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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 JUNE 2024

1. Monthly Rainfall Scenario (01 to 30 June,2024):

Rainfall over the country as a whole for the month of June 2024 was 147.2 mm, which is 11% less than its Long Period Average (LPA) of 165.3 mm. Daily variation of the rainfall over the country as a whole during the month of June 2024 with normal based on data of 1971-2020 is presented in Fig 1 (a). The all India monthly rainfall percentage departure from normal for June during 1901-2024 is presented in Fig 1(b). Rainfall over All India (147.2 mm) was 32nd lowest since 1901 and 7th lowest since 2001 presented in fig 1(c). Rainfall over homogeneous region of South Peninsular India (183.9 mm) was 5th highest rainfall since 2001. Rainfall over homogeneous regions of Northwest India (52.6 mm), East and northeast India (284.9 mm) and Central India (147 mm) was 5th, 8th and 9th lowest respectively since 2001.

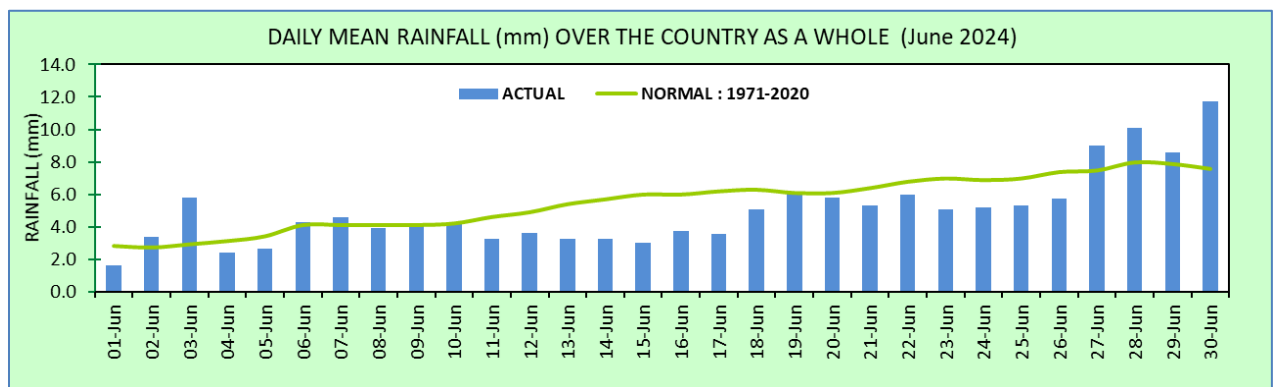


Fig.1 (a): Daily variation of rainfall over the country as a whole during June 2024.

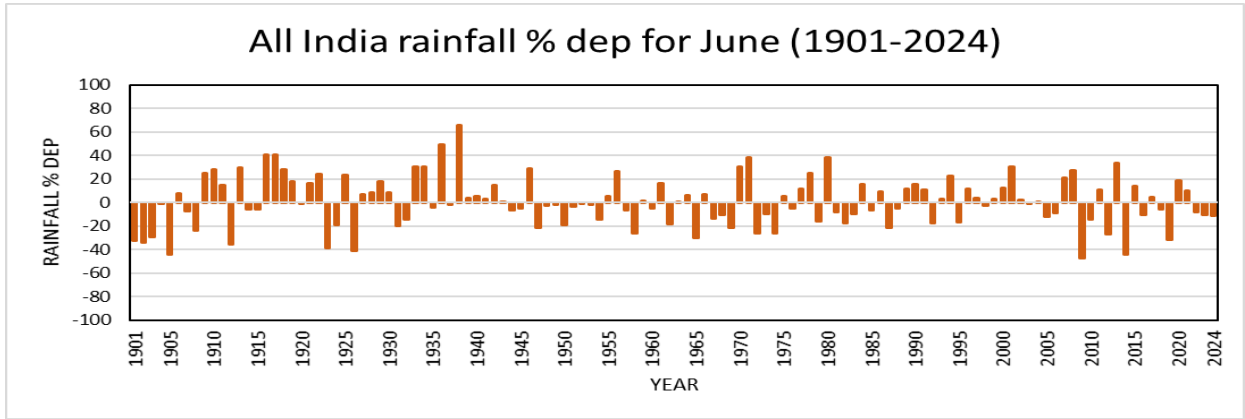


Fig 1(b). All India monthly rainfall percentage departure from normal (1971-2020) for June from 1901-2024.

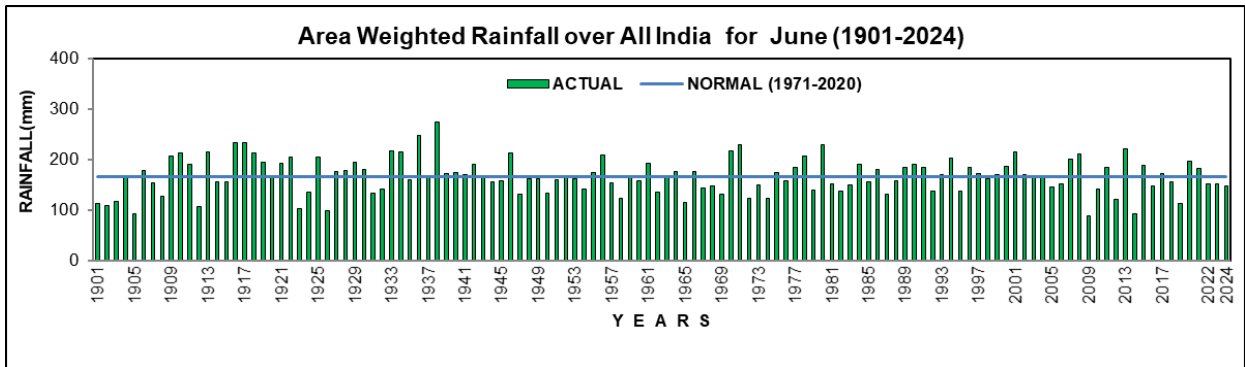


Fig 1(c). Time series of area weighted rainfall over All India for June (1901 – 2024).

