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भारतसरकार
Government of India
पृथ्वीविज्ञानमंत्रालय(एम. ओ. ई. एस.)
Ministry of Earth Sciences (MoES)
भारतमौसमविज्ञानविभाग
INDIA METEOROLOGICAL DEPARTMENT
Climate Research and Services (CR S)

Climate Summary for Winter (Jan-Feb) season and for the month of
February 2021

1. Characteristics of Temperatures of Winter (Jan-Feb) season 2021

The actual observed average maximum, average minimum and mean temperature for the country as a whole during Winter 2021 are 27.47 °C, 15.39 °C and 21.43 °C respectively, against the normal of 26.70 °C, 14.59 °C and 20.65 °C based on period 1981-2010. Thus the average maximum, average minimum and mean temperature for the country as a whole were above normal by 0.77 °C, 0.80 °C and 0.78 °C respectively. The climatological data based on the period of 1981 to 2010 are used to calculate the normal and hence the anomaly (Actual average temperature in 2021- normal temperature based on data of 1981-2010). Figure 1 shows time series of all India seasonal average maximum, average minimum and mean temperature during 1971-2021. The average temperatures for the four homogeneous regions (North West , East & NE India, Central and South Peninsular India) are given in Figure 2.

The observed spatial temperature pattern of seasonal average maximum, average minimum and mean temperature over India and their departures from normal (1981 to 2010 period) for winter season 2021 is given in Figure 3.

