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Weather in India

MONSOON SEASON (June to September 2024)†

1. Introduction

The rainfall over the country as a whole during the monsoon season (June-September) 2024 was 108% of its long period average (LPA), thus categorized as *normal* monsoon. The realized rainfall for the monsoon season for year 2024 was 107% of its LPA over northwest India, 119% of its LPA over central India, 87% of its LPA over east & northeast India & 114% of its LPA over south peninsula. Rainfall over homogeneous region of east & northeast India (1178.7 mm) was 9th lowest since 1901. Most sub-divisions of the country received large excess/excess/normal rainfall except Arunachal Pradesh, Jammu & Kashmir & Ladakh and Punjab which were deficient. During the season, out of 36 meteorological subdivisions, 2 subdivisions received large excess rainfall, 10 subdivisions received excess rainfall, 21 received normal rainfall and the remaining 3 subdivisions received deficient rainfall.

Total fourteen low-pressure systems formed during monsoon season of 2024, out of which one Cyclonic Storm 'ASNA' over Arabian sea, three deep depression, three depression, two well-marked low-pressure area and five low pressure areas. The monsoon arrival over Kerala on 30th May which was two days prior of its normal date and also the further advance was normal over most parts of the country outside northwest India where it arrived earlier to its normal date and covering the entire country on 2 July which was 6 days ahead of its normal date. The withdrawal of southwest monsoon began on 23 September (normal date 17 Sept.) and the monsoon withdrew from the entire country on 15 Oct. (normal date of 15 Oct.).

During the Southwest monsoon season, positive SSTs were observed over most parts of the Indian Ocean including the Bay of Bengal & the Arabian Sea. El Nino-Southern Oscillation (ENSO) neutral conditions were observed over the equatorial Pacific during the season.

2. Various aspects of southwest Monsoon-2024

2.1. *Onset and advance*

Fig.1 shows the isochrones and Table 1 shows the details of advance of monsoon over the country. In view of strengthening of south westerlies in the lowertropospheric levels, fairly widespread to widespread rainfall activity and persistent cloudiness over the area, Southwest monsoon advanced over the parts of Andaman

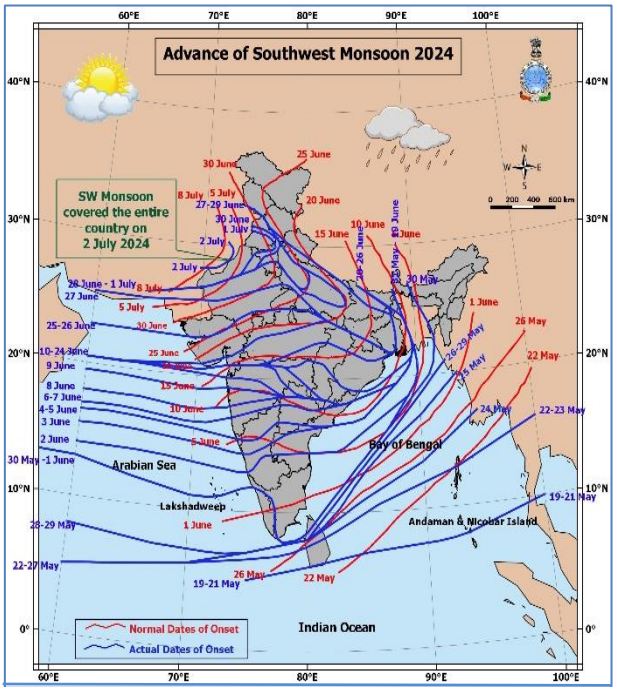

Fig. 1. Advance of Southwest Monsoon 2024

Sea on 19 May (normal date 22 May), it set over Kerala on 30 May, 2 days prior to its normal date. Southwest Monsoon advanced into some parts of Maldives & Comorin area and some parts of South Bay of Bengal, Nicobar Islands and South Andaman Sea on 19 May, 2024. By 31 May, it advanced into remaining parts of northeast Bay of Bengal and some parts of northwest Bay of Bengal, remaining parts of Tripura, Meghalaya & Assam & most parts of Sub-Himalayan West Bengal & Sikkim. The monsoon continued advancing in early June, covering parts of central and northwest Bay of Bengal, coastal Andhra Pradesh, Telangana, Goa & Karnataka. By June 8, it reached southern Maharashtra, Telangana and Odisha and from June 8 to 12, it extended further into the north Arabian Sea and Maharashtra, including Mumbai, before a brief halt in its progress from June 12 to 19. On June 20, the monsoon resumed its advancement, reaching Vidarbha, Chhattisgarh, Odisha, Sub-Himalayan West Bengal and parts of Bihar. It spread into Madhya Pradesh, Jharkhand and Gujarat by June 23. The monsoon reached the northern Arabian Sea, Gujarat, Rajasthan and parts of Jammu & Kashmir, Himachal Pradesh and Punjab by June 27. The Southwest Monsoon entirely covered India by 2 July, six days earlier than its normal date of 8 July.

**Definitions of terms in italics other than sub-titles are given in Appendix*

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TABLE 1

Advance of southwest monsoon 2024

S. No.	Date	Southwest monsoon advanced over	Northern limit of monsoon passed through
1.	19 May	Some parts of Maldives & Comorin area and some parts of South Bay of Bengal, Nicobar Islands and South Andaman Sea	Lat. 05° N/ Long.75° E, 6° N/80° E, 7° N/85° E, Nancowry and 10° N/100° E.
2.	22 May	Some parts of south Arabian Sea, some more parts of Maldives, Comorin area and south Bay of Bengal and some more parts of Andaman & Nicobar Islands and Andaman Sea	05° N/60° E, 06° N/70° E, 6.5° N/75° E, 7.5° N/80° E, 10° N /85° E, Mayabandar and 16° N/100° E.
3.	24 May	Some more parts of Maldives & Comorin area, south Bay of Bengal, remaining parts of Andaman & Nicobar Islands, Andaman Sea and some parts of eastcentral Bay of Bengal	05° N/60° E, 06° N/70° E, 7° N/75° E, 8° /80° E, 11° N / 85° E, 13.5° N/90° E and 17° N/95° E.
4.	25 May	Some more parts of Southwest Bay of Bengal, remaining parts of Southeast Bay of Bengal, some more parts of Central Bay of Bengal and some parts of Northeast Bay of Bengal	05° N/60° E, 06° N/70° E, 7° N/75° E, 8° N/80° E, 13° N /85° E, 17° N/90° E, 20° N/95° E, 23° N/100° E.
5.	26 May	Some more parts of southwest Bay of Bengal, central Bay of Bengal and northeast Bay of Bengal	05° N/60° E, 06° N/70° E, 7° N/75° E, 8° N/80° E, 13° N /84° E, 16° N/87° E, 18.5° N/89.5° E, 21° N/93° E.
6.	28 May	Some more parts of south Arabian Sea and Maldives area	08° N/60° E, 07° N/75° E, 08° N/80° E, 13° N/84.5° E, 16° N /87.5° E, 18.5° N/90° E, 21° N/92.5° E.
7.	30 May	Into remaining parts of southwest Arabian Sea, some parts of west central Arabian Sea, most parts southeast Arabian Sea and Lakshadweep area, most parts of Kerala, Mahe, some parts of south Tamil Nadu, remaining parts of Maldives and Comorin area; some more parts northeast Bay of Bengal, most parts of northeast India including entire Nagaland, Manipur, Mizoram, Arunachal Pradesh and most parts of Tripura, Meghalaya and Assam	13° N/60° E, 12° N/65° E, 11° N/70° E, Amini, Kannur, Coimbatore, Kanyakumari, 8.5° N/80° E, 13° N/84° E, 16° N /87° E, 20° N/91° E, Agartala, Dhubri, 27° N/89.5° E.
8.	31 May	Remaining parts of northeast Bay of Bengal and some parts of northwest Bay of Bengal, remaining parts of Tripura, Meghalaya and Assam and most parts of Sub-Himalayan West Bengal & Sikkim.	13° N/60° E, 12° N/65° E, 11° N/70° E, Amini, Kannur, Coimbatore, Kanyakumari, 8.5° N/80° E, 13° N/84° E, 16° N /87° E, 18.5º N/89° E, 21° N/90° E, 23° N/89.5° E and Islampur
9.	2 June	Some more parts of central Arabian Sea, remaining parts of Lakshadweep area and Kerala, Tamil Nadu, some parts of Karnataka, Rayalaseema and Andhra Pradesh, remaining parts of southwest Bay of Bengal and more parts of central and northwest Bay of Bengal.	14° N/60° E, 14° N/65° E, 13.5° N/70° E, Mangalore, Chitradurga, Nellore, 14.5° N/82.5° E, 16° N/85° E, 21° N /90° E, 23° N/89.5° E and Islampur.
10.	3 June	Some more parts of central Arabian Sea, some more parts of Karnataka, Rayalaseema, coastal Andhra Pradesh, some parts of Telangana and further some more parts of westcentral and northwest Bay of Bengal	15.5° N/60° E, 15.5° N/65° E, 15° N/70° E, Honnavar, Ballari, Kurnool, Narsapur 17° N/85° E, 19.5° N/88° E 21.5° N /90° E, 23° N/89.5° E and Islampur.
11.	4 June	Into some more parts of central Arabian Sea, Goa, some more parts of Karnataka & Telangana, remaining parts of Rayalaseema	16.5° N/60° E, 16.5° N/65° E, 16° N/70° E, Dabolim, Gadag, Narayanpet, Narsapur, 17° N/85° E, 19.5° N/88° E 21.5° N/90° E, 23° N/89.5° E and Islampur
12.	6 Jun	Some more parts of central Arabian Sea; most parts of Karnataka; some parts of Maharashtra, Telangana & coastal Andhra Pradesh; most parts of westcentral Bay of Bengal and some more parts of northwest Bay of Bengal	17.0° N/60° E, 17.0° N/65° E, 16.5° N/70° E, Ratnagiri, Solapur, Medak, Bhadrachalam, Vizianagaram, 19.5°N/88° E, 21.5° N/89.5° E, 23° N/89.5° E and Islampur.
13.	8 June	Some more parts of central Arabian sea, south Maharashtra, Telangana and some parts of south Chhattisgarh & south Odisha and some more parts of Coastal Andhra Pradesh	18.0° N/60° E, 18.0° N/65° E, 17.5° N/70° E, Harnai, Baramati, Nizamabad, Sukma, Malkangiri, Vizianagaram, 19.5° N/88° E, 21.5° N/89.5° E, 23° N/89.5° E and Islampur

Table 1 continued.

S. No.	Date	Southwest monsoon advanced over	Northern limit of monsoon passed through
14.	9 June	Remaining parts of central Arabian Sea, some parts of north Arabian Sea, some more parts of Maharashtra (including Mumbai	19.5° N/60° E, 19.5° N/65° E, 19.0° N/70° E, Thane, Ahmednagar, Beed, Nizamabad, Sukma, Malkangiri, Vizianagaram, 19.5° N/88° E, 21.5° N/89.5° E, 23° N/ 89.5° E and Islampur
15.	10 June	Into some more parts of north Arabian Sea and some more parts of Maharashtra	20.5° N/60° E, 20.5° N/65° E, Dahanu, Nasik, Chhatrapati Sambhajinagar, Nizamabad, Sukma, Malkangiri, Vizianagaram, 19.5° N/88° E, 21.5° N/89.5° E, 23° N / 89.5° E and Islampur
16.	11 June	Some more parts of north Arabian Sea, Maharashtra & Telangana	20.5° N/60° E, 20.5° N/63° E, 20.5° N/70° E, Navsari, Jalgaon, Akola, Pusad, Ramagundam, Sukma, Malkangiri, Vizianagaram, 19.5° N/88° E, 21.5° N/89.5° E, 23° N / 89.5° E and Islampur
17.	12 June	Some more parts of Maharashtra, entire Telangana and some more parts of Chhattisgarh	Lat. 20.5° N/ Long. 60° E, Lat. 20.5° N/ Long. 63° E, Lat. 20.5° N/ Long. 70° E, Navsari, Jalgaon, Amravati, Chandrapur, Bijapur, Vizianagaram, Sukma , Lat. 19.5° N/ Long. 88° E, Lat. 21.5° N/ Long. 89.5° E, Lat. 23° N/ Long. 89.5° E and Islampur
18.	20 June	Southwest Monsoon has further advanced into some more parts of Vidarbha, Chhattisgarh, Odisha, northwest Bay of Bengal, Sub-Himalayan West Bengal and some parts of Bihar	20.5° N/60° E, 20.5° N/63° E, 20.5° N/70° E, Amravati, Gondia, Durg, Rampur (Kalahandi), 19.5° N/86.5° E, 23° N /89.5° E, Malda, Bhagalpur and Raxaul.
19.	21 June	Some more parts of Maharashtra including remaining parts of Vidarbha, some parts of Madhya Pradesh, some more parts of Chhattisgarh & Odisha, some parts of Gangetic West Bengal, remaining parts of Sub-Himalayan West Bengal and some parts of Jharkhand	20.5° N/60° E, 20.5° N/63° E, 20.5° N/70° E, Navsari, Jalgaon, Mandla, Pendra Road, Jharsuguda, Balasore, Haldia, Pakur, Sahibganj and Raxaul
20.	23 June	Some more parts of Arabian Sea, Gujarat state; remaining parts of Maharashtra; some more parts of Madhya Pradesh & Chhattisgarh; remaining parts of Odisha and some parts of Jharkhand	20.5° N/60° E, 20.5° N/63° E, 20.5° N/70° E, Veraval, Rajpipla, Ujjain, Vidisha, Siddhi, Chaibasa, Haldia, Pakur, Sahibganj and Raxaul
21.	25 June	Some more parts of north Arabian Sea, Gujarat state and Madhya Pradesh and some parts of southeast Rajasthan	23° N/60° E, 23° N/65° E, Mundra, Mehsana, Udaipur, Shivpuri, Siddhi, Chaibasa, Haldia, Pakur, Sahibganj and Raxaul
22.	27 June	Remaining parts of north Arabian Sea, Gujarat state; some more parts of Rajasthan, most parts of Madhya Pradesh; some more parts of west Uttar Pradesh; Bihar, some parts of east Uttar Pradesh; most parts of Uttarakhand, Himachal Pradesh, Jammu-Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, some parts of Punjab	26.5° N/60° E, 25.5° N/65° E, Barmer, Jaipur, Agra, Banda, Siddhi, Chaibasa, Haldia, Pakur, Patna, Maharajganj, Dehradun, Una, Pathankot, Jammu, 33° N/74° E
23.	28 June	Some more parts of west Rajasthan, remaining parts of east Rajasthan, some parts of Haryana, entire Delhi, some more parts of west Uttar Pradesh; remaining parts of Madhya Pradesh, Chhattisgarh, West Bengal, Jharkhand, Bihar; some more parts of east Uttar Pradesh and remaining parts of Uttarakhand	26° N/65° E, Jaisalmer, Churu, Bhiwani, Delhi, Aligarh, Kanpur, Ghazipur, Gonda, Kheri, Moradabad, Una, Pathankot, Jammu, 33° N/74° E
24.	29 June	Remaining parts of east Uttar Pradesh and some more parts of west Uttar Pradesh	26° N/65° E, Jaisalmer, Churu, Bhiwani, Delhi, Aligarh, Hardoi, Moradabad, Una, Pathankot, Jammu, 33° N/74° E
25.	30 June	Some more parts of west Rajasthan and Haryana, remaining parts of Uttar Pradesh, some more parts of Punjab and remaining parts of Himachal Pradesh and Jammu	26° N/65° E, Jaisalmer, Churu, Hissar, Karnal, Jalandhar, Tarn Taran and 31.5° N/74.5° E
26.	1 July	Some more parts of Rajasthan, Haryana, Punjab and entire Chandigarh	26° N/65° E, Jaisalmer, Sirsa, Kurukshetra, Rajpura, Ludhiana and 31.2° N/74.5° E
27.	2 July	Remaining parts of Rajasthan, Haryana and Punjab	The Southwest Monsoon has covered the entire country on 2nd July 2024

TABLE 2

Withdrawal of Southwest Monsoon 2020

S. No.	Date	Southwest monsoon advanced into	Northern limit of monsoon passed through
1.	23 September	Some parts of west Rajasthan and Kachchh	Anupgarh, Bikaner, Jodhpur, Bhuj, Dwarka
2.	24 September	Some more parts of Rajasthan & Gujarat, some Parts of Punjab & Haryana	Firozpur, Sirsa, Churu, Ajmer, Mount Abu, Deesa, Surendranagar, Junagarh and 21° N/70° E.
3.	2 October	From entire Jammu & Kashmir-Ladakh-Gilgit-Baltistan-Muzaffarabad, Himachal Pradesh, Uttarakhand, Punjab and Haryana-Chandigarh-Delhi; remaining parts of west Rajasthan; some parts of west Uttar Pradesh, west Madhya Pradesh and east Rajasthan	30.8° N/81.2° E, Lakhimpur Kheri, Shivpuri, Kota, Udaipur, Deesa, Surendranagar, Junagarh and 21° N /70° E.
4.	5 October	Some more parts of Uttar Pradesh, Gujarat Region, Madhya Pradesh, some parts of Maharashtra and most parts of North Arabian Sea	29° N /84° E, Nautanwa, Sultanpur, Panna, Narmadapuram, Khargaon, Nandurbar, Navsari and 20° N /70° E.
5.	11 October	Entire Uttar Pradesh, major parts of Madhya Pradesh, some parts of Bihar, Jharkhand and Chhattisgarh	29° N /86° E, Darbhanga, Hazaribagh, Pendra Road, Narsinghpur, Khargaon, Nandurbar, Navsari and 20° N/70° E.
6.	13 October	Remaining parts of Bihar, Jharkhand, entire West Bengal & Sikkim; some more parts of Chhattisgarh, Madhya Pradesh; many parts of Odisha and some parts of Assam & Meghalaya, northwest Bay of Bengal	28.5° N /89.5° E, 27.0° N /90.0° E Dhubri, Tura, 22° N/ 89° E, 20° N/ 87° E, Gopalpur, Raipur, 22.5° N /79.5° E, Khargone, Nandurbar, Navsari and 20° N /70° E.
7.	14 October	Remaining parts of Assam, Meghalaya, entire Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura, most parts of north Bay of Bengal.	18.5° N/92.0° E, 18.5° N/90.0° E, Gopalpur, Raipur, 22.5° N /79.5° E, Khargone, Nandurbar, Navsari and 20° N/70° E.
8.	15 October		Southwest monsoon has withdrawn from the entire country .

During the 2024 monsoon season, the El Niño-Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) conditions were neutral. During most days in June and July 2024, the Madden-Julian Oscillation (MJO) remained weak. However, it became active and entered in favourable phases for the most days in August and September, contributing to significant rainfall during the latter part of the monsoon season.

The withdrawal of the SW-monsoon 2024 began on 23 Sept. against its normal date of 17 Sept.. Table 2 shows the details of withdrawal of monsoon over the country.

2.2. *Monthly rainfall distribution*

The sub-division wise rainfall and its departure from normal for each month and season as a whole are given in Table-3. Monthly and Seasonal Rainfall for the country as a whole is depicted in Figs. 2 to 6. Table 8 shows Representative amounts of Heavy Rainfall (12cm and above) for June, July, August and September 2024.

During the month of June, realized rainfall was 89% of its LPA over the country as a whole, 67% of its LPA over northwest India, 86% of its LPA over central India, 88% of its LPA over east & northeast India and 114% of its LPA over south peninsula. The precipitation over the country was *normal* which was on the negative side except

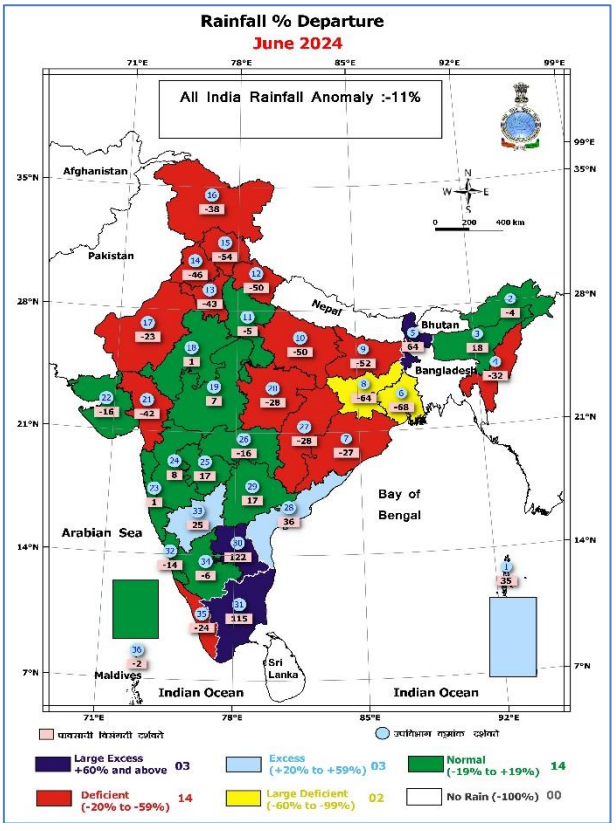

Fig. 2. Rainfall % departure June 2024

TABLE 3

Rainfall figures (mm) for each month and season as a whole (June-September 2020)

S. No.	Meteorological Sub-divisions	June			July			August			September			Monsoon Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	Andaman & Nicobar Islands	564.9	417.5	35%	296.5	387.1	-23%	394.2	397.6	-1%	375.2	429.5	-13%	1630.7	1631.7	0%
2.	Arunachal Pradesh	435.5	454.7	-4%	365.4	529.2	-31%	255.2	343.2	-26%	144.2	348.0	-59%	1200.3	1675.1	-28%
3.	Assam & Meghalaya	574.7	486.6	18%	438.4	552.3	-21%	318.9	394.7	-19%	163.9	328.6	-50%	1495.9	1762.2	-15%
4.	Nagaland–Manipur–Mizoram–Tripura	241.2	353.2	-32%	259.9	354.2	-27%	397.0	326.0	22%	171.1	268.3	-36%	1083.8	1301.7	-17%
5.	Sub–Himalayan West Bengal & Sikkim	747.4	455.9	64%	618.3	586.3	5%	309.9	459.1	-33%	400.6	388.2	3%	2076.2	1889.5	10%
6.	Gangetic West Bengal	80.0	247.9	-68%	269.1	344.8	-22%	437.4	308.3	42%	386.5	265.8	45%	1173.0	1166.8	1%
7.	Odisha	153.6	209.3	-27%	335.9	341.4	-2%	335.4	363.8	-8%	267.0	235.7	13%	1092.0	1150.2	-5%
8.	Jharkhand	67.4	189.5	-64%	223.6	318.7	-30%	421.7	290.7	45%	296.2	224.0	32%	1008.9	1022.9	-1%
9.	Bihar	78.9	163.3	-52%	241.3	340.5	-29%	260.3	271.9	-4%	218.3	216.5	1%	798.7	992.2	-19%
10.	East Uttar Pradesh	54.1	108.3	-50%	247.9	276.9	-10%	246.1	240.6	2%	197.7	173.4	14%	745.8	799.2	-7%
11.	West Uttar Pradesh	74.4	78.6	-5%	225.5	240.3	-6%	187.0	228.3	-18%	256.0	124.8	105%	742.8	672.0	11%
12.	Uttarakhand	88.9	176.8	-50%	481.9	417.8	15%	419.4	385.7	9%	282.8	182.4	55%	1273.0	1162.7	9%
13.	Haryana, Chandigarh & Delhi	31.3	55.3	-43%	89.5	150.5	-41%	189.9	147.7	29%	106.3	77.2	38%	417.0	430.7	-3%
14.	Punjab	29.3	54.5	-46%	89.4	161.4	-45%	153.7	146.2	5%	42.1	77.7	-46%	314.6	439.8	-28%
15.	Himachal Pradesh	46.5	101.1	-54%	181.2	255.9	-29%	247.8	256.8	-3%	125.3	120.6	4%	600.8	734.4	-18%
16.	Jammu & Kashmir	47.1	75.9	-38%	111.9	192.6	-42%	161.9	184.9	-12%	50.1	95.7	-48%	408.5	549.1	-26%
17.	West Rajasthan	30.5	39.4	-23%	107.4	107.8	0%	283.3	95.5	197%	64.8	40.9	58%	486.0	283.6	71%
18.	East Rajasthan	75.1	74.7	1%	231.1	228.6	1%	421.5	231.5	82%	192.5	91.8	110%	920.3	626.6	47%
19.	West Madhya Pradesh	126.0	117.8	7%	346.5	297.7	16%	348.5	312.8	11%	254.0	149.0	70%	1075.1	877.3	23%
20.	East Madhya Pradesh	107.5	148.4	-28%	384.3	342.7	12%	443.8	362.3	22%	245.6	190.0	29%	1181.2	1043.4	13%
21.	Gujarat Region	76.7	133.3	-42%	407.5	340.3	20%	453.1	307.0	48%	265.5	146.9	81%	1202.9	927.5	30%
22.	Saurashtra & Kutch	78.6	93.6	-16%	357.8	196.3	82%	404.6	156.8	158%	101.7	93.2	9%	942.7	539.9	75%
23.	Konkan & Goa	707.4	701.5	1%	1780.2	1053.5	69%	714.8	741.7	-4%	508.4	374.1	36%	3710.8	2870.8	29%
24.	Madhya Maharashtra	171.0	157.7	8%	393.2	229.5	71%	307.9	201.2	53%	163.8	159.0	3%	1035.8	747.4	39%
25.	Marathwada	157.5	134.7	17%	230.5	170.4	35%	151.2	176.8	-14%	233.3	160.9	45%	772.5	642.8	20%
26.	Vidarbha	146.6	175.4	-16%	517.9	309.3	67%	228.9	297.1	-23%	205.1	155.5	32%	1098.5	937.3	17%
27.	Chhattisgarh	136.3	188.0	-28%	461.8	369.0	25%	368.2	364.2	1%	265.4	211.0	26%	1231.7	1132.2	9%
28.	Coastal Andhra Pradesh and Yanam	149.0	109.5	36%	241.7	158.6	52%	181.7	170.3	7%	228.4	163.0	40%	800.8	601.4	33%
29.	Telangana	153.7	131.4	17%	290.5	218.5	33%	209.5	226.1	-7%	294.6	158.8	85%	948.3	734.8	29%
30.	Rayalaseema	160.8	72.3	122%	70.3	92.1	-24%	160.3	107.3	49%	91.1	136.9	-33%	482.5	408.6	18%
31.	Tamil Nadu, Puducherry and Karaikal	109.2	50.7	115%	77.4	69.0	12%	160.3	90.1	78%	42.9	118.6	-64%	389.8	328.4	19%
32.	Coastal Karnataka	743.5	863.6	-14%	1814.0	1088.9	67%	775.1	821.3	-6%	434.0	320.1	36%	3766.7	3093.9	22%
33.	North Interior Karnataka	132.0	105.3	25%	139.9	116.5	20%	125.7	119.4	5%	101.8	139.6	-27%	499.4	480.8	4%
34.	South interior Karnataka	140.4	149.7	-6%	321.4	200.6	60%	189.1	179.5	5%	76.1	148.6	-49%	727.0	678.4	7%
35.	Kerala and Mahe	490.2	648.3	-24%	760.1	653.5	16%	311.1	445.1	-30%	187.1	271.8	-31%	1748.4	2018.7	-13%
36.	Lakshadweep	328.3	335.6	-2%	312.5	289.3	8%	570.2	232.0	146%	93.2	169.7	-45%	1304.2	1026.6	27%

except south peninsula where it was positive. Rainfall over the homogeneous region of South Peninsular India (182.8 mm) was 5th highest rainfall since 2001. Rainfall over homogeneous regions of Northwest India (52.1 mm), east and northeast India (288.4 mm) & Central India (146.6 mm) were 5th, 8th & 9th lowest respectively, since 2001. Most sub-divisions from Northwest India, eastern parts of central India, eastern India, Kerala & Mahe received deficient/large deficient rainfall. The remaining sub-divisions received large excess/excess/normal rainfall. Sub- Himalayan west Bengal, Tamil Nadu, Puducherry & Karaikal and Rayalaseema received large excess rainfall. Rainfall over Tamil Nadu, Puducherry & Karaikal (109.2 mm) was the 3rd highest & over Rayalaseema (160.8 mm) was the 4th highest since 1901. Rainfall over Nagaland, Manipur, Mizoram & Tripura (241.2 mm) & Gangetic West Bengal (80.0 mm) was 3rd lowest since 1901.