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

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	147.2	165.3	-10.9
Northwest India	52.6	78.1	-32.6
Central India	147.0	170.3	-13.7
South Peninsula	183.9	161.0	14.2
East & northeast India	284.9	328.4	-13.3

During June 2024, 2 sub-divisions received large excess, 4 received excess, 14 received normal, 14 received deficient and 2 received large deficient rainfall (Fig 2).

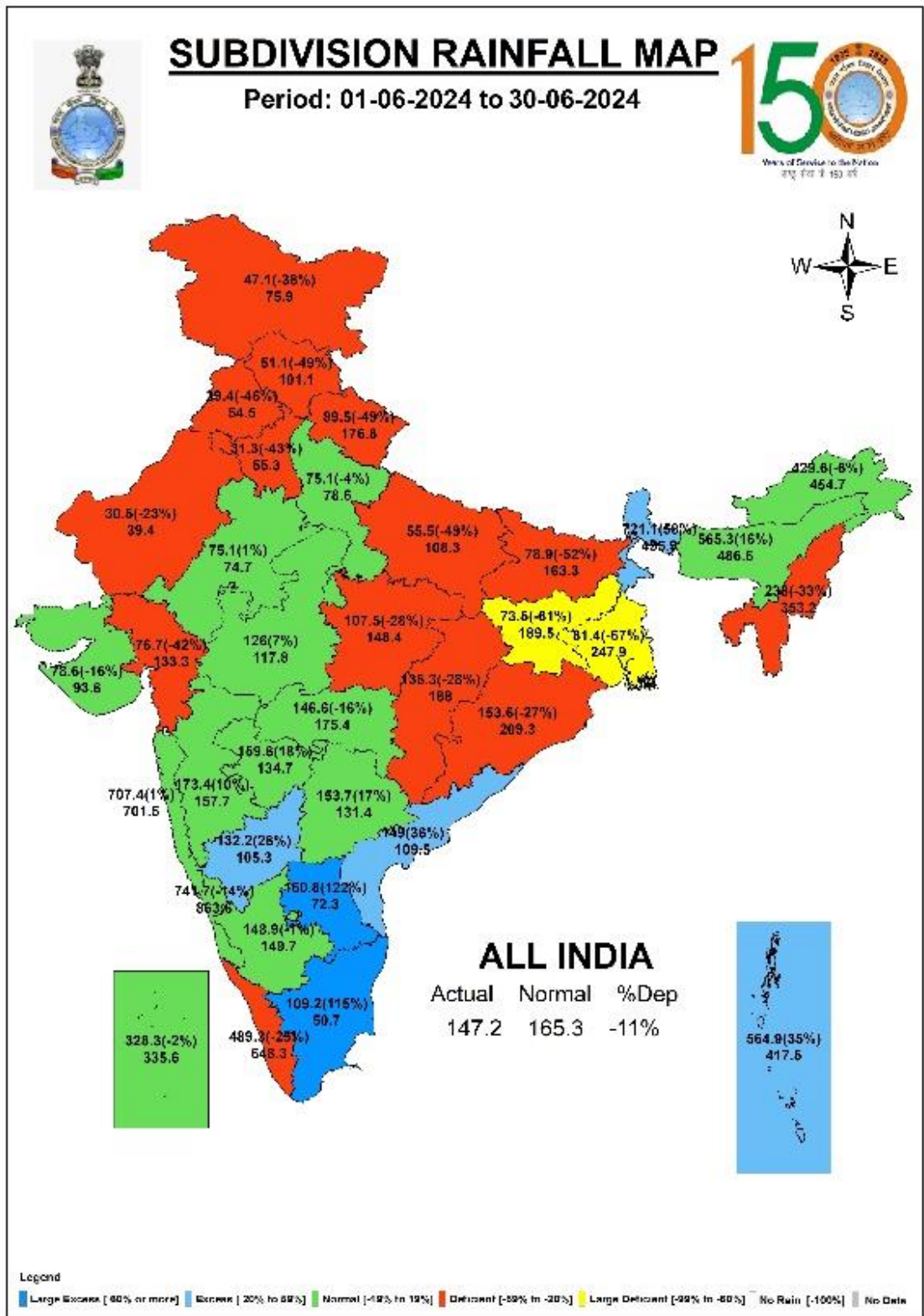
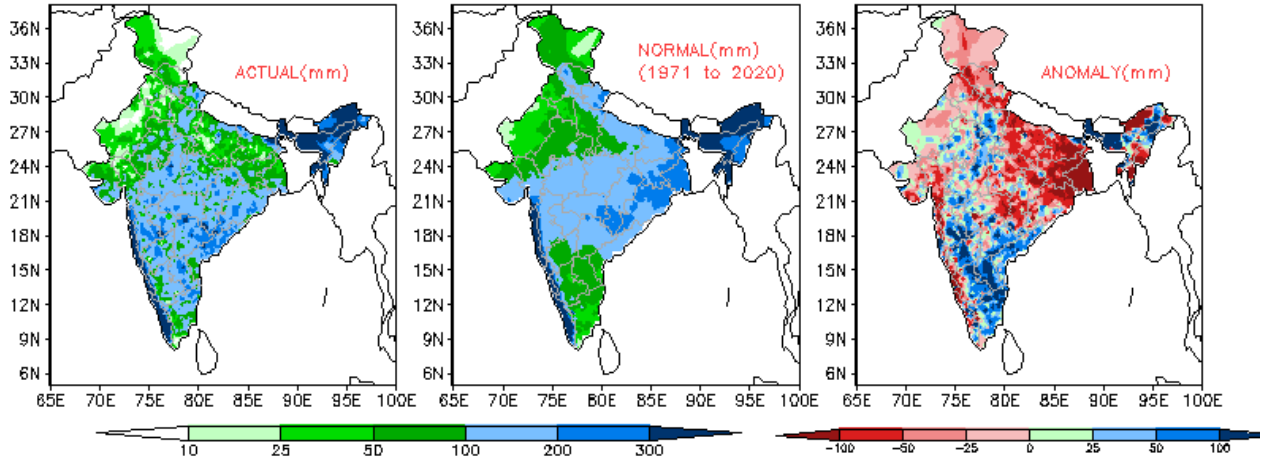


Fig 2: Subdivision-wise rainfall distribution for June 2024.