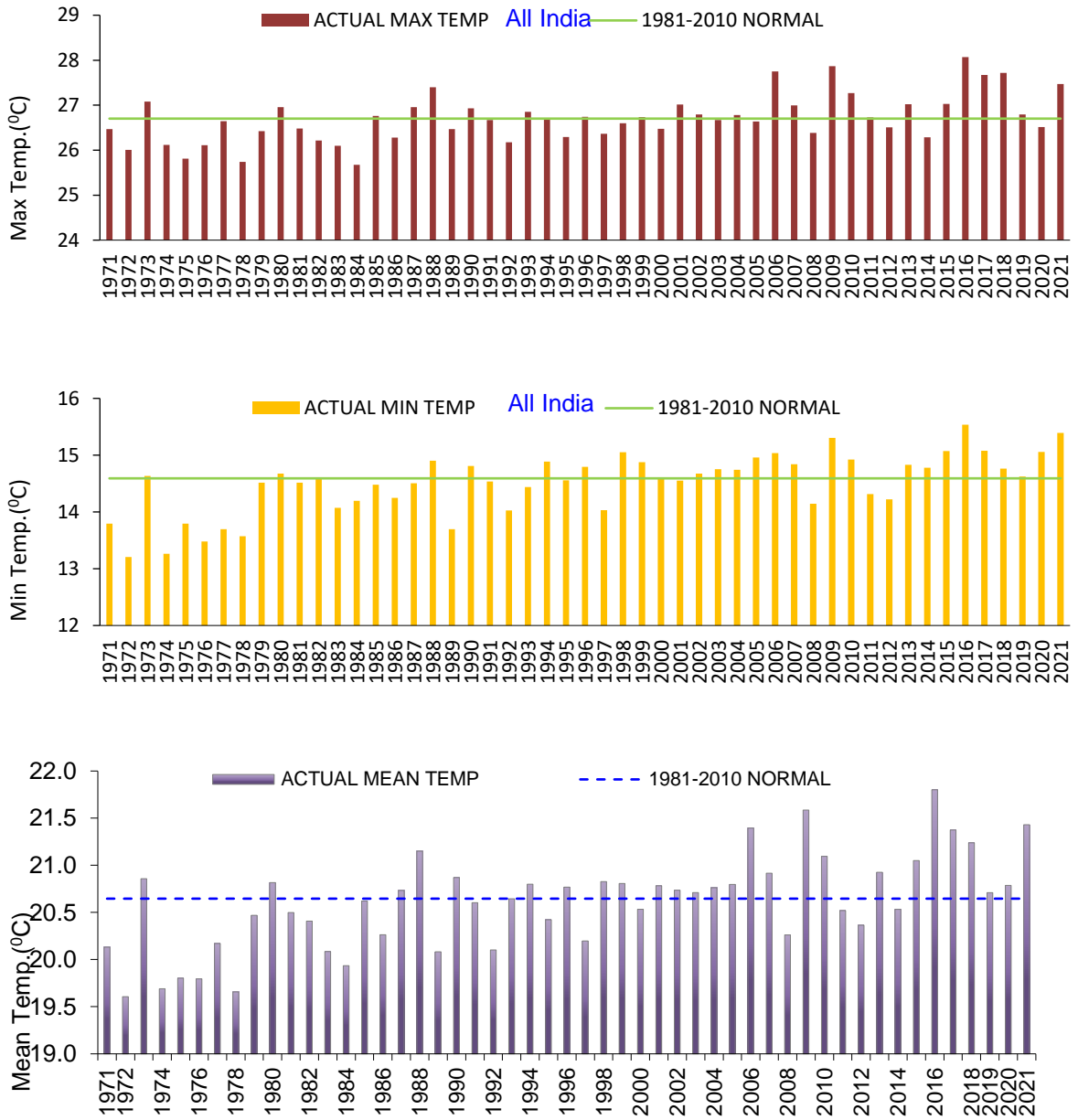


Fig 1: Time series of All India seasonal average maximum, average minimum and mean temperature for the winter season during 1971-2021.

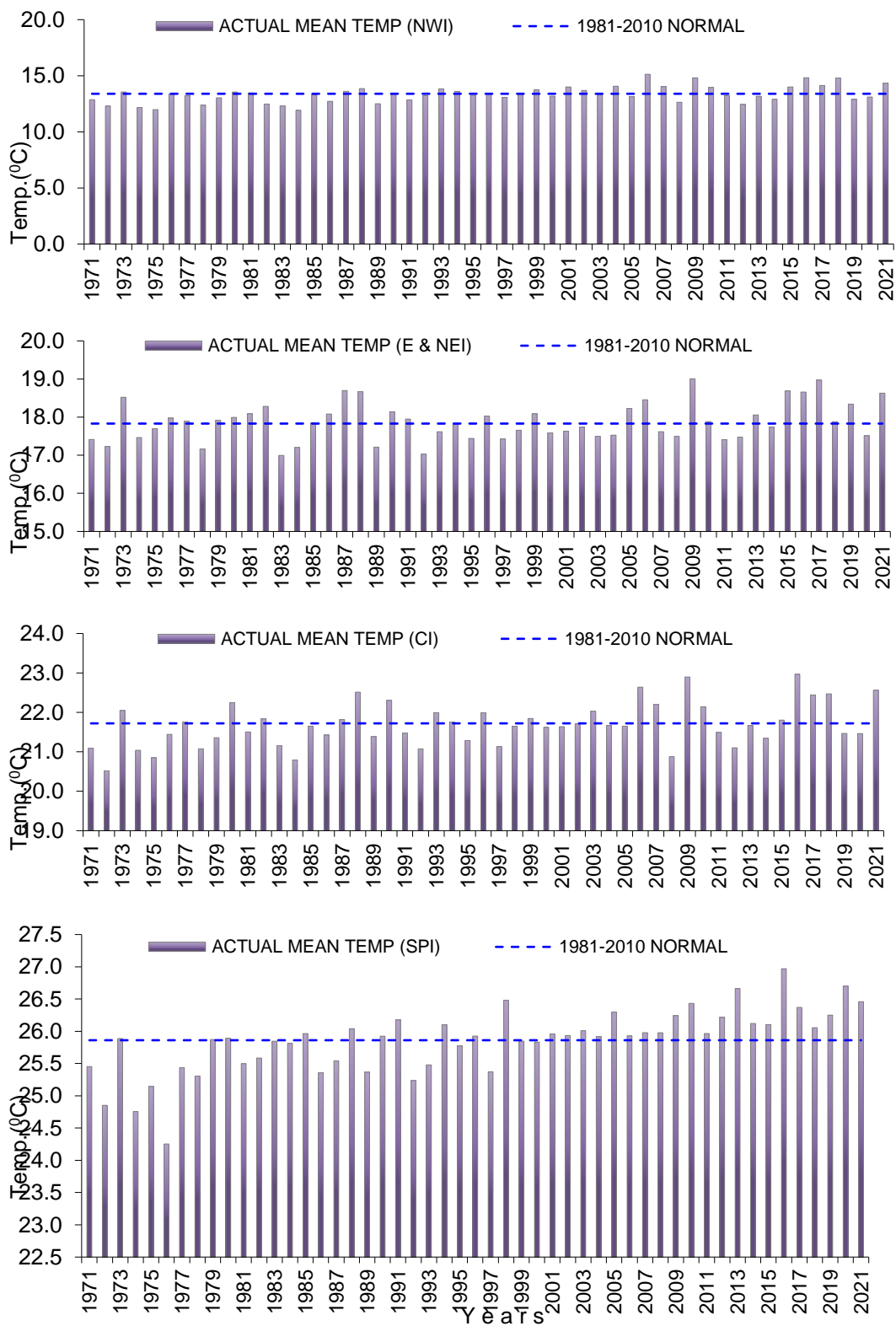


Fig 2: Time series of seasonal mean temperature (winter) over four homogeneous regions of India during 1971-2021.

