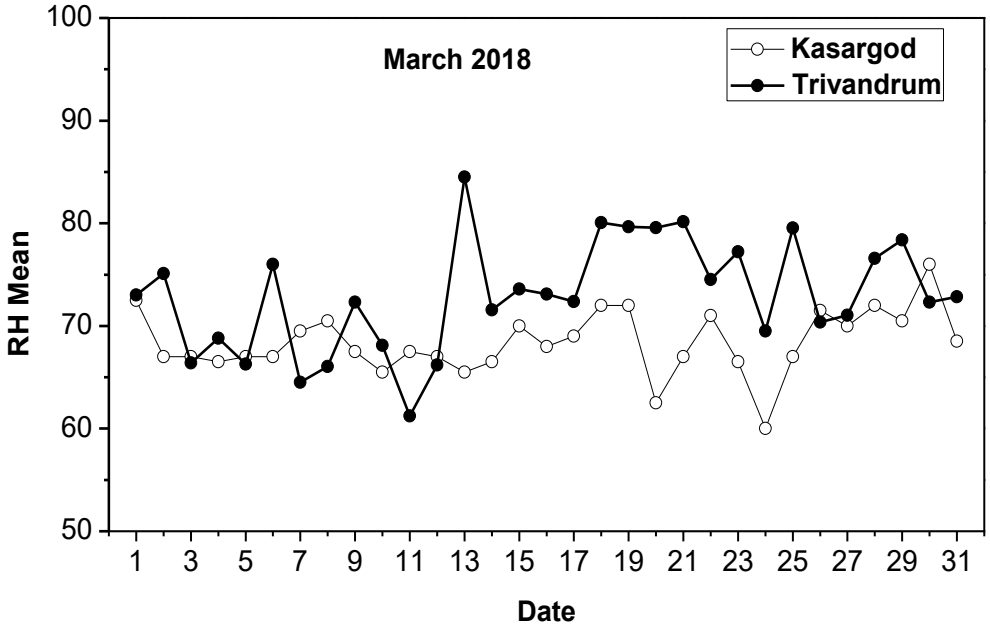

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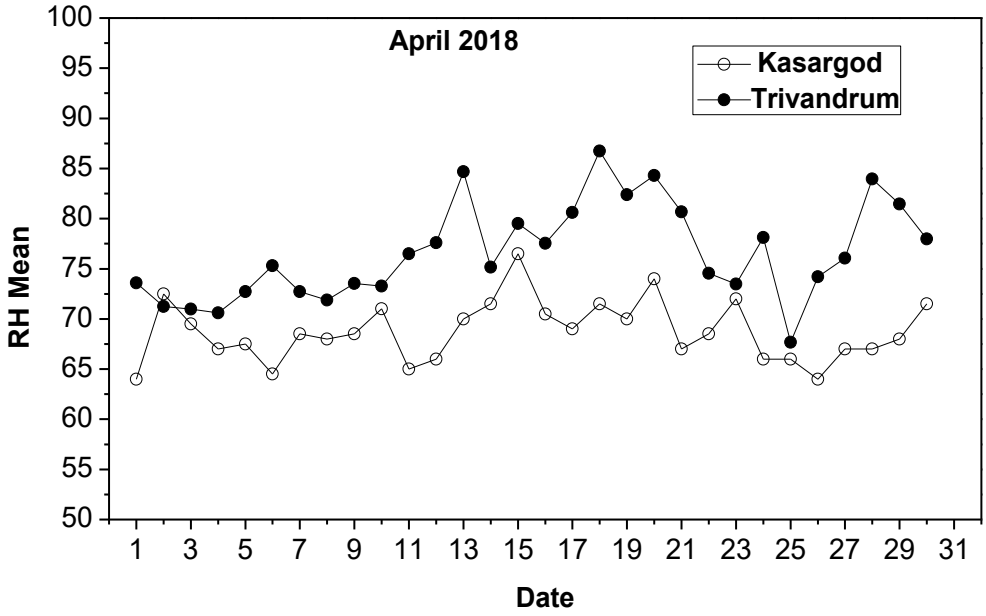

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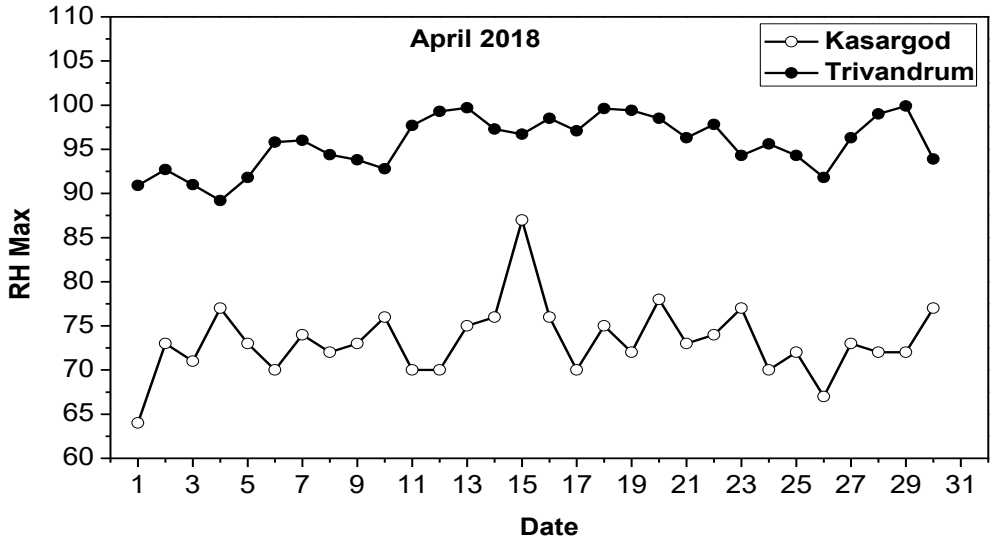

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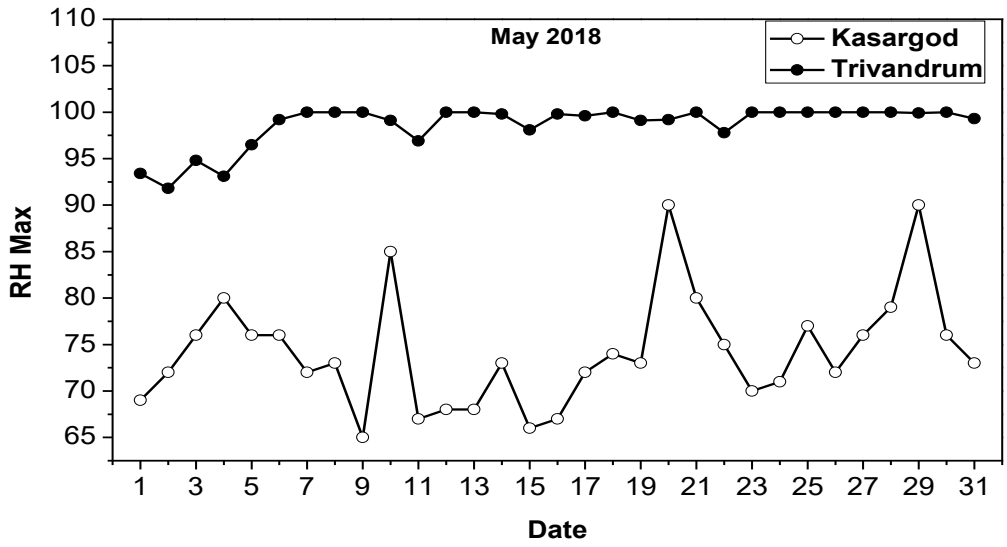

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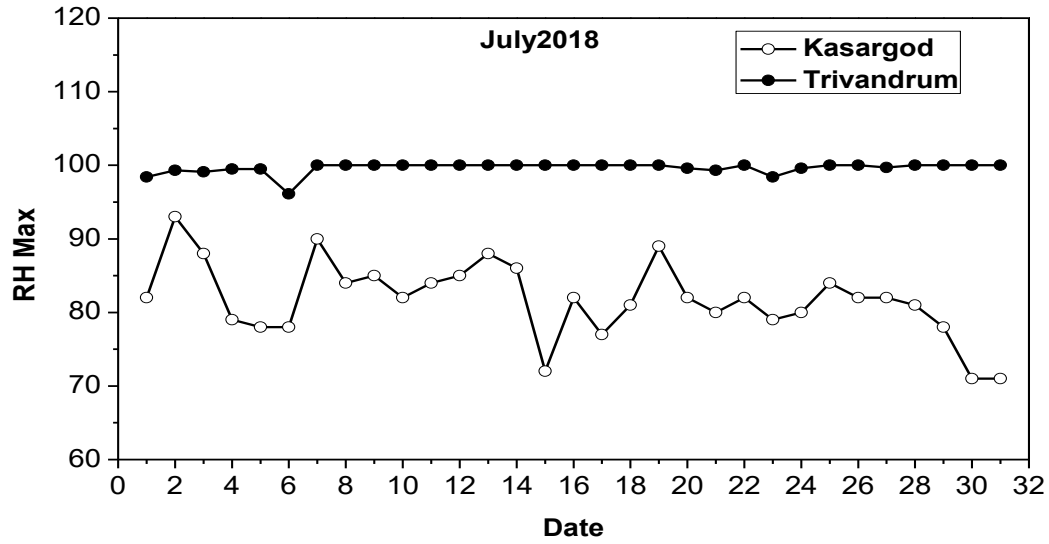