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

RAINFALL OVER THE COUNTRY FOR JUNE 2024

(CLIMATE MONITORING AND PREDICTION GROUP)

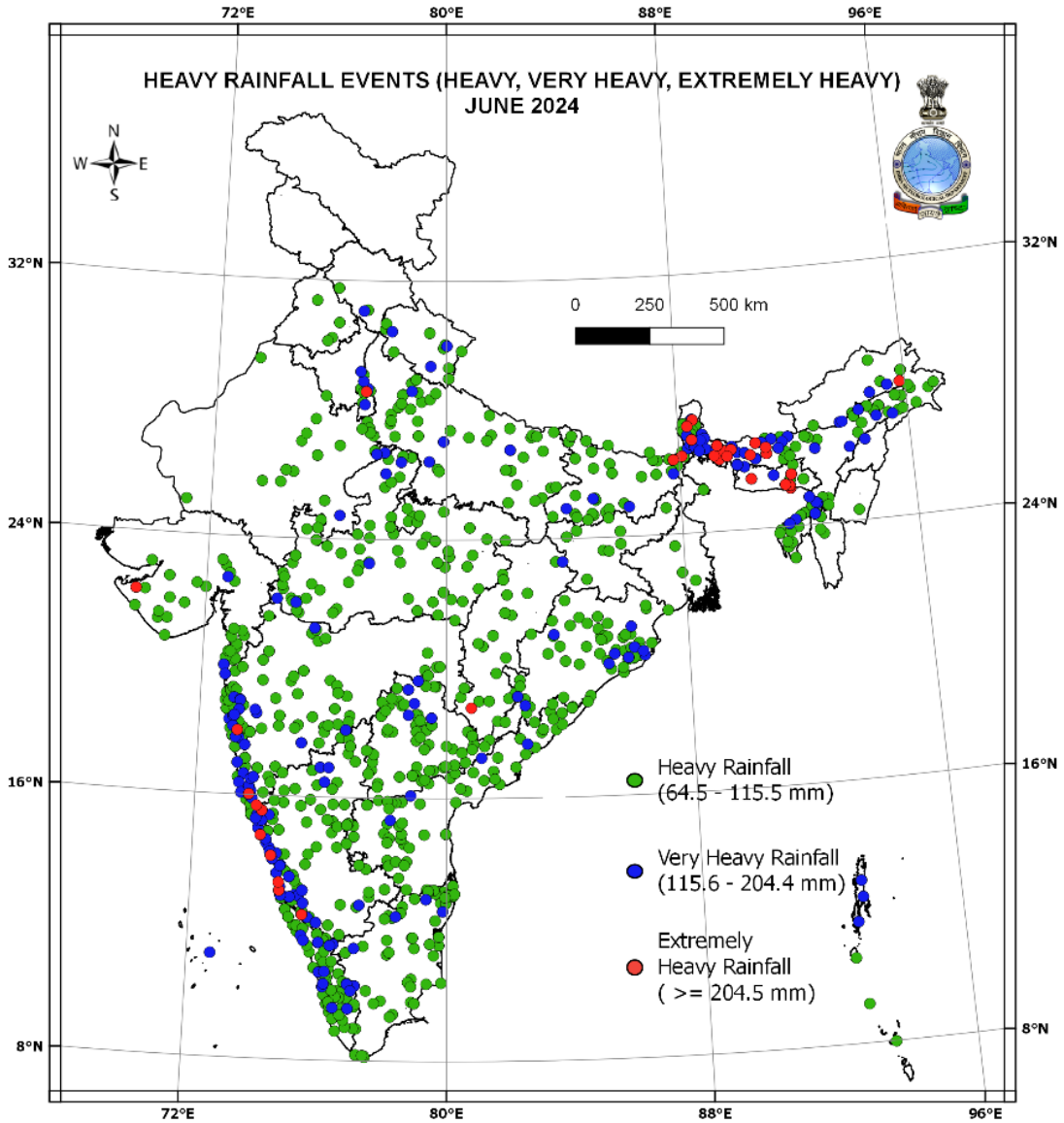


**Fig 3: Observed spatial Rainfall pattern for the month June 2024 over India and their departure from normal (1971 to 2020 period).
(Departure from normal is anomaly = actual rainfall - normal rainfall)**

2. Frequency of Heavy Rainfall events:

June 2024 witnessed Extremely very heavy rainfall events (≥ 204.4 mm) mainly over Assam & Meghalaya, Sub Himalayan West Bengal & Sikkim, Arunachal Pradesh, Bihar, Chhattisgarh, Coastal Karnataka, Haryana, Chandigarh & Delhi, Konkan & Goa, South Interior Karnataka and Saurashtra & Kutch, very heavy rainfall events (115.6 – 204.4 mm) over Coastal Andhra Pradesh, East Rajasthan, Uttar Pradesh state, Gujarat Region, Himachal Pradesh, Kerala & Mahe, Madhya Maharashtra, Marathwada, Nagaland, Manipur, Mizoram & Tripura, North Interior Karnataka, Odisha, Rayalaseema, Tamilnadu, Puducherry & Karaikal, Telangana, Uttarakhand, Vidarbha, West Madhya Pradesh and both the islands and heavy rainfall events (64.5 – 115.5 mm) were observed mainly over Jharkhand, Punjab and West Rajasthan.

The location of occurrences of heavy, very heavy and extremely heavy rainfall events is shown in the Figure 4. Out of total 904 occasions, 35 were extremely heavy rainfall (≥ 204.4 mm), 171 were very heavy rainfall (115.6 to 204.4 mm) and 698 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 June 2024.

3. a. Chief Synoptic weather features observed during June 2024:

During June 2024 only one low pressure system formed over Bay of Bengal on 28th June which became less marked on 30th June.

Category	LPS during June 2024							Climatology	
	CS	DD	D	WML	L	Total LPS	Total LPS days	Long period Average LPS	Long period Average LPS days
June 2024	0	0	0	0	1	1	3	1	11

Only 3 WD against the normal of 4-5 WD was observed across north India (5-10, 19-25, and 26-28 June). The absence of active WD, mainly from 10 June to 19 June, is also the reason for longer dry spells and heat waves prevailing over NW and adjacent central India.

b. Progress of Monsoon during the month of June 2024 (till 30th):

Monsoons advanced into Andaman Sea on 19 May 2024, nearly two days before the normal date. Southwest Monsoon has set in over Kerala on 30th May 2024 against the normal date of 1st June. Southwest Monsoon has advanced into most parts of country as on 30 June 2024 (Fig 5). The southwest monsoon covered the entire country on 2nd July 2024 against its normal date of 8th July 2024.

