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**Government of India**  
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**Ministry of Earth Sciences (MoES)**  
भारत मौसम विज्ञान विभाग  
**INDIA METEOROLOGICAL DEPARTMENT**  
**Climate Research and Services (CRS)**

**Climate Summary for the month of August 2022**

**1. Monthly Rainfall Scenario (01 to 31 August, 2022)**

Rainfall over the country as a whole for the month of August 2022 shows that it has recorded 263.7 mm, which is 3% more than its Long Period Average (LPA) of 254.9 mm.

Rainfall over homogeneous region of east and northeast India (243.9 mm) was third lowest since 1901 after the years 2019 (215.3 mm) and 2006 (240.7 mm).

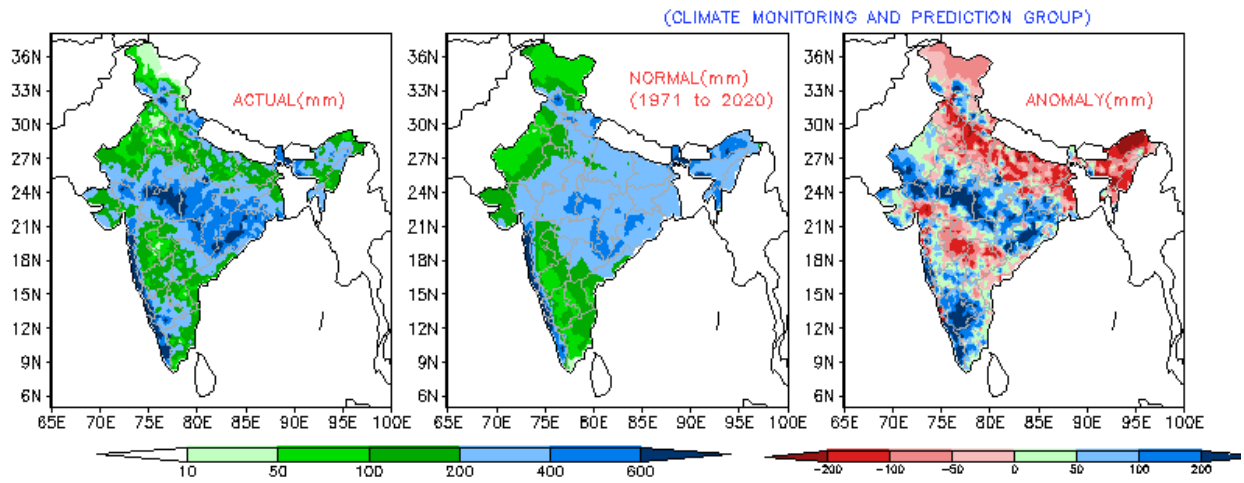
Rainfall over All India (263.7 mm) was 8th highest since 2001. Rainfall over homogeneous region of central India (364.9 mm) and South Peninsular India (242.2 mm) were 4th highest since 2001.

The monthly rainfall for August 2022 is given in the table below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	263.7	254.9	3.0
Northwest India	177.0	197.1	-10.0
Central India	364.9	308.8	18.0
South Peninsula	242.2	190.7	27.0
East & northeast India	243.9	332.0	-27.0

During this month, 4 sub-divisions received large excess, 8 excess, 14 normal and 9 deficient and one received large deficient rainfall.

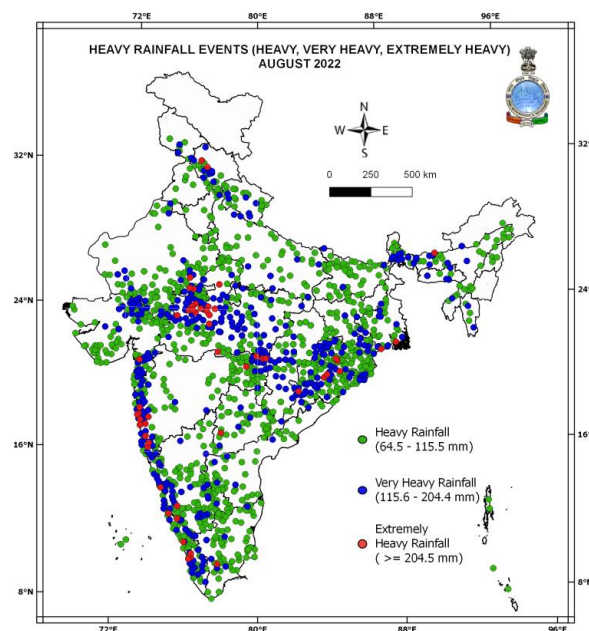
The observed spatial rainfall (normal rainfall for the period 1971 to 2020) and its departures from normal for the month of August 2022 is given in Figure 1.



