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Weather in India

POST MONSOON SEASON (October-December 2023) †

1. Introduction

Post monsoon season 2023 witnessed the formation of four intense low pressure systems in the north Indian ocean (NIO), *viz* Extremely Severe Cyclonic Storm "TEJ" over the Arabian Sea & Very Severe Cyclonic Storm "HAMOON" over westcentral Bay of Bengal in October; Severe Cyclonic Storm "MIDHILI" over the Bay of Bengal in November and Severe Cyclonic Storm "MICHAUNG" over the Bay of Bengal in December.

As per the ACR/AMR recommendation, the southwest monsoon withdrawal and northeast monsoon dates have been modified. The southwest monsoon withdrew from the entire country on 16th October 2023, (normal date 20th October) and simultaneously northeast monsoon season commenced over the southern peninsula. Northeast monsoon activity was ceased on 12th January 2024. Rainfall activity during the season as a whole was 94% of its LPA. It was 46% of its LPA during October, 117% of its LPA during November and 229% of its LPA during December.

Northeast monsoon rainfall over the five core regions was: *excess* in Kerala & Mahe (127% of L.P.A.), *normal* inCoastal Andhra Pradesh & Yanam (83% of L.P.A.) and Tamil Nadu, Puducherry & Karaikal (104% of L.P.A.) while deficient in South Interior Karnataka (72% of L.P.A.) and Rayalaseema (70% of L.P.A.).

As a whole the mean temperature for the Post-Monsoon season over the country was 24.24 °C with an anomaly of 1.0 °C and it was highest since 1901. Over the country as a whole the maximum temperature was 3rd highest (29.59 ºC with an anomaly of 0.68 ºC) and the minimum temperature was highest (18.89 ºC with an anomaly of 1.31 ºC) since 1901.

Among the four homogeneous regions, over East & Northeast India the maximum temperature was highest (28.87 ºC with an anomaly of 1.28 ºC) and the minimum temperature was also highest (17.08 ºC with an anomaly of 1.20 ºC) since 1901. Over South Peninsular India the maximum temperature was 2nd highest (31.41 ºC with an anomaly of 1.01 ºC) and the minimum temperature was highest (23.58 ºC with an anomaly of 1.28 ºC) since 1901. The minimum temperature was 2nd highest (19.20 ºC with an anomaly of 1.46 ºC) over Central India and highest (12.45 ºC with an anomaly of 1.25 ºC) over northwest India since 1901.

(* *Definitions of terms in italics (other than subtitles) are given in Appendix.)*

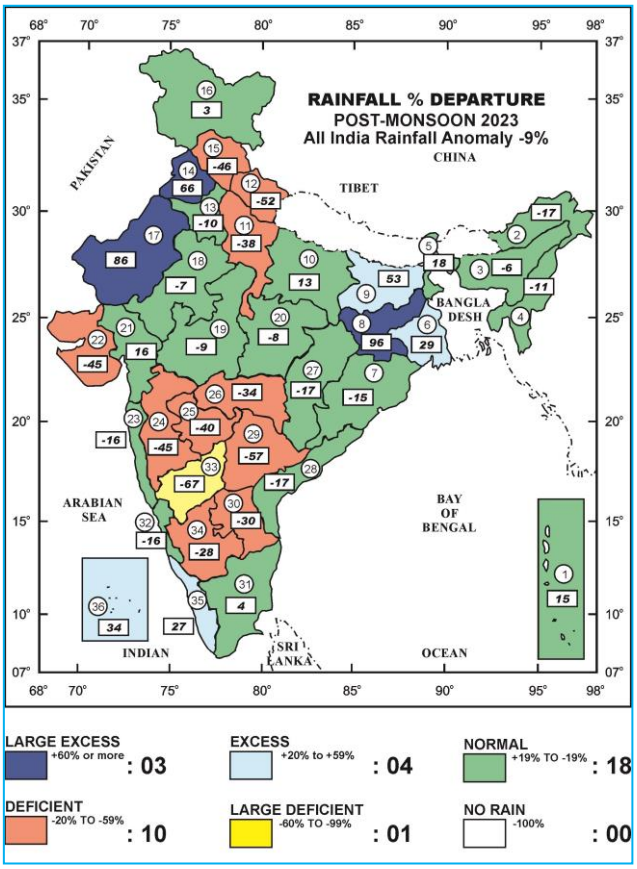

Fig. 1. Sub-divisionwise seasonal rainfall departure from normal (%) for post monsoon season (October to December, 2023).

Maximum temperature was above normal over most parts of the country, except some parts of northwest India, central India and east India. Maximum temperature anomaly was more than 2 ºC over parts of Ladakh state, Himachal Pradesh, Uttarakhand, Assam & Meghalaya, Andhra Pradesh state and South Interior Karnataka. Maximum temperature anomaly was less than -1 ºC over

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parts of Punjab, Rajasthan state, Uttar Pradesh state, Madhya Pradesh state and Gangatic West Bengal.

Minimum temperature was above normal over most parts of the country, except some parts of northwest India and central India. Minimum temperature anomaly was more than 3 ºC over parts of Punjab, Bihar, Jharkhand, Manipur, Gujarat region, Tamil Nadu, Puducherry & Karaikal and South Interior Karnataka. Minimum temperature anomaly was less than -1 ºC over parts of West Uttar Pradesh.

Cold wave conditions were observed at isolated places over Punjab only in the last fortnight of December. Cold day to severe cold day conditions were observed at many places over Punjab, Haryana, northwest Rajasthan; at a few places over west Uttar Pradesh and at isolated places over east Uttar Pradesh, north Madhya Pradesh on 31st December.

Dense fog/foggy conditions prevailed over northern/northeastern parts of the country almost throughout the month of December. Dense to very dense fog prevailed over the homogenous regions of North and Northeast India during the most days of December. It was also observed over eastern region and central India during last week of the season. Moderate to shallow fog was observed over most places of most sub divisions of north India with isolated places over northeast India from 2nd week of December. Northwest India also experienced Moderate to shallow fog at isolated places during 2nd fortnight of December.

Moderate to strong El Niño conditions were prevailing over equatorial Pacific region & the sea surface temperatures (SSTs) were above average over most of the equatorial Pacific Ocean and Indian Ocean Dipole was also strongly positive during the season which were favourable for good NEM activity. MJO was not conducive for enhancement of convective activity over the Bay of Bengal (BoB) and Arabian Sea during October and November. During the last week of November 2023, MJO entered phase 3 (Indian Ocean) with reduced strength. During the first fortnight of December 2023, MJO propagated eastwards from phase 3 (Indian Ocean) to phase 6 (Western Pacific) with enhanced strength. In the last week of December, it entered into phase 2 (Indian Ocean) with enhanced strength.

2. Seasonal rainfall (October-December)

The meteorological sub-division wise rainfall percentage departures from normal are given in Fig. 1 and Table 1. The precipitation in the post monsoon 2023 season was 91.5% of long period average (LPA), with the homogeneous regions of Northwest India, East & Northeast India and South Peninsula being *normal* while and Central India precipitation being *deficient*. December being wetter than normal (large excess), for the country as well as all the four homogenous regions with central India recording 290% of L.P.A rainfall. October rainfall being highly deficient over the homogenous regions of Central India and south Peninsula. The monthly December precipitation was exceptionally high over the East & Northeast India, Central India and South Peninsula region, while it is large deficient over Northwest India. Northwest India received excess rainfall in October and normal in November. Rainfall realized over the country as a whole was 91.5% of its LPA during the season. It was 99% of its LPA over northwest India, 78 % of its LPA over central India, 110% if it's LPA over east & northeast India and 87% of its LPA over south peninsula.

(** Definitions of terms in italics (other than subtitles) are given in Appendix.)*

3. Monthly features

3.1. *October*

3.1.1. *Withdrawal of southwest monsoon*

In view of the establishment of an anti-cyclonic circulation in the lower tropospheric levels over western parts of Northwest India and substantial reduction in moisture content as well as rainfall, the southwest monsoon withdrew from parts of southwest Rajasthan on 25th September against its normal date of 17th September. Further withdrawal was sluggish and the monsoon retreated from the entire country on 16th October 2023.

3.1.2. *Commencement of northeast monsoon rains*

In view of setting in of north easterly winds in the lower tropospheric levels over Bay of Bengal and South Peninsular India, the Northeast monsoon rains commenced over coastal areas of Tamil Nadu, Puducherry, Karaikal and Kerala, Mahe, Coastal Andhra Pradesh, south interior Karnataka, Rayalaseema on 16th October.

3.1.3. *Storms and depressions*

Fig. 2. Cyclones and depressions during post-monsoon season 2023.

(*i*) Extremely Severe Cyclonic Storm "TEJ" over the Arabian Sea (20th to 24th October, 2023)

In October, under the influence of cyclonic circulation over southeast Arabian Sea and adjoining Lakshadweep area, a low-pressure area formed over southeast and adjoining eastcentral Arabian Sea 18th Oct. morning. It lay as a well marked low pressure area over

TABLE 1

Sub-divisionwise rainfall (mm) for each month and season as a whole (October-December, 2023)

S. No.	Meteorological Sub-divisions	October			November			December			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	A. & N. Islands	280.0	284.6	-2%	349.8	238.8	46%	139.8	147.1	-5%	769.6	670.5	15%
2.	Arunachal Pradesh	167.3	169.7	-1%	14.0	41.6	-66%	19.9	30.2	-34%	201.2	241.5	-17%
3.	Assam & Meghalaya	142.8	153.1	-7%	16.8	26.6	-37%	19.0	10.4	83%	178.6	190.1	-6%
4.	Naga., Mani., Mizo. and Tri.	78.3	150.7	-48%	53.9	38.2	41%	45.3	10.2	344%	177.6	199.1	-11%
5.	Sub-Himalayan West Bengal & Sikkim	185.2	142.7	30%	4.5	14.9	-70%	9.4	10.7	-12%	199.0	168.3	18%
6.	Gangetic West Bengal	172.0	135.3	27%	6.2	21.1	-71%	48.5	18.6	161%	226.6	175.0	29%
7.	Orissa	75.4	112.0	-33%	12.5	22.1	-43%	31.9	6.7	377%	119.9	140.8	-15%
8.	Jharkhand	135.2	73.4	84%	3.1	8.8	-65%	36.5	6.9	429%	174.8	89.1	96%
9.	Bihar	94.6	57.2	65%	0.1	4.8	-99%	8.1	5.1	58%	102.7	67.1	53%
10.	East Uttar Pradesh	38.6	33.6	15%	2.2	3.3	-35%	7.0	5.4	29%	47.7	42.3	13%
11.	West Uttar Pradesh	9.3	20.7	-55%	5.0	3.5	41%	4.3	5.9	-27%	18.6	30.1	-38%
12.	Uttarakhand	20.0	31.0	-35%	2.2	6.4	-66%	4.4	17.6	-75%	26.6	55.0	-52%
13.	Haryana, Chandigarh & Delhi	9.7	9.6	1%	5.0	3.7	35%	2.8	6.1	-54%	17.5	19.4	-10%
14.	Punjab	24.8	8.1	206%	12.0	5.1	135%	3.3	10.9	-70%	40.1	24.1	66%
15.	Himachal Pradesh	27.2	25.1	9%	11.7	19.7	-40%	5.7	38.1	-85%	44.7	82.9	-46%
16.	Jammu & Kashmir and Ladakh	79.7	33.1	141%	38.6	35.2	10%	12.6	59.4	-79%	131.0	127.7	3%
17.	West Rajasthan	14.3	7.6	88%	8.1	3.0	169%	0.1	1.5	-93%	22.4	12.1	86%
18.	East Rajasthan	1.4	15.0	-91%	12.2	7.6	60%	10.6	3.3	221%	24.2	25.9	-7%
19.	West Madhya Pradesh	1.8	29.5	-94%	26.5	10.6	150%	14.1	6.4	120%	42.3	46.5	-9%
20.	East Madhya Pradesh	16.2	36.6	-56%	12.4	10.9	14%	22.8	8.2	178%	51.4	55.7	-8%
21.	Gujarat Region	1.0	22.1	-96%	34.8	9.1	282%	2.3	1.6	43%	38.0	32.8	16%
22.	Saurashtra & Kutch & Diu	2.6	18.1	-86%	13.2	9.7	36%	0.1	0.8	-92%	15.8	28.6	-45%
23.	Konkan & Goa	87.7	116.4	-25%	30.0	21.0	43%	0.0	3.3	-100%	117.8	140.7	-16%
24.	Madhya Maharashtra	22.1	77.9	-72%	28.1	21.3	32%	7.0	4.3	63%	57.1	103.5	-45%
25.	Marathawada	7.7	74.0	-90%	44.5	17.7	151%	6.2	5.0	25%	58.5	96.7	-40%
26.	Vidarbha	5.5	57.8	-91%	38.1	13.0	193%	6.9	5.4	28%	50.5	76.2	-34%
27.	Chhattisgarh	29.4	60.4	-51%	4.9	9.8	-50%	28.1	5.3	430%	62.5	75.5	-17%
28.	Coastal Andhra Pradesh & Yanam	18.8	182.2	-90%	76.9	113.1	-32%	171.5	27.6	521%	267.6	322.9	-17%
29.	Telangana	6.6	95.8	-93%	19.2	23.0	-16%	27.0	5.3	409%	52.8	124.1	-57%
30.	Rayalaseema	12.7	132.1	-90%	68.9	78.4	-12%	83.2	25.9	221%	164.7	236.4	-30%
31.	Tamil Nadu, Pudcherry & Karaikal	98.4	172.0	-43%	233.1	181.9	28%	127.5	89.4	43%	459.0	443.3	4%
32.	Coastal Karnataka	120.4	192.9	-38%	87.7	61.7	42%	13.7	9.4	46%	221.8	264.0	-16%
33.	North Interior Karnataka	8.1	103.2	-92%	31.4	23.4	34%	4.2	4.9	-15%	43.6	131.5	-67%
34.	South Interior Karnataka	59.7	137.2	-56%	76.4	51.2	49%	6.4	10.6	-40%	142.5	199.0	-28%
35.	Kerala & Mahe	310.5	306.4	1%	240.1	153.1	57%	74.3	32.4	129%	624.8	491.9	27%
36.	Lakshadweep	135.4	153.0	-11%	174.7	120.3	45%	138.4	61.6	125%	448.5	334.9	34%

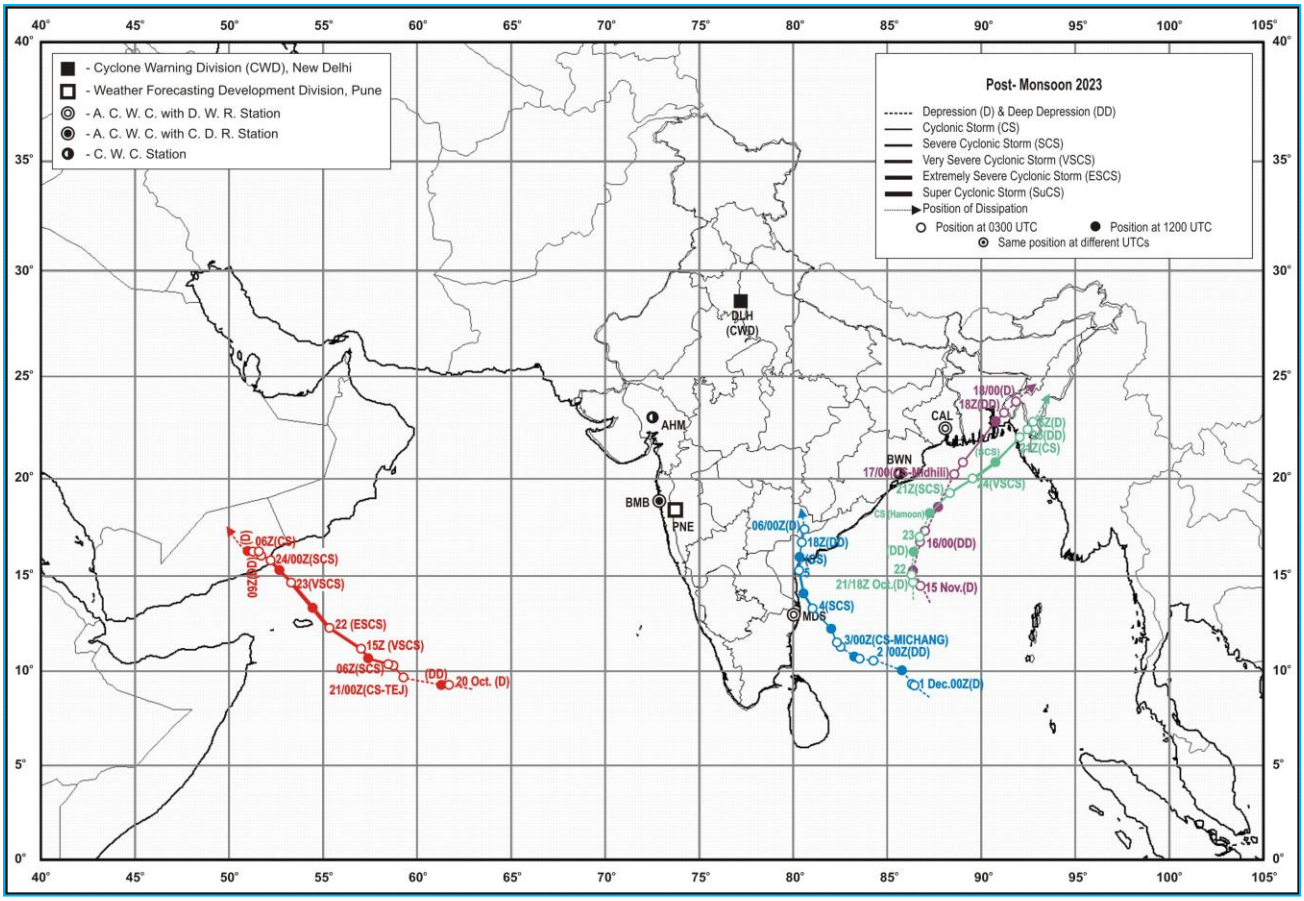


Fig. 2. Cyclones and depressions during post-monsoon season 2023.

Arabian Sea at 2330 hours IST of 19 Oct. It concentrated into a Depression at 0830 hrs IST of 20 Oct. over southwest Arabian Sea near Lat. 9.3° N / Long. 61.7° E. It moved west northwestwards and intensified into Deep Depression at 1730 hrs IST of 20 Oct. over the same region near Lat. 9.4° N / Long. 61.3° E. It further intensified into a Cyclonic Storm "Tej" (pronounced as Tej) at 0530 hrs IST of 21 Oct. and lay centered over the same region near Lat 9.9° N / Long. 59.4° E. It further intensified into a Severe Cyclonic Storm at 1130 hrs IST of 21 Oct. and lay centered over the same region near Lat. 10.2° N / Long. 58.3° E. It moved northwestwards and intensified into a Very severe Cyclonic Storm at 2030 hrs IST of 21 Oct. and lay centered over the same region near Lat. 11.1° N / Long. 57.0° E. It further intensified into an Extremely Severe Cyclonic Storm; moved northwestwards and lay centered at 0830 hrs IST of 22 Oct. over the same region near Lat. 12.3°N / Long. 55.4° E. It continued to move northwestwards and weakened into a Very Severe Cyclonic Storm and lay centered at 0830 hrs IST of 23 Oct. over westcentral Arabian Sea near Lat. 14.6° N / Long. 53.2° E about 230 km north northwest of Socotra (Yemen). It crossed Yemen coast near Lat. 15.9° N / Long. 52.2° E close to south of Al Ghaidah between 0230 hrs IST and 0330 hrs IST of 24 Oct. as a Very Severe Cyclonic Storm. It then continued to move northwestward and weakened into a Severe Cyclonic Storm and lay centered at 0530 hrs IST of 24 Oct. over coastal Yemen near Lat. 15.9° N / longitude 52.1° E. It moved west northwestward and weakened into a Cyclonic Strom and lay centered at 1130 hrs IST of 24 Oct. over Yemen, near Lat. 16.1° N / Long. 51.5° E. It moved west northwestwards and weakened into a Deep Depression and lay centered at 1430 hrs IST of 24 Oct. over Yemen near Lat. 16.1° N / Long. 51.3° E. It moved west northwestward and weakened into a Depression and lay centered over Yemen near Lat. 16.2° N / Long. 51.0° E at 1730 hrs IST of 24 Oct. It moved west northwestward and weakened into a well marked low pressure area over the same region at 2030 hrs IST of 24 Oct. It further moved west northwestwards and weakened into a low pressure area over the same region at 0530 hrs IST of 25 Oct. with the associated cyclonic circulation extending upto mid tropospheric levels and then became unimportant.

