

भारत सरकार
Government of India
पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)
Ministry of Earth Sciences (MoES)



भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT
Climate Research and Services (CRS)

Climate Summary for the month of May 2024

1. Monthly Rainfall Scenario (01 to 31 May 2024)

Rainfall over the country as a whole for the month of May 2024 was 66.5 mm which was 8% more than its Long Period Average (LPA) of 61.4 mm. Daily variation of the rainfall over the country as a whole during the month of May 2024 with normal based on data of 1971-2020 is presented in Figure 1(a).

The all India rainfall percentage departure from normal for May during 1901-2024 is presented in Figure 1(b). Rainfall over All India (66.5 mm) was 42nd highest since 1901 and 10th highest since 2001 presented in Figure 1(c). Rainfall over homogeneous region of Northwest India (11.8 mm) was 11th lowest since 1901 and lowest since 2001 presented in Figure 1(d). Homogeneous regions of South Peninsular India (125.1 mm) and Central India (25 mm) received 3rd highest and 5th highest rainfall since 2001.

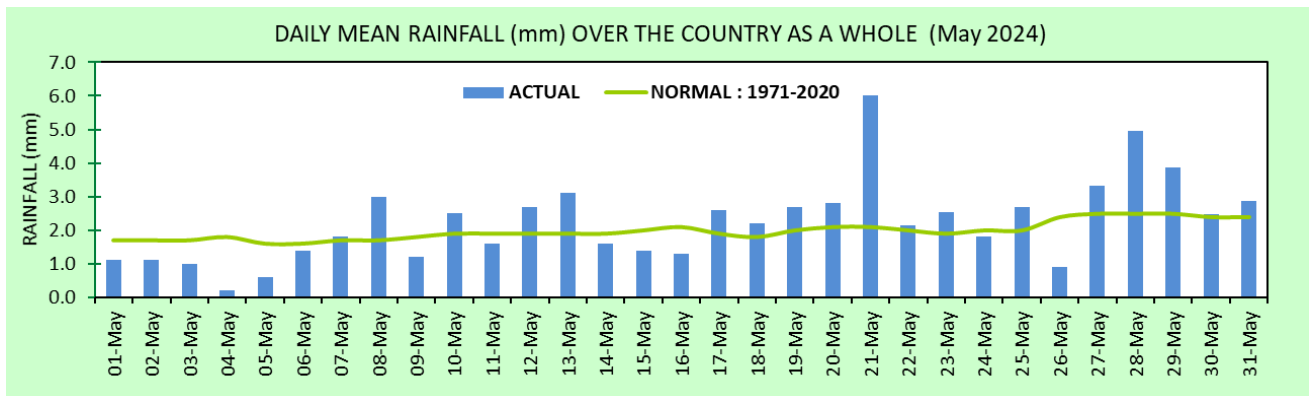


Fig.1 (a): Daily variation of rainfall over the country as a whole during May 2024

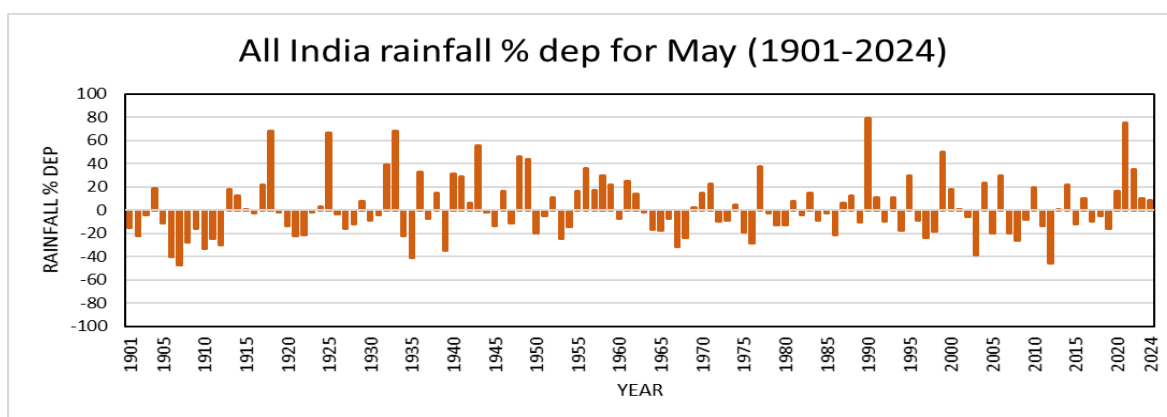


Fig. 1(b): All India monthly rainfall percentage departure from normal (1971-2020) for May from 1901-2024

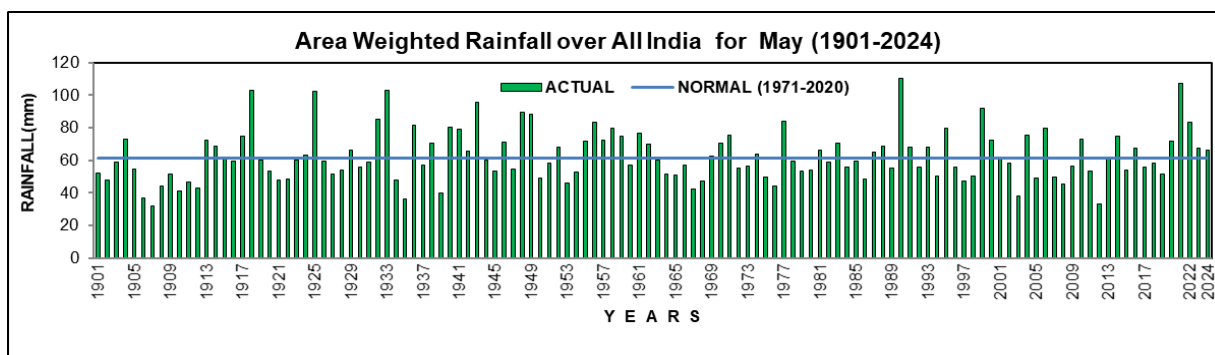


Fig. 1(c): Time series of area weighted rainfall over All India for May (1901 – 2024)