The Temperature during winter (Jan-Feb) 2021 for All India and homogeneous regions are given bellow;

WINTER 2021		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	27.47	15.39	21.43
	NORMAL	26.70	14.59	20.65
	ANOMALY	0.77	0.80	0.78
NORTH WEST INDIA	ACTUAL	21.17	7.51	14.34
	NORMAL	19.89	6.89	13.39
	ANOMALY	1.27	0.61	0.94
EAST & NORTH EAST INDIA	ACTUAL	25.55	11.71	18.63
	NORMAL	24.52	11.14	17.83
	ANOMALY	1.03	0.57	0.80
CENTRAL INDIA	ACTUAL	29.69	15.43	22.56
	NORMAL	28.84	14.60	21.72
	ANOMALY	0.85	0.83	0.84
SOUTH PENNINSULAR INDIA	ACTUAL	30.91	22.01	26.46
	NORMAL	30.68	21.04	25.86
	ANOMALY	0.23	0.96	0.60

The five highest temperature records since 1901 for All India MeanTemperature and Minimum Temperature is given in the table below.

All India (Winter (Jan-Feb 2021))				
Year	T Mean	Normal	Anomaly	Rank
2016	21.8009	20.65	1.15	1
2009	21.5858	20.65	0.94	2
2021	21.4304	20.65	0.78	3
2006	21.3942	20.65	0.75	4
2017	21.374	20.65	0.73	5
Year	T Min	Normal	Anomaly	Rank
2016	15.5353	14.59148	0.94382	1
2021	15.3908	14.59148	0.79932	2
2009	15.3056	14.59148	0.71412	3
1926	15.2981	14.59148	0.70662	4
1912	15.2899	14.59148	0.69842	5