It caused widespread floods and power outages, extensive damage to buildings, cell phone towers, trees *etc*. in Yemen.

TABLE 2

Details of the weather systems during October 2023

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Cyclonic storm*					
1.	Extremely Severe Cyclonic Storm "TEJ"	20 (0300 UTC)- to 24(1200 UTC)	southwest Arabian sea	North-westwards	Yemen	Initially it lay as cyclonic circulation over southeast Arabian sea and adjoining Lakshadweep area 17. Alow pressure area formed over southeast and adjoining eastcentral Arabian Sea on 18. It then concentrated into a **Depression** over southwest Arabian sea at 0300 hrs UTC of 20. It concentrated into ESCS on 22, weakened into D on 24, **a well marked low pressure area** overYemen at 1500 hrs UTC of 24and into **a low pressure area** over the same region at 0000 hrs UTC of 25 and then became unimportant. Details are given in the article on Storms & Depressions over the north Indian Ocean-2023.
2.	Very Severe Cyclonic Storm "HAMOON"	21(1800 UTC) to 25 (0600 UTC)	westcentral Bay of Bengal	North-eastwards	westcentral Bay of Bengal	Initially it lay as a cyclonic circulation in lower tropospheric levels over southeast Bay of Bengal on 19. Alow pressure area formed over southwest and adjoining southeast Bay of Bengal on 20 morning and lay as a WMLP over southeast and adjoining central Bay of Bengal at 0300 hrs UTC of 21. It concentrated into a D over westcentral Bay of Bengal at 1800 hrs UTC of 21 and VSCS over northwest and adjoining northeast Bay of Bengal at 0300 hrs UTC of 24. It weakened into a D over Mizoram at 0600 hrs UTC of 25 Oct, a well marked low pressure area over north Mizoram and adjoining Manipur & Myanmar at 1200 hrs UTC of 25 and less marked on 26 morning. Details are given in the article on Storms & Depressions over the north Indian Ocean-2023.
(**B**)	*Well marked Low Pressure area/Low Pressure area*					
Nil						
(**C**)	*Western Disturbances/Eastward moving Systems*					
(*i*)	*As a trough*					
1.	At 5.8 km above m. s. l.	2-4	Roughly along 67° E to north of 30° N.	Northeast	Roughly along 76° E to north of 32° N	It moved away northeastwards on 5.
2.	At 4.5 km above m. s. l.	8-11	Roughly along 70° E to north of 32° N.	Northeast	Roughly along 78° E to north of 32° N.	It lay as a cyclonic circulation on 10 and again lay as a trough on 11. It moved away northeastwards on 12.
3.	At 5.8 km above m. s. l.	13-15	Roughly along 62° E to north of 30° N.	merged with the induced cyclonic circulation over Haryana & neighbourhood.	Roughly along 70° E to north of 32° N.	It lay as a cyclonic circulation on 15. It merged with other WD at 64° E to north of 28° N. on 16.

TABLE 2 (*Contd.*)

4.	Between 3.1 to 4.5 km above m. s. l.	15-18	Roughly along 55° E to north of 26° N.	Northeast	Roughly along 73° E to north of 32° N.	It lay as a cyclonic circulation on 16 and again lay as as a trough in mid tropospheric westerlies on 18. It moved away northeastwards on 19.
5.	At 5.8 km above m. s. l.	20-23	Roughly along 50° E to north of 32° N.	east-northeast	Himachal Pradesh and neighbourhood at 3.1 km above m. s. l. s.	It lay as a cycir over north Pakistan and neighbourhood at 3.1 km above m.s.l. on 22nd. It moved away east-northeastwards on 24th. The trough aloft in middle tropospheric levels became less marked on 23.
6.	At 5.8 km above m. s. l.	27 Oct. -1 Nov.	Roughly along 54° E to north of 24° N.	east-northeast	Long. 75° E to the north of Lat. 25° N.	It lay as cyclonic circulation over west Pakistan and neighbourhood on 28. It lay as a trough on 31 It moved away east-northeastwards on 2 Nov.
(*ii*)	*Western Disturbances as a cyclonic circulation*					
1.	At 3.1 km above m. s. l	23- 26	Afghanistan and neighbourhood	east-northeast	long. 86° E to the north of lat. 30° N	a trough in middle tropospheric levels with its axis at 5.8 km above m. s. l. ran roughly along Long. 70° E to the north of Lat. 32° N on 24. Moved away east-northeastwards on 27th.
(*iii*)	*Induced cyclonic circulation*					
1.	Upto 2.1 km above m. s. l.	14	central Pakistan and neighbourhood	Southeast	north Haryana and neighbourhood	Became less marked on 18th morning.
(**D**)	*Other upper air cyclonic circulations*					
1.	At 3.1 km above m. s. l.	2	north Punjab and adjoining Jammu-Kashmir	Stationary	*In situ*	Became less marked on 3.
2.	Between 3.1 and 4.5 km above m. s. l.	7	north coastal Andhra Pradesh and neighbourhood	West	Telangana and adjoining coastal Andhra Pradesh	Became less marked on 11.
3.	Between 1.5 and 3.1 km above m. s. l.	7	Lakshadweep and neighbourhood	Stationary	*In situ*	Became less marked on 11.
4.	At 4.5 km above m. s. l.	8	Tamil Nadu and neighbourhood	Stationary	*In situ*	Became less marked on 9 morning.
5.	Upto 3.1 km above m. s. l.	10-12	Sub Himalayan West Bengal	Southeast	Tripura and neighbourhood	Became less marked on 13.
6.	At 0.9 km above m. s. l.	10-16	Rayalaseema	South	coastal Tamil Nadu and neighbourhood	merged with the trough ran from the cyclonic circulation over southeast Bay of Bengal and adjoining Andaman sea to south coastal Tamil Nadu on 17.
7.	Up to 5.8 km above m. s. l.	11	eastcentral Bay of Bengal	Stationary	*In situ*	Became less marked on 12.

TABLE 2 (*Contd*.)

8.	At 3.1 km above m. s. l.	12-14	north Bangladesh and adjoining Sub Himalayan West Bengal	East	south Assam and neighbourhood	Became less marked on 15.
9.	At 3.1 km above m. s. l.	16-19	northeast Bay of Bengal and neighbourhood	East	Mizoram and neighbourhood	Became less marked on 20.
10.	At 0.9 km above m. s. l.	17-18	southwest Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 19.
11.	Upto 5.8 km above m. s. l.	19-21	Comorin area and neighbourhood	Stationary	*In situ*	Became less marked on 22.
12.	Upto 1.5 km above m. s. l.	21-22	west Rajasthan and neighbourhood	northeast	north Haryana and neighbourhood	Became less marked on 23.
13.	Between 1.5 and 3.1 km above m. s. l.	24-26	southwest Bay of Bengal off coastal Andhra Pradesh	Initially north and then south	southwest Bay of Bengal off Tamil Nadu coast	Became less marked on 27.
14.	At 0.9 km above m. s. l	25	north Kerala and neighbourhood	Stationary	*In situ*	Became less marked on 26.
15.	At 0.9 km above m. s. l.	26	south Tamil Nadu	Stationary	*In situ*	Became less marked on 27.
16.	upto 1.5 km above m. s. l.	29	Haryana and neighbourhood	Stationary	*In situ*	Became less marked on 29.
17.	At 3.1 km above m. s. l.	29-30	Bangladesh	Stationary	*In situ*	Became less marked on 31 October.
18.	Upto 5.8 km above m. s. l.	30-4	southwest Arabian sea	north	westcentral Arabian sea	Became less marked on 4 November.
19.	Between 3.1 km and 4.5 km above m. s. l.	31	northeast Arabian sea and adjoining north Konkan-Gujarat coast	Stationary	*In situ*	Became less marked on 1 November.
20.	At 0.9 km above m. s. l.	30	Sri Lanka and adjoining Comorin area	Stationary	*In situ*	Became less marked on 31October.
(**E**)	*Other troughs/Wind Discontinuity*					
1.	At 0.9 km above m. s. l.	1	cyclonic circulation associated with the well marked low pressure area over western parts of Gangetic West Bengal to east Uttar Pradesh	Stationary	*In situ*	Became less marked on 2.
2.	Between 3.1 and 5.8 km	2-4	south Chhattisgarh to central parts of Madhya Maharashtra across Telangana and south Marathwada	Northeast	Sikkim to south Chhattisgarh across the low pressure area over western parts of Gangetic West Bengal-adjoining Jharkhand and Odisha	Became less marked on 5.
3.	Upto 1.5 km above m. s. l.	5-7	cyclonic circulation associated with the low pressure area over western parts of Gangetic West Bengal & neighbourhood to east Uttar Pradesh across Jharkhand	east	Manipur to east Bihar across the cyclonic circulation over central parts of Bangladesh and neighbourhood.	Became less marked on 8.

TABLE 2 (*Contd.*)

4.	At 0.9 km above m. s. l.	8	central parts of Chhattisgarh to south Tamil Nadu across Telangana and interior Karnataka	Stationary	*In situ*	Became less marked on 9.
5.	North-south trough upto 3.1 km above m. s. l.	8-9	Sikkim to north coastal Odisha across central parts of Bangladesh	Stationary	Sub Himalayan West Bengal to north Odisha across Gangetic West Bengal	Became less marked on 10.
6.	Upto 1.5 km above m. s. l	9	Rayalaseema to Comorin area across Tamil Nadu	Stationary	*In situ*	Became less marked on 10.
7.	Upto 1.5 km above m. s. l.	10	northeast Uttar Pradesh to southeast Assam across Bihar and the cyclonic circulation over Sub Himalayan West Bengal	Stationary	*In situ*	Became less marked on 11.
8.	At 0.9 km above m. s. l. on	11-12	south interior Karnataka to Comorin area across Tamil Nadu	east	cyclonic circulation over north Tamil Nadu and neighbourhood to Comorin area	Became less marked on 13.
9.	Upto 1.5 km above m. s. l.	15	east Bihar to south Bangladesh across West Bengal	Stationary	*In situ*	Became less marked on 16.
10.	Upto 4.5 km above m. s. l.	17-18	cyclonic circulation over southeast Bay of Bengal and adjoining Andaman sea to south coastal Tamil Nadu tilting southwards with height	south	cyclonic circulation over southeast Bay of Bengal to Comorin	Became less marked on 19.
11.	Upto 5.8 km above m. s. l.	21-23	cyclonic circulation associated with the well marked low pressure area over southeast and adjoining eastcentral Bay of Bengal to Comorin area	-	cyclonic circulation associated with the Depression over westcentral Bay of Bengal to Sri Lanka	Became less marked on 24.
(**F**) *Trough in easterlies*						
Nil						
(**F**) *Trough in easterlies*						
Nil						

(*ii*) Very Severe Cyclonic Storm "HAMOON" over westcentral Bay of Bengal (21st to 25th October 2023)

In October, under the influence of cyclonic circulation in lower tropospheric levels over southeast Bay of Bengal, a low pressure area formed over southwest and adjoining southeast Bay of Bengal on 20 Oct. morning. It moved northwestwards and became a well marked low pressure area and lay centered over southeast and adjoining central Bay of Bengal at 0830 hrs IST of 21 Oct. It moved slowly northwestwards and concentrated into a Depression and lay centered at 2330 hrs IST of 21 Oct. over westcentral Bay of Bengal near Lat. 14.7° N / Long. 86.4° E. It moved nearly northwards and intensified into a Deep Depression and lay centered at 1730 hrs IST of 22 Oct. over the same region near Lat. 16.2° N / Long. 86.4° E. It moved north northeastwards and intensified into a Cyclonic Storm "Hamoon" (pronounced as Hamoon) and lay centered at 1730 hrs IST of 23 Oct. over the same region near Lat. 18.3° N / Long. 87.3° E. It further moved northeastwards and intensified into a Severe Cyclonic Storm and lay centered at 0230 hrs IST of 24 Oct. over northwest Bay of Bengal near Lat. 19.3° N / Long. 88.4° E. It moved east northeastwards and intensified into a

Very Severe Cyclonic Storm and lay centered at 0830 hrs IST of 24 Oct. over northwest and adjoining northeast Bay of Bengal near Lat. 20.0° N / Long. 89.5° E. It moved northeastwards and weakened into a Severe Cyclonic Storm and lay centered at 1730 hrs IST of 24 Oct. over northeast Bay of Bengal near Lat. 20.9° N / Long. 90.8° E. It moved northeastwards and weakened into a Cyclonic Storm and crossed Bangladesh coast to the south of Chittagong near Lat. 21.9° N / Long. 91.9° E between 0230 hrs IST and 0330 hrs IST of 25 Oct. as a Cyclonic Storm and then lay centered at 0530 hrs IST of 25 Oct. over coastal Bangladesh near Lat. 22.2° N / Long. 92.2° E. It moved nearly northeastwards and weakened into a Deep Depression and lay centered at 0830 hrs IST of 25 Oct. over southeast Bangladesh and adjoining Mizoram near Lat 22.4° N / Long. 92.4° E. It moved nearly north northeastwards and weakened into a Depression and lay centered at 1130 hrs IST of 25 Oct. over Mizoram near Lat. 22.7° N / Long. 92.7° E. It moved nearly north northeastwards and weakened into a well marked low pressure area and lay centered over north Mizoram and adjoining Manipur & Myanmar at 1730 hrs IST of 25 Oct. which became less marked on 26th morning.

It caused widespread floods and power outages, extensive damage to buildings, cell phone towers, trees etc. in Bangladesh.

3.1.4. *Other synoptic features and associated weather*

Table 2 provides a summary of the synoptic features for the month of October 2023. The sub-divisional percentage departures of rainfall from normal and significant amounts of rainfall are given in Tables 1 and 5, respectively.

El Niño conditions were prevailing over the equatorial Pacific region. In addition to El Nino-Southern Oscillation (ENSO) conditions over the Pacific, other factors such as the Indian Ocean SSTs have also some influence on the northeast monsoon. During October Indian Ocean is experiencing positive Indian Ocean Dipole (IOD) conditions, which began in August 2023. During October, MJO is not conducive for enhancement of convective activity over the Bay of Bengal (BoB) and Arabian Sea.

The monthly rainfall for the country being deficient (67% of L.P.A.). The realized rainfall for October this year was 144% of its LPA over northwest India, 40% of its LPA over central India, 109% of its LPA over east & northeast India, and 41% of its LPA over south peninsula. Rainfall over the homogeneous region of South Peninsular India (61.8 mm) was the fifth lowest since 1901 prior lowest rainfall years are 1918 (47.9 mm), 1988 (50.6 mm), 1965 (53.9 mm) and 2016 (55.1 mm). During the month, northeast monsoon rainfall activity over the core region of the south peninsula (comprising of 5 subdivisions *viz*. Coastal Andhra Pradesh, Rayalaseema, Tamil Nadu & Puducherry and Karaikal, South Interior Karnataka and Kerala & Mahe) as a whole was below normal. For October 2023, rainfall over the south peninsula (northeast monsoon region 79.1 mm) was 46% of its Long Period Average (LPA) value and was 7th lowest since 1901. Prior lowest rainfall years are 2016 (50.7 mm), 1988 (54.4 mm), 1918 (61.2 mm), 1927 (67.1 mm), 1965 (74.1 mm) and 1938 (76.4 mm).

October month experienced Formation and movement of twin-low pressure system 1) Extremely Severe Cyclonic Storm "TEJ" over the Arabian Sea (20th to 24th October, 2023) over west coast from Arabian Sea, have caused heavy to very heavy rainfall over West coast as well as over east central another 2) Very Severe Cyclonic Storm "HAMOON" over westcentral Bay of Bengal (21st to 25th October 2023) over east coast from Bay of Bengal which moved towards Yemen and over Mizoram and adjoining areas of Manipur and Myanmar respectively and adjoining parts of east and northeast India. During this period, Heavy to very heavy rain occurred at isolated places over Kerala & Mahe on one day, Heavy rain occurred at isolated places over Kerala & Mahe on three days; over Tamilnadu & Puducherry and Karaikal on two days and over Andaman & Nicobar Islands and Gangetic West Bengal on one day each.

Under the influence of the cyclonic circulation over Myanmar and adjoining Eastcentral Bay of Bengal, another Low-Pressure Area has formed over Northeast & adjoining Eastcentral Bay of Bengal on morning of 29th September and it moved west-northwest wards and became a Well Marked Low Pressure Area over Northwest Bay of Bengal on 30 September 2023. It lay over southeast Jharkhand and adjoining areas of Gangetic West Bengal & north Odisha on 1st October and then weekend into Low Pressure Area and lay over South Jharkhand & neighbourhood with the associated cyclonic circulation extended upto mid tropospheric levels on both the dates of 2 and 3 October. On 4th October, it lay over western parts of Gangetic West Bengal & adjoining Jharkhand. Under the influence of this system also Gangetic West Bengal (Barisha (West Midnapore) -52 cm) reported exceptionally heavy rainfall on 4 October 2023. Remnant of this low pressure area as a lower level cyclonic circulation moved very slowly north-northeastwards from Gangetic West Bengal & neighbourhood to Sub-Himalayan West Bengal & adjoining Bangladesh during 5-11 Oct, which caused stronger moisture convergence over northeastern states of India and nearby areas and it, caused rainfall at many places over these areas during most dates in the week.

Isolated Heavy to very heavy rainfall continued mainly over Assam & Meghalaya during 5-10 Oct. Isolated heavy rainfall also observed over West Bengal & Sikkim on 5, 8 and 9 Oct. Heavy to very heavy rainfall at a few places with extremely heavy falls at isolated places also observed over Meghalaya on 2 days on 7 and 8 Oct.

Movement of an active Western Disturbance (WD) and under the influence of its induced cyclonic circulation in the lower tropospheric levels during 16-17 October, fairly widespread to widespread rainfall and thunderstorms activities reported over Jammu-Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, Uttarakhand, Punjab, Himachal Pradesh, Haryana-Chandigarh-Delhi, West Uttar Pradesh. Season's 1st spell of Snowfall also reported over hills of western Himalayan States during the same period.

Some of the stations received record 24-hour rainfall. A list of stations is given below with their previous record and date:

Station	*24 hours record rainfall in October 2023 (mm)#*	*Date*	*Previous rainfall record(mm)*	*Date*
Itanagar	103.4	3	94.1	08-10-2009
Churk	161.4	3	128	04-10-2001
Banihal	77.4	17	63.7	20-10-2015
K. Paramathi	139.0	15	125.6	26-10-2001
Trivendrun Aero	211.4	15	175.2	17-10-1977

Source: Climate Summary for the month of October 2023

3.1.5. *Temperature*

Maximum temperature was above normal over most parts of the country, except some parts of northwest India, central India, and east India. Maximum temperature anomaly was more than 3 ºC over parts of Andhra Pradesh state and South Interior Karnataka. Maximum temperature anomaly was more than 2 ºC over parts of Himachal Pradesh, Uttarakhand, Maharashtra state (except Konkan), Karnataka state, southern Odisha, Telangana, Andhra Pradesh state and Kerala & Mahe. Maximum temperature anomaly was less than -1 ºC over parts of Jammu & Kashmir state, Punjab, Saurashtra & Kutch, East Uttar Pradesh, East Madhya Pradesh, and Gangatic West Bengal.