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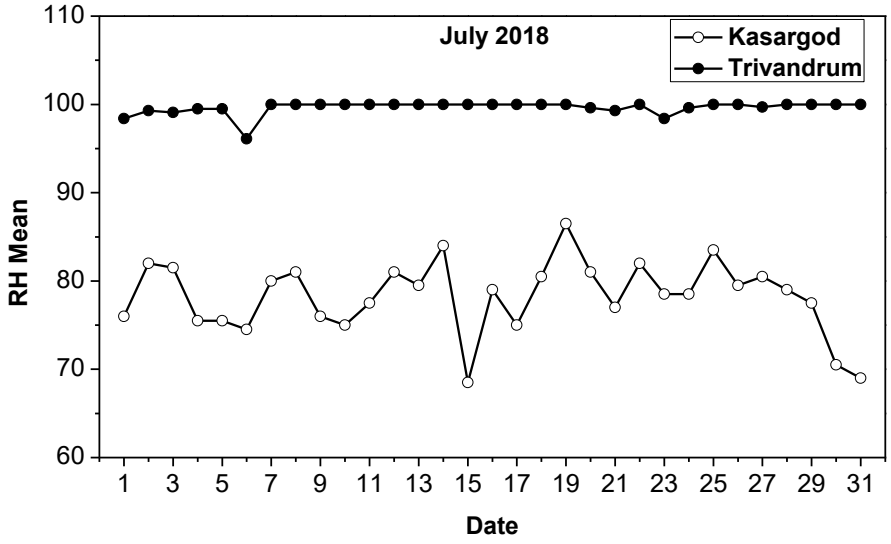

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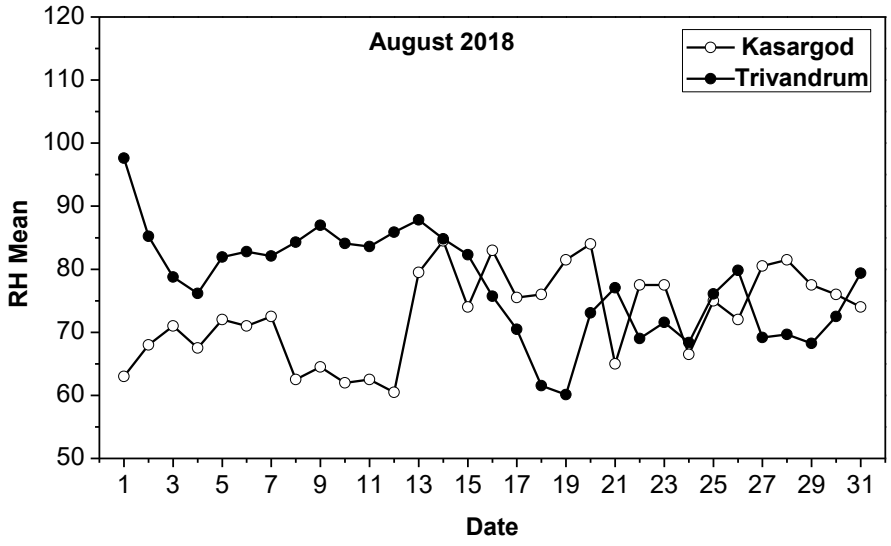

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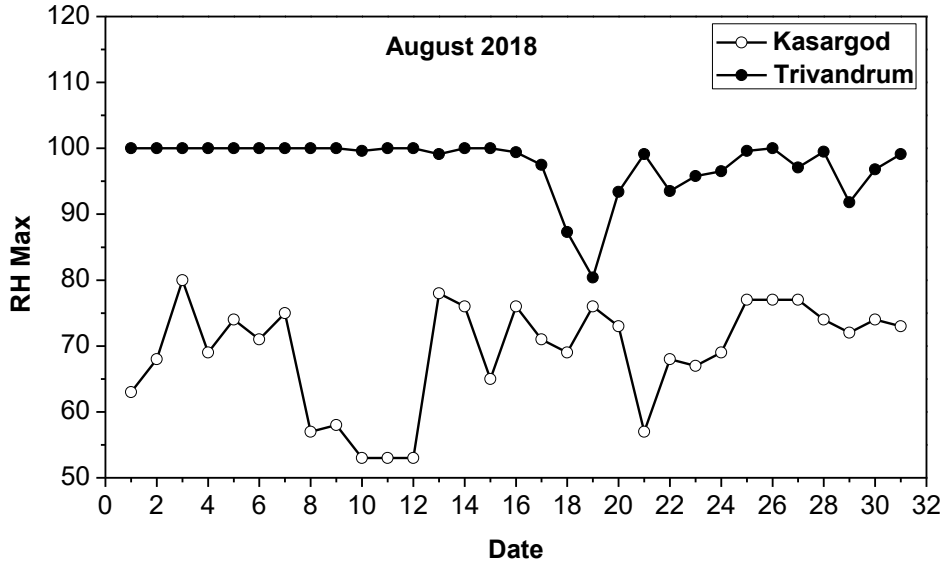

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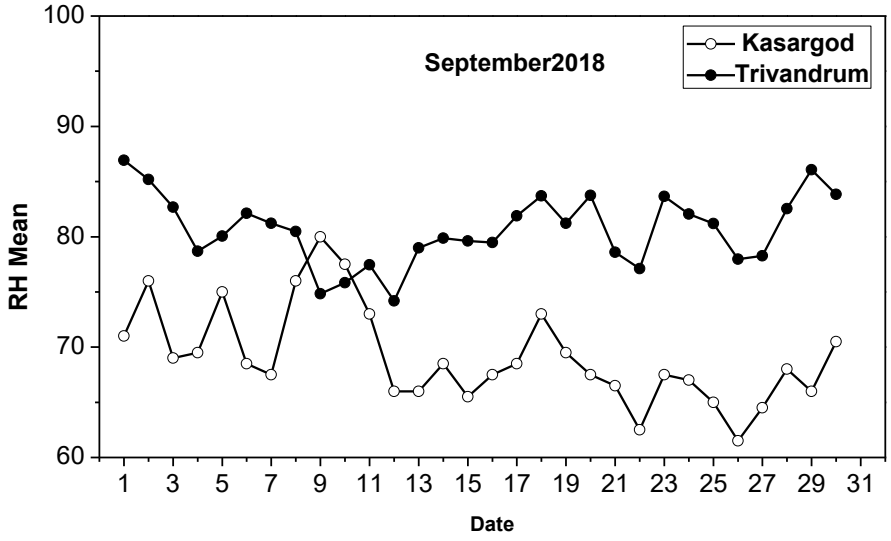

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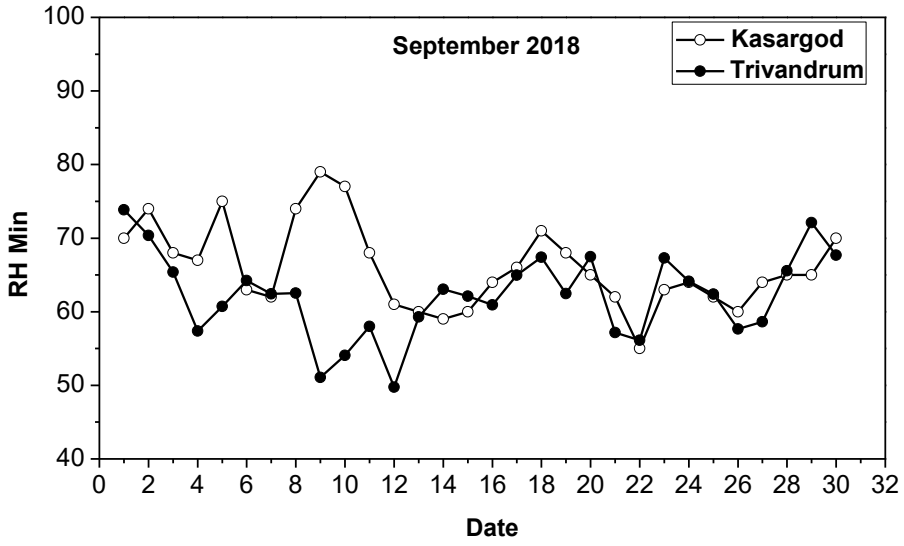