**Fig 1: Observed spatial Rainfall pattern for the month of August 2022 over India and their departure from normal (1971 to 2020 period).**

## 2. Frequency of Heavy Rainfall events

The month of August 2022, witnessed extremely heavy rainfall events mainly along west coast, west Madhya Pradesh, Vidarbha and Odisha. The location of occurrences of heavy, very heavy and extremely heavy rainfall events are shown in the Figure 2. Out of total 1419 stations, 53 stations reported extremely heavy rainfall ( $\geq 204.5$  mm), 403 station reported very heavy rainfall (115.6 to 204.4 mm) and 963 stations reported heavy rainfall (64.5 to 115.5 mm of rainfall) during this month.



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

**Fig 2: The location of occurrences of heavy rainfall events in the month August 2022.**

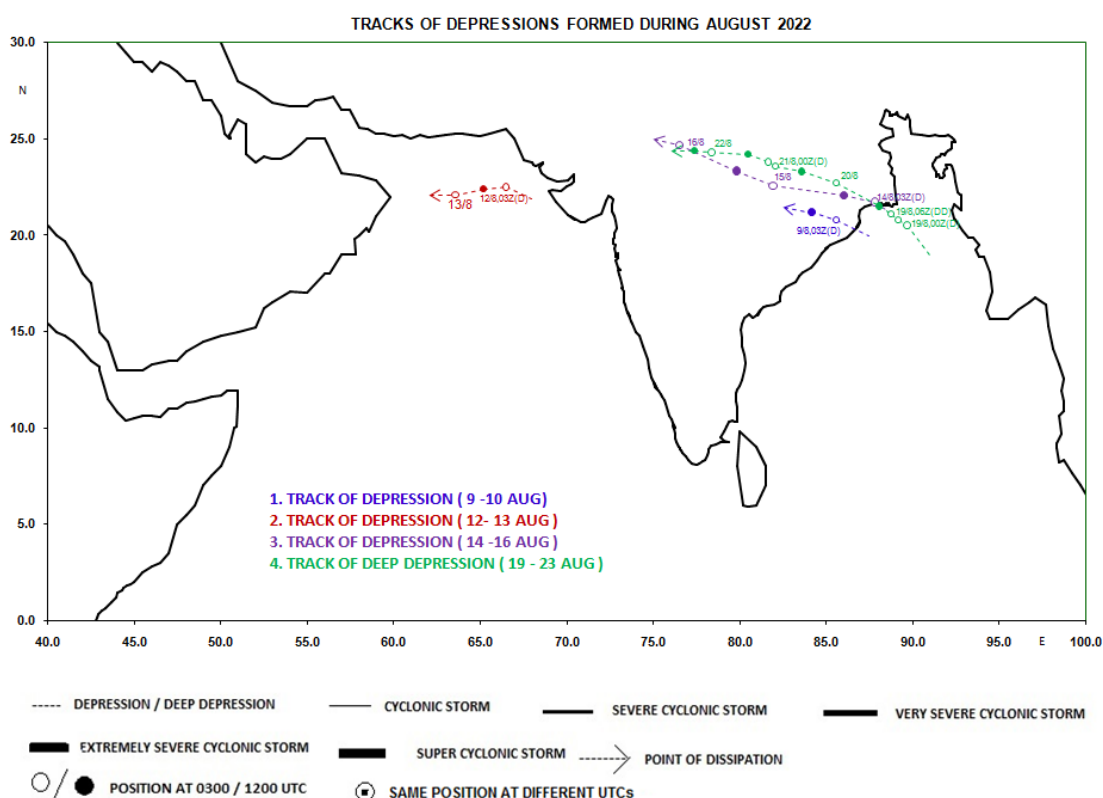
Some stations received record rainfall (24 hour).The table below shows stations received 24-hour record rainfall and its previous record.

STATION	24 HOUR RECORD RAINFALL IN AUGUST 2022(mm)#	DATE	PREVIOUS RAINFALL RECORD(mm)	DATE
KOTA (A)	224.2	22	193.1	07-08-2016
BHIND	100	20	80.4	04-08-1975
SHIVPURI	215	14	155	25-08-1991
RAJNANDGAON	152	10	135	22-08-1990
MAHABALIPURAM	53.4	22	4.2	02-08-1979
CHAMARAJNAGAR	78.4	30	61.2	28-08-2008
SHIRALI	287.8	2	240.4	03-08-1982
MANDYA	143	2	133.3	15-08-2017