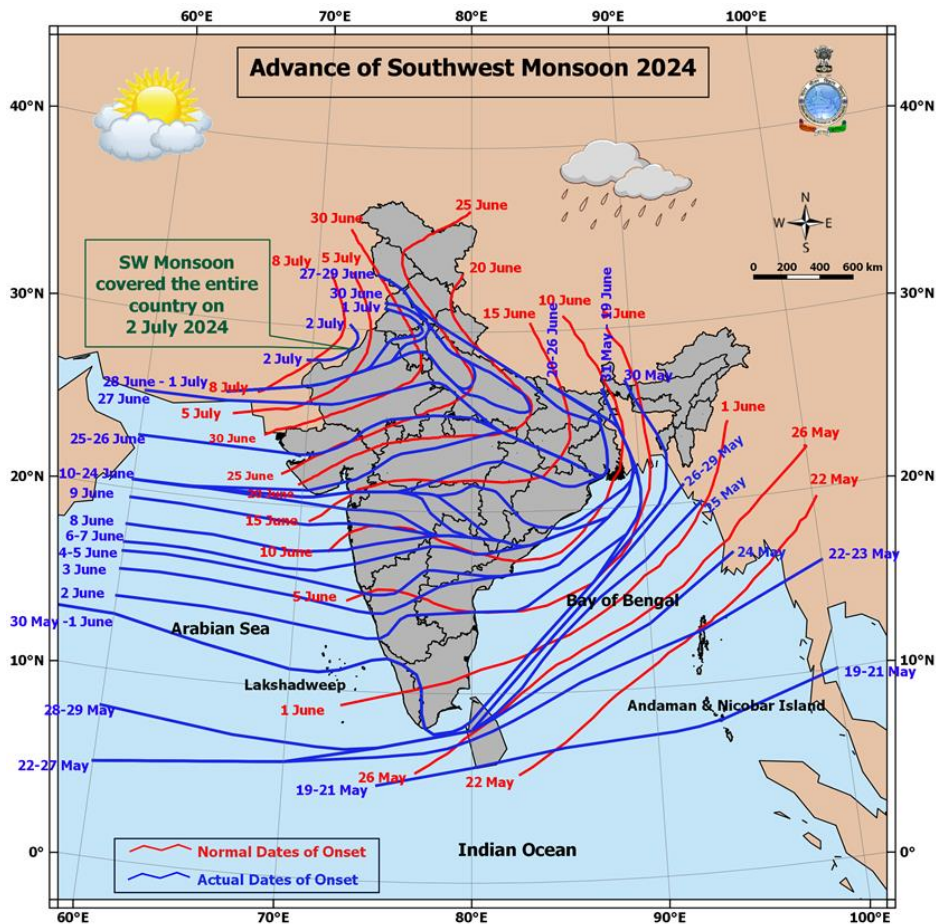


Fig 5: Advance of Southwest Monsoon 2024.

4. Characteristics of Temperatures for the month of June 2024:

The average maximum, average minimum and mean temperature for the country as a whole during June 2024 were 35.62°C, 25.47°C and 30.55°C respectively, against the normal of 34.60°C, 24.66°C and 29.63°C based on data of 1991-2020. Thus, the average maximum, average minimum and mean temperature were above normal with departure from normal of 1.02°C, 0.81°C and 0.91°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 June 2024 is shown in the figure 6(a) and (b) respectively.

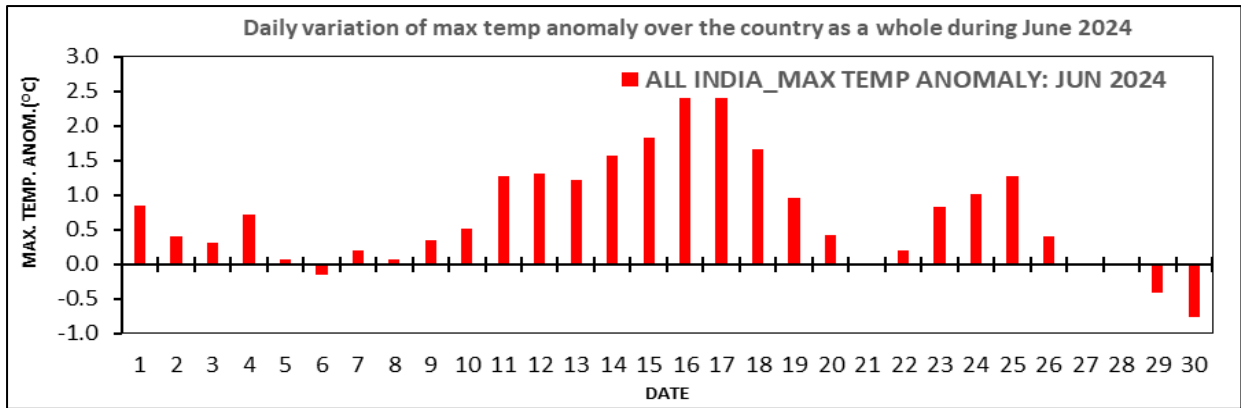


Fig 6(a): Daily variation of maximum temperature anomaly (departure from normal) over the country as a whole for June 2024