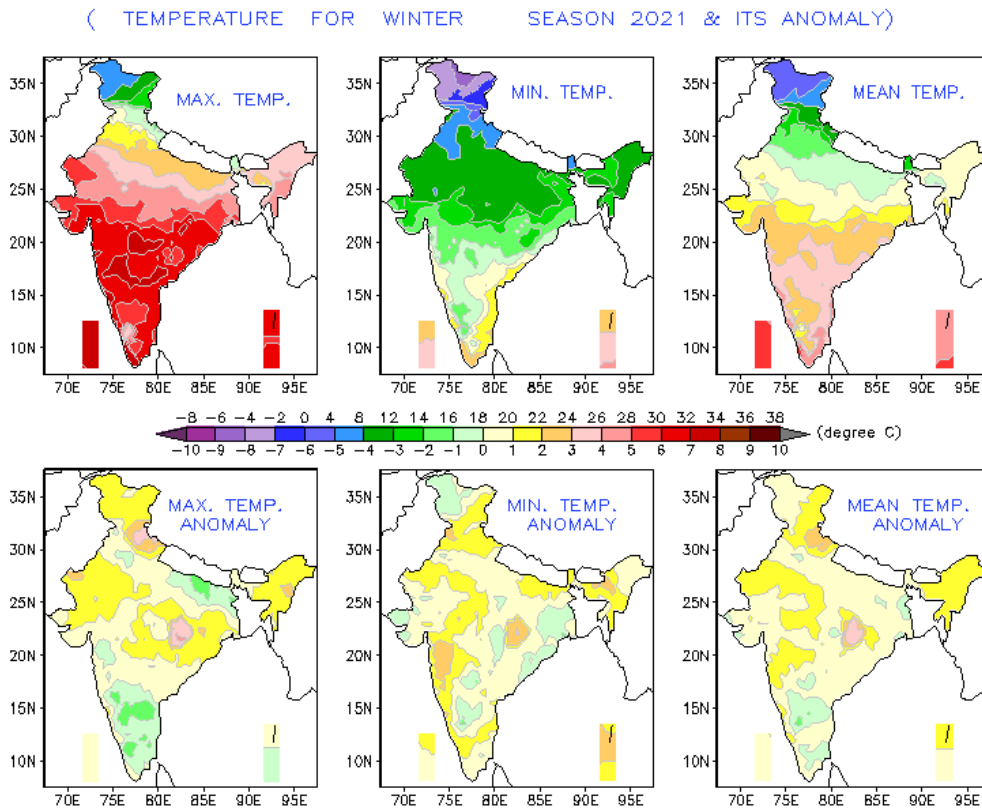


Fig 3: Observed spatial temperature pattern of seasonal average maximum average minimum, and mean temperature over India (top three from left to right) and their departure from normal (1981 to 2010 period) for winter season 2021(lower three from left to right).

2. Characteristics of Temperatures of the month of February 2021

The observed spatial temperature pattern of monthly average maximum, average minimum and mean temperature over India and their departures from normal (1981 to 2010 period) for the month of February 2021 is given in Figure 4. The actual observed average maximum, average minimum and mean temperature for the country as a whole during February 2021 are 29.09 °C, 16.01 °C and 22.55 °C respectively, which are above normal.

TEMPERATURE FOR THE MONTH FEB 2021 & ITS ANOMALY

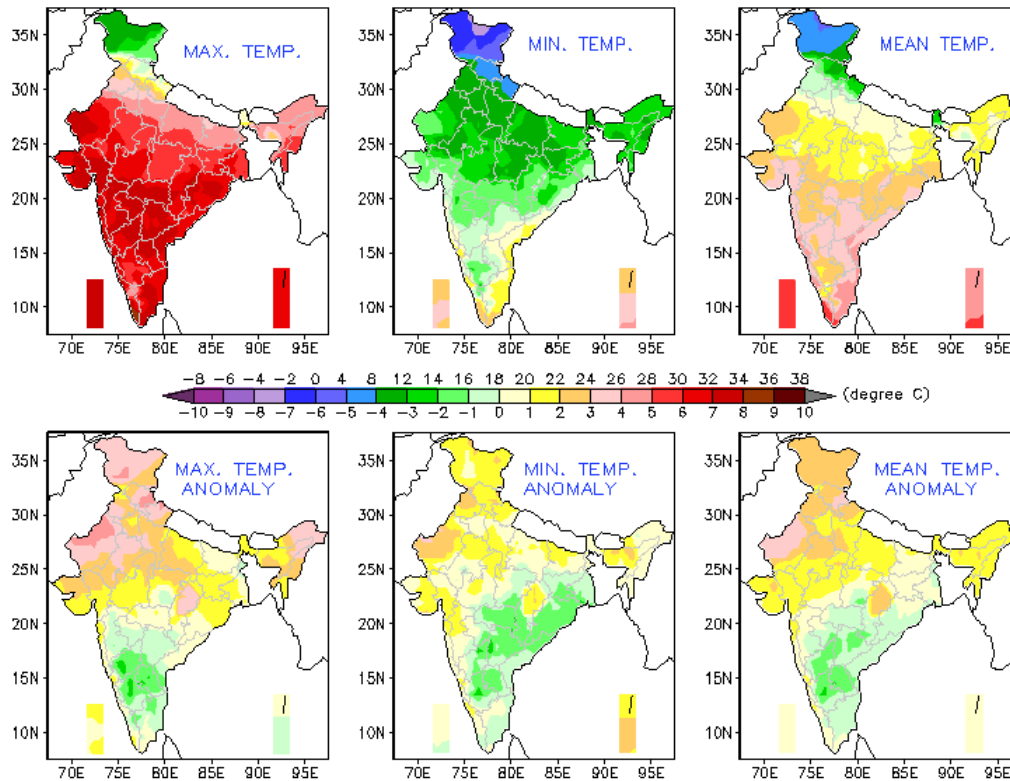


Fig 4: Observed spatial temperature pattern of monthly average maximum average minimum, and mean temperature over India (top three from left to right) and their departure from normal (1981 to 2010 period) for February 2021(lower three from left to right).

Table below shows actual, normal and anomalies of All India and 4 homogeneous regions during February 2021.