# based on real time available data

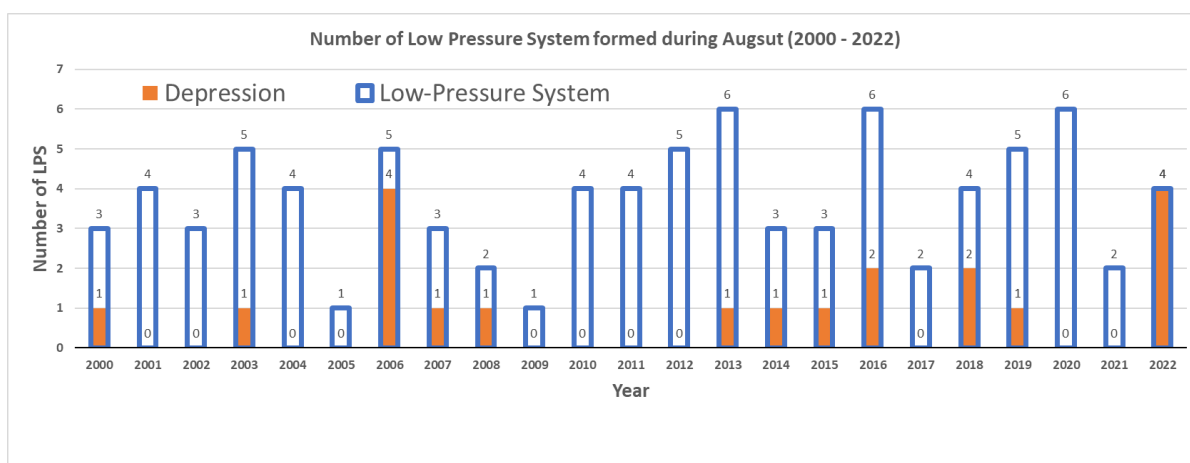
### 3. Chief synoptic features during August 2022

One Deep depression during 19 – 23 August over Bay of Bengal and three depressions (2 over Bay of Bengal during 9 -10 August and 14 -16 August and 1 over Arabian Sea during 12 – 13 August) formed during the month. Track of these depressions are shown in figure 3.



**Figure 3: Tracks of Low-Pressure System formed during August 2022.**

The low-pressure systems formed during the monsoon season contribute heavy and very heavy rainfall over many parts of the country. The figure 4 shows number of low-pressure systems formed over Indian region in the month of August during 2000 to 2022.



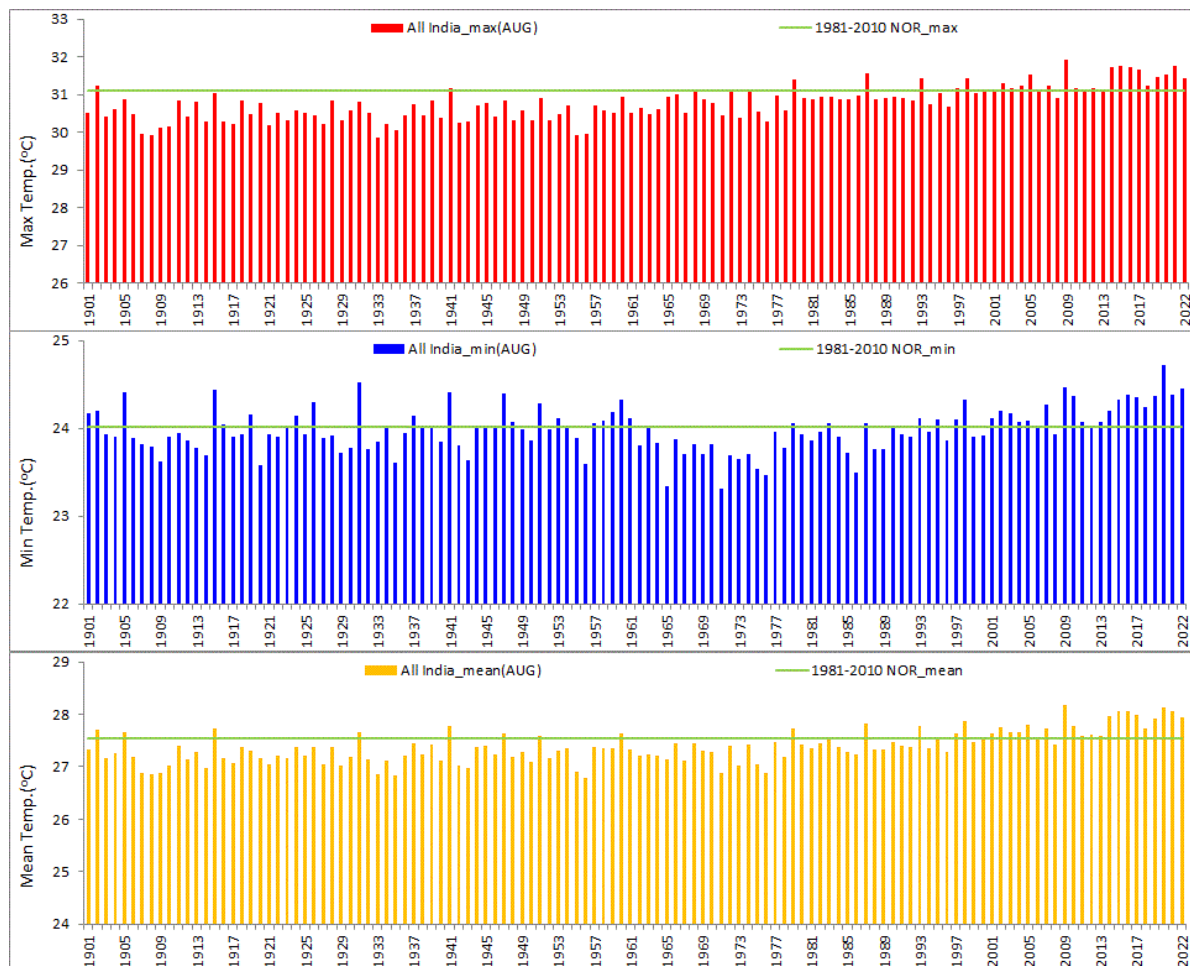
**Figure 4. Number of low-pressure systems during August from 2000 to 2022.**