Out of 36 meteorological sub-divisions, 3 received large excess rainfall, 3 received excess rainfall, 14 received normal rainfall, 14 received deficient rainfall and 2 sub-divisions received large deficient rainfall.

In association with an onset of Monsoon over Kerala on 30th May, heavy to very heavy rainfall was observed at isolated places over Kerala during the week. An isolated extremely heavy to heavy rainfall was observed at most places over peninsular India and northeast India during 1st week of June.

The presence of cyclonic circulation in lower tropospheric level and Strong southwesterly/southerly winds and moisture incursion from Bay of Bengal to northeast India in lower tropospheric levels caused Exceptional heavy rainfall over northeast India during 13-18 June which caused flood conditions and impacted lives in the region. There was no further advance of Monsoon during the 3rd week and was stagnated till 19 June 2024. After that, the Southwest Monsoon further advanced upto Maharashtra, entire Telangana and parts of Chhattisgarh.

The month of June is characterized by heat wave to severe heat wave spells over many areas of northwest, central and eastern regions of India. It was mainly observed over most parts of north India. During the 4th week, heat wave spell over north and adjoining central India got abated due to an active western disturbance and its induced circulation which caused clouding and rainfall accompanied with thunderstorms. Thereafter, there was no significant heat wave development over any part of the country except at isolated places over Punjab and southwest Bihar. Simultaneously monsoon further advanced into some more parts of Vidarbha, Chhattisgarh, Odisha, northwest Bay of Bengal, Sub-Himalayan West Bengal and some parts of Bihar, Gujarat State and Madhya Pradesh and Rajasthan and covered the entire country on 2 July 2024. Excess/ large Excess rainfall was reported over Saurashtra & Kutch, west Uttar Pradesh, northern parts of Northeast India and coastal Andhra Pradesh. All the remaining sub-divisions reported Excess / Normal rainfall except north interior Karnataka, Rayalaseema and Kerala where the rainfall was deficient.
A low pressure area over northwest Bay of Bengal off north Odisha coast and its associated cyclonic circulation during end of the month caused very heavy rainfall with an extremely heavy rainfall at isolated places over Odisha, Jharkhand, west Bengal and Sikkim.

During June 2024, negative sea surface temperatures (SSTs) were observed over parts of the eastern Pacific Ocean, while positive SSTs were observed over most parts of the Indian Ocean, including the Bay of Bengal and the Arabian Sea. Madden Julian Oscillation (MJO) index was in Phase 5 with a weaker amplitude less than 1 which was not favourable for enhancement of convective activity and neutral El Nino-Southern Oscillation (ENSO) conditions were observed over the equatorial Pacific.

During the month of July, rainfall realized over the country as a whole was 109% of its LPA, 135% of its LPA over the south peninsula, 133% of its LPA over central India, 86% of its LPA over northwest India and 76% of its LPA over east & northeast India. Rainfall over

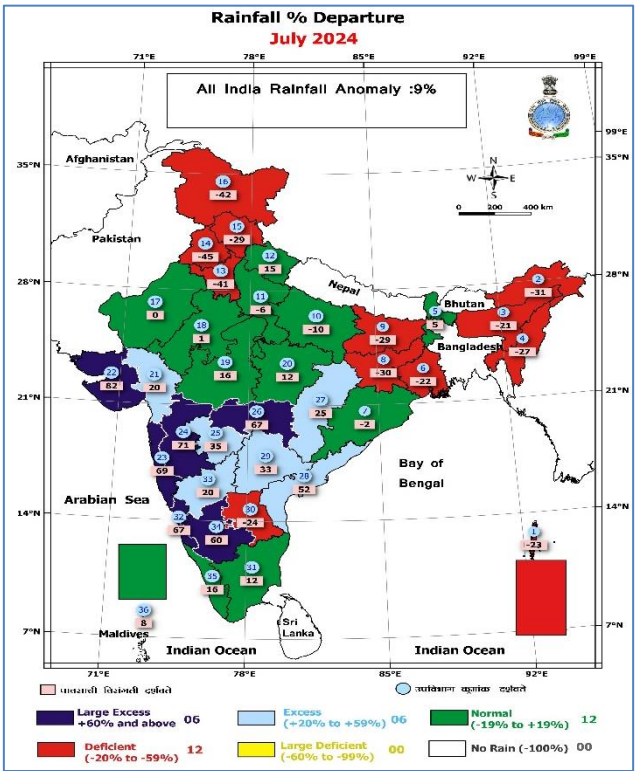

Fig. 3. Rainfall % departure July 2024

the homogeneous region of east and Northeast India (323.2 mm) was the 12th lowest since 1901 and the 8th lowest since 2001. Southwest Monsoon covered entire country on 2 July against the normal date of 8 July (6 days before the normal date of covering the entire India).

Subdivisions from east and northeast, north, Andaman & Nicobar Islands and Rayalaseema received deficient rainfall while remaining subdivisions received large excess/excess/normal rainfall. Out of 36 meteorological subdivisions, 6 received large excess rainfall, 6 received excess rainfall, 12 received normal rainfall and 12 subdivisions received deficient rainfall. Rainfall over Konkan & Goa (1780.2 mm) and Coastal Karnataka (1814.0 mm) was the 3rd highest since 1901. Rainfall over Nagaland, Manipur, Mizoram & Tripura (259.9 mm) was the 3rd lowest since 1901.

During July 2024, one depression (19 - 20 July), one low pressure area (15-17 July) & another well marked low pressure area (26-28 July) formed over the Bay of Bengal.

During the first week of July, on most of the days, the monsoon trough was to the south of its normal position, an east-west shear zone at middle tropospheric levels having southwards tilt with height, active off-shore trough at mean sea level off south Gujarat-north Kerala coasts, cyclonic circulation over east central Bay of Bengal and it's movement towards westcentral & adjoining northwest Bay of Bengal off north Andhra Pradesh in the middle tropospheric levels resulted into active / vigorous monsoon over west coast, central India and also over many parts of the country. Due to above conducive weather scenario, Mumbai and Goa received season's first spell of extremely heavy rainfall during the second half of the week causing flash floods which severely affected normal lives over these areas. Heavy to very heavy rainfall with extremely heavy rainfall was also observed at isolated places over east Uttar Pradesh, Sub-Himalayan West Bengal, Assam & Meghalaya, Gujarat Region, coastal and south interior Karnataka, Konkan & Goa and Madhya Maharashtra. During the same week, a western disturbance moving north-easterly direction at middle tropospheric levels over north India and it's interaction with lower level monsoonal winds from the Bay of Bengal and Arabian Sea resulted in heavy to very heavy rainfall with extremely heavy rainfall at isolated places over Himachal Pradesh, Uttarakhand and West Uttar Pradesh along with heavy to very heavy rainfall at isolated places was observed over adjacent plains of northwest India during the same period.

Around mid of the month, monsoon trough shifted to the south of its normal position extended in the lower tropospheric levels, formation of a low pressure area over the northwest & adjoining westcentral Bay of Bengal off south Odisha coast and laid over south Chhattisgarh & adjoining Vidarbha and southwest Madhya Pradesh, an east-west shear zone roughly between Lat.20° N and Lat.22° N at middle tropospheric levels tilting southwards with height and active off-shore trough at mean sea level along south Gujarat-north Kerala coasts caused active to vigorous rainfall over most parts of west coast and west central and south peninsular India. Alongwith all these systems, a lowpressure area over the central and adjoining north Bay of Bengal and it's concentration into season's first monsoon depression over northwest and adjoining westcentral Bay of Bengal off Odisha and adjoining north Andhra Pradesh coasts caused active / vigorous rainfall over most parts of west coast and adjoining central India for many days. An exceptionally heavy rainfall was recorded over Saurashtra from 19th to 20th July. It was mainly due to the influence of cyclonic circulation in the lower troposphere over this area, persistence of an off-shore trough and the strengthening of wind flow over the west coast due to the distant effect caused by the presence of Depression over the Bay of Bengal. These extremely heavy rainfall spells continued over Madhya Maharashtra, Konkan & Goa and Gujarat Region. However, there was a significant reduction of rainfall over Konkan & Goa and Gujarat State around end of the month due to northward shift of the monsoon trough and the weakening of an off-shore trough over Gujarat-Konkan coasts. A well marked low pressure area over Gangetic West Bengal and north Bay of Bengal on 26th and it's west-northwestwards movement towards north Odisha, Chhattisgarh & neighbourhood and southern Madhya Pradesh caused heavy to very heavy rainfall with extremely heavy rainfall at isolated places over Chhattisgarh and west Madhya Pradesh. Towards the end of month, the off-shore trough became active along Kerala coast with the cyclonic circulation in the lower levels over the southeast Arabian Sea and adjoining Lakshadweep Islands off Kerala coast which caused strong south-westerly / westerly moist winds gets converged along and off Kerala coast and lifted upwards by the orography of Western Ghats resulted in a fresh spells of heavy to very heavy rain with extremely heavy rainfall at isolated places over Kerala, south interior Karnataka and Tamil Nadu.

During July 2024, average to below average sea surface temperatures (SSTs) were observed over parts of the eastern Pacific Ocean and average over equatorial western and central Pacific Ocean, while positive SSTs were observed over most parts of the Indian Ocean, including the Bay of Bengal and the Arabian Sea. Madden Julian Oscillation (MJO) index was meandering between Phase 3 to 8 with a weaker amplitude greater than 1. Neutral Indian Ocean Dipole (IOD) conditions prevailed over the Indian Ocean and Neutral El Nino-Southern Oscillation (ENSO) conditions were observed over the equatorial Pacific.

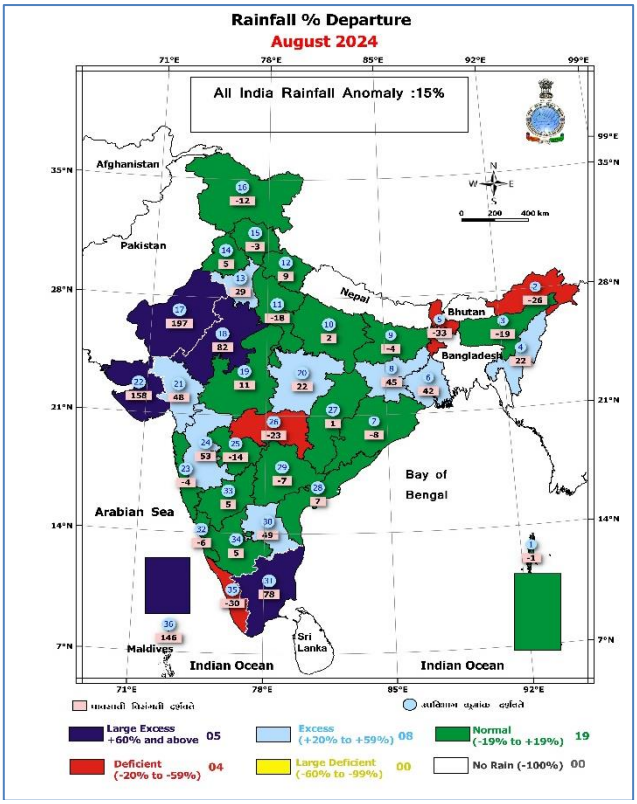

Fig. 4. Rainfall departure August 2024

During August 2024, the realized rainfall was 130% of its LPA over northwest India, 116% of its LPA over central India, 106% of its LPA over south peninsula & 102% of its LPA over east & northeast India. Rainfall over the homogeneous region of Northwest India (256.4 mm) was the 21st highest since 1901 & the highest since 2001. Rainfall over the homogeneous region of Central India (359.5 mm) was the 30th highest since 1901 and the 6th highest since 2001. Rainfall realized over the country as a whole was 115% of its LPA during August 2024. Rainfall over All India (293.5 mm) was the 20th highest since 1901 & the 3rd highest since 2001. Five subdivisions recorded large excess, 8 excess, 19 normal and 4 deficient, no subdivision recorded large deficient or no rain.

During the month, six low-pressure systems formed {2 low pressure areas (one over land during 3- 5 August 2024, one over Arabian Sea during 22- 24 August 2024), one well marked low pressure area over the Bay of Bengal during 25- 28 August 2024, one Depression over Bay of Bengal during 29 August – 2 September 2024, one land Deep depression during 2 - 5 August 2024 and one cyclonic storm "ASNA" over Bay of Bengal during 16 August - 2 September 2024}.

During the first week, active to vigorous monsoon conditions prevailed over central India and adjoining areas of east-northeast India at isolated places mainly due to west-northwestwards movement of deep depression from north Jharkhand and neighbourhood to central parts of Pakistan across north Madhya Pradesh and north Rajasthan, the low pressure area over southwest Rajasthan and active Monsoon trough & it's south of the normal position. The active off-shore trough along Gujarat to Karnataka coasts caused active to vigorous monsoon conditions along west coast of India which resulted into isolated extremely heavy rainfall over western Maharashtra and Gujarat Region during the same period.

During the second week, cyclonic circulation over northeast Rajasthan & neighbourhood and convergence of moisture laden southerly / southwesterly winds from Arabian Sea to northwest India on most of the days along with easterly winds from Bay of Bengal on few days at lower levels, the southwest monsoon was active over northwest and adjoining north & central India on most of the days. Due to which an exceptionally heavy rainfall recorded at isolated places over east Rajasthan and an extremely heavy rainfall at isolated places were observed over northwest India towards the mid of the week. There was reduction in rainfall over west coast and adjoining northern parts of peninsular India due to weak off-shore trough along west coast during first half of the week which disappeared thereafter.

During third & fourth week of the month, active monsoon conditions observed over northeast India & adjoining eastern parts, some parts of northwest India and central India due to back to back low pressure systems (well marked low pressure area over the Bay of Bengal during 25- 28 August, depression over Bay of Bengal during 29 August – 2 September and cyclonic storm "ASNA" over Bay of Bengal during 16 August - 2 September). This caused severe floods over parts of Andhra Pradesh. This was mainly due to formation of Low Pressure Area over central and adjoining north Bay of Bengal on 29th August, its west-northwestwards movement and intensification into a depression during 29th Aug till 2 Sept 2024. It moved from central and adjoining north Bay of Bengal to Vidarbha during 29th Aug till 2nd Sept.

A cyclonic circulation persisted during third week in lower tropospheric levels over peninsular India and a trough from this cyclonic circulation to Comorin area caused active monsoon condition over southeast peninsular India during the third week.

In August 2024, sea surface temperatures (SSTs) in the eastern Pacific Ocean were negative, while they were positive in the western and adjoining central Pacific & neutral El Nino-Southern Oscillation (ENSO) conditions

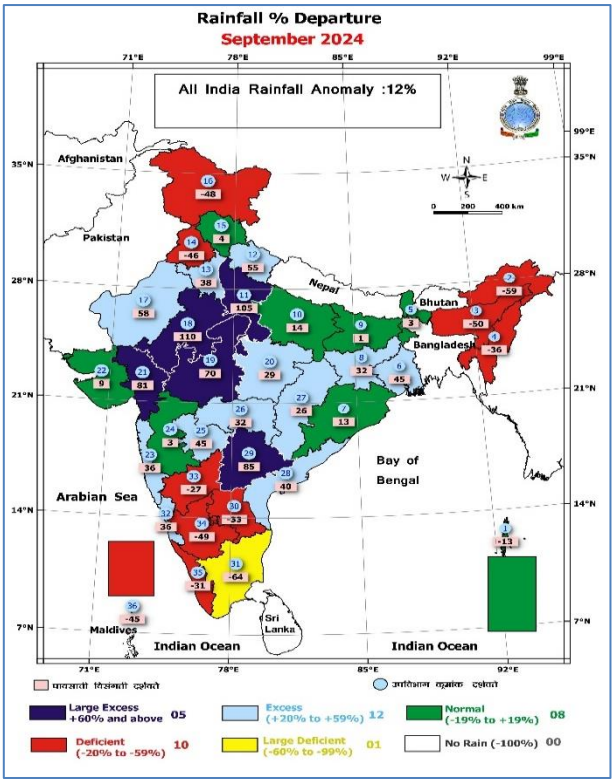

Fig. 5. Rainfall departure September 2024

were observed over the equatorial Pacific. Positive sea surface temperatures (SSTs) were observed across most of the Indian Ocean, including the Bay of Bengal and the Arabian Sea.

During September 2024, Rainfall realized was 129% of its LPA over northwest India, 132% of its LPA over central India, 82% of its LPA over east & northeast India and 97% of its LPA over south peninsula. The monthly rainfall for all India was 112% of L.P.A. Five sub-divisions recorded large excess, 12 excess, 8 normal, 10 deficient and 1 sub-division (Tamil Nadu, Puducherry & Karaikal) recorded large deficient.

During the month, four low-pressure systems formed (one Deep depression during 8 - 10 September over westcentral and adjoining northwest Bay of Bengal, one land depression during 11 - 13 September over Northeast Madhya Pradesh, one Deep depression during 13 - 18 September over northeast Bay of Bengal and adjoining Bangladesh and one low pressure area during 24 - 25 September over westcentral Bay of Bengal & adjoining northwest Bay off north Andhra - south Odisha coasts). Extremely Heavy to very heavy rainfall spell reported over coastal Andhra Pradesh & Yanam on 1st Sept. Another extremely heavy to very heavy rainfall spells reported sequentially over coastal Andhra Pradesh & Yanam, Chhattisgarh, Telangana, Marathwada and Gujarat Region during the week along with an exceptionally heavy rainfall reported over Telangana at the mid of week. The presence of shear zone roughly between Lat.18° N to Lat.22° N over north peninsular India at mid tropospheric level during the same period also contributed to an extremely heavy rainfall.

During second week of the month, a deep depression over northwest and adjoining westcentral Bay of Bengal crossed Odisha coast close to Puri, weakened into a Depression over interior Odisha and further weakened into a well marked low pressure area over northeast Madhya Pradesh and neighbourhood and again re-intensified into a Depression over northeast Madhya Pradesh. Secondly, position of active monsoon trough to south of its normal at mean sea level caused an extremely heavy rainfall reported over Odisha, Chhattisgarh, Madhya Pradesh and east Rajasthan during the second half of the week. Also, very heavy rainfall reported over Gujarat Region, east Madhya Pradesh, Madhya Maharashtra and Chhattisgarh towards the end of week.

During third week of the month, deep depression over Bangladesh and adjoining Gangetic West Bengal and adjoining Jharkhand and it's weakening into a depression over Jharkhand and adjoining north Chattisgarh, Madhya Pradesh and adjoining southwest Uttar Pradesh caused an isolated exceptionally heavy rainfall over west Madhya Pradesh at the beginning of week. Also, heavy to very heavy rain at a few places with extremely heavy rain at isolated places was recorded over west Uttar Pradesh, east Rajasthan, east Madhya Pradesh and Uttarakhand during first half of the week.

Prior to this system, depression over northwest Madhya Pradesh and neighbourhood moved north-northeastwards and lay over Southwest Uttar Pradesh & neighbourhood and monsoon trough caused exceptionally heavy rainfall was recorded over west Madhya Pradesh, extreme heavy rainfall over west Uttar Pradesh, east Rajasthan, Madhya Pradesh, Haryana & Uttarakhand. Very heavy rainfall over Gangetic West Bengal, Jharkhand, Uttarakhand, Odisha, Madhya Pradesh, Uttar Pradesh, Chhattisgarh & Bihar.

Mainly dry weather was prevailed over most parts of west Rajasthan and adjoining Kutch during almost all dates during the last week. Also, monsoon was weak across most of the country during the week, except for the western ghats, northern peninsular India and parts of eastern India, where monsoon was active to vigorous over parts of these areas towards end of the week especially onSeptember 24th and 25th , due to the formation of a low pressure system over westcentral Bay of Bengal & adjoining northwest Bay off north Andhra - south Odisha

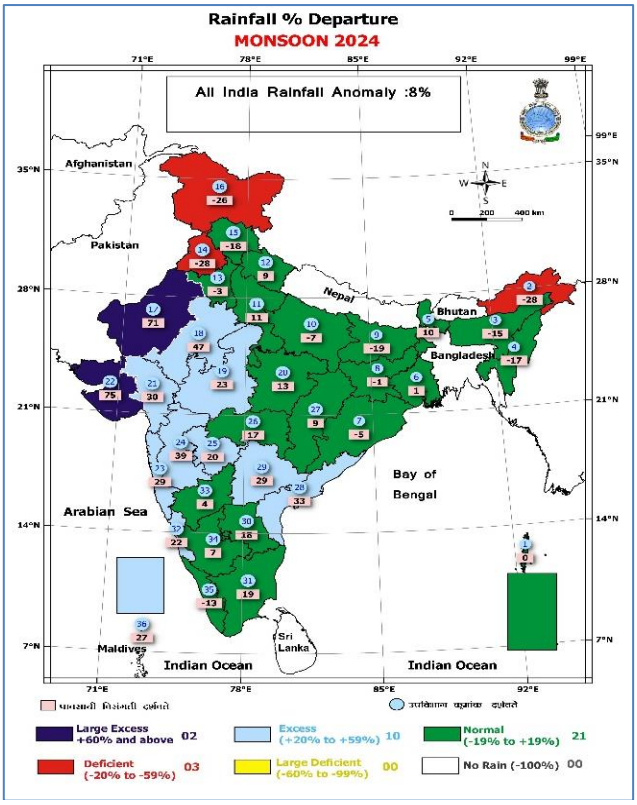

Fig. 6. Rainfall % departure Monsoon 2024

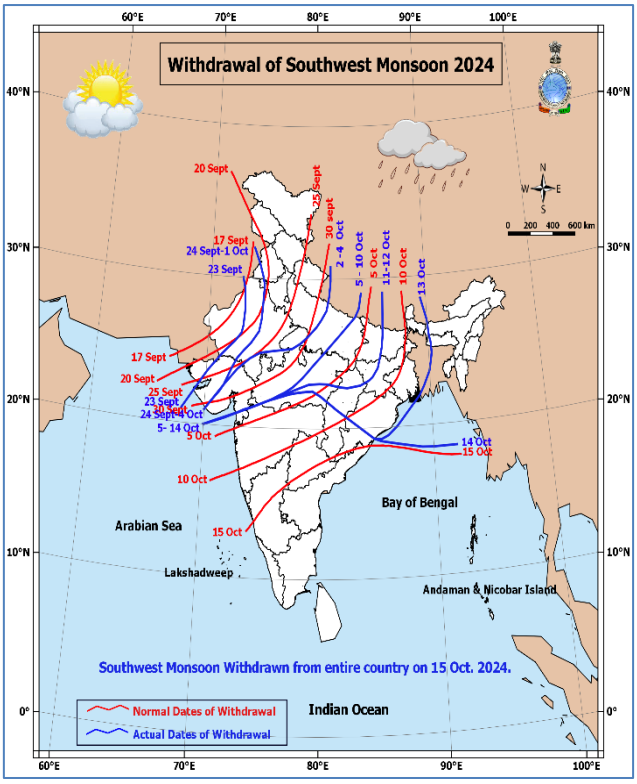

Fig. 7. Withdrawal of Southwest Monsoon 2024

coasts on 24th Sept. and its movement as remnant as cyclonic circulation to south Chhattisgarh & neighbourhood, very heavy rainfall was recorded over peninsular, east & central India during last week of the month. Afterwards, the southwest monsoon withdrew from some parts of West Rajasthan, Kutch, Gujarat, some parts of Punjab & Haryana which caused mainly dry weather over most parts of west Rajasthan and adjoining Kutch on most of the days.Thus, monsoon was weak across most parts of India, except for the western ghats, northern peninsular India and parts of eastern India where monsoon was active to vigorous over parts of these areas due to the influence of low pressure area over westcentral Bay of Bengal & adjoining northwest Bay of Bengal off north Andhra pradesh-south Odisha coasts.

In September 2024, neutral El Nino-Southern Oscillation (ENSO) conditions were observed over the equatorial Pacific.

2.3. *Seasonal rainfall distribution*

Meteorological sub–divisionwise seasonal rainfall distribution in terms of percentage departures from *normal* is shown in Fig. 6. Out of the total 36 meteorological sub-divisions, 2 sub-divisions received large *excess* rainfall (9% area of the country), 10 *excess* rainfall (26% area of the country), 21 *normal* (54% area of the country) and 3 sub-divisions (11% area of the country) *deficient* precipitation. No sub-divisions have *large deficient* or no rainfall in this season.