FEBRUARY 2021		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	29.09	16.01	22.55
	NORMAL	27.80	15.49	21.65
	ANOMALY	1.29	0.51	0.90
NORTH WEST INDIA	ACTUAL	24.40	9.45	16.92
	NORMAL	21.46	8.17	14.82
	ANOMALY	2.94	1.27	2.11
EAST & NORTH EAST INDIA	ACTUAL	27.66	12.53	20.09
	NORMAL	26.00	12.32	19.16
	ANOMALY	1.66	0.21	0.93
CENTRAL INDIA	ACTUAL	31.09	16.05	23.57
	NORMAL	29.88	15.64	22.76
	ANOMALY	1.21	0.41	0.81
SOUTH PENINSULAR INDIA	ACTUAL	31.43	21.68	26.56
	NORMAL	31.35	21.50	26.43
	ANOMALY	0.07	0.18	0.13

Figure 5 shows time series of all India monthly average maximum, average minimum and mean temperature for during 1971-2021.

The average maximum and mean temperature over Northwest India as a whole during February 2021 were 24.4 °C and 16.92 °C respectively. The maximum and mean temperatures over Northwest India exceeded the normal during February (by 2.94°C and 2.11°C respectively, second warmest since 1901). Figure 6 shows time series of Northwest India monthly average maximum and mean temperature during 1971-2021.