The number of Low-Pressure System days had been 23 in August 2022 against the normal of 16.3. All the low-pressure systems which developed in August month are intensified in to monsoon depression category. The details of the Low-Pressure systems formed over the Indian region for the year 2017 to 2022 is given in the table below:

Year	Monsoon Depression	No. of Low-Pressure Systems	Total	Low-Pressure System days
2017	-	2	2	9
2018	2	2	4	18
2019	1	4	5	21
2020	-	6	6	26
2021	-	2	2	15
2022	4	-	4	23
<b>Climatology (1901-2020)</b>	<b>1.6</b>	<b>3.7</b>	<b>5.38</b>	<b>16.3</b>

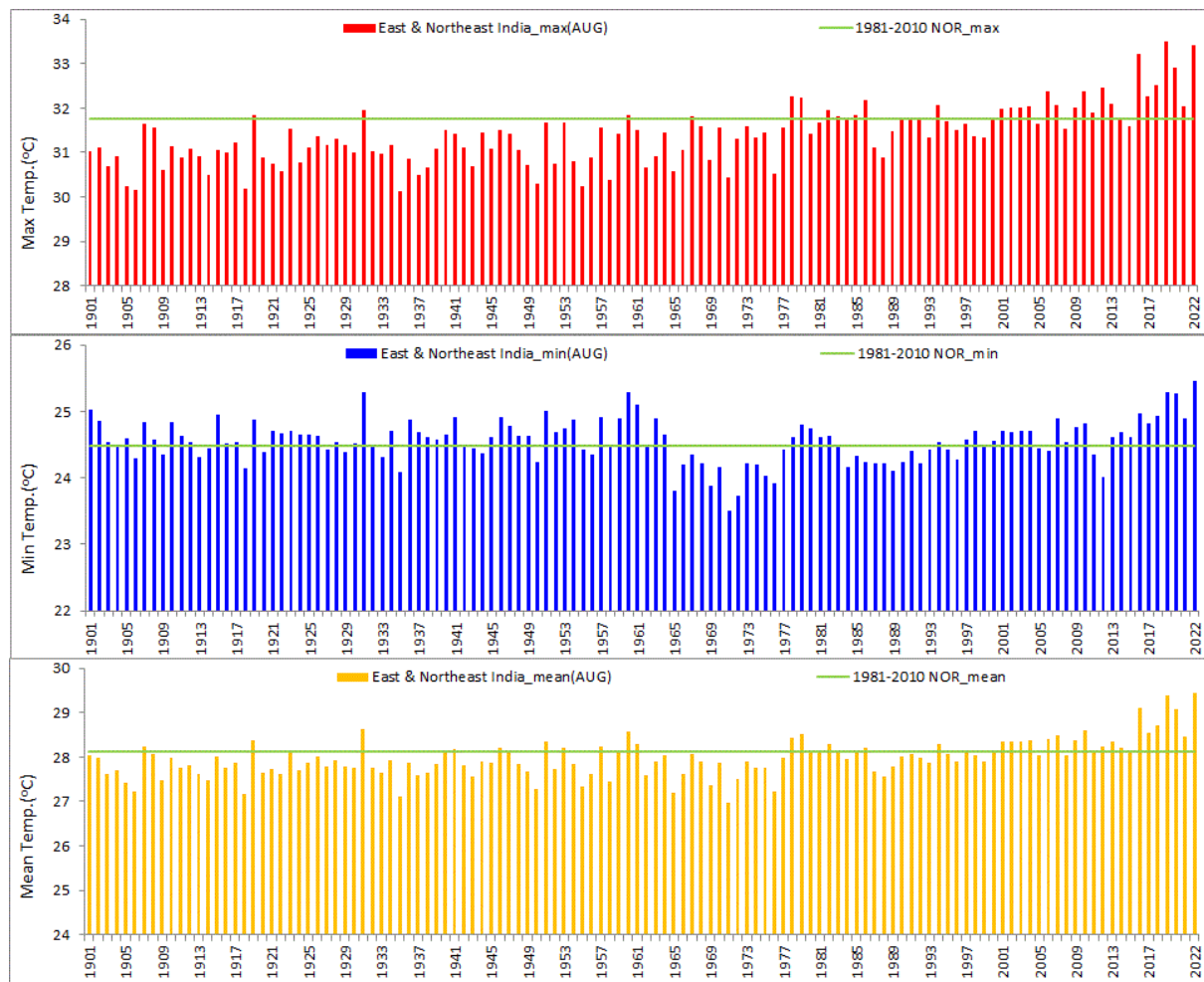
#### 4. Characteristics of Temperatures for the month of August 2022

