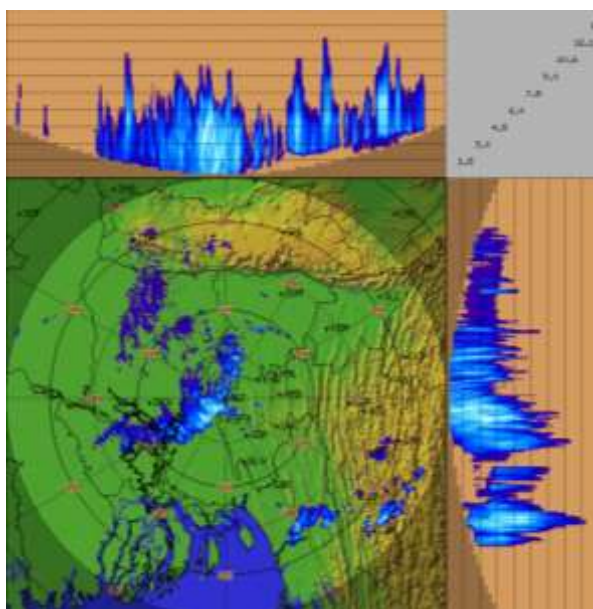




PRE-MONSOON WEATHER REPORT TRIPURA – 2022



Prepared by : Sri. Rana Das, Sri. Nahush Prakash Kulkarni and Dr. Partha Roy

India Meteorological Department

Meteorological Centre, Agartala

M.B.B.Airport,Agartala Tripura (West)-799009

Abstract

A study has been done for the pre-monsoon season 2022 for Tripura state. Regarding temperature, the mean monthly Maximum temperatures were much higher than normal in the first two months (March and April) and near normal in the month of May whereas Mean monthly Minimum temperatures were higher than normal in all the three months in the season. During the Pre-monsoon season of 2022 Tripura received 530.8 mm of rainfall which was 22% less than the normal rainfall. The departures of rainfall were - 02% and - 26% at Agartala and Kailashahar respectively. The number of rainy days was 21 days in Agartala and 29 days in Kailashahar and the number of Thundery days was 21 & 22 for Agartala and Kailashahar respectively. the number of thunderstorm days was -36% and -35% to the normal values for both the stations. Five number of Squalls (20th April, 3rd May, 19th May, 21st May, and 25th May) were also recorded at Agartala during the seasons.

Introduction:

Based on Indian climatology, the March, April & May months are considered the pre-monsoon season. This season is characterized by high temperatures and thunderstorms. The eastern & north-eastern regions of the country are considered to be one of the most thunderstorm-prone areas, which starts from the month of March and gradually increases in the month of April to May. These thunderstorm events in east and northeast India are known as “ Norwesters” or “Kalbhaishakhi”. Tripura is the most prone state to thunderstorms and its associated weather Phenomena like lightning, squall, and Hailstorm. Tripura state has two observatories at Agartala & Kailashahar under India Meteorological Department (IMD). In Agartala monthly mean numbers of thundery days during March, April & May are 5,12 & 16 respectively, whereas, in Kailashahar, these numbers are 6,13 & 15 respectively.

A brief description of weather events in Tripura during the pre-monsoon season of 2022 has been presented in this Report.

1. Temperatures

2.1. Maximum Temperature

Mean monthly maximum temperature departures from normal were positive for three months at Agartala and temperature departures from normal were positive for the month of March & April whereas negative for the month of May at Kailashahar. These departures were higher at Agartala than at Kailashahar. Daily maximum temperatures were above normal (more than +1.5°C from normal) on 66% of occasions both at Agartala and Kailashahar. Below normal daily maximum temperatures were recorded on 8% occasions at both Agartala and Kailashahar during the season. During this season the highest maximum temperature of 37.3°C and 36.5°C was recorded at Agartala and Kailashahar respectively on 19th April and 23rd March 2022.