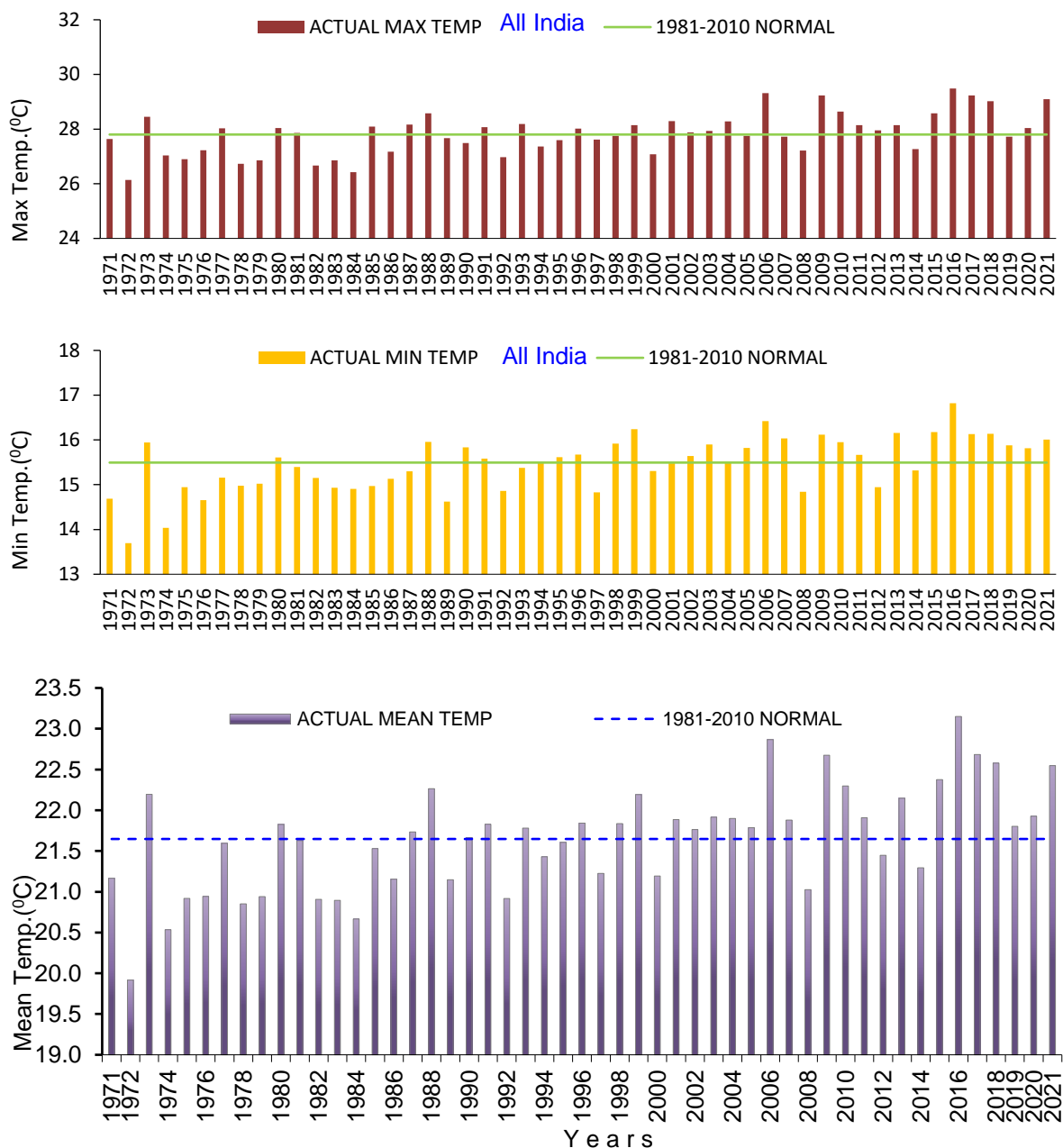


Fig 5: Time series of All India monthly average maximum, average minimum and mean temperature for the month of February during 1971-2021.

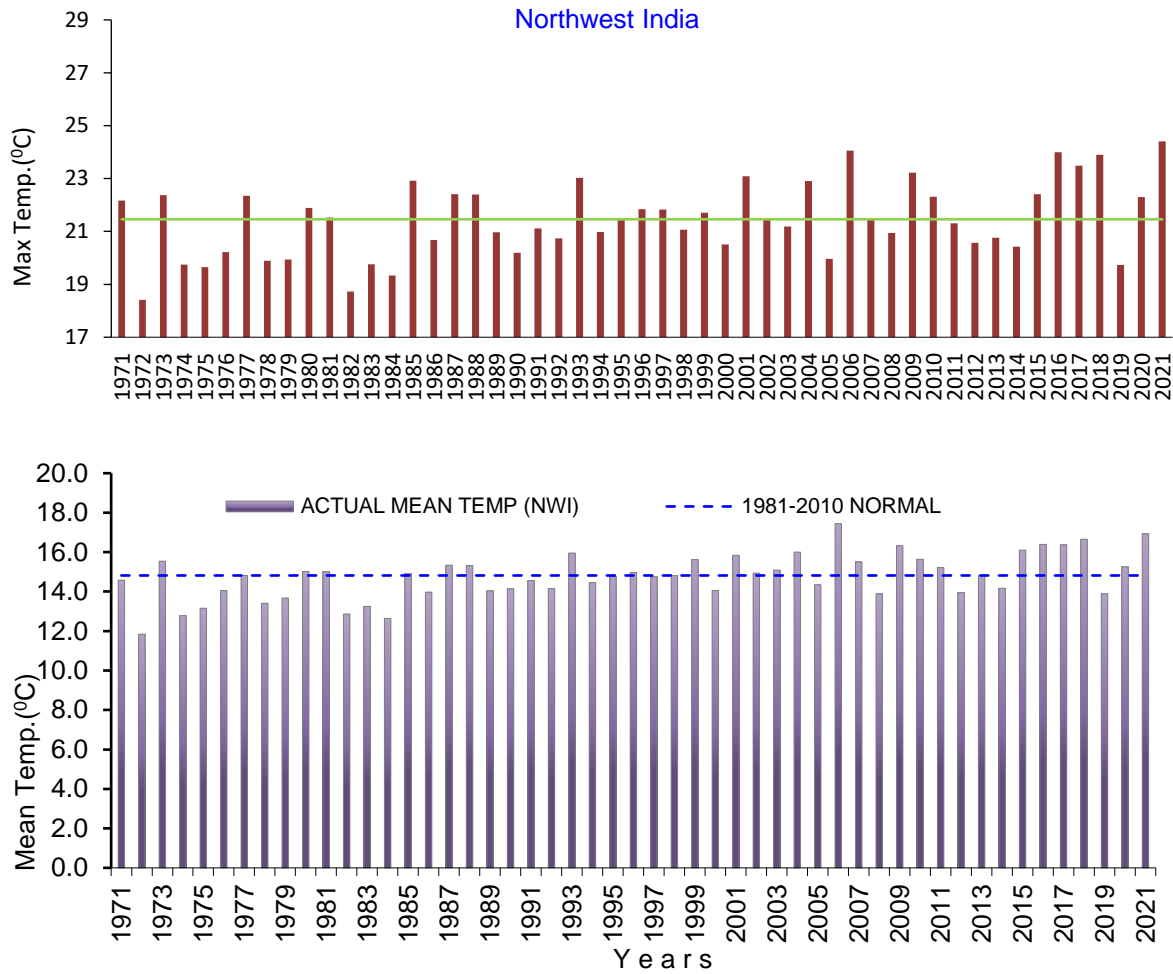


Fig 6: Time series of Northwest India monthly average maximum and mean temperature for the month of February during 1971-2021.