The observed average maximum, average minimum and mean temperature for the country as a whole during August 2022 are 31.44°C, 24.45°C and 27.94°C respectively, against the normal of 31.09°C, 24.01°C and 27.55°C based on period 1981-2010. Thus, the average maximum temperature, average minimum temperature and mean temperature are above normal by 0.35°C, 0.44°C and 0.39°C respectively for the country as a whole. 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 2022 - normal temperature based on data of 1981-2010). Figure 5 shows time series of monthly average maximum, average minimum and mean temperature over all India for the month of August during 1901-2022. Over all India during August, the average minimum temperature is fourth highest with 24.45°C after the years 2020 (24.73°C), 1931(24.52°C), 2009(24.46°C) since 1901. The temperatures during August 2022 for all India and homogeneous regions with its ranks since 1901 is given in Table 1 and the five extremes for temperature along with year occurrence is given in Table 2.



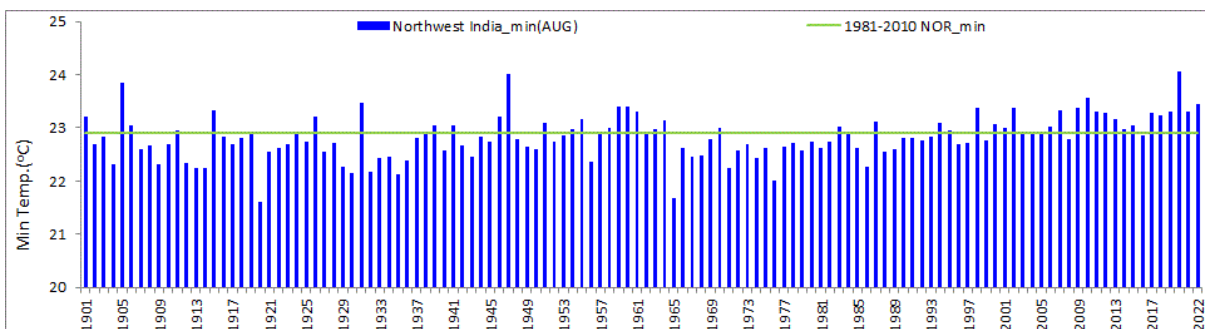
**Fig 5: Time series of monthly average maximum, average minimum and mean temperature over all India for the month of August during 1901-2022.**

Figure 6 shows time series of monthly average maximum, average minimum and mean temperature over East & Northeast India for the month of August during 1901-2022. Over East & Northeast India during August, the average maximum temperature is second highest with 33.41 °C after the year 2019(33.50 °C) since 1901. The average minimum temperature is ever highest with 25.45°C since 1901 and it has broken the earlier highest record of 25.297°C which was in 1931 for the month of the August. The mean temperature is also the ever highest with 29.43°C since 1901 and it has broken the earlier highest record of 29.40°C which was in 2019 for the month of the August.



**Fig 6: Time series of monthly average maximum, average minimum and mean temperature over East & Northeast India for the month of August during 1901-2022.**

Figure 7 shows time series of monthly average minimum temperature over Northwest India for the month of August during 1901-2022. Over Northwest India during August, the average minimum temperature is sixth highest with 23.44 °C since 1901.