Table 1: Mean monthly maximum temperatures and their departures from normal at Agartala

MONTH	MEAN MAXIMUM TEMPERATURE	DEPARTURE FROM NORMAL	NO. OF DAY WITH MAXIMUM TEMPERATURE		
			BELOW NORMAL	NORMAL	ABOVE NORMAL
March-22	34.0	+2.3	0	10	21
April-22	35.6	+2.7	1	3	26
May-22	33.5	+0.9	6	11	14

Table 2: Mean monthly maximum temperatures and their departures from normal at Kailashahar.

MONTH	MEAN MAXIMUM TEMPERATURE	DEPARTURE FROM NORMAL	NO. OF DAY WITH MAXIMUM TEMPERATURE		
			BELOW NORMAL	NORMAL	ABOVE NORMAL
March-22	33.5	+2.0	3	9	19
April-22	33.3	+0.8	1	8	21
May-22	31.8	-0.2	3	7	21

Fig 1. Graphical representations of the daily Maximum temperatures at the two stations (Agartala and Kailashahar) along with their pentad normal for each of the months are shown in figure 1 (a-f).

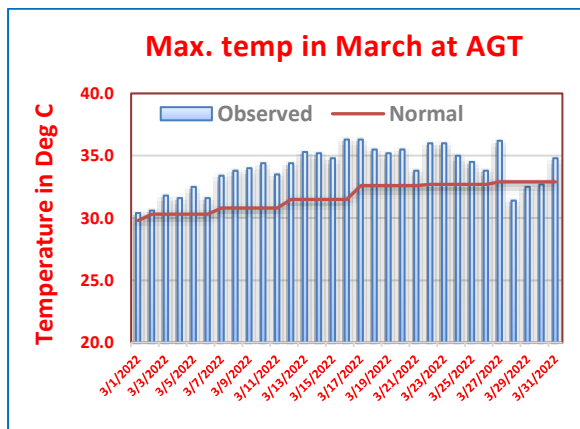


Fig. 1a

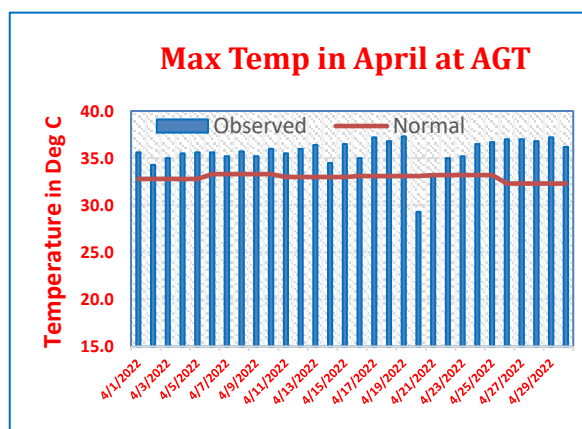


Fig. 1b

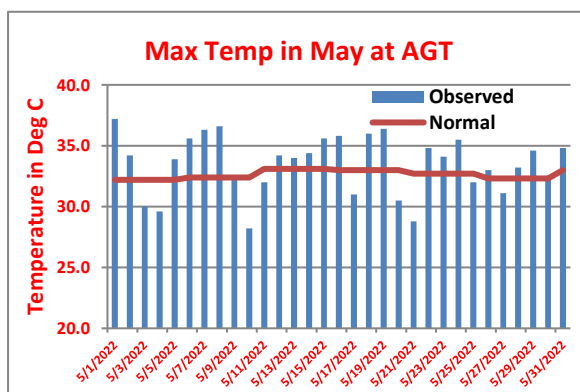


Fig. 1c

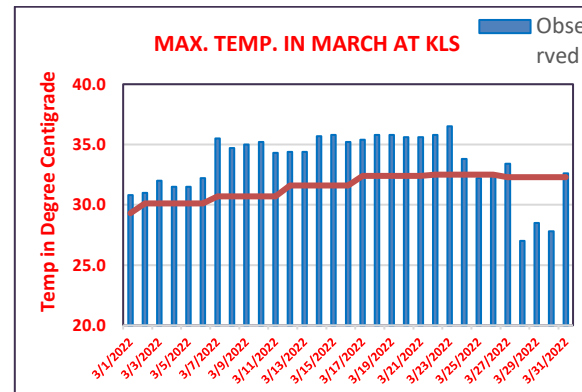


Fig. 1d

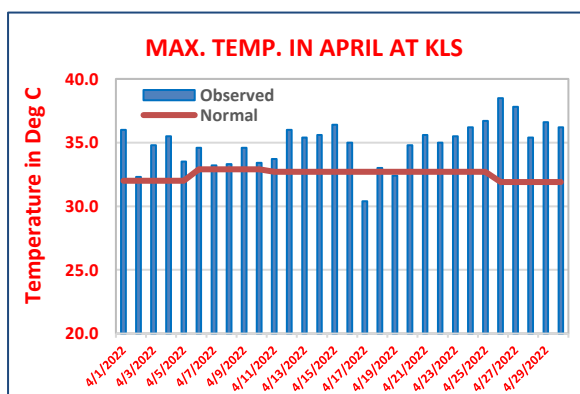


Fig. 1e

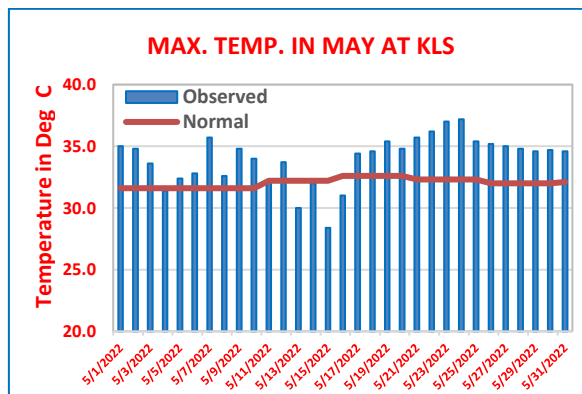


Fig. 1

1.2 Minimum Temperature:

Mean monthly minimum temperature departures were positive for all three months at Agartala as well as at Kailashahar. The positive departures are higher at Agartala as compared to Kailashahar. Daily minimum temperatures were above normal (more than + 1.5°C from normal value) on 53% of occasions at Agartala whereas it was 47% at Kailashahar during the season. Minimum Temperatures were below normal on 13% of occasions at Agartala and 10% of occasions at Kailashahar. During the season, the lowest minimum temperature of 14.0 °C was recorded at Agartala and 13.0 °C at Kailashahar on 2nd March 2022.

Table 3: Mean monthly minimum temperatures and their departures from normal at Agartala

MONTH	MEAN MINIMUM TEMPERATURE	DEPARTURE FROM NORMAL	NO. OF DAY WITH MINIMUM TEMPERATURE		
			BELOW NORMAL	NORMAL	ABOVE NORMAL
March-22	19.5	+0.6	7	15	9
April-22	25.2	+2.8	3	2	25
May-22	24.6	+1.2	2	14	15

Table 4: Mean monthly minimum temperatures and their departures from normal at Kailashahar.

MONTH	MEAN MINIMUM TEMPERATURE	DEPARTURE FROM NORMAL	NO. OF DAY WITH MINIMUM TEMPERATURE		
			BELOW NORMAL	NORMAL	ABOVE NORMAL
March-22	18.7	+0.8	6	12	13
April-22	23.2	+1.9	1	14	15
May-22	23.7	+0.5	2	14	15

Fig 2. Graphical representations of the daily minimum temperatures at the two stations (Agartala and Kailashahar), along with their pentad normal for each of the months are shown in figure 2 (a-f).