2.4. *Withdrawal of southwest Monsoon*

Figure 7 shows the isochrones and Table 2 shows the details of withdrawal of Southwest monsoon 2024. With reduction in the rainfall and formation of the anti-cyclonic circulation in lower troposphere, withdrawal of the monsoon began on 23rd September 2024 against the normal date of 17 September. On 23rd September withdrew from some parts of west Rajasthan and Kutch and on 24th September, some more parts of Rajasthan &Gujarat, some parts of Punjab & Haryana. There was no further withdrawal till 2nd October, when the monsoon withdrew from major part of North India and it withdrew from entire country on 15th Oct. 2024 on its normal date.

3. Chief synoptic features of southwest Monsoon 2024

The details of synoptic disturbances which affected the Indian monsoon region during June, July, August and September are given in Tables 4 to 7 respectively. Fig. 8 shows Tracks of cyclonic storm and depressions during monsoon 2024.

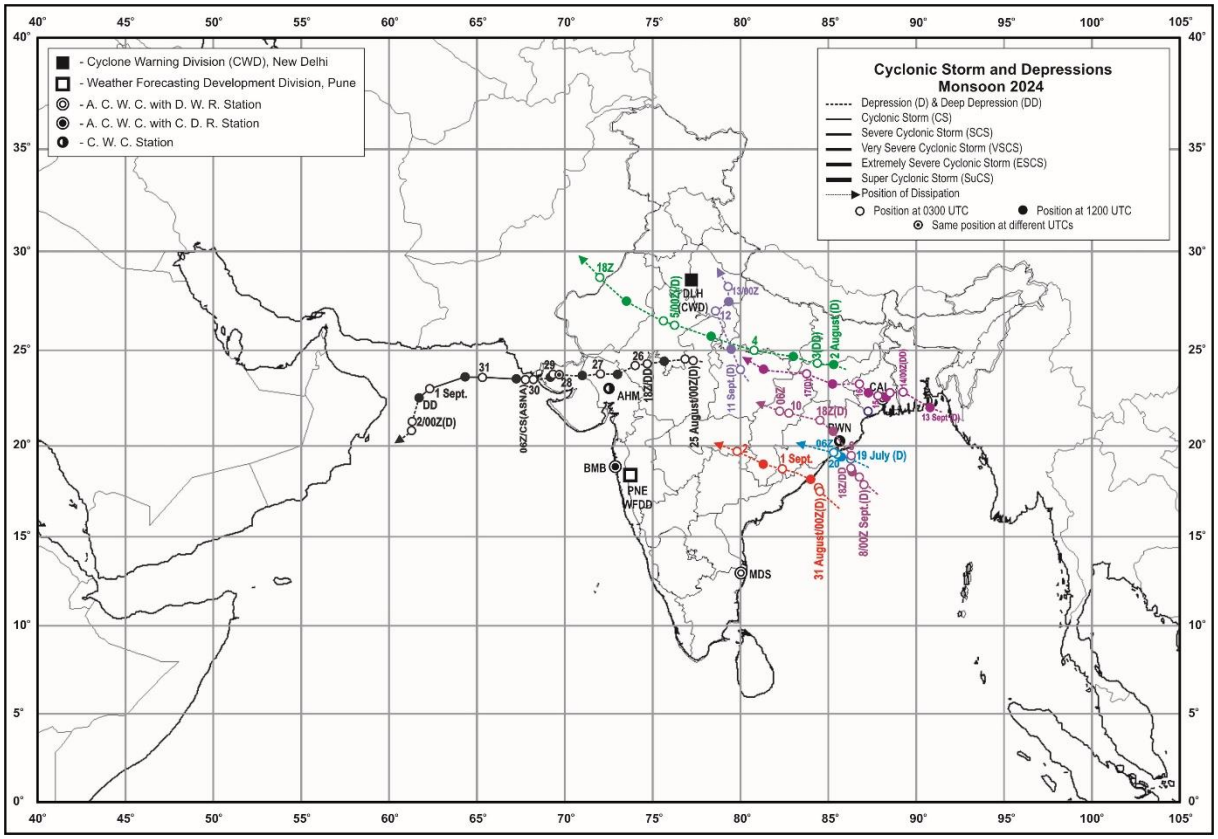

Fig. 8. Track of cyclonic storm and depressions during monsoon 2024

TABLE. 4

Details of the weather systems during June 2024

Sr. No (1)	System (2)	Duration (3)	Place of initial location (4)	Direction of Movement (5)	Place of final location (6)	Remarks (7)
I. Cyclonic storm /Low Pressure						
1	Low Pressure Area	28- 29 Jun.	Northwest Bay of Bengal off north Odisha coast	Westwards	northwest Bay of Bengal adjoining north Odisha-Gangetic West Bengal coasts	Initially it lay as a cycir over northwest & adjoining westcentral Bay of Bengal on 27th. The associated cyclonic circulation extended upto 5.8 km above m.s.l. on 28th. LPA became less marked on 30th June morning. However, the associated cyclonic circulation lay over east Jharkhand & neighbourhood which extended upto 1.5 km above m.s.l. on 30th and became less marked on 4th Jul.
II. Western Disturbances /Eastward moving Systems						
(a) As a trough						

TABLE. 4 Continued.

1	At 5.8 km above m. s. l.	6-10	Roughly along Long.65° E to the north of Lat.30° N	Northeast	Roughly along Long. 70° E to the north of Lat.28° N	Initially, western disturbance as a cyclonic circulation over Iran and neighbourhood which extended at 3.1 km above m. s. l. on 4th. Again on 11th, it lay as a cyclonic circulation over Jammu & Kashmir at 5.8 km above m.s.l. on 11th & Moved away north-eastwards on 12th.
2	At 5.8 m. s. l.	16-18	Roughly along Long.56° E to the north of Lat.30° N	Eastwards	Roughly along Long. 67° E to the north of Lat.30° N	It lay as a cyclonic circulation over North Pakistan & neighbourhood on 19th. It then lay over Himachal Pradesh & neighbourhood between 3.1 & 5.8 km above m.s.l. with a trough aloft in middle tropospheric westerlies with its axis at 7.6 km above m.s.l. roughly along Long.68°E to the north of Lat.28°N on 21st.Then again It lay as a trough in middle tropospheric westerlies with its axis at 5.8 km above m.s.l. ran roughly along Long.70°E to the north of Lat.28°N on 22nd. Again, lay as a cycir over Himachal Pradesh & neighbourhood at 5.8 km above m.s.l. on 25th which moved away northeastwards on 26th.
3	At 5.8 km above m.s.l.	13	Roughly along Long.72° E to the north of Lat.32° N	Stationary	In situ	Moved away northeastwards on 14th.
4	At 5.8 km above m.s.l.	26-27	Roughly along Long.64 °E to the north of Lat.28° N	Stationary	In situ	Moved away northeastwards on 28th.
(b) Induced cyclonic circulations						
1	At 1.5 km above m.s.l..	19-22	Central Pakistan	Eastward	Northwest Uttar Pradesh & neighbourhood	Became less marked on 23rd.
III. Other upper air cyclonic circulations.						
1	At 1.5 km above m.s.l.	1-7	Coastal Andhra Pradesh and neighbourhood	Oscillatory	South Telangana & neighbourhood	Became less marked on 8th.
2	Between 3.1 km & 5.8 km above m.s.l.	1-2	Eastcentral and adjoining southeast Bay of Bengal	Oscillatory	Eastcentral Bay of Bengal	Became less marked on 3rd.
3	At 1.5 km above m.s.l.	2-8	Central Pakistan and neighbourhood	Oscillatory	Saurashtra & neighbourhood	Became less marked on 9th.
4	Between 3.1 & 4.5 km above m.s.l.	2	South Sri Lanka and neighbourhood	Stationary	In situ	Became less marked on 3rd.
5	Between 3.1 & 4.5 km above m.s.l.	2	Southwest Uttar Pradesh and neighbourhood	Stationary	In situ	Became less marked on 3rd.
6	Upto 1.5 km above m.s.l.	2-5 (Mor)	Southern parts of east Uttar Pradesh and neighbourhood	Eastwards	East Uttar Pradesh & adjoining Bihar	Became less marked on 5th.
7	At 0.9 km above m.s.l.	2-3	Southeast Rajasthan and neighbourhood	Eastwards	Northwest Madhya Pradesh & neighbourhood	Became less marked on 4th.

TABLE. 4 continued

8	Upto 0.9 km above m.s.l.	2-3	North Haryana and neighbourhood	Eastwards	Northwest Uttar Pradesh & neighbourhood	Merged with the cyclonic circulation over east Uttar Pradesh on 4th.
9	At 3.1 km above m.s.l.	2-4	Southeast Arabian sea adjoining south Kerala coast	Oscillatory	South Tamil Nadu & neighbourhood	Became less marked on 5th.
10	At 3.1 km above m.s.l.	2-6	Saurashtra and adjoining northeast Arabian sea	Oscillatory	South Gujarat & neighbourhood	Became less marked on 7th.
11	Upto 1.5 km above m.s.l.	3-5	Northeast Assam	Oscillatory	Nagaland & neighbourhood	Became less marked on 6th.
12	At 0.9 km above m.s.l.	3	Bihar	Stationary	In situ	Became less marked on 4th.
13	Upto 1.5 km above m. s. l.	5 (Mor)-8	North Haryana and neighbourhood	Oscillatory	Northwest Madhya Pradesh & neighbourhood	Became less marked on 9th.
14	Between 4.5 km & 5.8 km above m.s.l.	5	Coastal Karnataka and neighbourhood	Stationary	In situ	Merged with the shear zone roughly along 16°N on 6th.
15	Between 5.8 km & 7.6 km above m.s.l.	5-7	North Andaman Sea off Myanmar coast	Westwards	Eastcentral Bay of Bengal & adjoining Myanmar coast	Became less marked on 8.
16	At 1.5 km above m.s.l.	6-18	Northeast Assam and neighbourhood	Stationary	Northeast Assam and neighbourhood between 1.5 & 5.8 km above m.s.l.	Became less marked on 19th.
17	Upto 3.1 km above m.s.l.	6	North Bangladesh and neighbourhood	Stationary	In situ	Became less marked on 7th.
18	At 0.9 km above m.s.l.	7-13 (Mor)	Northwest Uttar Pradesh	Oscillatory	Southwest Uttarakhand & neighbourhood	Became less marked on 13th.
19	At 0.9 km above m.s.l.	7-9	Bihar	Stationary	In situ	Merged with the east-west trough from northwest Bihar to Nagaland on 10th.
20	At 1.5 km above m.s.l.	9-10	Marathwada and neighbourhood	Stationary	In situ	Became less marked on 11th.
21	At 0.9 km above m.s.l.	11-13 (Mor)	East Uttar Pradesh & neighbourhood	Eastwards	Central parts of Bihar and neighbourhood	Merged with the east-west trough which ran from northwest Bihar to Nagaland on 13th.
22	At 3.1 km above m.s.l.	11-19	North Gujarat & adjoining south Rajasthan	Oscillatory	North Gujarat & neighbourhood	Became less marked on 20th.
23	At 3.1 km above m.s.l.	12	North Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 13th.
24	At 1.5 km above m.s.l.	14	East Bihar & adjoining Sub-Himalayan West Bengal & Sikkim	Stationary	In situ	Became less marked on 15th.
25	At 3.1 km above m.s.l.	14	Northwest Madhya Pradesh & neighbourhood	Stationary	In situ	Became less marked on 15th.
26	At 0.9 km above m.s.l.	15-16	North Bangladesh and neighbourhood	Northward	Sub-Himalayan West Bengal and neighbourhood	Became less marked on 17th morning.
27	Between 3.1 km & 7.6 km above m.s.l.	16	Southwest and adjoining westcentral Bay of Bengal	Stationary	In situ	Became less marked on 17th.
28	At 0.9 km above m.s.l.	17	Southeast Arabian Sea off Kerala coast	Stationary	In situ	Became less marked on 18th.
29	At 3.1 km above m.s.l.	18	Westcentral Bay of Bengal adjoining coastal Andhra Pradesh	Stationary	In situ	Became less marked on 19th.
30	At 4.5 km above m.s.l.	18	Rayalaseema & neighbourhood	Stationary	In situ	Became less marked on 19th.

TABLE. 4 Continued

31	At 5.8 km above m.s.l.	19	Coastal Andhra Pradesh & adjoining Telangana	Stationary	In situ	Became less marked on 20th.
32	Between 3.1 & 5.8 km above m.s.l.	19-23	Eastcentral Bay of Bengal	Oscillatory	Northeast & adjoining eastcentral Bay of Bengal	Became less marked on 24th.
33	At 0.9 km above m.s.l.	19	Northeast Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 20th.
34	Between 1.5 & 3.1 km above m.s.l.	20-23	South Pakistan & neighbourhood	Oscillatory	Southwest Rajasthan & neighbourhood	Became less marked on 24th.
35	Upto 1.5 km above m.s.l.	20-21	East Bihar & neighbourhood	Oscillatory	Bihar & adjoining east Uttar Pradesh	Became less marked on 22nd.
36	At 0.9 km above m.s.l.	20-21	Assam	Northeast	Northeast Assam	Became less marked on 22nd.
37	Between 3.1 & 4.5 km above m.s.l.	21	Vidarbha & neighbourhood	Stationary	In situ	Became less marked on 22nd.
38	Between 3.1 & 7.6 km above m.s.l.	21-23	Interior Odisha	Oscillatory	south Chhattisgarh	Became less marked on 24th.
	At 0.9 km above m.s.l.	23-24	Central Assam	Northeast	Northeast Assam	Became less marked on 25th.
39	Upto 1.5 km above m.s.l.	23	Central Rajasthan	Stationary	In situ	Became less marked on 24th.
40	At 1.5 km above m.s.l.	23	North Haryana & neighbourhood	Stationary	In situ	Became less marked on 24th.
41	At 0.9 km above m.s.l.	24	Southeast Pakistan & neighbourhood	Stationary	In situ	Became less marked on 25th.
42	Between 1.5 & 5.8 km above m.s.l.	24-30 Jun	South Gujarat & neighbourhood	Oscillatory	Southeast Pakistan and adjoining Kutch at 1.5 km above m.s.l.	Became less marked on 1st July.
43	Between 3.1 & 5.8 km above m.s.l.	25-27	Eastcentral Bay of Bengal & neighbourhood		Northwest & adjoining westcentral Bay of Bengal	Under its influence, a low pressure area formed over northwest Bay of Bengal off north Odisha coast on 28th.
44	At 0.9 km above m.s.l.	25	Southwest Madhya Pradesh & neighbourhood	Stationary	In situ	Became less marked on 26th
45	At 0.9 km above m.s.l.	25-28	Northwest Rajasthan & neighbourhood	Oscillatory	Northeast Rajasthan & neighbourhood	Became less marked on 29th.
46	At 1.5 km above m.s.l.	25	Southwest Rajasthan & neighbourhood	Stationary	In situ	Became less marked on 26th.
47	Between 1.5 & 3.1 km above m.s.l.	27 Jun-1 Jul	East Assam & neighbourhood	northeast	northeast Assam	Became less marked on 2nd Jul.
48	At 0.9 km above m.s.l.	27	North Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 28th.
49	Upto 1.5 km above m.s.l.	28-29	Northwest Rajasthan & neighbourhood	Stationary	In situ	Became less marked on 30th.
50	Between 3.1 km & 5.8 km above m.s.l.	28-29	North Haryana & neighbourhood	Eastwards	Northwest Uttar Pradesh & neighbourhood between 1.5 km & 3.1 km above m.s.l.	Merged with the cyclonic circulation over north Haryana & neighbourhood on 30th June.
51	Upto 1.5 km above m.s.l.	29	East Uttar Pradesh and adjoining Bihar	Stationary	In situ	Merged with the cyclonic circulation over east Jharkhand & neighbourhood on 30th June.
52	At 0.9 km above m.s.l	29 Jun-1 Jul	North Punjab and neighbourhood	Eastwards	North Haryana & neighbourhood	Became less marked on 2nd July.

TABLE. 4 Continued

53	Between 3.1 & 4.5 km above m.s.l.	30 Jun-5 Jul	North Gujarat & neighbourhood		South Gujarat & neighbourhood	became less marked on 6th Jul.
54	At 1.5 km above m.s.l.	30 Jun-1 Jul	Central Pakistan & neighbourhood	Stationary	In situ	Became less marked on 2nd July.
55	At 5.8 km above m.s.l.	30 Jun	Central Madhya Pradesh & neighbourhood	Stationary	In situ	Merged with the trough from the cyclonic circulation over south Gujarat to central Madhya Pradesh on 1st July.
IV. Other troughs / Wind Discontinuity						
1	At 1.5 km above m.s.l.	3	From the cyclonic circulation over east Uttar Pradesh to north interior Karnataka across Madhya Pradesh & interior Maharashtra	Stationary	In situ	Became less marked on 4th.
2	At 1.5 km above m.s.l.	4-5 (Mor)	Roughly along Long.87° E to the north of Lat.22° N	Eastwards	Roughly along Long. 88° E to the north of Lat.22° N on	Became less marked on 5th.
3	At 0.9 km above m.s.l.	5-6	From the cyclonic circulation over west Uttar Pradesh to east Bangladesh across east Uttar Pradesh, Jharkhand & Gangetic West Bengal	Oscillatory	from the cyclonic circulation over northwest Madhya Pradesh to West Bengal across east Madhya Pradesh & Jharkhand	Became less marked on 7th.
4	Upto 0.9 km above m.s.l.	7-8	From south Maharashtra to southeast Arabian sea off south Kerala	Oscillatory	From Maharashtra to north Kerala	Became less marked on 9th.
5	At 0.9 km above m.s.l.	10-17 (Mor)	From northwest Bihar to Nagaland across Sub-Himalayan West Bengal and south Assam	Oscillatory	Sub-Himalayan West Bengal & Sikkim to northeast Assam across west Assam	Became less marked on 17th.
6	At 1.5 km above m.s.l. l	11-13	Roughly along Long.86° E to the north of Lat.22° N	Stationary	In situ	Became less marked on 14.
7	Between 3.1 km & 5.8 km above m.s.l.	13-15	From Telangana to central parts of Bay of Bengal across coastal Andhra Pradesh	Oscillatory	From Rayalaseema to central Bay of Bengal across westcentral Bay of Bengal	Became less marked on 16th.
8	Between 3.1 km & 5.8 km above m.s.l.	13-15	Roughly along Long.91° E to the north of Lat.23° N	Eastwards	Roughly along Long. 94° E to the north of Lat.26° N	Became less marked on 16th.
9	At 3.1 km above m.s.l.	16-17	From the cyclonic circulation over northeast Arabian Sea and adjoining Saurashtra to eastcentral Arabian Sea off Maharashtra coast	Oscillatory	From the cyclonic circulation over northeast Arabian Sea adjoining Saurashtra to eastcentral Arabian Sea off south Maharashtra coast	Became less marked on 18th.
10	At 1.5 km above m.s.l. on	17	From north Bihar to southern parts of Gangetic West Bengal	Stationary	In situ	Became less marked on 18th.
11	At 3.1 km above m.s.l.	17	From Goa to south coastal Andhra Pradesh	Stationary	In situ	Became less marked on 18th.
12	Between 1.5 & 3.1 km above m.s.l.	19	Rroughly along Long.88° E to the north of Lat.22° N	Stationary	In situ	Became less marked on 20th.
13	At mean sea level	20-30	Ran off Karnataka and Kerala coasts	Oscillatory	Ran along Maharashtra-Kerala coasts	

TABLE. 4 Continued

14	At 0.9 km above m.s.l.	21-26	From northeast Rajasthan to Manipur across northwest Madhya Pradesh, Uttar Pradesh, Bihar, Sub-Himalayan West Bengal, Bangladesh, Meghalaya & Assam	Oscillatory	From northwest Rajasthan to Manipur across south Uttar Pradesh & Jharkhand	Became less marked on 27th.
15	At 3.1 km above m.s.l.	23	From the cyclonic circulation over south Chhattisgarh to south Maharashtra coast	Stationary	In situ	Merged with the trough from the cyclonic circulation over south Gujarat to Jharkhand on 24th.
16	At 0.9 km above m.s.l.	23	From the cyclonic circulation over central Rajasthan to northeast Arabian Sea	Stationary	In situ	Became less marked on 24th.
17	Between 1.5 & 4.5 km above m.s.l.	24-25	From the cyclonic circulation over south Gujarat to Jharkhand across Madhya Pradesh & north Chhattisgarh	Oscillatory	From the cyclonic circulation over central Gujarat & neighbourhood to northwest Bihar across Madhya Pradesh & southeast Uttar Pradesh	Became less marked on 26th.
18	At 3.1 km above m.s.l.	26	From the cyclonic circulation over central Gujarat to east Vidarbha across Madhya Maharashtra & Marathwada	Stationary	In situ	Became less marked on 27th.
19	At 0.9 km above m.s.l.	27	From the cyclonic circulation over central Gujarat to west Bihar across east Rajasthan, northwest Madhya Pradesh & east Uttar Pradesh	Stationary	In situ	Became less marked on 28th.
20	Upto 1.5 km above m.s.l.	28-29	From the cyclonic circulation over northeast Rajasthan to the low pressure area over northwest Bay of Bengal off north Odisha coast across Madhya Pradesh, Chhattisgarh, Jharkhand, Odisha	Oscillatory	From northwest Uttar Pradesh to the centre of the low pressure area over northwest Bay of Bengal off north Odisha coast across the cyclonic circulation over east Uttar Pradesh and adjoining Bihar, Jharkh at 0.9 km above m.s.l.	Became less marked on 30th.
21	At 5.8 km above m.s.l.	30 Jun-1 Jul	From northeast Arabian sea off south Gujarat coast to northwest Bihar across cyclonic circulation over central Madhya Pradesh	Oscillatory	From the cyclonic circulation over south Gujarat to central Madhya Pradesh	Became less marked on 2nd July.
22	Between 3.1 & 3.6 km above m.s.l.	30 Jun	West Assam to north Odisha	Stationary	In situ	Became less marked on 1st July.
V. East-West shear zone						
1	Between 4.5 km & 5.8 km above m.s.l.	6-12	Roughly along Lat.16° N	Oscillatory	Roughly along 17° N	Became less marked on 13th.
2	Between 3.1 & 5.8 km above m.s.l.	27-29	Roughly along 17° N	Northward	Roughly along 20° N between 5.8 & 7.6 km above m.s.l.	Became less marked on 30th June.

TABLE 5

Details of the weather systems during June 2024

Sr. No	System	Duration	Place of initial location	Direction of Movement	Place of final location	Remarks
I. Depression/Well marked Low/Low Pressure area						
1	Low Pressure area	15- 16 (Eve)	Northwest and adjoining west central Bay of Bengal off south Odisha coast	Westward	Southeast Madhya Pradesh and neighbourhood	with the associated cyclonic circulation extended upto 7.6 km above m.s.l. tilting southwestwards with height. became less marked on 17th.
2	Depression	19-20	Northwest & adjoining westcentral Bay of Bengal off Odisha and adjoining north Andhra Pradesh coasts	Westward	Odisha coast near Chilika Lake	Initially, it lay as a low pressure area over central and adjoining north Bay of Bengal on 18th. Details are given in the article 'Cyclones & Depressions over north Indian ocean 2024'.
3	Well marked low pressure area	26 (Eve)-27	Gangetic West Bengal and north Bay of Bengal	Westwards	Gangetic West Bengal & adjoining north Odisha	Initially it lay as a cyclonic circulation over Gangetic West Bengal & adjoining Bangladesh on 25th. Under it's influence, a low pressure area formed over north Bay of Bengal and adjoining coastal areas of Bangladesh and Gangetic West Bengal with the associated cyclonic circulation extended upto 7.6 km above m. s. l. tilting southwestwards with height on 26th. Weakened into low pressure area over Gangetic West Bengal & adjoining north Odisha on 27th and became less marked on 27th evening. However, it's associated cyclonic circulation lay over north Chhattisgarh and neighbourhood which became less marked on 30th.
II. Western Disturbances /Eastward moving Systems						
(a) Upper air cyclonic circulation						
1	At 3.1 km above m.s.l. may check	6 (Eve)-7	North Pakistan	Northeast	Central Pakistan and neighbourhood	With a trough aloft in mid tropospheric westerlies with its axis at 5.8 km above m.s.l. roughly along Long.70° E to the north of Lat.32° N It moved away northeastwards on 8th
(b) As Trough						
1	At 5.8 km above m.s.l.	13-18	Roughly along Long.70° E to the north of Lat.30° N	Northeast	Roughly along Long. 74° E to the north of Lat.32° N	Moved away northeastwards on 19th.
2	At 5.8 km above m.s.l.	20-21 (Eve)	Roughly along Long.66° E to the north of Lat.28° N	Northeast	Roughly along Long. 70° E to the north of Lat.30° N	Moved away northeastwards on 22nd.
3	At 5.8 km above m.s.l.	22-22 (Eve)	Roughly along Long.65° E to the north of Lat.30° N	Eastwards	Roughly along Long. 67° E to the north of Lat.30° N	Moved away eastwards on 23rd.
III. Other upper air cyclonic circulations						
1	Between 3.1 & 7.6 km above m.s.l.	1	South Gujarat & neighbourhood	Stationary	In situ	Merged with the cyclonic circulation over north Gujarat & neighbourhood on 2nd.
2	At 1.5 km above m.s.l.	2	Southeast Pakistan & neighbourhood	Stationary	In situ	Became less marked on 3rd.