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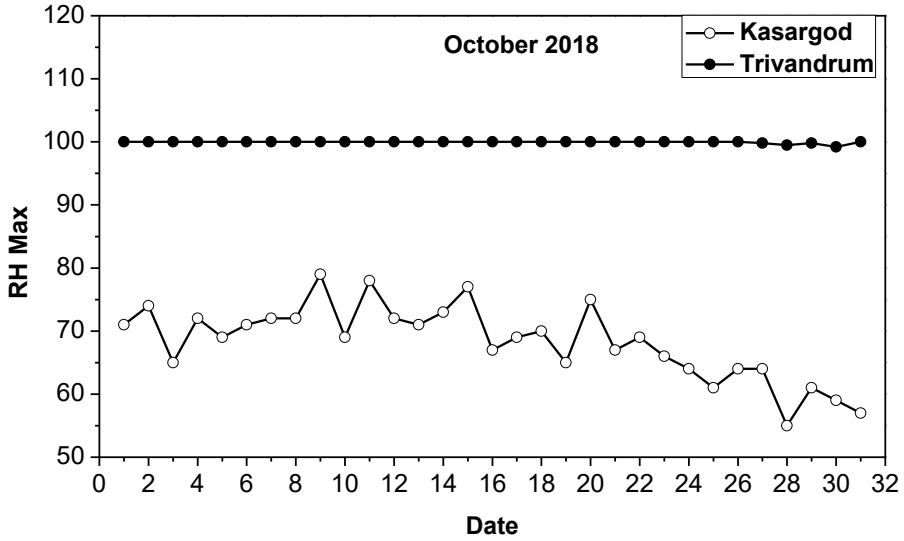

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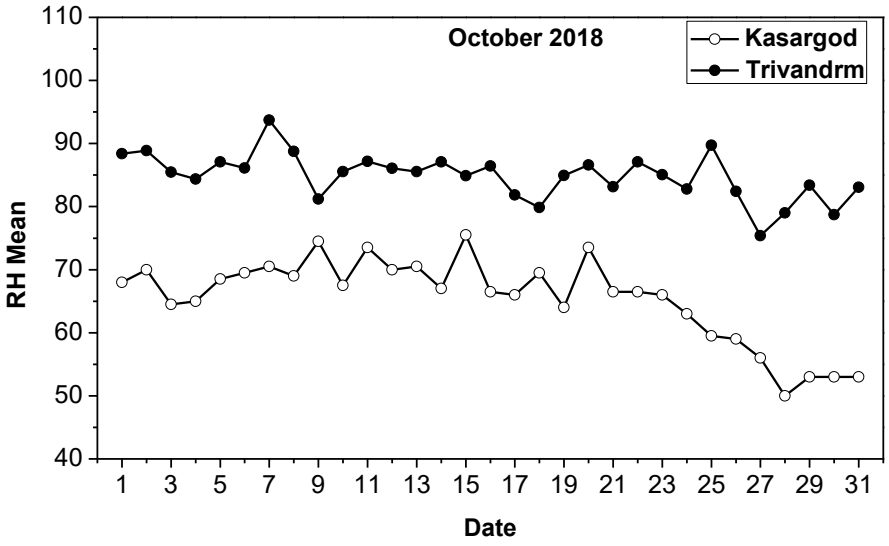
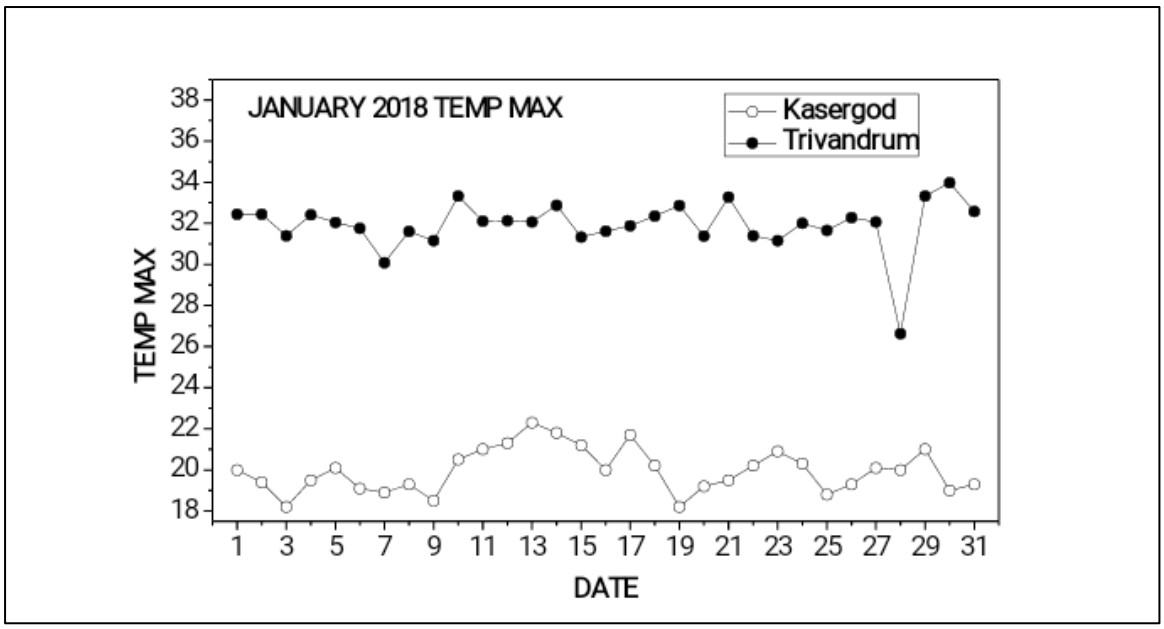


Figure 17

Maximum and mean temperature from January 2018 to October 2018



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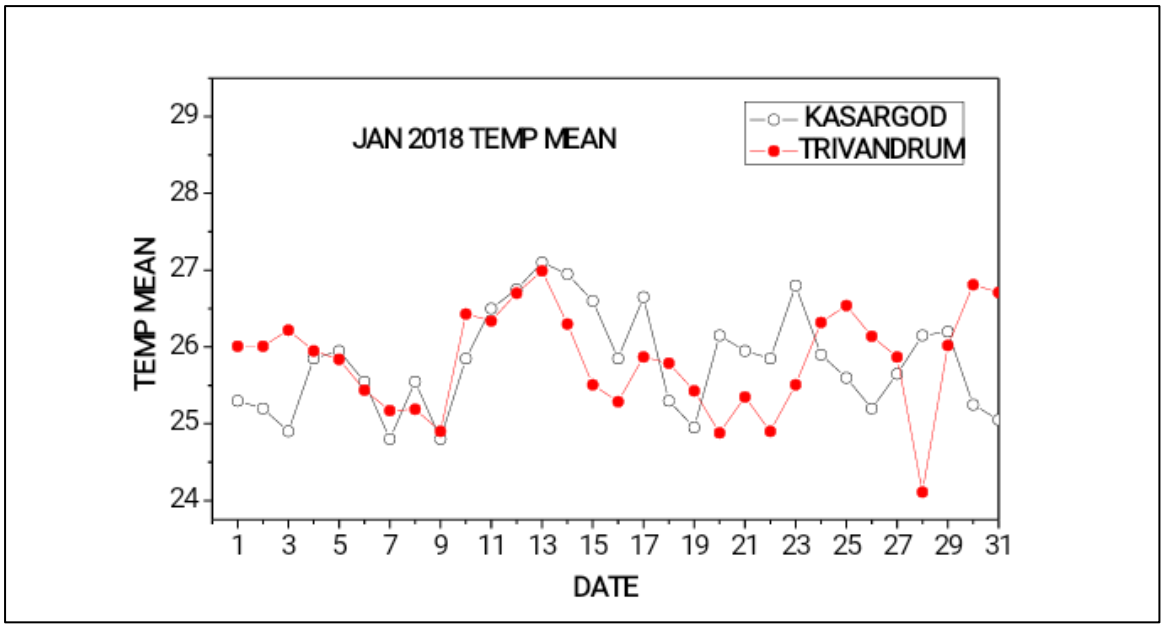