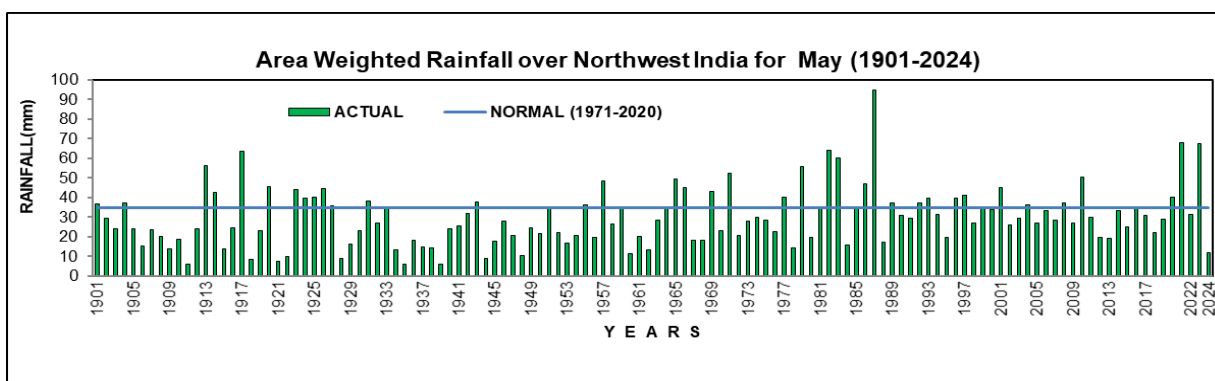


Fig 1(d): Time series of area weighted rainfall over Northwest India for May (1901 – 2024)

The monthly rainfall for **May 2024** is given in the table below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	66.5	61.4	8.2
Northwest India	11.8	34.6	-66.0
Central India	25.0	19.0	31.8
South Peninsula	125.1	71.8	74.2
East & Northeast India	187.0	189.9	-1.5

During this month, 11 sub-divisions received large excess, 7 received excess, 7 received normal, 3 received deficient and 8 received large deficient rainfall (Figure 2).

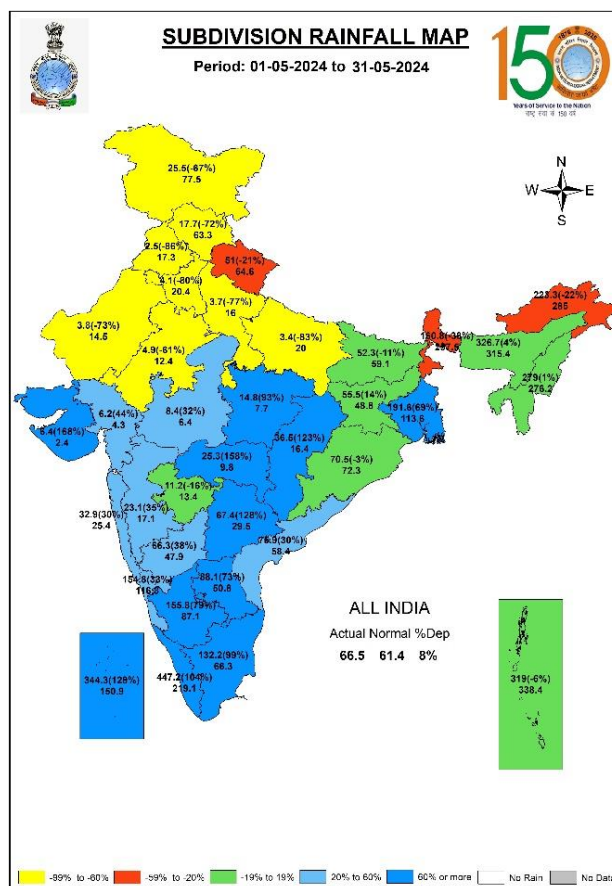


Fig. 2: Subdivision-wise rainfall distribution for May 2024

The observed spatial distribution of rainfall during May 2024, normal rainfall based on data of 1971 to 2020 and rainfall departures from normal during May 2024 are shown in Figure 3.

RAINFALL OVER THE COUNTRY FOR MAY 2024

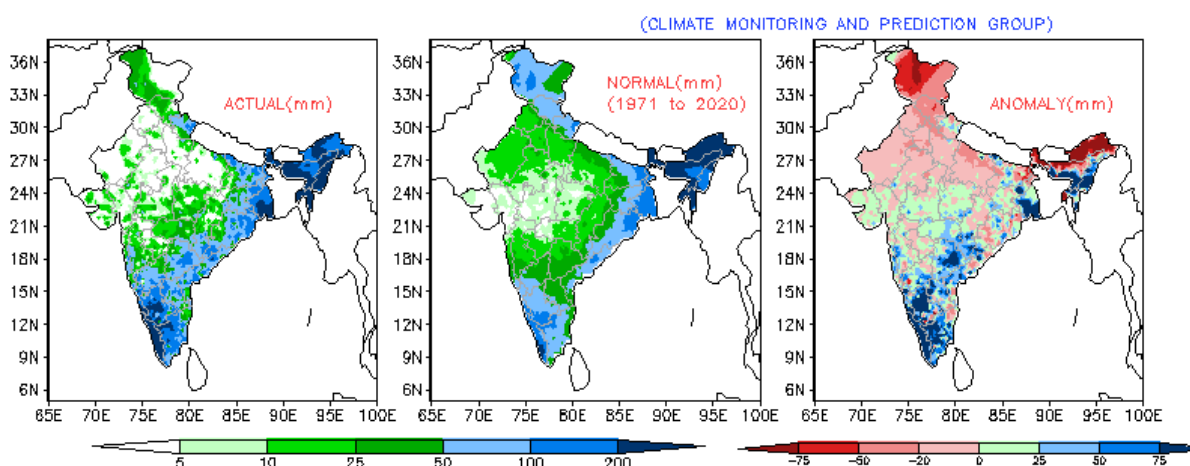
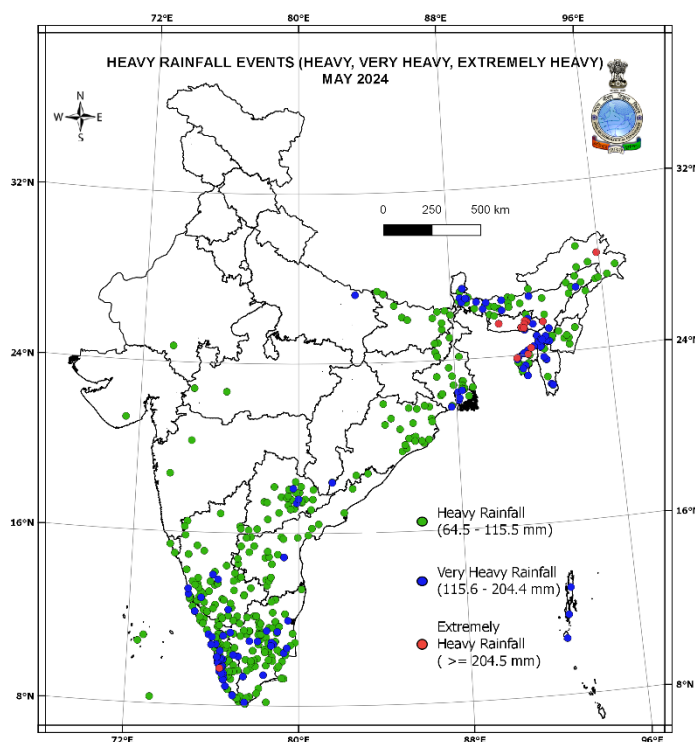


Fig. 3: Observed spatial Rainfall pattern for the month May 2024 over India and their departure from normal (1971 to 2020 period). Departure from normal (anomaly) is actual rainfall - normal rainfall.