TABLE. 5 Continued

3	Between 3.1 & 4.5 km above m.s.l.	2	Assam & neighbourhood	Stationary	In situ	Became less marked on 3rd.
4	Between 4.5 & 5.8 km above m.s.l.	2	East Bihar & neighbourhood	Stationary	In situ	Became less marked on 3rd.
5	At 1.5 km above m.s.l.	3-4 (Mor)	Himachal Pradesh	Eastwards	northwest Uttar Pradesh	Became less marked on 4th.
6	At 1.5 km above m.s.l.	3	Manipur	Stationary	In situ	Became less marked on 4th.
7	At 1.5 km above m.s.l.	4-8	Northeast Rajasthan	Oscillatory	northeast Rajasthan & neighbourhood	Became less marked on 9th.
8	At 1.5 km above m.s.l.	4-5	Southeast Pakistan	Eastwards	west Rajasthan & adjoining Pakistan at 0.9 km above m.s.l.	Became less marked on 6th.
9	Between 3.1 km & 5.8 km above m.s.l.	4	west Jharkhand & neighbourhood	Stationary	In situ	Became less marked on 5th.
10	At 5.8 km above m.s.l.	5-8	Eastcentral Bay of Bengal	Westwards	Westcentral Bay of Bengal & adjoining northwest Bay of Bengal off north Andhra Pradesh coast	Became less marked on 9th.
11	At 0.9 km above m.s.l.	5	East Uttar Pradesh & neighbourhood	Stationary	In situ	Became less marked on 6th.
12	Upto 1.5 km above m.s.l.	6-14	Northeast Assam & neighbourhood	Oscillatory	Nagaland & neighbourhood	Became less marked on 15th.
13	At 4.5 km above m.s.l.	8-10	Central Gujarat	Westwards	Kutch and extended upto 1.5 km above m.s.l.	Became less marked on 11th.
14	Upto 1.5 km above m.s.l.	10	Northeast Rajasthan & neighbourhood	Stationary	In situ	Became less marked on 11th.
15	At 3.1 km above m.s.l.	11	Interior Odisha	Stationary	In situ	Became less marked on 12th.
16	Upto 1.5 km above m.s.l.	11	Punjab	Stationary	In situ	Became less marked on 12th
17	Between 3.1 km & 4.5 km above m.s.l.	11	North Madhya Maharashtra	Stationary	In situ	Became less marked on 12th.
18	At 0.9 km above m.s.l.	12	Sub-Himalayan West Bengal & neighbourhood	Stationary	In situ	Became less marked on 13th.
19	At 5.8 km above m.s.l.	12	East Bihar & neighbourhood	Stationary	In situ	Became less marked on 13th.
20	At 3.1 km above m.s.l.	12-14	North Gujarat & neighbourhood	Southwards	Gujarat	Became less marked on 15th.
21	At 3.1 km above m.s.l.	13	Jharkhand & neighbourhood	Stationary	In situ	Merged with the cyclonic circulation over Gangetic West Bengal & adjoining Jharkhand & Odisha on 14th.
22	At 5.8 km above m.s.l.	13	West central Bay of Bengal off coastal Andhra Pradesh	Stationary	In situ	Merged with the cyclonic circulation over Gangetic West Bengal & adjoining Jharkhand & Odisha on 14th.
23	Upto 5.8 km above m.s.l.	14	Gangetic West Bengal & adjoining Jharkhand & Odisha	Stationary	In situ	Became less marked on 15th.
24	At 1.5 km above m.s.l.	15	Southwest Pakistan & neighbourhood	Stationary	In situ	Became less marked on 16th.
25	At 0.9 km above m.s.l.	15 (Mor)	West Rajasthan & neighbourhood	Stationary	In situ	Merged with the monsoon trough on 15th.

TABLE. 5 Continued

26	Upto 1.5 km above m.s.l.	16-19	Northeast Assam & neighbourhood	Stationary	In situ	Became less marked on 20th.
27	At 0.9 km above m.s.l.	17-21	Saurashtra & Kutch and neighbourhood	Oscillatory	northeast Arabian Sea and adjoining Kutch	Became less marked on 22nd.
28	At 1.5 km above m.s.l.	20	Himachal Pradesh	Stationary	In situ	Became less marked on 21st.
29	Upto 1.5 km above m.s.l.	20	Central Rajasthan	Stationary	In situ	Became less marked on 21st.
30	Upto 1.5 km above m.s.l.	20	East Bihar & adjoining Sub-Himalayan West Bengal	Stationary	In situ	Became less marked on 21st.
31	Upto 1.5 km above m.s.l.	20-25	Central Assam	Oscillatory	Assam and neighbourhood	Became less marked on 26th.
32	At 0.9 km above m.s.l.	21	Northeast Rajasthan & neighbourhood	Stationary	In situ	Merged with the monsoon trough on 22nd.
33	At 1.5 km above m.s.l.	23	Northwest Uttar Pradesh	Stationary	In situ	Became less marked on 24th.
34	At 1.5 km above m.s.l.	23	Southwest Rajasthan	Stationary	In situ	Became less marked on 24th.
35	At 3.1 km above m.s.l.	24	North Gujarat & neighbourhood	Stationary	In situ	Became less marked on 25th.
36	At 1.5 km above m. s. l.	25	Northwest Uttar Pradesh	Stationary	In situ	Became less marked on 26th.
37	Upto 1.5 km above m. s. l.	27	Northwest Uttar Pradesh	Stationary	In situ	Became less marked on 28th.
38	At 1.5 km above m. s. l.	29 Jul-1 Aug	Northeast Arabian Sea and adjoining Saurashtra	Oscillatory	Northeast Arabian sea and adjoining Saurashtra at 4.5 km above m. s. l.	Became less marked on 2nd Aug.
39	Between 3.1 & 7.6 km above m. s. l.	30 Jul-1 Aug.	Jharkhand & neighbourhood	Oscillatory	Gangetic West Bengal and adjoining south Bangladesh	Under its influence, a low pressure area formed over Gangetic West Bengal and adjoining Jharkhand on 2nd.
40	Between 1.5 & 3.1 km above m. s. l.	30-31 Jul	Northeast Assam & neighbourhood	Oscillatory	South Assam	Became less marked on 1st August.
41	At 3.1 km above m. s. l.	30	Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 31st.
42	At 3.1 km above m. s. l.	30	Himachal Pradesh & neighbourhood	Stationary	In situ	Became less marked on 31st.
IV. Other Troughs						
1	At mean sea level	1-31	Along Maharashtra-Kerala coasts	Oscillatory	Along south Gujarat to Kerala coast	
2	At 0.9 km above m.s.l.	1-6	From north Punjab to Mizoram across north Haryana, north Uttar Pradesh, north Bihar, the cyclonic circulation over Sub-Himalayan West Bengal and Assam	Oscillatory	From the cyclonic circulation over southwest Uttar Pradesh & neighbourhood to the cyclonic circulation over northeast Assam across Bihar & West Bengal	Became less marked on 7th.
3	At 3.1 km above m.s.l.	2	From northeast Madhya Pradesh to the cyclonic circulation over Assam	Stationary	In situ	Became less marked on 3rd.
4	At 3.1 km above m.s.l.	3	From southeast Pakistan to Bangladesh across south Rajasthan, Madhya Pradesh, Jharkhand	Stationary	In situ	Became less marked on 4th.

TABLE. 5 Continued

5	At 0.9 km above m.s.l.	4	Ran roughly along Long. 93° E to the north of Lat. 24° N	Stationary	In situ	Became less marked on 5th.
6	Between 1.5 km & 3.1 km above m.s.l.	5	From the cyclonic circulation over southwest Uttar Pradesh & neighbourhood to west Assam across Bihar, Sub-Himalayan West Bengal & Sikkim, north Bangladesh	Stationary	In situ	Became less marked on 6th
7	Between 3.1 km & 5.8 km above m.s.l.	6	From the cyclonic circulation over southwest Uttar Pradesh to northeast Arabian sea off Gujarat coast across Madhya Pradesh	Stationary	In situ	Became less marked on 7th.
8	At 1.5 km above m.s.l.	10	From northeast Uttar Pradesh to the cyclonic circulation over northeast Assam across north Bihar and Sub-Himalayan West Bengal	Stationary	In situ	Became less marked on 11th.
9	At 0.9 km above m.s.l.	12	Northeast Assam to northwest Bay of Bengal	Stationary	In situ	Became less marked on 13th.
10	At 3.1 km above m.s.l.	12	West Assam to northwest Bay of Bengal	Stationary	In situ	Became less marked on 13th.
V. East-West Shear Zone						
1	Between 4.5 & 7.6 km above m.s.l.	8-11	Roughly along Lat.18° N	Oscillatory	Roughly along Lat. 18° N	Became less marked on 12th.
2	Between 3.1 & 7.6 km	15-29	Roughly along 20° N	Oscillatory	Roughly along Lat. 20° N	Became less marked on 30th.
3	Between 4.5 & 5.8 km above m. s. l.	31 Jul	Roughly along 20° N	Stationary	In situ	Became less marked on 1st August.

TABLE 6

Details of the weather systems during August 2024

Sr. No	System	Duration	Place of initial location	Direction of Movement	Place of final location	Remarks
1.Cyclone/ Depression/Deep Depression/Low Pressure area/Well Marked Low						
1	Deep Depression	3 (0830)-4 (2330)	Southwest Bihar and adjoining northwest Jharkhand	Westward	Northwest Madhya Pradesh and adjoining northeast Rajasthan	Under the influence of cyclonic circulation over Gangetic West Bengal and adjoining south Bangladesh, a low pressure area formed over Gangetic West Bengal and adjoining Jharkhand on 2nd morning. It then intensified into Dep over north Jharkhand & neighbourhood at 1730 IST of 2nd. Details are given in the article on, 'Cyclones & depression over north Indian ocean 2024'
2	Low Pressure area	3-4(Eve)	Southwest Rajasthan and neighbourhood	Westward	South Pakistan & neighbourhood	became unimportant to Indian Region on 4th night.

TABLE 6. Continued

3	Well marked low pressure area	26 (0530)-26 (1730)	Gangetic West Bengal	Westward	Gangetic West Bengal and adjoining Jharkhand	Initially it lay as a cyclonic circulation over north Bay of Bengal at 5.8 km above m.s.l. on 23rd. It then lay over south Bangladesh & neighbourhood on 25th morning. Under its influence, a low pressure area formed over the same region at 1130 IST of 25th.subsequently, it became more marked. It weakened as a low pressure area over Jharkhand & neighbourhood on 27th morning and became less marked on 28th morning.
4	Low Pressure area	22 (Mor)-23	Eastcentral Arabian sea off Karnataka-Goa coasts	Northward	Eastcentral Arabian sea off Maharashtra coasts	Initially, it lay as a cyclonic circulation over Lakshadweep & neighbourhood. The associatedcyclonic circulation extended upto 5.8 km above m.s.l. tilting southwestwards with height. It became less marked on 24th morning. However, it's associated cyclonic circulation over eastcentral Arabian sea off Maharashtra coast also became less marked on the same day.
5	Cyclonic Storm 'ASNA'	30 Aug. (1130)-1 Sept (0830)	Kutch coast and adjoining areas of Pakistan & northeast Arabian Sea	Westward	Northwest Arabian Sea	Under the influence of the cyclonic circulation over south Bangladesh & adjoining Gangetic West Bengal, a low pressure area has formed over northwest Bay of Bengal and adjoining areas of West Bengal and Bangladesh 16th morning. Then intensified into WML, dep, dd. & CS Details are given in the article on 'cyclones & depressions over north Indian ocean during 2024'.
6	Depression	31 Aug (0530)-2 Sept (0830)	Westcentral & adjoining northwest Bay of Bengal off north Andhra Pradesh & south Odisha coasts	Westwards	East Vidarbha and adjoining Telangana	Under the influence of cyclonic circulation over eastcentral Bay of Bengal & neighbourhood, a low pressure area formed over central and adjoining north Bay of Bengal on 29th August. It became a well marked low pressure area over the same region on the same day and concentrated into a Depression. Details are given in the article on 'cyclones & depressions over north Indian ocean during 2024'.
II. Western Disturbances /Eastward moving Systems						
(a) As A Trough						
1	At 5.8 km above m.s.l.	20	Roughly along Long.70° E to the north of Lat.32° N	Stationary	In situ	It then lay as a cyclonic circulation over Jammu & Kashmir at 3.1 km above m.s.l. on 21st and became less marked on 22nd.
2	At 5.8 km above m.s.l.	22-26	Roughly along Long.65° E to the north of Lat.30° N	Eastward	roughly along Long. 72° E to the north of Lat.30° N	It then lay as a cyclonic circulation over north Pakistan & neighbourhood at 3.1 km above m.s.l. with trough aloft in middle tropospheric westerlies with its axis at 7.6 km above m.s.l. roughly along Long.72° E to the north of Lat. 32° N on 27th and moved away eastwards on 28th.
3	At 5.8 km above m. s. l.	28-30	Roughly along Long.67° E to the north of Lat.33° N	Stationary	Roughly along Long. 67° E to the north of Lat.30° N	Moved away northeastwards of 31st August.

TABLE 6. Continued

4	At 5.8 km above m.s.l.	31 Aug-4 Sept	Roughly along Long. 58° E to the north of Lat.30° N	Eastwards	Roughly along Long. 67° E to the north of Lat.32° N	It then lay as a cyclonic circulation over Jammu and adjoining Pakistan at 3.1 km above m.s.l. with a trough aloft in middle tropospheric westerlies with its axis at 5.8 km above m.s.l. ran roughly along Long.67° E to the north of Lat.32° N on 5th. It became less marked along with its associated trough aloft on 7th.
III. Other upper air cyclonic circulations						
2	At 0.9 km above m.s.l.	1	Northeast Rajasthan & neighbourhood	Stationary	In situ	Merged with the east-west trough from north Rajasthan to south Assam on 2nd.
3	Between 3.1 & 5.8 km above m.s.l.	1	Punjab & neighbourhood	Stationary	In situ	Became less marked on 2nd.
4	At 0.9 km above m.s.l.	2	Nagaland and neighbourhood	Stationary	In situ	Became less marked on 3rd.
5	At 0.9 km above m.s.l.	4-13	northeast Assam	Oscillatory	Northeast Assam	Became less marked on 14th.
6	Between 1.5 & 7.6 km above m.s.l.	6-10	Gangetic West Bengal and adjoining Bangladesh	Westward	Southeast Uttar Pradesh & neighbourhood	Became less marked on 11th.
7	Between 1.5 & 4.5 km above m.s.l	7-17	Haryana & neighbourhood	Oscillatory	West Rajasthan & neighbourhood	Became less marked on 18th.
8	Between 5.8 & 7.6 km above m.s.l.	9	South Jharkhand & neighbourhood	Stationery	In situ	Merged with the cyclonic circulation over southeast Uttar Pradesh & neighbourhood on 10th.
9	At mean sea level	10	Along Maharashtra-Karnataka coasts	Stationery	In situ	Became less marked on 11th.
10	Between 3.1 & 4.5 km above m.s.l.	12	East Bangladesh & neighbourhood	Stationery	In situ	Became less marked on 13th.
11	At 5.8 km above m.s.l.	12	Jharkhand & neighbourhood	Stationery	In situ	Became less marked on 13th.
12	At 1.5 km above m.s.l.	12-14	Southeast Pakistan & adjoining Rajasthan	Oscillatory	Southwest Rajasthan and neighbourhood	Became less marked on 15th.
13	Upto 4.5 km above m.s.l.	13	South Sri Lanka & neighbourhood	Stationery	In situ	Became less marked on 14th.
14	At 3.1 km above m.s.l.	13-14	Gujarat & neighbourhood	Southward	South Gujarat & neighbourhood between 3.1 & 4.5 km above m.s.l.	Became less marked on 15th.
15	Between 1.5 & 4.5 km above m.s.l.	13-15	South Bangladesh & neighbourhood	Westward	South Bangladesh and adjoining Gangetic West Bengal	Under its influence, a low pressure area has formed over northwest Bay of Bengal and adjoining areas of West Bengal and Bangladesh 16th morning.
16	Upto 5.8 km above m.s.l.	14-19	Southeast Arabian sea & adjoining Kerala coast	Oscillatory	Rayalaseema & neighbourhood	Became less marked on 20th.
17	Between 3.1 & 4.5 km above m. s. l.	15	Jharkhand & neighbourhood	Stationery	In situ	Became less marked on 16th.
18	Between 3.1 & 5.8 km above m.s.l.	16 (Mor)	Borth Gujarat & adjoining south Rajasthan	Stationery	In situ	Became less marked on 16th.
19	Upto 3.1 km above m.s.l.	18-20	Southwest Pakistan & neighbourhood	Stationery	In situ	Became less marked on 21st.

TABLE 6. Continued

20	At 0.9 km above m.s.l.	20 (Mor)-21	Jharkhand & neighbourhood	Stationery	In situ	Merged with the monsoon trough on 22nd.
21	Between 3.1 and 5.8 km above m.s.l.	20-21	Southeast Arabian Sea and adjoining Lakshadweep	Oscillatory	Lakshadweep & neighbourhood	Under its influence, a low pressure area formed over eastcentral Arabian sea off Karnataka-Goa coasts on 22nd morning.
22	At 0.9 km above m.s.l.	20	Northwest Uttar Pradesh & neighbourhood	Stationery	In situ	Became less marked on 21st.
23	At 1.5 km above m.s.l.	20	North Tamil Nadu & adjoining south coastal Andhra Pradesh	Stationery	In situ	Became less marked on 21st.
24	Between 4.5 & 5.8 km above m.s.l.	21	Northeast Arabian sea and adjoining Gujarat	Stationery	In situ	Became less marked on 22nd.
25	At 5.8 km above m.s.l.	23-25	North Bay of Bengal	Westward	South Bangladesh & neighbourhood	Under its influence, a low pressure area formed over the same region at 1130 IST of 25th
26	Upto 1.5 km above m.s.l.	24	Northeast Assam and adjoining area	Stationery	In situ	Became less marked on 25th.
27	at 0.9 km above m.s.l.	27	central Assam	Stationery	In situ	became less marked on 28th.
28	Upto 5.8 km above m.s.l.	28	Eastcentral Bay of Bengal & neighbourhood	Stationary	In situ	A low pressure area formed over central and adjoining north Bay of Bengal on 29th August. it then intensified into wml & then Dep. at 0530 IST on 31st August.
29	Upto 3.1 km above m.s.l.	28	Southeast Uttar Pradesh	Stationary	In situ	Became less marked on 29th.
30	Upto 1.5 km above m.s.l.	31 Aug.-1 Sept.	Central Assam	Eastward	Nagaland and neighbourhood	Became less marked on 2nd Sept.
IV. North-South Trough/Other trough						
1	At m.s.l	1-8	South Gujarat to Kerala coast	Oscillatory	Along south Gujarat to north Kerala coasts	Became less marked on 9th.
2	At 0.9 km above m.s.l.	1	From the cyclonic circulation over Gangetic West Bengal and adjoining south Bangladesh to northeast Bihar	Stationary	In situ	Became less marked on 2nd
3	Between 1.5 & 3.1 km above m.s.l.	1	From west Uttar Pradesh to the cyclonic circulation over Gangetic West Bengal	Stationary	In situ	Became less marked on 2nd.
4	Between 0.9 km to 4.5 km above m.s.l.	2-6	From north Rajasthan to south Assam across north Madhya Pradesh, the cyclonic circulation associated with the low pressure over Gangetic West Bengal & adjoining Jharkhand, Sub-Himalayan West Bengal	Oscillatory	From the low pressure area over central parts of Pakistan to east Bihar across central parts of Rajasthan & Uttar Pradesh	Became less marked on 7th.
5	At 0.9 km above m.s.l.	7	From Rayalaseema to Comorin area across interior Tamil Nadu	Stationary	In situ	Became less marked on 8th.
6	At mean sea level	10	Maharashtra-Karnataka coasts	Stationary	In situ	Became less marked on 11th.
7	At 0.9 km above m.s.l.	10-17	From south interior Karnataka to Comorin area	Oscillatory	From the cyclonic circulation over north interior Karnataka and adjoining Telangana to Comorin area across Kerala and interior Tamil Nadu	Became less marked on 18th morning.

TABLE 6. Continued

8	Upto 3.1 km above m.s.l.	11-13	From the cyclonic circulation over northeast Rajasthan to Bangladesh across Uttar Pradesh, Bihar and Sub-Himalayan West Bengal	Oscillatory	From the cyclonic circulation over northeast Rajasthan & neighbourhood to Bangladesh across south Uttar Pradesh, south Bihar and Gangetic West Bengal	Became less marked on 14th.
9	Between 3.1 & 4.5 km above m.s.l.	12	From northeast Arabian sea to the cyclonic circulation over northwest Madhya Pradesh & neighbourhood	Stationary	In situ	Became less marked on 13th.
10	At 3.1 km above m.s.l.	17	From the cyclonic circulation over west Rajasthan to westcentral Arabian sea	Stationary	In situ	Became less marked on 18th.
11	Between 9.6 & 12.6 km above m.s.l.	17	From west Assam to north Odisha	Stationary	In situ	Became less marked on 18th.
12	Upto 1.5 km above m.s.l.	18-19	From the cyclonic circulation over north interior Karnataka & adjoining Telangana to southeast Arabian sea across Kerala	Oscillatory	From cyclonic circulation over Rayalaseema & neighbourhood to Comorin area across Tamil Nadu	Became less marked on 20th.
13	Between 1.5 & 5.8 km above m.s.l.	19-20	From eastcentral Arabian sea off Karnataka coast to Maldives area	Stationary	In situ	Became less marked on 21st.
14	At mean sea leval	23-30	From the low pressure area over eastcentral Arabian sea off Maharashtra coasts to north Kerala coast	Oscillatory	South Gujarat to Kerala coasts	Became less marked of 31st August.
15	Upto 1.5 km above m.s.l.	24	From the low pressure area over southeast Uttar Pradesh & adjoining northwest Madhya Pradesh to northeast Bay of Bengal	Stationary	In situ	Became less marked on 25th.
16	Upto 3.1 km above m.s.l.	28	From the cyclonic circulation over southeast Uttar Pradesh to the cyclonic circulation over eastcentral Bay of Bengal	Stationary	In situ	Became less marked on 29th.

TABLE 7

Details of the weather systems during September 2024

Sr. No	System	Duration	Place of initial location	Direction of Movement	Place of final location	Remarks
Deep Depression/Depression/Low pressure area						
1	Deep Depression	8 (2330)-9 (1730)	Northwest and adjoining westcentral Bay of Bengal	Westwards	Interior Odisha	Under the influence of cyclonic circulation over coastal Andhra Pradesh & adjoining westcentral Bay of Bengal, a low pressure area formed over westcentral and adjoining northwest Bay of Bengal off north Andhra Pradesh-south Odisha coasts on 6th. It then intensified into WML & Dep. Details are given in the article on, 'Cyclones & depression over north Indian ocean during 2024'.

TABLE 7 Continued

2	Depression	11 (0830)-13 (0530)	Northeast Madhya Pradesh	Oscillatory	Northwest Uttar Pradesh & neighbourhood	Weakened into a well marked low pressure area over northwest Uttar Pradesh & neighbourhood on 0830 IST of 13th. Details are given in the article on, 'Cyclones & depression over north Indian ocean during 2024'.
3	Deep Depression	14 (0530)-16 (1730)	Bangladesh and adjoining Gangetic West Bengal	Westwards	Jharkhand	Under the influence of cyclonic circulation over southeast Bangladesh and neighbourhood, a low pressure area formed over southeast Bangladesh and neighbourhood on 12th night. It then lay as a WML, Dep & DD. Details are given in the article on, 'Cyclones & depression over north Indian ocean during 2024'.
4	Low Pressure area	24	westcentral Bay of Bengal & adjoining northwest Bay off north Andhra-south Odisha coasts	Stationary	In situ	Initially it lay as a cyclonic circulation over central Bay of Bengal on 23rd. It became less marked on 25th. However, the associated cyclonic circulation lay over south Chhattisgarh & neighbourhood and extended upto 5.8 km above m.s.l. tilting southwards with height on the same day which became less marked on 30th September.
II. Western Disturbances /Eastward moving Systems						
(a) As a trough						
1	At 5.8 km above m.s.l.	8-12	Roughly along Long.72° E to the north of Lat.32° N	Northeast	Roughly along Long.72° E to the north of Lat.28° N	Moved away east-northeastwards on 13th.
2	At 5.8 km above m.s.l.	13-16 (Mor)	Roughly along Long.62° E to the north of Lat.32° N	Northeast	Roughly along Long.77° E to the north of Lat.29° N	It then lay as a cyclonic circulation over Himachal Pradesh & neighbourhood between 3.1 & 5.8 km above m.s.l. on 16th and became less marked on 17th.
3	At 5.8 km above m.s.l.	16-18	Roughly along Long.60° E to the north of Lat.28° N	Eastward	Roughly along Long.70° E to the north of Lat.30° N	moved away northeastwards on 19th.
4	At 5.8 km above m.s.l.	27-28	Roughly along Long.68° E to the north of Lat.30° N	Eastward	Roughly along Long.70° E to the north of Lat.30° N	moved away northeastwards on 29th.
III. Other upper air cyclonic circulations						
1	At 1.5 km above m.s.l.	1	North Haryana and neighbourhood	Stationary	In situ	Became less marked on 2nd.
2	Between 1.5 & 3.1 km above m.s.l.	2	Central Pakistan and adjoining west Rajasthan	Stationary	In situ	Became less marked on 3rd.
3	Between 3.1 km & 5.8 km above m.s.l.	3-5 (Mor)	Coastal Andhra Pradesh & Yanam and neighbourhood	Westwards	Coastal Andhra Pradesh & adjoining westcentral Bay of Bengal	Under its influence, a low pressure area formed over westcentral and adjoining northwest Bay of Bengal off north Andhra Pradesh-south Odisha coasts. CIt then lay as a WML, Dep & Deep Dep. It weakened into WML & again re-intensified into Dep over northeast Madhya Pradesh at 0830 IST of 11th September.
4	Between 4.5 km & 7.6 km above m.s.l.	3	Saurashtra & neighbourhood	Stationary	In situ	Became less marked on 4th.