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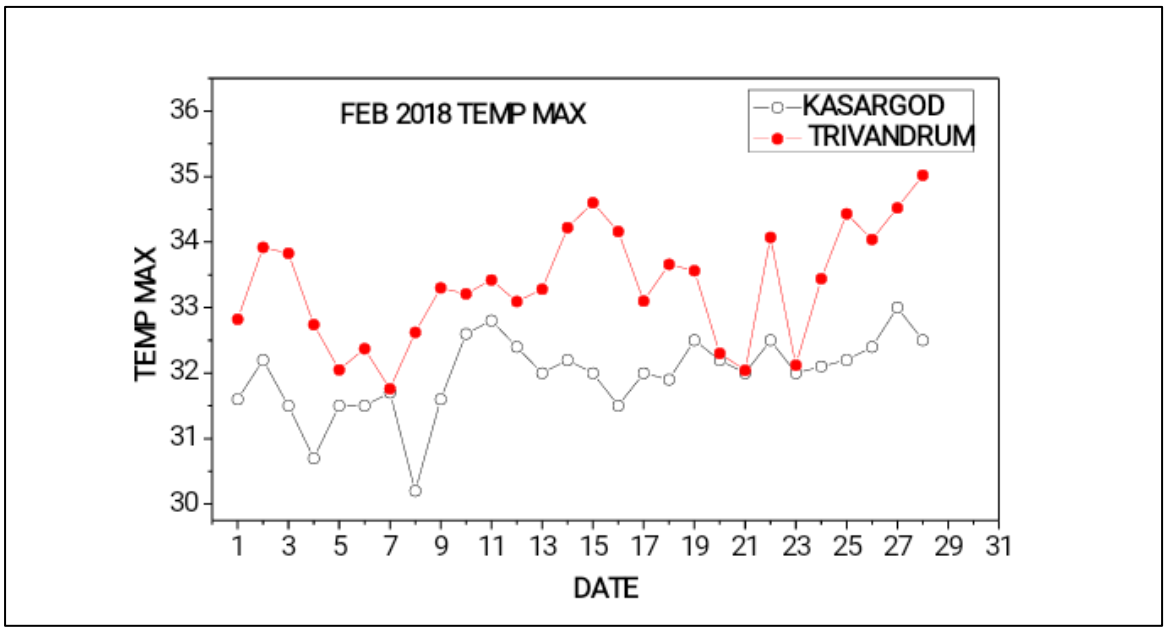

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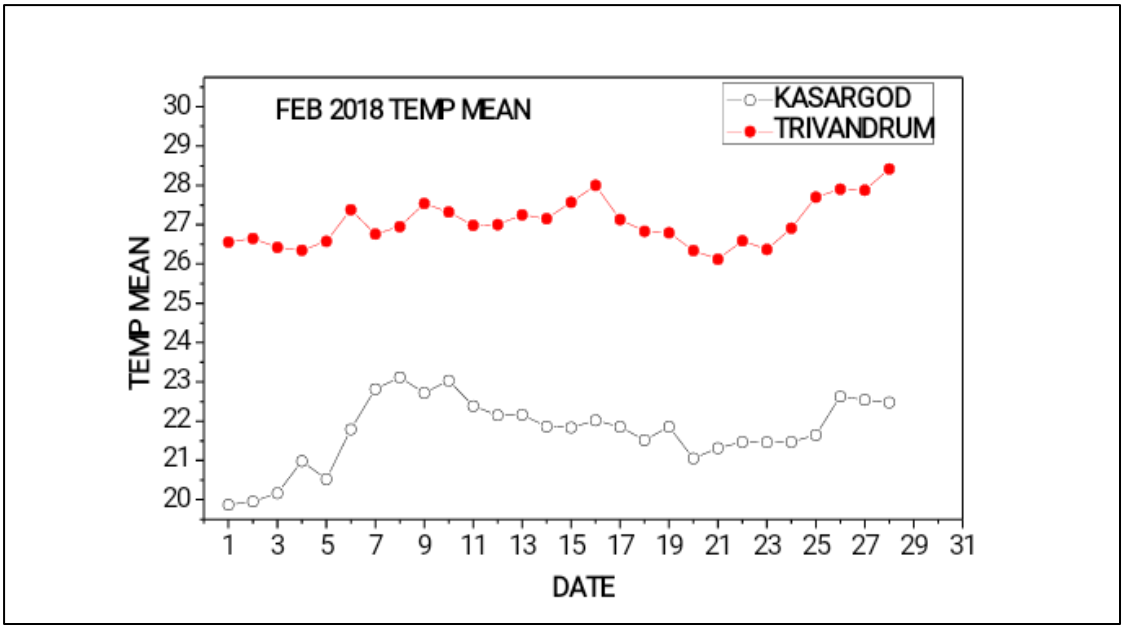

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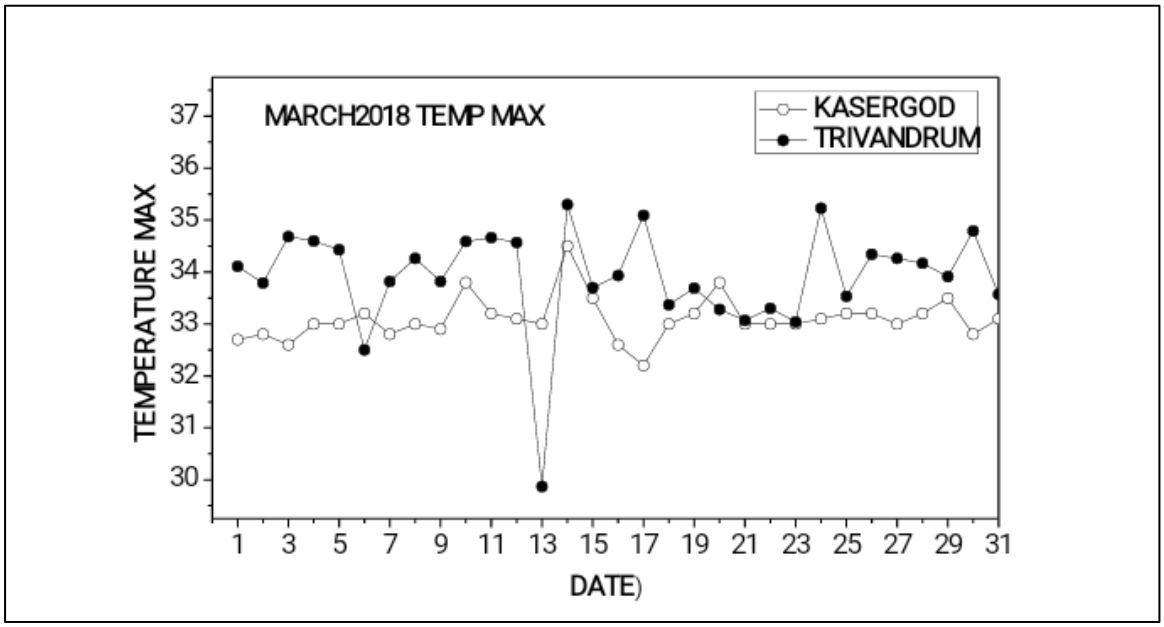

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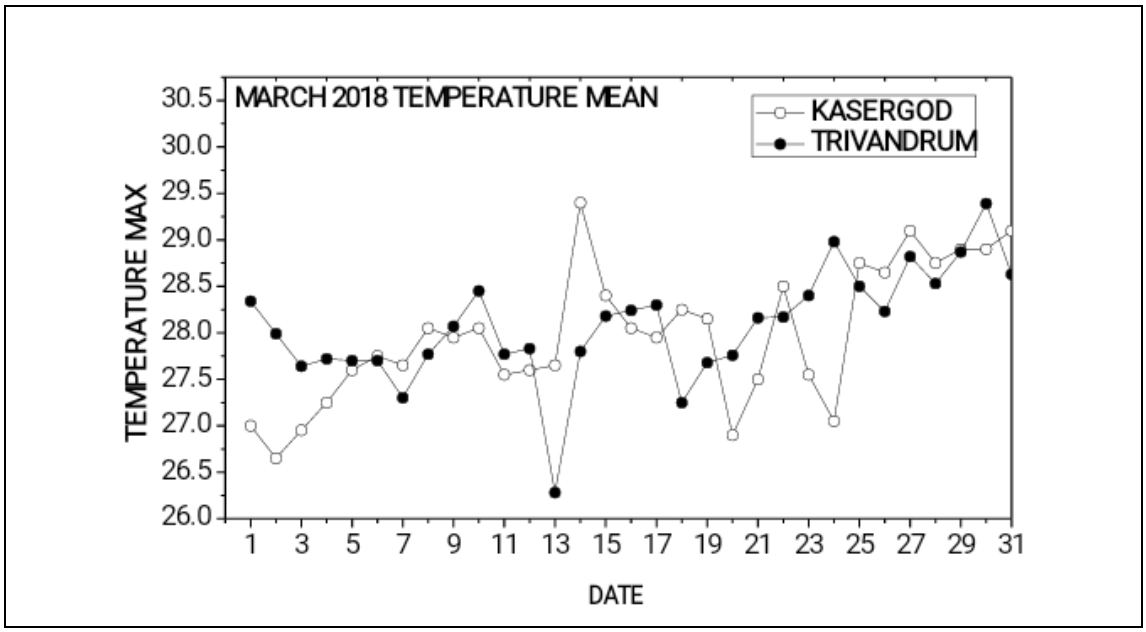