2. Frequency of Heavy Rainfall events

May 2024 witnessed Extremely heavy rainfall events (≥ 204.4 mm) mainly over Assam & Meghalaya, Arunachal Pradesh, Kerala & Mahe, Nagaland, Manipur, Mizoram & Tripura, very heavy rainfall events (115.6 – 204.4 mm) over East Uttar Pradesh, Sub Himalayan West Bengal & Sikkim, Telangana, Tamilnadu, Puducherry & Karaikal, Coastal Andhra Pradesh, South Interior Karnataka, Chhatisgarh, Coastal Karnataka and Gangetic West Bengal and heavy rainfall events (64.5 – 115.5 mm) were observed mainly over Bihar, Rayalaseema, Odisha, East Rajasthan, West Madhya Pradesh, North Interior Karnataka, Saurashtra & Kutch, Jharkhand and Konkan & Goa and Lakshdweep. The location of occurrences of heavy, very heavy and extremely heavy rainfall events is shown in the Figure 4.

Out of total 448 occasions, 13 were extremely heavy rainfall (≥ 204.4 mm), 100 were very heavy rainfall (115.6 to 204.4 mm) and 335 were heavy rainfall (64.5 to 115.5 mm) categories during this month.



(Only highest category of rainfall event considered for a station)

Fig. 4: The location of occurrences of heavy and very heavy rainfall events in the month of May 2024.

3. Chief Synoptic weather features observed during May 2024

During May 2024 a Severe Cyclonic Storm “**REMAL**” formed over Bay of Bengal during 24 – 28 May 2024. Figure 5 shows track of this Severe Cyclonic Storm. Along with this Severe Cyclonic Storm a low-pressure area formed over Arabian Sea on 23rd May which became less marked on 24th May. Also, five WD s (2-4, 4-7, 9-15, 17-22, 24-27 May) affected north India during May.

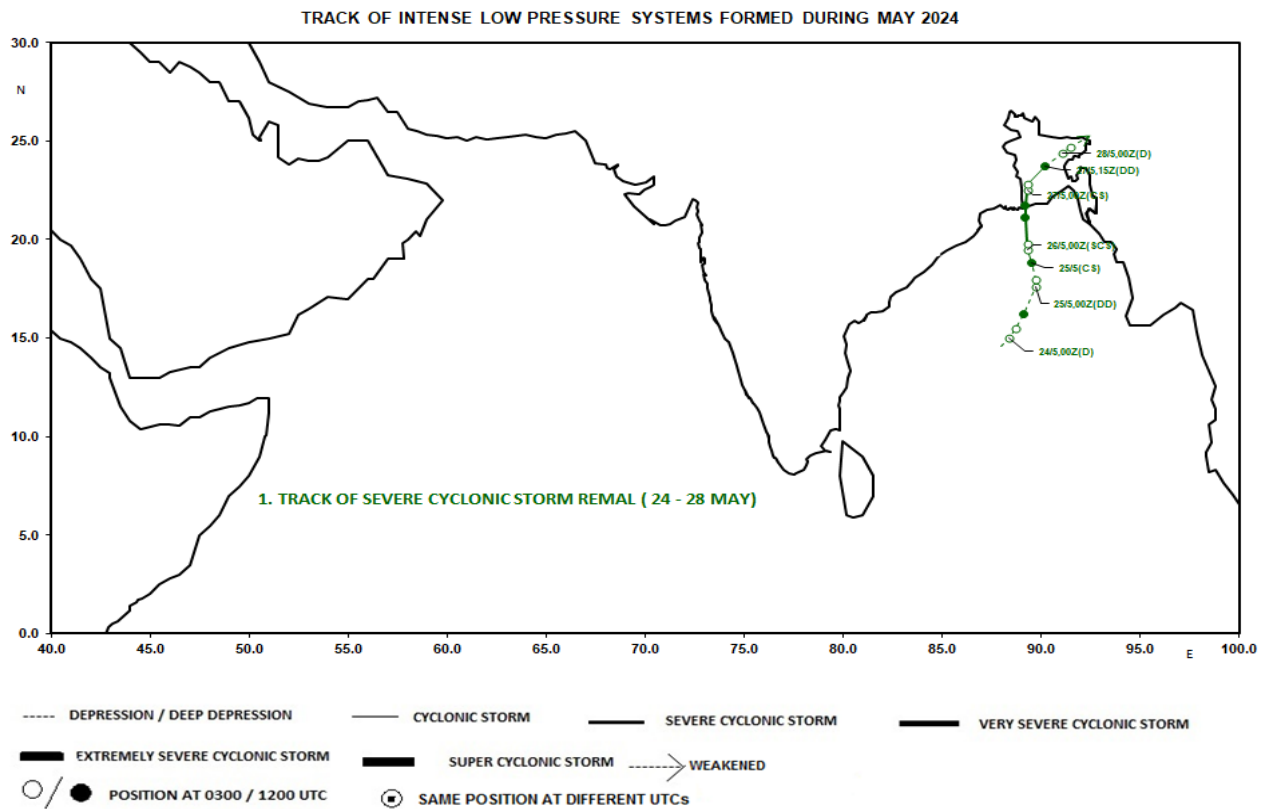


Fig. 5: Track of intense low-pressure systems formed during May 2024

4. Characteristics of Temperatures and major heat wave spell over different Met Sub-divisions for the month of May 2024

The average maximum, average minimum and mean temperature for the country as a whole during May 2024 were 37.32°C, 24.83°C and 31.08°C respectively, against the normal of 36.60°C, 24.17°C and 30.38°C based on data of 1991-2020. Thus, the average maximum, average minimum and mean temperature were above normal with departure from normal of 0.72°C, 0.66°C and 0.69°C respectively for the country as a whole. The daily variation of maximum and minimum temperature departure from normal over the country as a whole for May 2024 is shown in the figure 6(a), 6(b) respectively.