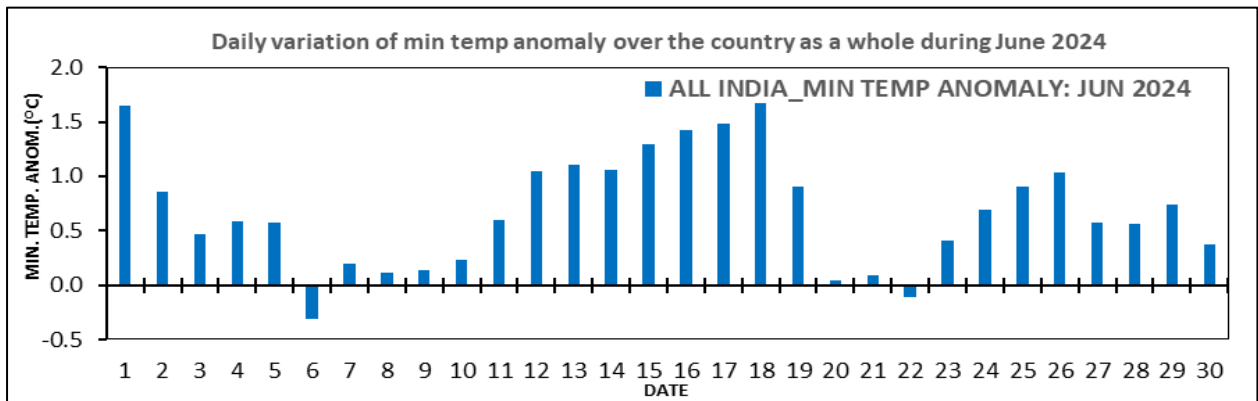


Fig 6(b): Daily variation of minimum temperature anomaly (departure from normal) over the country as a whole for June 2024

Figure 7 shows time series of monthly average maximum, average minimum and mean temperature over the country as a whole for the month of June 1901-2024. Over the country during June, the average maximum temperature was 35.62°C with departure from normal of 1.02°C (16th highest since 1901). The average minimum temperature was 25.47°C with departure from normal of 0.81°C (6th highest since 1901). The mean temperature was 30.55°C with departure from normal of 0.91°C (8th highest since 1901).

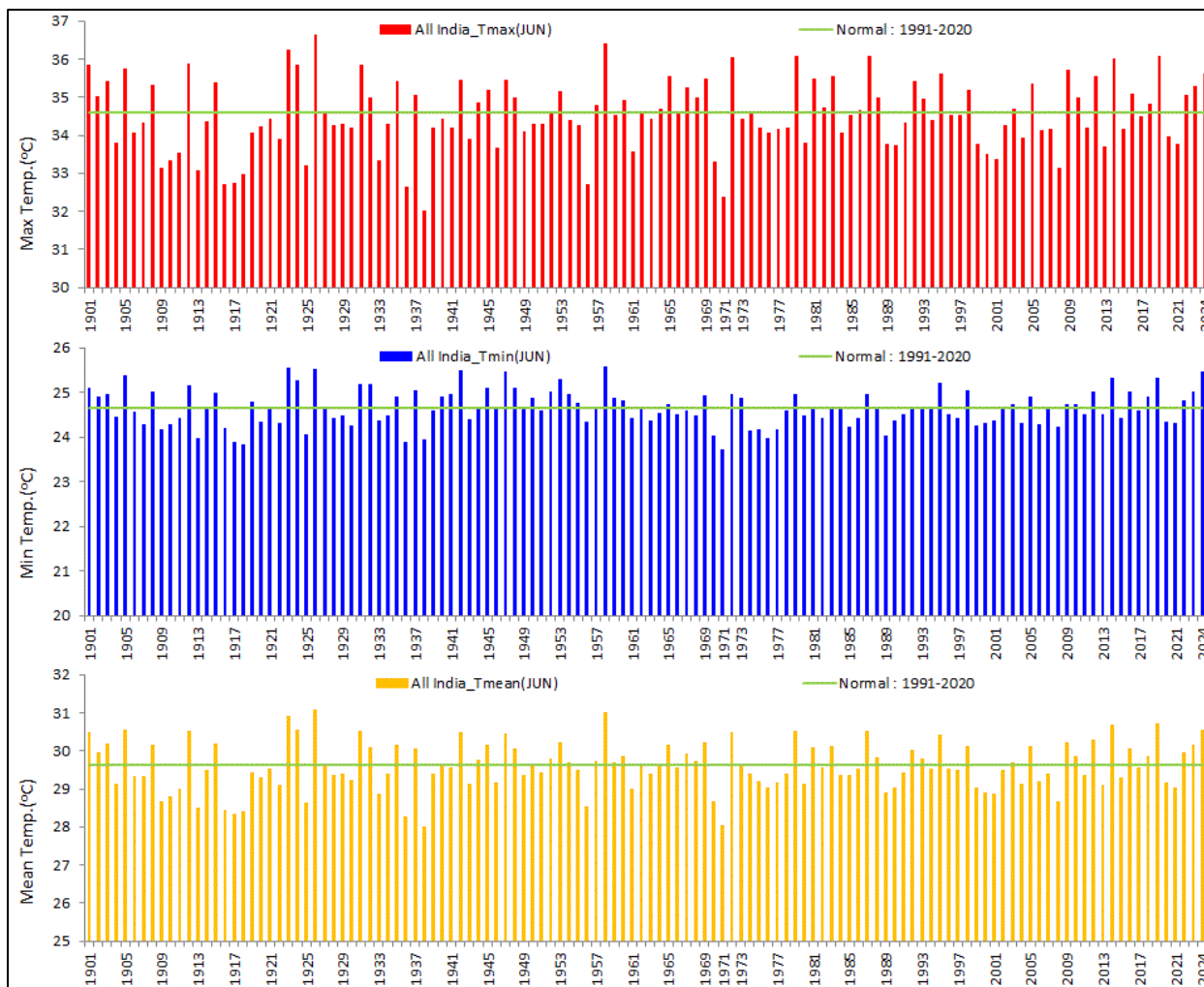


Fig 7: Time series of monthly average maximum, average minimum and mean temperature over the country as a whole for the month of June 1901-2024

Figure 8 shows time series of average maximum, average minimum and mean temperature over the Northwest India for the month of June 1901-2024. Over Northwest India during June, the average maximum temperature was highest at 38.02°C since 1901 against the earlier record of 38.01°C in 1958. The average minimum temperature was 2nd highest (25.44°C with departure from normal of 1.35°C) after the year 1947(25.54°C) since 1901. The mean temperature was highest at 31.73°C since 1901 against the earlier record of 31.69°C in 1947.