The minimum temperature was above normal over most parts of the country, except some parts of northwest India, central India, south peninsular India, Arunachal Pradesh, and Assam state. The minimum temperature anomaly was more than 2 ºC over parts of Punjab, Jharkhand, West Bengal state, Sikkim state, Bihar, Rajasthan state, Gujarat region, Kerala & Mahe and South Interior Karnataka. The minimum temperature anomaly was less than -1 ºC over parts of West Uttar Pradesh, Madhya Pradesh state, and Maharashtra state (except Konkan).

The highest maximum temperature of 38.7 °C was reported at Surendranagar (Saurashtra and Kutch) on 21st October. The lowest minimum temperature of 13.0 °C is reported at Sikar (east Rajasthan) over the plains of the country on 23rd October.

3.1.6. *Damages associated with disastrous weather events*

During October, a total of 124 persons reportedly claimed dead, more than 25 persons were injured, more than 75 persons missing & more than 31,500 livestock perished. The details of causalities are given below, which are based on real-time media reports.

Heavy rains, floods, and landslide: A total of 119 persons were reportedly claimed dead, 26 persons injured, more than 75 persons missing & more than 31,500 livestock perished, in (104 in Gangtok / East Sikkim, Mangan / North Sikkim, Namchi/South Sikkim, Pakyong (Sikkim)) during October, because of heavy rains, floods and landslides. Seven, 4 and 4 reported dead at Pithoragarh (Uttarakhand) Bokaro, Palamu, Ranchi (Jharkhand) and at West Jaintia Hills (Meghalaya) respectively.

While, Ernakulam, Thiruvananthapuram districts of Kerala were also affected on 14 & 15 October.

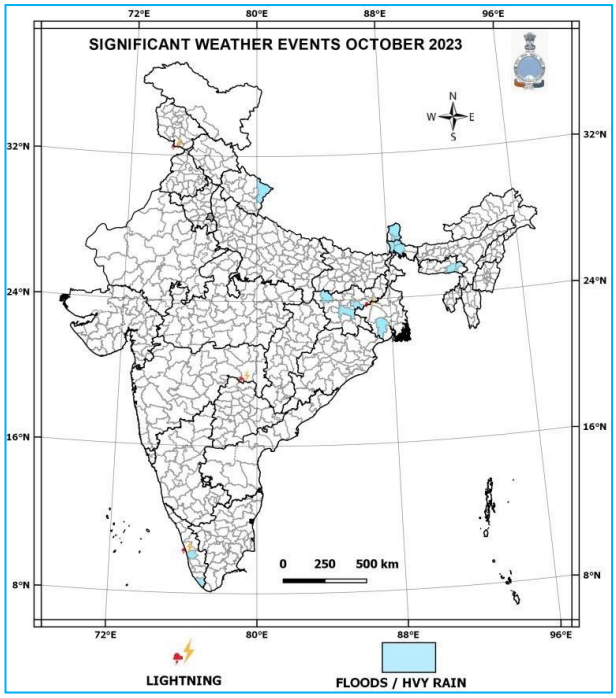
Darjeeling, Jalpaiguri, Kalimpong districts of West Bengal were also affected from 4 to 6 October.

East Khasi Hills district of Meghalaya, West Midnapore district of West Bengal also affected due to Extremely Heavy Rains.

Lightning: A total of 5 persons (4 in Jamtara (Jharkhand) and 1 in Chandrapur (Maharashtra)) were reportedly claimed dead, 3 persons (1 in Thrissur (Kerala) and 2 in Chandrapur (Maharashtra)) were injured, during October, because of Lightning.

Also, damage to an ancient Shiv Temple - Ranbirashwar Temple in the Jammu district of Jammu & Kashmir reported on 17 October.

Fig. below shows significant weather events during October (based on real-time media reports).



Source : IMD, Climate Summary for the month of October 2023

3.2. *November*

3.2.1. *Storms and depressions*

Severe Cyclonic Storm "MIDHILI" over the Bay of Bengal (15th to 18th November, 2023)

In November, under the influence of cyclonic circulation over Andaman Nicobar Islands and adjoining areas of Andaman and southeast Bay of Bengal extending upto upper tropospheric levels, a low pressure area formed over southeast Bay of Bengal and adjoining Andaman Nicobar Islands at 0530 hrs IST of 14 Nov. It moved west northwestwards and lay as a well marked low pressure area over southeast and adjoining central Bay of Bengal at 1730 hrs IST of 14 Nov. and then it lay over westcentral and adjoining areas of eastcentral and south Bay of Bengal at 0530 hrs IST of 15 Nov. with the associated cyclonic circulation extending upto upper tropospheric levels. It further moved west northwestwards and concentrated into a Depression and lay centred over westcentral Bay of Bengal near Lat. 14.5° N / Long. 86.8° E at 0830 hrs IST of 15 Nov. It further moved north northeastwards and intensified into a Deep Depression and lay centred over westcentral Bay of Bengal near Lat 16.9° N / Long 86.8°E at 0530 hrs IST of 16 Nov. It moved north northeastwards and intensified into a Cyclonic storm "Midhili" (pronounced as "Midhili") and lay centered over northwest Bay of Bengal near Lat. 20.1° N / Long. 88.5° E at 0530 hrs IST of 17 Nov. It moved north northeastwards and concentrated as severe cyclonic storm and lay centered over northeast and adjoining northwest Bay of Bengal close to Bangladesh coast near Lat. 21.8° N / Long. 90.0° E at 1430 hrs IST of 17 Nov. It moved north northeastwards and crossed Bangladesh coast near Khepupara during 1430 to 1530 hrs IST of 17 Nov. It then continued to move north northeastwards across the islands of Bangladesh weakened as a Cyclonic Storm and lay centered over coastal Bangladesh near Lat. 22.8° N / Long. 90.8° E at 1730 hrs IST of the 17 Nov. Further it moved north northeastwards and weakened into a Deep Depression and lay centered over Tripura and adjoining Bangladesh near Lat. 23.3° N / Long. 91.3° E at 2330 hrs IST of 17 Nov. It moved northeastwards, weakened into a Depression and lay centered over Tripura and adjoining Bangladesh and Mizoram near Lat. 23.7° N / Long. 91.7° E at 0530 hrs IST of 18 Nov. It moved northeastwards and weakened into a low pressure area over north Tripura and neighbourhood at 0830 hrs IST on the 18 Nov. and became less marked on the evening of 18th.

3.2.2. *Weather and associated synoptic features*

A summary of the synoptic systems for the month of November 2023 are given in Table 3. The sub-divisionwise percentage departure of rainfall from normal and the significant amount of rainfall during the month are given in Tables 1 and 5, respectively.

The monthly rainfall over the homogenous region of Northwest India and South Peninsula (117% of L.P.A.) was normal whilethe precipitation over the homogenous region of central India (154% of L.P.A.) was *excess* and East & Northeast India (117% of L.P.A.) was normal and Central India (63% of L.P.A.) was *large deficient*. During the month, northeast monsoon rainfall activity over the core region of south peninsula (comprising of 5 subdivisions viz. Coastal Andhra Pradesh and Yenam, Rayalaseema, Tamil Nadu & Puducherry and Karaikal, South Interior Karnataka and Kerala & Mahe) as a whole was above normal. Except Coastal Andhra Pradesh remaining 4 sub divisions received excess/normal rainfall. For November 2023, rainfall over the south peninsula (northeast monsoon region) was 117% of its Long Period Average (LPA) value. In November, out of 36 meteorological subdivisions, 7 received large excess rainfall, 13 received excess rainfall, 4 received normal rainfall, 6 subdivisions received deficient rainfall and 6 subdivisions received large deficient rainfall.

Moderate El Niño conditions were prevailing over the equatorial Pacific region. In addition to El Nino-Southern Oscillation (ENSO) conditions over the Pacific, other factors such as the Indian Ocean SSTs have also some influence on the northeast monsoon. During November Indian Ocean was experiencing positive Indian Ocean Dipole (IOD) conditions. During second forthnight of the month, Madden Julian Oscillation (MJO) index

TABLE 3

Details of the weather systems during November 2023

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Cyclonic storm*					
1.	Cyclonic storm "Midhili"	15(0830 hrs IST) - 18 0530 hours IST	West-central Bay of Bengal	Northeast	Tripura and adjoining Bangladesh and Mizoram	Initially it lay as a cyclonic circulation over Gulf of Thailand on 12th, over south Andaman sea on 13th morning and over Andaman-Nicobar Islands and adjoining areas of Andaman and southeast Bay of Bengal on 13thnight. Under its influence, a **LPA** formed over southeast Bay of Bengal and adjoining Andaman-Nicobar Islands on 14 morning and into **well marked LPA** in the evening of 14. It concentrated into **D on**15 over westcentral Bay of Bengal, DD over same region on 16 and into a **Cyclonic storm "Midhili"** at0530 hrs IST on 17 over northwest Bay of Bengal. It weakened into a **DD** at 2330 hrs IST on 17 and further weakened **D** on 18 over Tripura and adjoining Bangladesh and Mizoram and moved northeastwards and weakened into **LPA** over north Tripura. Details are given in the article on Storms & Depressions over the north Indian Ocean-2023.
(**B**)	*Well marked Low Pressure area/Low Pressure area*					
1.	Low Pressure area	8 morning - 9	East central Arabian sea	stationary	eastcentral Arabian sea	Initially it lay as a cyclonic circulation over south Tamil Nadu and neighbourhood on 4, over north Tamil Nadu on 5, over southeast Arabian sea off Kerala coast on 6and over southeast and adjoining eastcentral Arabian sea on 7. Under its influence, LPA formed on 8 morning and became less marked on 10. However, the associated cyclonic circulation lay over eastcentral and adjoining southeast Arabian sea 10, over southwest and adjoining westcentral Arabian sea 11 and 12 and became less marked on 13.
(**C**)	*Western Disturbances /Eastward moving Systems*					
(*i*)	*As a trough*					
1.	At 5.8 km above m. s. l.	1	roughly along Long. 65° E to the north of Lat. 32° N	northeast	roughly along Long. 75° E to the north of Lat. 32° N	It moved away northeastwards on 4.
2.	At 5.8 km above m. s. l.	6-8	roughly along Long. 58° E to the north of Lat. 28° N	east-northeast	roughly along Long. 78° E to the north of Lat. 32° N	It moved away east northeastwards on 9.

TABLE 3 (*Contd*.)

3.	At 5.8 km above m. s. l.	8-11	roughly along Long. 60° E to the north of Lat. 30° N	northeast	ran roughly along Long. 78° E to the north of Lat. 28° N	It lay as a cyclonic circulation between 3.1 and 4.5 km above m. s. l over northwest Uttar Pradesh and neighbourhood with trough aloft and became less marked on 12 morning. However, the trough in mid tropospheric westerlies with its axis at 5.8 km above m. s. l ran roughly along Long. 82° E to the north of Lat. 28° N on 12 which moved away northeastwards on 13.
4.	At 3.1 km above m. s. l.	18-21	roughly along Long. 61° E to the north of Lat. 29° N	east-northeast	roughly along Long. 77° E to the north of Lat. 30° N	It lay as a cyclonic circulation over central Pakistan at 3.1 km above m.s.l. with a trough aloft ran roughly along Long. 67° E to the north of Lat. 30° N at 5.8 km above m. s. l on 19. It moved away east-northeastwards on 22 morning.
5.	At 5.8 km above m. s. l	22-23	roughly along Long. 55° E to the north of Lat. 30° N	east	along Long. 68° E to the north of Lat. 34° N	Became less marked on 24.
6.	At 5.8 km above m. s. l.	25-26	roughly along Long. 55° E to north of Lat. 25° N.	east	central Pakistan and neighbourhood	It lay as a cyclonic circulation over central Pakistan and neighbourhood between 3.6 km and 9.4 km above m. s. l. on 27 morning and then persisted over the same region on 27 which became less marked. However, the trough aloft ran roughly along Long. 72° E to north of Lat. 20° N at 12.0 km above m. s. l. on 27th. It ran roughly along Long. 75° E to north of Lat. 20° N on 28th and ran roughly along Long. 80° E to north of Lat. 23° N.on 29.
7.	At 5.8 km above m. s. l	29	roughly along Long. 58° E to the north of Lat. 30°	east-northeastward	south Haryana and neighbourhood	It lay as a cyclonic circulation over south Haryana and neighbourhood between 3.1 & 4.5 km above m. s. l. with trough aloft on 1st December. It persisted on 2 and became less marked on 3. However the trough aloft moved away east-north-eastwards on 3rd.
(*ii*) *As a cyclonic circulation*						
Nil						
(*iii*) *Induced cyclonic circulations*						
1.	At 0.9 km above m. s. l.	7	northwest Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 8.
2.	Upto 1.5 km above m. s. l.	10	central Pakistan and neighbourhood	Stationary	*In situ*	Became less marked on 11.
3.	Between 1.5 and 3.1 km above m. s. l.	26-28	central Pakistan and adjoining west Rajasthan	south	southeast Rajasthan and adjoining west Madhya Pradesh	Became less marked on 29.
4.	upto 3.1 km above m. s. l.	30	over northwest Rajasthan and neighbourhood	Stationary	*In situ*	became less marked on 1 December

TABLE 3 (*Contd.*)

(**D**)	*Other upper air cyclonic circulations*					
1.	Upto 3.6 km above m. s. l.	1-2	Sri Lanka and neighbourhood	Stationary	*In situ*	It embedded with trough of low in easterlies over southwest and adjoining westcentral Bay of Bengal on 2 and became less marked on 3.
2.	Upto 1.5 km above m. s. l.	8-9	Comorin area	Stationary	*In situ*	Became less marked on 10.
3.	Up to 1.5 km above m. s. l	13-20	southwest Bay of Bengal	Northwest	Comorin area	It merged with the trough in easterly at mean sea level ran over Comorin area to westcentral off Andhra Pradesh coast which extended upto 3.1 km above m. s. l on 21.
4.	Upto 5.8 km above m. s. l.	17-19	south Andaman Sea	East	over southeast Bay of Bengal and adjoining Andaman Sea	Became less marked on 20.
5.	Upto 3.1 km above m. s. l.	20	southwest Bay of Bengal off Tamil Nadu coast	Southeast	Comorin area	It merged with the trough in easterlies at mean sea level ran from Comorin area to westcentral Bay of Bengal off Andhra Pradesh coast which extended upto 3.1 km above m. s. l on 21.
6.	Upto3.1 km a.s.l.	22	interior Tamil Nadu and adjoining Kerala	-	-	It merged with the trough in easterlies at mean sea level ran from Maldives to south Maharashtra coast on 23.
7.	Upto 1.5 km above m. s. l.	24-25	southeast and adjoining southwest Arabian sea	Stationary	*In situ*	Became less marked on 26.
8.	Upto 3.1 km above m. s. l.	27-28	southwest Arabian sea	Stationary	*In situ*	Became less marked on 29.
9.	Between 3.1 and 4.5 km above m. s. l.	26-27	northwest Bay of Bengal and adjoining areas of north Odisha-West Bengal coasts	northeast	south Bangladesh and adjoining northwest Bay of Bengal	Became less marked on 28.
10.	Between 1.5 and 3.1 km above m. s. l.	26-27	central parts of north Madhya Pradesh	Stationary	*In situ*	Became less marked on 28.
11.	Upto 1.5 km above m. s. l	28-31	south Sri Lanka and neighbourhood	east	southwest Bay of Bengal and adjoining south Sri Lanka	Became less marked on 1December.
12.	At 3.1 km above m. s. l	29	central Rajasthan	Stationary	*In situ*	Became less marked on 30.
13.	Between 1.5 km and 3.1 km above m. s. l.	29	north Bangladesh and neighbourhood	Stationary	*In situ*	Became less marked on 30.
14.	Between 1.5 km and 3.1 km above m. s. l.	29-3 Dec	northeast Arabian Sea and adjoining Maharashtra coast	south	eastcentral Arabian Sea	Became less marked on 4 December.
(**E**)	*Troughs*					
1.	At 1.5 km above m. s. l.	6	from southeast Arabian sea and adjoining Lakshadweep area to southwest Bay of Bengal and adjoining south Andhra Pradesh coast across Kerala, south interior Karnataka and Andhra Pradesh	Stationary	*In situ*	Became less marked on 7.

TABLE 3 (*Contd.*)

2.	Upto 3.1 km above m. s. l	14-18	from the cyclonic circulation over southwest Bay of Bengal and adjoining Sri Lanka to the low pressure area over southeast Bay of Bengal and adjoining Andaman-Nicobar Islands	northwest	ran from the cyclonic circulation over southwest Bay of Bengal and adjoining Sri Lanka to the cyclonic circulation associated with the low pressure area over north Tripura and neighbourhood	Became less marked on 19.
3.	Upto 1.5 km above m. s. l.	27	from the cyclonic circulation over northern parts of Gujarat and adjoining south Rajasthan to northeast Arabian Sea	Stationary	*In situ*	Became less marked on 28.
(**F**)	*Troughs in easterlies*					
1.	Upto 1.5 km above m. s. l.	1-4	A trough of low in easterlies ran over southwest and adjoining southeast Bay of Bengal	Northwest	ran from north interior Karnataka to the cyclonic circulation over south Tamil Nadu and neighbourhood	Became less marked on 5.
2.	At mean sea level	20-21	A trough in easterlies ran from Sri Lanka to southwest and adjoining westcentral Bay of Bengal	northwest	from Comorin area to westcentral Bay of Bengal off Andhra Pradesh coast	Became less marked on 22.
3.	Upto 1.5 km above m. s. l.	23-27	from Maldives to south Maharashtra coast	northwest	southwest Arabian sea to central parts of Arabian sea	Became less marked on 27.
4.	At 0.9 km above m. s. l.	29	North Kerala to north Madhya Maharashtra	Stationary	*In situ*	Became less marked on 30.
5.	At 0.9 km above m. s.	30	southwest Madhya Pradesh to the cyclonic circulation over northwest Rajasthan & neighbourhood l.	Stationary	*In situ*	Became less marked on 1 of December.

TABLE 4

Details of the weather systems during December 2023

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Cyclonic Storm*					
1.	Severe Cyclonic Storm "MICHAUNG"	1 (0000 hrs UTC) – 6 (0000 hrs UTC)	southeast and adjoining southwest Bay of Bengal	Initially north northwestwards and then northwards	northeast Telangana and adjoining south Chhattisgarh, south interior Odisha & Coastal Andhra Pradesh	Initially it lay as a cyclonic circulation over south Andaman sea and adjoining Thailand on 26 Nov. Under it's influence, a **LPA** formed over south Andaman sea and adjoining Malacca strait on 27 Nov. It concentrated into a **D** and lay centered over southeast and adjoining southwest Bay of Bengal on 1 Dec. and into **DD** over same region on 2 Dec. It intensified into a **Cyclonic Storm "MICHAUNG"** on 3 Dec. and into a **Severe Cyclonic Storm** on 4 Dec. It weakened into **D** at 0000 hrs UTC of 6 Dec and **well marked LPA** on 6 Dec. Details are given in the article on Storms & Depressions over the north Indian Ocean-2023.

TABLE 4 (*Contd*.)