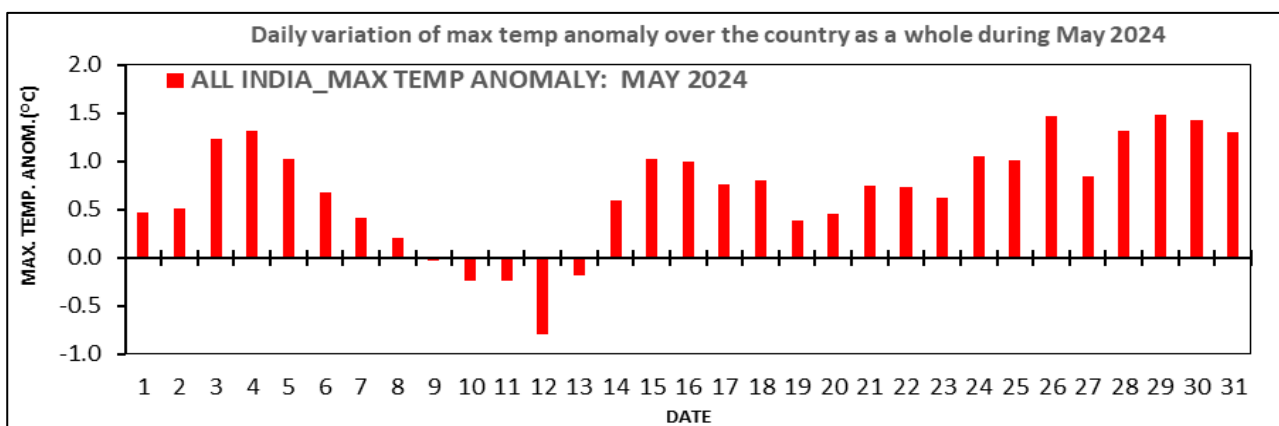


Fig. 6(a): Daily variation of maximum temperature anomaly (departure from normal) over the country as a whole for May 2024

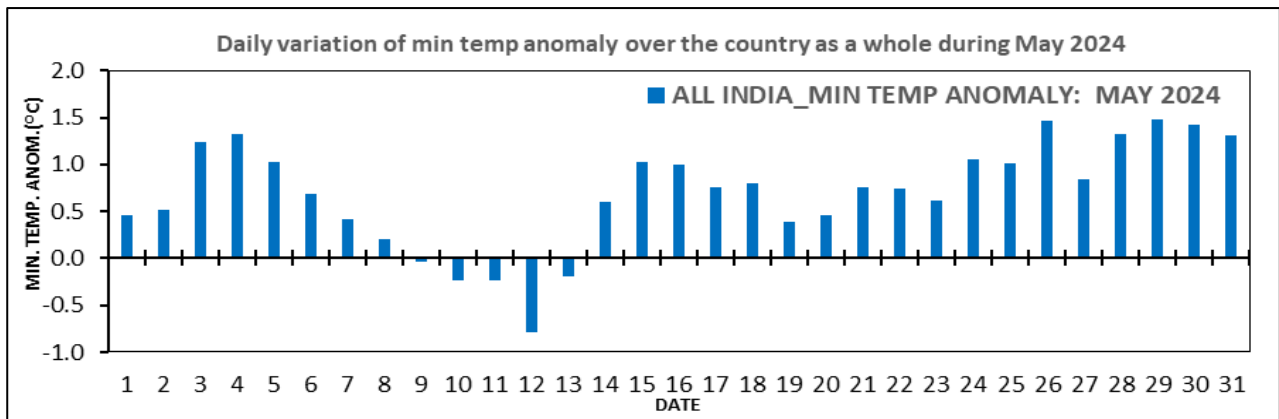


Fig. 6(b): Daily variation of minimum temperature anomaly (departure from normal) over the country as a whole for May 2024

Figure 7 shows time series of monthly average maximum, average minimum and mean temperature over the country as a whole for the month of May 1901-2024. Over the country during May, the average maximum temperature was 37.32°C with departure from normal of 0.72°C (8th highest since 1901). The average minimum temperature was 24.83°C with departure from normal of 0.66°C (10th highest since 1901). The mean temperature was 4th highest (31.08°C with departure from normal of 0.69°C) after the years 1921 (31.92°C), 1906 (31.22 °C) and 1978 (31.09 °C) since 1901.