**Fig 7: Time series of monthly average minimum temperature over Northwest India for the month of August during 1901-2022.**

**Table1.** The Temperatures during August 2022 for all India and homogeneous regions with its ranks since 1901 are given below:

AUG 2022		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	31.44	24.45	27.94
	NORMAL	31.09	24.01	27.55
	ANOMALY	0.35	0.44	0.39
	TOP RANK	11	4	8
	BOT RANK	112	119	115
NORTHWEST INDIA	ACTUAL	31.44	23.44	27.44
	NORMAL	31.78	22.91	27.35
	ANOMALY	-0.34	0.53	0.09
	TOP RANK	57	6	27
	BOT RANK	66	117	96
EAST & NORTHEAST INDIA	ACTUAL	33.41	25.45	29.43
	NORMAL	31.76	24.48	28.12
	ANOMALY	1.65	0.97	1.31
	TOP RANK	2	1	1
	BOT RANK	121	122	122
CENTRAL INDIA	ACTUAL	30.68	24.39	27.54
	NORMAL	30.21	24.18	27.19
	ANOMALY	0.47	0.22	0.34
	TOP RANK	12	15	10
	BOT RANK	111	108	113
SOUTH PENNINSULAR INDIA	ACTUAL	31.03	24.66	27.84
	NORMAL	30.92	24.40	27.66
	ANOMALY	0.11	0.26	0.18
	TOP RANK	30	21	24
	BOT RANK	93	102	99

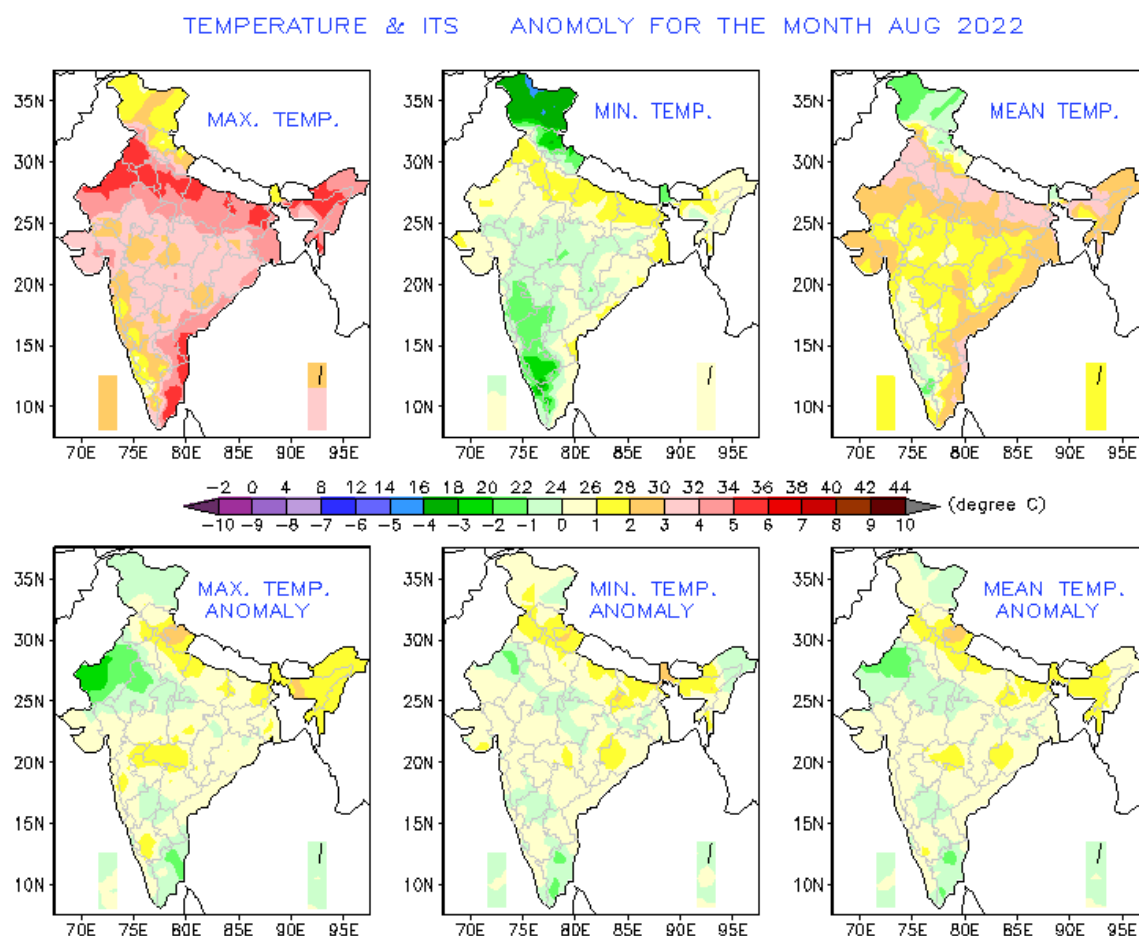
Note: Values are rounded off to nearest two decimal

**Table 2.** The five highest temperature records with corresponding ranks since 1901 along with year occurrence for East & Northeast India (TMax, TMin, TMean) are given in the table below:

East & Northeast India (August 2022)					East & Northeast India (August 2022)					East & Northeast India (August 2022)				
Year	TMax	Normal	Anomaly	Rank	Year	TMin	Normal	Anomaly	Rank	Year	TMean	Normal	Anomaly	Rank
2019	33.50	31.76	1.74	1	2022	25.449	24.48	0.966	1	2022	29.43	28.12	1.31	1
2022	33.41		1.65	2	1931	25.297		0.814	2	2019	29.40		1.28	2
2016	33.21		1.45	3	1960	25.295		0.813	3	2016	29.09		0.97	3
2020	32.90		1.14	4	2019	25.294		0.811	4	2020	29.08		0.96	4
2018	32.52		0.76	5	2020	25.265		0.782	5	2018	28.72		0.60	5



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 August 2022 is given in Figure 8.



**Fig 8: 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 August 2022 (lower three from left to right).**

## 5. Significant Weather Events for the month of August 2022:

During August, total 160 persons reportedly claimed dead, more than 60 persons injured, 15 persons missing & more than 100 livestock perished. The details of casualties given below, which are based on real time media reports and other state government agencies.

Fig 9(a). shows significant weather events during the month. (Based on real time media reports). There were many districts which affected by flood due to heavy rainfall events. Fig 9(b) shows the districts affected by floods with location of very heavy/extremely heavy rainfall.

Floods, Heavy Rains & Landslide: Total 116 persons reportedly claimed dead, 27 persons injured, 15 persons missing & 50 livestock perished, during August, because of Floods, Heavy Rains & Landslide. The details of the area effected by the events are summarized and given in the table below;



DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE) AFFECTED
11, 15, 19, 20 Aug.	31	12			Chamba, Kangra, Kullu, Lahaul & Spiti, Mandi (Himachal Pradesh)
8, 9, 10 Aug.	26		1	50	Amaravati, Nagpur, Washim, Yavatmal (Maharashtra)
1, 2, 29 Aug.	22		5		Ernakulam, Idukki, Kannur, Kottayam, Kollam, Malappuram, Pathanamthitta, Thiruvananthapuram (Kerala)
13, 14, 17, 19, 21, 22 Aug.	12	7			Balasore, Keonjhar, Khordha, Koraput, Mayurbhanj, Sambalpur (Odisha)
19, 29 Aug.	10	3	7		Dehradun, Pauri Garhwal, Tehri Garhwal (Uttarakhand)
1, 4 Aug.	8	1			Dakshina Kannada, Tumkur, Uttara Kannada (Karnataka)
20 Aug.	3				Ramgarh, West Singhbhum (Jharkhand)
22 Aug.	2	4	2		Baran, Bundi (Rajasthan)
11 Aug.	2				Ramban (Jammu & Kashmir)

**Lightning :** Total 43 persons reportedly claimed dead, more than 35 persons injured & 68 livestock perished, during August , because of Lightning. The details of the area effected by the events are summarized and given in the table below;

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE) AFFECTED
6 Aug.	9	2			Guna, Satna, Vidisha (Madhya Pradesh)
3, 16, 28 Aug.	8	7		60	Alluri Seetarama Raju, Eluru (Andhra Pradesh)
4 Aug.	6				Banka, Katihar, Nawada (Bihar)
28 Aug.	5	11			Jharsuguda, Mayurbhanj (Odisha)
6, 7, 8, 13, 18 Aug.	5	2		8	Cachar, Goalpara, Kokrajhar, Lakhimpur, South Salmara (Assam)
1, 13 Aug.	4	15			East Singhbhum, Gumla, Ranchi (Jharkhand)
3 Aug.	3				Jayashankar Bhupalpally (Telangana)
6 Aug.	2				Muzaffarnagar (Uttar Pradesh)
6 Aug.	1				Bijapur (Karnataka)

**Thunder storm:** One person reportedly claimed dead on 8<sup>th</sup> August in Lakhimpur district of Assam because of Thunderstorm.