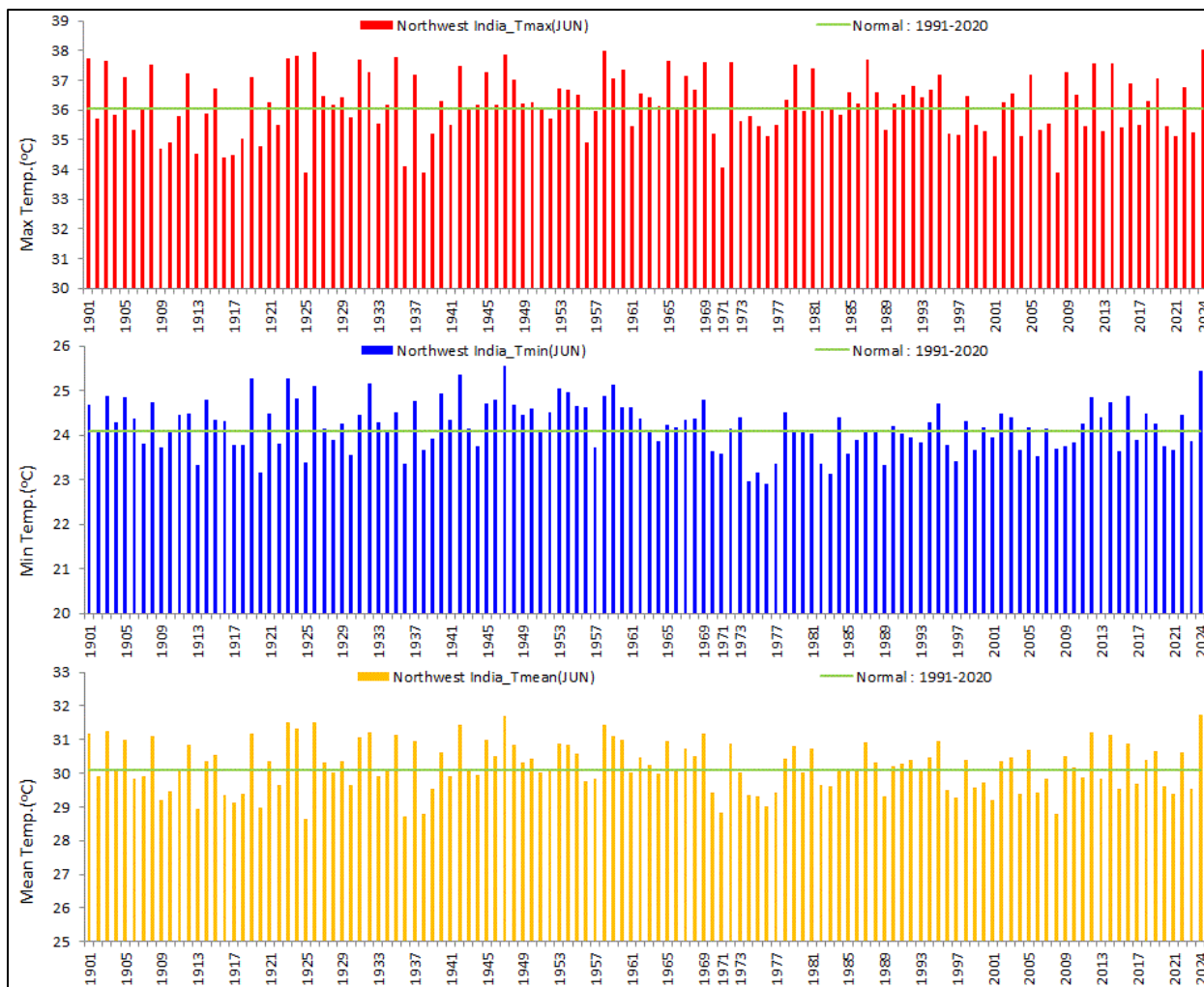


Fig 8: Time series of monthly average maximum, average minimum and mean temperature over Northwest India for the month of June 1901-2024

Figure 9 shows time series of average minimum and mean temperature over the East & Northeast India for the month of June 1901-2024. Over East & Northeast India during June, the average minimum temperature was highest at 25.14°C since 1901 against the earlier record of 24.98°C in 1958. The mean temperature was 5th highest (29.07°C with departure from normal of 1.01°C) after the years 1958(29.44°C), 1979(29.33°C), 2019(29.26°C) and 2023(29.22°C) since 1901. The five highest temperature records are considered.