TABLE 7 Continued

5	At 0.9 km above m.s.l.	3	East Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 4th.
6	Upto 1.5 km above m.s.l.	4-5	Northeast Assam & neighbourhood	Stationary	In situ	Became less marked on 6th.
7	At 1.5 km above m.s.l.	4-8	Haryana & neighbourhood	Oscillatory	central Rajasthan & neighbourhood	Became less marked on 9th.
8	Between 4.5 & 5.8 km above m.s.l.	4-5	North Andaman Sea & neighbourhood	Stationary	In situ	Became less marked on 6th.
9	Between 3.1 & 7.6 km above m.s.l.	4	North Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 5th.
10	At 0.9 km above m.s.l.	6(Mor)	North Bangladesh & neighbourhood	Stationary	In situ	Became less marked on 7th.
11	Upto 1.5 km above m.s.l.	7	Central Pakistan & neighbourhood	Stationary	In situ	Became less marked on 8th.
12	At 3.1 km above m.s.l.	10-14	South Gujarat	Oscillatory	North Gujarat & adjoining southwest Rajasthan	Became less marked on 15th.
13	Upto 3.1 km above m.s.l.	10-11	Northeast Assam	Oscillatory	Central Assam	Became less marked on 12th.
14	Upto mid tropospheric levels	11-12	Central parts of Myanmar	Oscillatory	Southeast Bangladesh and neighbourhood	Under its influence, a low pressure area formed over southeast Bangladesh and neighbourhood on 12th night. It then lay as a WML, Dep & DD.
15	At 3.1 km above m.s.l.	12	Punjab & adjoining Haryana	Stationary	In situ	Became less marked on 13th.
16	Upto 1.5 km above m.s.l.	15 (Mor)-15 (0830)	North Haryana & neighbourhood	Eastwards	northwest Uttar Pradesh & adjoining Haryana	Became less marked on 16th.
17	Between 1.5 & 3.1 km above m.s.l.	17 (Mor)-18	Haryana & neighbourhood	Oscillatory	north Punjab & neighbourhood	Became less marked on 19th.
18	Between 3.1 and 5.8 km above m.s.l	20-22	Westcentral & adjoining southwest Bay of Bengal	Eastwards	Westcentral Bay of Bengal	Merged with the east-west trough ran from Andhra Pradesh coast to south coastal Maynmar on 23rd.
19	Upto 0.9 km above m.s.l.	20	Punjab and adjoining Pakistan	Stationary	In situ	Merged with the cyclonic circulation over north Rajasthan on 21st.
20	Upto mid tropospheric levels	21-22	Northern parts of Thailand & neighbourhood and extended	Northwest	South coastal Myanmar & neighbourhood.	Merged with the east-west trough ran from Andhra Pradesh coast to south coastal Maynmar on 23rd.
21	At 0.9 km above m.s.l.	21	Tripura & neighbourhood	Stationary	In situ	Became less marked on 22nd.
22	At 1.5 km above m.s.l.	23	Northeast Assam & neighbourhood	Stationary	In situ	Became less marked on 24th.
23	At 1.5 km above m.s.l.	26-27	Northeast Assam	Stationary	In situ	Became less marked on 28th.
24	Upto 5.8 km above m.s.l.	29	South Gujarat & neighbourhood	Stationary	In situ	Became less marked on 30th.
25	At 1.5 km above m.s.l.	30 Sept.-1 Oct.	Northeast Assam & neighbourhood	Stationary	In situ	Became less marked on 2nd.
IV. North-South Trough/Other trough/trough in easterlies						
1	At mean sea level	2	Along south Gujarat to north Kerala coast	Stationary	In situ	Became less marked on 3rd.
2	At 0.9 km above m.s.	5	From the cyclonic circulation over northwest Uttar Pradesh & adjoining Haryana to Manipur across east Uttar Pradesh, Bihar, Sub-Himalayan West Bengal l.	Stationary	In situ	Became less marked on 6th morning.

TABLE 7 Continued

3	Between 1.5 and 3.1 km above m.s.l.	6	From southeast Uttar Pradesh to the cyclonic circulation associated with low pressure area over central adjoining north Bay of Bengal across north Chhattisgarh & north Odisha	Stationary	In situ	Became less marked on 7th.
4	At 0.9 km above m.s.l.	7	From the cyclonic circulation over central Rajasthan to north Chhattisgarh across central Madhya Pradesh	Stationary	In situ	Became less marked on 8th.
5	At mean sea level	8	Off north Karnataka to Kerala coasts	Stationary	In situ	Became less marked on 9th.
6	At mean sea level	10-12	Along south Gujarat to central Kerala coast	Oscillatory	along south Gujarat to Karnataka coasts	Became less marked on 13th.
7	Upto 3.1 km above m.s.l.	9	From southwest Uttar Pradesh to the centre of Deep Depression over northwest Bay of Bengal across north Madhya Pradesh, Chhattisgarh & Odisha	Stationary	In situ	Merged with the monsoon trough on 10th.
8	Upto 5.8 km above m.s.l.	22	From Andhra Pradesh coast to south coastal Maynmar	Stationary	In situ	Merged with the cyclonic circulation over central Bay of Bengal on 23rd.
9	Upto 5.8 km above m.s.l.	25-28	From north Konkan to south Bangladesh across the cyclonic circulation over south Chhattisgarh	Oscillatory	From northeast Arabian Sea to northwest Bihar across the cyclonic circulation over southwest Uttar Pradesh & neighbourhood	Became less marked on 29th.
10	At 0.9 km above m.s.l.	28 Sept.-1 Oct.	From south interior Karnataka to Gulf of Mannar across interior Tamil Nadu	Oscillatory	From the cyclonic circulation over Comorin area to north interior Karnataka across interior Tamil Nadu at 0.9 km above m.s.l.	Became less marked on 2nd.
11	Between 1.5 & 3.1 km above m.s.l.	30-Sept- 1 Oct.	From north Konkan to southeast Uttar Pradesh across Madhya Pradesh	Oscillatory	From north Konkan to northeast Madhya Pradesh across interior Maharashtra	Became less marked on 2nd.
V. East-west shear zone/ trough						
1	Between 4.5 & 7.6 km above m.s.l	1-4	Roughly along Lat.18° N	Northwards	Roughly along Lat. 22° N	Became less marked on 5th.
2	Between 3.1 km to 7.6 km above m.s.l.	24	Roughly along 16° N	Stationary	In situ	Merged with the trough which ran from north Konkan to south Bangladesh on 25th.

TABLE 8

Representative amounts of Heavy Rainfall (12cm and above) for June, July, August and September 2024

Date	Rainfall amounts
1 Jun	23 - Udumbannoor AWS; 14 - Urumi AWS.
2 Jun	19 - Cherrapunji; 16 - Cherrapunji (rkm) ; 14 - Kunnamkulam and Vadakkancherry; 13 - Mawsynram; 12 - Kodungallur.
3 Jun	18 - Banaganapalle and Shella; 17 - Goalpara PTO; 16 - Goalpara AWS; 15 - Cherrapunji (rkm) and Mawkyrwat; 14 - Williamnagar, Ramanagara and Mahanga; 13 - Lower Sholayar AWS, Srisailam, Mawkyrwat ARG, Devarhippargi, Kantapada and Mawsynram; 12 - Narsipatnam, Athirappalli AWS, Cherrapunji, Resubelpara, Kujanga and Marsaghai.
4 Jun	15 - Matijuri ARG; 14 - Samsing and Kamalpur AWS.
5 Jun	14 - Lohagaon IAF; 13 - Nedungal; 12 - Sarangapur and Sevoke.
6 Jun	Nil.
7 Jun	14 - Pookot; 13 - Pandharpur; 12 - Irinjalakuda and Talikote.
8 Jun	23 - Manki; 22 - Karwar; 20 - Gokarna and Kumta; 19 - Canacona and Ankola; 17 - Quepem; 15 - Sanguem and Honavar; 13 - Wallajah.
9 Jun	22 - Mulde ARG; 19 - Kudal; 18 - Gersoppa; 17 - Karwar; 16 - Kota, Castle Rock and Devgad; 15 - Malvan; 14 - Sawantwadi and Lohagaon IAF; 13 - Rajapur; 12 - Pune, Barpeta/Sarbhog AWS, Kollur and Ankola.

TABLE 8 Continued

10 Jun	25 - Amfu Pundibari; 15 - Alipurduar PTO and Panvel ARG; 14 - Cooch Behar; 12 - Falakata, Karwar and Sindgi.
11 Jun	20 - Neora and Bhutanghat; 16 - Hasimara; 15 - Murud; 14 - Buxaduar and Dahigaon - Fmo; 13 - Nilanga.
12 Jun	13 - Dahanu and Ashapara AWS.
13 Jun	35 - Cherrapunji; 29 - Cherrapunji (rkm) ; 26 - Singhik and Mawsynram; 22 - Mangan; 15 - Jhallong and Rongo; 13 - Samsing, Algarah, Mawkyrwat, Mawkyrwat ARG and Shipgyar; 12 - Jalpaiguri and Shella.
14 Jun	27 - Shahjahanpur; 16 - Manash Nh Xing; 15 - Rongo and Fakiragram ARG; 14 - Alipurduar PTO, Nh31 Bridge, Jhallong, Singhik and Bilasipara ARG; 13 - Mangan and Barpeta; 12 - Falakata, Dhupguri, Panbari and Hailakandi AWS.
15 Jun	64 - Mawsynram; 51 - Cherrapunji; 50 - Cherrapunji (rkm) ; 40 - Shella; 30 - Mawkyrwat; 27 - Mawkyrwat ARG; 21 - Alipurduar PTO; 17 - Matijuri; 16 - Chepan; 15 - Barpeta/Sarbhog AWS and Srijangram ARG; 13 - Tikrikilla; 12 - Barobhisha, Sankalan, Manash Nh Xing and Kokrajhar.
16 Jun	45 - Cherrapunji (rkm) ; 44 - Cherrapunji; 43 - Mawsynram; 30 - Barpeta; 29 - Aie Nh Xing; 25 - Beky Rly.bridge and Hasimara; 24 - Manash Nh Xing; 23 - Alipurduar PTO, Barobhisha, Barpeta/Sarbhog AWS and Bahalpur; 21 - Chepan; 20 - Tamulpur and Tihu ARG; 18 - Panbari; 17 - Srijangram ARG; 15 - Bilasipara ARG, Mawkyrwat and Bhutanghat; 14 - Chengmari/Diana, Nagarkata and Williamnagar; 13 - Amfu Pundibari, Goibargaon, Gossaigaon, Fakiragram ARG, Kokrajhar and Mawkyrwat ARG; 12 - Buxaduar, Murti, Hazuah and Koloriang.
17 Jun	23 - Khambhalia and Williamnagar; 20 - Hasimara; 19 - Kokrajhar; 16 - Kumargram and Gossaigaon; 15 - Karimganj and Nalbari/Pagladia; 14 - Siliguri PTO, Panbari and Cherrapunji (rkm) ; 13 - Bagdogra IAF, Champasari, Sankalan, Cherrapunji, B P Ghat and Badarpur ARG; 12 - Alipurduar PTO, Tamulpur ARG and Shella.
18 Jun	78 - Mawsynram; 43 - Cherrapunji (rkm) ; 39 - Cherrapunji; 30 - Mawkyrwat; 28 - Mawkyrwat ARG; 26 - Thakurganj; 22 - Pothia; 21 - Mathabhanga; 18 - Itanagar; 15 - Kumargram, Naharlagun, Manash Nh Xing, Kokrajhar and Kadamtala ARG; 14 - Dhubri CWC; 13 - Cooch Behar, Sevoke, Goibargaon, Williamnagar, B P Ghat, Karimganj and Tikrikilla; 12 - Dighalbank, Tamulpur ARG, Barpeta, Beky Rly.bridge, Srijangram ARG, Dhubri IMD, Hailakandi AWS, Haflong and Bhaghmara.
19 Jun	23 - Sevoke; 20 - Thakurganj; 19 - Tedhagach and Pothia; 18 - Tihu ARG; 17 - Falakata, Tamulpur, Tamulpur ARG, Barpeta, Hazuah and Nalbari/Pagladia; 16 - Dhubri CWC and Kamalpur; 15 - Beky Rly.bridge, Panbari, Khowai, Baksa Kvk AWS and Hasimara; 14 - Alipurduar PTO; 13 - Chepan, Nagarkata, Devala and Bahalpur; 12 - Chengmari/Diana, Manash Nh Xing, Dhubri IMD, Williamnagar and Nongstein.
20 Jun	17 - Bahalpur; 16 - Amfu Pundibari; 15 - Maduranthagam; 14 - Cooch Behar; 13 - Dhengraghat, Palghar ARG, Goalpara AWS, Kokrajhar and Goalpara CWC; 12 - Barobhisha, Mathabhanga and Mussoorie.
21 Jun	26 - Valpoi; 21 - Dodamarg; 17 - Matheran and Gaganbawada; 16 - Kankavli and Vaibhavwadi; 14 - Karjat ARG, Chiplun and Wakwali ARG; 13 - Awalegaon - ARG and Sattar Kataiya; 12 - Bairagarh Airport.
22 Jun	21 - Mandangad; 16 - Chiplun; 15 - Savarde-arg; 14 - Sanguem; 12 - Maya Bandar, Amini, Khanpur, Sudhagad Pali and Tala.
23 Jun	14 - Utnur; 13 - Mangkolemba; 12 - Aswaraopeta, Deomali and Moranhat.
24 Jun	14 - Srirampur; 13 - Port Blair; 12 - Sondwa and Chinchwad - ARG.
25 Jun	22 - Hasimara; 21 - Basar AWS; 19 - Barobhisha and Basar; 17 - Jalpaiguri; 14 - Champasari; 13 - Siliguri PTO; 12 - Matar, Nh31 Bridge, Barpathar and Long Island.
26 Jun	28 - Bahadurganj; 20 - Chinnakalar; 19 - Devala; 18 - Ayoadhya and Mulki; 17 - Sevoke, Padinjarathara Dam AWS and Manki; 15 - Siliguri PTO, Cincona, G Bazar, Munnar Kseb and Bhagamandala; 14 - Long Island, Upper Gudalur, Peermade To, Vadakara, Lower Sholayar AWS, Mani, Vyttiri and Valparai; 13 - Taluk Office Pandalur, Idamalayar Dam AWS and Kundapur; 12 - Sholayar, Worth Estate Cher, Dighalbank, Ayyankunnu AWS, Tellichery, Padannakkad AWS, Kottayam, Venkurinji AWS, Kollur and Vadakara AWS.
27 Jun	30 - Mulki; 21 - Udupi and Bhagamandala; 19 - Panathur AWS; 18 - Bilari, Ayyankunnu AWS, Gersoppa and Muliyar AWS; 17 - Ponda, Dapoli ARG, Mangaluru AP, Mani, Karkala, Nainital and Agumbe; 15 - Chandurthi, Ratnagiri , Dharmasthala, Belthangadi, Panambur, Honavar, Kotpad and Vyttiri; 14 - Sama, Vellarikkundu AWS, Roha, Uppinangadi, Kota, Shirali PTO and Kottigehara; 13 - Ghatigaon, Worth Estate Cher, Mandangad, Napoklu and Dholpur; 12 - Gohad, Avalanche, Taluk Office Pandalur, Nalumukku, Margao, Ponnampet PWD and Bhutanghat.
28 Jun	23 - Safdarjung and Bijapur; 22 - Lodi Road AWS; 19 - Lodi Road; 17 - Joiti; 16 - Delhi University Obs; 15 - Depalpur and Delhi Ridge; 14 - Pitampura AWS, Shimla AP, Mhasla and Tala; 13 - President House, Mandkhola AWS and Ranpur; 12 - Jeypore and Dhauj.
29 Jun	28 - Taluk Office Pandalur; 24 - Mawsynram; 22 - Buxaduar; 20 - Sevoke and Cherrapunji (rkm) ; 19 - Devala; 18 - Kottigehara; 17 - Bhapur and Auraiya (CWC) ; 15 - Pasighat AP; 14 - Roing, Cherrapunji, Mawkyrwat and Dunguripalli; 12 - Anandpur and Kannauj.
30 Jun	33 - Mawsynram; 24 - Chanan; 23 - Mawkyrwat; 22 - Sevoke and Roing; 20 - Cherrapunji (rkm) and Mawkyrwat ARG; 19 - Pasighat AP and Cherrapunji; 17 - Jhallong; 16 - Kaler, Kusmi and Jiagaon; 15 - Chauldhowaghat; 14 - Jalpaiguri, Tekari and Patna; 13 - Neora and Samalkha; 12 - Siliguri PTO, Gajoldoba, Jahanabad, Laxmipur, Bari, Namsai Kvk AWS, Banki and Jamui.
1 Jul	50 - Mawkyrwat ARG; 47 - Cherrapunji (rkm) ; 45 - Mawkyrwat and Mawsynram; 31 - Cherrapunji; 30 - Mawphlang; 25 - Shella; 22 - Sama; 21 - Palsana, Manavadar and Nongstein; 20 - Gossaigaon; 19 - Jowai; 18 - Loharkhet, Roing and Kvk South; 17 - Mahuva; 16 - Mahendragarh Kvk AWS, Chepan, Khliehriat, Bhaghmara and Nainital; 15 - Kotpad, Bardoli, Dwarka, Vanthali, Kutiana, Barobhisha, Pasighat AP, Williamnagar and Jiagaon; 14 - Kamrej, Olpad and Hazuah; 13 - Harisan Malayalam Ltd., Wood Braiyar Estate, Worth Estate Cher, Mendarda, Mundra, Namsai Kvk AWS, Majuli, Kokrajhar and Virajpet; 12 - Dharoi Colony, Itanagar, Naharlagun, Shillong CSO and Ranganadi Nt Xing.
2 Jul	36 - Vanthali; 34 - Visavadar; 30 - Junagadh; 29 - Sevoke; 26 - Mawkyrwat; 25 - Shella; 24 - Bardoli; 23 - Khambhalia; 22 - Barharia and Manavadar; 21 - Navsari, Alipurduar PTO and Mawsynram; 20 - Lakri Nabiganj, Siwan Sadar, Jalalpor, Navasari AWS and Kalyanpur; 19 - Goriakothi, Palsana, Amfu Pundibari and Keshod AP; 18 - Mahuva, Mendarda, Dhoraji, Khliehriat and Sabroom; 17 - Bhesan; 16 - Okha, Malia, Mathabhanga, Goalpara CWC and Karimganj; 15 - Baitunthpur, Bathnaha, Mahuva (b) , Cherrapunji (rkm) and Mahsi; 14 - Lonavala ARG, Rajula, Talala, Morbi, Hanumana, Nh31 Bridge, Cherrapunji, Goalpara AWS, Gossaigaon, Mawkyrwat ARG, Bahraich and Chanderdeepghat; 13 - Barauli, Katihar, Siswan, Gir Gadhada, Cooch Behar, Dhupguri and Kokrajhar; 12 - Katoria, Igatpuri, Daman Fmo, Valod, Bagasra, Dwarka, Kodinar, Una, Mangrol (j) , Kutiana, Barobhisha, Falakata, Gajoldoba, Tikrikilla, Gandachara AWS, Aonla and Darjeeling.

TABLE 8 Continued

3 Jul	27 - Lakhani; 24 - Basti; 23 - Barharia; 22 - Ramnagar; 20 - Fatehpur Tehsil; 19 - Baltara; 17 - Kucchaikot; 16 - Nagina; 15 - Bhore, Salakhua, Raghunathpur, Mukhlispur, Nichlaul, Dhanghata and Kataula; 14 - Gopalganj, Motipur, Nautan and Jollygrant; 13 - Arrah, Katihar, Mohanpur, Ziradei, Dehra Dun, Berinag, Dhambola, Baheri, Dhampur, Shahjahapur and Shahjahanpur; 12 - Motihari, Bagaha, Madhubani, Sikta, Haldwani, Gaighat (Bla Fmo) , Muhammadi and Nawabganj.
4 Jul	25 - Agumbe; 24 - Gersoppa; 23 - Siddapura; 21 - Ramnagar; 20 - Kammardi; 19 - Tahrauli and Linganamakki HMS; 17 - Bhanpur and Rudhauli; 15 - Kadra, Siddapur and Sringeri HMS; 14 - Chandgad; 13 - Kadi and Kundapur; 12 - Vadakara, Valpoi, Pasighat AP, Fatehpur Tehsil, Manki and Burdwan PTO.
5 Jul	28 - Alipurduar PTO; 24 - Amfu Pundibari; 21 - Mathabhanga and Mawsynram; 20 - Danta, Chepan and Balrampur; 19 - Barobhisha and Bahraich; 18 - Malpura and Mirganj; 17 - Bansi Tehsil; 15 - Bhutanghat, Kumargram and Manki; 14 - Kamba AWS; 13 - Palampur, Valpoi, Dhupguri, Gossaigaon and Mawkyrwat; 12 - Sajjangarh SR, Sanguem, Falakata, Nh31 Bridge, Itanagar, Mawkyrwat ARG and Mercara.
6 Jul	33 - Badoda; 22 - Dharmshala AWS; 21 - Dharmsala, Palampur, Barobhisha and Amfu Pundibari; 19 - Kalyanpur, Shahabad and Sheopur; 18 - Domohani; 17 - Sikta, Jogindarnagar, Rishikesh and Castle Rock; 16 - Motihari, Kangra AP, Chepan and Honavar; 15 - Deoli, Kumargram, Bagrakote, Jalpaiguri and Udupi; 14 - Baijnath, Malpura, Piplu SR, Pohri, Buxaduar and Tonk; 13 - Sugauli, Turkaulia, Taibpur, Madhopur, Champawat, Todaraisingh SR, Uniara/Aligarh, Madhbun, Shivpuri, Cooch Behar, Sukiapokhri, Nh31 Bridge, Neora, Cherrapunji (rkm) and Ankola; 12 - Srinagar, Lohaghat, Mori, Nainwa, Karauli, Umerpada, Bamori, Alipurduar PTO, Bhutanghat, Falakata, Gajoldoba, Nagarkata and Darjeeling.
7 Jul	28 - Haraiya; 22 - Matheran; 21 - Balrampur, Mankapur, Chanderdeepghat and Castle Rock; 20 - Tanda, Ayoadhya, Basti and Bhanpur; 19 - Shambhuganj, Rudhauli & Palliakalan; 18 - Champawat & Gaganbawada; 17 -Jalpaiguri & Muhammadi; 16 - Gajoldoba, Murti, Hasimara & Nainital; 15 - Kishanganj, Tarapur, Sikta, Ratnagiri & Neora; 14-Deoprayag, Taranagar/Reni, Chengmari/Diana, Gaighat (Bla Fmo) , Dabri Fmo, Honavar and Basti; 13 - Sultanganj, Asarganj, Kotdwara, Rajapur, Lonavala ARG, Mohkheda, Nighasan, Bhinga, Kakardharighat, Nawabganj & Kasganj; 12 - Laxmipur, Ponda, Panvel ARG, Dolvan, Bagrakote, Katarniaghat, Bhatpurwaghat, Bisalpur & Bansi Tehsil.
8 Jul	46 - Baheri; 43 - Banbasa; 38 - Awalegaon - ARG; 36 -Panjim ; 31 - Dodamarg; 30 - Mapusa; 29 - Tala; 28 - Khatima; 27 - Santacruz and Mhasla; 25 - Pernem, Murud, Wakwali ARG, Rameshwar ARG and Mulde ARG; 23 - Valpoi, Rajapur, Kudal and Kadra; 22 - Champawat, Sanguem and Kumta; 21 - Malvan, Vengurla ARG, Mormugao - Pmo IMD, Margao and Dabolim N.a.s.; 20 - Pantnagar, Gersoppa, Devgad and Shirali; 19 - Lohaghat, Haldwani, Ponda, Dapoli ARG, Kankavli, Vaibhavwadi, Canacona, Gaganbawada and Manki; 18 - Banki, Sawantwadi and Udupi; 17 - Chiplun, Harnai IMD, Quepem, Bisalpur, Honavar, Nongpuh and Pawarwadi - ARG; 16 - Lanja and Kundapur; 15 - Alibag - IMD Part Time, Mirganj and Malgund - ARG; 14 - Pinapaka, Nawabganj and Linganamakki HMS; 13 - Vasai, Shriwardhan, Mandangad, Chandgad and Bilaspur; 12 - Ghasipura, Pithoragarh, Khed, Thane, Kolaras, Siddapura, Kollur, Castle Rock, Pilibhit City, Nainital and Akola.
9 Jul	23 - Mhasla, Dapoli ARG and Malvan; 21 - Murud; 20 - Dodamarg; 19 - Pernem; 18 - Wakwali ARG and Gajoldoba; 17 - Tala, Vengurla ARG and Sevoke; 16 - Colaba , Vasai and Harnai; 15 - Uran, Buxaduar, Bombay Santacruz and Alibag; 14 - Kudal and Nagarkata; 13 - Guhagarh, Ratnagiri , Rameshwar ARG, Murbad and Jalpaiguri; 12 - Shriwardhan, Mulde ARG, Mantha, Bhutanghat and Devgad.
10 Jul	22 - Mawsynram; 17 - Cherrapunji (rkm) ; 16 - Dighalbank; 13 - Lodhika; 12 - Sohra (cher) .
11 Jul	31-Shella & Sohra (cher); 29-Cherrapunji (rkm); 28-Mawsynram; 15-Dodamarg & Bilasipara ARG; 12–Dhubri CWC, Tihu ARG & Dharchula.
12 Jul	43 - Mawsynram; 35 - Mawkyrwat; 31 - Mawkyrwat ARG; 18 - Daman AWS and Sevoke; 17 - Harinkhola and Cherrapunji (rkm) ; 16 - Cherrapunji; 15 - Hariharganj and Siliguri PTO; 14 - Alipurduar PTO, Mawphlang and Nongstein; 13 - Labpur and Nautanwa; 12 - Kutumba, Dhaka, Dhengbridge, Santacruz and Falakata.
13 Jul	23 - Kilacheruvai and Kusmi; 18 - Ratnagiri ; 17 - Rameshwar ARG and Bansi Tehsil; 15 - Masulipatnam Cdr, Vadakara and Mandangad; 14 - Guntur, Barahar Kothi, Sikta, Lakkur, Tellichery, Quilandi, Talasari, Matheran, Roha, Tala and Alibag; 13 - Thirukalukundram, Poladpur, Sangameshwar Devrukh, Sanguem, Mahabaleshwar, Khanvel, Daman, Gandevi, Khergam, Navsari, Zirapur, Karkala, Ankola, Gersoppa, Honavar, Kadra, Kumta and Bhagamandala; 12 - Tenali, Poonjar AWS, Mahe, Awalegaon - ARG, Buxaduar and Devgad.
14 Jul	26 - Murbad; 24 - Lonavala ARG; 23 - Jagalbet; 22 - Matheran, Sudhagad Pali, Pen and Castle Rock; 21 - Pernem, Wada, Tala and Mandangad; 20 - Ulhasnagar; 19 - Bhiwandi; 17 - Karjat ARG, Quepem, Alibag and Agumbe; 16 - Awalegaon - ARG, Ambernath, Gandevi and Vansda; 15 - Desaiganj, Dornapal, Murud, Panvel ARG, Roha, Mahabaleshwar and Kumta; 14 - Padia, Santacruz , Khalapur, Mhasla, Vengurla ARG, Sanguem, Thane, Khergam and Niwari; 13 - Halsi, Dahanu , Vasai, Mangaon, Poladpur, Dapoli ARG, Wakwali ARG, Kankavli, Gersoppa and Kadra; 12 - Ayyankunnu AWS, Palghar ARG, Vikramgad, Mahad, Shriwardhan, Lanja, Vaibhavwadi, Gaganbawada, Silvassa, Kaprada, Nanipalson, Neora, Jhallong, Jalalpur Fmo, Siddapura and Honavar.
15 Jul	25 - Jagalbet; 24 - Chiplun; 22 - Wakwali ARG; 21 - Khed and Mandangad; 20 - Pernem and Lonavala ARG; 19 - Wada, Mahad, Mulde ARG and Quepem; 18 - Mapusa and Valpoi; 17 - Awalegaon - ARG, Kudal and Devgad; 16 - Kankavli, Canacona, Sanguem and Garudeshwar; 15 - Rajim, Ponda, Khalapur, Sudhagad Pali, Poladpur, Dodamarg, Vengurla ARG and Umerpada; 14 - Panjim and Mangaon; 13 - Chinnakalar, Dapoli ARG, Malvan, Margao, Chandgad, Gaganbawada, Patan, Surat Kvk AWS and Dharchula; 12 - Kotapalle, Vemanapalle, Matheran, Shriwardhan, Ratnagiri , Sawantwadi, Mahabaleshwar, Jhallong, Bhagamandala, Castle Rock and Chandrapur.
16 Jul	37 - Avalanche; 33 - Agumbe; 26 - Ankola; 25 - Valparai PTO, Upper Bhavani and Umerpada; 23 - Chinnakalar and Karwar; 21 - Gersoppa; 19 - Canacona, Kundapur, Gokarna, Manki and Linganamakki HMS; 18 - Munnar Kseb, Panjim , Netrang, Siddapura and Honavar; 17 - Cincona, Valparai Pap, Idukki, Koppa, Kottigehara, Sringeri HMS, Bhagamandala, Kollur and Devgad; 16 - Valparai Taluk Office, Chalakudi, Lower Sholayar AWS, Kumta, Siddapur and Castle Rock; 15 - Ponda, Malvan, Barwaha, Kota, Jayapura and Idamalayar Dam AWS; 14 - Sholayar, Peermade To, Udumbannoor AWS, Vadakara, Athirappalli AWS, Kodungallur, Irinjalakuda, Kammardi and Mormugao; 13 - Emeralad, Gangadhara, Neeleswaram ARG, Kunnamangalam AWS, Vyttiri, Quepem, Nandod, Amraghat and Shirali; 12 - Lamataput, Navipet, Kochi C.i.a.l., Perumpavur, Kozhikode, Alathur, Kollamkode, Kollengode AWS, Vellanikkara, Margao, Sanguem, Sanawad, Zirapur, Makdone, Matijuri and Kadra.
17 Jul	34-Avalanche; 22-Upper Bhavani; 21-Agumbe; 19-Ponda; 17-Yeda Palle & Bhopalpatnam; 16-Kutaru; 15-Devala, Navipet & Bhagamandala; 14-Taluk Office Pandalur, Ayyankunnu AWS, Kammardi, Kottigehara & Sringeri HMS; 13-Emeralad, Worth Estate Cher, Padamala AWS, Manavadar, Vichhiya & Jayapura; 12-Dornapal, Sajjangarh SR, Mormugao - Pmo IMD, Malia, Mangrol (j), Lakhipur & Aralam AWS.
18 Jul	24 - Castle Rock; 20 - Avalanche, Valpoi and Gaganbawada; 19 - Kottigehara and Kollur; 17 - Ratnagiri and Awalegaon - ARG; 16 - Vaibhavwadi; 15 - Chinnakalar, Sangameshwar Devrukh, Lanja, Jagalbet, Siddapur, Joida and Pawarwadi - ARG; 14 - Dharmsala, Kannur Icar AWS, Mhasla, Kankavli, Sanguem and Hunchadakatte; 13 - Desaiganj, Taliparamba, Ponda, Ankola, Kadra, Kumta, Bhagamandala, Cheruvanchery AWS, Irikkur and Agumbe; 12 - Valparai PTO, Emeralad, Ayyankunnu AWS, Kannur, Kuppady, Belthangadi, Gersoppa, Londa, Linganamakki HMS, Ams Kannur and Aralam AWS.