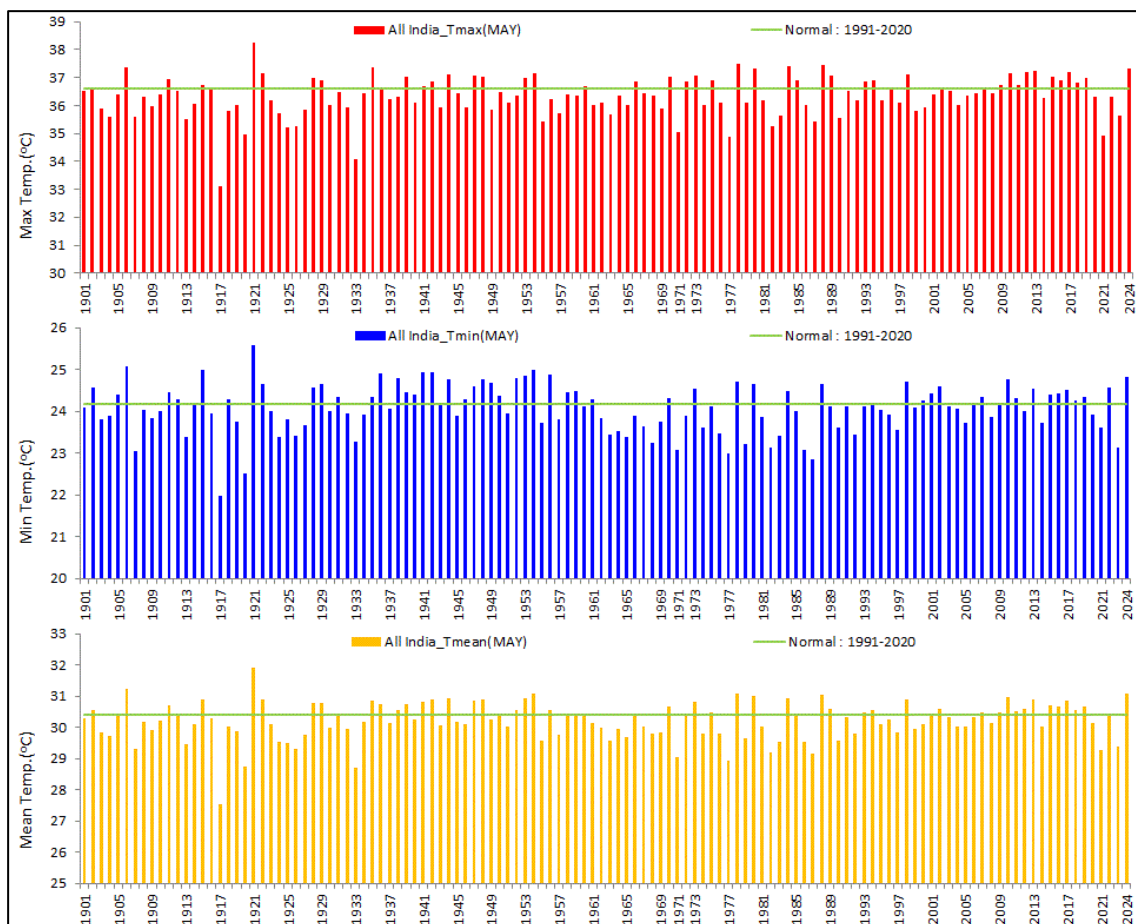


Fig. 7: Time series of monthly average maximum, average minimum and mean temperature over the country as a whole for the month of May 1901-2024

Figure 8 shows time series of average maximum, average minimum and mean temperature over the Northwest India for the month of May 1901-2024. Over Northwest India during May, the average maximum temperature was 3rd highest (38.36°C with departure from normal of 1.81°C) after the years 1921(39.86°C) and 1978(38.62°C) since 1901. The average minimum temperature was 12th highest (23.61°C with departure from normal of 1.24°C) since 1901. The mean temperature was 6th highest (30.99°C with departure from normal of 1.53°C) since 1901.

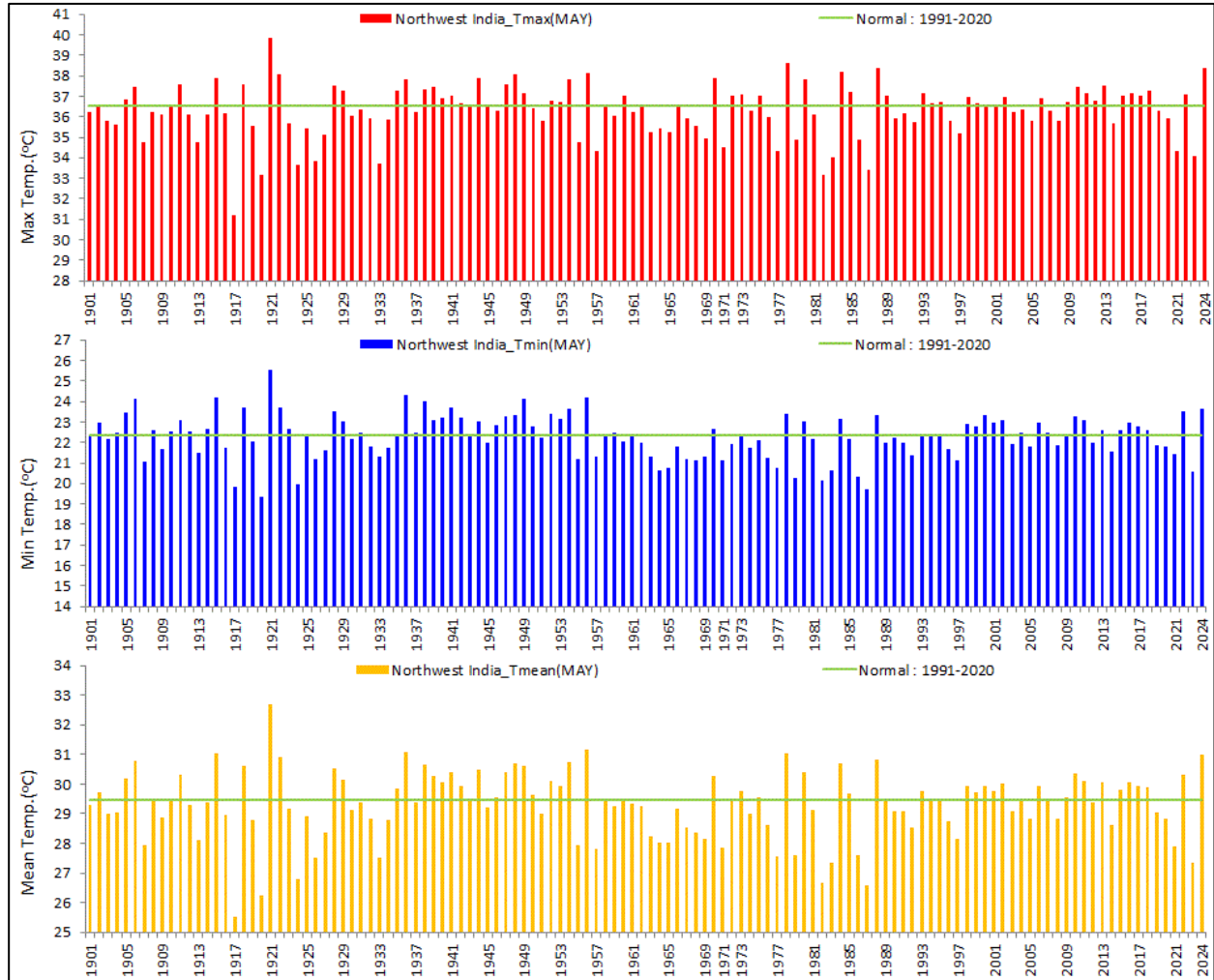


Fig. 8: Time series of monthly average maximum, average minimum and mean temperature over Northwest India for the month of May 1901-2024

Figure 9 shows time series of average maximum, average minimum and mean temperature over the East & Northeast India for the month of May 1901-2024. Over East & Northeast India during May, the average maximum temperature was 12th highest (33.72°C with departure from normal of 1.12°C) since 1901. The average minimum temperature was 4rd highest (23.63°C with departure from normal of 0.83°C) after the years 1956 (23.80°C), 1960 (23.69°C) and 1921 (23.64°C) since 1901. The mean temperature was 3th highest (28.67°C with departure from normal of 0.98°C) after the years 1960(28.90°C) and 1966(28.80°C) since 1901.

