



Cyclonic storms & depressions over the North Indian Ocean during 2024

1. Introduction

During 2024, in all 13 intense lowpressure systems formed over the Indian ocean. These include; two severe cyclonic storms (REMAL & DANA), two cyclonic storms (ASNA & FENGAL), 3 deep depressions and 6 depressions. Out of these 13 systems, 9 systems formed over the Bay of Bengal, 2 over the Arabian Sea and 2 over land. One severe cyclonic storm formed over the Bay of Bengal in pre-monsoon season. Monsoon Season witnessed one cyclonic storm over the Arabian sea, two deep depression & two depressions over the Bay of Bengal and one deep depression & one depression over land. One severe cyclonic storm, one cyclonic storm and two depressions formed over Bay of Bengal and one depression formed over the Arabian sea in post-monsoon season.

The details of these systems are summarised below in Table -1 and the tracks are shown in Fig.1

2. Details of the systems during 2024

2.1. Severe Cyclonic Storm “REMAL” over the Bay of Bengal (24th-28th May, 2024)

2.1.1. Under the influence of cyclonic circulation over southwest Bay of Bengal, a **Low Pressure Area** formed over southwest and adjoining westcentral Bay of Bengal off north Tamil Nadu-south Andhra Pradesh coasts on morning of 22nd May. It persisted over the same region with the associated cyclonic circulation extended upto 7.6 km above m.s.l. on the same day. It moved northeastwards and lay over westcentral & adjoining southwest Bay of Bengal on 23rd morning. It further moved northeastwards and lay as a **Well Marked Low Pressure Area** over the same region on the same day. It continued to move northeastwards and concentrated into a **Depression** and lay centered over central Bay of Bengal near Lat. 15.0° N/ Long.88.4° E, about 800 km south-southwest of Khepupara (Bangladesh) at 0000 UTC on 24th. It further moved northeastwards and lay centered over the same region near Lat.15.5° N/Long.88.7° E at 0300 UTC on 24th. It then moved north-northeastwards and lay centered over eastcentral Bay of Bengal near Lat.16.2° N/Long.89.1° E at 1200 UTC on 24th. Continued moving north-northeastwards and it intensified into a **Deep Depression** and lay centered over eastcentral Bay of Bengal near Lat.

17.6° N/Long.89.7° E at 0000 UTC on 25th. Then it moved nearly northwards and lay centered over the same region near Lat.18.0° N/Long.89.7° E at 0300 UTC of 25th. It further moved nearly northward and intensified into a **Cyclonic Storm “REMAL” (pronounced as “Re-Mal”)** and lay centered over north & adjoining eastcentral Bay of Bengal near Lat.18.8° N/Long.89.5° E at 1200 UTC on 25th. It continued to move nearly northwards and lay centered over north Bay of Bengal near Lat.19.3° N/Long.89.4° E at 1800 UTC on 25th. It moved nearly northwards and further intensified into a **Severe Cyclonic Storm** and lay centered over north Bay of Bengal near Lat.19.5° N/Long. 89.4° E at 0000 UTC on 26th. It continued to move nearly northwards and lay centered over north Bay of Bengal near Lat.19.8° N/Long.89.3° E at 0300 UTC on 26th with maximum sustained wind speed of 90-100 kmph gusting to 110 kmph around the cyclone centre. It continued to move nearly northwards and lay centered over the same region near Lat.21.1° N/Long.89.2° E at 1200 UTC on 26th. It moved nearly northwards over the same region and crossed the Bangladesh and adjoining West Bengal coasts between Sagar Islands and Khepupara close to southwest of Mongla near Lat.21.75° N/Long. 89.2° E between 1700 UTC on 26th to 1900 UTC on 26th as a **Severe Cyclonic Storm** with wind speed of 110 to 120 kmph gusting to 135 kmph. It lay centered over coastal Bangladesh and adjoining coastal West Bengal at 2100 UTC on 26th. It continued to move nearly northwards and weakened into a **Cyclonic Storm** and lay centered over the same region near Lat.22.5° N/Long.89.2° E at 0000 UTC on 27th. It lay centered over the same region near Lat.22.8° N/Long.89.2° E at 0300 UTC on 27th. It moved east-northeastwards and weakened into a **Deep Depression** which lay centered over the same region near Lat.23.8° N/ Long.90.2° E at 1500 UTC on 27th. It moved east-northeastwards and further weakened into a **Depression** and lay centered over east Bangladesh near Lat.24.4° N/ Long.91.1° E at 0000 UTC on 28th. It further moved east-northeastwards and lay centered over the same region near Lat.24.7° N/Long.91.5° E at 0300 UTC on 28th. It then moved nearly northeastwards and lay centered over northeast Bangladesh and adjoining Meghalaya near Lat.25.1° N/Long.91.8° E at 0600 UTC on 28th. It moved nearly northeastwards and weakened into a **Well Marked Low Pressure Area** over northeast Assam & neighbourhood on 28th evening. It further weakened into a **Low Pressure Area** over the same region on 29th morning

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TABLE 1

Brief Summary of Cyclonic Storms and Depressions over Indian Seas and neighbourhood during 2024

S. No.	Category	Life Period	Place/Time of landfall	Lowest Estimated central Pressure (hPa)	Max. wind Estimate (kts)	C.I. No.
1.	Severe Cyclonic Storm “REMAL” over the Bay of Bengal	24 th -28 th May, 2024	Crossed the Bangladesh and adjoining West Bengal coasts between Sagar Islands and Khepupara close to southwest of Mongla near Lat.21.75° N /Long.89.2° E between 1700-1900 UTC on 26 th May as a Severe Cyclonic Storm. Weakened into a well marked low pressure area (WML) over Northeast Assam and neighbourhood at 1200 UTC of 28 th May.	978	60	3.5
2.	Depression over Northwest Bay of Bengal	19 th -20 th July, 2024	Weakened into a well marked low pressure area over Coastal Odisha at 1200 UTC of 20 th July.	990	25	1.5
3.	Deep Depression over North Jharkhand and neighbourhood	2 nd -6 th Aug., 2024	Weakened into a well marked low pressure area over central parts of Pakistan and adjoining northwest Rajasthan at 0000 UTC of 6 th Aug.	988	30	-
4.	Cyclonic Storm ‘ASNA’ over Arabian sea	25 th Aug.-2 nd Sept., 2024	Weakened into a well marked low pressure area over Northwest Arabian Sea at 0600 UTC of 2 nd Oct.	990	40	2.5
5.	Depression over westcentral Bay of Bengal	31 th Aug.-02 nd Sept., 2024	Weakened into a well marked low pressure area over central parts of Vidarbha and neighbourhood at 1200 UTC of 2 nd Sept.	996	25	1.5
6.	Deep Depression over westcentral and adjoining northwest Bay of Bengal	8 th -10 th Sept., 2024	Crossed Odisha coast close to Puri between 0500 to 0600 UTC of 9 th September (1030 to 1130 hrs IST of 9 th September) as a deep depression with wind speed of 55-65 gusting to 75 kmph. Weakened into a well marked low pressure area over Northeast Madhya Pradesh and neighbourhood on 10 th Sept. at 1200 UTC of 10 th Sept.	991	30	2.0
7.	Depression over Northeast Madhya Pradesh	11 th -13 th Sept., 2024	Weakened into a well marked low pressure area over northwest Uttar Pradesh & neighborhood at 0300 UTC of 13 th Sept.	994	20	-
8.	Deep Depression over Northeast Bay of Bengal and adjoining Bangladesh	13 th -18 th Sept., 2024	Crossed Bangladesh coast close to Patuakhali (Bangladesh) between 1700 to 1800 UTC of 13 th September (2230 to 2330 hrs IST of 13 th September) as a depression with wind speed of 45-55 gusting to 65 kmph. Weakened into a well marked low pressure area over northeast Madhya Pradesh and adjoining southwest Uttar Pradesh at 0000 UTC of 18 th Sept.	989	30	-
9.	Depression over central Arabian Sea	13 th -15 th Oct., 2024	Crossed North Oman coast close to Duqm (41291, Oman) between 1700 to 1800 UTC of 15 th October as a depression with wind speed of 40-50 gusting to 60 kmph. Weakened into a well marked low pressure area over Oman coast at 1800 UTC of 15 th Oct.	1001	25	1.5
10.	Depression over southwest Bay of Bengal	15 th -17 th Oct., 2024	Crossed north Tamil Nadu-south Andhra Pradesh coast between Puducherry and Nellore, close to north of Chennai around 2300 UTC of 16 th October as a depression with wind speed of 25-35 gusting to 45 kmph. Weakened into a well marked low pressure area over south coastal Andhra Pradesh and adjoining north coastal Tamil Nadu at 0000 UTC of 17 th Oct.	1000	25	1.5
11.	Severe Cyclonic Storm “DANA” over Eastcentral Bay of Bengal	22 nd -26 th Oct., 2024	Crossed North Odisha coast close to Habalikhata Nature Camp (Bhitarkanika) & Dhamara between 2000 to 2200 UTC of 24 th October as a Severe Cyclonic Storm with wind speed of 100-110 gusting to 120 kmph. Weakened into a well marked low pressure area over North Odisha at 0000 UTC of 26 th Oct.	986	60	3.5
12.	Cyclonic Storm “FENGAL” over Southwest Bay of Bengal	23 th Nov.-2 nd Dec., 2024	Crossed North Tamil Nadu and Puducherry coast near lat. 12.05° N and long 79.9° E close to Puducherry between 1700-1800 UTC of 30 th Nov. Weakened into well marked low pressure area over North Interior Tamil Nadu AT 0000 UTC of 2 nd Dec.	996	45	3.0
13.	Depression over westcentral Bay of Bengal off Andhra Pradesh coast	20 th -21 st Dec., 2024	Weakened into a well marked low pressure area over westcentral Bay of Bengal at 1200 UTC of 21 st Dec.	1002	25	1.5

CYCLONIC STORMS & DEPRESSIONS OVER THE NORTH INDIAN OCEAN DURING 2024

TABLE 2
Storms/Depressions statistics 2024

Name of the system	Winter		Pre-Monsoon			Monsoon				Post-Monsoon			Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Over the Bay of Bengal													
Depressions/deep depressions	-	-	-	-	-	-	1	1	2	1	-	1	6
Cyclonic storms	-	-	-	-	-	-	-	-	-	-	1	-	1
Severe cyclonic storms	-	-	-	-	1	-	-	-	-	1	-	-	2
Very severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Extremely severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Super cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Land Depression													
Depressions/deep depressions	-	-	-	-	-	-	-	1	1	-	-	-	2
Over the Arabian Sea													
Depressions/deep Depressions	-	-	-	-	-	-	-	-	-	1	-	-	1
Cyclonic storms	-	-	-	-	-	-	-	1	-	-	-	-	1
Severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Very severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Extremely severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Super cyclonic storms	-	-	-	-	1	-	1	3	3	3	1	1	13

TABLE 3
Ships Observations during 1st January to 31st December, 2024

Call Sign	Date/ Time(UTC)	Position of the Ship		Wind		Pressure
		Lat. (Deg. N)	Long. (Deg. E)	Dir. (Deg.)	Speed (kts)	PPPP (hPa)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A) Severe Cyclonic Storm “REMAL” over the Bay of Bengal (24th–28th May, 2024)						
AUYQ	241800	17.6	83.4	080	07	1010.0
AWEQ	241800	10.5	83.6	220	20	999.0
AWEQ	250600	12.4	84.2	220	35	990.0
AWXY	250600	20.5	86.2	060	11	997.0
3EDC7	250600	11.9	84.1	060	27	1001.9
AWEQ	251200	13.4	84.6	010	30	998.0
AWXY	251200	20.1	86.8	040	18	993.0
AUYQ	251800	17.6	83.4	260	09	1010.0
AWEQ	251800	14.2	84.8	010	30	999.0
3EDC7	260000	20.1	86.8	320	28	992.0
AWXY	260600	18.1	86.1	010	30	994.0
AUYQ	261200	17.6	83.4	200	20	1007.0
AUYQ	270000	17.6	83.4	220	21	1004.0
AWEQ	270000	18.7	86.4	210	30	993.0
AWEQ	270600	19.7	86.8	210	30	993.0
AWWB	270600	19.2	86.3	240	18	960.0
AWXY	270600	20.1	86.8	230	24	994.0
AWXY	271200	20.1	86.8	200	23	992.0
AUYQ	271800	17.7	83.4	220	20	1000.0

TABLE 3 *conti.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)
AWWB	271800	21.2	87.6	280	23	960.0
AWXY	271800	20.1	86.8	210	23	996.0
AUYQ	280000	17.7	83.4	220	27	1002.0
AWWB	280000	21.0	87.9	230	25	965.0
AWXY	280000	20.1	86.8	330	18	996.0
AUYQ	280600	17.7	83.4	200	19	1002.0
AWWB	280600	21.0	87.9	220	24	971.0
AWXY	280600	20.1	86.8	220	23	997.0
AWWB	281200	21.0	87.9	210	24	995.0
AUYQ	281800	17.7	83.4	200	21	1002.0
AWWB	281800	21.0	87.9	200	22	985.0
(B) Cyclonic Storm “ASNA” over northeast Arabian Sea off Kachchh and adjoining Pakistan coasts (25th Aug. - 2nd Sept. 2024)						
VTHL	250600	22.5	69.7	290	26	1010.0
VTHL	251800	22.5	69.7	290	26	1008.0
VTHL	260600	22.5	69.7	280	30	1008.0
VTHL	261800	22.5	69.7	280	31	1007.0
RRYTS7Z	270600	21.9	65.2	220	27	1005.5
VTHL	271800	22.5	69.7	270	30	997.0
WWY5NFD	281800	21.6	65.7	250	21	1002.5
VTHL	291800	22.5	69.7	270	38	996.0
AVBC	300000	22.3	61.3	220	20	1003.1
VTHL	301800	22.5	69.7	190	21	1003.0
V7QJ6	311200	16.6	66.2	240	27	1009.0
VRZK9	311800	19.2	72.4	290	20	1007.0
AUBE	011800	19.1	72.6	270	12	1003.9
AWWB	011800	15.2	71.5	250	31	1006.1
(C) Severe Cyclonic Storm “DANA” over the Eastcentral Bay of Bengal (22nd - 26th October, 2024)						
AWXA	221200	15.1	84.9	020	14	1000.1
VTWV	221200	13.3	80.4	130	18	1000.8
AWXA	221800	16.4	85.2	050	22	--
V7A6082	231200	17.8	90.0	140	38	1003.7
VTWV	231200	13.3	80.4	130	18	1000.8
VTUQ	231200	22.1	88.1	220	36	1000.9
V7A6082	240000	16.9	90.4	180	29	1010.7
V7A6082	241800	14.0	88.3	240	16	1015.6
(D) Cyclonic Storm “FENGAL” Southwest Bay of Bengal (25th November - 1st December)						
V7TR9	250000	5.5	87.0	140	20	1007.0
7KJY	251200	5.5	80.1	340	22	1005.0
7KJY	260000	5.5	82.7	290	22	1001.0
V7TR9	260600	5.5	80.6	280	27	1005.0
9V6221	270000	11.8	89.3	150	24	1005.3
3E6625	271200	5.5	83.3	250	25	1005.0
VRGO8	280600	11.5	83.5	090	20	1004.0
VRGO8	281800	11.5	83.0	090	20	1004.0
VRGO8	291200	12.2	82.8	090	50	998.0
VRGO8	291800	12.9	82.7	090	24	1000.0
AUTP	300600	14.4	85.1	220	18	1012.0
VRGO8	300600	14.0	83.1	120	20	1006.0

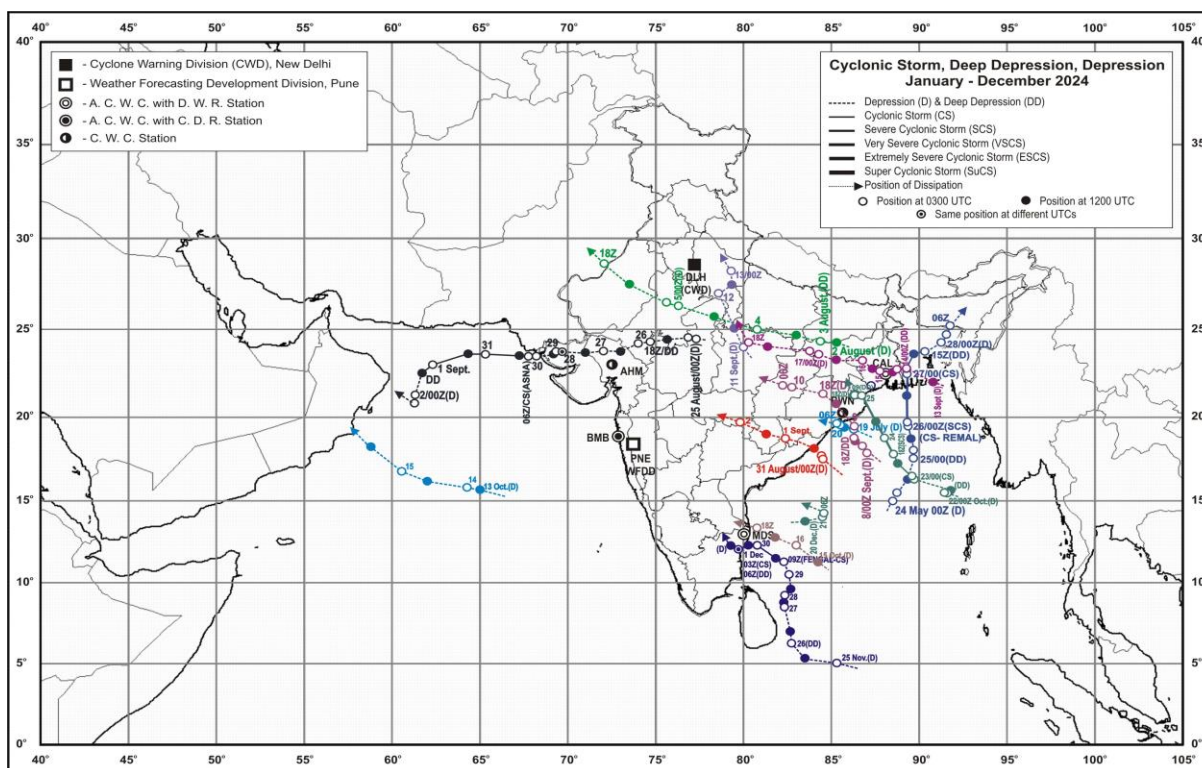


Fig.1. Tracks of Storms and depressions during the year 2024.

and became less marked thereafter. However, the associated cyclonic circulation persisted over the same region and extended upto 5.8 km above m.s.l. on 29th May.