The five highest temperature records and corresponding ranks since 1901 for the region North West India (T Mean & T Max) are given in the table below.

North West India (February)				
Year	T Mean	Normal	Anomaly	Rank
2006	17.4368	14.82	2.62	1
2021	16.9244	14.82	2.11	2
1960	16.7805	14.82	1.96	3
2018	16.6523	14.82	1.84	4
2016	16.3897	14.82	1.57	5
Year	T Max	Normal	Anomaly	Rank
1960	24.5522	21.46051	3.091693	1
2021	24.4034	21.46051	2.942893	2
2006	24.0575	21.46051	2.596993	3
2016	23.9986	21.46051	2.538093	4
2018	23.8969	21.46051	2.436393	5

3. Seasonal Rainfall Scenario for Winter (January to February 2021)

Rainfall over the country as a whole for the winter season, 2021 shows that it has recorded 27.8mm which is 32% less than its Long Period Average (LPA) of 40.8 mm. Rainfall over South Peninsular India (56.1mm) during the season was fourth highest since 1901 after the years 1901 (61 mm), 1986 (59.9 mm) and 1984 (59.2 mm). The observed winter season spatial rainfall for the year 2021, normal rainfall for the period 1961 to 2010 and its departures from normal is given in Figure 7. Detail information for the seasonal rainfall is given below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	27.8	40.8	-32.0
Northwest India	39.1	78.9	-51.0
Central India	8.8	15.2	-42.0
South Peninsula	56.1	16.2	246
East & northeast India	11.5	52.1	-78.0

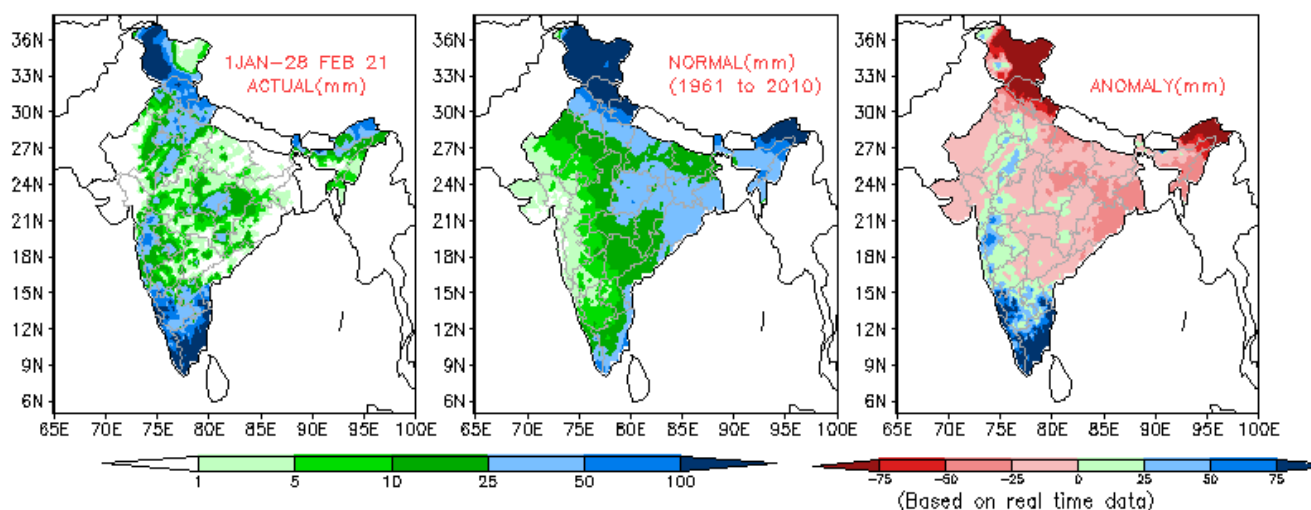


Fig 7: Observed spatial pattern of seasonal average Rainfall over India and their departure from normal (1961 to 2010 period) for winter 2021 season.