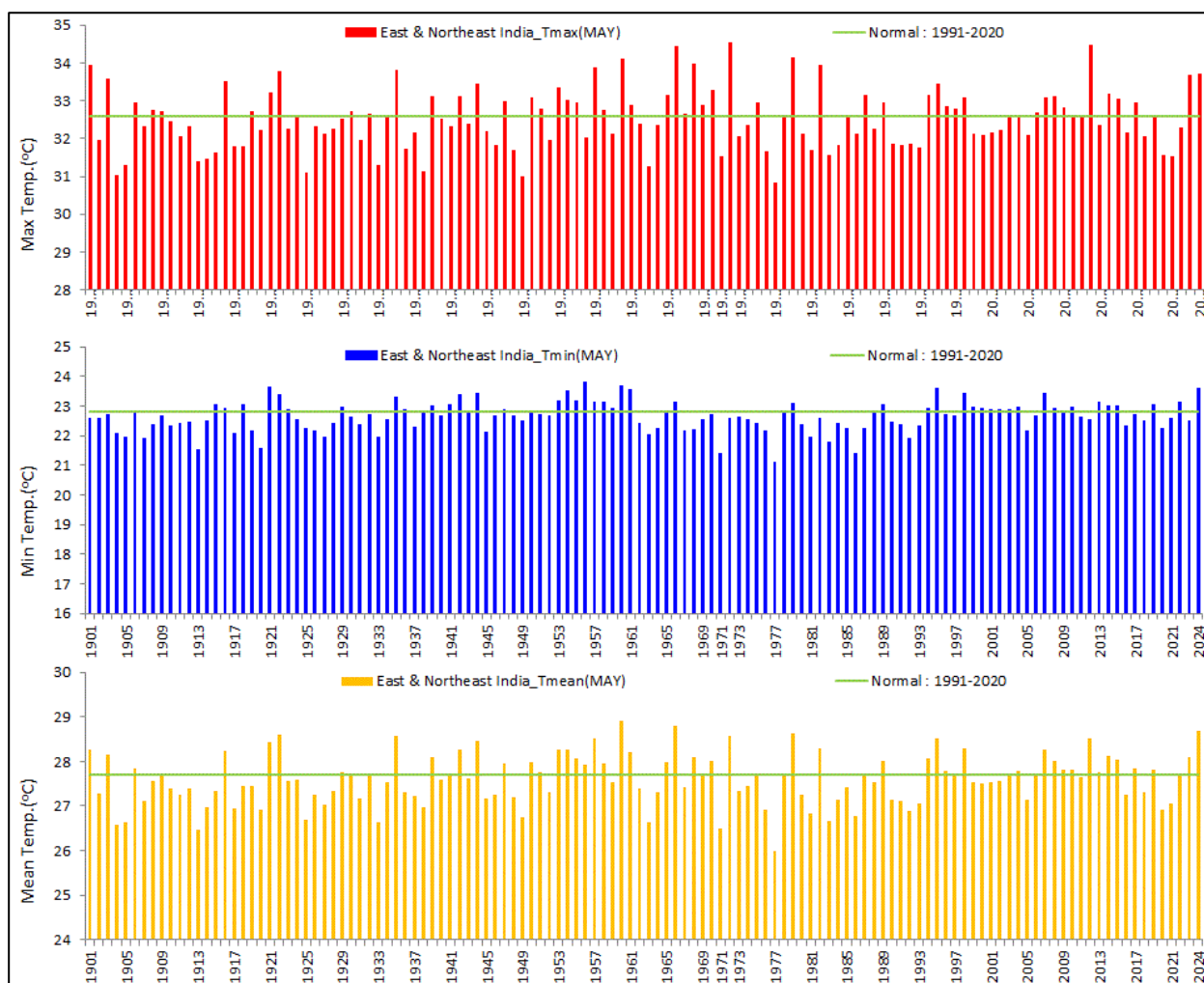


Fig. 9: Time series of monthly average maximum, average minimum and mean temperature over East & Northeast India for the month of May 1901-2024

The Temperatures during May 2024 for all India and homogeneous regions with its top ranks since 1901 are given below:

MAY 2024		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	37.32	24.83	31.08
	NORMAL	36.60	24.17	30.38
	ANOMALY	0.72	0.66	0.69
	Rank since 1901	8	10	4
NORTHWEST INDIA	ACTUAL	38.36	23.61	30.99
	NORMAL	36.55	22.37	29.46
	ANOMALY	1.81	1.24	1.53
	Rank since 1901	3	12	6
EAST & NORTHEAST INDIA	ACTUAL	33.72	23.63	28.67
	NORMAL	32.60	22.80	27.70
	ANOMALY	1.12	0.83	0.98
	Rank since 1901	12	4	3
CENTRAL INDIA	ACTUAL	39.53	26.19	32.86
	NORMAL	39.26	25.88	32.57
	ANOMALY	0.27	0.31	0.29
	Rank since 1901	31	35	33
SOUTH PENINSULAR INDIA	ACTUAL	35.94	25.61	30.77
	NORMAL	36.38	25.41	30.90
	ANOMALY	-0.44	0.19	-0.12
	Rank since 1901	67	36	52

Note: Values are rounded off to nearest two decimal.

The five highest temperature records with corresponding top ranks since 1901 along with year of occurrence for All India (TMean), Northwest India (TMax) and East & Northeast India (TMin, TMean) are given in the table below:

All India (May 2024)					East & Northeast India (May 2024)				
Year	TMean	Normal	Anomaly	Rank	Year	TMin	Normal	Anomaly	Rank
1921	31.92	30.38	1.54	1	1956	23.80	22.80	1.01	1
1906	31.22		0.83	2	1960	23.69		0.89	2
1978	31.09		0.71	3	1921	23.64		0.84	3
2024	31.08		0.69	4	2024	23.63		0.83	4
1954	31.07		0.69	5	1995	23.59		0.80	5

Northwest India (May 2024)					East & Northeast India (May 2024)				
Year	TMax	Normal	Anomaly	Rank	Year	TMean	Normal	Anomaly	Rank
1921	39.86	36.55	3.32	1	1960	28.90	27.70	1.20	1
1978	38.62		2.08	2	1966	28.80		1.11	2
2024	38.36		1.81	3	2024	28.67		0.98	3
1988	38.35		1.80	4	1979	28.63		0.93	4
1984	38.22		1.67	5	1922	28.59		0.90	5

Maximum temperature was above normal by 4.4°C mainly over most parts of India except some parts of central India and South Peninsular India. Figure 10 shows the stations with number of days, which were above normal (>4.4 °C) maximum temperatures.