2.1.2. Other features observed

No rapid intensification was observed during the life cycle of REMAL. The system reached its peak intensity of maximum sustained wind speed of 60 knots gusting to 70 knots (110-120 kmph gusting to 135 kmph) at 1200 UTC (1730 IST) of 26th May with estimated central pressure (ECP) of 978 hPa and pressure drop of about 18 hPa.

Khepupara and Patuakhali stations in Bangladesh reported 111 kmph during landfall. In West Bengal highest wind speed of 91 kmph was reported at Dum Dum followed by 78 kmph at Canning. Storm surge of about 3.8 m height inside the creeks of Balaswar river close to Sapleja, Bangladesh occurred during landfall.

2.1.3. Weather and damage caused

The cyclone “REMAL” caused, torrential rains (heavy to extremely heavy rainfall) and gale-force winds over coastal districts of Bangladesh and West Bengal on 26th and 27th May. While moving northeastwards, outer rainbands reached the northeastern states and caused squally wind and heavy to extremely heavy rainfall activity

over Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura on 27th and 28th May. Some of the states like Assam, Meghalaya, Mizoram and Tripura reported extremely heavy rainfall leading to floods and landslides, especially over Mizoram, Tripura and South Assam and also in Bangladesh. Maximum storm surge of 3.8 meters over Bangladesh and about one metre over south and north 24 Pargana districts of West Bengal was reported at the time of landfall. The system caused heavy to extremely heavy rainfall activity over West Bengal, Bangladesh and Northeastern states of India including Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura. Light to moderate rainfall occurred at most places with heavy falls at isolated places over Mizoram, Manipur, Assam, Arunachal Pradesh, Odisha and heavy to very heavy falls at isolated places over Meghalaya and extremely heavy rainfall at isolated places over Gangetic West Bengal.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 25th - 30th May are given below:

25 May, 2024

Andaman : Port Blair-7
& Nicobar
Islands

26 May, 2024

Tripura : Manughat-8, Secretariat-7

Andaman : Maya Bandar-13
& Nicobar
Islands

27 May, 2024

Arunachal : Hollongi-7.

Pradesh

Assam : Beki Mathungari & N. lakhimpur/Lilabari-10 each, Majuli & Tezpur-7 each

Meghalaya: Shella-17, Mynram-8, Cherrapunji & Sohra-7 each.

Manipur : Ukhrul & Chandel-7 each.

Mizoram : Mizoram University, Kolasib & Aizwal-8 each

Odisha : Ranpur-9, Rajnagar-8, Bhapur, Aul & Nawana-7 each.

Gangetic West Bengal : Tarakeshwar-30, Sagar Island-18, Alipore-15, Durgachack-14, Contai & Uluberia-13 each, Diamond Harbour-12, Amta-11, Saltlake & Canning-10 each, Dum Dum, Kakdwip & Kalyani S.-9 each, Rajnagar, Barrackpur & Basirhat-8 each, Champasari, Barobhisha, Bagati & Digba-7 each.

28 May, 2024

Arunachal : Nari-13, Basar-8, Huri-7

Pradesh

Assam : Umrangso-24, Karimganj-22, Silchar-17, Matijuri, B P Ghat & Lala-16 each, Hailakandi, Silchar, Udalguri & Badarpur-15 each, Lkhep & A P Ghat-14 each, Gharmura-13, Halflong-11, Lakhimpur & Dholai-9 each, Kheronighat, Lakhimpur, Amraghat & Amraghat-8 each, Harinagar & Cachar-7 each.

Meghalaya: Cherrapunji-59, Mawphlang & Cherrapunji-39 each, Mynram-36, Jowai-27, Rattacherra-26, Shillong C.S.O. & Shillong-24 each, Mawkyrwat & Williamnagar-23 each, Mawkyrwat-22, Khliehriat-18, Barapani-17, Nongpuh-7.

Manipur : Ukhrul & Jiribam-9 each, Bishnupur, Chandel & Thoubal-7 each.

Mizoram : Mizoram University-20, Thingsulthiah-17, Vairengte-12, Kolasib & Mamit-10 each, Lunglei & Kolasib-9 each.

Tripura : Kailashashar, Kumhat & Kumhat-25 each, Nutanbazar & Dhalai-24 each, DM Office-23, Kailashahar & Secretariat-22 each,

Agartala, Budhjongnagar, Kadamtala & Manughat-21 each, Amarpur & Khowai-20 each, Nagicherra, Khowai, Lembuchhera, Gajaria & Arundhutinagar-19 each, Ashapara & Dharmanagar/ Panisagar-18 each, Gandachara, Houra, Kadamtala, Sabroom & Amarpur-17 each, Sipahijhala & Kamalpur-16 each, Udaipur & Sonamurahanbhog-15 each, South, Lengpui & Amarpur-14 each, Kanchanpur-13, Kamalpur-12, Cti, Belonia, Sabroom, Gokulpur, Gandacherra & Bishalgarh-11 each, Belonia & Karbook-10 each, Chhanu-9, Bagafa-8, Eden Launge-7.

29 May 2024

Arunachal : Bomdila-19, Miao-12, Miao-11, Namsai & Pradesh Kalaktang-7 each.

Assam : Cachar & Lala-18 each, Lakhimpur-17, Hailakandi, Amraghat & Haflong-15 each, Dholai & Silchar-14 each, Amraghat-13, A.P. Ghat & Kokrajhar-11 each, Silchar & Harinagar-10 each, Gossaigaon, Fakiragram, Lakhimpur, Goalpara & Karimganj-9 each, Karimganj, Badarpur & Bilasipara-8 each, Baithlghanso Hazuwa, Dhemaji, B.P. Ghat & Beki Mathanguri-7 each.

Meghalaya: Pynursula-31, Cherrapunji-28, Khliehriat, Secretariat Hills-7.

Nagaland : Tening-10

Manipur : Ukhrul-11, Imphal-9, Jiribam-7,

Mizoram : Lawngtlai-15, Chawnhu-13, Lawngtlai-12, Vairengte-10, Saiha-9.

Tripura : Kadamtala-11, Nutan Bazar-8.

Sub-Himalayan West Bengal : Kumargram & Hasimara-19 each, Buxaduar-16, Barobhisha & Champasari-11 each, Chengmari/Diana-10.

Bengal

Sikkim : Chepan-12.

30 May 2024

Assam : Halflong-13, Fakiragram-12, Aie Nh Xing-12, Lakhimpur-11, Lakhimpur-10, Silchar, Manash Nh Xing (Barpeta)-9, A P Ghat, Gossaigaon & Karimganj-8 each, B P Ghat, Beky Rly.bridge, Dudhnoi, Harinagar & Kokrajhar-7 each.

Meghalaya: Mawsynram & Cherrapunji-66 each, Khliehriat-33, Jowai-31, Mawphlang-21, Mawkyrwat-20, Mawkyrwat-19.

Nagaland : Tening-10.

Manipur : Jiribam-11, Tamenglong-7.

2.2. Depression over Northwest Bay of Bengal (19th-20th July, 2024)

2.2.1. A Low Pressure Area formed over central and adjoining north Bay of Bengal with the associated cyclonic circulation extended upto mid-tropospheric levels tilting southwestwards with height on 18th. It became **Well Marked Low Pressure Area** over the same region on 18th evening. It moved northwestwards and lay over northwest & adjoining westcentral Bay of Bengal off Odisha and adjoining north Andhra Pradesh coasts on 19th morning which then concentrated into a **Depression** over the same area near Lat. 19.2° N /Long.86.2° E at 0300 UTC on 19th. Moving west-northwestwards, it lay centered over Odisha coast near Chilika Lake at Lat.19.6° N/Long.85.5° E on 20th morning and remained practically stationary over the same region on 20th. It moved northwestwards and weakened into a **Well Marked Low Pressure Area** over coastal Odisha on 20th evening. Continued moving northwestwards, it lay over interior Odisha and neighbourhood on 21st morning and lay over interior Odisha and adjoining Chhattisgarh 0300 UTC on 21st. It lay as a **Low Pressure Area** over north Chhattisgarh & neighbourhood on 22nd morning. It lay over east Madhya Pradesh and adjoining Chhattisgarh with the associated cyclonic circulation extended upto 7.6 km above m.s.l. tilting southeastwards with height on the same day and became less marked on 23rd. However, its associated cyclonic circulation lay over Jharkhand and neighbourhood which extended upto 7.6 km above m.s.l. tilting southwards with height and persisted over the same region on 24th.

2.2.2. Other features observed

The estimated maximum sustained surface wind speed (MSW) was 25 knots at 0300 UTC of 19th July and maintained its peak intensity till 0600 UTC of 20th July. The estimated central pressure during this period was 990 hPa with pressure drop of about 4 hPa.

2.2.3. Weather and damage caused

Rainfall associated with the deep depression seen that heavy to very heavy rainfall occurred at isolated places over coastal Andhra Pradesh and coastal Odisha on 19th July & heavy to very heavy rainfall at isolated places over coastal Odisha, coastal Andhra Pradesh on 20th July. Light to moderate rainfall at a few places with heavy to very heavy rainfall at isolated places occurred over Madhya Pradesh, Jharkhand, Chhattisgarh and Odisha on 20th July.

No damage was reported in association with this system.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 20th – 21st July are given below:

20 July 2024

Odisha : Chitrakunda K Guma & Korukunda-22 each, Malkangiri-18, Mathili & Kotpad-16 each, Padia-13, Nandahandi, Tentulikhunti & Papadahandi-11 each, Aska & Kosagumda-10 each, Nawarangpur, Nawarangpur Pto, Jeypore, Nandapur & Th Rampur-9 each, Purushottampur & Lamataput-8 each, Berhampur, Similiguda, Rangeilunda, Ganjam, Pottangi & Dharakote-7 each.

Coastal A.P. & Yanam : Chintur-21, Anakapalle-13, Nuzvid-10, &Paderu, Vararamachandrapur & Narsipatnam-9 each, Araku Valley & Kukunoor-8 each, Visakhapatnam Ap, Therlam, Bondapalle, Kurupam, Tekkali, Kunavaram & Chodavaram-7 each.

Rayalaseema : Rudravaram & Dornipadu-7 each.

Telangana : Venkatapuram-8, Bayyaram, Julurpad & Manuguru-7 each.

Chhattisgarh: Bhairamgarh-25, Aundhi, Durgkondal & Bhanupratappur-17 each, Konta, Sukma & Dornapal-15 each, Gadiras-14, Doundi, Tongpaal, Kutaru, Chhindigarh, Jagargunda & Nangur-13 each, Antagarh, Narayanpur, Bijapur & Lal Bahadur Nagar-12 each, Kohkameta, Gangalur, Bastanar, Chhuria & Katekalyan-11 each, Kuakonda, Gidam, Manpur, Gurur, Bhanpuri & Pakhanjur-10 each, Kondagaon, Darbha, Chhotedongar, Lohandiguda, Dantewara, Orcha, Balod, Khadgaon, Bade Bacheli, Jagdalpur, Dongargarh & Ambagarh Chowki-9 each, Charama, Usoor, Kukrel, Baderajpur, Mohla, Dhanora, Pharasgaon & Bastar-8 each, Dongargaon, Makadi, Kanker, Barsur, Dondilohara & Gundardehi-7 each.

Vidharbha : Lakhandur-24, Pauni-20, Bramhapuri-19, Arjuni Morgaon-15, Desaignanj, Bhiwapur-14 each, Deori, Armori, Nagbhir & Umrer-12 each, Kurkheda, Korchi, Chimur & Bhandara-11 each, Kuhi, Sakoli, Sindewahi, Kamptee, Dhanora & Lakhani-10 each, Bhamragad, Selu, Nagpur Aerodrome, Agriculture College (Nagpur) & Nagpur-9 each, Gadchiroli, Sadakarjuni & Salekasa-8 each, Mauda, Wardha, Tirora, Sakoli, Tiroda, Saoli, Samudrapur, Hinganghat, Etapalli & Mul-7 each.

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Vidarbha : Nagpur Aerodrome & Gadchiroli-16 each, Gadchiroli-15, Sindewahi & Chandrapur-14 each, Pombhurna, Perseoni, Hingna & Bhamragad-11 each, Bhadravati & Mauda-10 each, Chamorshi, Deoli, Kamptee, Warora, Samudrapur & Ramtek-9 each, Selu, Sironcha, Chimur, Armori, Wani, Saoner, Zarizamni, Tumsar & Wardha-8 each, Amgaon, Hinganghat, Maregaon, Umrer, Ralegaon & Kalmeshwar-7 each Chhattisgarh: Bijapur-21, Gurur-16, Kutaru & Rajnandgaon-14 each, Marri Bangla Deori, Arjunda, Gangalur & Balod-12 each, Gundardehi-11, Bhopalpatnam-10, Lal Bahadur Nagar, Bhairamgarh, Usoor, Dhamtari & Dongargarh-9 each, Nerharpur & Sarona-8 each, Dongargaon, Gidam, Bade Bacheli & Narayanpur-7 each.

Telangana : Mortad-14, Mallapur, Metpalle & Sarangapurni-13 each, Laxmanchanda, Khanpur & Balkonda-12 each, Kammar Palle, Navipet, Bheemgal, Makloor & Nandipet-11 each, Velpur, Ranjal, Armur, Yeda Palle, Jannaram & Nirmal-10 each, Kathlapur, Regonda, Shayampet, Nizamabad, Atmakurwari & Jainoor-9 each, Bodhan, Parkal, Aswapuram, Venkatapuram, Asifabad, Chityal, Huzurabad, Gangadhara, Dandepalle & Jaipur-8 each, Sirpuru, Kataram, Manuguru & Dummagudem-7 each.

Odisha : Athmalik-15, Boden-14, Padampur, Padmapur, Sinapali & Dunguripalli-11 each, Nawapara & Bolangir-10 each, Bangamunda-9, Salebhatta, Gania, Patnagarh, Binika, Kantamal, Agalpur & Ullunda-8 each, Tarva, Mathili, Khariar, Boudhgarh, Barpalli, Gaisilet, Chitrakunda K Guma, Khairamal, Jaipatna & Komna-7 each.

2.3. Deep Depression over north Jharkhand & neighbourhood (2nd - 6th Aug. 2024)

2.3.1. Under the influence of the cyclonic circulation over Gangetic West Bengal & adjoining Bangladesh, a **Low Pressure Area** formed over Gangetic West Bengal and adjoining Jharkhand at 0000 UTC of 2nd Aug. It persisted over the same region with the associated cyclonic circulation extended upto 7.6 km above m. s. l. It intensified into a **Depression** and lay centred near Lat.24.2° N /Long.85.2° E over north Jharkhand & neighbourhood at

1200 UTC of 2nd. It moved west-northwestwards and intensified into a **Deep Depression** and lay centered at 0300 UTC of 3rd over southwest Bihar and adjoining northwest Jharkhand near Lat. 24.4° N/Long. 84.4° E about 50 km northeast of Daltonganj (Jharkhand). It continued to move west-northwestwards and lay centered near Lat.24.8° N /Long.83.0° E over southeast Uttar Pradesh and neighbourhood at 1200 UTC of 3rd. It further moved west-northwestwards and lay centered near Lat.24.8° N /Long.81.5° E over northeast Madhya Pradesh and neighborhood at 1800 UTC of 3rd. It further moved west-northwestwards and lay centered over northeast Madhya Pradesh & adjoining south Uttar Pradesh near Lat. 25.0° N /Long. 80.7° E, about 60 km south-southeast of Banda (Uttar Pradesh) at 0300 UTC of 4th. It further moved west-northwestwards and lay over northwest 25.8° N/Long. 78.4° E at 1200 UTC of 4th. It continued to move west-northwestwards and lay over northwest Madhya Pradesh and adjoining northeast Rajasthan centered near Lat. 26.0° N/Long. 77.6° E at 1800 UTC of 4th. It further moved west-northwestwards and weakened into a **Depression** and lay over northeast Rajasthan and adjoining northwest Madhya Pradesh centered near Lat 26.3° N/ Long. 76.2° E at 0000 UTC of 5th. It continued to move west-northwestwards and lay over northeast Rajasthan and neighbourhood centered near Lat. 26.5° N/Long. 75.6°E, about 40 km south-southwest of Jaipur (Rajasthan) at 0300 UTC of 5th. It moved west-northwestwards and lay over the same region centered near Lat. 26.8° N/ Long. 75.2° E at 0600 UTC of 5th. It moved west-northwestwards and lay centered over northwest Rajasthan near Lat. 27.6° N/Long. 73.5° E at 1200 UTC of 5th. It moved west-northwestwards and lay over Pakistan and adjoining northwest Rajasthan centered near Lat. 28.8° N/Long. 72.0° E at 1800 UTC of 5th. It further moved west-northwestwards and weakened into a **Well Marked Low Pressure area** over central parts of Pakistan and adjoining northwest Rajasthan at 0000 UTC of 6th. It lay as a **Low Pressure area** over the same region at 0300 UTC of 6th with the associated cyclonic circulation extended upto 5.8 km above m. s. l. Further, it became less marked on 7th Aug.

2.3.2. Other features observed

The estimated maximum sustained surface wind speed (MSW) was 30 knots at 0300 UTC of 3rd Aug. and maintained its peak intensity till 1800 UTC of 4th Aug. The lowest estimated central pressure during this period was 990 hPa with pressure drop of about 6 hPa.

2.3.3. Weather and damage caused

Rainfall associated with the deep depression shows that light to moderate rainfall occurred at isolated places & heavy to very heavy rainfall at isolated places over coastal

Odisha, costal Andhra Pradesh & West Bengal on 1st August. Light to moderate rainfall at a few places with heavy to very heavy rainfall at isolated places occurred over Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh and Odisha on 2nd August.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 2nd – 5th August are given below:

2 August 2024

Gangetic : Dum Dum-10, Mo Saltlake, Diamond Harbour, Burnpur & Asansol-8 each, Rajnagar-7.

Sub : Buxaduar-7.

Himalayan
West Bengal

Bihar : Puraini-11, Sherghati-9, Dobhi & Imamganj-8, Udai Kishanganj, Kumarkhand, Barachatti, Banka, Rajauli, Chausa & Deo-7 each.