TABLE 8 Continued

19 Jul	49 - Porbandar; 29 - Kalyanpur; 27 - Polavaram, Kukunoor and Awalegaon - ARG; 25 - Bhopalpatnam, Vanthali and Keshod AP; 24 - Ranavav; 23 - Castle Rock; 22 - Avalanche, Bhagamandala and Agumbe; 21 - Manki; 19 - Pen and Sironcha; 18 - Chintalapudi, Kotapalle, Sutrapada, Karkala and Gersoppa; 17 - Kagaznagar, Kankavli and Kottigehara; 16 - Pusapatirega, Rajura, Manavadar, Mangaluru AP and Udupi; 15 - Aswaraopeta, Vemanapalle, Valpoi, Poladpur, Tala, Vaibhavwadi, Gaganbawada, Lonavala ARG, Ankola, Gokarna, Siddapur, Kalasa, Murnadu and Napoklu; 14 - Kataram, Uran, Sawantwadi, Veraval, Jamjodhpur, Kutiana and Kollur; 13 - Tadepalligudem, Worth Estate Cher, Perur, Perur (ARG) , Vellarikkundu AWS, Pernem, Panjim , Mhasla, Mahad, Rameshwar ARG, Mulde ARG, Canacona, Mahabaleshwar, Mangrol (j) , Mendarda, Kadra and Koppa; 12 - Dowleshwaram, Koyyalagudem, Upper Bhavani, Kotpad, Kaleswaram, Manthani, Mapusa, Sangameshwar Devrukh, Rajapur, Kudal, Quepem, Sanguem, Chandgad, Khambha, Talala, Visavadar, Upleta, Teliamura ARG, Dharmasthala, Kota, Kumta, Virajpet and Linganamakki HMS.
20 Jul	42 - Dwarka; 29 - Shahjina Fmo and Hamirpur CWC; 26 - Okha; 25 - Bhairamgarh; 24 - Lakhandur; 22 - Korukunda and Chitrakunda K Guma; 21 - Chintur and Pen; 20 - Pauni; 19 - Sudhagad Pali and Bramhapuri; 18 - Roha, Malkangiri and Hamirpur; 17 - Bhanupratappur, Durgkondal, Aundhi, Haripur, Ranganadi Nt Xing and Porbandar AP; 16 - Kotpad, Mathili, Daman Fmo and Umergam; 15 - Arjuni Morgaon, Dornapal, Konta, Sukma and Vanthali; 14 - Desaiganj, Bhiwapur, Gadiras, Uran, Lonavala ARG and Auraiya (CWC) ; 13 - Anakapalle, Padia, Doundi, Nangur, Kutaru, Chhindgarh, Jagargunda, Tongpaal, Sangameshwar Devrukh, Kalyanpur, Keshod AP and Agumbe; 12 - Nagbhir, Armori, Deori, Umrer, Bijapur, Antagarh, Narayanpur, Lal Bahadur Nagar, Khalapur, Tala, Tbia IMD Part Time, Daman, Gersoppa and Linganamakki HMS.
21 Jul	24 - Pipariya; 23 - Dapoli ARG; 21 - Bijapur and Mandangad; 18 - Budhni; 17 - Itarsi and Barghat; 16 - Gadchiroli (aws) , Nagpur Aerodrome, Gurur, Shahpur and Sohagpur; 15 - Gadchiroli, Athmalik, Mahad, Shriwardhan, Sangameshwar Devrukh, Wakwali ARG, Mahabaleshwar and Tamia; 14 - Chandrapur, Sindewahi, Boden, Mortad, Kutaru, Rajnandgaon, Mhasla, Ulhasnagar, Babai (makhan Nagar) and Dolariya; 13 - Mallapur, Metpalle, Sarangapurnrl, Poladpur, Ratnagiri , Thane, Bankhedi, Rehti, Katangi and Dwarka; 12 - Khanpur, Laxmanchanda, Balkonda, Balod, Arjunda, Marri Bangla Deori, Gangalur, Sama, Tala, Sausar, Kollur and Castle Rock.
22 Jul	24 - Mahabaleshwar; 22 - Umergam; 21 - Rajapur; 20 - Castle Rock; 19 - Dahanu , Gaganbawada, Daman Fmo and Surat City; 18 - Santacruz ; 17 - Chitrakunda K Guma, Talasari and Silvassa; 16 - Lakhandur, Kamrej, Palsana and Vapi; 15 - Palghar ARG, Matheran, Shahuwadi, Lonavala ARG and Surat Kvk AWS; 14 - Kurkheda, Bhairamgarh, Poladpur, Mandangad, Lanja, Vaibhavwadi, Thane, Daman, Umerpada, Nizer and Mawsynram; 13 - Pauni, Desaiganj, Sama, Mhasla, Panvel ARG, Tbia IMD Part Time, Mahuva, Ichhawar, Gersoppa and Supaul; 12 - Armori, Arjuni Morgaon, Karjat ARG, Chiplun, Sangameshwar Devrukh, Murbad, Ankleshwer, Navsari, Navasari AWS, Pardi, Amla, Jabalpur-aws, Patharughat ARG and Pawarwadi - ARG.
23 Jul	29 - Kalyanpur; 27 - Bijadandi; 24 - Visavadar; 21 - Silvassa, Dwarka and Manavadar; 20 - Talasari; 19 - Matheran, Palsana, Malia and Damoh-aws; 18 - Bardoli, Kaprada and Nainpur; 17 - Karjat ARG, Gaganbawada, Khanvel, Vapi and Ghansore; 16 - Balod, Jawhar, Palghar ARG, Vikramgad, Khergam, Pardi, Bina, Barghat and Mawsynram; 15 - Kangra AP, Mahabaleshwar, Chikhli, Kamrej, Upleta, Seoni and Castle Rock; 14 - Dharmsala, Khalapur, Panvel ARG, Lonavala ARG, Daman, Daman Fmo, Dharampur, Mundra, Ranavav and Sagar-aws; 13 - Kukrel, Dharmshala AWS, Dahanu , Pen, Tala, Mandvi, Okha, Mungaoli, Gotegaon, Khurai, Cherrapunji and Cherrapunji (rkm); 12- Dondilohara, Phangota, Mokheda - Fmo, Wada, Murbad, Chandgad, Igatpuri, Navsari, Nanipalson, Umergam, Kodinar & Kutiana.
24 Jul	30 - Umerpada; 27 - Lonavala ARG, Palsana and Pali; 23 - Bardoli and Kamrej; 22 - Khergam, Visavadar and Mahroni; 21 - Mangrol and Jodia; 20 - Jharbandh; 18 - Chinchwad - ARG, Surat Kvk AWS, Vyara, Dwarka and Dheemarkheda; 17 Paikmal, Waghai, Navsari, Mahuva and Tikamgarh-aws; 16 Ullunda, Sagbara, Navasari AWS, Songadh, Umariyapan and Rampur; 15 - Kusmi, Bhairamgarh, Kutaru, Quepem, Mahabaleshwar, Jhagadia, Dang Kvk AWS, Jalalpor, Vansda, Mandvi, Surat City and Manki; 14 - Gaganbawada, Shahuwadi, Dangs (ahwa) , Dolvan, Bagasra, Sleemanabad, Moradabad CWC and Moradabad; 13 - Padampur, Padmapur, Kashdol, Lawan, Hansot, Maktampur AWS, Valia, Gersoppa and Broach; 12-Nawapara, Sarmathura SR, Matheran, Sanguem, Murbad, Paud Mulshi, Subir, Ukai, Mundra and Agumbe.
25 Jul	35 - Lonavala ARG and Borsad; 33 - Mahabaleshwar; 32 - Vadodara; 28 - Mokheda - Fmo and Mulher - Fmo; 23 - Karjat ARG, Matheran, Murbad and Mohangarh; 22 - Igatpuri; 21 - Dapoli ARG and Padra; 20 - Pali, Dausa, Sudhagad Pali, Paud Mulshi and Tilakwada; 18 - Castle Rock; 17 - Chinchwad - ARG, Nda Pune - ARG, Talegaon AWS and Siddapura; 16 - Poladpur, Thane, Velhe and Khergam; 15 - Jharbandh, Pen, Naswadi, Chhotaudepur Kvk AWS, Subir, Rithi, Sleemanabad and Panna; 14 - Mul, Avalanche, Khalapur, Wada, Wakwali ARG, Ulhasnagar, Shahuwadi, Vadgaon Maval, Sinor, Umariyapan and Kammardi; 13 - Saoli, Gadchiroli, Gadchiroli (aws) , Pakhanjur, Hardibazar, Karauli, Roha, Uran, Mandangad, Dahegam, Nandod, Rajpipala, Orchha and Kottigehara; 12 - Thennala AWS, Mahad, Sangameshwar Devrukh, Tbia IMD Part Time, Ajra, Chandgad, Gaganbawada, Sankheda, Halol, Katni (mudwara) , Moradabad CWC, Mussoorie and Broach.
26 Jul	28 - Mahabaleshwar; 27 - Sama and Karjat ARG; 24 - Lonavala ARG; 22 - Navapur; 20 - Avalanche, Matheran and Uchchhal; 19 - Chandgad and Shahuwadi; 18 - Bhatapara, Murbad, Subir, Dolvan, Bajna and Bhagamandala; 17 - Simga, Gaganbawada and Jatton Barrage; 16 - Kesarpura SR, Sudhagad Pali, Ajra, Navsari and Agumbe; 15 - Khushalgarh, Ratlam-aws, Castle Rock and Pawarwadi - ARG; 14 - Sallopat SR, Dapoli ARG, Mahuva and Kottigehara; 13 - Poladpur, Sangameshwar Devrukh, Lanja, Vadgaon Maval, Gandevi, Jalalpor, Navasari AWS, Napoklu and Sheopur; 12 - Beir SR, Nainwa, Khalapur, Panvel ARG, Rajapur, Ulhasnagar, Panhala and Somwarpet.
27 Jul	24 - Bhairamgarh; 20 - Haripur; 18 - Avalanche; 17-Mahabaleshwar and Bareli; 16-Chandgad, Mudigere & Agumbe; 15-Badi & Somwarpet; 14-Nandapur, Simga, Kutaru, Kumbhraj, Sringeri HMS & Castle Rock; 13-Jeypore; 12-Karnaprayag, Ganganagar & Shahuwadi.
28 Jul	21 - Suvasara; 20 - Shamgarh; 19 - Aundhi; 18 - Khurai; 17 - Khadgaon; 16 - Keshkal; 15 - Antagarh; 14 - Gadchiroli, Bhanupratappur, Pakhanjur, Baderajpur, Phangota and Barod; 13 - Bhairamgarh and Kotri; 12 - Dhanora, Durgkondal, Manpur, Ranjit Sagar Dam Site & Agar.
29 Jul	17-Arnod SR & Bhavgarh; 15-Bhimpur & Castle Rock; 14 - Jollygrant, Ayyankunnu AWS & Lunawada; 13 - Nadiad, Niwali & Nagda; 12 - Shajapur.
30 Jul	34 - Vadakkancherry; 31 - Valparai PTO; 30 - Alathur; 28 - Vadakara and Vyttiri; 27 - Kollamkode and Kollengode AWS; 25 - Anakayam ARG, Thritla, Kalasa, Bhagamandala, Ams Kannur, Cheruvanchery AWS and Kannur Airport AWS; 24 - Chinnakalar, Karipur Ap., Parumbikulam and Pothundy Dam AWS; 23 - Cincona, Worth Estate Cher and Pattembi; 22 - Ayyankunnu AWS, Vadakara AWS, Manjeri and Athirappalli AWS; 21 - Munderi AWS, Perinthalamanna, Mannarkkad AWS, Mannarkkad, Ottapalam, Kottigehara and Agumbe; 20 - Devala, Taluk Office Pandalur, Munnar Kseb, Peechi AWS and Manantoddy; 19 - Sholayar, Valparai Pap, Valparai Taluk Office, Angadipuram, Mankara AWS, Visnagar, Kammardi, Idamalayar Dam AWS and Thrissur; 18 - Avalanche, Kannur, Kannur Icar AWS, Malampuzha Dam AWS, Mahesana, Napoklu and Aralam AWS; 17 - G Bazar, Upper Gudalur, Quilandi, Kunnamangalam AWS, Nilambur AWS, Thennala AWS and Dharmasthala; 16 - Udumbannoor AWS, Nilambur, Ponnani, Palakkad, Matheran and Prantij; 15 - Taliparamba, Peermade To, Kozhikode, Chittur, Mahabaleshwar, Koppa and Ponnampet PWD; 14 - Barwood, Pinarayi AWS, Mahe, Ambalavayal, Karapuzha AWS, Hansot, Vijapur, Sringeri HMS, Castle Rock and Vilangad AWS; 13 - Rasagovindapur, Thodupuzha ARG, Palemad AWS, Vadgam, Murnadu, Panathur AWS and Kunnamkulam AWS; 12 - Harisan Malayalam Ltd., Wood Braiyar Estate, Idukki, Kuppady, Mansa, Jotana, Digha and Anayirankal Dam AWS.

TABLE 8 Continued

31 Jul	21 - Agumbe; 19 - Mani and Castle Rock; 18 - Karkala; 17 - Uppinangadi; 16 - Manki; 15 - Matheran, Puttur HMS and Kammardi; 14 - Ramnagar, Korba, Pernem, Mandangad, Belthangadi, Mulki, Bhagamandala, Mudigere and Mangalore/P.bur; 13 - Rajpur, Darri, Surat Kvk AWS, Lala ARG, Dharmasthala, Kadra, Panathur AWS and Kollur; 12 - Poladpur, Shahuwadi, Amraghat, Mangaluru AP, Ankola, Gersoppa, Honavar and Sringeri HMS.
1 Aug	24 - Haripur; 23 - Karkala; 21 - Roshnabad and Palampur; 20 - Quepem, Ankola, Castle Rock and Chuari; 19 - Buxar; 18 - Ambala Cantt and Dharmsala; 17 - Jaipur Tehsil SR, Dehra Dun, Sleemanabad, Bichhia, Valpoi, Sanguem, Siddapura and Agumbe; 16 - Mahsi, Jaipur AP, Chomu, Karauli, Umariyapan, Bhawnathpur, Mulki, Kadra, Jogindarnagar, Baripada and Pathankot IAF; 15 - Green Field Ps, Hardwar, Belthangadi, Dharmasthala, Kundapur, Gokarna, Dharmshala AWS and Kangra AP; 14 - Ambala, Taran Taran, Bonli, Niwai, Sps Mayur Vihar, President House, Ponda, Margao, Mormugao - Pmo IMD, Shahuwadi, Kumta and Sujanpur Tira; 13 - Mohammedabad (Y) , Kakardharighat, Mulana, Kosli, Nahar REV, Churu, Taranagar/Reni, Bahadurpur SR, Kotkasim SR, Phagi, Sanganer Tehsil SR, Ramgarhshekhatan SR, Champua, Betanati, Chandua Kuliana, Jamda, Gersoppa, Manki, Baijnath and Shirali; 12 - Gurgaon AWS, Phangota, Alwar Obs, Jollygrant, Pichhore, Panjim , Pernem, Awalegaon - ARG, Dodamarg, Gaganbawada, Karai Parsurai, Rairangpur, Sarasakana, Karwar and Paonta.
2 Aug	24 - Lava and Gheropara; 21 - Devser, Hetampur, Luchipur, Manteswar and Belonia; 19 - Kajuwala SR, Sri Niketan, Panagarh (IAF) , Burdwan PTO, Mani and Suri; 17 - Labpur, Salar and Durgapur; 16 - Pipariya, Singrauli-aws, Bagati, Mangalkote, Kvk South and Puttur HMS; 15 - Raghunath Nagar, Sohagpur, Nala, Kandi, Cherrapunji (rkm) , Sabroom, Mangaluru and Mangalore/P.bur; 14 - Kusmi, Malerainadunger SR, Mahabaleshwar, Debagram, Burnpur, Canning, Karkala, Manki and Amarpur; 13 - Shankargarh, Pungal SR, Jamtara Fmo, Suri PTO, Amtala, Kalyani Smo, Uppinangadi, Kollur, Ankola, Kadra, Amarpur ARG and Jarmindi; 12 - Hanumangarh, Sadulsahar SR, Chomu, Khandar SR, Srimadhopur, Sanguem, Lonavala ARG, Bankura (CWC) , Tilpara Barrage, Asansol, Mangaluru AP, Kundapur and Gersoppa.
3 Aug	27 - Ramgarh Kvk AWS; 26 - Bau Kanke; 25 - Cherrapunji (rkm) ; 24 - Purvi Tundi; 22 - Cherrapunji; 21 - Shankargarh, Hendigir, Herhanj and Mawsynram; 20 - Mawkyrwat; 19 - Kolayat Magra and Koner; 18 - Kusmi, Masuda SR, Koner Dvc, Ramgarh Dvc and Agumbe; 17 - Kaprada, Vapi, Valsad Kvk AWS, Nayanagar/Beawar, Pisagan SR, Bokaro Thermal, Phusro, Palganj, Hazaribagh Dvc, Khalari, Ormanjhi and Ranchi AP; 16 - Rajpur, Papunki, Ramgarh, Mawkyrwat ARG and Jaridih; 15 - Mangliawas SR, Bhim, Maithon Dvc, Bhawnathpur, Manatu, Icar Namkum, Mawphlang and Kaliasole; 14 - Daman, Rajdhanwar, Balumath, Bariyatu, Dumri Dvc and Saryu; 13 - Daman Fmo, Daman AWS, Odagi, Merta City, Tatgarh SR, Tenughat, Maithon, Putki, Barkisuriya, Bhurkunda, Mandu Dvc, Burmu and Topchanchi; 12 - Pardi, Chando, Ramanujganj, Samari, Pratappur, Sum SR, Khivensar SR, Biaora, Lonavala ARG, Chandankiary, Chandrapura, Gobindpur, Bagodari, Giridih, Sisai, Jamtara Fmo, Parsabad, Tilaiya, Bandgaon, Belonia ARG and Castle Rock.
4 Aug	29 - Matheran; 24 - Igatpuri and Lonavala ARG; 23 - Janakpur Bharatpur and Katni (mudwara) ; 21 - Pawai and Shahnagar; 20 - Badwara and Amanganj; 19 - Sihora, Garhakota and Ramnagar; 18 - Vansda, Majholi, Singodi, Vijayraghogarh, Simariya and Chandia; 17 - Wandrafnagar, Tendukheda, Jaisingh Nagar, Devser and Surgana; 16 - Waghai, Pathari, Dheemarkheda, Barhi, Bilhari, Umariyapan, Bichhia, Maihar, Beohari and Trimbakshwar; 15 - Doura Kochali, Patan, Shahpura, Gudh, Mada and Thane; 14 - Kaprada, Dharampur, Nanipalson, Rithi, Deori, Kesli, Rehli, Rampur, Sarai and Mahabaleshwar; 13 - Dangs (ahwa) , Dang Kvk AWS, Dolvan, Ramanujganj, Biharpur, Kurwai, Damoh-aws, Jabalpur-aws, Kumdam, Mohgaon, Narayanganj, Gonour, Rewa-aws, Khurai, Churhat, Talasari, Karjat ARG, Akole and Ozharkheda - Fmo; 12 - Silvassa, Khergam, Vapi, Amarpatan, Kusmi, Murbad, Ulhasnagar and Harsul - Fmo.
5 Aug	32 - Nagrarfort SR; 26 - Sojat; 23 - Khergam; 22 - Hindoli; 21 - Jahazpur; 20 - Surgana; 19 - Bundi; 18 - Dharampur, Kekri SR and Sarwar; 17 - Kaprada, Geola SR, Sawar SR and Deoli; 16 - Dangs (ahwa) and Kishanganj; 15 - Chikhli, Mangliawas SR, Mangrol, Malhargarh, Buxwaha, Orchha, Jawhar, Vikramgad and Lonavala ARG; 14 - Waghai, Vansda, Nanipalson, Valsad, Karhal, Hatta and Igatpuri; 13 - Daman, Dang Kvk AWS, Pardi, Vadakuthu, Pisagan SR, Bakani SR, Jawad, Pohri, Hut Bay, Buxaduar and Manki; 12 - Neyveli AWS, Deogarh, Uniara/Aligarh, Kolaras, Patera, Bina, Peth, Mahabaleshwar and Shella.
6 Aug	26 - Pali; 20 - Chanpatia; 19 - Pokhran; 17 - Marwar Junction and Nasirabad; 16 - Ahore SR and Bettiah; 15 - Jalore, Rahghopur and Boudhgarh; 14 - Srinagar SR and Ullunda; 13 - Wallajah, Attur, Nachna/Lathi, Rohat SR, Pisagan SR, Thollada, Bhore, Barharia, Pipra, Gaunaha and Khanapara; 12 - Burmal ARG, Fatehgarh, Panchet, Kishanpur and Saraigarh Bhaptiyahi.
7 Aug	32 - Banki; 31 - Baheri; 21 - Bhapur; 20 - Begunia; 17 - Bokaro Kvk AWS; 16 - Bijapur and Gualpara; 15 - Kusmi, Kutumba and Birmaharajpur; 14 - Itarahi, Hindol and Dabugan; 13 - Jagdalpur, Kolayat Magra, Dhurki, Barahar Kothi, Patarghat, Bargarh, Atabira, Batli, Bolangir, Harabhanga, Dharmagarh, Khajuripada, Bolagarh, Kotpad, Ranpur, Kumta and Jogindarnagar; 12 - Gangalur, Banbasa, Ghattu, Quepem, Sanguem, Amfu Pundibari, Beldaur, Supaul, Kesinga, Binika, Gokarna and Paonta.
8 Aug	20 - Dholpur; 16 - Simdega and Jammu AP; 15 - Nadbai and Bari; 14 - Chopan Fmo and Sarmathura SR; 13 - Bano Simdega Kvk AWS, Murti and Nawarangpur; 12 - Pondi Bachra, Karauli and Waraseoni.
9 Aug	25 - Buxaduar; 19 - Mahwa; 18 - Vilupuram; 17 - Ramnagar and Punhana; 16 - Korba, Nadbai, Jogindarnagar and Mawsynram; 14 - Katghora; 13 - Jhirka; 12 - Sethiathope and Cherrapunji (rkm) .
10 Aug	17 - Nahan; 16 - Mawsynram; 15 - Puducherry; 14 - Tozhudur; 12 - Yercaud, Chachoda and Cherrapunji (rkm) .
11 Aug	38 - Karauli; 30 - Cherrapunji (rkm) ; 26 - Cherrapunji; 25 - Mawsynram; 22 - Vilupuram; 20 - Nahan; 19 - Renuka/Dadhau; 17 - Nangal, Raghunathpur and Nahar Katia; 16 - Una Rampur AWS; 14 - Gingee, Niwai, Vijaypur (adp) , Darauli, Naina Davi and Sangraha; 13 - Tindivanam, Danapur, Honavar and Una; 12 - Ambala REV, Dodamarg and Sarmera.
12 Aug	21 - Sapotra; 17 - Lalsot, Bhalukpong and Sawai Madhopur; 15 - Khandar SR and Rampur; 14 - Palacode, Katpadi, Bonli, Malerainadunger SR and Nagari; 13 - Chandigarh, Vilupuram and Jaipur Tehsil SR; 12 - Chandigarh AWS, Nedungal and Jaipur AP.
13 Aug	16 - Bhanpur, Nainwa, Mahwa and Niwai; 15 - Sanganer Tehsil SR; 14 - Hazuah; 12 - Ayyankunnu AWS.
14 Aug	22 - Minicoy; 13 - Bhinga, Adayamadai, Gummagatta, Sadar Chaibasa and Katra; 12 - Ranjit Sagar Dam Site.
15 Aug	17 - Kapkot; 16 - Kangra AP; 15 - Pali, Jaipur Tehsil SR and Dharmsala; 14 - Orai, Bakore ARG and Palampur; 13 - Jammu; 12 - Jammu AWS, Perundurai, Gohad, Nahan and Katra.
16 Aug	22 - Hindoli; 21 - Mangliawas SR; 17 - Kolayat Magra and Tatgarh SR; 16 - Atru SR; 15 - Jaitran, Pisagan SR and Jenapur; 13 - Belaguntha, Telkoi and Gudari; 12 - Narnound REV, Shergarh, Mahwa, Bamanwas SR, Guna-aws and Bhuban.
17 Aug	20 - Agathi; 17 - Nautanwa; 16 - Kanjirappally and Chigurumamidy; 15 - Poonjar AWS and Dholai; 14 - Nachna/Lathi and Puttur; 13 - Medak; 12 - Pokhran and Laha AWS.
18 Aug	17 - Raniganj; 15 - Ramnagar; 14 - Shoharatgarh and Koilwar; 13 - Silao; 12 - Kakardharighat and Tribeni/Balmikinagar.