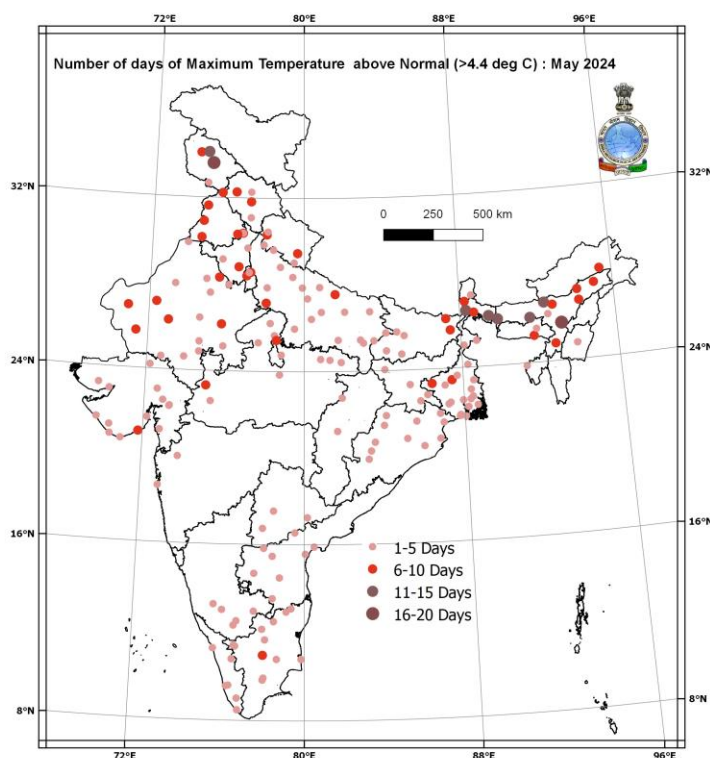


Fig. 10: Number of days with maximum temperature above normal (>4.4 °C) over the country for May 2024

The observed spatial temperature pattern of monthly average maximum, average minimum and mean temperature over India and their departures from normal (1991 to 2020 period) for the month of May 2024 is given in Figure 11a.

TEMPERATURE & ITS ANOMOLY FOR THE MONTH MAY 2024

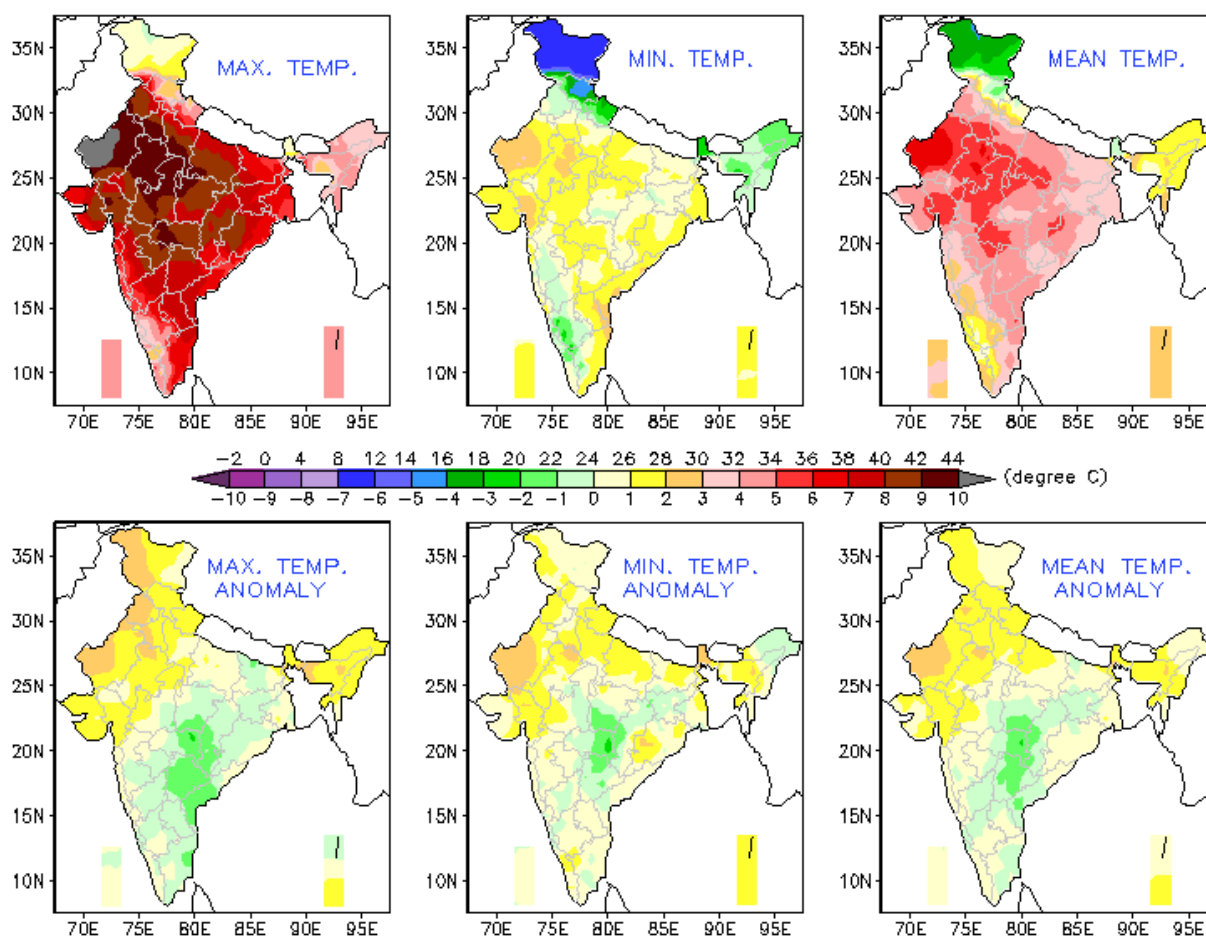


Fig. 11a: Observed spatial temperature pattern of monthly average maximum, average minimum, and mean temperature over India (top three from left to right) and their departure from normal (1991 to 2020 period) for May 2024 (lower three from left to right)

Major Heat wave spell

- Major Spells of Heat Wave conditions:** During 1st half of May 2024, no heat wave was observed over any parts of northwest and central India due to WD impact and isolated rainfall occurrences in these areas. But, Peninsular India experienced heat wave to severe heat wave during **1 May till 7 May** which was mainly observed over its southeast parts covering Tamil Nadu, Interior Karnataka and Rayalaseema. It was abated due to rainfall thereafter. During 2nd half of May, no heat wave was observed over Extreme southern Peninsula (Kerala and Tamil Nadu). However, over Northwest and central India, **a major heat wave to severe spell conditions prevailed persistently and severely impacted the region during 16 May till 31 May**. In terms of Meteorological Sub-division-wise, Heat wave to severe heat wave conditions observed mainly over Rajasthan, Gujarat, Madhya Pradesh, Jammu Division, Punjab, Haryana, Chandigarh, Delhi, Uttar Pradesh, Himachal Pradesh, Vidarbha, Madhya Maharashtra, Uttar Pradesh, during 16-31 May and then spread over to Uttarakhand, Odisha, Chhattisgarh and Bihar during 28-31 May. Absence of WD and dry spell, northwesterly stronger dry and warmer winds

and anti-cyclone over south west Rajasthan and adjoining Gujarat at middle levels were causes of such prolonged intense heat wave spell in these areas.