Jharkhand : Mandu & Ramgarh-27, Bau Kanke-26, Purvi Tundi-24, Hendigir-21, Koner-19, Bokaro Thermal, Ranchi Aero & Ormanjhi-17 each, Papunki & Ramgarh-16 each, Icar Namkum-15, Rajdhanwar & Balumath-14 each, Putki, Barkisuriya, Bhurkunda, Tenughat, Maithon & Mandu Dvc-13 each, Gobindpur, Tilaiya, Giridih, Bandgaon, Sisai & Jamtara Fmo-12 each, Kuru, Dumri, Panchet, Tundi, Diyakel Khunti, Chandwa & Raidih-11 each, Dhurki, Daltonganj & Rajmahal-10 each, Murhu, Lesliganj, Markachou, Torpa, Maharo, Latehar, Palamu Dtg, Bharno, Koderma, Latehar Balumat & Patraru-9 each, Ramgarh(bdo) , Rania, Messenjar, Nawa Bazar, Arki, Nandadih, Mohanpur & Garu-8 each, Barkagaon, Gola, Simdega & Amrapara-7 each.

East : Masuda Sr-18, Nayanagar/beawar & Rajasthan Pisagan Sr-17 each, Mangliawas Sr & Bhim-15 each, Tatgarh Sr-13, Deogarh-10, Mounntabu Tehsil Sr & Begu-9 each, Pushkar-8, Raipur, Hurda, Mounnt Abu & Sangod-7 each.

Chhattisgarh: Shankarh-21, Kusmi-18, Rajpur-16, Odagi-13, Ramanujganj, Pratappur, Samari & Chando-12 each, Raghunath Nagar-11, Bhanupratappur, Balrampur, Wandrafanagar & Doura Kochali-10 each, Bhatgaon, Kelhari, Janakpur Bharatpur & Chalgali-9 each, Durg, Biharpur, Kutaru,

Bhairamgarh, Sonhat & Durgkondal-8 each, Kotadol, Manora, Latori, Bhaiyathan, Pakhanjur, Kunkuri & Lundra-7 each.

East : Amarpatan, Ramnagar & Matiyari-9 each, Madhya Jaisingh Nagar-8, Barhi, Khurai, Pradesh Venkatnagar, Sarai, Nagode & Jaitpur -7 each.

West : Biaora-12, Sultanpur & Harda-11 each, Madhya Raisen-9, Gairatgang & Bareli-8 each, Pradesh Sehore Udaipura, Badi, Shamshabad, Berasia & Ganjbasoda-7 each.

3 August 2024

Madhya : Katni-24, Badwara-20, Garhakota-19, Pradesh Ramnagar & Sihora-19 each, Vijayraghavgarh, Majholi, Singodi & Jaisinagar-18 each, Devsar & Tendukheda-17 each, Maihar, Barhi, Bilharli, Deemarkheda, Umariyapan, Beohari & Bichhiya-16 each, Mada, Patan & Shahpura-15 each.

Konkan : Matheran-29, Thane-15, Karjat & Talasari-13 each, Murbad & Ulhasnagar-12 each, & Goa Khalapur, Kalyan & Bhiwandi-11 each, Mokheda, Jawhar, Panvel_agri & Santacruz Imd Obsy-10 each, Wada, Poladpur & TbiaImd Part Time-9 each, Ambernath, Vikramgad, Shahapur & Canacona-8 each, Mangaon, Mahad, Quepem, Pen & Uran-7 each.

Madhya : Igatpuri & Lonavala_agri-24 each, Maharashtra Surgana-17, Trimbakshwar-16, Mahabaleshwar-14, Akole & Ozarkheda-13 each, Harsul-12, Velhe & Peth-11 each, Nashik Imd Obsy, Chandgad, Shahuwadi & Vani -7 each.

Chhattisgarh: Janakpur Bharatpur-23, Wandrafanagar-17, Doura Kochali-15, Ramanujganj & Biharpur-13 each, Kotadol & Bhatgaon-11 each, Kukdur-10, Balrampur, Raghunath Nagar, Ramchandrapur & Rajpur-8 each, Odagi, Chalgali, Belgahna & Ramanujnagar-7 each.

Gujarat : Vandsa-18, Waghai-16, Nanipalson-14, Region Dharampur-14, Kaprada-14, Dolvan & Dang-13 each, Silvassa, Khergam & Vapi-12 each, Khanvel, Dholka, Songadh & Valsad-11 each, Chikhli, Umerpada, Subir & Madhbun-10 each, Mahuva, Valod , Godra, Godhra & Gandeve-9 each, Padra & Vyara-8 each, Pardi, Vijaynagar, Sagbara & Dhanera-7 each.

East Rajasthan	:Arai-10, Kekri-9, Nithuwa & Mounnt Abu-7 each.
West Rajasthan	:Gudamalani-9, Sum-8, Raniwada, Ramsar & Bagoda-7 each.
Jharkhand	Messenjor-9, Daltonganj & Dhurki-7 each.
Bihar	:Mansahi & Amdabad-9 each, Katihar-7.

East Uttar Pradesh :Dudhi-6, Prayagraj & Churk-5 each.

4 August 2024

East Rajasthan	:Nagarfort-32, Hindoli-22, Jahazpur-21, Bundi-19, Sarwar & Kekri-18 each, Sawar, Geola & Deoli-17 each, Kishanganj-16, Mangliawas & Mangrol-15 each, Bakani & Pisagan-13 each, Uniara / Aligarh & Deogarh-12 each, Bhinay, Badesar, Shahpura, Baran, Malpura, Patan, Mandalgarh, Nayanagar/beawar, Todaraisingh & Talera-11 each, Bhainsroadgarh, Nainwa, Tatgarh, Pratapgarh, Tonk Tehsil, Atru ed & Nimbahera-10 each, Masuda, Pachpahar, Pushkar, Jhalrapatan, Piplu & Nasirabad-9 each, Bijoliya, Kotri, Pirawa, Shahabad, Ladpura, Indergarh, Gangdhar & Aklera-8 each, Chothkabarwara, Degod, Kota, Mavli, Anta, Ramganjmandi, Arai, Railmagra, Chittorgarh, Begu, Jhalawar, Rashmi & Dug-7 each,
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West Rajasthan	:Sojat-26, Degana-10, Raipur & Bilara-9 each.
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Gujarat Region	:Khergam-23, Dharampur-18, Kaprada-17, Dangs-16, Chikhli-15, Vansda, Waghai & Valsad-14 each, Daman-13 each, Subir, Dolvan & Valsad-11 each, Dang & Pardi-7 each.
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Madhya Maharashtra	:Surgana-20, Lonavala-15, Igatpuri-14, Peth & Mahabaleshwar-12 each, Ozarkheda & Yaval-11 each, Trimbakshwar-10, Harsul-9, Paud Mulshi-7, Velhe & Dindori-6 each.
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East Madhya Pradesh	:Buxwaha & Orchha-15 each, Hatta-14, Patera & Bina-12 each, Shahgarh & Malthone-11 each, Mohangarh, Amarkantak & Panagar-9 each, Khargapur & Junnardeo-8 each, Prithvipur, Badagaon Dhasan, Palera & Niwari-7 each.
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West Madhya Pradesh	:Malhargarh-15, Karhal-14, Jawad & Pohri-13 each, Kolaras-12, Sheopur-aws & Karera-11 each, Pichhore & Bamori-10 each, Zirapur, Narwar, Badoda, Manasa, Shivpuri & Kayampur-9 each, Raghogarh, Dhundhadaka, Biaora, Khirkiya-arg &
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Barod-8 each, Bhanpura, Bhimpur, Nepanagar, Susner, Bairad, Neemuch, Shamgarh, Badarwas, Sitamau & Pachore-7 each,

Konkan & Goa	:Vikramgad-15, Jawhar-15, Mokheda & Talasari-9 each, Khalapur & Pen-8 each, Palghar & Matheran-7 each,
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5 August 2024

East Rajasthan	:Nasirabad-17, Srinagar-14, Pisagan-13, Ajmer & Ajmer Tehsil-11 each, Mangliawas-10, Pushkar & Deogarh-9 each, Nayanagar/beawar & Tatgarh-8 each.
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West Rajasthan	:Pali-26, Pokhran-19, Marwar Junction-17, Ahore-16, Jalore-15, Rohat & Nachna / Lathi-13 each, Fatehgarh-12, Phalodi-11, Sojat, Phalodi Tehsil, Gida & Nokh-10 each, Jaisalmer-9, Luni-8.
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Madhya Maharashtra	:Gaganbawada & Lonavala-7 each.
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2.4. Cyclonic Storm “ASNA” over northeast Arabian Sea off Kachchh and adjoining Pakistan coasts (25th August - 2nd September 2024)

2.4.1. 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 on morning of 16th Aug. It persisted over the same region with the associated cyclonic circulation extended upto 4.5 km above m. s. l tilting southwestwards with height. It lay over north Bay of Bengal and adjoining areas of Bangladesh-West Bengal coasts at 0000 UTC of 17th; over south Bangladesh & neighbourhood at 0300 UTC of 17th with the associated cyclonic circulation extends upto 7.6 km above mean sea level tilting southwestwards with height. It persisted over the same region on 18th and 19th with the associated cyclonic circulation extends upto 5.8 km above m. s. l. It lay over central parts of Bangladesh & neighbourhood on 20th morning. It then persisted over the same region with the associated cyclonic circulation extended upto 7.6 km above m. s. l. It lay over north Bangladesh & neighbourhood on 20th evening and persisted there on 21st and 22nd with the associated cyclonic circulation extending upto 9.6 km above m. s. l. It moved westwards and lay over northern parts of West Bengal & neighbourhood at 0000 UTC of 23rd; over northern parts of West Bengal and adjoining areas of northeast Jharkhand at 0300 UTC of 23rd; over northwest Jharkhand & neighbourhood at 0000 UTC of 24th and moved nearly westwards and lay as a **Well marked Low Pressure Area** over southeast Uttar Pradesh & adjoining northwest Madhya Pradesh at 0300 UTC of 24th with the associated

cyclonic circulation extended upto 7.6 km above m. s. l. It lay over central parts of north Madhya Pradesh at 1200 UTC 24th. It moved westwards and intensified into a **Depression** and lay centered over northwest Madhya Pradesh and neighbourhood near Lat. 24.5° N/Long. 77.3° E at 0000 UTC 25th. It further moved westwards and lay centered over northwest Madhya Pradesh and adjoining east Rajasthan near Lat. 24.6° N/Long. 76.9° E, about 60 km west-southwest of Guna (west Madhya Pradesh) at 0300 UTC of 25th. It continued to move westwards and lay centered over east Rajasthan and adjoining northwest Madhya Pradesh near Lat. 24.6° N/Long. 76.5° E at 0600 UTC of 25th. It moved west-southwestwards and lay centered over northwest Madhya Pradesh and adjoining east Rajasthan near Lat. 24.4° N/Long. 75.6° E at 1200 UTC 25th. It further moved west-southwestwards and intensified into a **Deep Depression** and lay centered over east Rajasthan and adjoining west Madhya Pradesh near Lat. 24.3° N/Long. 74.7° E at 1800 UTC of 25th. It further moved west-southwestwards and lay centered over the same region near Lat. 24.2° N/Long. 74.2° E at 0000 UTC of 26th. It further moved west-southwestwards and lay centered over east Rajasthan near Lat. 24.1° N/Long. 74.0° E, about 60 km southsoutheast of Udaipur (east Rajasthan) at 0300 UTC 26th. It moved nearly westwards and lay centered over north Gujarat and adjoining southeast Rajasthan near Lat. 23.8° N/Long. 73.0° E at 1200 UTC of 26th. It slowly moved westwards and lay centered over north Gujarat near Lat. 23.8° N/Long. 72.2° E at 0000 UTC of 27th. It continued to move slowly westwards and lay centered over the same region near Lat. 23.8° N/Long. 72.0° E, about 10 km west of Patan at 0300 UTC of the 27th. It moved nearly westwards and lay centered over Saurashtra & Kutch and adjoining north Gujarat near Lat. 23.7° N/Long. 71.0° E, about 40 km east-northeast of Rapar (Gujarat) at 1200 UTC of 27th. It moved westwards and lay centered over Saurashtra & Kutch near Lat. 23.7° N/Long. 70.0° E, about 50 km north-northeast of Bhuj (Gujarat) at 0000 UTC of 28th. It further moved westwards and lay centered at 0300 UTC 28th over the same region near Lat. 23.7° N/Long. 69.7° E, about 50 km north-northwest of Bhuj (Gujarat). It moved slowly westwards and lay centered over the same region near Lat. 23.7° N/Long. 69.4° E, about 60 km northwest of Bhuj (Gujarat) at 0300 UTC of 29th. It moved slowly westwards and lay centered over Kachchh & adjoining areas of Saurashtra, northeast Arabian Sea and Pakistan at 1800 UTC of 29th. It moved west-southwestwards and lay centered over Kachchh coast and adjoining areas of Pakistan & northeast Arabian Sea at 0000 UTC of 30th. It further moved westwards and persisted over the same region near Lat. 23.5° N/Long. 68.2° E, about 70 km west-northwest of Naliya (Gujarat) at 0300 UTC of 30th. It continued to move westwards and intensified into a **Cyclonic Storm "ASNA"** (pronounced as **As-Na**) and lay centered over the same region near Lat.

23.5° N/Long. 67.9° E at 0600 UTC of 30th. It moved westwards and lay centered over northeast Arabian Sea off Kachchh and adjoining Pakistan coasts near Lat. 23.5° N/Long. 67.2° E at 1200 UTC of 30th. It further moved westwards and lay centered over northeast Arabian Sea off Pakistan coast near Lat. 23.6° N/Long. 65.8° E at 0000 UTC of 31st Aug. 2024. It continued to move westwards and lay centered over northeast and adjoining northwest Arabian Sea near Lat. 23.6° N/Long. 65.3° E, about 260 km southwest of Karachi (Pakistan) at 0300 UTC of 31st Aug. 2024. It continued to move westwards and lay centered over central parts of north Arabian Sea near Lat. 23.6° N/Long. 64.4° E at 1200 UTC of 31st Aug. 2024. It moved west-southwestwards and lay centered over northwest and adjoining northeast Arabian Sea at 1800 UTC of 31st Aug. 2024. It further moved west-southwestwards and lay centered over northwest Arabian Sea near Lat. 23.2° N/Long. 62.6° E at 0000 UTC of 1st Sept. It continued to move west-southwestwards and lay centered over the same region near Lat. 23.0° N/Long. 62.3° E, about 280 km south-southwest of Pasni (Pakistan) at 0300 UTC of 1st Sept. It moved south-southwestwards and weakened into a **Deep Depression** and lay centered over the same region near Lat. 22.2° N/Long. 61.7° E at 1200 UTC of 1st Sept. It moved south-southwestwards and weakened into a **Depression** and lay centered over the same region near Lat. 21.2° N/Long. 61.3° E at 0000 UTC of 2nd. It moved south-southwestwards and lay centered over the same region near Lat. 20.9° N/Long. 61.2° E, about 210 km southeast of Ras Al Hadd (Oman) 0300 UTC of 2nd. It moved south-southwestwards and weakened into a **Well Marked Low Pressure Area** over northwest Arabian sea at 0600 UTC of 2nd. It then lay over northwest & adjoining westcentral Arabian Sea at 0000 UTC of 3rd sept. It lay as a **Low Pressure Area** over westcentral & adjoining northwest Arabian Sea with the associated cyclonic circulation extending upto 5.8 km above m. s. l. on 3rd and then became less marked on 4th sept. However, the associated cyclonic circulation lay over westcentral Arabian Sea off Oman coast which extended upto 3.1 km above m. s. l.

2.4.2. Other features observed

The system reached its peak intensity of maximum sustained wind speed of 40 knots gusting to 50 knots (70-80 kmph gusting to 90 kmph) at 0000 UTC (0530 hrs. IST) of 31st August with estimated central pressure (ECP) of 990 hPa and pressure drop of about 8 hPa over Northeast Arabian Sea. It was moving in a favourable environment with high sea surface temperature, high positive vorticity at lower levels, low to moderate anticyclonic vertical wind shear (5-15 knots), enhanced warm moist air incursion into the core region of the system from southeast Arabian Sea, favourable Madden Julian Oscillation and convectively coupled equatorial waves. After, entering northwest

Arabian Sea, it encountered colder sea conditions and started weakening gradually from 1st September Morning (0300 UTC).

2.4.3. Weather and damage caused

During its different stages of development, i.e. during low pressure area to deep depression stage, while moving over land, it affected almost all the states over the eastern and western parts of the country from Tripura, Meghalaya, Gangetic West Bengal, Odisha, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat State and also Bangladesh leading to extensive flooding and massive damage to life and property.

As per media reports, Flooding in Gujarat killed 49 people between 25 and 31 August. The flooding also resulted in the death of 2,618 livestock. Crops were destroyed in several districts in Kutch and Saurashtra regions. In Vadodara and elsewhere, there was extensive damage to houses, shops and businesses. 4,173 km of roads were damaged. Total 6,931 villages and 17 cities were affected by the loss of electricity. Total 88 substations were shut down during the flooding. An old bridge between Bodeli and Chhota Udepur on the national highway collapsed. An initial survey reported that the Government of Gujarat suffered damages worth more than ₹250 crore (US\$29 million) to government properties and public infrastructure.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 UTC of date the 25th - 31st August are given below:

25 August 2024

Gujarat Region : Vapi-36, Pardi-35, Kaprada, Valsad-34 each, Umerpada-31, Khergam & Daman-29 each, Silvassa, Ukai & Dharampur-27 each, Daman-26, Madhbun-24, Sagbara & Khanvel-20 each, Vyara-19, Vansda-18, Songadh-17, Waghahi, Dangs, Subir & Mangrol-15 each, Umergam & Valsad 14, Narmada-13, Khanpur, Chhota Udepur, Kadi & Garbada-12 each, Uchchhal & Palsana-11 each, Kamrej, Valod, Quant, Dahod-10 each, Chikhli, Mandvi, Dolvan, Patan, Tarapur, Morva Hadaf-9 each, Dediapada, Limkheda, Mansa, Kukarmunda, Gandevi, Surat & Deesa-8 each, Mahesana, Netrang, Dholka, Jambughoda, Virpur, Vyara, Surat City, Vijapur, Kalol, Ghoghamba, Mahuva, Poshina, Bardoli, Garudeshwar, Kalol & Anand-7 each.