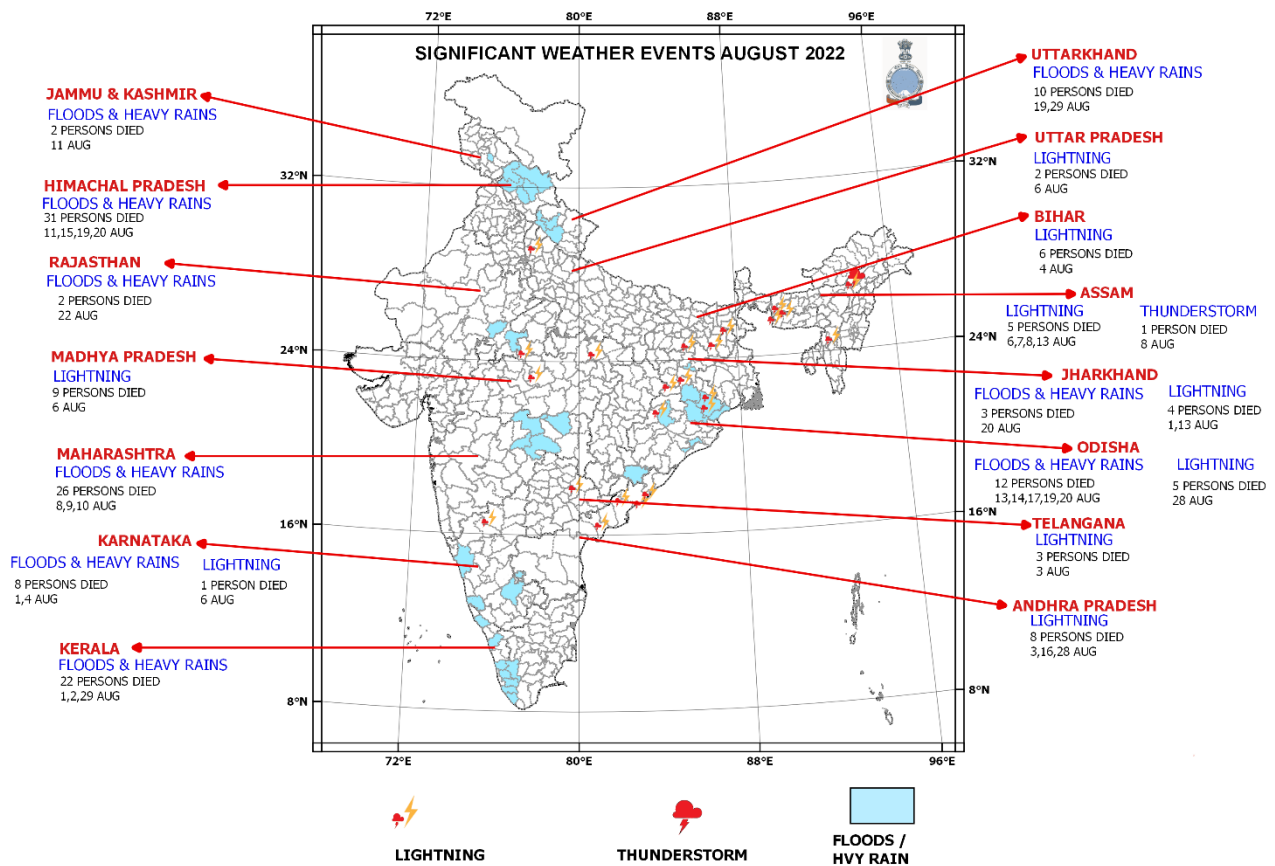


Fig 9(a): Significant weather events during August 2022 (Based on real-time media report)

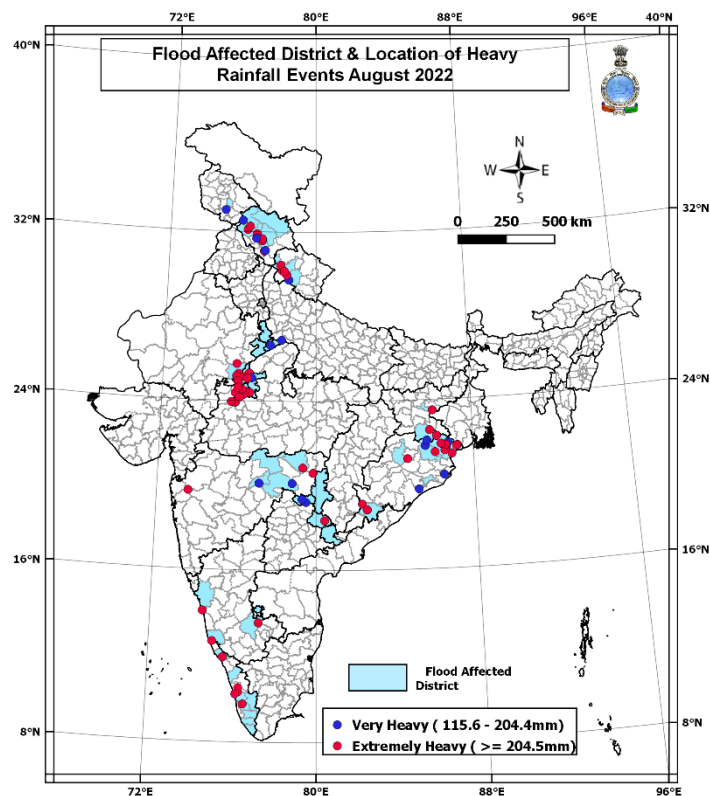


Fig 9(b): Districts affected by floods and location of heavy rainfall events.