- Meteorological sub-division wise total number of Heat wave days and severe heat wave days as observed over India during May 2024 given in Fig 11b: It was 11-17 days over Rajasthan, Gujarat, MP, Punjab, Haryana, Chandigarh, Delhi, West Uttar Pradesh and 4-8 days over remaining parts of central India and eastern India.
- The highest maximum temperature of **50.5°C** had been recorded at **Churu (West Rajasthan)** on **28th May 2024**

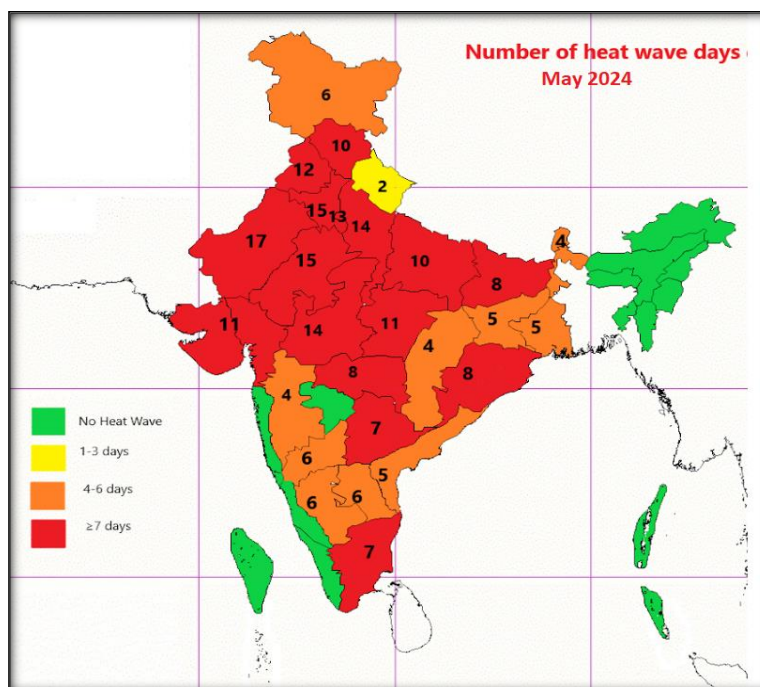


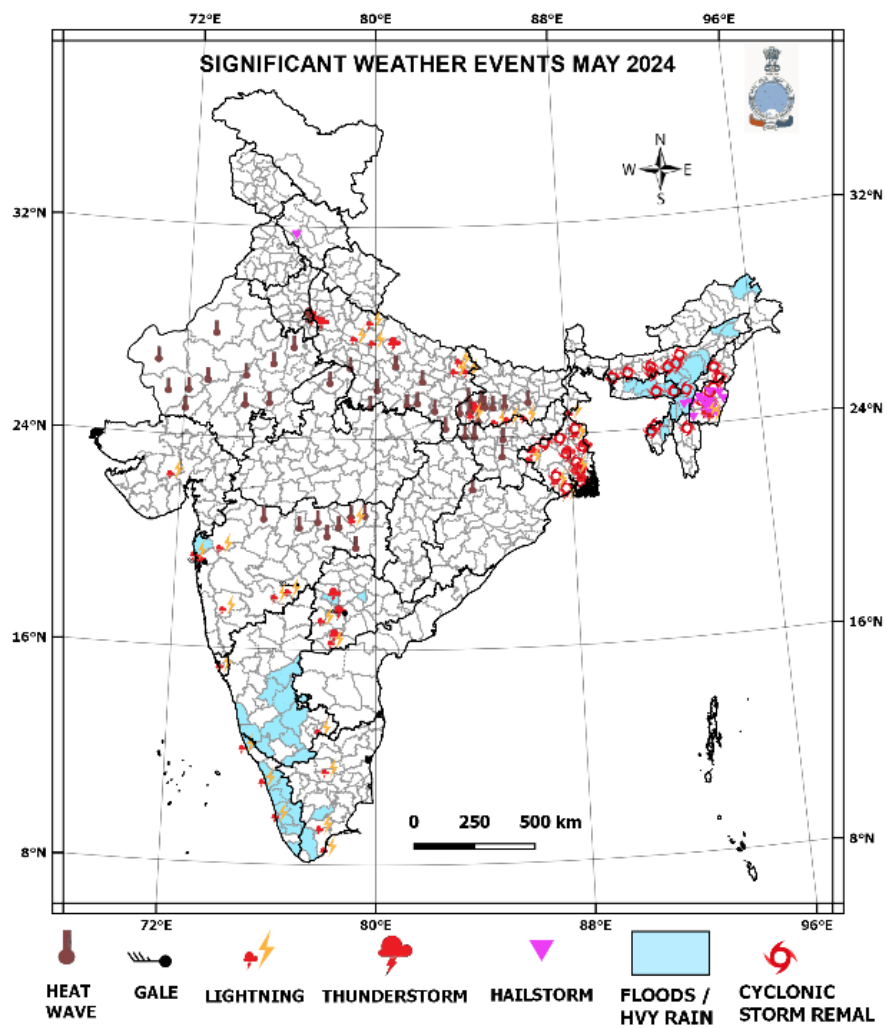
Fig 11b: Met Sub-Division-wise total Heat wave Days observed During May 2024

5. Significant Weather Events

During May, a total of 350 people reportedly died, more than 600 were injured, 09 were reportedly missing, and more than 180 livestock perished, as per the media report. The details of event-wises casualties are given below. However, the actual data on casualties and damages may be available to concerned state governments. Deaths and damages due to significant weather events during May 2024 is shown in Figure 12.

Event	Number of human deaths
Heat Wave:	155 (Mainly north, central and eastern India)
Thunderstorm and Lightning:	98 (Mainly West Bengal, Tamil Nadu, Telangana, Maharashtra, Kerala)
Monsoon related Heavy Rains, Floods & Landslide:	43 (Mainly Kerala, Telangana and Assam)
Cyclonic Storms related Heavy Rains, Floods & Landslide:	51 (Mainly Mizoram, Meghalaya, Manipur, Assam & WB)
Squally Wind:	3 (Mainly Maharashtra and Telangana)

There was also damage reported from different states as mentioned above due to above hazards and hailstorm.



**Fig. 12: Deaths and damages due to significant weather events during May 2024
(Based on real time media reports)**