(**B**) *Well marked Low Pressure area/Low Pressure area*						
1.	Low pressure area	30 Dec. 2023 (0000 hrsUTC) -3 Jan 2024 (0000 hrs UTC)	west equatorial Indian Ocean and adjoining southeast Arabian sea	Northwest and then northwards	southeast Arabian sea	Initially, it lay as a cyclonic circulation over west equatorial Indian Ocean and adjoining southeast Arabian sea on 29 evening and persisted over the same region on 30 morning. Under its influence, **LPA** formed over the same region with the associated cyclonic circulation extending upto mid-tropospheric levels on 30. It persisted on 31 Dec. It moved nearly northwestwards and lay over southeast Arabian sea and adjoining west equatorial Indian Ocean at 0300hrsUTC of 1 Jan. It further moved nearly northwards and lay over southeast Arabian sea at 0300 hrs UTC of 2. It persisted over the same region on 3.It became less marked on 4 Jan. 2024.
(**C**) *Western Disturbances / Eastward moving systems*						
(*i*) *As a Trough*						
1.	At 5.8 km above m. s. l.	2 eve-7	ran roughly along Long. 62° E to the north of Lat. 30° N	east	roughly along Long. 75° E to the north of Lat. 28° N.	It lay as a cyclonic circulation over central Pakistan and neighbourhood between 3.1 & 4.5 km above m. s. l. with a trough aloft ran roughly along Long. 65° E to the north of Lat. 30° N at 5.8 km above m. s. l. on 3. However, the trough along Long. 68° E to the north of Lat. 25° N moved away on 5. It became less marked on 8.
2.	At 5.8 km above m. s. l.	8	roughly along Long. 65° E to the north of Lat. 34° N	northeast	-	It moved away northeastward on 9.
3.	At 5.8 km above m. s. l.	11-13	roughly along Long. 65° E to the north of Lat. 32° N.	east-northeast	roughly along Long. 88° E to the north of Lat. 26° N.	It lay as a cyclonic circulation over northwest Uttar Pradesh and neighbourhood between 1.5 and 3.1 km above m. s. l. on 12. It lay as a trough in westerlies in mid tropospheric levels with its axis at 5.8 km above m. s. l. roughly along Long. 84° E to the north of Lat. 26° N on 13.It moved away east northeastwards on 14.
4.	At 5.8 km above m. s. l.	15	roughly along Long. 55° E to the north of Lat. 30° N	northeast	roughly along Long. 75° E to the north of Lat. 32° N.	It lay as a cyclonic circulation over north Pakistan on 16 with a trough aloft. It lay over Jammu and neighbourhood with the trough aloft on 17 &18.It moved away east-northeastwards on 19.
5.	At 5.8 km above m. s. l.	20-23	roughly along Long. 50° E to the north of Lat. 30° N	east-northeast	ran between Lat. 36° N/Lon. 67° E and Lat. 26° N/Lon. 72° E	It moved away east-northeastwards on 24.
6.	At 5.8 km above m. s. l.	26-27	roughly along Long. 58° E to the north of Lat. 30° N	east-northeast	along Long. 67° E to the north of Lat. 34° N	It moved away east-northeastwards on 28.
7.	At 5.8 km above m. s. l.	31 December morning	roughly along Long. 50° E to the north of Lat. 30° N	Stationary	*In situ*	It moved away northeastwards on 31 December
8.	At 5.8 km above m. s. l.	29-30	roughly along Long. 52° E to the north of Lat. 30° N	east-northeast	as a cyclonic circulation lay over northwest Uttar Pradesh and neighbourhood.	It moved away east-northeastwards on 31 December evening.
(*ii*) *As a cyclonic circulation*						
Nil						

TABLE 4 (*Contd.*)

(*iii*) *Induced cyclonic circulation*						
1.	At1.5 km a.s.l.	4	southeast Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 5.
2.	At 0.9 km above m. s. l.	16-17	northwest Rajasthan and neighbourhood	east	over north Haryana and neighbourhood	Became less marked on 18 morning.
3.	Upto 1.5 km above m. s. l.	23	west Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 24 morning.
4.	Upto 1.5 km above m. s. l.	30	west Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 31.
(**D**) *Other upper air cyclonic circulations*						
1.	At 0.9 km above m. s. l.	1	southwest Madhya Pradesh	Stationary	*In situ*	Became less marked on 2.
2.	At 1.5 km above m. s. l.	3	west Uttar Pradesh and neighbourhood	Stationary	*In situ*	Became less marked on 4.
3.	At 1.5 km above m. s. l.	3-4	south Assam and neighbourhood	Stationary	*In situ*	Became less marked on 5.
4.	Upto 3.1 km above m. s. l.	4	southwest Arabian sea	Stationary	*In situ*	Became less marked on 5.
5.	Upto 1.5 km above m. s. l.	7-14	southeast Arabian sea and neighbourhood	Southwest	southwest Arabian Sea and adjoining equatorial Indian Ocean	Became unimportant for our region on 15.
6.	Upto 1.5 km above m. s. l.	8	east Bangladesh and neighbourhood	Stationary	*In situ*	Became less marked on 9.
7.	Upto 1.5 km above m. s. l.	13	Bangladesh	Stationary	*In situ*	Became less marked on 14.
8.	Upto 1.5 km above m. s. l.	15-23	southwest Bay of Bengal and adjoining equatorial Indian Ocean	Northwest and then south	southeast and adjoining southwest Arabian sea	It moved away southwards into the equatorial Indian Ocean on 24.
9.	Upto 3.1 km above m. s. l.	22-23	equatorial Indian Ocean and adjoining southwest Bay of Bengal	southwards	*In situ*	It moved away southwards into the equatorial Indian Ocean on 24.
10.	At 1.5 km above m. s. l.	24-31 Dec.	west Bangladesh and neighbourhood	East and then southeast	northeast Bay of Bengal and adjoining Bangladesh	Became less marked on 1st January.
(**E**) *Troughs*						
1.	At 0.9 km above m. s. l.	6	from the cyclonic circulation associated with the well-marked low pressure area over northeast Telangana and adjoining south Chhattisgarh-south interior Odisha-coastal Andhra Pradesh to south Tamil Nadu	Stationary	*In situ*	Became less marked on 7.

TABLE 4 (*Contd.*)

2.	At 1.5 km above m. s. l. on	1-2	from the cyclonic circulation over northeast Arabian sea and adjoining north Maharashtra-south Gujarat coasts to southeast Madhya Pradesh	northwest	from the cyclonic circulation over northeast Arabian sea to northeast Madhya Pradesh	Became less marked on 3.

(**F**) *Troughs in easterlies*

Nil

TABLE 5

Representative amounts of rain greater than or 50 mm for Post monsoon season Oct. to Dec. 2023

Date	Some representative amounts of rainfall in cm for October, November and December 2023 (5 cm and above)
1 Oct	20 - Hatwara; 19 - Purulia and Simula; 15 - Dharmasthala; 14 - Castle Rock, Jatni, Kharidwar and Mohanpur; 13 - Ratnagiri , Kansabati Dam, Midnapore (CWC) , Midnapore, Irikkur, Taliparamba and Vaikom; 12 - Kottigehara, Roha, Sudhagad Pali, Ranibandh, Jhalda and Tusuma; 11 - Mani, Bhagamandala, Tenughat, Iit Guwahati ARG, Amfu Pundibari, Oothu and Thycauttussery AWS; 10 - Satyabadi, Cooch Behar, Worth Estate Cher, Cherthala, Peermade To and Aryankavu; 9 - Uppinangadi, Virajpet, Sawantwadi, Kendrapara, Chas, Jaridih, Bokaro Kvk AWS, Papunki, Nandadih, Parsabad, Purihansa, Kashipur, Manmothnagar, Chinnakalar, Nlumukku, Piravam and Odakali AWS; 8 - Ankola, Mapusa, Pernem, Murud, Bokaro Thermal, Panchet, Panchet Dvc, Putki, Bankura (CWC) , Durgachack, Lalgarh, Taluk Office Pandalur, Gundar Dam, Pinarayi AWS, Alwaye PWD, Vilangad AWS, Nilambur, Pirappancode AWS, Padinjarathara Dam AWS and Vyttiri; 7 - Kollur, Tala, Dodamarg, Sanguem, Odagaon, Gop, Gomia, Chandrapura, Maithon Dvc, Bankura, Asansol, Balagarh, Uluberia, Uluberia (state) , Phulberia, Amfu Kharagpur, Cincona, Balamore, Kalial, Pechiparai, Purnea, Rupouli, Haripad, Mavelikara, Ams Kannur, Mattannur ARG, Tellichery, Idamalayar Dam AWS, Kochi C.i.a.l., Perumpavur, Idukki, Palluruthy ARG, Kottayam, Quilandi, Kurudamannil and Vilangankunnu ARG; 6 - Siddapura, Gokarna, Jagalbet, Madikeri PTO, Rameshwar ARG, Mulde ARG, Quepem, Lonavala ARG, Vadgaon Maval, Cuttack, Nischintakoili, Bhuban, Lakhanpur, Kendrapada PTO, Nayagarh, Chandankiary, Phusro, Maithon, Purvi Tundi, Putki Dvc, Palganj, Markachou, Saryu, Guwahati City IMD, Khanapara, Guwahati ARG, Aizawl, Ghazipur CWC, Amta-i, Deganga, Jhargram, Kalaikunda (Iaf) , Sholayar, Valparai PTO, Adayamadai, Kakkachi, Narpatganj, Bachwara, Gogri, Monghyr, Dalsinghsarai, Jandhaha, Neeleswaram ARG, Koothattukulam AWS, Padannakkad AWS, Kottarakkara AWS, Kanjirappally, Punalur, Kumarakam, Vadakara, Urumi AWS, Karipur Ap., Manjeri and Konni; 5 - Sattenapalle, Singrauli- aws, Kadra, Kumta, Manki, Manchikere, Londa, Napoklu, Karjat ARG, Khalapur, Matheran, Pen, Awalegaon - ARG, Chinchwad - ARG, Salepur, Aul, Hunterganj, Tundi, Jamtara, Murhu, Ramgarh, Khalari, Ramgarh (bdo) , Kalyani Smo, Kozhiporvilai, Perunchani Dam, Barauni, Mohania, Chausa, Sahebganj, Ekangersarai, Champa, Aralam AWS, Kochi IAF, Thodupuzha, Mannarkkad AWS, Thiruvalla AWS, Kodungallur, Enamakkal and Vadakkancherry.
2 Oct	19 - Bhawnathpur; 16 - Sangameshwar Devrukh; 13 - Wakwali ARG, Hazaribagh Dvc, Saryu and Kusmi; 12 - Poladpur and Mandangad; 11 - Khed, Padampur, Kankadahad, Padmapur, Sonepur and Nlumukku; 10 - Ratnagiri , Udgir, Khairamal, Bamra, Shilaichak, Madnur, Oothu and Hisua; 9 - Shriwardhan, Dapoli ARG, Akhuapada, Jujumura, Palganj, Hendigir, Bhurkunda, Mawsynram, Idamalayar Dam AWS and Vakkad AWS; 8 - Harnai IMD, Phusro, Bokaro Thermal, Koner Dvc, Bau Kanke, Rajauli and Chemberi AWS; 7 - Chiplun, Guhagarh, Lanja, Lonavala ARG, Mahabaleshwar, Chakur, Bhuban, Binjharpur, Marsaghai, Naktideul, Birmaharajpur, Chandrapura, Dhurki, Bharno, Lohardaga Kvk AWS, Palamu Dtg Kvk AWS, Ramgarh Kvk AWS, Shella, Chinnakalar, Valparai PTO, Balamore, Kalial, Gundar Dam, Kakkachi, Bodh Gaya, Fatehpur, Sherghati, Narhat, Nauhatta, Hasanpur, Rosera, Laha AWS and Thiruvananthapuram; 6 - Devgad, Indapur, Karad, Udgir - IMD Parttime, Pallahara, Chandbali, Boudhgarh, Danagadi, Laikera, Phiringia, Dhankauda, Sambalpur, Tarva, Chas, Nawadih, Nandadih, Dumri, Tuladih, Kuru, Daltonganj, Gola, Mandu, Patratu, Cit Tatisilwai, Ormanjhi, Bandgaon, Cincona, Pechiparai, Nabinagar, Sarmera, Balrampur, Kayamkulam ARG, Kochi IAF, Peermade To, Karipur Ap., Ponnani, Thritla, Ranni AWS, Kodungallur, Irinjalakuda and Hazaribagh; 5 - Anakapalle AP, Palakonda, Visakhapatnam AP, Bhum, Latur, Rajkishorenagar, Loisingha, Kantamal, Barkote, Rajkanika, Rairakhol, Mandira Dam, Chatra, Dumri Dvc, Murhu, Ramgarh (bdo) , Gharmura, Indus, Bolpur, Perunchani Dam, Puthan Dam, Worth Estate Cher, Wazirganj, Warisaliganj, Palluruthy ARG, Angadipuram, Manjeri, Munderi AWS and Mannarkkad AWS.
3 Oct	16 - Churk; 15 - Bamra and Dhurki; 13 - Anandpur, Banspal, Ghasipura, Kurunthancode and Wandrafnagar; 12 - Hazuah, Chopan Fmo, Robertsganj and Pratappur; 11 - Rajkishorenagar, Bhuban and Bhairamgarh; 10 - Japla, Itanagar, Barpeta and Nagercoil; 9 - Bahanga, Sukinda, Laikera, Jhumpura, Bargaon, Beky Rly.bridge, Dhemaji and Kanyakumari; 8 - Nh5 Gobindpur, Rajghat, Soro, Niali, Danagadi, Kirmira, Daitari, Keonjhargarh, Telkoi, Jamankira, Hariharganj, Naharlagun, Mawsynram, Garubathan, Bankura (CWC) , Kottaram and Chenari; 7 - Mada, Yeola, Talcher, Balasore, Jaleswar, Nilgiri, Oupada, Athgarh, Lakhanpur, Kaptipada, Rasagovindapur, Udala, Kakatpur, Nimpara, Tensa, Chakradharpur, Barpeta ARG, Kvk Dhalai, Jaunpur CWC, Hemtabad, Pingla, Anaikedanku, Adayamadai, Eraniel, Kozhiporvilai, Mylaudy, Mambzhathuraiyaru, Tamnar, Ambikapur and Trivandrum AP; 6 - Chitrangi, Singrauli-aws, Boudhgarh, Harabhanga, Kantapada, Altuma, Barkote, Dhenkanal, Hindol, Dhenkanal PTO, Swam-patna, Muruda, Astaranga, Satyabadi, Hemgiri, Boram, Garu, Manash Nh Xing, Kalpi Tehsil, Rongli, Kaliaganj, Amfu Kharagpur, Bhoothapandy, Balamore, Mullanginavillai, Aurangabad, Adhwara, Alalnagar, Kusmi, Bhaiyathan, Piravam, Pirappancode AWS, Vellayani AWS and Sundergarh; 5 - Kaniha, Remuna, Salepur, Jenapur, Baliguda, Phiringia, Tikabali, Gop, Tangarpali, D/Mohanbari AP, Mohanbari AWS, Varanasi BHU, Maya Bandar, Haldibari, Kushmundi, Namthang, Bankura, Thirupathisaram AWS, Thuckalay, Daudnagar, Nabinagar, Gharghoda, Neyyattinkara and Dhanbad.

TABLE 5 (*Contd.*)