West Madhya Pradesh : Kathiwada-21, Biaora & Alirajpur-14 each, Begumganj & Navibagh-13 each, Bairagarh Airport & Maheshwar-11 each, Badarwas, Raisen, Bhimpur, Budhni & Khategaon- 9 each, Seoni Malwa, Chicholi, Bhopal Arera Hills, Kurwai & Rehti-8 each, Shahpur, Rahatgaon, Godadongri, Tal, Satwas, Sitamau, Hatpiplaya, Sarangpur, Bagli, Shajapur, Sonkatch-7 each.

Madhya Maharashtra : Velhe-18, Lonavala_agri, Peth & Harsul-16 each, Navapur & Igatpuri-14 each, Surgana-13, Dhadgaon/akrani-Hydro-12, Akole, Mahabaleshwar- Imd Obsy, Ozarkheda & Paud Mulshi-11 each, Nandurbar, Gidhade, Dhule, Bodwad & Akalkuwa-8 each, Jamner, Taloda, Mulher, Vani, Chalisgaon, Trimbakshwar & Chandgad-7 each,

Konkan & Goa : Pernem-16, Matheran-15, Vikramgad, Valpoi, Dahanu, Quepem & Sangameshwar Devrukh-14 each, Dabolim- Navy, Khalapur, Mapusa, Talasari, Tala & Sanguem-13 each, Kudal, Mokheda, Lanja, Mormugao & Devgad-12 each, Pen, Dodamarg, Jawhar, Panjim, Ratnagiri, Karjat_agri, Khed & Margao-11 each, Mulde, Thane, Murud & Canacona-10 each, Panvel, Tbia, Sawantwadi, Malvan, Palghar, Roha, Rajapur & Mahad-9 each, Dapoli, Santacruz, Ulhasnagar, Vaibhavwadi, Rameshwar_agri, Ponda, Murbad, Guhagarh & Awalegaon-8 each, Vengurla, Mangaon, Bhiwandi, Uran, Shahapur, Wakwali, Pawarwadi Arg & Poladpur- 7 each.

East Madhya Pradesh : Badamalhera & Tendukheda-14 each, Panagar-12, Khurai & Tikamgarh-11 each, Badwara-10, Bina, Buxwaha & Orchha- 9 each, Badagaon Dhasan, Karkeli, Baldevgarh, Chandia & Jabera-7 each.

East Rajasthan : Dausa-14, Reodar-13, Chothkabarwara-12, Sangod, Baran & Kishanganj-9 each, Pindwara, Banera Sr, Ajmer, Pratapgarh, Kherwara & Khandar-8 each, Nasirabad, Kotri, Sarmathura, Malerainadunger, Jawaja, Malpura, Garhi & Mangliawas-7 each.

Chhattisgar : Gangalur 11, Lalpur Thana 7

Saurashtra & Kutch : Talala-10, Mendarda-9, Visavadar-8, Keshod & Babra-7 each.

Odisha : Khaira-10, Banki Ghasipura & Chendipada-9 each, Kaptipada, Swam-patna, Anandpur, Laikera, Jhumpura & Kirmira -8 each, Bijatala, Udala, Oupada & Jaipur-7 each.

Jharkhand : Chakulia-9, Bau Kanke-7.

Vidarbha : Nagbhir-8, Chikhalda-7.

West : Raniwada Sr-7.

Rajasthan

26 August 2024

Gujarat Region : Khergam-35, Dangs-29, Waghai-26, Dang-24, Kaprada, Santrampur & Dharampur-23 each, Subir-22, Shahera-21, Ukai, Vansda & Madhbun-20 each, Nadiad-19, Valsad, Nandod & Dediapada-18 each, Fatepura, Kukarmunda, Khanvel & Mahudha-17 each, Sagbara, Kadana, Anand & Karjan-16 each, Quant, Dahod, Narmada & Silvassa-15 each, Modasa-14.

East Rajasthan : Pipalkhunt-26, Bhungra & Banswara-19 each, Sallopat-16, Bagidora, Arthuna, Garhi & Sajjangarh-15 each, Pratapgarh, Kesarpura, Chikali & Danpur-13 each, Loharia, Shergarh & Arnod-11 each, Sabla-10.

Saurashtra & Kutch : Rajkot-23, Muli & Chotila-21 each, Wankaner-20, Halvad-18, Paddhari-17, Thangadh & Surendranagar-14 each, Wadhvan-13, Dhrangadhra & Sayla-11 each, Lodhika-10.

West Madhya Pradesh : Alirajpur-19, Malhargarh-15, Pansemal-13, Jaora, Kathiwada & Raoti-12 each, Jawad & Shamshabad-11 each, Sailana, Mandsaur & Neemuch-10 each.

Madhya Maharashtra : Surgana-24, Dhadgaon/akrani- Hydro-19, Radhanagari & Peth-16 each, Mahabaleshwar-14, Lonavalaagri-13, Trimbakshwar-12, Igatpuri & Taloda-11 each, Bhor-10.

Konkan & Goa : Palghar agri & Jawhar-15 each, Vikramgad & Wada-13 each, Talasari & Dahanu-12 each, Mangaon, Kankavli & Valpoi-11 each, Mahad, Ponda, Mhasla & Matheran-10 each.

Jharkhand : Maheshpur-12.

Chhattisgar : Sukma-10.

West Rajasthan : Jaitran-7.

27 August 2024

Saurashtra : Tankara-36, Wankaner-34, Rajkot-32, Kalavad-26, Mandvi, Khambhalia-25 each, Lodhika- 23, Chotila, Morbi & Nakhatrana-22 each, Thangadh & Lalpur- 21 each, Kotdasangani-17, Chuda & Jodia-16 each, Dhrol & Sayla-14 each, Lakhtar & Barvala-13 each, Jamnagar, Gadhda, Dasada, Vadia, Paddhari, Gondal & Botad-12 each, Visavadar, Ranpur, Muli, Wadhvan, Jasdan, Dwarka, Naliya & Babra-11 each, Kalyanpur, Jamnagar, Okha, Surendranagar & Keshod-10 each.

Gujarat Region : Morva Hadaf-34, Tarapur-31, Nadiad & Khambhat-29 each, Borsad, Padra & Vadodara-28 each, Godhra & Sojitra-27 each, Wanakbori-26, Anand-24, Mahemdavad-23, Vaso-22, Balasinor & Mahudha-21 each, Dholka 20, Bilodara_aws, Matar, Kheda & Meghraj-19 each, Halol, Ghoghamba & Jotana-18 each, Galteshwar, Shahera, Santrampur, Jambughoda, Limkheda & Dhandhuka-17 each, Arnej_aws-16, Siddhpur, Fatepura, Kadi- 15 each, Singvad, Dhandhuka, Mansa, Abad City, Kathalal, Chhota Udepur, Khanpur & Anklav-14 each, Umreth, Visnagar, Modasa, Dascroi, Mc Ahmedabad, Mandal & Waghai-13 each, Bavla, Virpur, Savli, Dholera, Becharaji- 12 each, Viramgam, Jhalod, Dang, Vadodara, Desar, Harij, Waghodia, Petlad, Bayad, Jetpur Pavi, Vadnagar, Godra_aws & Bodeli-11 each, Vijapur, Subir, Dhanpur, Gandhinagar, Mahesana, Kalol, Sanjeli, Dahegam & Detroj Prantij-10 each.

Chhattisgar : Kusmi-25, Wandrafnagar-15, Raghunath Nagar & Manora-9 each, Sanna-7.

East Rajasthan : Bagidora-20, Sallopat & Shergarh-17 each, Dhambola-14, Veja-13, Arthuna-11, Sajjangarh-10, Loharia, Khushalgarh & Chikali-9 each, Garhi-8, Kanva, Galiakot & Sanganer Tehsil-7 each.

East Madhya Pradesh : Kusmi-15, Sidhi & Churhat-14 each, Nagode, Beohari & Bahri-11 each, Rampur-10, Majhauili, Devser & Sihawal-9 each, Orchha & Bilhari-8 each, Naigarhi, Semariya, Gudh & Lavkushnagar-7 each.

Madhya : Gaganbawada & Mahabaleshwar-13
Maharashtra each, Surgana-12, Lonavala_agri & Trimbakshwar-11 each, Shahuwadi-10, Ajra, Chandgad, Radhanagari & Velhe-9 each, Peth-8, Patan, Igatpuri & Harsul-7 each. Konkan & Goa: Jawhar-12, Awalegaon Arg-10, Matheran & Pawarwadi-8 each, Lanja, Mandangad, Mokheda, Vikramgad & Rajapur-7 each.

West : Kathiwada-10, Bhabhra-9, Meghnagar,
Madhya Udaigarh & Thandla-7 each.
Pradesh

Bihar : Khaira, Silao & Sono-7 each.

Jharkhand : Rania-14, Kharsema-13, Maithon & Dumri-12 each, Bagodari-11, Panchet, Nandadih, Panchet, Nawadih & Dumri-9 each, Hunterganj, Chandil, Markachou, Gobindpur, Madhupur & Chakulia-8 each, Torpa, Giridih Bengbad, Giridih, Jamtara & Diyakel Khunti-7 each.

Orissa : Jagatsinghpur-11, Cuttack, Bhuban & Kantapada-9 each, Athgarh, Mundali & Banki-7 each.

Gangetic : Bankura-13, Luchipur & Diamond
West Bengal Harbour-11 each, Bankura-10, Asansol-9, Jhargram & Burnpur-8 each, Kalaikunda & Midnapore-7 each.

28 August 2024

Saurashtra : Khambhalia-43, Jamnagar-38,
& Kutch Jamjodhpur-32, Dwarka-31, Lalpur-30, Porbandar & Ranavav-28 each, Bhanvad, Kalyanpur & Kalavad-24 each, Kotdasangani-23, Dhrol-18, Lodhika-17, Dhoraji & Jamkandorna-16 each, Jodia & Gondal-15 each, Kutiana-13, Morbi, Mangrol, Tankara, Visavadar & Rajkot-12 each, Upleta, Vanthali & Manavadar-11 each, Bhesan, Talala, Jetpur & Paddhari-10 each, Junagadh & Naliya-9 each, Mendarda, Wankaner, Keshod, Babra & Abdasa-8 each, Botad-7.

Gujarat : Nadiad-8, Kapadvanj-7.

East : Mounnt Abu-9.
Rajasthan

29 August 2024

Odisha : Birmaharajpur & Jeypore-10 each,
Tangarpali & Nandapur-8, Hirakud-7.

Gujarat : Umerpada-7.
Region

Saurashtra : Naliya-30, Bhanvad-29, Abdasa-27,
& Kutch Kalyanpur-26, Dwarka, Lakhpur & Khambhalia-23 each, Jamjodhpur-22, Nakhatrana-20, Mandvi-18, Kalavad & Lalpur-17 each, Kandla Airport-16, Dhoraji & Lodhika-15 each, Kutiana & Jamkandorna-13 each, Anjar & Ranavav-12 each, Jamnagar-11, Jetpur & Mundra-10 each, Bhuj, Porbandar, Rajkot, Manavadar, Upleta & Gondal-9 each, Vanthali, Wankaner & Jamnagar-8 each, Gandhidham, Kandla New, Bhesan, Kotdasangani & Jodia-7 each.

Madhya : Igatpuri-8.
Maharashtra

30 August 2024

Gujarat : Mandvi-39, Mundra-22, Okha-17,
Naliya & Abdasa-16, Dwarka & Anjar-8 each, Gandhidham-7.

31 August 2024

Odisha : Padia-14, Malkangiri-11, Nandapur-8,
Junagarh-5.

Chhattisgarh : Dornapal-11, Konta-10.

East : Bhungra-11, Devel, Sajjangarh &
Rajasthan Kherwara-10 each, Ganeshpur, Kesarpura & Sallopat-7 each.

West : Nawa-7.
Rajasthan

East : Harrai & Kirnapur-9 each
Madhya Pradesh

West : Gandhwani-16, Kukshi-14, Sardarpur &
Madhya Bagh-13 each, Jabot-12, Jhabua, Dahi &
Pradesh Rama- 11 each, Alirajpur-10, Udaigarh & Meghnagar-8 each, Ranapur, Manawar, Khalwa & Maksudangarh-7 each.

Gujarat : Waghai-11, Bodeli-7.
Region

Madhya : Navapur-16, Nandgaon & Pathardi-9,
Maharashtra Gaganbawada & Gidhade-7 each.

Marathwada : Kinwat-18, Himayatnagar-17, Mahur-11, Hadgaon & Bhokar-7 each.

Vidarbha : Pusad-10, Mangrulpur-8, Digra-7.

Gujarat : Valia-37, Songadh & Mangrol-25 each,
Region Vyara-22, Maktampur-20, Bharuch-19, Nadiad, Netrang & Tilakwada-17 each,

Dolvan-16, Vansda, Uchchhal & Subir-15 each, Daman-14, Bayad & Kapadvanj-13 each, Karjan, Lunawada, Valod, Nandod, Valsad, Mandvi & Prantij-12 each, Kathalal, Himatanagar, Bayad & Mahesana- 11 each, Waghai, Garudeshwar, Umerpada, Virpur, Vagra, Balasinor & Kamrej-10 each.

2.5. Depression over westcentral & adjoining Northwest Bay of Bengal (31st Aug. - 2nd Sept. 2024)

2.5.1. Under the influence of the cyclonic circulation over eastcentral Bay of Bengal & neighbourhood, a **Low Pressure Area** formed over central and adjoining north Bay of Bengal at 0300 UTC of 29th Aug. It moved west-northwestwards and lay over westcentral & adjoining northwest Bay of Bengal at 1800 UTC of 29th. It further moved west-northwestwards and lay over westcentral & adjoining northwest Bay of Bengal off north Andhra Pradesh & south Odisha coasts at 0000 UTC of 30th and became a **Well Marked Low Pressure Area** over the same region at 0300 UTC of 30th. It moved west-northwestwards and intensified into a **Depression** and lay centered over the same region near Lat. 17.5° N/Long. 84.6° E at 0000 UTC of 31st Aug. It moved northwestwards and lay centered over the same region near Lat. 17.7° N/Long. 84.5° E, about 80 km south-southeast of Kalingapatnam (Andhra Pradesh) at 0300 UTC of 31st Aug. It moved northwestwards and lay centered over north Andhra Pradesh coasts at 1800 UTC of 31st Aug. and crossed north Andhra Pradesh & south Odisha coasts near Kalingapatnam between 1900 and 2100 UTC of 31st Aug. and lay centered over north coastal Andhra Pradesh. It moved west-northwestwards and lay centered over south Odisha and adjoining areas of north Andhra Pradesh & Chhattisgarh near Lat. 18.5° N/Long. 83.0° E at 0000 UTC of 1st Sept. It further moved west-northwestwards and lay centered over south Odisha and adjoining south Chhattisgarh & north Andhra Pradesh near Lat. 18.7° N/ Long. 82.4° E, about 60 km southeast of Jagdalpur (Chhattisgarh) at 0300 UTC of 1st Sept. It further moved west-northwestwards and lay centered over south Odisha and adjoining south Chhattisgarh near Lat. 18.7° N /Long. 82.1° E at 0600 UTC of 1st Sept. It moved slowly westwards and lay centered over south Chhattisgarh and adjoining south Odisha near Lat. 18.7° N/Long. 81.9° E at 0900 UTC of 1st Sept. It continued to move west-northwestwards and lay centered over south Chhattisgarh and neighbourhood near Lat. 19.0° N/Long. 81.2° E at 1200 UTC of 1st Sept. It further moved west-northwestwards and lay centered over southeast Vidarbha and neighbourhood near Lat. 19.3° N/Long. 80.4° E at 1800 UTC 1st Sept. It moved northwestwards and lay centered over east Vidarbha and adjoining Telangana near Lat. 19.6° N/Long. 80.0° E

at 0000 UTC of 2nd. and over the same region near Lat. 19.8° N /Long. 79.9° E, about 70 km east-southeast of Chandrapur (Maharashtra) at 0300 UTC of 2nd. It moved west-northwestwards and weakened into a **Well Marked Low Pressure Area** over central parts of Vidarbha and neighbourhood at 1200 UTC of 2nd. It then lay as a **Low Pressure Area** over west Vidarbha & neighbourhood with the associated cyclonic circulation extending upto 3.1 km above m. s. l. on 3rd and over southwest Madhya Pradesh & neighbourhood at 1200 UTC of 3rd. It lay over southeast Rajasthan and adjoining southwest Madhya Pradesh at 0000 UTC of 4th Sept. and became less marked. However, the associated cyclonic circulation lay over southeast Rajasthan & neighbourhood which extended upto 5.8 km above m. s. l.

2.5.2. Other features observed

The lowest estimated central pressure was 996 hPa during 1200 UTC of 31st Aug. to 0000 UTC of 1st Sept. with the pressure drop of about 4 hPa and maximum sustained wind speed was 25 knots during 0000 UTC of 31st Aug. to 0300 UTC of 1st Sept.