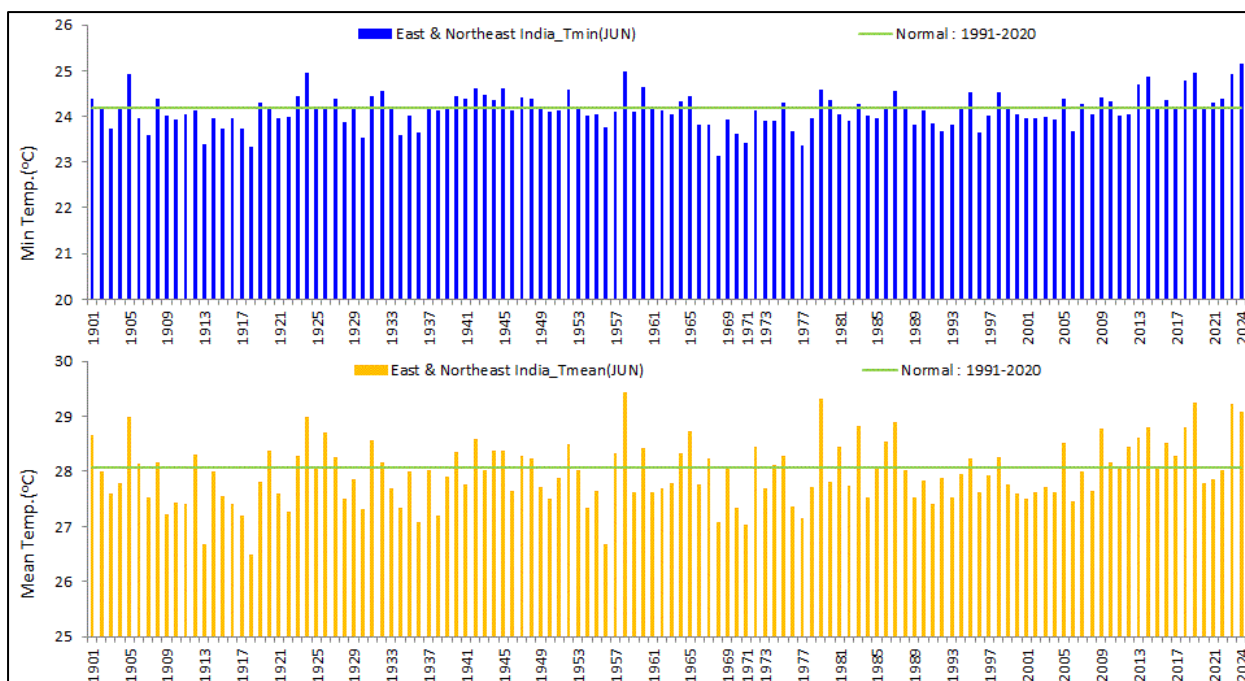


Fig 9: Time series of monthly average minimum and mean temperature over East & Northeast India for the month of June 1901-2024

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

JUN 2024		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	35.62	25.47	30.55
	NORMAL	34.60	24.66	29.63
	ANOMALY	1.02	0.81	0.91
	Rank since 1901	16	6	8
NORTHWEST INDIA	ACTUAL	38.02	25.44	31.73
	NORMAL	36.06	24.10	30.08
	ANOMALY	1.96	1.35	1.65
	Rank since 1901	1	2	1
EAST & NORTHEAST INDIA	ACTUAL	33.01	25.14	29.07
	NORMAL	31.94	24.19	28.06
	ANOMALY	1.07	0.95	1.01
	Rank since 1901	12	1	5
CENTRAL INDIA	ACTUAL	36.65	26.30	31.48
	NORMAL	35.69	25.63	30.66
	ANOMALY	0.96	0.67	0.82
	Rank since 1901	26	16	25
SOUTH PENNINSULAR INDIA	ACTUAL	33.20	24.66	28.93
	NORMAL	33.40	24.49	28.94
	ANOMALY	-0.20	0.17	-0.01
	Rank since 1901	57	26	42

Note: Values are rounded off to nearest two decimals.

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

Northwest India (June 2024)				
Year	TMax	Normal	Anomaly	Rank
2024	38.02	36.06	1.96	1
1958	38.01		1.95	2
1926	37.93		1.87	3
1947	37.84		1.78	4
1924	37.83		1.77	5

East & Northeast India (June 2024)				
Year	TMin	Normal	Anomaly	Rank
2024	25.14	24.19	0.95	1
1958	24.98		0.79	2
2019	24.964		0.78	3
1924	24.962		0.77	4
1905	24.93		0.74	5

Northwest India (June 2024)				
Year	TMin	Normal	Anomaly	Rank
1947	25.54	24.10	1.44	1
2024	25.44		1.35	2
1942	25.36		1.26	3
1919	25.28		1.18	4
1923	25.26		1.16	5

East & Northeast India (June 2024)				
Year	TMean	Normal	Anomaly	Rank
1958	29.44	28.06	1.37	1
1979	29.33		1.26	2
2019	29.26		1.20	3
2023	29.22		1.15	4
2024	29.07		1.01	5

Northwest India (June 2024)				
Year	TMean	Normal	Anomaly	Rank
2024	31.73	30.08	1.65	1
1947	31.69		1.61	2
1926	31.51		1.43	3
1923	31.50		1.43	4
1958	31.44		1.36	5

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 June 2024 is given in Figure 10.

TEMPERATURE & ITS ANOMOLY FOR THE MONTH JUNE 2024

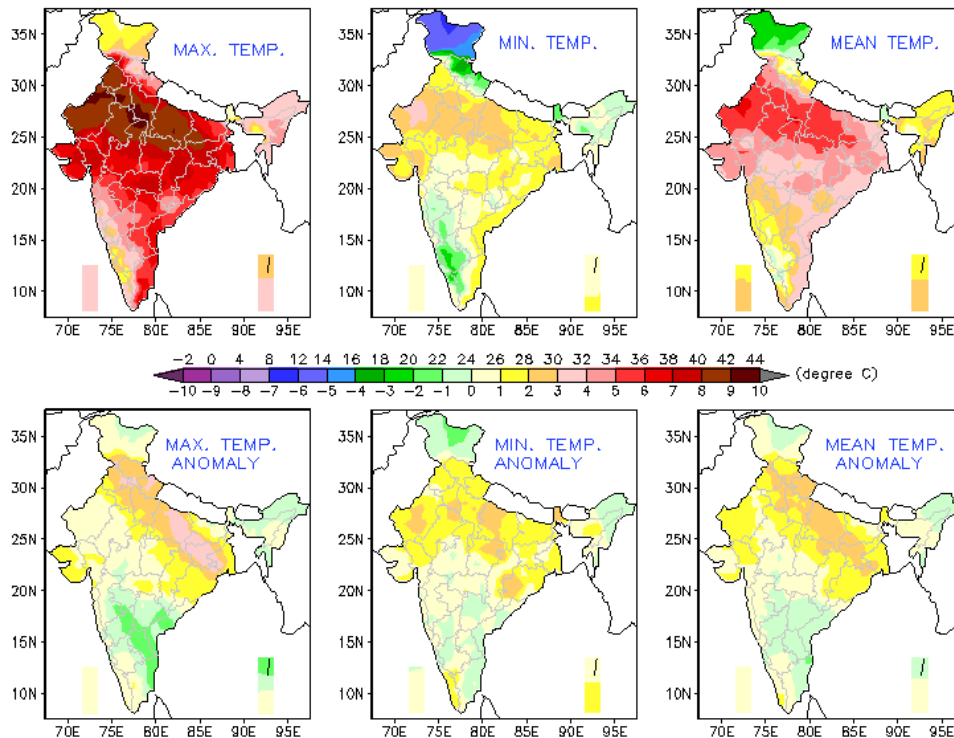


Fig 10: Observed spatial temperature pattern of monthly average maximum, average minimum, and mean temperature over India (top three from left to right) and their departure from normal (1991 to 2020 period) for June 2024 (bottom three from left to right)

Heat Wave during the month of June 2024: Above-normal heatwave days across north and adjoining central & east India (10-18 days: West Rajasthan Himachal Punjab, Haryana-Chandigarh-Delhi, HP, Uttar Pradesh, Bihar, Jharkhand, GWB, East Madhya Pradesh, Bihar, Odisha) are shown in the following figure 11 (To declare a heat wave, the heat wave criteria should be met at least in 2 stations in the meteorological sub-division for at least two consecutive days).