4 Oct	25 - Sabong; 19 - Pedong and Pingla; 15 - Jaleswar; 13 - Amfu Kalimpong, Kalimpong, Majitar and Durgachack; 12 - Ranganadi Nt Xing, Darjeeling and Pakyong; 11 - Rongli, Mylaudy and Trivandrum AP; 10 - Musabani, Chakradharpur, Buxaduar, Damthang, Diamond Harbour, Kuzhithurai and Dinara; 9 - Kakatpur, Jamtara, Latehar, Manash Nh Xing, N.lakhimpur/Lilabari, Tinsukia, Churk, Amta-i, Uluberia, Uluberia (state) , Anaikedanku, Kanyakumari, Kozhiporvilai and Mambzhathuraiyaru; 8 - Kendrapara, Udala, Batagaon, Torpa, Saryu, Hut Bay, Asansol, Debagram, Khirpai, Kalial, Adhwara, Dhengraghat, Jalalgarh, Dehri, Indrapuri and Ramanujganj; 7 - Naraj, Deogaon, Kendrapada PTO, Daitari, Kaptipada, Astaranga, Gop, Diyakel Khunti Kvk AWS, Garu, Bhurkunda, Bandgaon, Beky Rly.bridge, Ghazipur, Nichlaul, Rongo, Hasimara, Contai (state) , Alipore, Ranaghat, Baruipur, Nagercoil, Perunchani Dam, Bahargama, Barun, Nabinagar, Rampur, Gaunaha, Tribeni/Balmikinagar, Bhaiyathan, Pratappur and Thiruvananthapuram; 6 - Sarai, Bhograi, Remuna, Derabis, Jamankira, Jarmindi, Zrs Dumka, Patamda, Panki, Ranchi AP, Manoharpur, Dharamtul, Melabazar/Matunga, Patti, Trimohani Ghat Fmo, Chopan Fmo, Yuksom, Narayanpur, Burnpur, Nandigram, Deganga, Mo Saltlake, Jhalda, Purihansa, Amfu Kakdwip, Manmothnagar, Sagar (state) , Balamore, Kottaram, Mullanginavillai, Puthan Dam, Suralacode, Thuckalay, Araria, Daudnagar, Rafiganj, Sahar, Sangrampur, Chenari, Bikramganj, Bagaha and Sikta; 5 - Chitrangi, Balasore, Nh5 Gobindpur, Mundali, Balikuda, Kujanga, Aul, Sukruli, Odagaon, Naktideul, Mohanpur, Panchet, Panchet Dvc, Ghatsila, Gumla Bishnupur Kvk AWS, Jamtara Fmo, Arki, Japla, Manatu, Naudiha Bazar, Lesliganj, Ramgarh, Bansgaon, Chanderdeepghat, Mirzapur CWC, Robertsganj, Sukiapokhri, Karandighi, Bankura (CWC) , Mangalkote, Bagati, Harinkhola, Kalyani Smo, Krishnanagar (state) , Kharidwar, Adayamadai, Raniganj, Aurangabad, Wandrafnagar, Neyyattinkara and Sagar Island.
5 Oct	20 - Sonhaula; 19 - Dhengraghat; 17 - Rajmahal and Sabour; 16 - Pathargama; 15 - Ghurriya; 14 - Mehgawan and Borio; 12 - Bagrakote, Chanchal and Malda; 11 - Harish Chandrapur; 10 - Panchet, Habibpur, Luchipur, Sultanganj and Peermade To; 9 - Gobindpur, Gobindpur Dvc, Gajole, Jiaganj, Krishnanagar (state) , Kashipur, Amarpur, Banka and Taibpur; 8 - Sawantwadi, Panchet Dvc, Kaliachak- Iii, Amdabad and Barari; 7 - Hazaribagh, Koner, Koner Dvc, Naharlagun, Chandrapur ARG, Kokrajhar, Bamongola, Narayanpur, Durgapur, Amtala, Bongaon, Shambhuganj, Bihpur and Colgaon; 6 - Kaliasole, Hazaribagh Dvc, Bhurkunda, Guwahati City IMD, Bhaghmara, Darjeeling, Amfu Majhian, Bankura (CWC) , Kanksa (dsf) , Mankar, Naugachia, Kishanganj and Rajpur; 5 - Godda, Nala, Karmatand, Sahibganj Kvk AWS, Williamnagar, Kalimpong, Karandighi, Balurghat, Kumarganj, Bankura, Labpur, Deganga, Jhalda, Chandan, Dumaria, Tedhagach, Rupouli and Tribeni/Balmikinagar.
6 Oct	20 - Mawsynram; 17 - Cherrapunji; 15 - Mawkyrwat; 12 - Shella and Bihubar; 11 - Cherrapunji (rkm) ; 10 - Mawphlang, Nongstein and Chengam; 9 - Williamnagar and Aryankavu; 8 - Lumding and Bhaghmara; 6 - Sawantwadi, Sanguem, Guwahati City IMD, Jowai, Lembuchhera, Chinsura, Bongaon, Kvk Kattukuppam ARG and Rscl Vallam; 5 - Ponda, Tuting, Khowang, Naharkatia ARG, Chauldhowaghat and Laha AWS.
7 Oct	27 - Cherrapunji (rkm) and Shella; 22 - Cherrapunji; 12 - Mawsynram; 8 - Tihidi and Khetri ARG; 6 - Bhadrak, Mawkyrwat and Contai (state) ; 5 - Jayapura, Kutra, Miao, Nachu ARG, J B Gaon and Nongpuh.
8 Oct	21 - Mawsynram; 19 - Cherrapunji and Cherrapunji (rkm) ; 15 - Jowai; 14 - Khliehriat; 13 - Mawkyrwat; 10 - Shella and Elumalai; 9 - Rengali and Mawphlang; 8 - Rajghat, Dhemaji and Samastipur; 7 - Rongo and Tura; 6 - Garubathan and Paramakudi; 5 - Banarpal, Korei, Nachu ARG, Mangan, Vedasandur, Shoolagiri and Ammundi.
9 Oct	12 - Chauldhowaghat; 10 - Itanagar; 9 - Somwarpet, Cherrapunji, Mawsynram and Cherrapunji (rkm) ; 8 - C R Patna, Panbari and Namthang; 7 - Hoskote, Tumakuru, Tezu, Namsai Kvk AWS and N.lakhimpur/Lilabari; 6 - Pakala, Belur, Naharlagun, Ranganadi Nt Xing, Gyalsing PTO, Valparai Taluk Office and Valparai Pap; 5 - Gubbi, Nala, Seppa, Mangan, Manteswar, Kodaikanal and Balehonnur.
10 Oct	11 - Dc Office Tiruppur; 9 - Hunsur, Periyanaickenpalayam and Tiruvadanai; 8 - Sravanabelagola and Salem; 7 - Devanahalli, Bengaluru City, Sholavandan, Coonoor PTO, Pwd and Coonoor; 6 - Bengaluru HAL AP, Srirangapatna, Chinnakalar and Krp Dam; 5 - Ksndmc Campus, Kamba AWS, Pillur Dam Mettupalayam, Taluk Office Pandalur, Anaimaduvu Dam, Tiruppur and Vellakoil.
11 Oct	10 - Ranni AWS; 9 - Padannakkad AWS; 7 - Uppinangadi, Pappireddipatti, Kalial, Thirparappu, Katpadi and Mannarkkad AWS; 6 - Maddur, Sargur, Tuting, Rscl-3 Avalurpettai, Nilambur AWS and Kanjirapuzha ARG; 5 - Dinhata and Urumi AWS.
12 Oct	18 - Neeleswaram ARG; 12 - Madurai North and Madurai South; 10 - Mettupatti, Tallakulam and Vellarikkundu AWS; 9 - Periyapatti, Kochi C.i.a.l. and Konni; 8 - Dharmasthala, Sathiar, Ponnamaravathi and Thodupuzha; 7 - Khowai, Garubathan, Mangan, Kurudamannil, Pirappancode AWS and Varkala; 6 - Sakleshpura, Bhagamandala, Sankalan, Kayamkulam ARG, Idamalayar Dam AWS, Kollam Rly, Angadipuram, Ponnani, Perinthalamanna and Pattembi; 5 - Tuting, Champasari, Airport Madurai, Kallikudi, Vadipatti, Viraganur Dam, Singampunari, Sothuparai, Pwd, Chavara AWS and Cochi IAF.
13 Oct	10 - Chittar; 9 - Thirparappu; 8 - Enamakkal; 7 - Mani and Kottarakkara AWS; 6 - Thuckalay, Ottapadiram and Vembakottai; 5 - Barpeta, Gossaigaon, Sivalogam (chittar Ii) , Sattur, Konni and Kunnathanam AWS.
14 Oct	10 - Thekkadi; 8 - Kalial; 7 - Kayamkulam ARG, Mavelikara and Ernakulam South; 6 - Pechiparai, Thirparappu, Kochi IAF, Perumpavur and Kunnathanam AWS; 5 - Junagadh, Manamelkudi and Neeleswaram ARG.
15 Oct	21 - Trivandrum AP; 20 - Cherthala; 19 - Neyyattinkara; 17 - Anaikedanku, Mambzhathuraiyaru and Mavelikara; 16 - Kalial and Mullanginavillai; 15 - Kuzhithurai and Thiruvalla AWS; 14 - Kozhiporvilai, Thirparappu and K.paramathi; 13 - Chittar, Anaippalayam, Alapuzha, Ernakulam South, Pirappancode AWS and Lower Sholayar AWS; 12 - Sivalogam (chittar Ii) , Paripalli AWS, Malampuzha Dam AWS, Palakkad, Kunnathanam AWS and Thiruvananthapuram; 11 - Chinnakalar, Bhavani, Thycauttussery AWS and Kumarakam; 10 - Perundurai, Kurunthancode, Thuckalay, Kodanad, Kochi IAF, Palluruthy ARG and Thattathumala AWS; 9 - Cincona, Pechiparai, Sholavandan, G Bazar, Pullambadi, Kayamkulam, Vaikom, Quilandi, Venkurinji AWS and Kodungallur; 8 - Valparai Taluk Office, Valparai Pap, Mylaudy, Andipatti, Kumarapalayam, Paramathivelur, Upper Gudalur, Gangavalli, Kallakudi, Aryankavu, Urumi AWS and Varkala; 7 - Kodaikannal Boat Club, Balamore, Thirupathisaram

TABLE 5 (*Contd*.)

	AWS, Namakkal, Glenmorgan, Haripad, Cherthala AWS, Karumadi AWS, Mancompu, Chavara AWS, Angadipuram, Nilambur AWS, Kanjirapuzha ARG, Kurudamannil and Enamakkal; 6 - Visavadar, Pillur Dam Mettupalayam, Pwd Makkinampatti, Kodaikanal, Kavundapadi, Kodumudi, Sathyamangalam, Adayamadai, Nagercoil, Mettupatti, Alakarai Estate, Alangudi, Thirumoorthi Dam, Trp Town, Perumpavur, Kollam Rly and Kunnamangalam AWS; 5 - Bandipura, Varattupallam, Eraniel, Erumapatti, Viralimalai, Thirumoorthy Ib, Aruppukottai, Kanjirappally, Karipur Ap., Manjeri and Vadakkancherry.
16 Oct	12 - Periyakulam AWS; 10 - Peraiyur; 9 - Kamudhi, Tondi, Sothuparai, Virudhunagar and Mannarkkad; 8 - Thiruchuzhi; 7 - Kankavli, Sankarapuram, Manamelkudi, Mudukulatur, Adirampatnam and Myladumpara ARG; 6 - Mimisal, Vaigai Dam, Trp Town, Aruppukottai Kvk AWS, Kovilankulam and Virudunagar AWS; 5 - Kallikudi and Uppar Dam.
17 Oct	11 - Chemberi AWS and Urumi AWS; 9 - Saligrama, Bhaderwah ARG, Govindpura AWS and Udhampur (IAF) ; 8 - Krishnarajpet, Jaisalmer, Pokhran, Kalial, Thirparappu, Theerthandathanam, Tiruvadanai, Thammampatty, Uppar Dam, Dalhousi Alha AWS and Banihal; 7 - Mirganj, Ap Peelamedu, Sulur, Kilanilai, Devakottai, Thenparanadu, Chuari, Manjeri, Munderi AWS, Batote and Badarwah; 6 - Ankola, Virajpet, Phangota, Kunderipallam, Sivalogam (chittar Ii) , Thalaignayer, Vattanam, Mettur, Tindivanam, Jammu, Jammu AWS, Kathua Kvk, Reasi ARG, Manjeswaram ARG and Angadipuram; 5 - Mangaluru AP, Madhopur, Neemsar, Pawayan, Valparai Taluk Office, Valparai Pap, Salem, Palladam, Kheri, Verinag, Chatha Agro AWS, Jammu AP, Reasi Kvk AWS, Peringome AWS and Kukernagh.
18 Oct	10 - Nlumukku; 9 - Pillur Dam Mettupalayam, Kozhiporvilai and Paramakudi; 8 - Kurunthancode, Tindivanam and Pothundy Dam AWS; 7 - Pushprajgarh, Kollam Rly and Konni; 6 - Perunchani Dam, Mullanginavillai, Shencottah, Thanjai Papanasam, Oothu and Papanasam; 5 - Balamore, Pechiparai, Puthan Dam, Thuckalay, Kakkachi and Chittur.
19 Oct	Nil.
20 Oct	23 - Beed; 6 - Kanniyakumari.
21 Oct	Nil.
22 Oct	7 - Port Blair.
23 Oct	Nil.
24 Oct	9 - Uluberia; 6 - Punalur; 5 - Paradip Cwr and Kottayam.
25 Oct	7 - Kottayam.
26 Oct	Nil.
27 Oct	Nil.
28 Oct	Nil.
29 Oct	Nil.
30 Oct	5 - Nagapattinam.
31 Oct	Nil.
1 Nov	8 - Bailhongal; 6 - Hut Bay; 5 - Quepem.
2 Nov	9 - Kozhikode, Ramanadhi Dam and Nancowry; 8 - Kurudamannil, Karaikal and Ramanathapuram; 7 - Ramnadu Kvk AWS, Manjolai, Tiruchendur and Aruppukottai; 6 - Kannur, Urumi AWS, Palode AWS, Coimbatore South, Thondamuthur, Kurunthancode, Shencottah, Kannadaian Anicut, Moolaikaraipatti, Kayalpattinam, Pilavakkal, Watrap and Bailhongal; 5 - Konni, Tnau Coimbatore, Eraniel, Kozhiporvilai, Kakkachi, Pwd, Kadalkudi, Eluru, Vannamada AWS and Peelamedu/Coi.ap.
3 Nov	9 - Kudulu; 8 - Chidambaram AWS; 7 - Annamalai Nagar, Kakkachi, Manjolai and Radhapuram; 6 - Muliyar AWS, Kalial, Nlumukku, Tiruppur South and Bailhongal; 5 - Sengulam Dam AWS, Thenkasi and Kotpad.
4 Nov	13 - Pillur Dam Mettupalayam; 12 - Mancompu, Alandur, Kamudhi and Sivagiri; 11 - Anakayam ARG, Adirampatnam, Puzhal ARG and Bailhongal; 10 - Singampunari and Bandhugaon; 9 - Chemberi AWS, Angadipuram, Chennai AP and Bamra; 8 - Src Kudithangi, Madurai South, Velankanni, Ayinkudi, Karaiyur and Vannamada AWS; 7 - Kumarakam, Dindigul, Natham, Alakarai Estate, Avudayarkoil, Kilanilai, Nagudi, Paramakudi, Theerthandathanam and G B Nagar; 6 - Alapuzha, Kanjirappally, Venkurinji AWS, Kundrathur, Mylaudy, Usilampatti, Arimalam, Pudukottai, Vamban Kvk AWS, R.s.mangalam, Karaikudi, Tirupathur, Tirupuvanam and Nilambur AWS; 5 - Chittur, Rania, Tonto, Cheyyur, Taramani ARG, Mettupalayam, Periyanaickenpalayam, Mullanginavillai, Airport Madurai, Viralimalai, Peravurani, Kariyapatti, Kirmira and Gurundia.
5 Nov	19 - Kochi C.i.a.l.; 17 - Neeleswaram ARG; 13 - Valparai Pap and Valparai Taluk Office; 12 - Peringalkuthu AWS and Irinjalakuda; 11 - Aluva AWS, Alwaye PWD, Idamalayar Dam AWS, Tondi, Veerapandi and Kurnool; 10 - Angadipuram, Shencottah, Bodinaickanur, Pwd, Vannamada AWS and Bailhongal; 9 - Ernakulam South, North Paravur AWS, Anayirankal Dam AWS, Myladumpara ARG, Vadavathur AWS, Perinthalamanna, Kollamkode, Parumbikulam, Pothundy Dam AWS, Kodungallur, Vellanikkara, Vilangankunnu ARG, Elanthakuttai Medu, Kumarapalayam, Ramanathapuram, Edapadi, Thammampatty and Kollengode AWS; 8 - Kochi IAF, Ponnani, Chittur, Valparai PTO, Andipatti, Mohanur, Valinokam, Pattukottai and Muvattupuzha ARG; 7 - Meenkara ARG, Ranni AWS, Palode AWS, Peringamala ARG, Chimoni ARG, Enamakkal, Vadakkancherry, Chinnakalar, Pillur Dam Mettupalayam, Bhavani, Kunderipallam, Modakkurichi, Pambar Dam, Pulipatti, Kil Kotagiri Estate, R.s.mangalam, Sankaridurg, Ambur, Neryamangalam ARG and Keerampara ARG; 6 - Kalamassery AWS, Odakali AWS,

TABLE 5 (*Contd*.)

	Kottayam, Vaikkom AWS, Varkala, Amini, Cincona, Sholayar, Gobichettipalayam, Kodivery, Nambiyur, Suralacode, Chittampatti, Erumapatti, Paramathivelur, Geddai, K Bridge, Ramnadu Kvk AWS, Illayangudi, Katpadi and Korukunda; 5 - Thycauttussery AWS, Perumpavur, Palluruthy ARG, Piravam, Chalakudi, Mettupalayam, Sathyamangalam, Varattupallam, Coonoor PTO, Burliar, Shanthi Vijaya School, Theerthandathanam, Gangavalli, Sothuparai, Oothu, Uthukuli, Ponneri, Palamaner, Koraput, Kovilkadavu AWS, Alathur and Coonoor.
6 Nov	12 - Thenkasi and Kandukur; 11 - Belthangadi; 10 - Ayikudi and Kavali; 9 - Elumalai and Kundapur; 8 - Sulya and Shirali; 7 - Panathur AWS, Dharmasthala, Kota, Puttur HMS, Kudulu and Bajpe AP; 6 - Anayirankal Dam AWS, Myladumpara ARG, Kancheepuram, Sivagiri, Rajapalayam, Udayagiri, Tada, Tirupati AP, Somwarpet and Kollur; 5 - Sattenapalle, Udupi, Kalasa, Hunchadakatte and Bailhongal.
7 Nov	14 - Punalur; 12 - Bhavani and Sivalogam (chittar Ii) ; 11 - Rajapalayam, Srivilliputhur and Thondebhavi; 10 - Tondi; 9 - Chinnakalar, Kunderipallam, Anaikedanku, Chittar, Mambzhathuraiyaru, Pechiparai, Thuckalay, Airport Madurai, Tirumangalam, Ottapadiram, Kovilankulam, Aruppukottai Kvk AWS, Hebburu and Krishnarajpet; 8 - Palacode, Erode, Kavundapadi, Kozhiporvilai, Velankanni, Tiruchengode, Tirupuvanam, Cheranmahadevi, Kayathar, Kovilpatti, Penu Konda, Haveri Apmc, Ramanagara, Midigeshi and Ksndmc Campus; 7 - Govindaraopet, Lower Sholayar AWS, Kallakurichi, K.paramathi, Nagapattinam, Kumarapalayam, Tiruvadanai, Manjolai, Madathukulam, Ettayapuram, Kadambur, Virudhunagar, Chilamathur, Lepakshi, Madakasira, Ron, Bengaluru City and Sargur; 6 - Kanjirappally, Dharmapuri PTO, Manimutharu Dam PWD, Kannimar, Aravakurichi, Shanthi Vijaya School, Valinokam, Vattanam, Theerthandathanam, Anaimaduvu Dam, Gadana Dam, Shencottah, Andipatti, Ambasamudram, Kannadaian Anicut, Kalugumalai, Kariyapatti, Sattur, Bandhugaon, Mathili, Doddaballapura, Yagati, Saligrama, Bellur, Bailhongal and Dharmapuri; 5 - Kothagudem, Ottapalam, Venkurinji AWS, Palode AWS, Pennagaram, Kalial, Usilampatti, Edapadi, Sothuparai, Uttamapalayam, Pilavakkal, Virudunagar AWS, Punganur, Amarapuram, Gorantla, Hindupur, Shiggaon, Devanahalli and Magadi.
8 Nov	11 - Addanki; 10 - Panjim , Dabolim N.a.s.- Navy and Margao; 9 - Enadimangalam AWS, Periyanaickenpalayam, Tirupoondi and Karwar; 8 - Urumi AWS, Rscl-2 Kedar and Yerragondapalem; 7 - Palacode, Kodivery, Velankanni, Needamangalam and Mundlamuru; 6 - Ammapettai, Varattupallam, Kodiayakarai, Yercaud, Pallipattu, Kavali, Quilandi and Mormugao; 5 - Ranni AWS, Quepem, Sanguem, Karad, Thondamuthur, Kothavacherry, Gobichettipalayam, Mayiladuthurai, Mohanur, Tiruvarur, Hagaribommanahalli and Bailhongal.
9 Nov	23 - Kil Kotagiri Estate; 16 - Kannur; 15 - Pillur Dam Mettupalayam; 14 - Moolaikaraipatti and Amraoti; 13 - Peruvannamuzhi ARG and Kannur Icar AWS; 12 - Nambiyur and Avinasi; 11 - Pinarayi AWS, Thritla and Aliyar; 10 - Taliparamba, Periyanaickenpalayam and Tnau Coimbatore; 9 - Vellarikkundu AWS, Panathur AWS, Kollamkode, Urumi AWS, Bhavanisagar, Alakarai Estate, Tuticorin, Rajapalayam, Virudhunagar, Watrap, Kollengode AWS, Vilangad AWS, Balehonnur and Hassan; 8 - Panniyoor ARG, Kalpeta AWS, Kothavacherry, Kalial, Melur, Coonoor PTO, Andipatti, Pwd, Ottapadiram, Thalaguppa, Pattembi, Ottapalam AWS and Coonoor; 7 - Chemberi AWS, Sengulam Dam AWS, Pothundy Dam AWS, Venkurinji AWS, Pookot, Coimbatore South, Mettupalayam, Kurinjipadi, Parangipettai, Mambzhathuraiyaru, Idayapatti, Kadaladi, Ramanathapuram, Ramnadu Kvk AWS, Budalur, Kalakadu, Gooty, Bevoor and Bhagamandala; 6 - Waddepalli, Itikyal, Aralam AWS, Tellichery, Thodupuzha, Anakayam ARG, Erimayur ARG, Ottapalam, Kurudamannil, Vyttiri, Sangli , Thondamuthur, Vadakuthu, Kodumudi, Kunderipallam, Anaikedanku, Thirparappu, Elumalai, Kallikudi, Burliar, Billimalai Estate, Paramakudi, Pwd Travellers Bungalow, Maniyachi, Srivaikuntam, Tiruchendur, Kovilankulam, Aruppukottai Kvk AWS, Srivilliputhur, Mangalagiri, Guntakal, Tanakal, Uppinangadi, Puttur HMS, Kadur, Bhadravathi, Alathur, Virajpet and Bailhongal; 5 - Anayirankal Dam AWS, Konni, Seethathode AWS, Chalakudi, Vadakkancherry, Padinjarathara Dam AWS, Mhasla, Kuppanatham, Virudachalam, Virdhachalam Kvk AWS, Kodaikannal Boat Club, Sivalogam (chittar Ii) , Pulipatti, Sathiar, Thaniamangalam, Tirumangalam, Nagapattinam, Adar Estate, Kodanad, Kothagiri, Kamudhi, Thammampatty, Tirupuvanam, Kodumudiyaru Dam, Dc Office Tiruppur, Ettayapuram, Kovilpatti, Virudunagar AWS, Sulya and Perumpavur.
10 Nov	9 - Sivalogam (chittar Ii) ; 8 - Kuzhithurai, Pwd and Ambathur; 7 - Ottapalam and Nannilam; 6 - Ulhasnagar, Kalial, Kil Kotagiri Estate, Pamban and Yedwad; 5 - Ambernath, Karaikal, Puzhal ARG, Needamangalam, Kollur and Bailhongal.
11 Nov	15 - Thangachimadam; 14 - Mandapam; 10 - Bailhongal; 9 - Udhampur (IAF) ; 8 - Pamban; 7 - Long Island; 6 - Rameswaram; 5 - Piravam and Matheran.
12 Nov	7 - Bailhongal.
13 Nov	8 - Bailhongal; 7 - Minicoy; 6 - Port Blair.
14 Nov	17 - Velankanni;15 - Nagapattinam; 14 - Karaikal; 12 - Cuddalore, Parangipettai, Puducherry and Nannilam; 11 - Tirupoondi and Vedaranniyam; 10 - Maduranthagam, Chidambaram, K.m.koil, Mayiladuthurai, Thalaignayer and Kodiayakarai; 9 - Mahabalipuram, Thirukalukundram, Bhuvanagiri, Chidambaram AWS, Kothavacherry, Srimushnam, Vanamadevi, Sirkali and Tarangambadi; 8 - Kelambakkam, Collectorate, Lalpet, Src Kudithangi, Vadakuthu and Kollidam; 7 - Annamalai Nagar, Sethiathope, Vepur, Sembanarkoil PWD, Tiruvarur, Marakkanam, Rscl-2 Mundiyampakkam and Vanur; 6 - Chengalpattu, Suthamalli Dam, Kurinjipadi, Kuppanatham, Panruti, Manalmedu, Lower Anaicut, Kodavasal, Needamangalam, Thiruthuraipoondi, Tindivanam and Bailhongal; 5 - Thirukuvalai, Mannargudi, Pandavaiyar Head, Rscl-2 Koliyanur and Rscl-2 Valavanur.
15 Nov	12 - Dgp Office; 11 - Karaikal, Kodiayakarai and Velankanni; 9 - Chennai Collectorate Bu and Ambathur; 8 - Hindusthan University, Mahabalipuram, Anna Uty ARG, Sholinganallur and Nagapattinam; 7 - Anna University, Alandur, Chennai AP, Chennai (n) , Mgr Nagar, Perambur, Cd Hospital Tondaipet, Taramani ARG, Collectorate, Sembanarkoil PWD, Thirukuvalai and Vedaranniyam; 6 - Kayamkulam, Kelambakkam, Kolapakkam ARG, Thirupporur, Satyabama Uty ARG, Ayanavaram Taluk Office, Bhuvanagiri, Vadakuthu, Mayiladuthurai, Sirkali, Tirupoondi, Nannilam and Tiruvarur; 5 - Mavelikara, Tambaram, Annamalai Nagar, Chidambaram, Kurinjipadi, Kollidam, Tarangambadi, Avadi, Ponneri, Puzhal ARG, Red Hills and Bailhongal.