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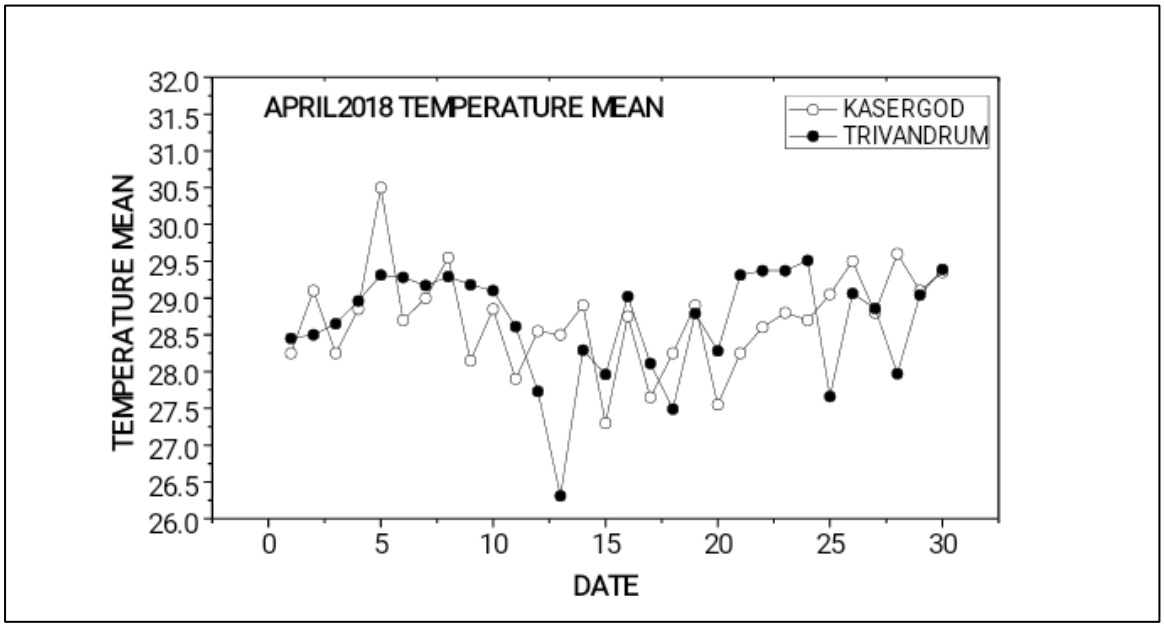

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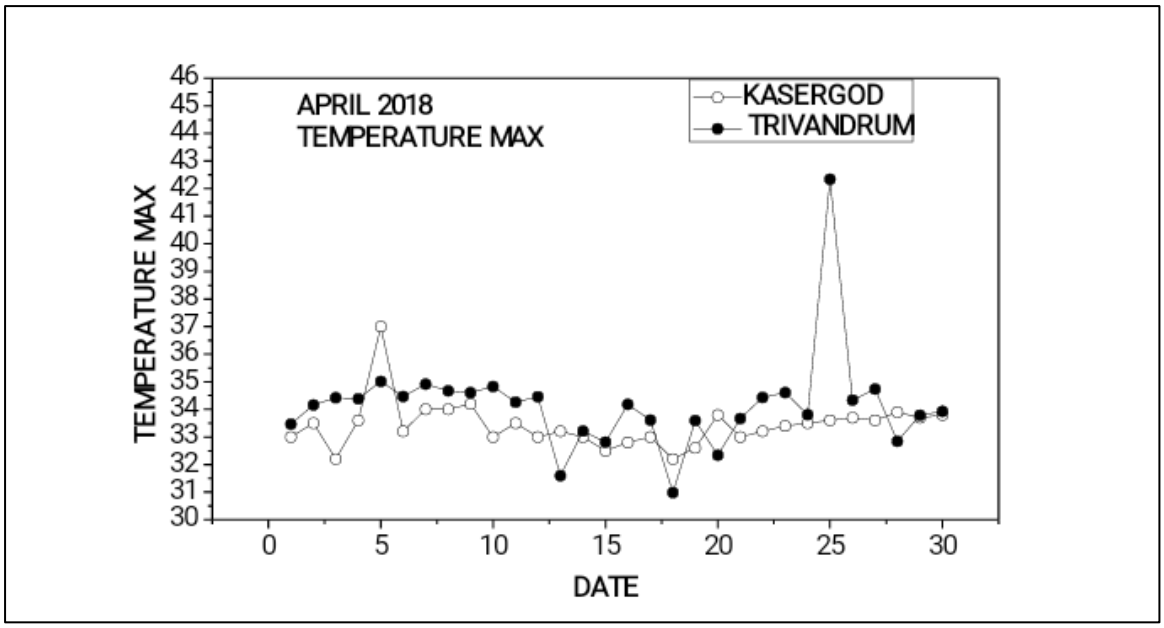

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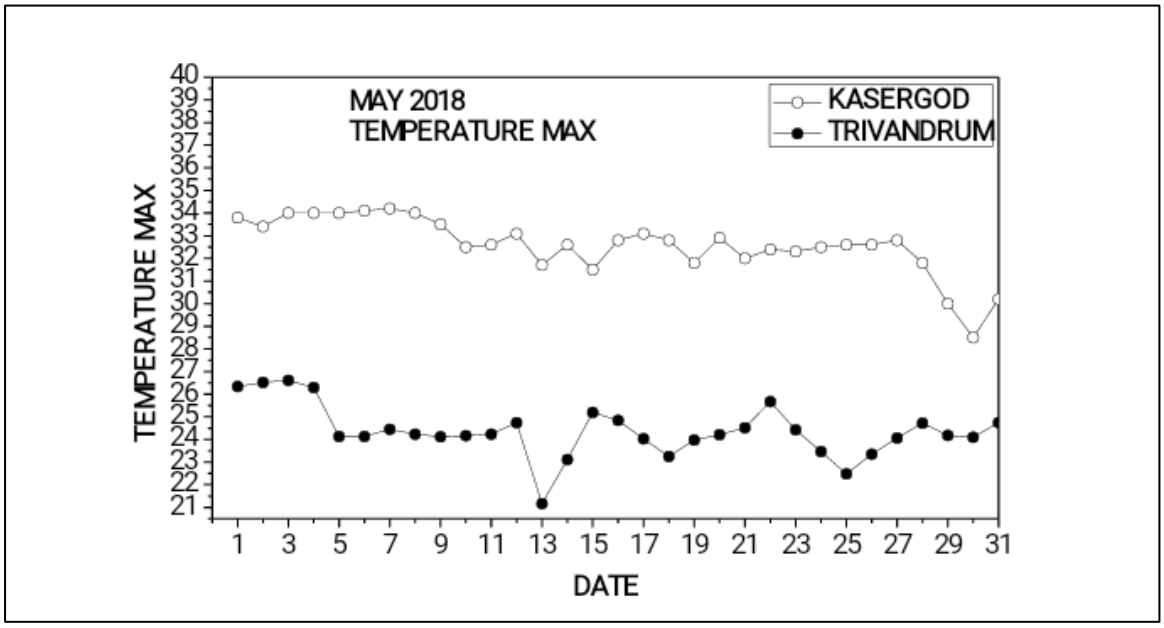

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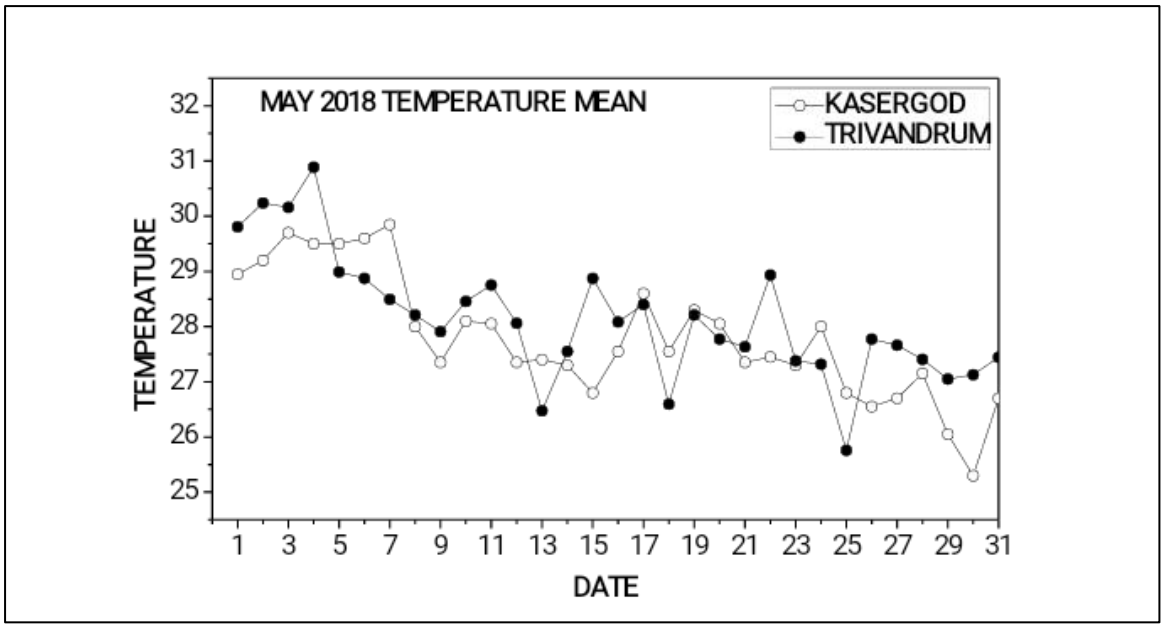