4. Monthly Rainfall Scenario (01 to 28 February, 2021)

Rainfall over the country as a whole for the month of February, 2021 shows that it has recorded 7.6 mm which is 68 % less than its Long Period Average (LPA) of 23.5 mm. Rainfall over All India during the month of February was sixth lowest since 1901. The observed spatial rainfall, normal rainfall for the period 1961 to 2010 and its departures from normal for February month 2021 is given in Figure 8. The monthly

rainfall for February 2021 is given in the table below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	7.6	23.5	-67.6
Northwest India	10.6	45.3	-76.5
Central India	5.1	7.7	-34.4
South Peninsula	10.3	8	29
East & northeast India	3.9	33.8	-88.4

During this month, 9 sub-divisions received large excess, 2 normal while remaining 23 are deficient or large deficient rainfall and 2 with No rainfall.

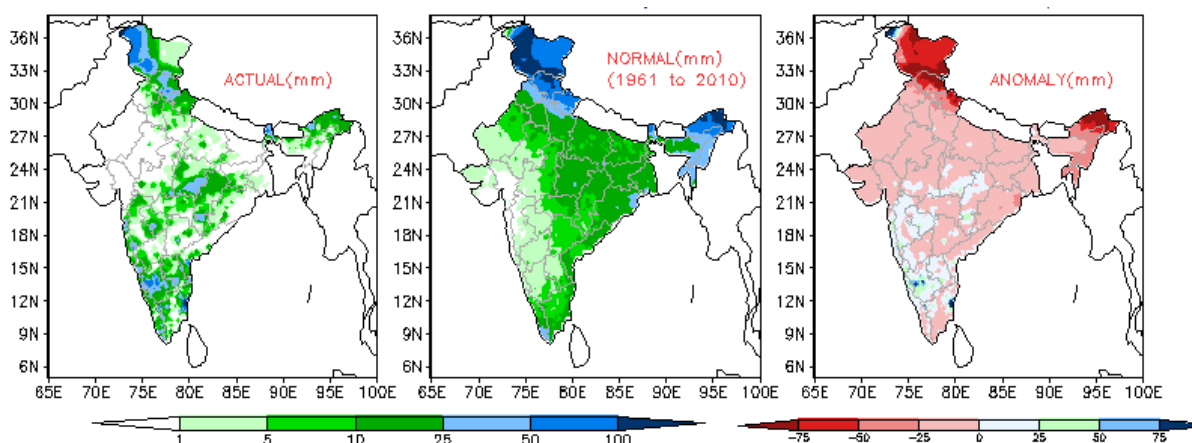


Fig 8: Observed spatial Rainfall pattern for the month of February 2021 over India and their departure from normal (1961 to 2010 period).

5. Frequency of Heavy Rainfall events

The February 2021 also witnessed heavy rainfall events over few stations in the South Peninsular India. The location of occurrences of heavy rainfall events are shown in the Figure 9. Cuddalore reported 185.6 and 112 mm of rainfall on 21st February and 22nd February respectively and its previous highest recorded rainfall was 119.4 mm on 9th February 1930.

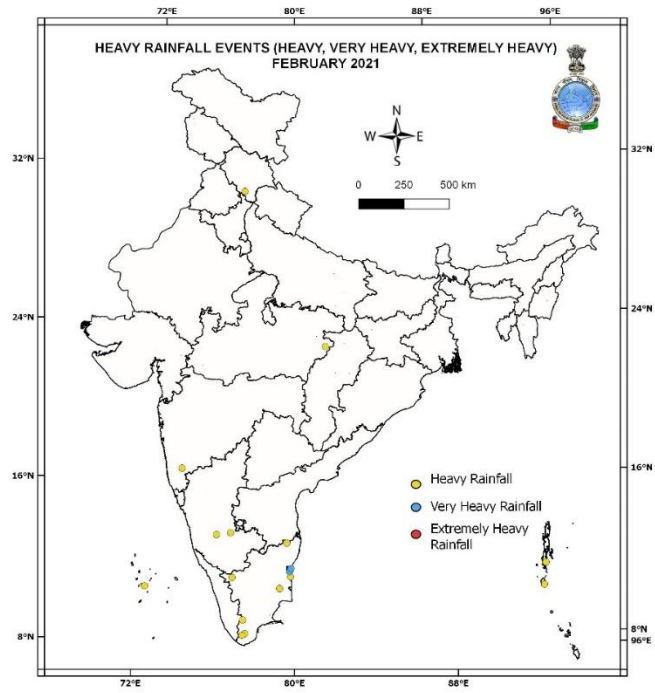


Fig 9: The location of occurrences of heavy rainfall events in the month of February 2021.