2.5.3. Weather and damage caused

Rainfall associated with the deep depression seen that heavy to very heavy rainfall occurred at many places over coastal Andhra Pradesh and at isolated places over south coastal Odisha. Heavy to very heavy rainfall occurred at isolated places over Telangana, Vidarbha on 1st September and at isolated places over Madhya Pradesh on 2nd September. Moderate to heavy rainfall occurred at isolated places over east Gujarat, Rajasthan on 2nd September. No damage was reported in association with this system.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0830 UTC of date the 1st – 3rd Sept. are given below:

1 Sept. 2024

Telangana : Mahabubabad-37, Kodada-35, Manuguru & Kusumanchi-32 each, Chilkur-31, Mattampally & Huzur Nagar-30 each, Parvathagiri & Burgampadu-29 each, Madhira & Banswada-28 each, Kodakandla-27, Dornakal, Chinthakam, Tadwai Mlg & Noothankal-26 each, Gudurwrgl-25, Palawancha-24, Bhadrachalam & Khammam-23 each, Aswapuram & Thollada-22 each, Sadasivanagar & Bonakal-21 each, Mothey, Bhiknur & Chennaraopet-20 each, Jajireddigudem, Konijerla & Suryapet-19 each, Bayyaram &

Kamareddy-18 each, Garla, Kothagudem & Wyra Kvk-17 each Dhar Pale, Tadwai, Kothaguda & Kalwakurthy-16 each, Govindaraopet, Domakonda, Miryalaguda, Zaffergadh & Sathupalle-15 each, Jammikunta, Vangoor, Tekulapalle, Devaruppal, Achampeta, Devarakonda, Medak & Yellandu-14 each, Tandur, Huzurabad, Chandrugonda, Neredcherla, Varni, Thimmapur, Shadnagar, Khammam Urban, Thimmajipeta & Kollapur-13 each, Jadcherla, Kodangal, Kosgi, Yellandu, Kowdipalle, Chandur, Bhoothpur, Gandeed, Khila Ghanpur, Choppadandi, Karimnagar, Mulakalapalle-12 each, Alladurg, Narsampet, Mahbubnagar, Nalgonda, Sangem, Khanapur, Maddur, Narsapur, Hanwada, Lingampet, Damaragidda, Koilkonda, Julurpad, Pochampalle, Gandhari, Tekmal, Yellareddypeta, Pinapaka 11 each, Regode, Wanaparthy, Enkuru, Aswaraopeta, Chandurthi, Palakurthi, Shankarapatnam, Bheemgal, Nagarjuna Sagar, Yellareddy, Chevella, Ibrahimpatnam, Ramayampet, Gopalpet, Choutuppal, Chinna Chinta Kunt 10 each, Mustabad, Papannapet, Midjil, Nanganur & Mominpet, Maganoor, Velpur, Narmetta, Atmakurwrgl, Nawabpetmbn, Sultanabad, Nawabpet, Chigurumamidy, Tamsi, Pebbair, Nangnoor, Bomraspet, Nidamanur, Doma, Narayanpet, Boath, Gangadhara, Hathanoora, Bachhanpet, Kothakota, Jagadevpur & Jogipet-9 each, Talamadugu, Peddamandadi, Jangaon, Kondurg, Yadagirigutta, Veepangandla, Julapalle, Atmakur Wnp, Ramannapeta, Nallabelly, Bazarhathnoor, Vicarabad, Pargi, Tandur, Wargal, Chegunta, Atmakur M, Pedda_adiserlapalle, Yacharam, Ghatkesar, Kondapak, Naga Reddipet, Maheswaram, Konaraopeta, Navipet, Wankdi & Utnur-8 each, Bhuvanagiri, Dindigul, Narva & Asifabad, Pitlam, Peddemul, Bala Nagar, Peddapalle, Nagar Kurnool, Ghanpur, Bejjanki, Kagaznagar, Daira, Palem, Addakal, Asifabad, Mulug, Raghunathpalle, Esci_gachibowli, Saroornagar, Venkatapuram, Kondapur, Sirsilla, Sangareddy, Mudhole, Kukatpally Jntu, Marriguda, Utkoor, Venkatapur, Nirmal, Sarangapurnrl, Dubbak, Kammar Pale, Kathlapur-7 each,

Coastal :Amaravati & Tiruvuru-26 each, Guntur-23, Kukunoor-20, Atchampet-19, Tenali- &18, Mangalagiri, Nandigama, Piduguralla & Macherla-17 each, Velairpad-16, Nuzvid, Mundlamuru & Kunavaram-14 each, Jangamaheswarapuram, Bapatla & Vijayawada-13 each, Santhamaguluru & Vararamachandrapur-12 each, Avanigada, Addanki, Vijayawada A.p. & Chintur-11 each, Karamchedu-10, Kaikalur, Sattenapalle & Repalle-9 each, Anakapalle, Yelamanchili, Markapur & Chimakurthi-8 each, Podili, Ongole & Gudivada-7 each.

Vidarbha : Kalamb-12, Digras-11, Deoli, Mahagaon-10 each, Pandherikawara, Umerkhed, Babulgaon, Ralegaon & Yeotmal-9 each, Zarizamni-8, Pused, Arni, Ghatanji, Maregaon, Wani & Yeotmal-7 each.

Marathwada : Kinwat-18, Himayatnagar-17, Mahur-11, Hadgaon-9, Bhokar, Umarga-7 each.

Odisha : Padia-14.

Chhattisgarh : Dornapal-11, Konta-10,

East Madhya :Harrai & Kirnapur-9 each.

Pradesh

West Madhya:Maksudangarh-7.

Pradesh

Rayalaseema :Nandikotkur, Jupadu Bungalow & Atmakur-9 each, Pagidyala-8.

2 Sept. 2024

Marathwada : Manvat-31, Dhalegaon-26, Mantha, Pathri-23 each, Partur-22, Sonpeth-20, Selu & Ardhapur-19 each, Udgir-16, Ambad-15, Nanded-14, Jintur, Ghansawangi , Deoni, Ambejogai / Mominabad & Parbhani-13 each, Georai, Udgir, Dharur & Palam-12 each, Hingoli - Hydromet, Aundha Nagnath, Sillod, Bhokardan-11 each, Wadawani, Jalkot, Kandhar & Purna-10 each, Gangakhed, Mudkhed, Latur, Bhokar, Hadgaon, Vasmat, Ahmedpur & Washi-9 each, Phulambri, Badnapur, Kallamnuri, Renapur & Kaij-8 each, Beed, Dharmabad, Chakur, Parli Vajinath, Kallamb, Sambhajinagar, Mukhed, Mahur, Shirur Anantpal, Bhum, Manjlegaon, Paithan, Loha, Naigaon Khairgaon & Patoda-7 each.

Telangana : Sadasivanagar & Tadwai-24 each, Lingampet-23, Kamareddy-22, Jainoor-19, Papannapet, Utnur & Gandhari-17 each, Mirdoddi, Yellareddy, Naga Reddipet & Gambhiraopet-15 each, Khanpur-14, Laxmanchanda & Dubbak-

13 each, Balkonda, Tekmal, Metpalle, Nirmal, Yellareddypeta, Kondapak, Mallapur, Alladurg & Dandepalle-12 each, Kampasagar, Sarangapur, Bhiknur, Bejjanki, Mortad, Banswada & Navipet-11 each, Domakonda, Peddapalle, Nanganur, Medak, Elagaid, Sangem, Husnabad, Dilawarpur, Belampalle & Jangaon-10 each.

West Madhya: Bhagwanpura & Bhikangaon-13 each, Pradesh Khargone-10, Gogawan & New Harsud-9 each, Khandwa & Dabra-7 each.

East Rajasthan: Jaipur Aero-12, Nasirabad-11, Sanganer Tehsil Sr-9, Thanagazi & Bassi-8 each, Srimadhopur & Vijaynagar Sr-7 each,

West Rajasthan: Nawa-7.

Gujarat Region: Waghai-11, Bodeli-7.

Madhya Pradesh: Pathardi-9

Maharashtra

Vidarbha: Pusad-10, Digra-7.

3 Sept. 2024

Gujarat Region: Valia-37, Songadh & Mangrol-25 each, Vyara-22, Maktampur-20, Bharuch-19, Nadiad, Netrang & Tilakwada-17 each, Dolvan-16, Vansda, Uchchhal & Subir-15 each, Daman-14, Bayad & Kapadvanj-13 each, Karjan, Lunawada, Valod, Nandod, Valsad, Mandvi & Prantij-12 each, Kathalal, Himatanagar, Bayad & Mahesana-11 each, Waghai, Garudeshwar, Umerpada, Virpur, Vagra, Balasinor & Kamrej-10 each.

Madhya Pradesh: Navapur-16, Nandgaon-9, Gaganbawada & Gidhade-7 each,

West Madhya: Gandhwani-16, Kukshi-14, Sardarpur & Pradesh Bagh-13 each, Jabot-12, Jhabua, Dahi & Rama-11 each, Alirajpur-10, Udaigarh & Meghnagar-8 each, Ranapur, Manawar & Khalwa-7 each,

Telangana: Tekmal-11, Papannapet & Kowdipalle-8 each, Naga Reddipet & Yellareddy-7 each,

East Rajasthan: Bhungra-11, Devel, Sajjangarh & Kherwara-10 each, Ganeshpur, Kesarpura & Sallopat-7 each,

Vidarbha: Mangrulpir-8.

2.6. Deep Depression over westcentral and adjoining northwest Bay of Bengal (8th - 10th Sept. 2024)

2.6.1. Under the influence of cyclonic circulation over coastal Andhra Pradesh & adjoining westcentral Bay of Bengal, a **Low Pressure Area** has formed over

westcentral and adjoining northwest Bay of Bengal off north Andhra Pradesh-south Odisha coasts on 5th Sept. with the associated cyclonic circulation extended upto 7.6 km above m. s. l. tilting southwestwards with height. It lay over central and adjoining north Bay of Bengal at 0300 UTC of 6th and lay as a **Well Marked Low Pressure area** over northwest and adjoining central Bay of Bengal at 0300 UTC of 7th. It concentrated into a **Depression** and lay centered over westcentral and adjoining northwest Bay of Bengal near Lat. 17.9° N/Long. 87.0° E at 0000 UTC of 8th. It moved north-northwestwards and lay centered over the same region near Lat. 18.2° N/Long. 86.8° E, about 230 km east-southeast of Gopalpur (Odisha) at 0300 UTC of 8th. It moved slowly northwestwards and lay centered over northwest and adjoining westcentral Bay of Bengal near Lat. 18.6° N/Long. 86.4° E at 1200 UTC of 8th. It moved slowly north-northwestwards and intensified into a **Deep Depression** over the same region near Lat. 18.9° N/Long. 86.3° E at 1800 UTC of 8th. It further moved slowly north-northwestwards and lay centered over the same region near Lat. 19.3° N/Long. 86.2° E at 0000 UTC of 9th. It moved nearly north-northwestwards and lay centered over northwest Bay of Bengal near Lat. 19.6° N/Long. 86.2° E, about 50 km east-southeast of Puri (Odisha) at 0300 UTC of 9th Sept. It crossed Odisha coast close to Puri near Lat. 19.85° N/Long. 86.0° E between 0500-0600 UTC and lay centered over coastal Odisha near Lat. 20.0° N/Long. 86.0° E at 0600 UTC of 9th. It moved northwestwards and lay centered over interior Odisha near Lat. 20.8° N/Long. 85.1° E at 1200 UTC of 9th. It further moved northwestwards and weakened into a **Depression** over the same region and lay centered near Lat. 21.3° N/Long. 84.4° E at 1800 UTC of 9th. It moved west-northwestwards and lay centered over north Chhattisgarh & adjoining interior Odisha near Lat. 21.7° N/Long. 83.3° E at 0000 UTC of 10th. It moved west-northwestwards and lay centered over north Chhattisgarh near Lat. 21.8° N/Long. 82.8° E, 70 km east-southeast of Bilaspur (Chhattisgarh) at 0300 UTC of 10th. It moved northwestwards and weakened into a **Well Marked Low Pressure Area** over northeast Madhya Pradesh and neighbourhood at 1200 UTC of 10th.

2.6.2. Other features observed

The lowest estimated central pressure was 991 hPa with the pressure drop of 6 hPa and maximum sustained wind speed was 30 knots during 1800 UTC of 8th Sept. to 1200 UTC of 9th Sept.

2.6.3. Weather and damage caused

Rainfall associated with the deep depression shows that light to moderate rainfall occurred at many places over Odisha, Chhattisgarh on 08th September. Light to moderate rainfall occurred at many places with extremely heavy

rainfall at isolated places over Odisha and heavy to very heavy rainfall at few places over Chhattisgarh, Vidarbha and heavy rainfall at a few places over Coastal Andhra Pradesh on 09th September. Light to moderate rainfall occurred at many places with extremely heavy rainfall at isolated places over Vidarbha, Odisha & Chattisgarh and heavy to very heavy rainfall at isolated places over East Madhya Pradesh and heavy rainfall at isolated places over West Madhya Pradesh on 10th September. Light to moderate rainfall occurred at many places with extremely heavy rainfall at a few places over East Madhya Pradesh; at isolated places over West Madhya Pradesh and heavy rainfall at isolated places over Chhattisgarh, East Rajasthan and West Uttar Pradesh on 11th September. No damage was reported in association with this system.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 9th -11th Sept. are given below:

9 Sept. 2024

Odisha : Malkangiri-25, hitrakunda K Guma-23, Korukunda-20, Mathili-15, Lamataput-13, Ambadola-12, Padia & Chhatrapur-10 each, Digapahandi, Gopalpur, Jeypore & Similiguda-9 each, Madanpur Rampur, Ranpur, Kotpad, Chikiti, Nandapur & Lanjigarh-8 each, Ullunda, Nandahandi, Ganjam, Berhampur, Rangeilunda, Chandahandi, Koksara, Koraput, Th Rampur, Udala & Nawana-7 each.

Chhattisgarh : Bhairamgarh, Bijapur & Kutaru-21 each, Chhotedongar, Orcha & Kohkameta-20 each, Narayanpur- 19, Tongpaal-18, Sukma-17, Gangalur-16, Gadiras, Gidam, Bastanar & Antagarh-14 each, Bade Bachel-13, Dantewara, Dornapal, Kuakonda, Pakhanjur & Jagargunda-11 each, Bhopalpatnam, Dhanora, Nangur, Bhanupratappur, Konta, Kanker & Pharasgaon-10 each, Keshkal, Usoor & Lohandiguda-9 each, Charama-8, Barsur, Baderajpur & Belargaon-7 each,

Vidarbha : Bhamragad-16, Etapalli & Ahiri-7 each

Coastal : Chintapalle-13, Ranastalam-11, Andhra Pusapatirega, Bondapalle & Bheemunipatnam-10 each, Yanam Merakamudidam, Cheepurupalle, Visakhapatnam Ap & Garividi-9 each, Denkada, Visakhapatnam, Narsipatnam, Gajapathinagaram, & Srungavarapukota-8 each, Vepada, Vizianagaram, Yelamanchili, Chodavaram, Tuni, Therlam & Araku Valley-7 each.

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Vidarbha : Gondia Ap-29, Deori & Gondia-21 each, Salekasa-20, Sadakarjuni-19, Goregaon-18, Korchi-15, Arjuni Morgaon & Amgaon-14 each, Lakhandur & Desaiganj-13 each, Sakoli-12, Kuhi & Sindewahi-10 each, Lakhani, Mulchera, Gadchiroli, Bramhapuri & Dhanora-9 each, Chamorshi, Saoli & Bhamragad-8 each, Kurkheda, Pauni, Nagbhir & Etapalli-7 each.

Chhattisgarh : Lal Bahadur Nagar-24, Sukma, Dongargarh & Gurur-19 each, Rajnandgaon & Bhanupratappur-18 each, Khairagarh-17, Balod, Durgkondal & Baloda Bazar-16 each, Mohla, Lawan, Chhuria, Dhanora, Dongargaon, Bhatapara & Marri Bangla Deori-15 each, Pallari, Charama, Pithora, Dhamtari, Keshkal, Gangalur, Doundi, Pakhanjur & Khadgaon-14 each, Nerharpur, Suhela, Kukrel, Sonakhan & Antagarh-13 each, Manpur, Labhandih, Arjunda, Darbha, Kanker, Kashdol, Raipur and Bhakhara & Komakhan-12 each.

Odisha : Lanjigarh-23, Madanpur Rampur-22, Tikarpara-15, Ambadola-14, Nawapara-13, Kotpad, Belgaon & Birmaharajpur-11 each, Malkangiri, Bissem-cuttack & Athmalik-10 each, Barmul & Lamataput-9 each, Kosagumda & Harabhanga-8 each and Mathili, Nawarangpur, Padia, Gaisilet, Nawarangpur Pto, Tarva, Sonapur, Nandahandi, Jeypore, Dabugan, Narla, Borigumma & Rairakhol-7 each.

East Madhya Pradesh : Kirnapur-20, Matiyari & Baihar-13 each, Lanji-12, Lalburra-10, Bichhia-9, Dhanora, Paraswada & Harrai-7 each.

West Madhya Pradesh : Raoti-10, Satwas & Gogawan-9 each, Nasrullahganj & Petlawad-7 each.

11 Sept.2024

East Madhya Pradesh : Shahgarh-30, Patharia-28, Buxwaha-24, Damoh aws, Hatta & Banda-21 each, Baihar, Jabalpur aws, Jabera, Rehli & Seoni-19 each, Tendukheda, Panagar & Narsinghpur aws-18 each, Garhakota, Tendukheda, Kareli & Matiyari-17 each, Deori & Bichhia-16 each, Badamalhera & Mohgaon-15 each, Patera & Sagar aws-14 each, Kesli & Niwas-13 each, Kumdam, Batiyagarh, Patan & Barghat-12 each.

West : Udaipura-25, Bareilly & Pipariya-16 each,
 Madhya Pradesh : Narwar-15, Bhandar-12, Seoni Malwa,
 Sultanpur, Pachmarhi & Navibagh Aet-11
 each, Karera, Deori & Bankhedi-10 each,
 Gairatgang, Raghogarh, Bhitwarwar,
 Thandla, Sohagpur, Begumganj &
 Narsingarh-9 each and Bhopal Arera Hills,
 Badi, Ganjbasoda, Babai, Kolaras, Chinor
 & A lot-8 each.

Chhattisgarh : Gandai-11, Rengakhar Kala-9, Tilda-8,
 Sahaspurlohara 7.

East : Khushalgarh-11, Banera-9, Ganeshpur-8,
 Rajasthan : Shahpura, Mounnt abu Tehsil, Chaksu,
 Baseri, Phagi, Bansur, & Jaipur Aero-7
 each.

West : Mahroni, Muzaffarnagar, Jhansi,
 Uttar Pradesh : Mauranipur & Madawara-9 each, Pali-7.

2.7. Depression over Northeast Madhya Pradesh (11th-13th Sept.)

2.7.1. The Well Marked Low Pressure Area
 lay over northeast Madhya Pradesh and neighbourhood
 at 1200 UTC of 10th. It moved nearly north-northwestwards
 and re-intensified into a **Depression** and lay centred
 over northeast Madhya Pradesh near Lat. 24.0° N/
 Long. 80.0° E, about 60 km east-northeast of
 Damoh (Madhya Pradesh) at 0300 UTC of 11th. It moved
 slowly north-northwestwards and lay centred over
 northeast Madhya Pradesh and adjoining south Uttar
 Pradesh near Lat. 25.0° N/Long. 79.6° E at 1200 UTC of
 11th. It moved nearly northwestwards and lay centred over
 northwest Madhya Pradesh and adjoining southwest Uttar
 Pradesh near Lat. 26.2° N/Long. 78.2° E at 1800 UTC of
 11th. It continued to move nearly northwards and lay
 centred over northwest Madhya Pradesh and
 neighbourhood near Lat. 26.7° N/Long. 78.3° E at
 0000 UTC of 12th. It moved north-northeastwards
 and lay centred over southwest Uttar Pradesh
 & neighbourhood near Lat. 27.0° N/Long. 78.5° E,
 about 50 km east-southeast of Agra (Uttar Pradesh) at
 0300 UTC of 12th. It moved east-northeastwards and
 lay centred over central Uttar Pradesh near Lat.
 27.5° N/Long. 79.1° E at 1200 UTC of 12th. It moved north-
 northwestwards and lay centred over northwest Uttar
 Pradesh & neighbourhood near Lat. 28.2° N/Long. 79.3° E
 at 0000 UTC of 13th. It moved north-northwestwards and
 weakened into a **Well-Marked Low Pressure Area** over
 the same region at 0300 UTC of 13th and became less
 marked. However, the associated cyclonic circulation lay
 over the same region between 3.1 & 5.8 km above m. s. l.