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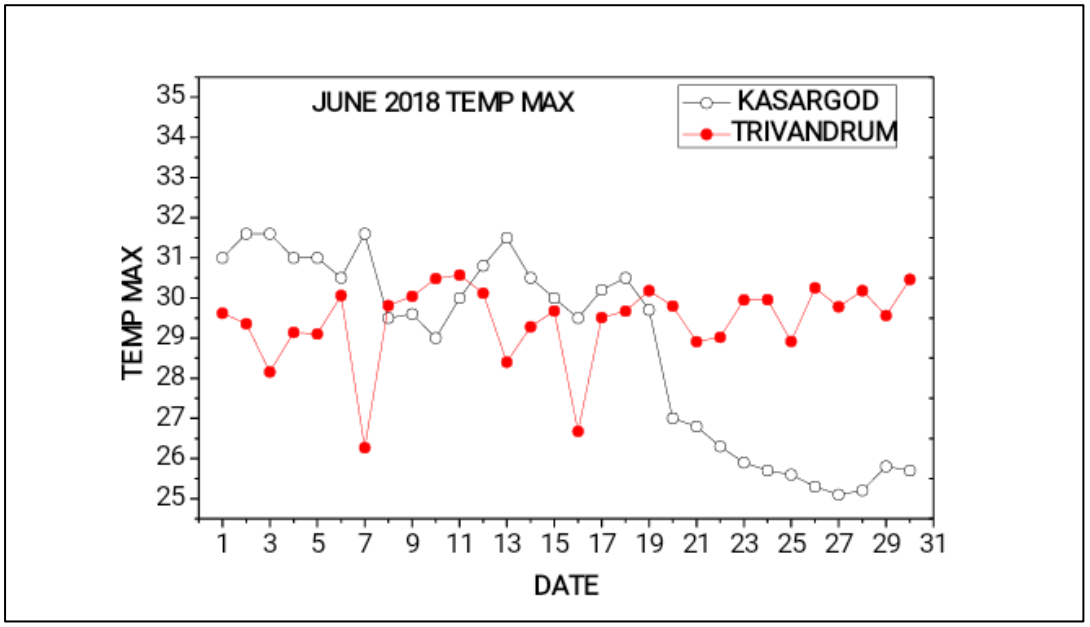

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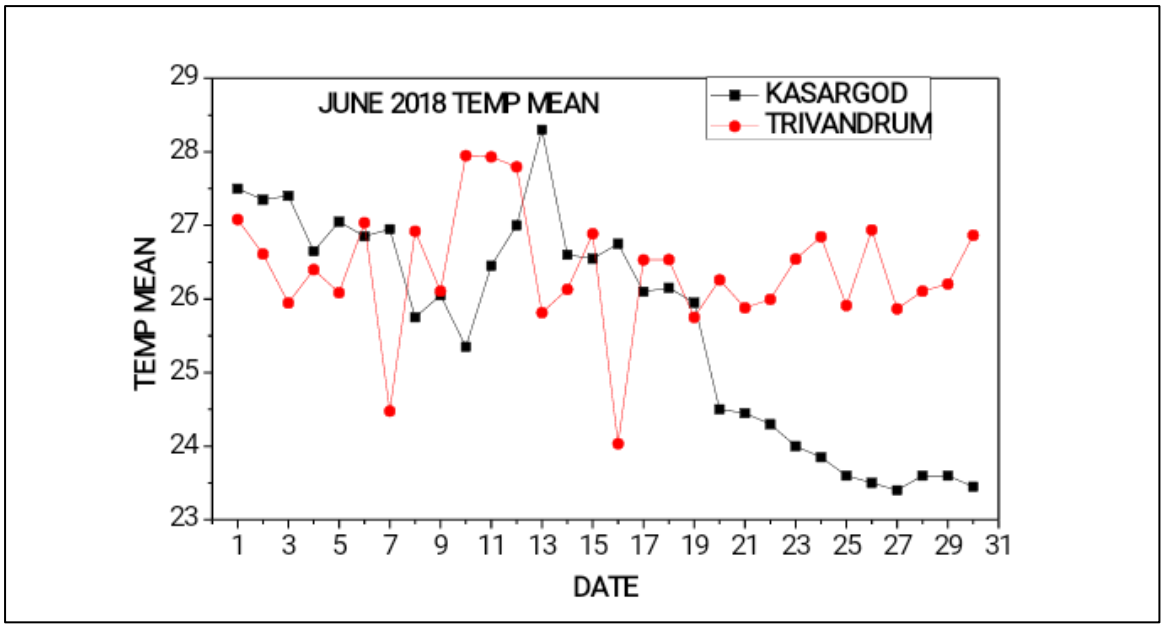

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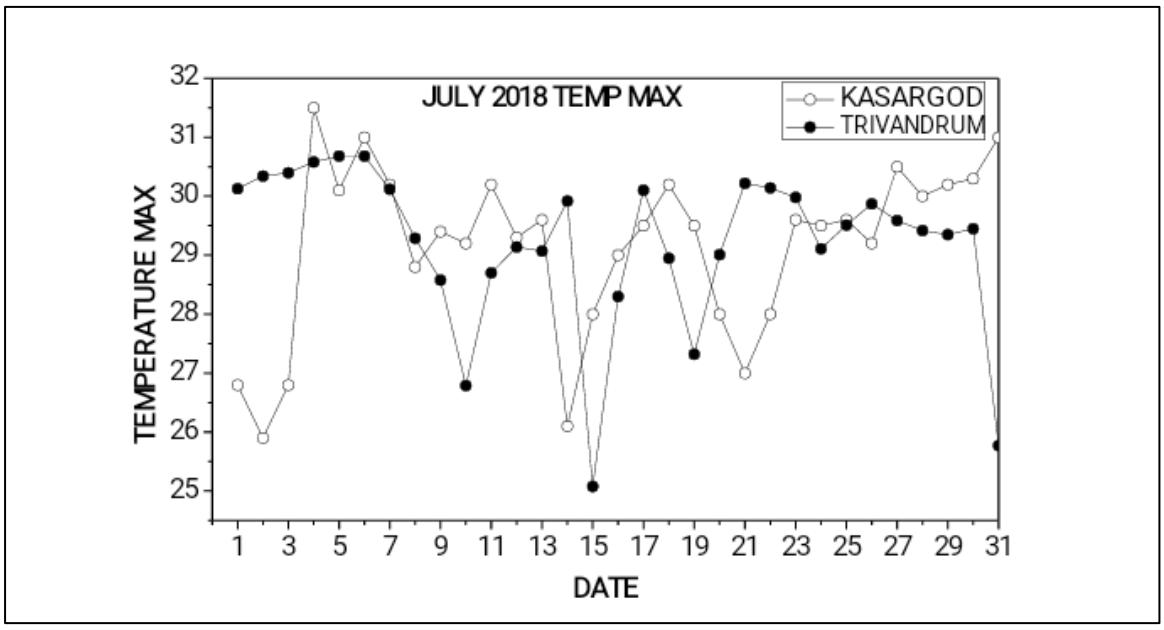