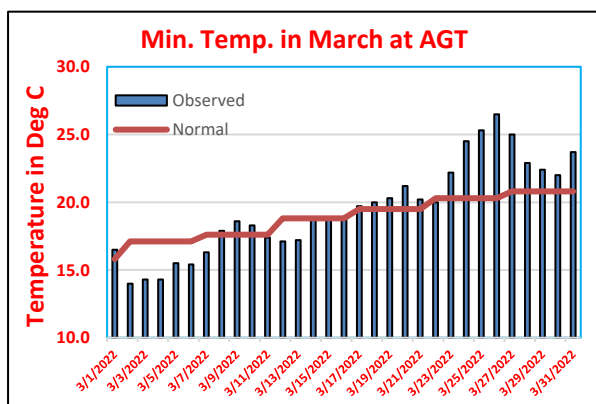


Fig. 2a

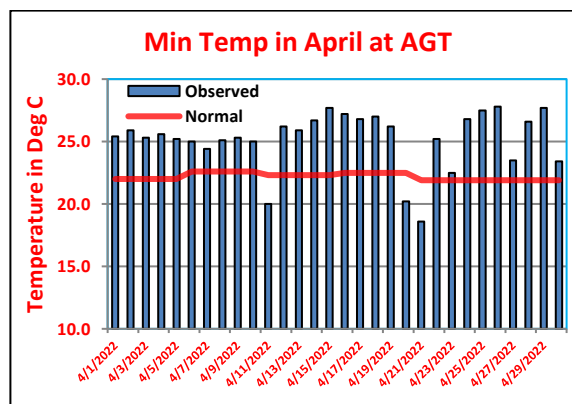


Fig. 2b

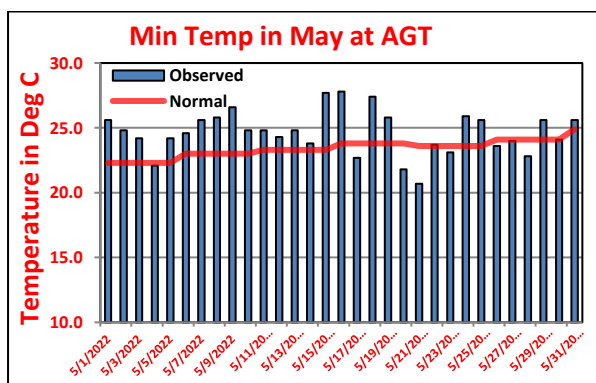


Fig. 2c

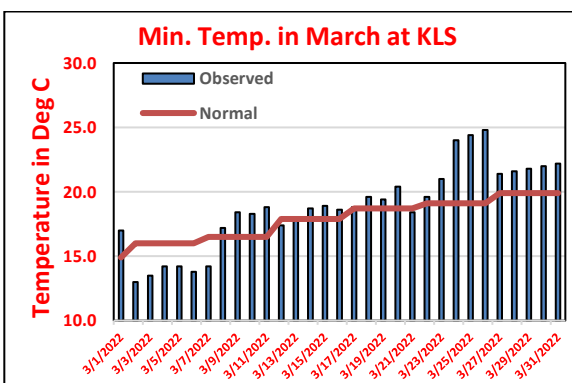


Fig. 2d

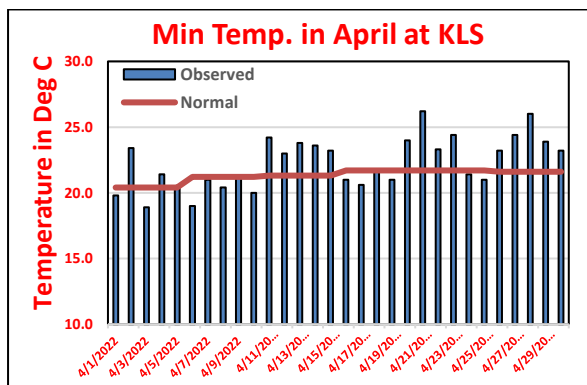


Fig. 2e

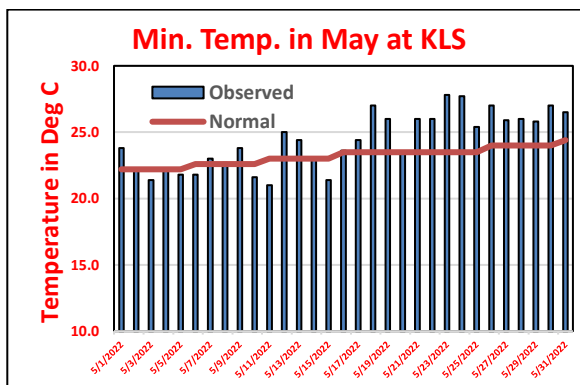


Fig. 2f

2. Rainfall and Thunderstorms

The state received less than normal rainfall during the season, Tripura received 530.8 mm of rainfall which was 22% less than the normal rainfall. The departures of rainfall were -02% and -26% at Agartala and Kailashahar respectively. But the number of thunderstorm days was -36% and -35% to the normal values for both the stations. Five squalls were recorded at Agartala, which was below the normal value. The distribution of rainfall and thunderstorm & its related phenomena is shown in table 5.

Table 5: Monthly Rainfall & its departure from normal and number of days with rain, thunderstorm, squall and hailstorm at Agartala and Kailashahar.

	AGARTALA				KAILASHAHAR			
	March-22	April-22	May-22	Total	March-22	April-22	May-22	Total
Monthly Rainfall in mm	17.7	61.2	504.1	583.0	45.6	82.0	462.0	589.6
Rainfall Departure from Normal	-72%	-69%	+51%	-02%	-55%	-70%	+07%	-26%
Days with Rain	01	03	17	21	03	08	18	29
Days with Thunderstorm	00	04	17	21	00	06	16	22