2.7.2. Other features observed

The lowest estimated central pressure was 993 hPa
 with the pressure drop of about 4 hPa during 0000 UTC to
 1800 UTC of 12th Sept. and maximum sustained wind
 speed was 20 knots during the system.

2.7.3. Weather and damage caused

Rainfall associated with the deep depression shows
 that light to moderate rainfall occurred at a few places over
 Madhya Pradesh, West Uttar Pradesh on 11th September.
 Light to moderate rainfall occurred at most places with
 extremely heavy rainfall at isolated places and heavy to
 very heavy rainfall at many places over West Madhya
 Pradesh, West Uttar Pradesh, light to moderate rainfall at
 many places with heavy to very heavy rainfall at a few
 places over East Madhya Pradesh, East Rajasthan and
 isolated heavy rainfall over Uttarakhand and East Uttar
 Pradesh on 12th September. Light to moderate rainfall
 occurred at many places with extremely heavy rainfall at
 isolated places over Uttarakhand and heavy to very heavy
 rainfall at a few places over Uttar Pradesh and isolated
 heavy rainfall over East Rajasthan, Delhi, Bihar, West
 Madhya Pradesh on 13th September. Light to moderate
 rainfall occurred at many places with heavy to very heavy
 rainfall at a few places over Haryana- Chandigarh,
 Gangetic West Bengal, Uttarakhand and heavy rainfall at
 isolated places over Odisha, Bihar, Uttar Pradesh,
 Himachal Pradesh, Delhi, Jharkhand, Chhattisgarh and
 Sub-Himalayan West Bengal on 14th September. No
 damage was reported in association with this system.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at
 0300 hrs UTC of from 12th-14th Sept. are given below:

12 Sept. 2024

West : Biaora-36, Gohad & Karera-22 each,
 Madhya Pradesh : Narwar & Rajgarh-21 each, Gwalior &
 Mau-20 each, Bhandar, Sabalgarh & Datia-
 19 each, Dabra-18, Ater, Ambah, Porsa,
 Ghatigaon & Bhitwarwar-17 each, Mihona,
 Mehgaon & Lahar-16 each, Chinor, Gormi,
 Bhindawas & Badoda-15 each, Alipur-14,
 Morena, Narsingarh, Pachmarhi & Roan-
 12 each, Badarwas & Shivpuri-11 each,
 Vijaypur & Pichhore-10 each, Seodha,
 Shamshabad, Khaniyadana, Indergarh,
 Bamori & Kailaras-9 each, Navibagh Aet,
 Kolaras & Ashoknagar-8 each, Bairad &
 Sheopur-7 each.

West Uttar : Agra-29, Jalesar & Sadabad-23 each,
 Pradesh : Sikandra Rao-20, Hathras-19, Tundla,
 Khairagarh, Kasganj & Sahawar-17 each,

Tahrauli-15, Jhansi-14, Fatehabad-13, Etawah, Sasani, Sahaswan & Vrindavan-12 each, Talbehat, Moth, Narora, Etah, Jasrana & Aligarh-11 each, Karhal & Etmadpur-10 each, Bah, Auraiya, Gunnaur, Madawara & Mainpuri-9 each, Shikohabad, Kurawali, Mauranipur, Kalpi Tehsil, Kalpi, Moradabad, Moradabad & Bareilly-8 each, Pali, Moradabad, Kasba Tanda, Aliganj, Etawah & Ghiror-7 each.

East Rajasthan : Rajakhera-24, Dholpur Tehsil-19, Sawaimadhopur Tesil-16, Aklera-13, Sapau, Bari & Shahabad-11 each, Manohar Thana, Baseri & Bharatpur Tehsil-10 each, Rupbas & Pipalda-9 each, Kathumer, Sarmathura, Kumher, Khandar, Beir & Deeg-8 each, Lalsot, Nagar, Nadbai, Bayana, Karauli, Baran, Atru & Dhariabad-7 each.

East Madhya Pradesh : Prithvipur-23, Orchha-15, Niwari & Chahtarpur-12 each, Nowgong-11, Mohangarh-10, Lidhora-9, Rajnagar-8, Patera, Banda & Lavkushnagar-7 each.

Uttarakhand : Banbasa-12, Champawat-9, Pantnagar & Lohaghat-8 each, Haldwani-7.

East Uttar Pradesh : Itwa-11, Bhanpur-7.

13 Sept. 2024

Uttarakhand : Lohaghat-27, Champawat-20, Banbasa & Khatima-13 each, Kashipur & Pithoragarh-11 each, Jaspur, Mukteshwar, Pantnagar, Pati & Haldwani-9 each, Almora-8, Betalghat, Ranikhet, Nainital, Haridwar & Gairsain-7 each.

West Uttar Pradesh : Bijnor-18, Kasganj & Sahawar-15 each, Budaun-14, Mirganj, Sahaswan & Pawayan-13 each, Baheri & Nauganva Sadat-12 each, Sikandra Rao, Amroha & Moradabad-11 each, Hasanpur, Dhampur, Dataganj, Bilari & Aligarh-10 each, Moradabad, Thakurdwara, Kasba Tanda, Jansath, Jasrana, Nagina, Moradabad, Shahjahanpur Obsy & Bisauli-9 each, Narora, Aonla, Mawana, Nawabganj, Aliganj, Etawah, Chandpur, Bareilly & Suar-8 each, Agra, Gunnaur, Chandausi, Pilibhit Tehsil, Shahjahanpur, Tundla, Bisalpur & Bareilly-7 each.

East Uttar Pradesh : Muhammadi-14, Ankinghat-12, Nighasan, Neemsar, Dhaurahara & Kaimganj-11 each, Mahsi & Katarniaghat-10 each, Nanpara & Hardoi-9 each, Dabri Fmo-8, Kheri Lakhimpur, Chhibramau, Bahraich & Shardanagar-7 each.

East Rajasthan : Viratnagar & Asnawar-8 each, Bharatpur Tehsil & Shahabad-7 each.

Haryana : Hassanpur & Delhi Ridge-7 each.

Chandigarh-Delhi

West : Ambah, Karhal and Porsa-7 each.

Madhya Pradesh

Bihar : Barauni-7.

14 Sept. 2024

Haryana-Chandigarh : Pataudi-21, Nahar Rev & Kosli-13 each, Palhawar Rev-9, Taoru & Faridabad-8 each, Dadri, Sohana, Nuh & Bhadkal-7 each.

Gangetic West Bengal : Contai-18, Durgachack-17, Digba-12, Bagati & Sagar Island-11 each, Durgapur-10, Diamond Harbour, Panagarh & Suri-9 each, Jangipur, Dum Dum, Alipore, Salar & Suri-8 each, Basirhat, Kalyani, Berhampore, Hetampur, Tilpara Barrage, Mo Saltlake, Sri Niketan & Gheropara-7 each.

Uttarakhand : Champawat-18, Haldwani-16, Nainital-15, Lohaghat-11, Pantnagar & Pithoragarh-9 each, Ghansali-8, Banbasa & Bhagwanpur-7 each.

Odisha : Kusumi-14, Bhograi-10, Jaleswar-7.

Bihar : Beldaur & Khaira-9 each, Lakhisarai, Nabinagar, Harsi & Jamui-8 each, Gogri, Bausi & Begusarai-7 each.

West Uttar Pradesh : Kasba Tanda-9, Bijnor-8, Suar-7.

Himachal Pradesh

Delhi : Kataula-8, Palampur-7.

Delhi

Jharkhand : Giridih, Bengbad & Bengabad-8 each, Sujani & Pakuria-7 each.

Chhattisgarh Surajpur-7.

Sub-Himalayan

West Bengal

East Uttar Pradesh : Katarniaghat-7.

Pradesh

2.8. Deep depression over Northeast Bay of Bengal & adjoining Bangladesh coast (13th-18th Sept. 2024)

2.8.1 Under the influence of the cyclonic circulation over southeast Bangladesh and neighbourhood, a **Low Pressure Area** formed over southeast Bangladesh and neighbourhood in the night of 12th Sept. and lay over the same region at 0000 UTC of 13th. It moved west-northwestwards and lay as a **Well Marked Low Pressure Area** over northeast Bay of Bengal and adjoining southeast Bangladesh coast at 0300 UTC 13th with the associated

cyclonic circulation over southeast Bangladesh and neighbourhood which extended upto 7.6 km above m. s. l. It moved west-northwestwards and concentrated into a **Depression** and lay centred near Lat. 22.0° N/Long. 90.8° E over northeast Bay of Bengal close to Bangladesh coast at 1200 UTC of 13th. It Crossed Bangladesh coast close to Patuakhali (Bangladesh) between 1700 to 1800 UTC of 13th September as a depression with the wind speed of 45-55 gusting to 65 kmph. It further moved west-northwestwards and intensified into a **deep depression** and lay centred over Bangladesh and adjoining Gangetic West Bengal near Lat. 22.8° N/Long. 89.2° E, 90 km northeast of Canning (West Bengal) at 0000 UTC 14th. It further moved west-northwestwards and lay centered over Gangetic West Bengal and adjoining Bangladesh near Lat. 22.7° N/Long. 88.8° E about 50 km northeast of Kolkata (West Bengal) at 0300 UTC of 14th. It then moved west-southwestwards and lay over Gangetic West Bengal centered near Lat. 22.4° N/Long. 88.3° E at 0600 UTC of 14th. It remained practically stationary and lay over the same region centered near Lat. 22.4° N/Long. 88.5° E at 1200 UTC 14th. It moved slowly northeastward and lay over the same region centered near Lat. 22.6° N/Long. 88.5° E at 1800 UTC of 14th. It further moved slowly westward and lay over the same region centered near Lat. 22.6° N/Long. 88.0° E at 0000 UTC of 15th. It moved slowly westward and lay over the same region centered near Lat. 22.6° N/Long. 87.8° E about 60 km west of Kolkata (West Bengal) at 0300 UTC of 15th. It moved west-northwestward and lay centered over the same region near Lat. 22.7° N/Long. 87.6° E at 0600 UTC of 15th. Then it moved west-northwestward and lay centered over the same region near Lat. 22.8° N/Long. 87.4° E at 1200 UTC of 15th. It further moved slowly northwestward and lay centered over the same region near Lat. 22.9° N/Long. 87.2° E at 1800 UTC of 15th. It moved slowly northwestward and lay centered over the same region near Lat. 23.0° N/Long. 87.0° E at 0000 UTC of 16th. It moved slowly west-northwestwards and lay centered over the Gangetic West Bengal and adjoining Jharkhand near Lat. 23.1° N/Long. 86.7° E about 40 km southeast of Purulia (West Bengal) at 0300 UTC of 16th. It moved westwards and lay centered over Jharkhand near Lat. 23.3° N/Long. 85.2° E at 1200 UTC of 16th. It continued to move west-northwestwards and weakened into a **Depression** and lay centered over Jharkhand and adjoining north Chhattisgarh near Lat. 23.6° N/Long. 84.2° E at 0000 UTC of 17th. It then moved and lay centered over northeast Chhattisgarh and adjoining Jharkhand near Lat. 23.7° N/Long. 83.7° E around 50 km southwest of Daltonganj (Jharkhand) at 0300 UTC of 17th. It moved westwards and lay centered over north Chhattisgarh and adjoining northeast Madhya Pradesh near Lat. 23.7° N/Long. 82.7° E at 0600 UTC of 17th. It then moved and lay centered over northeast Madhya Pradesh near Lat. 24.0° N/Long. 81.3° E at 1200 UTC of 17th. It further moved west-northwestwards

and weakened into a **Well Marked Low Pressure Area** over northeast Madhya Pradesh and adjoining southwest Uttar Pradesh at 0000 UTC of 18th. It lay over central parts of north Madhya Pradesh & neighbourhood at 0300 UTC of 18th. It further weakened into **Low Pressure Area** over the same region at 1200 UTC of 18th and became less marked at 0000 UTC of 19th. However, the associated cyclonic circulation lay over southeast Rajasthan & neighbourhood and extended upto 5.8 km above m. s. l.

2.8.2. Other features observed

The lowest Estimated Central Pressure (hPa) was 989 hPa with pressure drop of about 5 hPa on 14th Sept. The estimated maximum sustained surface wind speed was 30 kts during 0000 UTC of 14th to 1800 UTC of 16th Sept.

2.8.3. Weather and damage caused

Rainfall associated with the deep depression shows that light to moderate rainfall occurred at many places over Gangetic West Bengal and Uttarakhand on 12th September. Light to moderate rainfall occurred at many places with heavy to very heavy rainfall at isolated places over Gangetic West Bengal, Uttarakhand, Odisha and heavy rainfall at isolated places over Bihar, West Uttar Pradesh, Himachal Pradesh, Delhi, Jharkhand, Chhattisgarh, Sub-Himalayan West Bengal, East Uttar Pradesh on 13th September. Light to moderate rainfall occurred at many places with heavy to very heavy rainfall isolated places over Gangetic West Bengal, Jharkhand and heavy rainfall at isolated places over Odisha, Himalayan West Bengal and West Uttar Pradesh on 14th September. Light to moderate rainfall occurred at many places with heavy to very heavy rainfall isolated places over Jharkhand, Gangetic West Bengal, Chhattisgarh, Odisha and heavy rainfall at isolated places over Madhya Pradesh, East Uttar Pradesh, Bihar and Sub-Himalayan West Bengal on 15th September. Light to moderate rainfall occurred at many places with heavy to very heavy rainfall isolated places over Chhattisgarh and East Madhya Pradesh.

As a result of heavy rainfall and discharge of water from Damodar Valley Corporation severe flooding occurred in southern West Bengal, claiming three lives and affecting over 2.5 lakh residents. Six districts were significantly impacted, including Birbhum, Bankura, Howrah, Hooghly, North and South 24 Parganas, East and West Medinipur, and Paschim Bardhaman. Ghatal in West Medinipur and Uday Narayanpur in Howrah was worst affected area. The release of water from the dams and reservoirs worsened the situation in Ghatal. The Dwarakeswar River breached as well causing floods in Hooghly. This led people to leave their homes in search of a safe and secure shelter. The flooding also caused a lot of

damage to the crops as they got washed away. Panskura railway station and it's adjoining bus stand in East Medinipur district sunk after flood completely becoming inaccessible to commuters. (Situation Report 1 Floods in West Bengal Date: 20th September 2024 (Friday) Time: 12:00 PM (IST) Source: Sphere India)

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 14th -18th Sept. are given below:

14 Sept. 2024

Gangetic :Contai-18, Durgachack-17, Digha-12, West Bengal Bagati & Sagar Island-11 each, Durgapur-10, Diamond Harbour, Panagarh & Suri-9 each, Jangipur, Dum Dum, Alipore, Salar & Suri-8 each, Basirhat, Kalyani, Berhampore, Hetampur, Tilpara Barrage, Saltlake, Sri Niketan & Gheropara-7 each.

Uttarakhand : Champawat-18, Haldwani-16, Nainital-15, Lohaghat-11, Pantnagar & Pithoragarh-9 each, Ghansali-8 and Banbasa & Bhagwanpur-7each.

Odisha :Kusumi-14, Bhograi-10 & Jaleswar-7.

Bihar :Beldaur & Khairai-9 each, Lakhisarai, Nabinagar, Halsi & Jamui-8 each and Gogri, Bausi & Begusarai-7 each.

West Uttar:Kasba Tanda-9, Bijnor-8 & Suar-7. Pradesh

Himachal :Kataula-8 & Palampur-7. Pradesh

Delhi : Palam-8, Aya Nagar & Lodi Road-7 each

Jharkhand Giridih Bengbad & Bengabad-8 each and Sujani & Pakuria-7 eac.

Chhattisgarh :Surajpur-7.

Sub- :Malda-7.

Himalayan West Bengal

East Uttar :Katarniaghat-7. Pradesh

15 Sept. 2024

Gangetic :Jhargram-19, Contai-15, Amtala-14, West Bengal Kharidwar, Bankura, Lalgah & Kansabati-13 each, Kalyani, Tusuma & Digha-12 each, Asansol, Phulberia, D.P.Ghat, Asansol, Bagati & Bankura-11 each, Kharagpur- 10, Panagarh, Barrackpur, Harinkhola, Narayanpur, Debagram, Mohanpur, Midnapore &

Durgachack-9 each, Basirhat, Midnapore, Burnpur, Sri Niketan, Purihansa, Durgapur & Hetampur-8 each, Suri, Salar, Luchipur, Burdwan, Labpur, Kakdwip, Rajnagar & Gheropara-7 each.

Jharkhand :Meral-15, Garhwa-14, Burmu, Daltonganj & Chakulia-11 each, Potka, Dhalbhumgarh, Garu, Palamu, Latehar & Balumat-9 each, Panchet-8, Boram, Panchet, Rajdhanwar, Nandadih, Maithon, Gurabandha, Chandwa, Hendigir, Messenjoy & Saryu-7each.

Odisha :Bhograi-13, Rajghat-12, Suliapada-11, Udala & Jaleswar-10 each, Tensa-9, Rasagovindapur, Betanati, Chandua Kuliana, Kaptipada, Jamsolaghat & Bangiriposi-8 each, Sarasakan, Bijatala & G B Nagar-7 each.

West Uttar:Saharanpur-10. Pradesh

Chhattisgarh :Kusmi-7.

Sub Himalayan: Darjeeling-7.