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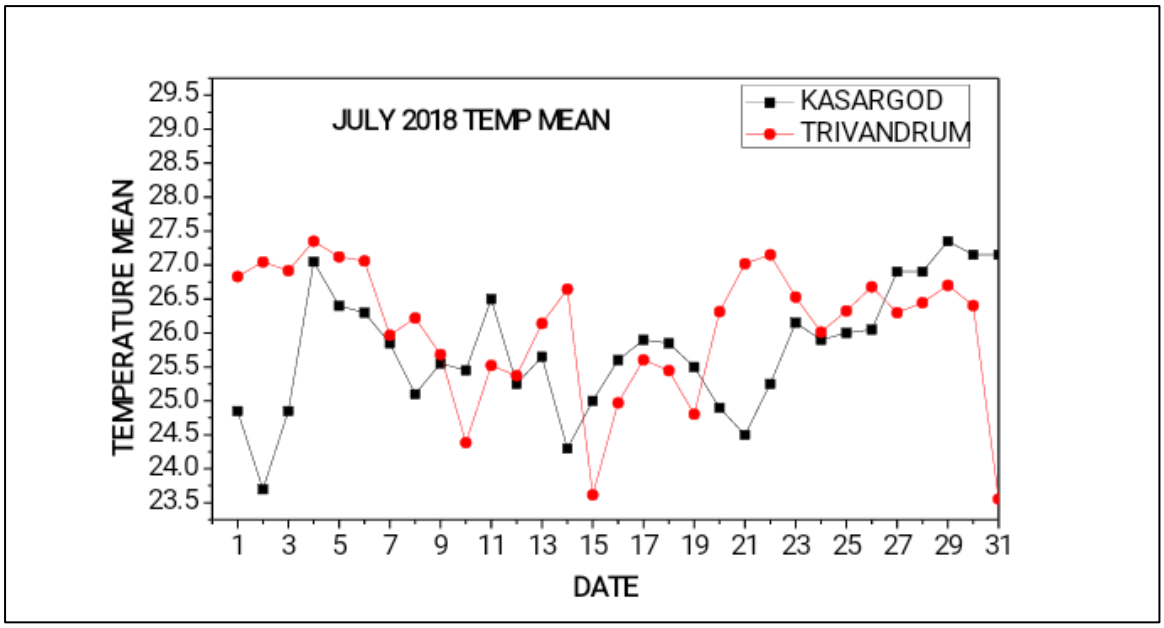

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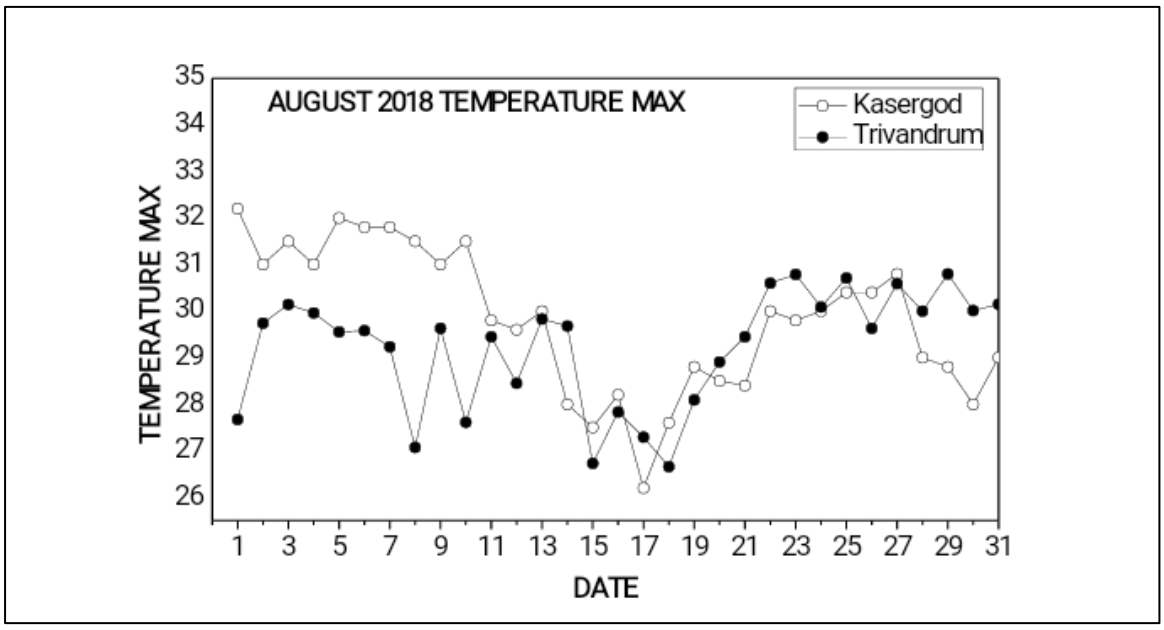

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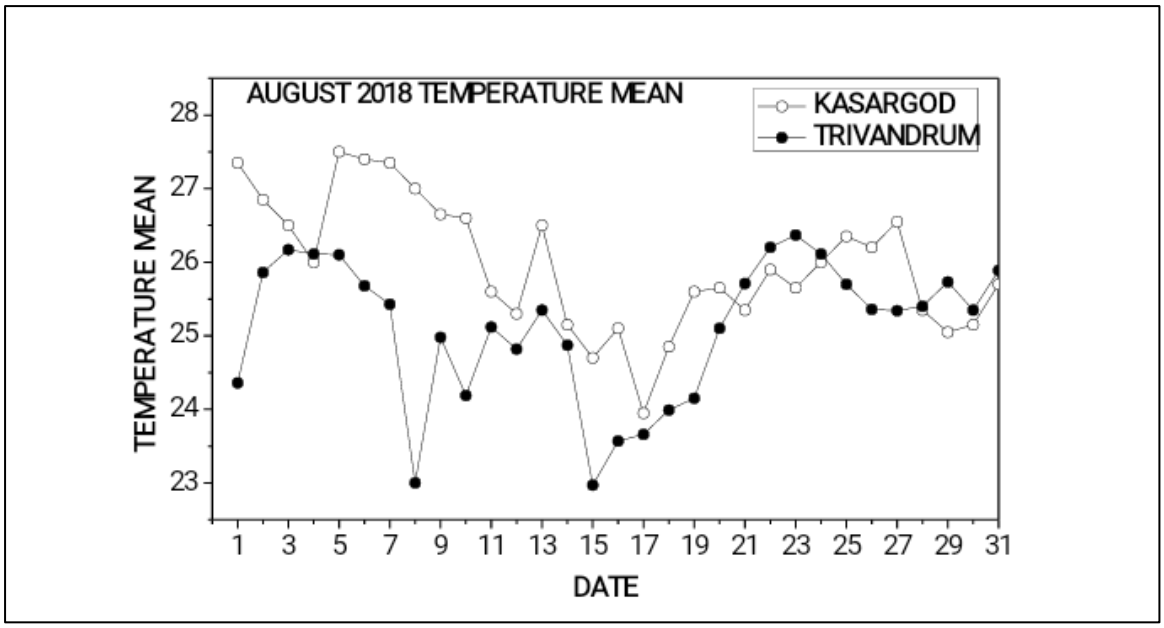

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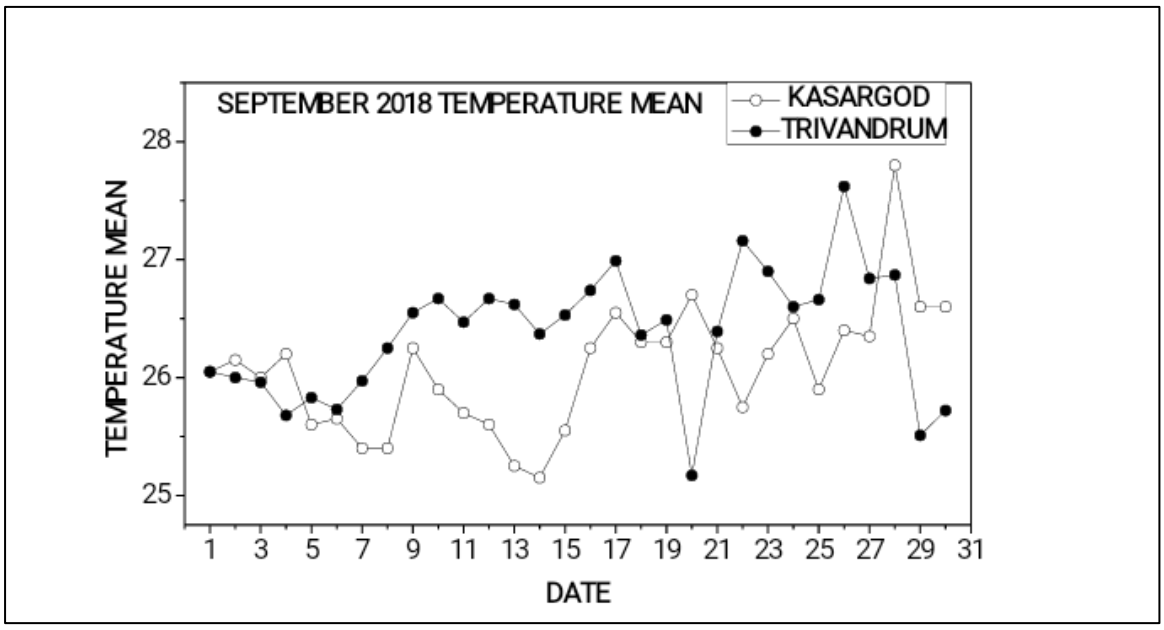