Days with Squall	00	01	04	05	---	--	--	--
Days with Hailstorm	00	00	00	00	00	00	00	00

3. Case studies on squall and hailstorm events at Agartala :

During the season, total 5 (Five) squalls (20th April, 3rd May, 19th May, 21st May and 25th May) were recorded at Meteorological Centre, Agartala. Brief case studies of those five events have been discussed here, with synoptic features and available Doppler Weather Radar (DWR) products or Satellite imageries. A satellite image is included only for those events where DWR image is not available during the time of occurrence of the event, due to some operational issues. Warning issued by Meteorological Centre, Agartala on the previous day for the events occurred in the next morning/forenoon and issued on the same day for the events occurred in the afternoon/evening/night have also been shown in this study.

4.1 Case I (Squall on 20th April, 2022):

(i) Description:

Time of occurrence: 0701-0703 IST
 Maximum wind Speed: 42 KTS

(ii) Synoptic Features:

A trough runs from the cyclonic circulation over Jharkhand to west Assam across West Bengal at 0.9 Km above mean sea level.

(iii) Thermodynamic Indices:

Date & Time of Ascent	Showalter index	Lifted index	Sweat index	K-index	Total index	CAPE
20.04.2022 0000 UTC	----	---	---	----	---	1830

(iv) Satellite Imagery:

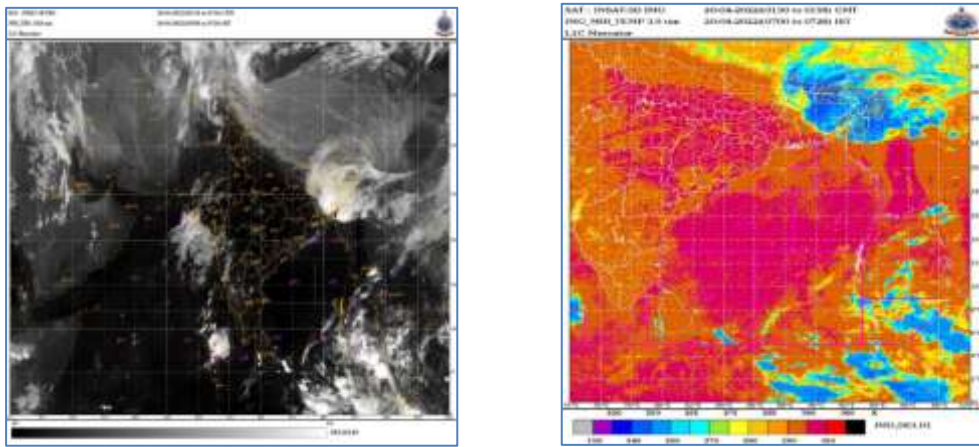


Fig 3: Satellite imagery of 0700-0726 IST showing deep convection over Tripura

(v) Warning issued:

Date & Time of Issue	Warning with colour code
19/1340 IST	Thunderstorm with Lightning and Gusty wind of speed reaching 40-50 kmph.

4.2 Case II (Squall on 3rd May, 2022):

(i) Description:

Time of occurrence: 1040-1042 HRS IST
 Maximum wind Speed : 50 KTS

(ii) Synoptic Features:

A trough from Northwest Rajasthan to Manipur across South Uttar Pradesh ,South Bihar, Sub Himalayan West Bengal and South Assam at 0.9 Km above MSL.

(iii) Thermodynamic Indices :

Date & Time of Ascent	Showalter index	Lifted index	Sweat index	K-index	Total index	CAPE
03.05.2022 0000 UTC	-9.02	-9.55	597.7	45.30	59.20	1701

(iv) Satellite Imagery:

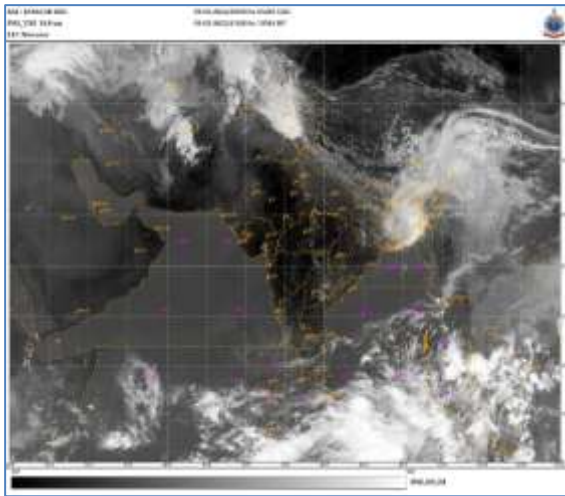


Fig4: Satellite imagery of 1030-1056 IST showing deep convection over Tripura

(v) Warning issued:

Date & Time of Issue	Warning with colour code
02/1340 IST	Thunderstorm with lightning and gusty wind of speed 40-50 kmph.

4.3 Case III (Squall on 19th May, 2022):

(i) Description:

Time of occurrence: 1626-1628 HRS IST
Maximum wind Speed: 45 KTS

(ii) Synoptic Features:

The east west trough from Northwest Rajasthan to West Assam across South Uttar Pradesh, South Bihar & Sub Himalayan West Bengal at 0.9 Km above mean sea level.