West Bengal

16 Sept. 2024

Jharkhand :Tandwa-16, Lawalong-15, Simaria & Maithon-14 each, Maithon-13, Gurabandha & Gobindpur-12 each, Sindri, Putki, Chandrapura, Chandankiary, Panchet, Panchet, Ghatsila, Latehar Balumat, Musabani-11 each, Potka, Chakulia, Karmatand, Jamshedpur Aero, Dhalbhumgarh & Parsabad-10 each, Jamtara, Putki, Bariyatu, Jamshedpur, Koderma & Bau Kanke-9 each, Hazaribagh, Majhgaon, Shilaichak & Dumri-8 each, Rajdhanwar, Chandil, Chandwa, Maheshpur, Messenjoy, Jamtara, Tonto, Nimdih, Nawadih, Dhurki, Bagodari, Phusro, Balumath, Chaibasa, Garhwa, Kharsema & Tenughat-7 each.

Gangetic :Asansol & Suri-15 each, Kharidwar-13, West Bengal Burnpur-12, Purihansa & Luchipur-11 each, Bankura, Harinkhola & Gheropara-10 each, Sri Niketan, Tusuma, Rajnagar & Phulberia-9 each, Purulia, Bankura, Mankar, Simula, Tantloi, Amtala, Lalgah, Rampurhat & Panagarh-8 each, Narayanpur, Labpur, Nalhati, Durgapur, Tilpara Barrage, Hetampur, Amfu Kharagpur & Kalaikunda-7each.

Chhattisgarh : Ramchandrapur-15, Kusmi-13, Samari-12, Wandrafanagar-11, Ramanujganj, Rajpur, Raghunath Nagar & Chando-8 each, Pratappur-7.

Odisha : Udala-14, G B Nagar, Nawana & Balimundali-12 each, Raruana, Betanati, Karanjia & Bahalda-11 each, Kaptipada, Balasore, Joshipur & Jaipur-10 each, Sarasakana, Tiring, Nh5 Gobindpur, Kusumi & Bijatala-9 each, Nilgiri, Joda, Jaleswar, Remuna, Jamsolaghat, Rasagovindapur, Baripada, Rajghat, Bhograi, Rairangpur & Muruda-8 each, Bangiriposi, Suliapada, Samakhunta, Chandua Kuliana & Sukruli-7 each.

East Madhya Pradesh : Chitrangi-11, Mauganj-8.

East Uttar Pradesh : Churk-10, Chopan-8, Robertsganj & Dudhi-7 each.

Bihar : Sanjhauli & Chakai-8 each, Rajauli-7.

Sub-Himalayan West Bengal : Rongo & Lava-8 each, Jhallong-7.

17 Sept. 2024

Chhattisgarh : Kusmi-15, Ramchandrapur-14, Samari & Biarpur-12 each, Ramanujganj-11, Odagi, Sonhat & Chando-9 each, Pondi Bachra & Balrampur-8 each and Rajpur, Bhaiyathan, Manora & Pasaan-7 each.

East Madhya Pradesh : Churhat-14, Panagar-12, Bilhari, Jabalpur & Bargi-10 each, Mada-9, Bijadandi, Sarai, Nowrozabad & Chitrangi-7 each.

18 Sept. 2024

East Uttar Pradesh : Attarra-16, Kanpur & Mau-12 each, Beberu, Manikpur, Rajapur & Karwi-11 each, Kanpur, Banda & Lalganj-10 each, Tirwa & Koraon-9 each, Chhibramau-8, Karchhana, Ghorawal, Kannauj, Prayagraj, Mirzapur, Prayagraj Sadar & Bhognipur-7 each.

West Uttar Pradesh : Rath-22, Hamirpur-13, Etawah & Chakkar Nagar-12 each, Shikohabad-8, Orai & Bharthana-7 each.

East Madhya Pradesh : Hanumana-13, Chitrangi, Rewa & Gaurihar-10 each, Mauganj, Sarai & Ajaigarh-9 each, Mangawan, Nowgong & Churhat-8 each, Devendranagar, Naigarhi, Sidhi, Nagode, Birsingpur,

Raipurkarchuliyan, Sihawal, Gudh, Jawa, Shahgarh & Unchehra-7 each.

Jharkhand : Lohardaga & Kharsema-8 each.

West Madhya Pradesh : Roan-15, Lahar-12, Mihona, Gohad & Mau-11 each, Gwalior, Ambah, Bhandar & Dabra-9 each, Bhind, Porsa & Datia-8 each, Ater, Ghatigaon, Gormi & Seodha-7 each.

Odisha : Dhenkanal & Dhenkanal-13 each, Bhuban-12, Banki & Korei-10 each.

2.9. Depression over central Arabian Sea (13th -15th October 2024)

2.9.1. Under the influence of upper air cyclonic circulation over Lakshadweep and adjoining southeast Arabian Sea, a **Low Pressure Area** formed over Lakshadweep and adjoining southeast & eastcentral Arabian Sea. It lay as a **Well Marked Low Pressure Area** over eastcentral Arabian Sea off Karnataka-Goa coasts at 0300 UTC of 10th with the associated cyclonic circulation extended upto 5.8 km above m. s. l. It moved northwestwards and lay over eastcentral Arabian sea off Maharashtra coast from 0300 UTC of 11th to 0300 UTC of 12th. It lay over eastcentral & adjoining westcentral Arabian Sea at 0000 UTC of 13th and persisted over the same region on 13th. It moved west-northwestwards and intensified into a **Depression** and lay centred over central Arabian Sea near Lat. 15.6° N/Long. 65.0° E, about 860 km southeast of Masirah (Oman) at 1200 UTC of 13th. It further moved slowly west-northwestwards and lay centred over the same region near Lat. 15.8° N/Long. 64.3° E, about 790 km southeast of Masirah (Oman) at 0300 UTC of 14th. It moved west-northwestwards and lay over westcentral Arabian Sea off Oman coast near Lat. 16.1° N/Long. 62.0° E at 1200 UTC of 14th. It further moved westwards and persisted over the same region near Lat. 16.1° N/Long. 61.0° E at 0000 UTC of 15th. It moved northwestwards and lay centred over the same region near Lat. 16.8° N/Long. 60.5° E, about 460 km south-southeast of Masirah (Oman) 0300 UTC of 15th. It moved and lay centred over the same region near Lat. 18.3° N/Long. 58.8° E at 1200 UTC of 15th. It moved northwestwards and crossed Oman coast near Lat. 19.35° N /Long. 57.7° E, close to Duqm (Oman) between 1700 UTC and 1800 UTC and lay as a **Well Marked Low Pressure Area** over coastal Oman at 1800 UTC of 15th and became unimportant for the Indian region on 16th october.

2.9.2. Other features observed

Estimated lowest Central Pressure (hPa) was 1001 hPa with pressure drop of about 4 hPa during 0300 UTC to 1800 UTC of 14th Oct. and estimated maximum sustained surface wind speed was 25 kts.

2.9.3. Weather and damage caused

No effect on Indian region.

2.10. Depression over southwest Bay of Bengal (15th-17th October, 2024)

2.10.1 Under the influence of the cyclonic circulation over southeast Bay of Bengal, a **Low Pressure Area** formed over the same region at 0000 UTC of 14th October, 2024. It persisted over the same region upto 1200 UTC 14th and moved west-northwestwards and lay as a **Well Marked Low Pressure Area** over the central part of south Bay of Bengal at 0000 UTC and persisted over the same region at 0300 UTC of 15th. It further moved west-northwestwards and lay centered over southwest and adjoining southeast Bay of Bengal at 0600 UTC of 15th. It continued to move west-northwestwards and intensified into a **Depression** and lay centered over southwest Bay of Bengal near Lat. 11.4° N/Long. 84.4° E at 1200 UTC of 15th. It further moved west-northwestwards and lay centered over the same region near Lat. 12.1° N/Long. 83.4° E at 0000 UTC 16th. It further moved west-northwestwards and lay centered over southwest and adjoining westcentral Bay of Bengal near Lat. 12.3° N/Long. 83.0° E, about 320 km east-southeast of Chennai (Tamil Nadu) at 0300 UTC of 16th and over the same region near Lat. 12.9° N/Long. 81.9° E at 1200 UTC of 16th. It continued moving west-northwestwards and lay centered over westcentral and adjoining southwest Bay of Bengal close to south Andhra Pradesh-north Tamil Nadu Coasts near Lat. 13.4° N/Long. 80.8° E at 1800 UTC of 16th. It further moved west-northwestwards and crossed north Tamil Nadu - south Andhra Pradesh coasts between Puducherry and Nellore, close to north of Chennai near Lat. 13.5° N/Long. 80.2° E around 2300 UTC of 16th as a depression. Subsequently, it weakened into a **Well Marked Low Pressure Area** and lay over south coastal Andhra Pradesh and adjoining north coastal Tamil Nadu at 0000 UTC of 17th. It persisted over the same region and associated cyclonic circulation extended upto 5.8 km above m. s. l. tilting southwestwards with height. It moved west-northwestwards and weakened into a **Low Pressure Area** over Rayalaseema and neighbourhood at 1200 UTC of 17th and then became less marked at 0000 UTC of 18th. However, the associated cyclonic circulation merged with the cyclonic circulation over eastcentral Arabian sea & adjoining north Lakshadweep area.

2.10.2. Other features observed

The lowest estimated Central Pressure (hPa) was 1002 hPa with the pressure drop of about 4 hPa and estimated maximum sustained surface wind speed was 25kts during 1200 UTC of 15th to 1800 UTC of 16th Oct.

2.10.3. Weather and damage caused

Rainfall associated with the depression shows that light to moderate rainfall occurred at a few places over coastal Tamil Nadu, Puducherry & Karaikal, Rayalaseema and south Andhra Pradesh on 15th October. Light to moderate rainfall occurred at most places with extremely heavy rainfall at isolated places and heavy to very heavy rainfall at many places over coastal Tamil Nadu, Puducherry & Karaikal, light to moderate rainfall at a few places with heavy to very heavy rainfall at isolated places over Rayalaseema, south Andhra Pradesh and isolated heavy rainfall over south interior Karnataka on 16th October. Light to moderate rainfall at a few places with isolated heavy rainfall over Rayalaseema, south Andhra Pradesh, south interior Karnataka and Kerala on 17th Oct.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 16th -17th Oct. are given below:

16 October 2024

Tamil Nadu, :Cholavaram-30, Red Hills-28, Avadi -25, Puducherry & Kathivakkam (Chennai)-23, Manali-21, Karaikal T.V.K Nagar-19, Kolathur, Adyar, Puzhal & Ambattur-18 each, Thiruvottiyur, Perungudi, Manali, Hindustan_University (Kancheepuram) & Ennore-17 each, Perambur, Malar Colony, Good Will School Villivakkam, Puzhal, Ayanavaram Taluk Office, Anna University, Ponneri & Thamarapakkam-16 each, Ambathur, Anna University, MGR Nagar, Sholinganallur, Thiru-Vi-Ka Nagar, Tondiarpet, Royapuram & Adayar-15 each, Madhavaram, Tondiarpet, Chennai(N), CD Hospital Tondiarpet, YMCA Nandnam & Kodambakkam-14 each, Anna Nagar, Vanagaram, Chennai Collector Office, Kodambakkam, DGP Office & Royapuram-13 each, Ice House, Pallikaranai, Teynampet, Alandur, Meenambakkam & Maduravoyal 12 each, Kolapakkam, Valasaravakkam, Uthandi, GCC, Tiruvottiyur & Adyar Eco Park-11 each, Mugalivakkam, Jaya Engg College, Perungudi, Sholinganallur & Tiruppur-10 each, Gummidipoondi, Perungudi, Uthukottai, Manimutharu Dam, Tiruvallur, Kachirayaopalayam, Mahabalipuram, Satyabama, Poonamallee & Chembarabakkam-9 each, ACS Medical College Bhuvanagiri (Cuddalore), VIT Chennai, Valavanur, Mahabalipuram, Koratur & Koliyanur-8 each, Uthangarai, Tiruttani, Pallipattu,

Kundrathur, Tambaram & Tiruppur South-7 each.

Rayalaseema: Sullurpeta-22, Tada-12, Tirupati Aero-11, Satyavedu-10, Porumamilla-9, Srikalahasti, Thottambedu, Venkatagiri, Penagaluru, Kodur & Nagari-8 each, Gudur & Pullampeta (Annamayya District)-7 each.

Coastal :Kavali-18, Nellore-13, Kandukur-10, Andhra Seetharamapuram-10, Vinjamur (Nellore) Pradesh && Udayagiri (Nellore)-9 each. Yanam

South :Bengaluru Hal Ap (Bengaluru Urban)-9, Interior Hesaraghatta (Bengaluru Urban)-7, Bellur Karnataka & Bengaluru City-7 each.

17 October 2024

Rayalaseema :Kodur-14, Pullampeta-10, Penu Konda-9, Ramagiri & Nandikotkur-8 each, Chenne Kothapalle, Jupadu Bungalow, Rajampet, Venkatagiri, Srikalahasti, Nallamada, Gorantla, Penagaluru & Tirupati-7 each.

Coastal :Nellore-7.

Andhra Pradesh & Yanam

Kerala :Kozhikode-7.

South Interior:Davanagere-9 each, Y N Hoskote & Karnataka Chitradurga-7 each.

2.11. Severe Cyclonic Storm "DANA" over the Eastcentral Bay of Bengal (22nd-26th October, 2024)

2.11.1. Under the influence of upper air cyclonic circulation over north Andaman Sea and adjoining eastcentral & southeast Bay of Bengal, a **Low Pressure Area** formed over eastcentral Bay of Bengal and adjoining north Andaman Sea in the early morning (0000 UTC) of 21st. It persisted over the same region at 0300 UTC of 21st. It moved west-northwestwards and lay as a **Well Marked Low Pressure Area** over eastcentral Bay of Bengal at 0600 UTC of 21st. It continued moving west-northwestwards and concentrated into a **Depression** & lay centred over the same region near Lat. 15.4° N/Long. 91.6° E at 0000 UTC 22nd. It further moved west-northwestwards and lay centred over the same region near Lat. 15.5° N/Long. 91.4° E about 700 km southeast of Paradip (Odisha) at 0300 UTC of 22nd. It further moved west-northwestwards and concentrated into **Deep Depression** & lay centred

over the same region near Lat. 15.6° N/Long. 90.9° E at 1200 UTC of 22nd. It further moved west-northwestwards and intensified into a **cyclonic storm "DANA" (pronounced as Dana)** and lay centred over the same region near Lat. 16.2° N/Long. 89.8° E about 560 km southeast of Paradip (Odisha) at 0000 UTC of 23rd. It moved northwestwards and lay centred over the same region near Lat. 16.5° N/Long. 89.6° E about 520 km southeast of Paradip (Odisha) at 0300 UTC of 23rd. It lay centred over the eastcentral & adjoining westcentral Bay of Bengal near Lat. 16.9° N/Long. 89.1° E at 0900 UTC of 23rd. It continued to move northwestwards and lay centred over the same region near Lat. 17.2° N/Long. 88.9° E at 1200 UTC of 23rd. It moved north-northwestwards and intensified into a **Severe Cyclonic Storm** over central & adjoining northwest Bay of Bengal and lay centered near Lat. 17.9° N/Long. 88.5° E at 1800 UTC of 23rd. It further moved north-northwestwards and lay centred over northwest & adjoining central Bay of Bengal near Lat. 18.6° N/Long. 88.2° E at 0000 UTC of 24th and over northwest Bay of Bengal near Lat. 18.9° N/Long. 88.0° E, about 210 km southeast of Paradip (Odisha) at 0300 UTC of 24th. It further moved north-northwestwards & lay over the same region near Lat. 19.8° N/Long. 87.5° E at 1200 UTC of 24th. It further moved north-northwestwards and crossed north Odisha coast close to Habalikhati Nature Camp (Bhitarkanika) and Dhamara during 2000 to 2200 UTC of 24th as a **severe cyclonic storm** with a wind speed of 100-110 kmph gusting to 120 kmph & lay centred at 2100 UTC of 24th over Odisha coast near Lat. 20.7° N /Long. 87.0° E about 20 km southeast of Dhamara (Odisha). It further moved north-northwestwards & lay centred at 0000 UTC of 25th over the same region near Lat. 21.0° N/Long. 86.8° E about 20 km north-northwest of Dhamara. It continued to move north-northwestwards and weakened into a **cyclonic storm** over north coastal Odisha and lay centred near Lat. 21.2° N/ Long. 86.7° E at 0300 UTC of 25th about 30 km northeast of Bhadrak. It moved northwestwards and weakened into a **Deep Depression** over the same region near Lat. 21.4° N/Long. 86.4° E at 0900 UTC of 25th. It moved westwards and lay centred over north Odisha near Lat. 21.4° N/Long. 86.3° E at 1200 UTC of 25th. It then remained practically stationary and weakened into a **Depression** over the same region near Lat. 21.4° N/Long. 86.2° E at 1800 UTC of 25th. It further moved slightly westwards and weakened into a **Well Marked Low Pressure Area** over the same region at 0000 UTC of 26th.

2.11.2. Other features observed

Estimated lowest Central Pressure (hPa) was 986 hPa with the pressure drop of about 18 hPa and estimated maximum sustained surface wind speed was 60 kts in the evening of 24th October at the centre.

2.11.3. Weather and damage caused

At the time of landfall, the estimated maximum sustained wind speed was about 100- 110 kmph gusting to 120 kmph over Kendrapara and Bhadrak districts of Odisha. Also, storm surge of height of about 1-2 meter above astronomical tide to inundate low lying areas of Kendrapara, Bhadrak, Balasore, East Medinipur districts during the time of landfall.

The system caused widespread rainfall over North coastal districts with heavy to very heavy rainfall at a few places over Bhadrak, Kendrapara and Jagatsinghpur districts of North coastal Odisha, heavy rainfall at isolated places over East & West Medinipur districts of West Bengal and heavy rainfall at isolated places over Singhbhum district of Jharkhand on 24th October. It caused heavy to very heavy rainfall at a few places with isolated extremely heavy rainfall (≥ 21 cm) over North Odisha and Gangetic West Bengal on 25th October.

As per media reports, no death was reported from Odisha. One died in West Bengal due to electrocution. About 5,800 homes were damaged due to Cyclone Dana, eight lakh people were evacuated to 6,210 cyclone relief centres in Odisha. A total of 35.95 lakh people in Odisha were impacted by cyclone Dana and subsequent flooding in 14 districts. The worst-hit districts were Kendrapara, Balasore and Bhadrak (PTI, 17 October).