TABLE 8 Continued

19 Aug	19 - Sama; 18 - Haripur; 17 - Loharkhet; 14 - Naina Davi; 13 - Pathankot IAF; 12 - Baijnath.
20 Aug	38 - Bagafa; 34 - Cherrapunji (rkm) ; 32 - Belonia and Sohra (cher) ; 31 - Amarpur; 27 - Gandachara AWS; 25 - Belonia ARG and Mawsynram; 23 - Kamalpur; 22 - Kvk Dhalai; 21 - Teliamura ARG and Sabroom; 20 - Manthralayam; 19 - Sama and Mawphlang; 18 - Hrc Nagicherra ARG; 17 - Yadagirigutta, Gandecherra, Dharmanagar/Panisagar, Jowai and Kailashahar AP; 16 - Kapkot, Udaipur, Kvk South, Arundhutinagar and Budhjongnagar ARG; 15 - Yadagirigutta (ARG) , Sonamura, Lembuchhera and Khumluwang ARG; 14 - Maddur, Khliehriat, Chhamonu and Dm Office ARG; 13 - Jammu AWS, Bansur, Khowai and Shillong CSO; 12 - Jammalamadugu, Aiza, Bhuvanagiri, Goilkera, Shillong AWS, Karimganj, Paren and Jammu.
21 Aug	34 - Mawsynram; 32 - Bhaghmara; 30 - Cherrapunji; 28 - Cherrapunji (rkm) ; 23 - Williamnagar; 22 - Mawphlang; 21 - Nongpuh; 20 - Met Agartala AWS; 18 - Agartala AP; 17 - Peermade To, Karnaprayag, Shella and Arundhutinagar; 15 - Biridi; 14 - Thodupuzha and Srisailam; 13 - Dehra Dun and Idamalayar Dam AWS; 12 - Silvassa, Vapi and Dm Office ARG.
22 Aug	49 - Bagafa; 31 - Kvk South; 23 - Teliamura ARG and Agartala AP; 22 - Lembuchhera; 20 - Sonamura; 18 - Budhjongnagar ARG; 17 - Agathi; 15 - Kapkot and Gandachara AWS; 14 - Kannauj and Belonia; 13 - Roshnabad, Paraswada, Kutumba, Miao, Kamalpur and Arundhutinagar; 12 - Ambikapur, Loharkhet and Cherrapunji (rkm) .
23 Aug	17 - Bichhua and Ghansore; 15 - Kotdwara; 13 - Chand and Rajdhanwar; 12 - Nabha, Raipur SR and Kannod.
24 Aug	21 - Mulde ARG; 20 - Awalegaon - ARG; 19 - Adbhar; 18 - Rameshwar ARG; 17 - Bamra; 16 - Kapadvanj, Anuppur-aws, Nowrozabad, Kudal and Devgad; 15 - Vijapur, Indore, Shahdole (sohagpur) and Dhurki; 14 - Vadgam, Jaithari, Kotma, Chandia, Ratnagiri and Sundargarh; 13 - Dahegam, Bhungra SR, Susner, Pali, Rahuri, Kutra, Lathikata, Tangarpali and Castle Rock; 12 - Mounntabu Tehsil SR, Meghnagar, Harnai IMD, Sawantwadi, Canacona, Uluberia and Rajgangpur.
25 Aug	36 - Vapi; 35 - Pardi; 34 - Kaprada and Valsad Kvk AWS; 31 - Umerpada; 29 - Daman, Daman AWS and Khergam; 27 - Silvassa, Ukai and Dharampur; 26 - Daman Fmo; 24 - Madhbun; 21 - Kathiwada; 20 - Khanvel and Sagbara; 19 - Vyara; 18 - Vansda and Velhe; 17 - Songadh; 16 - Pernem, Harsul - Fmo, Peth and Lonavala ARG; 15 - Dangs (ahwa) , Subir, Dang Kvk AWS, Waghai, Mangrol and Matheran; 14 - Umergam, Valsad, Dausa, Biaora, Badamalhera, Tendukheda, Valpoi, Dahanu , Vikramgad, Sudhagad Pali, Sangameshwar Devrukh, Quepem, Navapur, Igatpuri and Alirajpur; 13 - Narmada Kvk AWS, Reodar SR, Navibagh Aet, Begumganj, Mapusa, Talasari, Khalapur, Tala, Sanguem, Surgana, Castle Rock, Honavar and Dabolim N.a.s.; 12 - Chhota Udepur, Garbada, Khanpur, Kadi, Chothkabarwara SR, Panagar, Mokheda - Fmo, Lanja, Kudal, Mormugao - Pmo IMD, Dhadgaon/Akrani- Hydro and Devgad.
26 Aug	35 - Khergam; 29 - Dangs (ahwa) ; 26 - Waghai and Pipalkhunt SR; 24 - Dang Kvk AWS and Surgana; 23 - Santrampur, Kaprada, Dharampur and Rajkot; 22 - Subir; 21 Shahera, Chotila and Muli; 20 - Madhbun, Vansda, Ukai and Wankaner; 19 - Nadiad, Bhungra SR, Dhadgaon/Akrani- Hydro, Banswara and Alirajpur; 18 - Dediapada, Nandod, Valsad Kvk AWS and Halvad; 17 - Khanvel, Fatepura, Mahudha, Kukarmunda, Paddhari and Ozharkheda - Fmo; 16 Anand, Kadana, Sagbara, Karjan, Sallopat SR, Peth, Castle Rock and Radhanagari; 15 - Quant, Silvassa, Narmada Kvk AWS, Arthuna, Bagidora SR, Garhi, Sajjangarh SR, Malhargarh, Palghar ARG, Jawhar, Mulher - Fmo and Dohad; 14 - Borsad, Modasa, Lunawada, Pardi, Vapi, Surendranagar, Thangadh, Akkalkuwa, Mahabaleshwar and Ponnampet PWD; 13 - Limkheda, Bilodara AWS, Morva Hadaf, Wadhvan, Danpur, Kesarpura SR, Chikali SR, Pratapgarh, Pansemal, Vikramgad, Wada and Lonavala ARG; 12 - Daman, Galteshwar, Ghatol, Kathiwada, Jaora, Raoti, Dahanu , Mokheda - Fmo, Talasari, Shahuwadi, Trimbakshwar, Maheshpur and Kottigehara.
27 Aug	36 - Tankara; 34 - Morva Hadaf and Wankaner; 32 - Rajkot; 31 - Tarapur; 29 - Khambhat and Nadiad; 28 - Borsad, Padra and Vadodara; 27 - Sojitra and Godhra; 26 - Wanakbori and Kalavad; 25 - Khambhalia and Mandvi; 24 - Anand; 23 - Mahemdavad and Lodhika; 22 - Vaso, Nakhatrana, Morbi and Chotila; 21 - Mahudha, Balasinor, Lalpur and Thangadh; 20 - Dholka and Bagidora SR; 19 - Meghraj, Bilodara AWS, Kheda and Matar; 18 - Jotana, Ghoghamba and Halol; 17 - Dhandhuka, Limkheda, Galteshwar, Santrampur, Jambughoda, Shahera, Kotdasangani, Sallopat SR and Shergarh SR; 16 - Arnej AWS, Jodia, Chuda and Castle Rock; 15 - Fatepura, Kadi, Siddhpur, Kusmi and Wandrafnagar; 14 - Abad City, Dhandhuka ARG, Anklav, Chhota Udepur, Singvad, Mansa, Kathalal, Khanpur, Dhrol, Sayla, Dhambola, Churhat, Sidhi (gopadbanas) , Rania and Kollur; 13 - Dascroi, Mandal, Mc Ahmedabad ARG, Umreth, Modasa, Waghai, Visnagar, Barvala, Lakhtar, Veja SR, Valpoi, Gaganbawada, Mahabaleshwar, Kharsema, Car Nicobar, Bankura (CWC) and Car Nicobar IAF; 12 - Bavla, Dholera, Virpur, Becharaji, Savli, Vadia, Botad, Gadhda, Gondal, Paddhari, Dasada, Jawhar, Surgana, Maithon Dvc, Dumri, Hut Bay and Jamnagar AP.
28 Aug	43 - Khambhalia; 38 - Jamnagar AP; 35 - Jamnagar Kvk AWS; 32 - Jamjodhpur; 31 - Dwarka; 30 - Lalpur; 28 - Ranavav and Porbandar; 24 - Bhanvad, Kalyanpur and Kalavad; 23 - Kotdasangani; 18 - Dhrol; 17 - Lodhika; 16 - Dhoraji and Jamkandorna; 15 - Rae Bareli CWC, Jodia and Gondal; 13 - Kutiana and Mahabaleshwar; 12 - Mangrol (j) , Visavadar, Morbi, Tankara, Rajkot and Uttar Kashi (bar) .
29 Aug	30 - Naliya; 29 - Bhanvad; 27 - Abdasa; 26 - Kalyanpur; 23 - Dwarka, Khambhalia and Lakhpat; 22 - Jamjodhpur; 20 - Nakhatrana; 18 - Mandvi; 17 - Lalpur and Kalavad; 16 - Kandlaaerodrome; 15 - Dhoraji and Lodhika; 13 - Kutiana, Jamkandorna and Lodi Road AWS; 12 - Anjar and Ranavav.
30 Aug	33 - Mandvi; 17 - Okha and Mundra; 16 - Naliya; 15 - Taran Taran; 14 - Abdasa; 13 - Kalamassery AWS; 12 - Vadakara and Kodungallur.
31 Aug	18 - Masulipatnam Cdr, Prakasam Barrage and Vijayawada (ARG) ; 17 - Gudivada; 15 - Kaikalur; 14 - Narsapuram; 13 - Vaikom, Amaravati, Damaragidda and Matijuri ARG; 12 - Vijayawada AP and Gannavaram AP.
1 Sep	40 - Malyal; 37 - Mahabubabad; 35 - Kodada; 32 - Manuguru and Kusumanchi; 31 - Chilkur; 30 - Huzur Nagar and Mattampally; 29 - Burgampadu and Parvathagiri; 28 - Banswada and Madhira; 27 - Kodakandla; 26 - Amaravati, Tiruvuru, Chinthakam, Dornakal, Tadwai Mlg and Noothankal; 25 - Gudurwrgl; 24 - Palawancha; 23 - Guntur, Khammam (ARG) and Bchalam/Kothagu; 22 - Aswapuram and Thollada; 21 - Sadasivanagar and Bonakal; 20 - Kukunoor, Bhiknur, Mothey and Chennaraopet; 19 - Atchampet, Konijerla, Jajireddigudem and Suryapet; 18 - Tenali, Kamareddy, Bayyaram and Kinwat; 17 - Mangalagiri, Nandigama, Piduguralla, Macherla, Kothagudem, Wyra Kvk (agro) , Garla and Himayatnagar; 16 - Velairpad, Paleru Bridge, Tadwai, Kothaguda, Kalwakurthy and Dhar Palle; 15 - Dummugudem, Zaffergadh, Domakonda, Sathupalle, Govindaraopet and Miryalaguda; 14 - Padia, Kunavaram, Nuzvid, Mundlamuru, Yellandu, Tekulapalle, Devaruppal, Jammikunta, Achampeta, Vangoor, Devarakonda and Medak; 13 - Lakhipur, Kumargram, Bapatla, Vijayawada (ARG) , Jangamaheswarapuram, Chandrugonda, Huzurabad, Thimmapur, Kollapur, Thimmajipeta, Varni, Shadnagar, Neredcherla, Tandur and Khammam; 12 - Lakhipur ARG, Barobhisha, Vararamachandrapur, Santhamaguluru, Prakasam Barrage, Srisailam, Mulakalapalle, Yellandu (ARG) , Choppadandi, Karimnagar, Bhoothpur, Jadcherla, Gandeed, Kowdipalle, Chandur, Kosgi, Kodangal, Khila Ghanpur and Kalamb.
2 Sep	31 - Manvat; 26 - Dhalegaon - Fmo; 24 - Sadasivanagar and Tadwai; 23 - Lingampet, Mantha and Pathri; 22 - Kamareddy and Partur; 21 - Sama; 20 - Sonpeth; 19 - Jainoor, Ardhapur and Selu; 17 - Loharkhet, Utnur, Gandhari and Papannapet; 16 - Renuka/Dadhau and Udgir; 15 - Naga Reddipet, Yellareddy, Gambhiraopet, Mirdoddi and Ambad; 14 - Nahan, Dehra Dun, Khanpur and Nanded; 13 - Naina Davi, Bhikangaon, Bhagwanpura, Laxmanchanda, Dubbak, Ambejogai/Mominabad, Ghansawangi, Deoni, Parbhani and Jintur; 12 - Jaipur AP, Tajewala, Haripur, Rishikesh, Mallapur, Metpalle, Dandepalle, Alladurg, Tekmal, Nirmal, Balkonda, Yellareddypeta, Kondapak, Dharur, Georai, Udgir - IMD Parttime and Palam.

TABLE 8 Continued

3 Sep	37-Valia; 25 - Mangrol and Songadh; 22 - Vyara; 20 - Maktampur AWS; 18 - Castle Rock and Valpoi; 17 - Netrang, Nadiad and Tilakwada; 16 - Khanvel, Dolvan, Gandhwani and Navapur; 15 - Subir, Vansda, Uchchhal and Broach; 14 - Daman, Kukshi and Dodamarg; 13 - Daman Fmo, Kapadvanj, Bagh, Sardarpur and Bayad ARG; 12 - Lunawada, Nandod, Prantij, Mandvi, Valod, Karjan, Jabot and Valsad Kvk AWS.
4 Sep	17 - Hut Bay and Husnabad (ARG) ; 15 - Gudamalani SR; 14 - Amraghat; 13 - Yellandu, Makloor and Nandipet; 12 - Mokokchang, Kotri, Messenjor and Nanganur.
5 Sep	19 - Sevoke; 14 - Nainwa; 13 - Tarapur and Manuguru; 12 - Samana, Taibpur and Murud.
6 Sep	18 - Mansa; 16 - Naina Davi; 13 - Dharoi Colony, Vijapur and Talod.
7 Sep	17 - Loharia; 14 - Deogarh; 13 - Pushkar SR; 12 - Baswa and Sangareddy.
8 Sep	17 - Mahabubabad; 13 - Thollada; 12 - Jeypore and Bayyaram.
9 Sep	25 - Malkangiri; 23 - Chitrakunda K Guma; 22 - Nagar SR; 21 - Bhairamgarh, Bijapur and Kutaru; 20 - Korukunda, Orcha, Chhotedongar and Kohkameta; 19 - Narayanpur; 18 - Tongpaal; 17 - Sukma; 16 - Gangalur and Bhamragad; 15 - Mathili; 14 - Bastanar, Gidam, Antagarh and Gadiras; 13 - Lamataput, Bade Bacheli and Chintapalle; 12 - Ambadola and Pahari SR.
10 Sep	29 - Gondia AP, Phulbani and Gondia; 24 - Lal Bahadur Nagar; 23 - Lanjigarh; 22 - Madanpur Rampur; 21 - Deori; 20 - Kirnapur and Salekasa; 19 - Umerpada, Gurur, Dongargarh, Sukma and Sadakarjuni; 18 - Bhanupratappur, Rajnandgaon and Goregaon; 17 - Khairagarh; 16 - Balod, Baloda Bazar and Durgkondal; 15 - Tikarpara, Bhatapara, Marri Bangla Deori, Lawan, Dhanora, Mohla, Dongargaon, Chhuria and Korchi; 14 - Ambadola, Doundi, Pallari/Palari, Gangalur, Dhamtari, Charama, Pakhanjur, Keshkal, Pithora, Khadgaon, Amgaon, Arjuni Morgaon and Akkalkuwa; 13 - Nawapara, Sagbara, Sonakhan, Suhela, Kukrel, Antagarh, Nerharpur, Matiyari, Lakhandur, Desaiganj and Baihar; 12 - Arjunda, Kashdol, Darbha, Bhakhara, Komakhan, Manpur, Labhandih, Raipur, Lanji, Sakoli, Bramhapuri and Kanker.
11 Sep	30-Shahgarh; 28-Patharia; 25-Udaipura; 24-Buxwaha; 21-Hatta, Damoh-aws & Banda; 19-Jabera, Jabalpur-aws, Rehli, Seoni & Baihar; 18-Panagar & Narsinghpur-aws; 17-Tendukheda, Matiyari, Kareli & Garhakota; 16-Pipariya, Bareli, Bichhia & Deori; 15-Pasighat AP, Valia, Narwar, Badamalhera & Mohgaon; 14-Umerpada, Patera & Sagar-aws; 13-Niwas & Kesli; 12-Bhander, Batiyagarh, Kumdam, Patan & Barghat.
12 Sep	36 - Biaora; 29 - Agra (CWC) ; 24 - Rajakhera; 23 - Prithvipur, Jalesar and Sadabad; 22 - Gohad and Karera; 21 - Narwar and Rajgarh; 20 - Mau, Gwalior and Sikandra Rao; 19 - Bhander, Sabalgarh, Hathras, Dholpur and Datia; 18 - Dabra; 17 - Ater, Bhitarwar, Ghatigaon, Ambah, Porsa, Khairagarh, Tundla, Sahawar and Kasganj; 16 - Lahar, Mihona, Mehgaon and Sawai Madhopur; 15 - Gormi, Chinor, Badoda, Orchha, Tahrauli and Bhind; 14 - Alipur (jaura) and Jhansi; 13 - Aklera and Fatehabad; 12 - Banbasa, Roan, Morena-aws, Pachmarhi, Narsingarh, Chahtarpur-aws, Niwari, Sahaswan, Etawah (CWC) , Sasani and Mathura.
13 Sep	27 - Lohaghat; 20 - Champawat; 18 - Bijnor; 15 - Sahawar and Kasganj; 14 - Muhammadi and Budaun; 13 - Banbasa, Khatima, Sahaswan, Mirganj and Pawayan; 12 - Ankinghat, Baheri and Nauganva Sadat.
14 Sep	21-Pataudi; 18-Contai and Champawat; 17 - Durgachack; 16 - Haldwani; 15 - Nainital; 14 - Kusumi; 13 - Kosli and Nahar REV; 12 - Digha.
15 Sep	19 - Jhargram PTO; 15 - Contai and Bishrampur; 14 - Amtala, Garhwa and Indrapuri; 13 - Bhograi, Bankura (CWC) , Kansabati Dam, Lalgarh, Kharidwar and Latehar; 12 - Rajghat, Digha, Kalyani Smo, Tusuma, Nabinagar and Dumaria.
16 Sep	15 - Suri PTO, Asansol and Ramchandrapur; 14 - Udala and Maithon Dvc; 13 - Kharidwar, Kusmi, Maithon and Suri; 12 - Balimundali, G B Nagar, Nawana, Burnpur, Samari, Gobindpur Dvc and Gurabandha.
17 Sep	20 - Latehar Balumat Kvk AWS; 15 - Kusmi, Dhurki and Nandadih; 14 - Ramchandrapur and Churhat; 13 - Kuru and Naudiha Bazar; 12 - Bhandaripokhari, Bari, Samari, Biharpur, Panagar, Chandankiary, Ranchi AP, Bhawnathpur and Garu.
18 Sep	22 - Rath; 16 - Attarra; 15 - Roan, Kalpi Tehsil, Chilaghat and Karhal; 14 - Hamirpur CWC and Shahjina Fmo; 13 - Dhenkanal, Dhenkanal PTO, Hanumana, Auraiya (CWC) , Etawah (CWC) and Hamirpur; 12 - Bhuban, Lahar, Mau Tehsil, Chakkar Nagar, Kanpur Obsy & Etawah.
19 Sep	20 - Sikandra Rao; 18 - Narora and Kasganj; 16 - Gunnaur; 15 - Jasrana; 14 - Sahaswan; 13 - Car Nicobar IAF; 12 - Port Blair.
20 Sep	Nil.
21 Sep	Nil.
22 Sep	Nil.
23 Sep	Nil.
24 Sep	20 - Bijapur; 16 - Udaigarh and Bagh; 13 - Pardi; 12 - Manki, Gaganbawada and Shirali.
25 Sep	19 - Pernem; 16 - Sawantwadi; 15 - Palghar ARG and Bijonbari; 14 - Darjeeling, Bijadandi, Panjim , Malvan and Devgad; 13 - Kundapur, Mulde ARG and Kudal; 12 - Yanam, Sangrampur, Mapusa and Washi.
26 Sep	24-Haripur; 21-Vasai; 19-Sama; 17-Umerpada, Paonta, Colaba & Santacruz; 16-Loharkhet, Uran & Mussoorie; 15-Talcher; 14 - Khowang; 13-Lava, Guler, Nagrota Surian, Avadi, Rudraprayag, Vikramgad, Pune & Chinchwad - ARG; 12-Beky Rly.bridge, Algarah & Amfu Kalimpong.
27 Sep	31-Jokihat & Forbesganj; 29-Chargharia; 28-Palasi; 27-Raniganj, Sikti, Tedhagach & Lambhuaa; 26-Bahargama; 25-Kochadhaman & Srinagar; 23-Kursakanta & Kishanganj; 22-Araria; 21-Vyara & Kusmi; 20-Narpatganj, Bahadurganj, Taibpur, Pothia, Jalalgarh, Dagarua, Krityanand Nagar, Rahghopur & Sultanpur; 19 - Thakurganj, Dhengraghat and Kasba; 18 - Mansahi and Pratapganj; 17 - Katihar, Manihari, Dighalbank and Baisa; 16 - Daman, Songadh, Visavadar, Madhipura and Azamgarh; 15 - Daman Fmo, Ghogha, Kumarkhand, Banmankhi, Baisi, Purnea, Birpur, Tanda, Deogaon Lalganj and Ghoga ARG; 14 - Buxaduar, Mekhliganj, Raiganj PTO, Singheshwar, Andhratharhi, Amaur and Saraigarh Bhaptiyahi; 13 - Sankalan, Balurghat, Murliganj, Darauli, Raghunathpur, Kishanpur, Tribeniganj and Bhanpur; 12 - Daman AWS, Ramanujnagar, Khirkiya-arg, Jhanjharpur, Madhepur, Madhwapur, Basua, Pipra, Ayoadhya, Mahabaleshwar and Pratapgarh.
28 Sep	27 - Nagarkata; 26 - Bansi CWC and Basti; 25 - Gajoldoba; 24 - Nichlaul; 23 - Murti, Neora, Tribeni/Balmikinagar and Chanderdeepghat; 22 - Champasari and Chengmari/Diana; 21 - Siliguri PTO, Chanpatia and Bansgaon; 20 - Sevoke, Motihari, Ayoadhya and Birdghat; 19 - Bettiah, Gaunaha, Lauria Nandangarh, Lonavala ARG and Hasimara; 18 - Buxaduar, Patahi, Sikta, Thakrahan, Balrampur, Haraiya, Mankapur, Trimohani Ghat Fmo and Bhutanghat; 17 - Bagdogra IAF, Sagbara, Adapur, Tedhagach, Tanda, Mukhlispur, Mehdawal and Uska Bazar Fmo; 16 - Alipurduar PTO, Jalpaiguri, Sugauli and Sukiapokhri; 15 - Sardarpur, Harsidhi, Turkaulia, Ramnagar, Gorakhpur and Nautanwa; 14 - Domohani, Damthang, Lakhtar, Chatia, Sangrampur, Birpur, Gonda Sadar, Dhanghata, Bansi Tehsil and Naugarh; 13 - Dhupguri, Jhallong, Lava, Kalimpong, Jabot, Lalbegiaghat, Gopalganj, Basti, Regoli, Maharajganj, Domeriaganj and Shoharatgarh; 12 - Amfu Pundibari, Kumargram, Nh31 Bridge, Algarah, Amfu Kalimpong, Rongo, Rongli, Junagadh, Dhoraji, Barod, Areraj, Banjaria, Kotwa, Thawe, Akbarpur, Balrampur (t) , Pharenda, Khalilabad, Kakrahi, Matheran and Munsong
29 Sep	27 - Attarra; 21 - Banda; 19 - Banda CWC; 13 - Dhengbridge and Kakrahi; 12 - Ajaigarh, Dhaka, Piprakothi and Sonbarsa.
30 Sep	15 - Y N Hoskote; 13 - Vadodara.

Total fourteen low-pressure systems formed during the monsoon season of 2024, out of which one intensified cyclonic storm "ASNA", three deep depression and three depression. Other than these systems seven low pressure areas formed out of which two intensified to Well Marked Low Pressure areas. The off-shore trough along different parts of the west coast persisted from 29 June-7 August, 10 August, 23-30 August, 2 September and 10-12 September.