TABLE 5 (*Contd.*)

16 Nov	9 - Bailhongal; 8 - Ponneri; 7 - Sivalogam (chittar Ii) ; 6 - Konni and Thuckalay; 5 - Kottayam.
17 Nov	10 - Enadimangalam AWS and Nlumukku; 9 - Konni, Kannadaian Anicut and Oothu; 8 - Kakkachi; 7 - Manjolai and Bailhongal; 6 - Aryankavu, Paripalli AWS, Poonjar AWS, Sivalogam (chittar Ii) and Kalakadu; 5 - Kayamkulam ARG, Anaikedanku, Pechiparai, Ambasamudram and Papanasam.
18 Nov	15 - Kvk South; 14 - Amarpur; 13 - Kanchanpur; 11 - Lengpui, Kvk Dhalai, Gokulpur AWS and Agartala AP; 10 - Matijuri, Lawngtlai ARG, Sonamura, Arundhutinagar and Lembuchhera; 9 - Long Island, Dholai, Lakhipur, Silchar, Kolasib ARG and Dharmanagar/Panisagar; 8 - Udaipur and Khowai; 7 - Manalmedu, Nannilam, Amraghat, Gharmura, B P Ghat, Kamalpur, Serchip (hydro) , Saiha ARG, Bishalgarh, Kailashahar AP and Bailhongal; 6 - Nooranad AWS, Maya Bandar, Sabroom, Serchip AWS and Neryamangalam ARG; 5 - Palluruthy ARG, Needamangalam, Imphal AP and Tening Nsdma AWS.
19 Nov	11 - Nannilam; 9 - Pamban; 8 - Thangachimadam; 6 - Kalial, Pechiparai, Car Nicobar and Thodupuzha ARG; 5 - Aryankavu and Enadimangalam AWS.
20 Nov	16 - Kulasekarapattinam; 12 - Satankulam; 11 - Tiruchendur; 9 - Oothu and Kayalpattinam; 8 - Kakkachi, Manjolai and Car Nicobar; 7 - Kadaladi, Kodumudiyaru Dam, Nlumukku, Radhapuram and Car Nicobar IAF; 6 - Kalakadu, Nanguneri, Ottapadiram and Bailhongal; 5 - Moolaikaraipatti and Palayamkottai.
21 Nov	9 - Dgp Office, Ponneri, Nellore and Gudur; 8 - Chennai Collectorate Bu; 7 - Anna University, Chennai (n) , Ayanavaram Taluk Office, Cd Hospital Tondaipet and Sullurpeta; 6 - Perambur, Sholinganallur and Ennore AWS; 5 - Tada and Bailhongal.
22 Nov	17 - Pwd; 14 - Andipatti and Avinasi; 13 - Parangipettai; 12 - Watrap; 11 - Kothavacherry and Alakarai Estate; 10 - Srivilliputhur and Kavali; 9 - Thritla and Karaikal; 8 - Kalamassery AWS, Chittur, Nagapattinam, Coonoor PTO, Pattembi and Coonoor; 7 - Kurudamannil, Seethathode AWS, Kunnamkulam, Kunnamkulam AWS, Kurinjipadi, Perundurai, Elumalai, Uthukuli and Thenparanadu; 6 - Peermade To, Valparai PTO, Sathyamangalam, Adar Estate, Sivagiri and Tiruppur; 5 - Enadimangalam AWS, Perumkadavila ARG, Chennai (n) , Dgp Office, Vadakuthu, Virudachalam, Kozhiporvilai, Velankanni, Burliar, Bodinaickanur, Tiruppur South, Ambathur, Ennore AWS, Pilavakkal and Bailhongal.
23 Nov	37 - Mettupalayam; 24 - Kil Kotagiri Estate; 17 - Kadaladi; 15 - Kunnathanam AWS, Thiruvananthapuram, Kavundapadi and Valinokam; 13 - Enadimangalam AWS, Kozhiporvilai, Coonoor PTO, Vamban Kvk AWS, Ayikudi and Coonoor; 12 - Peermade To and Thuckalay; 11 - Perumkadavila ARG, Karuppanadhi Dam and Ottapalam AWS; 10 - Padinjarathara Dam AWS, Siruvani Adivaram, Elanthakuttai Medu, Mambzhathuraiyaru, Burliar, Perungalur, Manamadurai and Kayalpattinam; 9 - Myladumpara ARG, Pampadumpara AWS, Angadipuram, Ottapalam, Neyyattinkara, Venkurinji AWS, Varkala, Periyanaickenpalayam, Anaikedanku, Sivalogam (chittar Ii) , Alakarai Estate, Paramakudi, Ramanathapuram, Ramnadu Kvk AWS, Singampunari, Kalugumalai, Tiruchendur, Pilavakkal, Nilambur AWS and Mannarkkad AWS; 8 - Thodupuzha, Kollam Rly, Kanjirappally, Aruvikkara AWS, Kalpeta AWS, Pillur Dam Mettupalayam, Gobichettipalayam, Kothagiri, Alangudi, Mudukulatur, Tondi, Vilathikulam, Rajapalayam, Srivilliputhur and Mankara AWS; 7 - Kayamkulam ARG, Neeleswaram ARG, Kumarakam, Perinthalamanna, Seethathode AWS, Peringalkuthu AWS, Manantoddy, Natham, Chittar, Kurunthancode, Mullanginavillai, Vadipatti, Tirupoondi, Adar Estate, Adanakkotai, Kamudhi, R.s.mangalam, Kamudhi ARG, Vattanam, Theerthandathanam, Tirupuvanam, Sankarankoil, Virudhunagar, Quilandi and Pattembi; 6 - Idukki, Chavara AWS, Poonjar AWS, Nilambur, Erimayur ARG, Palakkad, Konni, Kurudamannil, Palode AWS, Vellanikkara, Vyttiri, Tnau Coimbatore, Kodivery, Adayamadai, Bhoothapandy, Nagercoil, Mylaudy, Suralacode, Thirupathisaram AWS, Shencottah, Thamaraipakkam, Thiruthuraipoondi, Kulasekarapattinam, Malampuzha Dam AWS and Keerampara ARG; 5 - Manjeri, Kalial, Thirparappu, Thirukuvalai, G Bazar, Barwood, Kinnakorai, Upper Gudalur, Malaiyur, Rameswaram, Gundar Dam, Sivagiri, Thenkasi, Moolaikaraipatti, Kovilpatti, Ottapadiram, Virudunagar AWS, Alathur, Airport Chakka ARG, Thiruvalla AWS and Bailhongal.
24 Nov	8 - Alakarai Estate, Billimalai Estate and Surangudi; 7 - Burliar, Kil Kotagiri Estate and Bailhongal; 6 - Kalakada; 5 - Devaruppal, Adar Estate, Devala, Kodanad and Lamataput.
25 Nov	11 - Seetharamapuram and Udayagiri; 10 - Car Nicobar; 9 - Car Nicobar IAF; 8 - Vinjamur; 7 - Taramani ARG; 5 - Minicoy, Bhuvanagiri, Annavasal and Bailhongal.
26 Nov	17 - Sethiathope; 11 - Kothavacherry, Lalpet, Srimushnam and Kollidam; 9 - Bhuvanagiri, K.m.koil and Vepur; 8 - Kayamkulam, Collectorate, Parangipettai, Labbaikudikadu, Nlumukku and Oothu; 7 - Satara , Cuddalore, Kurinjipadi, Pelandurai, Sirkali, Puducherry, Kakkachi, Manjolai, Marakkanam and Car Nicobar; 6 - Kayamkulam ARG, Annamalai Nagar, Chidambaram, Kilacheruvai, Tozhudur, Vadakuthu, Kumarapalayam, Eraiyur, Thaluthalai and Bailhongal; 5 - Jayamkondam, Lakkur, Virudachalam, Bhavani and Mayiladuthurai.
27 Nov	15 - Taloda; 14 - Sagbara; 13 - Navasari AWS; 12 - Mandvi and Umerpada; 11 - Sendhwa (med) , Niwali, Rama, Kukarmunda and Chuda; 10 - Pansemal, Rajpur, Narmada Kvk AWS, Kamrej and Kancheepuram; 9 - Badwani, Chachariyapati, Ranapur, Netrang, Surat City, Surat Kvk AWS, Jamner and Purna; 8 - Udaigarh, Warla, Jhabua-aws, Maheshwar, Nadiad, Yaval, Badnapur, Ardhapur, Parbhani , Manvat, Deolgaon Raja, Sindkhed Raja, Car Nicobar and Khargone; 7 - Bhabhra, Alirajpur, Kathiwada, Sondwa, Pati, Anjad, Kukshi, Bhagwanpura, Bhikangaon, Jhirnya, Gogawan, Modasa, Ankleshwer, Sankheda, Palsana, Olpad, Nizer, Shirpur, Shahada, Gangapur, Jafrabad, Partur, Palam, Pathri, Selu, Lonar, Mehkar, Car Nicobar IAF, Nandurbar and Washim; 6 - Jabot, Thikri, Pithampur, Petlawad, Kasarwad, Sailana, Sinderi SR, Bhabhar, Hansot, Chhota Udepur, Jetpur Pavi, Dediapada, Garudeshwar, Santalpur, Radhanpur, Choryasi, Mangrol, Surat AWS, Amreli, Dhadgaon/Akrani- Hydro, Hadgaon, Gummidipoondi, Risod, Nanded and Buldana; 5 - Dhar-aws, Gandhwani, Manawar, Sardarpur, Indore, Thandla, Badnagar, Nagda, Gogunda SR, Dholka ARG, Vagra, Maktampur AWS, Chhotaudepur Kvk AWS, Nandod, Jambughoda, Songadh, Mudhole, Sakri, Devla, Junnar, Velhe, Sambhajinagar-imd, Bhokar, Kandhar, Polur, Malkapur, Shegaon, Mangrulpir, Malegaon, Umerkhed, Tirupati AP, Hut Bay and Bailhongal.

TABLE 5 (*Contd.*)

28 Nov	9 - Poondi; 7 - Jamner; 6 - Godadongri, Parasia, Tamia, Umreth, Maduranthagam, Cuddalore, Kulasekarapattinam, Gudur, Satyavedu, Kodur and Pusad; 5 - Multai, Amarwara, Sholingur and Khamgaon.
29 Nov	9 - Ramanathapuram; 8 - Ausa; 7 - Alladurg, Sholapur , Deoni and Bailhongal; 6 - Regode, Nizamabad, Bidar and Bhadravathi; 5 - Renapur, Vadakuthu, Gummidipoondi, Rscl-2 Nemoor and Lakshmeswar.
30 Nov	19 - Avadi; 15 - Ponneri; 14 - Ambathur and Tada; 13 - Thalaignayer and Cholavaram; 12 - Anna University, Puzhal ARG and Red Hills; 11 - Anna Uty ARG, Perambur and Gummidipoondi; 10 - Alandur, Chennai AP and Venkatagiri; 9 - Kolapakkam ARG, Mgr Nagar, Sholinganallur, Ayanavaram Taluk Office, Taramani ARG, Kollidam, Thirukuvalai and Poonamallee; 8 - Chennai (n) , Dgp Office, Vepur, Kundrathur, Karaikal, Velankanni, Koratur and Tiruvallur; 7 - Tambaram, Satyabama Uty ARG, Sirkali, Tirupoondi, Thamaraipakkam, Thiruthuraipoondi, Tirur Kvk AWS, Rscl-2 Nemoor, Satyavedu and Bailhongal; 6 - Hamirpur, Kancheepuram, Sriperumbudur, Mayiladuthurai, Nagapattinam, Tarangambadi, Chembarabakkam, Ennore AWS, Basl Mugaiyur and Tirupati AP; 5 - Ulundurpet, Manalmedu, Muthupet and Vedaranniyam.
1 Dec	15 - Hut Bay; 8 - Yaval, Shivan REV and Vijayraghogarh; 7 - Hukkeri and Beohari; 6 - Pandhana and Car Nicobar; 5 - K.m.koil, Srimushnam, Kodumudi, Thalaignayer, Velankanni, Nellore, Sullurpeta, Chas ARG, Chikodi, Ropar and Car Nicobar IAF.
2 Dec	8 - Kannadaian Anicut; 7 - Kodiayakarai, Konni, Palode AWS and Pirappancode AWS; 6 - Peringamala ARG; 5 - Mylaudy, Thirukuvalai, Vedaranyam, Shencottah, Ambasamudram, Muthupet and Thiruvananthapuram.
3 Dec	15 - Pallipattu and Thottambedu; 14 - Srikalahasti; 13 - Uthukottai and Tirupati AP; 11 - Thenkasi; 10 - Ponneri and Satyavedu; 9 - Wallajah, Avadi, Nagari, Tada and Alapuzha; 8 - Alandur, Anna University, Anna Uty ARG, Chennai AP, Shencottah, Oothu, Thamaraipakkam, Tiruvallur, Gudur and Sullurpeta; 7 - Tambaram, Mgr Nagar, Gundar Dam, Kakkachi, Papanasam, Nlumukku and Nellore; 6 - Chennai (n) , Dgp Office, Sholinganallur, Ayikudi, Manjolai, Koratur, Katpadi and Kodur; 5 - Taramani ARG, Karuppanadhi Dam, Gummidipoondi, Poonamallee, Thiruvalangadu, Red Hills, Tiruttani PTO, Ponnai Dam, Palasamudram, Aryankavu, Kanjirappally and Tiruthani.
4 Dec	28 - Avadi; 25 - Alandur and Chennai AP; 23 - Chennai (n) , Cholavaram and Puzhal ARG; 22 - Mahabalipuram, Cd Hospital Tondaipet and Mgr Nagar; 21 - Anna University, Dgp Office and Ponneri; 20 - Perambur, Red Hills and Sullurpeta; 19 - Satyabama Uty ARG, Ayanavaram Taluk Office, Taramani ARG, Nellore and Tada; 18 - Anna Uty ARG, Chennai Collectorate Bu, Sholinganallur, Kvk Kattukuppam ARG, Ambathur and Thamaraipakkam; 17 - Kelambakkam, Tambaram and Gummidipoondi; 16 - Tiruvallur; 15 - Ennore AWS, Uthukottai and Tirur Kvk AWS; 14 - Thirukalukundram, Koratur, Poonamallee and Gudur; 13 - Thirupporur, Sriperumbudur, Chembarabakkam, Satyavedu, Srikalahasti and Thottambedu; 12 - Chengalpattu, Kundrathur and Nagari; 9 - Cheyyur, Maduranthagam, Kancheepuram, Uthiramerur and Thiruvalangadu; 8 - Walajabad, Arakonam, Minnal and Marakkanam; 7 - Tirupati AP and Pampadumpara AWS; 6 - Nainwa, Tiruttani PTO, Amalapuram and Tiruthani; 5 - Yanam, Kodur, Peringamala ARG, Manasa and Sheopur.
5 Dec	34 - Poonamallee; 28 - Avadi and Gudur; 27 - Kvk Kattukuppam ARG; 24 - Tambaram, Srikalahasti, Kodur and Nungambakkam; 23 - Penagaluru, Sullurpeta and Thottambedu; 22 - Mahabalipuram, Bapatla and Nellore; 21 - Rapur; 20 - Tada; 19 - Sholinganallur, Taramani ARG, Kundrathur, Thamaraipakkam, Tirur Kvk AWS, Atmakur and Minambakkam AP; 18 - Anna Uty ARG, Tiruvallur, Venkatagiri and Long Island; 17 - Sriperumbudur, Koratur, Ponneri, Uthukottai, Amalapuram, Addanki and Karamchedu; 16 - Kelambakkam and Masulipatnam Cdr; 15 - Cholavaram and Kavali; 14 - Thirupporur, Poondi, Thiruvalangadu, Avanigada, Vinjamur and Satyavedu; 13 - Red Hills, Udayagiri, Nagari and Tirupati AP; 12 - Alandur, Chembarabakkam, Gummidipoondi, Ongole, Rajampet and Tiruthani; 11 - Thirukalukundram, Pechiparai, Repalle and Kandukur; 10 - Minnal; 9 - Chengalpattu, Perunchani Dam, Wallajah, Tiruttani PTO, Santhamaguluru, Gudivada, Konakanamitla and Atlur; 8 - Puthan Dam, Panapakkam, Tenali, Kakinada, Yanam and Badvel; 7 - Walajabad, Kuzhithurai, Sholingur, Pallipattu, R.k.pet, Vembakkam, Guntur, Peddapuram, Vijayawada AP, Marripudi, Mundlamuru, Veligandla, Seetharamapuram, Tanuku, Gurramkonda, Chinnamandem, Kalakada, Pullampeta, Sambepalle, Royachoti, Pakala and Cuddapah; 6 - Uthiramerur, Arakonam, Kaveripakkam, Palar Anicut, Ponnai Dam, Anakapalle, Kaikalur, Velairpad, Lam AP, Chimakurthi, Palakoderu, Chittoor, Port Blair and Narsapur; 5 - Ammoor (walajah Railway, Mangalagiri, Sattenapalle, Podili, Bheemavaram, Palasamudram and Nambulipulikunta.
6 Dec	34 - Aswaraopeta; 25 - Palawancha; 24 - Bhimadole; 23 - Chandrugonda; 22 - Kukunoor and Kothagudem; 21 - Chintalapudi and Narsapuram; 20 - Narsipatnam, Koyyalagudem, Bheemavaram, Julurpad and Mulakalapalle; 19 - Kunavaram, Anakapalle, Amalapuram, Yelamanchili and Aswapuram; 18 - Sattenapalle, Palakoderu, Bhadrachalam and Burgampadu; 17 - Tanuku; 16 - Santhamaguluru, Kaikalur, Polavaram, Prathipadu and Sathupalle; 15 - Chintur, Chodavaram, Visakhapatnam, Denkada and Tekulapalle; 14 - Kakinada, Darsi, Tadepalligudem, Enkuru and Madhira; 13 - Anakapalle AP, Velairpad, Tiruvuru, Srungavarapukota and Bonakal; 12 - Paderu, Chintapalle, Nuzvid, Tuni, Mentada, Manuguru and Wyra Kvk (agro) ; 11 - Vararamachandrapur, Eluru, Amaravati, Guntur, Nandigama, Bondapalle, Gajapathinagaram, Vepada and Pottangi; 10 - Araku Valley, Mangalagiri, Piduguralla, Bheemunipatnam, Vizianagaram, Yanam, Pinapaka and Thollada; 9 - Addanki, Lam AP, Peddapuram, Mundlamuru, Gantyada, Pusapatirega, Konijerla and Similiguda; 8 - Vijayawada AP, Atchampet, Podili, Ranastalam, Garividi, Gundala and Gannavaram AP; 7 - Natham, Sathiar, Arimalam, Ponnamaravathi, Singampunari, Virudunagar AWS, Gudivada, Jangamaheswarapuram, Visakhapatnam AP, Cheepurupalle, Nellimarla, Yellandu, Chinthakam, Venkatapur and Koraput; 6 - Konta, Bapatla, Tenali, Salur, Kandukur, Merakamudidam, Khammam Urban, Kusumanchi, Dornakal, Khammam (ARG) , Mahabubabad, Govindaraopet, Tadwai Mlg, Venkatapuram, Mothey and Chitrakunda K Guma; 5 - Bijapur, Sukma, Masulipatnam Cdr, Macherla, Chimakurthi, Gudurwrgl, Kothaguda, Malyal, Mattampally, Khanapur and Padia.
7 Dec	11 - Varattupallam; 8 - Gomugi Dam PWD; 7 - Araku Valley, Chodavaram, Yelamanchili, Kharsema and Phulberia; 6 - Bastar, Katekalyan, Paderu, Tuni, Jamshedpur AP, Chandil, Anandpur, Goilkera, Khuntpani, Manoharpur, Aska, Hinjili, Kolabira, Laikera, Kotpad, Kansabati Dam, Burdwan PTO, Kharidwar, Midnapore (CWC) and Midnapore; 5 - Darbha, Jamshedpur, Nimdih, Chaibasa, Tonto, Berhampur, Kukudahandi, Kirmira, Boden, Burla, Bankura (CWC) , Purihansa, Tusuma and Jamda.