(iii) Satellite Imagery:

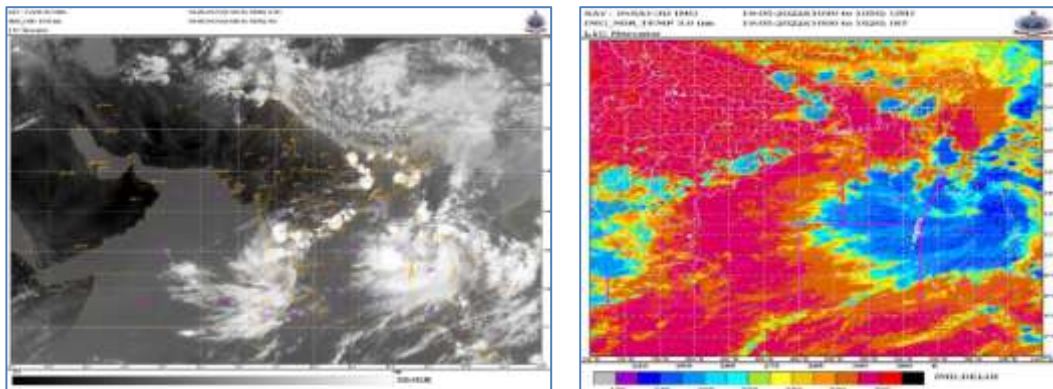


Fig 5 : Satellite imagery of 1030-1056 IST showing deep convection over Tripura (Source: Satmet Division, IMD, New Delhi)

(v) Warning issued:

Date & Time of Issue	Warning with colour code
18/1340 IST	Thunderstorm and lightning

4.4 Case IV (Squall on 21st May, 2022):

(i) Description :

Time of occurrence: 0601-0604 IST

Maximum wind Speed: 45 KTS

(ii) Synoptic Features:

- The well-marked low pressure area over Gulf of Martaban and adjoining Myanmar intensified into a depression over the same region and lay centred at 0830 hrs IST of Today ,the 20th May 2022 near latitude 16.2 deg North and longitude 97.3 deg East, about 40 km southwest of Mawlamyine (Myanmar),140 km East-southeast of Yangon (Myanmar) and 700 km Northeast of Port Blair(Andaman Islands). it is very likely to move North-eastwards and cross south Myanmar coast around Mawlamyine by evening of today, the 20th May,2022.
- The Trough in westerlies between 1.5 km & 2.1km above mean sea level roughly along long. 87 deg east & to the North of lat. 22 deg north has moved away east-north-eastwards.

(iii) Satellite Imagery:

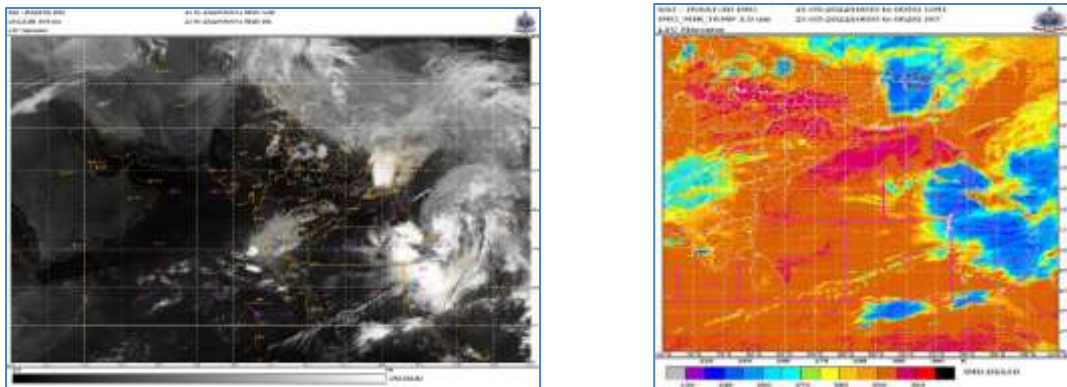


Fig 6: Satellite imagery of 0600-0626 IST showing deep convection over Tripura

(iv) Warning issued:

Date & Time of Issue	Warning with colour code
20/1340 IST	Thunderstorm with Lightning and Heavy Rainfall

4.5 Case V (Squall on 25th May, 2022):

(i) Description :

Time of occurrence: 1421-1422 IST

Maximum wind Speed: 34 KTS

(ii) Synoptic Features:

- The east west trough from Northwest Rajasthan to North Bangladesh extending upto 0.9 Km above mean sea level.