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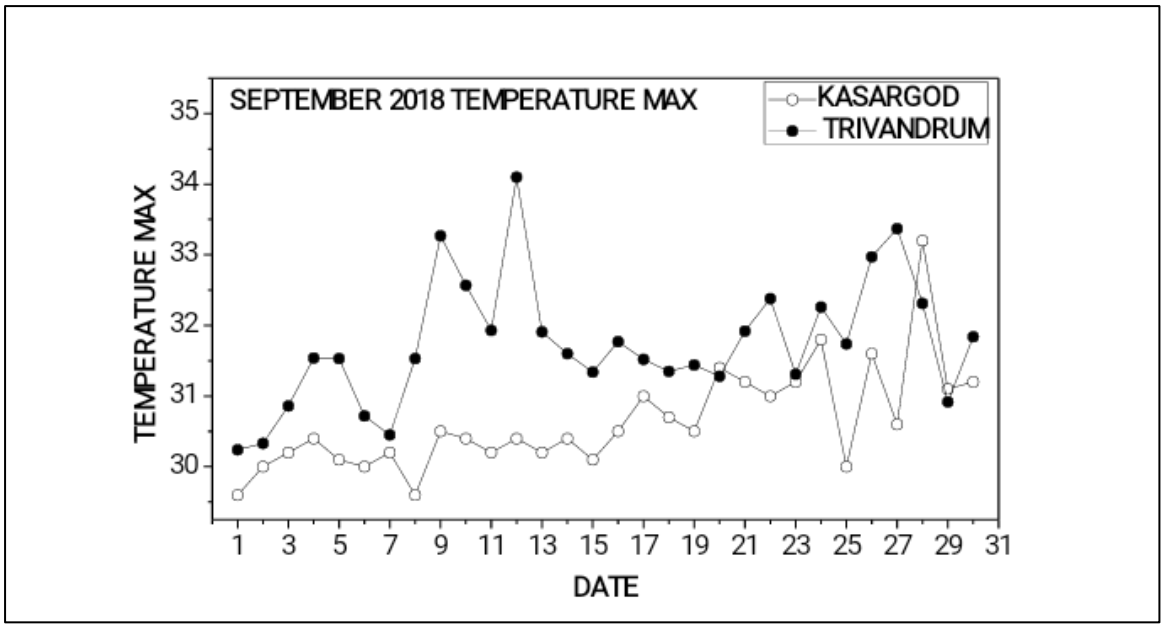

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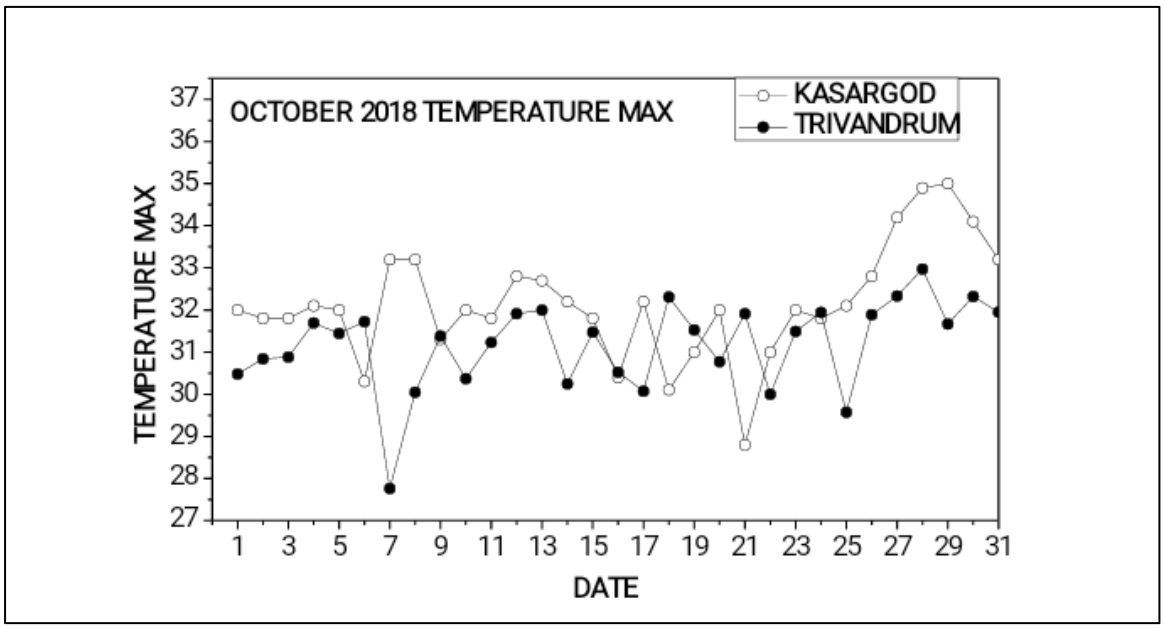

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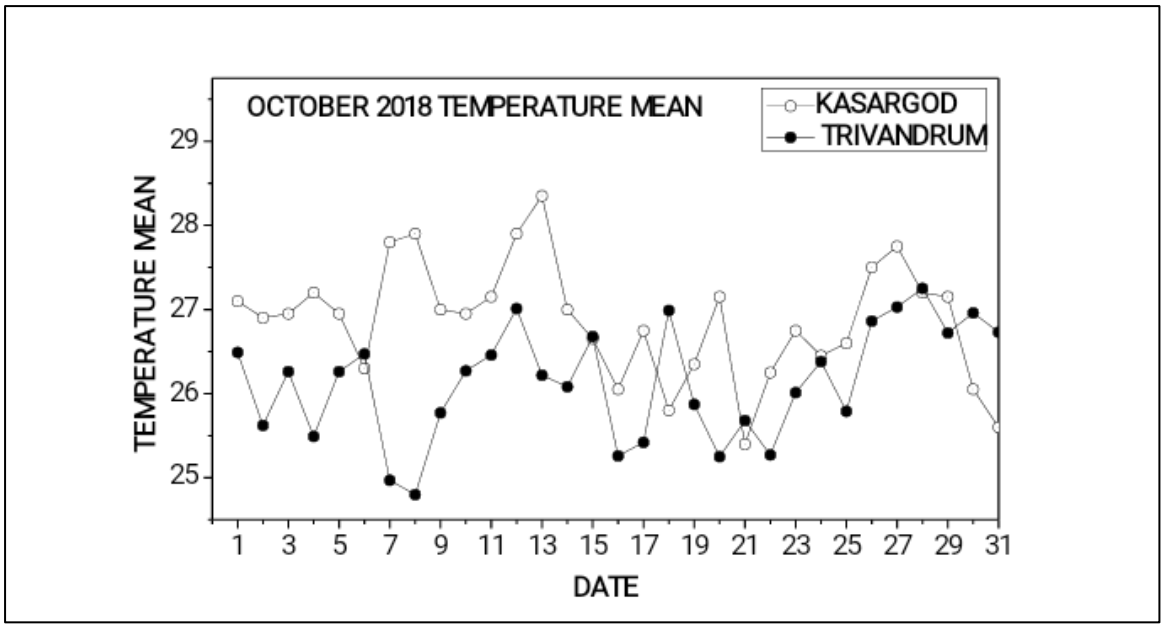

Figure 37

Discussion

Comparison table

MONTH	MAXIMUM TEMPERATURE(in°C)		MAXIMUM RELATIVE HUMIDITY	
	KASARARGOD	TRIVANDRUM	KASARAGOD	TRIVANDRUM
DECEMBER	34	35	82	100
JANUARY	32	34	83	100
FEBRUARY	32.5	34.5	85	99.6
MARCH	34.5	35.5	85	100
APRIL	37	42	87	99.9
MAY	34	36	90	100
JUNE	31.5	30.5	95	100
JULY	31.5	30.5	93	100
AUGUST	32.5	31	95	100
SEPTEMBER	33.2	34.1	81	100
OCTOBER	35	33	79	100
NOVEMBER	36	33.93	87	100

Table 1

CONCLUSION

From the Analysis of data collected from two extreme ends of Kerala, it is found that during Monsoon period, temperature at Trivandrum is lesser than that of Kasaragod. This may be explained on the basis of Flood occurred at Trivandrum side. After Flood temperature increased more at Trivandrum.

Humidity is high at Trivandrum compared to Kasaragod. It may also be related with flood.

During the period January to May, Temperature is larger in Trivandrum. While during monsoon period, temperature at Trivandrum is lesser than that of Kasaragod. After the flood during monsoon, Temperature got increased more in Trivandrum. The steep increase of Temperature in April may be attributed as one of the indicatives of flood occurred at Trivandrum.

Throughout the year, the Relative humidity is larger in Trivandrum, as the value of Relative humidity will depend on certain other factors also. This is expressing the humid character of Climate in Trivandrum.

The importance of this study lies in the fact that the comparison of climate at two extreme ends of Kerala is done successfully on the basis of two weather parameters. As the weather forecasting may help to avoid drastic consequences for communities and individuals, more studies are needed in this sector. In our comparative study of temperatures, we found a peak point at April, which were attributed as one of the indicatives of flood in Trivandrum side. Thus, if such a steep increase is observed, then as per the study, a serious climatic change can be expected.

By considering the above mentioned information provided, we can treat the study as an initiative for the analytical studies of the meteorological data

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