TABLE 5 (*Contd.*)

8 Dec	10 - Seethathode AWS; 9 - Periyanaickenpalayam and Pillur Dam Mettupalayam; 8 - Lengpui and Champai ARG; 7 - Siruvani Adivaram, Kil Kotagiri Estate, Rajapalayam, Tanakal, Neryamangalam ARG, Burdwan PTO, Lunglei and Serchip AWS; 6 - Lalpet, Kodaikannal Boat Club, Mayiladuthurai, Alakarai Estate, Burliar, Bodinaickanur, Palakkad, Krishnanagar, Kolasib ARG, Mokokchang, Serchip (hydro) and Thoubal; 5 - Valparai PTO, Karur, Navalur Kottapattu, Sengulam Dam AWS, Kalyani Smo, Saiha ARG and Lawngtlai ARG.
9 Dec	18 - Kurudamannil; 13 - Chittur; 12 - Kil Kotagiri Estate; 11 - Ap Peelamedu; 10 - Kunderipallam and Taluk Office Pandalur; 9 - Devala, Manjalar and Palayamkottai; 8 - Coimbatore South, Sulur, Kunnamkulam and Kunnamkulam AWS; 7 - Vadipatti, Thirumoorthy Ib, Thirumoorthi Dam, Neryamangalam ARG, Kumarakam, Malampuzha Dam AWS and Palakkad; 6 - Andipatti, Vaigai Dam, Alapuzha, Kayamkulam, Alwaye PWD, Aluva AWS, Kalamassery AWS, Vannamada AWS and Jayapura; 5 - Anaimalai Taluk Office, Bodinaickanur, Rajapalayam, Srivilliputhur, Mavelikara and Periakulum.
10 Dec	11 - Nlumukku; 10 - Alakarai Estate; 9 - Kannadaian Anicut, Manjolai, Oothu and Cheruthazham ARG; 8 - Burliar, Kil Kotagiri Estate and Kakkachi; 7 - Cheranmahadevi; 6 - Coonoor PTO, Kothagiri, Manimutharu and Coonoor; 5 - Hosdurg and Padannakkad AWS.
11 Dec	10 - Dharmasthala; 6 - Alakarai Estate, Mandapam, Pamban, Thangachimadam, Satankulam and Irinjalakuda; 5 - Tiruchendur.
12 Dec	6 - Kayamkulam ARG, Minicoy and Vadakara AWS; 5 - Vadakara.
13 Dec	5 - Venkurinji AWS.
14 Dec	6 - Chengmari/Diana.
15 Dec	Nil.
16 Dec	Nil.
17 Dec	19 - Nlumukku; 17 - Oothu; 15 - Kakkachi; 13 - Manjolai; 11 - Kanyakumari; 9 - Thirukuvalai and Orthanad; 8 - Theerthandathanam and Muthupet; 7 - Thirupathisaram AWS, Manamelkudi, Ramnadu Kvk AWS, Tondi, Vattanam, Needamangalam and Tiruvarur; 6 - Sembanarkoil PWD, Mayiladuthurai, Thalaignayer, Velankanni, Mimisal, Ramanathapuram, Pattukottai, Nannilam, Kodavasal and Thiruthuraipoondi; 5 - Nagapattinam, Kodiayakarai, Nagudi, Adirampatnam, Madukkur, Lower Anaicut, Manjalaru, Thiruvidaimaruthur, Radhapuram, Mannargudi, Pandavaiyar Head and Vedaranniyam.
18 Dec	95 - Kayalpattinam; 69 - Tiruchendur; 62 - Srivaikuntam; 61 -Moolaikaraipatti; 53 - Kovilpatti; 51 - Gundar Dam; 50 - Oothu; 47 - Nlumukku and Satankulam; 44 - Palayamkottai; 43 - Ambasamudram; 42 - Maniyachi; 41 - Cheranmahadevi and Kannadaian Anicut; 38 - Keelaarasadi; 37 - Kadambur and Ottapadiram; 36 - Kakkachi and Nambiyar Dam; 35 - Papanasam; 33 - Manimutharu, Nanguneri and Kulasekarapattinam; 32 - Kalakadu; 31 - Tirunelveli; 30 - Mylaudy, Shencottah, Kodumudiyaru Dam and Vedanatham; 28 - Radhapuram and Servalar Dam; 27 - Kayathar; 26 - Vilathikulam; 22 - Gadana Dam and Vaippar; 21 - Ayikudi and Ramanadhi Dam; 20 - Sattur; 19 - Kalugumalai; 18 - Kottaram, Nagercoil and Vembakottai; 17 - Kanyakumari, Manamadurai, Thenkasi, Ettayapuram, Aruppukottai Kvk AWS, Kovilankulam and Sivakasi; 16 - Kannimar, Sivagiri and Surangudi; 15 - Srivilliputhur, Thiruchuzhi, Virudunagar AWS and Watrap; 14 - Bhoothapandy, Pilavakkal and Rajapalayam; 13 - Suralacode, Thirupathisaram AWS, Kamudhi, Karuppanadhi Dam, Sothuparai, Kadalkudi and Virudhunagar; 12 - Anaikedanku, Chittar, Kurunthancode, Mambzhathuraiyaru, Pechiparai, Perunchani Dam, Thirparappu and Aruppukottai; 11 - Aralvaimozhi, Kozhiporvilai, Puthan Dam, Elumalai, Kadaladi, Ramnadu Kvk AWS, Thekkadi and Veerapandi; 10 - Kodaikanal, Eraniel, Sivalogam (chittar Ii) , Peraiyur and Ramanathapuram; 9 - Kodaikannal Boat Club, Kalial, Kuzhithurai, Mukkadal Dam, Mudukulatur, Paramakudi, Andipatti, Aranmanaipudur, Bodinaickanur, Shanmuganadhi and Pampadumpara AWS; 8 - Adayamadai, Thuckalay, davinainnarkoil Dam, Sankarankoil, Periyar, Kariyapatti, Vattavada AWS and Kovilkadavu AWS; 7 - Colachel, Mullanginavillai, Kallikudi, Tondi, Valinokam, Vaigai Dam, Amaravathy Dam, Myladumpara ARG, Thattathumala AWS, Kundala Dam AWS and Periakulum; 6 - Usilampatti, R.s.mangalam, Thirumoorthi Dam, Anchal ARG, Kottarakkara AWS, Peringamala ARG and Perumkadavila ARG; 5 - Palani, Pamban, Illayangudi, Manjalar, Manjolai, Thirumoorthy Ib, Aryankavu, Punalur, Airport Chakka ARG, Aruvikkara AWS, Neyyattinkara, Thiruvananthapuram and Trivandrum AP.
19 Dec	23 - Tiruchendur; 21 - Kayalpattinam; 19 - Nlumukku; 18 - Kakkachi and Kulasekarapattinam; 17 - Manjolai and Srivaikuntam; 16 - Satankulam; 15 - Oothu and Minicoy; 14 - Thoothukudi Har; 13 - Moolaikaraipatti; 12 - Ambasamudram; 11 - Papanasam; 10 - Vaippar; 9 - Kannadaian Anicut, Keelaarasadi, Maniyachi and Ottapadiram; 8 - Manimutharu, Kadalkudi, Kalugumalai, Surangudi and Vedanatham; 7 - Ettayapuram and Vilathikulam; 6 - Kalakadu and Servalar Dam; 5 - Cheranmahadevi and Palayamkottai.
20 Dec	Nil.
21 Dec	9 - Velankanni; 7 - Thirukuvalai; 5 - Thalaignayer.
22 Dec	Nil.
23 Dec	Nil.
24 Dec	Nil.
25 Dec	Nil.
26 Dec	11 - Nancowry.
27 Dec	Nil.

TABLE 5 (*Contd.*)

28 Dec	5 - Oothu.
29 Dec	100 - Morshi (ARG) ; 16 - Kakkachi and Oothu; 15 - Nlumukku; 6 - Manjolai.
30 Dec	22 - Oothu; 21 - Nlumukku; 20 - Kakkachi; 10 - Manjolai.
31 Dec	Nil.

was in phase 2 with amplitude greater than 1. It move across phases 2, 3 & 4 and supported cyclogenesis (formation of Depression) over the Bay of Bengal (BoB) and in Arabian Sea. During same time Sea surface temperature (SST) is 29-30 °C over South & adjoining Central BoB. SST is 27- 28 °C over Central & North Bay of Bengal (BoB). SST is 30-31 °C over Lakshadweep & Southeastern Arabian Sea (AS) is 30-31 °C over Southeast & Eastcentral AS & 29-30 °C over Western part of AS.

No significant weather was observed over most parts of India during the week except occurrences of Light to moderate rainfall at many places over extreme southern parts of peninsular India and Andaman Nicobar Islands during most dates in the week. Isolated heavy rainfall was also observed over extreme southern parts of peninsular India for 3 days mainly during the end of the first week of the month due to strong north-easterly/easterly winds from Bay of Bengal to over South Peninsular India.

Under the influence, a Low Pressure Area over Eastcentral Arabian Sea on 08th November, light/moderate scattered to fairly widespread rainfall with isolated heavy to very heavy falls occurred over south Peninsular India during most days of the first week of the month.

Under the influence of Western Disturbance, light isolated rainfall/snowfall occurred over Western Himalayan Region during 1st half of the week.

During second forthnight of the month, 1) upper air cyclonic circulation over Southwest Bay of Bengal & adjoining Sri Lanka and then over Comorin area (16 to 20 Nov.) and merge with a trough ran from Comorin area to Westcentral Bay of Bengal off Andhra Pradesh coast on 21st Nov. and 2) The trough ran from cyclonic circulation over Southwest Bay of Bengal & adjoining Sri Lanka to the cyclonic circulation associated with the Deep Depression over Westcentral Bay of Bengal and extended upto 3.1 km above mean sea level on 16th November. It ran from the cyclonic circulation over Southwest Bay of Bengal & adjoining Sri Lanka to the cyclonic circulation associated with cyclonic storm "Midhili" over Northwest & Northeast Bay of Bengal on 17th; ran from the cyclonic circulation over Southwest Bay of Bengal & adjoining Sri Lanka to the cyclonic circulation associated with the Low Pressure area over North Tripura & neighbourhood with same height on 18th and became less marked on 19th November.

Due to impact from above weather systems, isolated Heavy rainfall observed mainly over Tamil Nadu during most dates in the week and due to remnant of Cyclone "Midhili" moved as low pressure area to Tripura, heavy to very heavy rainfall observed at isolated places over Mizoram, Tripura and heavy rainfall at isolated places over Assam on 18th Nov.

Some stations received highest 24-hour record rainfall. A list of stations is given in the table 6 with their previous record and date.

3.2.3. *Temperature*

Maximum temperature was above normal over most parts of the country, except some parts of northwest India, west central India and east India (Gangatic West Bengal). Maximum temperature anomaly was more than 2 °C over parts of Himachal Pradesh, Uttarakhand, Assam & Meghalaya, West Bengal state, Odisha, Chhattisgarh and Andhra Pradesh state. Maximum temperature anomaly was less than -2 °C over parts of Punjab and West Rajasthan.

Minimum temperatures were above normal over most parts of the country, except some parts ofnorth- west India, central India. Minimum temperature anomaly was more than 3 °C over parts of Punjab, West Rajasthan, Gujarat state, Bihar, Jharkhand, Chhattisgarh, Odisha, Gangatic West Bengal, Telangana, North Interior Karnataka and South Interior Karnataka. Minimum temperature anomaly was less than -1 °C over parts of West Uttar Pradesh. The lowest minimum temperature of 7.0 °C is reported at Sikar (east Rajasthan) over the plains of the country on 23rd November. Cold day and Cold waveconditions were not observed in this month.

Some stations even recorded highest maximum temperature for the month. A list of stations is given in table 7 with their previous record and date.

TABLE 6

A list of stations with 24 hour record rainfall in November 2023 and their previous record and date

Station	*24 Hour Record Rainfall in November 2023(mm)#*	*Date*	*Previous Rainfall Record (mm)*	*Date*	*State*
Khargone-Aws	84.0	27	57.6	01-11-1981	Madhya Pradesh
Mandvi	116.0	27	103.6	02-11-1981	Gujarat
Gandhinagar	22.0	27	13	18-11-2010	Gujarat
Nanded-Imd Parttime	64.2	27	47.5	19-11-1987	Maharashtra
Udgir -IMD Parttime	45.0	9	35.6	22-11-2010	Maharashtra
Washim	55.8	27	46	14-11-2010	Maharashtra
Valparaipto	83.8	5	81.4	08-11-2009	Tamilnadu
Hamirpurobsy	57.0	30	21	19-11-2010	UttarPradesh

TABLE 7

A list of stations with highest maximum temperature for the month and their previous record and date

Highest Maximum Temperature				
Station Name	*New Record (^{0}C)#*	*Date (November 2023)*	*Previous Record (^{0}C)*	*DD/MM/YYYY*
Canning	35	3	33.6	26-11-1997
Dahanu	37.8 @	25	37.8	23-11-1948
Dehra Dun	31	1	30.6	01-11-1952
Digha	34.6	1	34.5	07-11-1989
Erode	36.2 @	21	36.2	18-11-1998
Imphal AP	35.4	10	31.4	03-11-2014
Khammam	36	3	35.4	04-11-1965
Koraput	38	1	32.2	19-11-2020
Lumding	34.2	2,3	33	04-11-1983
Mandla	34.4	5	34	02-11-1966
Minicoy	34.5	18	33.2	15-11-1987
Puri	34.4	2	34.2	06-11-1989
Rajnandgaon	33.5	10,11,12	33.2	06-11-1981
Silchar	35.2	1	35	29-11-1900
Washim	35.2	17	35	07-11-2010
Yavatmal	35.5	13	34.9	08-11-1976

 # based on Real Time available data
@ indicates equals previous record

3.2.4. *Damages associated with disastrous weather events*

During November, a total of 39 persons were reportedly claimed dead, 44 persons were injured & 79 livestock perished. The details of causalities given below, which are based on real time media reports and other state government agencies.

Floods, heavy rains and landslides: A total of 3 persons were reportedly claimed dead during November, because of Floods, Heavy Rains & Landslide each at

Mehsana (Gujarat). Chikmagalur (Karnataka) Idukki (Kerala). While,

(*i*) Ahmedabad, Amreli, Bharuch, Kheda, Panchmahal, Morbi, Surendranagar, Surat, Tapi districts of Gujarat also affected on 26 November.

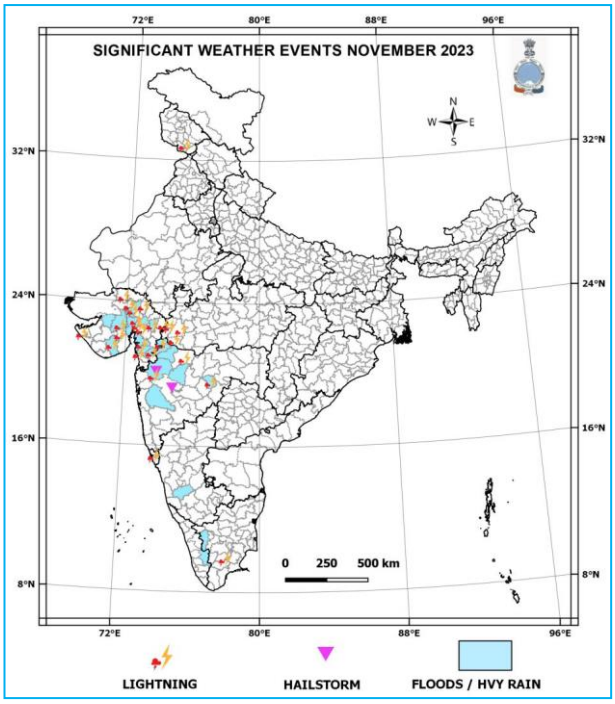
(*ii*) Chatrapati Sambhajinagar /Aurangabad, Dhule, Hingoli, Nandurbar, Nashik, Pune districts of Maharashtra also affected on 26 & 27 November.

(*iii*) Coimbatore district of Tamil Nadu also affected due to Extremely Heavy Rains.