(iii) Satellite Imagery:

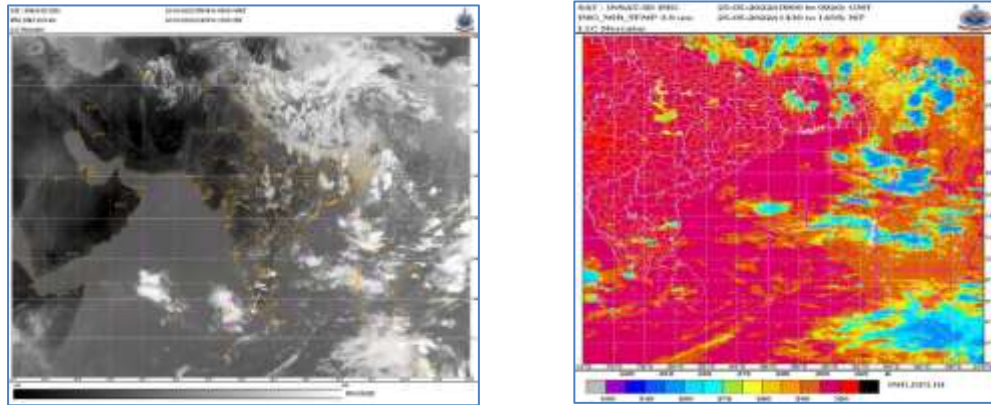


Fig 07: Satellite imagery of 1430-1456 IST showing deep convection over Tripura.

(iv) Warning issued:

Date & Time of Issue	Warning with colour code
24/1340 IST	NIL.

Summary:

A study has been done for the pre-monsoon season 2022 for Tripura by analyzing month-wise distribution of temperature, rainfall, Thunderstorm and its related weather phenomena based on Meteorological data of two departmental observatories, Agartala & Kailashahar in the states.

1. The mean monthly Maximum temperatures were much higher than normal in the first two months in the season whereas almost near normal in the month of May for both the stations. The departures were +2.3, +2.7, +0.9 in Agartala and +2.0, +0.8, -0.2 in Kailashahar during March, April & May respectively.
2. Mean monthly Minimum temperatures were higher than normal in all the three months in the season for both the stations. The departures were +0.6, +2.8, +1.2 in Agartala and +0.8, +1.9, +0.5 in Kailashahar during March, April & May respectively.
3. The departures of the seasonal rainfall was -02% in Agartala whereas -26% in Kailashahar. Month wise departures were -72%, -69% & +51% in Agartala and that were -55%, -70% & +07% in Kailashahar in the months of March, April & May respectively.
4. Tripura received 530.8 mm of rainfall which was 22% less than the normal rainfall. The departures of rainfall were - 02% and - 26% at Agartala and Kailashahar respectively.
5. The number of rainy days was 21 days in Agartala and 29 days in Kailashahar and the number of Thundery days were 21 & 22 for Agartala and Kailashahar respectively.
6. the number of thunderstorm days was -36% and -35% to the normal values for both the stations.
7. Five number of Squalls (20th April, 3rd May, 19th May, 21st May and 25th May) were also recorded at Agartala during the seasons.

ACKNOWLEDGEMENT:

The author are thankful to the Deputy Director-General Regional Meteorological Centre, Guwahati. The efforts of all staff members of Met Centre Agartala and M.O.Kailashahar are also acknowledge for making data available for this report.

REFERENCE :

Sri R.Phukan and Sri D.Saha “PRE-MONSOON WEATHER REPORT FOR TRIPURA – 2020”
<https://agartala.imd.gov.in/special-report/>

**India Meteorological Department
Meteorological Centre, Agartala
M.B.B.Airport,Agartala Tripura (West)-799009**