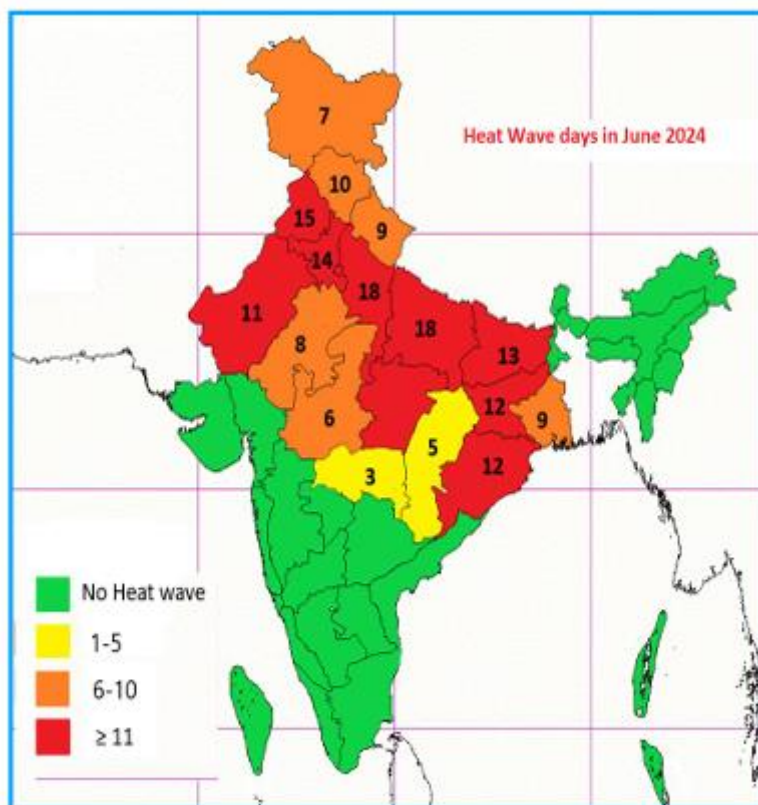


Fig 11: Heat Wave days in the month of June 2024

5. Significant Weather Events during the month of June 2024:

During June, a total of more than 180 people reportedly died, more than 85 were injured, 03 were reportedly missing, and more than 500 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 the concerned state governments.

Event	Number of human deaths
Thunderstorm and Lightning:	119 (Mainly Uttar Pradesh, Madhya Pradesh, Maharashtra, Bihar, Chhattisgarh, Odisha, Kerala, Andhra Pradesh, Karnataka, West Bengal, Himachal Pradesh, Meghalaya, Punjab, Uttarakhand)
Monsoon related Heavy Rains, Floods & Landslide:	58 (Mainly Assam, Sikkim, Delhi, Maharashtra, Meghalaya)
Heat Wave:	4 (Rajasthan)

There was also damage reported from different states as mentioned above due to above hazards. (Fig 12)

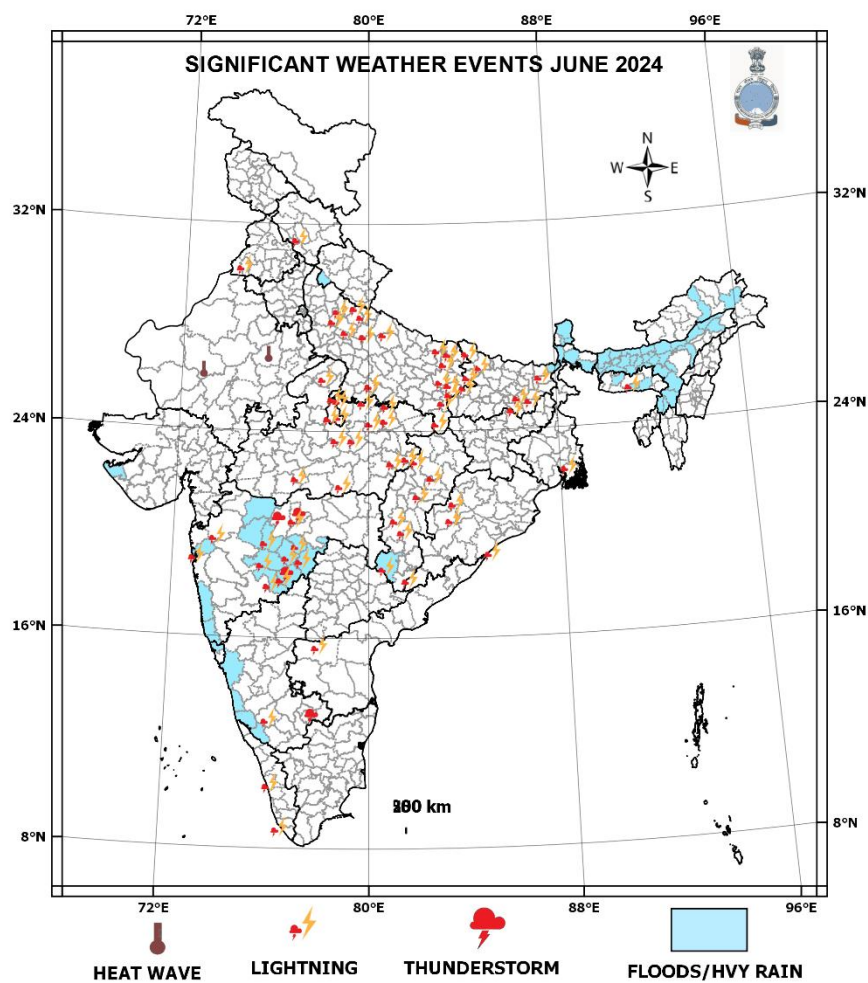


Fig 12: Deaths and damages due to significant weather events during June 2024 (Based on real time media reports)