Lightning: A total of 36 persons (24 at Ahmedabad, Amreli, Anand, Banaskantha, Bharuch, Botad, Dahod, Devbhoomi Dwarka, Kheda, Mehsana, Panchmahal, Patan, Sabarkantha, Surendranagar, Surat, Tapi (Gujarat), 5 at Hingoli, Jalgaon, Nandurbar, Nashik (Maharashtra), 4 at Barwani, Dhar, Jhabua (Madhya Pradesh), 2 at Madurai (Tamil Nadu) and 1 at North Goa (Goa)) were reportedly claimed dead, 44 persons injured & 79 livestock perished during November, because of Lightning.

Hailstorms: Ahmednagar & Nashik district of Maharashtra affected due to hailstorm on 26th November.

Fig. below shows significant weather events during the month of November (based on real time media reports).



Source : IMD, Climate Summary for the month of November 2023

3.3. *December*

3.3.1. *Storms and depressions*

Severe Cyclonic Storm "MICHAUNG" over the Bay of Bengal (1st to 6th December, 2023)

In December, under the influence cyclonic circulation south Andaman sea and adjoining Thailand, a **low pressure area** formed over south Andaman sea and adjoining Malacca strait on 27 Nov. It lay as a **well marked low pressure area** over southeast Bay of Bengal and adjoining south Andaman Sea on the morning of 29 Nov. It moved west northwestwards and concentrated into a **Depression** and lay centered over southeast and adjoining southwest Bay of Bengal at 0530 hrs IST on 1 Dec. near Lat. 9.1° N / Long. 86.4° E. It moved northwestwards and lay centered at 0830 hrs IST of 1 Dec. over the same region near Lat. 9.3° N / Long. 86.2° E. It further moved west northwestwards and intensified into a **Deep Depression** and lay centered at 0530 hrs IST on 2Dec. over the same region near Lat. 10.5° N / Long. 84.1° E. It further moved northwestwards and intensified into a **Cyclonic Storm "MICHAUNG" (pronounced as MIGJAUM)** and lay centered at 0530 hrs IST on 3 Dec. over the same region near Lat. 11.4° N / Long. 82.5° E. It moved northwestwards and further intensified into a **Severe Cyclonic Storm** and lay centered at 0830 hrs IST on 4 Dec. over the same region near Lat. 13.3° N / Long. 81.0° E. It moved northwards and **crossed** south Andhra Pradesh coast close to south of Baptla during 1230 to 1430 hrs IST on 5 Dec. as a Severe Cyclonic Storm with maximum sustained wind speed of 90 100 kmph. It lay centered at 1430 hrs IST on 5 Dec. over south coastal Andhra Pradesh near Lat. 15.8° N / Long. 80.3° E. It moved nearly northwards and weakened into a **Cyclonic Storm** at 1530 hrs IST and lay centered at 1730 hrs IST on 5 Dec. over south Coastal Andhra Pradesh near Lat. 16.0° N / Long. 80.3° E. It moved nearly northwards and weakened into a **Deep Depression** over central Coastal Andhra Pradesh and lay centered at 2330 hrs IST on 5 Dec. over central coastal Andhra Pradesh near Lat. 16.8° N / Long. 80.4° E. It moved nearly northwards and weakened into a **Depression** and lay centered at 0530 hrs IST on 6 Dec. over northeast Telangana and adjoining south Chhattisgarh south interior Odisha Coastal Andhra Pradesh near Lat. 17.4° N / Long. 80.5° E. It further weakened into a **well marked low pressure area** over the same region and the associated cyclonic circulation extended upto 5.8 km above m. s. l. on 6 Dec.

3.3.2. *Weather and associated synoptic features*

Table 4 gives a summary of the synoptic systems during the month of December 2023. The sub-division wise percentage departure of rainfall from normal and the significant amounts of rainfall during the month are given in Tables 1 and 5, respectively.

During December 2023, extremely wet-severely wet conditions were observed over parts of Uttar Pradesh state, Chhattisgarh, North Interior Karnataka, Telangana, Madhya Pradesh state, Jharkhand, Odisha, East Rajasthan, Tamil Nadu, Coastal Andhra Pradesh, Gujarat Region, Kerala, Nagaland, Manipur, Mizoram & Tripura, Assam & Meghalaya and Gangetic West Bengal, while extremely dry-severely dry conditions were not observed over any part of the country.

The monthly rainfall of December was *large deficient* over the homogenous regions of Northwest India (35% of L.P.A.) and Central India (290% of L.P.A.), South Peninsula (226% of L.P.A.), East & Northeast India (205% of L.P.A.) were *large excess* and 86% LPA *large excess* as a whole country. Rainfall over East & Northeast India (26. 9 mm) was 9th highest since 1901 and highest since 2001. Rainfall over South Peninsular India (72.2 mm) was 11th highest since 1901 and highest since 2001. Out of 36 meteorological subdivisions, 15 received large excess rainfall, 7 received excess rainfall, 3 received normal rainfall, 4 subdivisions received deficient rainfall, 6 subdivisions received large deficient and one subdivision did not receive any rainfall.

During December the moderate to strong El Niño conditions are prevailing over equatorial Pacific Ocean and the sea surface temperatures (SSTs) are above average over most parts of the central and eastern equatorial Pacific Ocean. Madden Julian Oscillation (MJO) index is currently in phase 1 with amplitude greater than 1 and move into phase 2 and 3 from 29th December.

Severe Cyclonic Storm "MICHAUNG" close to south Andhra Pradesh coast and crossed south Andhra Pradesh coast close to south of Bapatla during 1230 to 1430 hours IST of the 5th December 2023 as a Severe Cyclonic Storm with maximum sustained wind speed of 90-100 kmph. It caused Heavy to very heavy rainfall at a few places with isolated extremely heavy rainfall reported over northern parts of over coastal Tamil Nadu (mainly covering districts of Chennai, Tiruvallur, Chengalpattu and Kancheepuram) and isolated heavy to very heavy rainfall reported over Rayalaseema and south Coastal Andhra Pradesh (Nellore and Tirupati) on 4th Dec and then isolated Heavy to very heavy rainfall with extremely heavy falls observed at isolated places over northern parts of over coastal Tamil Nadu(mainly covering districts of Chennai, Tiruvallur, Chengalpattu and Kancheepuram), Coastal Andhra Pradesh (Nellore and Bapatla) and Rayalaseema(Tirupati) on 6th Dec.

No significant weather was realized over the country during 2nd week of month except parts of eastern and northeast India experienced isolated heavy rainfall during 7-9 Dec and coastal and south Tamil Nadu and Kerala experienced isolated heavy to very heavy rainfall during 7-10 Dec 2023.

Due to very slowly west-northwestward movement of the Cyclonic Circulation from southwest Bay of Bengal off southeast Sri-Lanka Coast to Lakshadweep & neighbourhood, across Comorin area & neighbourhood, during 16-19 Dec 2023 and straightening of north-easterly monsoonal winds at lower levels along the coasts, South coastal Tamil Nadu experienced extremely Heavy rainfall spell during 16-19 Dec, 2023 with **exceptionally heavy rainfall observed over Thoothukudi (**Kayalpattinam-**95 cm) and Tirunelveli (**Moolaikaraipatti -**62 cm) districts of south Tamil Nadu on 18th Dec.**

No significant rainfall reported over the country in last week of the month except light to moderate rainfall at isolated places over Kerala and South Tamilnadu and Andaman & Nicobar Islands on 21 and 26 Dec. No significant rainfall reported over the country except Tamilnadu, Puducherry & Karaikal where very heavy rainfall was reported on 29th December and extremely heavy rainfall was reported on 30th December at isolated places over south interior Tamil Nadu.

3.3.3. *Temperature*

In December 2023, the average maximum temperature, average minimum temperature and mean temperature were more than normal by 0.51 ºC, 1.71 ºC and 1.11 ºC respectively for the country as a whole. All India mean temperature was the highest (21.60 ºC with an anomaly of 1.11 ºC) since 1901 and the maximum temperature was 7th highest (27.04 ºC with an anomaly of 0.51 ºC) and the minimum temperature was highest (16.16 ºC with an anomaly of 1.71 ºC) since 1901.

Maximum temperature was above normal over most parts of the country, except some parts of northwest India, central India, South Peninsular India and east India. Maximum temperature anomaly was more than 2 ºC over parts of Jammu, Kashmir & Ladakh, Himachal Pradesh, Uttarakhand, Assam & Meghalaya and Arunachal Pradesh. Maximum temperature anomaly was less than -2 ºC over parts of Gangatic West Bengal and Madhya Maharashtra.

Minimum temperature was above normal over most parts of the country, except some parts of northwest India. Minimum temperature anomaly was more than 4 ºC over parts of Bihar, Jharkhand, Nagaland, Manipur, Mizoram, Madhya Maharashtra, South Interior Karnataka and Kerala & Mahe. Minimum temperature anomaly

was more than 3 ºC over parts of Bihar, Jharkhand, Gangatic West Bengal, Nagaland, Manipur, Mizoram, Tripura, Madhya Pradesh state, East Rajasthan, Gujarat state, Madhya Maharashtra, South Interior Karnataka, Tamil Nadu, Puducherry & Karaikal and Kerala & Mahe.

The highest maximum temperature of 36.8 °C had been recorded at Karwar (Coastal Karnataka) on 17th December 2023 and the lowest minimum temperature of 3.0 °C had been recorded at Sikar (East Rajasthan) on 20th December 2023 over the plains.

Cold wave conditions were observed mainly during second week at isolated pockets over Punjab on one day. Dense fog/foggy conditions prevailed over northern/northeastern parts of the country almost throughout the month. No Significant cold wave reported over any parts of the country during last week of the month.

Dense to Very Dense Fog observed at isolated pockets of East Uttar Pradesh on two days and Meghalaya, Bihar, Haryana, Chandigarh & Delhi and East Rajasthan on one day each during first week of December. Isolated Dense Fog observed over Punjab and northeastern states during the 2nd half of the 2nd week.

Dense to Very Dense Fog observed at isolated pockets of Punjab on one day; Dense fog in isolated pockets of Punjab on six days; over Assam, Tripura, Odisha, and West Rajasthan on one day and Shallow to moderate fog at isolated pockets of East Uttar Pradesh on six days; over Delhi on four days; Bihar; and Meghalaya, Tripura on 3 days; West Uttar Pradesh & West Rajasthan on one day one day each during the 15 to 21 Dec.

Season's 1st Longer duration dense to very dense fog (visibility <200 m) **spell observed across northwest and adjoining central India:** During morning hours, Dense to very dense fog (visibility: 25-200 m) was observed in isolated pockets over Punjab on 21 and 22 Dec and then it further intensified and extended both spatially and temporally for longer duration during night-morning hours during the period of 22-23 Dec. On 23 Dec, it was observed across Punjab, Haryana and west Uttar Pradesh and then further extended on 25 Dec and it was observed over Punjab, Haryana, Delhi, north Rajasthan, north Madhya Pradesh and Uttar Pradesh and Jammu-Kashmir. **On 26-27 Dec, Dense to very dense fog** reported during night-morning hours, in most parts of Punjab, many parts of Haryana, Chandigarh & Delhi and some parts of Uttar Pradesh and in isolated pockets over Jammu & Kashmir, northwest Rajasthan and northwest Madhya Pradesh.

Dense to very dense fog conditions observed during the end of month across northwest & central India and spread to over East India from 29 December.

Some stations recorded the highest maximum temperature for the month. A list of such stations is given in table 8 with their previous record and date.

3.3.4. *Damages associated with the Disastrous weather events*

During December, a total of 34 persons were reportedly claimed dead & 40 livestock were perished. The details of causalities are given below, which are based on real time media reports and other state government agencies.

Cyclonic Storm: A total of 24 persons (17 at Chennai (Tamil Nadu), 4 at Cuddapah, Eluru, Tirupati (Andhra Pradesh) and 3 at Khammam, Mulugu (Telangana)) were reportedly claimed dead during December 2023, because of Severe Cyclonic Storm MICHAUNG. The details of the area affected by the events are summarized below;

(*i*) Tiruvallur district of Tamil Nadu also affected due to Severe Cyclonic Storm MICHAUNG.

(*ii*) Bapatla, Guntur, Krishna, Nellore, Prakasam, Vishakhapatnam districts of Andhra Pradesh also affected due to Severe Cyclonic Storm MICHAUNG.

(*iii*) Bhadrari Kothagudem, Jayashankar Bhupalpally, Jangaon, Mahabubabad, Nalgonda, Suryapet, Warangal Urban/Hanumakonda, Warangal Rural districts of Telangana also affected due to Severe Cyclonic Storm MICHAUNG.

(*iv*) Malkangiri district of Odisha also affected due to Severe Cyclonic Storm MICHAUNG.

Floods & Heavy Rains: A total of 10 persons were reportedly claimed dead in Kanyakumari, Thoothukudi / Tuticorin, Tirunelveli, Tenkasi districts of Tamil Nadu during 18 & 19 December because of Floods & Heavy Rains. While,

(*i*) Bhadrari Kothagudem districts of Telangana affected due to Extreme heavy rain.

(*ii*) Annamayya, Bapatla, Cuddapah, Eluru, Nellore,

TABLE 8

A list of stations with highest maximum temperature for the month and their previous record and date

	Highest Maximum			
STATION NAME	*NEW RECORD (^{0}C)#*	*DATE (DECEMBER 2023)*	*PREVIOUS RECORD (^{0}C)*	DD/MM/YYYY
Ambikapur	29.6	3	29.5	22-12-1985
Bahraich	32	3	31.7	01-12-1896
Bangluru	31.2	6	31.1	17-12-2003
Gorakhpurpbo	30.6	3	30.5	02-12-1984
Karaikal	33.3	5	32.7	12-12-2010
Khammam	34.6@	1,3	34.6	01-12-1972
Kochii.A.F.	35.3@	29	35.3	30-12-2022
Koraput	31	2	30.9	31-12-2015
Lucknow/Amausi(A)	30.2	3	29.9	04-12-1976
Lumding	31.6	3	31	05-12-1972
Madurai(A)	36.6	5	34.8	14-12-2016
Matheran	31	27,31	30.9	02-12-1977
Minicoy	34.3	6	33.3	13-12-1972
Mysore	32.1@	7	32.1	28-12-2018
Pamban	33.9@	6	33.9	29-12-1906
Patna (A)	32	3	29.3	03-12-2005
Shahjahanpur	29.8	3	29.3	01-12-2021
Thiruvananthpuram (A) (Trivandrum)	35.2	29	34.4	17-12-2007
Thiruvananthpuram (Trivandrum)	36.2	29	35.5	28-12-2006
Valparaipto	30 @	23	30	14-12-2009

@ indicates equals previous record *# Based on Real Time available data*

Tirupati, West Godavari districts of Andhra Pradesh affected due to Extreme heavy rain.

(*iii*) Chennai, Chinglepet, Kanchipuram districts of Tamil Nadu affected due to Extreme heavy rain.

Lightning: A total of 40 livestock were perished in Bhadrari Kothagudem & Khammam districts of Telangana on 5th December because of Lightning.

Fig. 3 shows significant weather events during the month of December (based on real time media reports).

The inputs received from the office of the Director General of Meteorology (Hydromet), New Delhi is duly acknowledged. Thanks are due to Smt. P. P. Kulkarni, Met A., Weather Forecasting Division, Pune for her assistance.

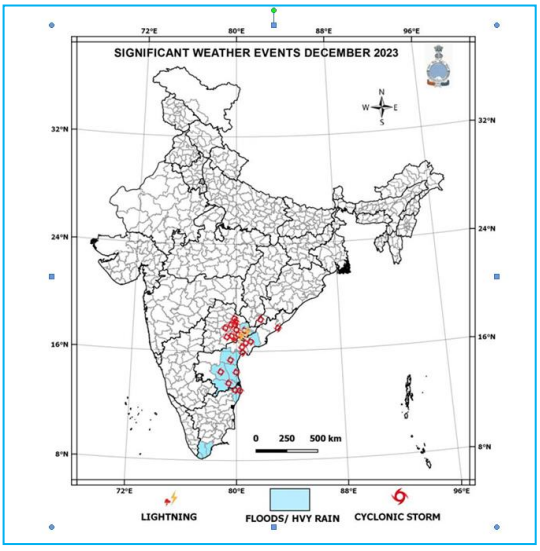


Fig. 3. significant weather events during the month of December
Source : IMD, Climate Summary for the month of December 2023

Appendix

Definitions of the terms given in '*Italics*'

(A) Rainfall

(*i*) Percentage departure from normal

Excess - +20% or more

Normal - –19% to +19%

Deficient - –20% to –59%

Scanty - –60% to –99%

(*ii*) Intensity (during the past 24 hours period ending at 0300 UTC)

Extremely heavy rainfall - 20.5 cm and above

Very heavy rainfall - 11.6 cm to 20.4 cm

Heavy rain - 6.5 cm to 11.5 cm

Heavy snowfall - 64.5 cm to 115.5 cm

(*iii*) Spatial distribution (percentage of the stations in a meteorological sub-division reporting a 24 hour rainfall of 0.1 mm or more)

At most places (Widespread) - ≥76% stations gets rainfall

At many places (Fairly widespread) - (51-75)% of stations gets rainfall

At a few places (Scattered) - (26-50)% of stations gets rainfall

At isolated places (Isolated) - ≤25% of stations gets rainfall

(B) Monsoon activity

(*i*) Southwest monsoon

Vigorous - Rainfall exceeding 4 times the normal with, at least two stations reporting rainfall more than or equal to 8 cm along the west coast and 5 cm elsewhere. Rainfall in that sub-division should be fairly widespread or widespread

Active - Rainfall more than 1½ to 4 times the normal, with at least two stations reporting rainfall more than or equal to 5 cm along the west coast and 3 cm elsewhere. Rainfall in that sub-division should be fairly widespread or widespread

(*ii*) Northeast monsoon

Vigorous - Rainfall exceeding 4 times the normal with at least two stations reporting rainfall more than or equal to 5 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 3 cm elsewhere in the northeast monsoon region. Rainfall in that sub-division should be fairly widespread or widespread

Active - Rainfall more than 1½ to 4 times the normal, with at least two stations reporting rainfall more than or equal to 3 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 2 cm elsewhere in the northeast monsoon region. Rainfall in that sub-division should fairly widespread or widespread

(C) Temperature

(*i*) Maximum / Day temperature

Markedly above normal - When departure from normal is +5 °C or more

Appreciably above normal - When departure from normal is +3.1 °C to +5.0 °C

Above normal - Departure from normal is +1.6 °C to +3.0 °C

Normal - When departure from normal is +1.5 °C to –1.5 °C

(*ii*) Minimum / Night temperature

Based on the revised criteria which came into practice with effect from 2016, cold waves are declared based on the actual minimum temperatures. Cold wave is considered when the minimum temperature of a station is 10 °C or less for plains and 0 °C or less for hilly regions. Also, to declare cold wave, the criteria should be met at least in 2 stations in a met sub-division for at least 2 consecutive days.

Severe cold wave conditions - When the negative departure of minimum temperature from Normal is less than 6.4 °C or when the actual minimum temperature is ≤2 °C over the plains

Cold wave conditions - When the negative departure of minimum temperature from normal is 4.5 °C to 6.4 °C or when the actual minimum temperature is ≤4 °C over the plains. For stations located over the coastal areas, when the minimum temperature departure is –4.5 °C or more, 'Cold Wave' may be described if the actual minimum temperature is 15 °C or less

Cold day to severe cold day conditions - When the minimum temperature is 10 °C or less for plains and 0 °C or less for hilly regions. Cold day may be described if the departure of maximum temperature is –4.5 °C to –6.4 °C and severe cold day when it is less than 6.4 °C

Markedly below normal - When the departure from normal is –5 °C to or less

Appreciably below normal - When the departure from normal is between –3.1 °C to –5.0 °C

Below normal - When the departure from normal is –1.6 °C to -3.0 °C

Normal - Departure from normal is –1.5 °C to +1.5 °C