4. *Extra Indian Features*

4.1. Cross Equatorial Flow during June – September 2024

(*a*) Over the Arabian Sea

	5° N-5° S					North of 5° N				
		Weeks					Weeks			
Month	Normal (in kts)	1	2	3	4	Normal (in kts)	1	2	3	4
June	10-12	+3	+1	+3	+6	15-20	0	0	0	+3
July	12-14	+1	+3	+1	+2	20-25	0	0	-1	0
Aug	12-14	+2	+1	+2	0	20-25	0	0	-7	-3
Sept.	08-10	+3	+3	+7	+5	05-10	+5	+9	+10	+7

The Cross - Equatorial flow along the equatorial belt (equator to 5° N / 5° S) over Arabian Sea was:

(*i*) During June 2024, it was above normal in 1st week, 2nd week, 3rd and 4th week.

(*ii*) During July 2024, it was above normal in 1st week, 2nd week, 3rd and 4th week.

(*iii*) During August 2024, it was normal in 4th week while it was above normal in 1st, 2nd & 3rd week.

(*iv*) During September 2024, it was above normal in 1st week, 2nd week, 3rd and 4th week.

The surface winds over Arabian Sea to the north of 5° N were:

(*i*) During June 2024, it was normal in 1st and 2nd week and 3rd week and above normal in 4th week.

(*ii*) During July 2024, it was normal in 1st week, 2nd week, 4th week and below normal in 3rd week.

(*iii*) During August 2024, it was above normal in 1st and 2nd week and below normal in 3rd and 4th week.

(*iv*) During Sept. 2024, it was above normal in all week.

(*b*) Over the Bay of Bengal

	5° N-5° S					North of 5° N				
		Weeks					Weeks			
Month	Normal (in kts)	1	2	3	4	Normal (in kts)	1	2	3	4
June	08-10	+3	+3	+13	+7	10-15	0	0	+7	0
July	08-10	+5	+4	+9	+5	10-15	+2	0	0	0
Aug	08-10	+10	+4	+5	+4	10-15	+1	0	+4	0
Sept.	08-10	+6	+5	+10	+2	05-10	+9	+7	+9	+2

The Cross Equatorial flow along the equatorial belt (equator to 5° N/ 5° S) overBay of Bengal was :

(i) During June 2024, it was above normal in all week.

(ii) During July 2024, it was above normal in all week.

(iii) During August 2024, it was above normal in all week.

(iv) During September 2024, it was above normal all week.

The surface winds over the Bay of Bengal to the north of 5° N were:-

(i) During June 2024, it was normal in 1st, 2nd and 4th week and above normal in 3rd week.

(ii) During July 2024, it was above normal in 1st week while it was normal in 2nd, 3rd and 4th week.

(iii) During August 2024, it was normal in 1st and 3rd week and normal in 2nd and 4th week.

(iv) During September 2024, it was above normal in all week.

4.2. Position of Equatorial Trough was

June 2024 **:** North of its normal position by 1°-2° , to the West of 55 E and 1°-8° from 55° E to 110° E in the first week. South of its normal position by 1°-3° from 40° E to 110° E in the second week. North of its normal position by 1°- 2° from 40° E to 64° E, South of its normal position by 1° from 64° E to 78° E and South of its normal position by 1°- 2° from 78° E to 110° E in the 3rd week. South of its normal position by 1°- 2° from 40° E to 67° E and north of its normal position by 1°- 2°, from 67° E to 110° E in the 4th week.

July 2024 *:* South of its normal position by 1º-5º, from 40º E to 110º E in the first week. South of its normal position by 2º-3º from 40º E to 110º E in the 2nd week. North of its normal position by 1º-4º from 40º to 92º E and South of its normal position by 2º-4º from 92º E to 110º E in the 3rd week. It was South of its normal position by 2º-6º from 40º E to 110º E in the 4th week.

August 2024 : It was North of its normal position by 1º from 40º E to 50º E and South of its normal position by 1º - 4º from 50º E to 110º E in the first week. South of its normal position by 1º- 5º from 40º E to 110º E in the 3rd week. South of its normal position by 1º from 40º E to 73º E and North of its normal position by 1º from 73º E to 110º E in the 4th week.

September 2024 : South of its normal position by 2º-3º from 40º E to 110 E in first week. South of its normal position by 1º-2º from 40º E to 67º E and North of its normal position by 1º-2º from 67º E to 95º E and South of its normal position by 1º-3º from 95º E to 110º E in the 2nd week. South of its normal position by 1º from 40º E to 73º E and North of its normal position by 1º-3º from 73º E to 110º E in the 3rd week. South of its normal position by 1º-2º from 40º E to 110º E in the 4th week.

4.3. Low Pressure Systems

4.3.1. *Low Pressure Systems during June to September 2024 in Bay of Bengal*

Low Pressure Systems	June	July	August	September	Total
Low Pressure Area / WML	01	02	01	02	06
Depression	00	01	01	00	02
Deep Depression	00	00	00	01	01
Tropical Storm (T.S.)	00	00	00	00	00
TOTAL	01	03	02	03	09

4.3.2. *Low Pressure Systems during June to September 2024 in Arabian Sea*

Low Pressure Systems	June	July	August	September	Total
Low Pressure Area / WML	00	00	01	00	01
Depression	00	00	00	00	00
Deep Depression	00	00	00	00	00
Tropical Storm (T.S.)	00	00	00	01	01
TOTAL	00	00	01	01	02

4.3.3. *Low Pressure Systems during June to September 2024 over the land region*

Low Pressure Systems	June	July	August	September	Total
Low Pressure Area / WML	00	00	01	00	01
Depression	00	00	00	01	01
Deep Depression	00	00	01	00	01
Total	00	00	02	01	03

4.3.4. *Low Pressure Systems over the West Pacific Ocean/ South China sea*

There were in all, 18 low pressure systems (reaching the intensity of Tropical depression and above) in the northwest Pacific Ocean / South China Sea during Jun-Sept. 2024. The month wise break-up is given below:

Low pressure systems	June	July	August	September	Total
Tropical Depression (T.D.)	01	01	02	02	06
Tropical Storm (T.S.)	00	01	01	03	05
Typhoon/Super Typhoon	00	01	03	03	07
TOTAL	01	03	06	08	18

4.3.5. *Low Pressure Systems in South Indian Ocean:*

No low pressure system (TD, TS, Typhoon) was reported in Southern Hemisphere during June-Sept 2024.

4.4. *Troughs in Westerlies affecting the Indian region: to the south of 30º N and to the north of 30º S during June to September 2024.*

4.4.1. *The Upper air troughs in mid and upper tropospheric Westerly over Indian region*

The month wise details of the number of troughs in westerlies which moved across Indian region from west to east and penetrated to the south of 30º N are given below:

Atmospheric Level	June	July	August	September	Total
500 hPa	5	5	7	6	23
300 hPa	8	6	6	5	25

4.4.2. Upper Air Troughs in westerlies over South Indian Ocean, which penetrate to the north of latitude 30º S. *(Source:INOSHAC/CONSTANT PRESSURE MAPS, USA)*

The troughs in upper air westerlies which moved across the South Indian Ocean from west to east, penetrated to the north of Lat.30º S, in the Southern

Hemisphere, during June to September 2024. The month wise break-up is as follows:

Atmospheric Level	June	July	August	September	Total
500 hPa	6	8	6	7	27
300 hPa	5	9	7	6	27

4.5. *Normal position of Mascarene HIGH is centered at 30º S/ 50º E and Australian HIGH is centered at 30º S/ 140º E during June to September 2024. (*Source: Climatic Atlas of The Indian Ocean)

The monthwise intensity of Mascarene HIGH which was centered at its mean position of Lat. 31.9º S & Long 54.2º E during June, July, August and September 2024 is as follows:

Month	*Normal Pressure (hPa) (approx.)	Actual Pressure(hPa)	Departure from normal hPa (approx.)
June	1023.0	1029.3	+6.3
July	1025.5	1026.5	+1.0
August	1026.0	1031.6	+5.6
September	1023.5	1026.9	+3.4

*Source: CMAD, NOAA

The Mascarene HIGH with its mean position at 31.9° S / 54.2º E was strengthened by 6.3 HPa in the month of June 2024. It was above normal by 6.3, 1.0, 5.6 & 3.4 hpa during the months of June, July, August and September 2024 respectively.

The monthwise intensity of Australian HIGH which was centred with its Mean position at Lat. 33.1º S and Long 139.5° E. during June to September 2024 is as follows:

Month	*Normal Pressure (hPa) (Approx.)	Actual Pressure(hPa)	Departure from normal hPa (Approx)
June	1022.0	1027.0	+5.0
July	1022.0	1031.2	+9.2
August	1020.5	1026.4	+5.9
September	1018.0	1029.1	+11.1

(*Source: NOAA)

The Australian HIGH centred at 33.1º S / 139.5º E was strengthened by an average of about 11.1 hPa during the month of September 2024. It was above normal by 5.0, 9.2, 5.9 & 11.1 hPa in the month of June, July, August and September 2024 respectively.

5. **Semi-permanent systems**

5.1. *Heat Low*

The monthwise lowest and the second lowest values at the centre of Heat Low were:

June: 992.2 hPa (on 20) and 992.7 hPa (on 29)

July: 988.9 hPa (on 24) and 989.1 hPa (on 2)

August:992.0 hPa (on 1), 992.3 hPa (5)

September: 997.1 hPa (14) and 999.2 (5).

5.2. *Low level jet*

The Low Level Jet (LLJ) is most prominent at 850 hPa, with core speeds typically ranging from 20-30 m/s, occasionally reaching up to 50 m/s near Madagascar and off the Somali coast. The LLJ is characterized by strong horizontal and vertical wind shears and originates from the Mascarene High. It crosses the equator, skirts the East African highlands, turns towards the Arabian Sea, and extends further eastward, crossing India. During southwest monsoon 2024, LLJ remained active throughout the season, maintaining strength close to its climatological normal. It shows notable strengthening in July, with core wind speeds surpassing 60 knots during the latter part of the month.

5.3. *Monsoon Trough*

After the establishment of the monsoonal circulation & the advancement of the monsoon over the Indian region, monitoring of the monsoon trough began on July 2, 2024. During the month of June, the Heat trough was established over the Indo-Gangetic plains & around end of the month Monsoon Trough was mainly positioned to its normal location. During the first half of July, the trough was observed near its normal position. However, in the second half of July, it shifted south of its normal position, leading to enhanced rainfall activity over the monsoon core zone. In the first half of August, the trough remained close to its normal position. By the second week of August, while the western end of the monsoon trough was near its normal position, the eastern end was located south of its normal position. In the first half of September, the trough again lay south of its normal position, but in the second half, the western end shifted north of its normal position, while the eastern end remained south of its normal position due to the formation of synoptic systems in the Bay of Bengal.

5.4. *Tibetan Anticyclone/HIGH*

Tibetan anticyclone located around 25° N & 92° E in June and September, while in July & August, it shifts to

around 28° N & 88° E. The strength & position of the Tibetan anticyclone can have a significant impact on the monsoon rainfall over India. During the 2024 monsoon season, the Tibetan anticyclone, normally centred over the south-eastern Tibetan Plateau, exhibited notable shifts in position & strength, influencing the monsoon rainfall patterns over India. The anticyclone was absent until June 22, when it finally established, settling mostly in its normal position by the last week of June. In the first week of July, it shifted westward till the second week. By the third week, it returned to a near-normal position, while drift westward again during the last week of July. Throughout most of August, it remained significantly west of its normal location. In the first week of Sept., the anticyclone was observed in its normal position, though east-west fluctuations were noted in later part of the Sept.

5.5. *Tropical Easterly Jet (TEJ)*

The TEJ got established over the southern peninsular India by 30 May over Chennai with reporting easterlies of 69 knots at 77 hPa level. A latitudinal spread of the easterly jet speed winds was observed between 8º N to 18º N , predominantly located south of 15° N during June. However, in July and August, it oscillated between north and south, reaching as far north as 18° to 20° N. During September, the jet had returned mostly south of 15° N, aligning closely with its normal position. The highest wind speed of 118 knots was recorded over Minicoy on 1st July at 112 hPa.

5.6. *Mascarene High*

Mascarene High, normally positioned in the southwest Indian Ocean, around 30° S, 50° E plays a crucial role in atmospheric interactions between the northern and southern hemispheres. An intensification of the MH significantly strengthens the Somali Low-Level Jet, enhancing summer monsoon circulation across tropical Asia and the western Pacific. In June and July, normal mean sea level pressure, however, it weakens during the first half of August. It then strengthened again in mid-August (average 1031.6 hPa), maintaining its intensity until the last week of the month.

6. Other features

6.1. Monthly wind anomalies during Southwest Monsoon 2024

The circulation anomaly features at lower, middle and upper tropospheric levels, 850, 700, 500 & 200 hPa during the southwest monsoon season are discussed below:

6.1.1. *June wind anomaly features*

In the monthly wind pattern, an anomalous anticyclonic circulation was seen at 850 hPa over north Bay of Bengal extending upto 700 hPa. An anomalous cyclonic circulation was seen at 500 hpa over north Konkan and adjacent Madhya Maharashtra extending upto 300 hpa. NE-SW anomalous ridge was seen at 200 hPa extended between 75° E/17° N to 92° E/25° N.

During the week ending 5 June, two anomalous cyclonic circulations was seen, one over east Bihar and neighbourhood & another over northwest Rajasthan and neighbourhood at 850 hpa.

During the week ending 12 June, two anomalous cyclonic circulation, one over interior Karnataka & neighbourhood at 850 hpa which extended upto 500 hpa & another over Lakshadweep and adjacent Kerala cost at 850 hPa.

During the week ending 19 June, two anomalous cyclonic circulations, one over northeast Assam and neighbourhood and other over Rayalseema and neighbourhood at 700 hpa which extended upto 500 hpa. A ridge was seen at 200 hpa extended along 25° N.

During the week ending 26 June, an anomalous cyclonic circulation was seen at 850 hPa over Madhya Maharashtra and neighbourhood extended upto 700 hpa.

6.1.2. *July wind anomaly features*

In the monthly wind pattern, two anomalous cyclonic circulations were observed one over Jammu & Kashmir and the other over Vidarbha and neighbourhood at 850 hPa. An anomalous ridge was seen at 850 hPa extended along 28° N. An anomalous cyclonic circulation was seen at 700 hpa over coastal Andhra Pradesh and neighbourhood.

During the week ending 3 July, two anomalous cyclonic circulations were seen one over Saurashtra & Kutch and neighbourhood and another over northeast Assam and neighbourhood at 850 hPa. An anomalous cyclonic circulation was seen at 700 hpa over Jharkhand and neighbourhood. A ridge was seen at 200 hPa extended along 30° N.

During the week ending 10 July, an anomalous cyclonic circulation was seen at 850 hPa over northeast Assam and neighbourhood. At 700 hpa, an anomalous

cyclonic circulation was seen over south interior Karnataka and neighbourhood.

During the week ending 17 July, two anomalous cyclonic circulation were seen one over south coastal Andhra Pradesh & adjoining Tamil Nadu at 850 hPa and other over Vidarbha & adjoining south Chattisgarh at 850 hPa which extended upto700 hpa. A ridge was seen at 200 hPa extended along 25° N.

During the week ending 24 July, two anomalous cyclonic circulation at 850 hpa one over south Gujarat & neighbourhood and other over coastal Andhra Pradesh and neighbourhood which extended upto 500 hpa. A ridge was seen at 200 hPa extended along 28° N.

During the week ending 31 July, two anomalous cyclonic circulation one at 850 hpa over north Madhya Maharashtra and neighbourhood which extended upto 700 hpa and other at 700 hpa over northwest Bay of Bengal and adjoining Odisha coast extended upto 300 hpa.

6.1.3. *August wind anomaly features*

In the monthly wind pattern, an anomalous anti cyclonic circulation was seen at 850 hpa over coastal Andhra Pradesh and Neighbourhood extended upto 500 hPa.

During the week ending 7 August, an anomalous cyclonic circulation was seen at 850 hpa over northwest Rajasthan and neighbourhood extended upto 500 hPa.

During the week ending 14 August, an anomalous cyclonic circulation was seen at 850 hPa over south Uttar Pradesh and neighbourhood extended upto 700 hPa. A ridge was seen at 200 hPa extended along 27° N.

During the week ending 21 August, an anomalous anticyclonic circulation was seen over South Uttar Pradesh and adjoining north Madhya Pradesh at 850 hpa extended upto 700 hPa.

During the week ending 28 August, two anomalous cyclonic circulation was seen at 850, one over south Bangladesh and neighbourhood and other over Gujarat and neighbourhood which extended upto 500 hPa.

6.1.4. *September wind anomaly features*

In the monthly wind pattern, an anomalous cyclonic circulation was seen at 850 hPa level over Odisha and adjoining north coastal Andhra Pradesh which extended upto 500 hpa. A ridge was seen at 200 hPa extended along 30° N.

During the week ending 4 September, two anomalous cyclonic circulation were seen at 850hpa, one over west central Bay of Bengal off coastal Andhra Pradesh coast extended upto 500 hpa and another over southwest Rajasthan & adjoining Saurashtra, Kutch extended upto 700 hpa.

During the week ending 11 September, an anomalous cyclonic circulation was seen at 850 hPa over coastal Andhra Pradesh and neighbourhood extended upto 500 hpa.

During the week ending 18 September, an anomalous cyclonic circulation was seen at 850 hPa over northwest Bay of Bengal and neighbourhood extended upto 200 hpa.

During the week ending 25 September, an anomalous cyclonic circulation was seen at 850 hPa over west central Bay of Bengal off coastal Andhra Pradesh extended upto 700 hpa. A ridge was seen at 200 hPa extended along 33° N.

During the week ending 2 October, an anomalous cyclonic circulation was seen at 850 hPa over north Madhya Maharashtra and neighbourhood extended upto 500 hpa. A ridge was seen at 200 hPa extended along 30° N.

7. Disastrous weather events and damage during Monsoon months

7.1. *June*

In June 2024, a total of more than 180 people reportedly died, more than 85 were injured, several were reportedly missing, and more than 500 livestock perished. Lightning, thunderstorm, heavy Rains & Landslide and heat wave claimed 117, 2, 58 and 4 persons death respectively.

Fig. 9 shows deaths and damage due to significant weather events during June 2024. (Based on real-time media reports).

7.2. *July*

During July 2024, a total of more than 690 (total 693) people reportedly died, more than 290 (total 297) were injured, more than 150 were reportedly missing, and more than 1200 livestock perished. Lightning and heavy

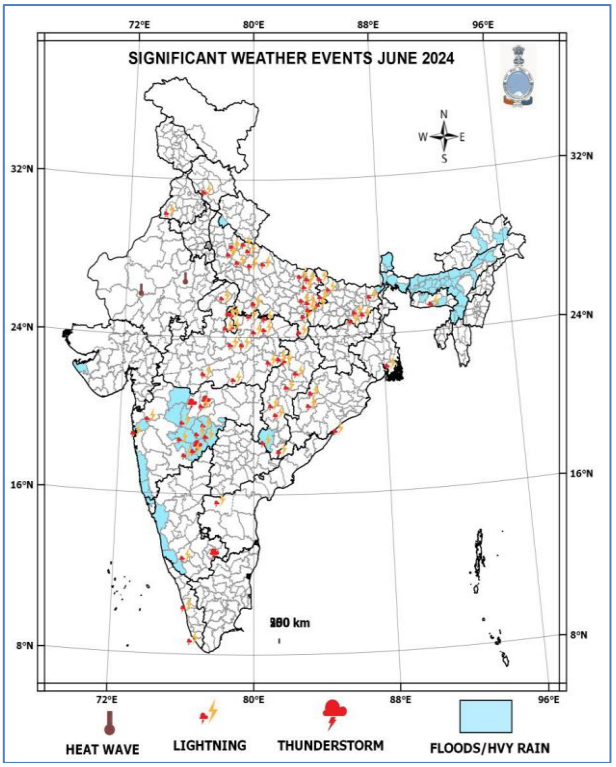

Fig. 9.

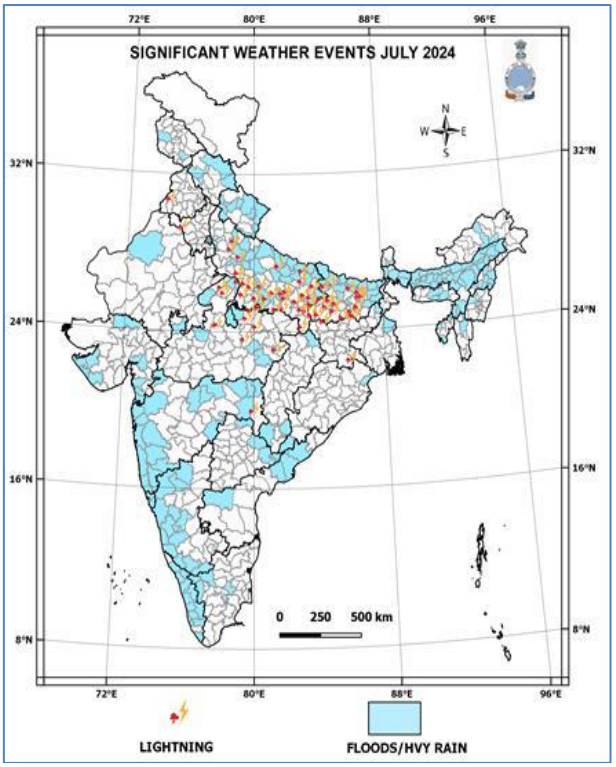

Fig. 10.

Rains & Landslide claimed 162, 531 persons death respectively.

Fig. 10 shows deaths and damage due to significant weather events during July 2024. (Based on real-time media reports).

7.3. *August*

In August 2024, a total of more than 175 people reportedly died, more than 110 were injured, 30 were reportedly missing, and more than 70 livestock perished. Lightning and heavy Rains & Landslide claimed 65 & 112 persons death respectively.

Fig. 11 shows deaths and damage due to significant weather events during August 2024. (Based on real-time media reports)

7.4. September

In September 2024, a total 81 people reportedly died, more than 50 were injured, several were reportedly missing, and more than 95 livestock perished. Lightning and Rains & Landslide claimed 28 and 53 persons death respectively.

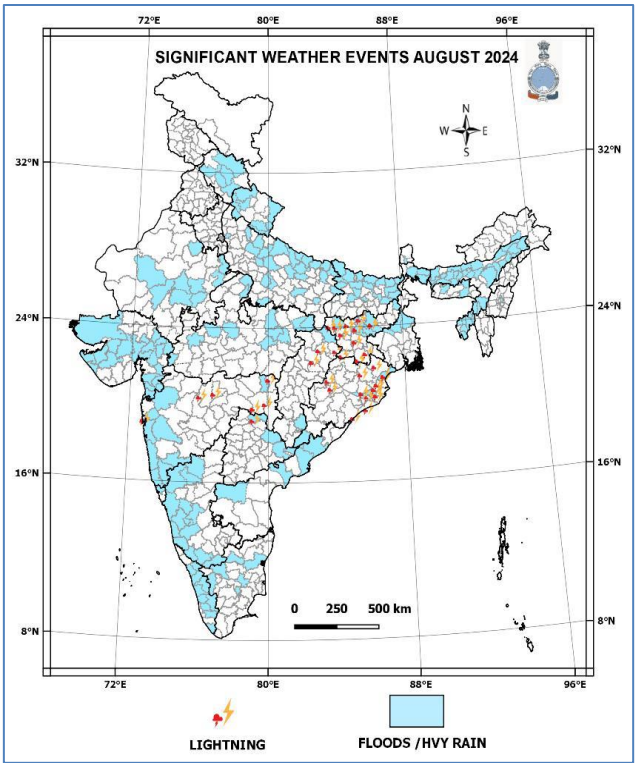

Fig.11.

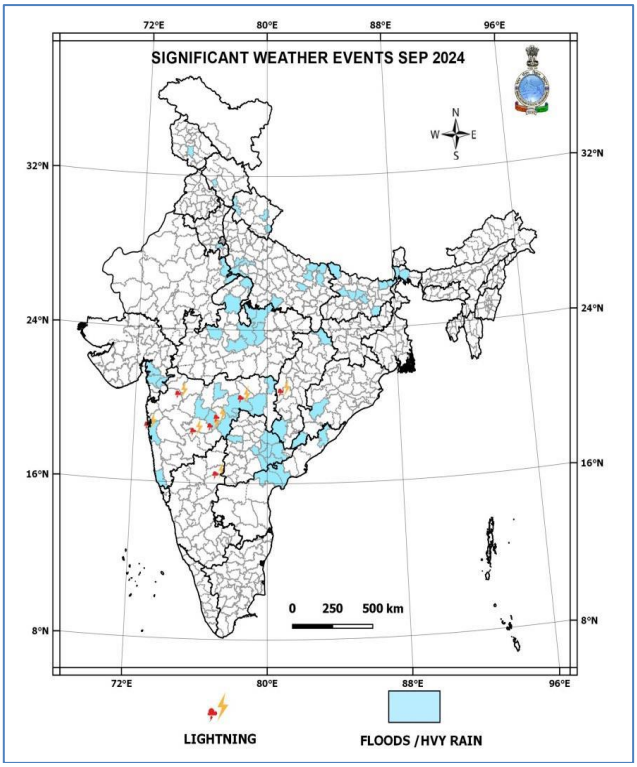

Fig. 12

Fig. 12 shows deaths and damage due to significant weather events during September 2024. (Based on real-time media reports).

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Appendix

Definitions of the terms given in *'Italics'*

Rainfall	
Very light	*0.1 to 2.4 mm*
Light	*2.5 to 15.5 mm*
Moderate	*15.6 to 64.4 mm*
Heavy	*64.5 to 115.5 mm*
Very heavy	*115.6 to 204.4 mm*
Extremely Heavy	*≥204.5 mm*
Monthly/Seasonal Rainfall Distribution on sub division scale	
Large Excess	*percentage departure from normal rainfall is + 60% or more.*
Excess	*percentage departure from normal rainfall is + 20% to +59%*
Normal	*percentage departure from normal rainfall is from + 19 % to – 19 %.*
Deficient	*percentage departure from normal rainfall is from – 20 % to – 59%.*
Large Deficient	*percentage departure from normal rainfall is from – 60 % or less.*
No rain	*-100%*
Rainfall distribution on All India scale	
Below Normal	*percentage departure from normal rainfall is from <10 %*
Normal	*percentage departure from normal rainfall is from + 10 % to – 10 %.*
Above Normal	*percentage departure from normal rainfall is from > 10 %*
Monsoon activity	
Active	Average rainfall of a sub–division is more than 1½ to 4 times the normal with minimum 5cms along the west coast and 3cms elsewhere in at least two stations in the sub–division.
Vigorous	Average rainfall of a sub–division is more than 4 times or more than the normal with minimum 7cms along the west coast and 5cms elsewhere in at least two stations in the sub–division.