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0830 hours UTC of date the 23rd – 26th Oct. are given below:

23 October 2024

Kerala & Mahe :Idamalayar Dam-12, Nooranad & Mavelikara-9 each, Kalamassery-8, Kottarakkara, Thenmala, Kayamkulam & Pampadumpara-7 each.

Tamil Nadu :Kelavarapalli Dam, Thuckalay-12 each Kovilpatti 11, Krishnagiri, Sankarapuram & Ambur-10 each, Bhavanisagar-9, Valparai, Vaniyambadi, Barur, Makkinampatti, Mambzhathuraiyaru, Hogenekal, Anaikedanku & Thirparappu-7 each.

24 October 2024

Odisha :Chandbali & Rajkanika-16 each, Nawana-14, Marsaghai, Basudevapur & Oupada-11 each, Rajnagar-10, Mohakalapada-9, Aul & Paradeep-8 each, Derabis, Bhadrak, Balasore, Jajpur, Kendrapada, Nilgiri, Kendrapara & Pattamundai-7 each.

Tamil Nadu, Kozhiporvilai, Mannargudi, Thuckalay, PuducherryNeyyoor & Aduthurai-11 each, Suthamalli & Karaikal Dam, Eraniel & Kodavasal-10 each, Manjalaru & Needamangalam-9 each, Madurai, Tiruvarur, Parangipettai, Nannilam, Mayiladuthurai, Kuruvadi, Idayapatti, Tirupuvanam & Colachel-8 each, Kumbakonam, Tiruvaayar, Kurunthancode, Mayiladuthurai, Ariyalur, Ariyalur Taluk Office, Budalur, Vettikadu, Tiruvarur, Natham, Lower Anaicut, Natham, Thiruvidadaimaruthur & Mylaudy-7 each.

Gangetic West Bengal :Diamond Harbour, Kalaikunda & Amfukharapur-9 each, Durgachack-8, Mohanpur, Jhargram & Uluberia-7 each.

Kerala & Mahe :Mannarkkad-7.

Coastal Karnataka :Dharmasthala & Belthangadi-7 each

Jharkhand :Gurabandha-7.

25 October 2024

Odisha :Oupada-24, Dhamnagar, Khaira & Bhandaripokhari-21 each, Nawana & Bonth-19 each, Chandbalit-17, Bhadrak-16, Rajkanika & Bari-15 each, Jajpur, Udala, Nilgiri & Tihidi-14 each, Akhuapada-13, Aul-12, Binjharapur & Remuna-11 each, Kaptipada, Soro & G B Nagar-10 each, Ghasipura, Basudevapur, Balasore, Gobindpur & Chandanpur-9 each, Betanati, Balimundali, Kusumi, Derabis, Bahanga, Jaipur & Chandikhol-8 each, Hatadihi, Samakhunta, Anandpur, Nischintakoili, Pattamundai, Kendrapara & Kendrapada-7 each.

Gangetic West Bengal :Barrackpur-17, Harinkhola-15, Alipore & Durgachack-12 each, Diamond Harbour, Kalyani, Amtala, Uluberia, Midnapore, Mohanpur, Midnapore & Panagarh-11 each, Burdwan, Kalaikunda, Dum Dum & Saltlake-10 each, Mankar, Gheropara, Lalgah & Manteswar-9 each, Debagram, Kharagpur, Canning & Sri Niketan-8 each, Labpur, Bankura, Suri & Mangalkote-7 each.

Tamil Nadu, Puducherry & Karaikal :Namakkal & Chittampatti-11 each; Colachel, Idayapatti & Usilampatti-9 each; Sholavandan, Kuppanampatti & Bhoothapandy-8 each; Kallandri, Tallakulam, Uppar Dam, Dindigul, Nilakottai, Adayamadai, Madurai city, Madurai North & Periyapatti-7 each.

Jharkhand :Maheshpur-8, Pakuria-7.

Kerala & :Kanjirapuzha & Airport Chakka-7 each.
Mahe

2.12. Cyclonic Storm “FENGAL” Southwest Bay of Bengal (23rd November – 2nd December)

2.12.1. Under the influence cyclonic circulation over east Equatorial Indian Ocean and adjoining south Andaman Sea & southeast Bay of Bengal, a **Low Pressure Area** formed over east Equatorial Indian Ocean and adjoining southeast Bay of Bengal, at 0300 UTC of 23rd. It moved west-northwestwards and became **Well Marked Low Pressure Area** & lay centred at 0300 UTC 24th over southeast Bay of Bengal & adjoining East Equatorial Indian Ocean. It further moved west-northwestwards and lay over central parts of south Bay of Bengal & adjoining East Equatorial Indian ocean at 0000 UTC of 25th. It continued to move west-northwestwards & intensified into a **Depression** & lay centred over central parts of south Bay of Bengal & adjoining east Equatorial Indian Ocean near Lat. 5.0° N/Long. 85.3° E about 600 km southeast of Trincomalee at 0300 UTC of 25th. It moved west-north-westwards & lay over southwest & adjoining east Equatorial Indian Ocean centered near Lat. 5.1° N/Long. 84.5° E at 0600 UTC of 25th. It moved west-northwestwards and lay over the same region centered near Lat. 5.2° N/Long. 83.5° E at 1200 UTC of 25th. It continued moving north-northwestwards and lay over southwest Bay of Bengal centred near Lat. 6.0° N/Long. 82.9° E at 0000 UTC of 26th. It further moved north-northwestwards and intensified into a **Deep Depression** and lay over the same region centred near Lat. 6.3° N/Long. 82.8° E about 310 km southeast of Trincomalee at 0300 UTC of 26th. It moved north-northwestwards and lay over the same region centred near Lat. 7.0° N/Long. 82.7° E at 1200 UTC of 26th. It lay over the same region centered near Lat. 8.2° N/Long. 82.4° E at 0000 UTC of 27th. It further moved north-northwestwards and lay over the same region centered near Lat. 8.5° N/Long. 82.3° E, about 120 km east-southeast of Trincomalee at 0300 UTC of 27th. It moved slowly north-northwestwards and lay over the same region centered near Lat. 8.9° N/Long. 82.2° E at 1200 UTC of 27th. It moved northwards and lay over the same region centered near Long. 9.0° N/Long. 82.2° E at 0000 UTC of 28th. It remained practically stationary and lay over the same region centered near Lat. 9.1° N/Long. 82.3° E about 110 km east-northeast of Trincomalee at 0300 UTC of 28th. It moved northeastwards and lay over the same region centered near Lat. 9.6° N/Long. 82.7° E at 1200 UTC of 28th. It moved north-northwestwards and lay over the same region centered near Lat. 10.4° N/Long. 82.7° E at 0000 UTC of 29th. It further moved north-northwestwards and lay over the same region centered near Lat. 10.6° N/Long. 82.6° E about 270 km north-northeast of Trincomalee at 0300 UTC of 29th. It further moved north-northwestwards

and intensified into a **Cyclonic Storm “FENGAL” (pronounced as FEINJAL)** and lay over the same region centered near Lat. 11.2° N/Long. 82.2° E at 0900 UTC of 29th. It moved northwestwards and lay over the same region centred near Lat. 11.5° N/Long. 81.9° E at 1200 UTC of 29th. It continued to move west-northwestwards and lay over the same region centered near Lat. 12.2° N/Long. 81.2° E at 0000 UTC of 30th. It further moved west-northwestwards and lay over the same region centered near Lat. 12.3° N/Long. 80.9° E, about 110 km southeast of Chennai at 0300 UTC of 30th. It moved west-southwestwards and lay over the southwest Bay of Bengal off north Tamil Nadu coast centered near Lat. 12.3° N/Long. 80.3° E at 1200 UTC of 30th. It moved west-southwestwards and crossed north Tamil Nadu & Puducherry coasts as a **Cyclonic Storm** with a wind speed of 70-80 kmph gusting to 90 kmph near Lat. 12.05° N/Long. 79.9° E close to Puducherry between 1700 UTC and 1800 UTC of 30th. It lay over north coastal Tamil Nadu & Puducherry centered near Lat. 12.0° N/Long. 79.8° E at 1800 UTC of 30th Nov. It remained practically stationary and lay over the same region centered near Lat. 12.0° N/Long. 79.8° E at 0000 UTC of 1st Dec. It remained practically stationary and lay over the same region centered near Lat. 12.0° N/Long. 79.8° E close to Puducherry about 30 km north of Cuddalore at 0300 UTC of 1st Dec. It remained practically stationary for 12 hours and weakened into a **deep depression** and lay centered over the same region near Lat. 12.0° N/Long. 79.8° E close to Puducherry about 30 km north of Cuddalore at 0600 UTC of 1st Dec. It moved slowly west-northwestwards and weakened into a **depression** and lay centered over the same region near Lat. 12.1° N/Long. 79.6° E about 20 km northeast of Villupuram at 1200 UTC of 1st Dec. It continued to move west-northwestwards and lay centered over the north coastal Tamil Nadu near Lat. 12.2° N/Long. 79.2° E about 40 km northwest of Villupuram at 1800 UTC of 1st Dec. It moved nearly westwards and further weakened into a **Well Marked Low Pressure Area** over north interior Tamil Nadu at 0000 UTC of 2nd. It persisted over the same area at 0300 UTC of 2nd. It then lay as a **Low Pressure Area** over north interior Tamil Nadu & adjoining south interior Karnataka at 1200 UTC of 2nd. It moved west-northwestwards & become **Well Marked Low Pressure Area** over coastal Karnataka & adjoining east central Arabian sea at 0000 UTC of 3rd and persisted over the same region at 0300 UTC of 3rd. It moved westwards and lay over east central Arabian sea & adjoining coastal Karnataka at 1200 UTC of 3rd. It weakened into a **Low Pressure Area** over eastcentral & adjoining southeast Arabian sea at 0300 UTC of 4th and became less marked at 0000 UTC of 5th December. However, the associated cyclonic circulation lay over southeast Arabian sea & neighbourhood which extended upto 4.5 km above m.s.l. tilting southwestwards with height.

2.12.2. Other features observed

The lowest estimated central pressure was 996 hPa with the pressure drop of about 10 hPa and estimated maximum sustained surface wind speed (MSW) was 45 knots during 0000 UTC to 0900 UTC of 30th Nov.

2.12.3. Weather and damage caused

The system caused heavy to extremely heavy rainfall activity over Tamil Nadu, Puducherry & Karaikal southern states of India including Kerala. Light to moderate rainfall occurred at many places over Tamil Nadu, Puducherry & Karaikal with heavy rainfall at isolated places over Andaman & Nicobar Islands on 26th November. Light to moderate rainfall occurred at many places with heavy to very heavy rainfall at isolated places on 27th November and heavy rainfall at a few places over on 30th November over Tamil Nadu, Puducherry & Karaikal. Light to moderate rainfall occurred at most places with extremely heavy rainfall at many places over Tamil Nadu, Puducherry & Karaikal and heavy rainfall at isolated places over Kerala on 01st December. Light to moderate rainfall occurred at most places with extremely heavy rainfall at many places over Tamil Nadu, Puducherry & Karaikal, heavy to very rainfall at a few places over Kerala and heavy rainfall at isolated places over Coastal Andhra Pradesh & Yanam on 02nd December.

As per media reports, 20 death was reported including 11 from floods, 7 from landslides, and 2 from wall collapse and electrocution from Tamil Nadu due to cyclone. 20 people died from drowning and landslides. About 1,317 homes were damaged due to Cyclone Fengal, eight lakh people were evacuated to 6,210 cyclone relief centres in Odisha. 17,117 hectares of agricultural lands were damaged in Tamil Nadu, 5,527 hectares in Puducherry, and 6,825 hectares in Andhra Pradesh. A total of 69 lakh people in Tamil Nadu were impacted by cyclone Fengal and subsequent flooding in 14 districts of Tamil Nadu. The worst-hit districts were Villupuram, Kallakurichi, Cuddalore, and Tiruvannamalai (Indian Express, 03 December).

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 26th November - 2nd December are given below:

26 November 2024

Andaman :Car Nicobar-7.
& Nicobar
Islands

27 November 2024

Tamil :Nagapattinam-19, Kodiyakarai,
Nadu, Nagapattinam & Velankanni-18 each,
Puducherry Tirupoondi-14, Manali & Thirukuvalai-13
&Karaikal each, Tiruvarur & Vedaranyam-12 each,
Mahabalipuram, Cheyyur, Thalaigayur,
Sirkali, Kathivakkam, Marakkanam,
Vadakuthu, Mahabalipuram &
Tarangambadi-11 each, Mayiladuthurai,
Thiruthurai, Kollidam, Tiruvarur,
Cuddalore Collector Office, Cuddalore,
Karaikal & Nannilam-10 each, Muthupet,
Mannudi, Ayyampettai, Needamangalam,
Karaikal, Madukkur, NIOT_Pallikaranai-9
each, Bahour, Manalmedu, Nctpl M ECR,
Mayiladuthurai, Manalmedu,
Adiramapattinam, Ayinkudi, Red Hills,
Pattukottai, Mylam, Thirukalukundram,
Puducherry, Vettikadu, Ennore, Orthanad,
Annamalai Nagar, Puducherry Town-8 each,
Chidambaram, Puducherry, Puzhal,
Kodavasal, Valangaiman, Neivasal
Thenpathi, Lower Anaicut, Manjalaru,
Perungudi, Taramani, Puzhal, Nagudi,
Madhavaram, Thirukkanur, Thiruvottiyur,
Parangipettai, Vanamadevi, Royapuram,
Adyar Eco Park, Adyar, Vilupuram,
Sholinganallur, Peravurani, Pandavaiyar
Head, Avadi & Sembankoil-7 each.

30 November 2024

Tamil :Ennore AWS-13, Kathivakkam-12,
Nadu, Thiruvottiyur, Tondiarpet, Sholinganallur,
Puducherry CD Hospital Tondiarpet, Basin Bridge-9
&Karaikal each, Ponneri, Manali, Ice House, Chennai
(N), Chennai Central-8 each, Adyar,
Alandhur, Kolathur, YMCA Nandam,
Madhavaram, Anna University ARG,
Chennai Collector Office, DGP Office,
Sholinganallur, Puzhal,
Hindustan_University, Manali New Tow &
Vadapalani-7 each.

1 December 2024

Tamil :Mylam-51, Puducherry-49, Puducherry-48,
Nadu Patthukannu-45, Thirukkanur-43,
Puducherry Town-40, Tindivanam-37,
Nemoor-35, Bahour & Vallam-32 each,
Semmedu-31, Valavanur & Koliyanur-28
each, Vilupuram- 27, Gingee & Kedar-25
each, Valathy, Vanur, Soorapattu &
Marakkanam-24 each, Cuddalore &
Avalurpettai-23 each, Tiruvannamalai,
Chetpet-22 each, Jamunamarathur,
Cuddalore Collector Office, Anandhapuram

& Uthiramerur-21 each, Maduranthagam, Keelpennathur, Gummidipoondi, Chengalpattu-20 each, Avadi, Thirukalukundram & Vanamadevi-19 each, Tiruttani, Arani, Mugaiyur & Arcot-18 each, Kudithangi & Cheyyar-17 each, Thirukoilur, Vandavasi, Thamarapakkam, Kalasapakkam, Kanjanur & Tambaram-16 each, Thandarampettai, Kallakurichi, Kancheepuram, Wallajah, Cheyyur, MGR Nagar, Ayanavaram Taluk Office, Mundiampakkam & Kalavai PWD-15 each, Yercaud, Cheyyar, Arakonam, Sholingur, Vembakkam, Panruti, Pallipattu, Kallakurichi, Mahabalipuram & Jaya Engg College-14 each, Koratur, Palar Anicut, Uthukottai, Chembarabakkam, Kaveripakkam, R.K.Pet, DSCL Madampoondi, Sriperumbudur, Panapakkam, Walajabad, Red Hills, Poondi, BASL Manampoondi, Minnal & Tiruvallur-13 each, Meenambakkam, Ambathur Rev, Valasaravakkam, Cholvaram, Thirupalapandal, Kalayanallur, Kolapakkam, Ayapakkam, Ranipet, Thirukoilur, Maduravoyal, Tiruttani & Ambattur MW-12 each, Chennai(AP), Alandur, BASL Manalurpet, Mill-1 Ariyalur, Vengur, Meenambakkam, Valasaravakkam, Anna Nagar, Ammoor, Nctpl Marg ECR, Vellore, Thiru-Vi-Ka Nagar, Ponneri, Chennai Collector Office, Kattumayilur, Sankarapuram, Perambur, Chennai(N) AWS, Kundrathur, Vadapalani, ACS Medical College ARG, Ulundurpet, Sholinganallur, Kodambakkam, Virugavoor, Chennai(N)-11 each, Alangayam, DGP Office(Chennai), Poonamallee, Ponnai Dam, Tondiarpet, Thiruvalangadu, Mugalivakkam, Ariyalur Camp Area, DSCL Sulangurichi, Aminjikarai, L Thiyagadurgam, DSCL Keelpadi, Basinbridge, Ammundi & Madipakkam-10 each

Kerala : Ulanad-9, Enadimangalam-7.

2 December 2024

Tamilnadu,:Uthangarai-50, Kedar-42, Soorapattu-38, Puducherry Vilupuram-35, Harur-33, & Karaikal Mundiampakkam, Koliyanur & Thirupalapandal-32 each, Madampoondi-31, Mugaiyur & Valavanur-30 each, Nemoor, Manampoondi & Kanjanur-29 each, Vengur-27, Thirukoilur-26, Jambukuttapatti

& Pochampalli-25 each, Yercaud-24, Eraiyur & Jamunamarathur-23 each, Pambar & Manalurpet-21 each, Thandarampettai & Barur Pappireddipatti-20 each, Penucondapuram & Sankarapuram-19 each, Kallakurichi-18, Anandhapuram & Kalayanallur-17 each, Tiruvannamalai, Panruti & Dharmapur-16 each, Moorarpalayam, Vanamadevi, Keelpennathur, Moongilthuraipattu, Ulundurpet, Kariyakovil Dam, Sulangurichi, Rishivandhiyam, SCS Mill Pillaiyarkuppam & Keelpadi-15 each, Virugavoor, Nedungal, Kattumayilur-14 each, Ariyalur, Ariyalur Camp Area & Kadavanur-13 each, Vepur & Me Mathur-12 each, Thiyagadurgam, Pennagaram, Semmedu, Manimutharu Dam PWD, SRC Kudithangi, Krishnagiri, Kachirayaopalayam, Thirukkanur & Paiyur-11 each, Sethiathope, Anaimaduvu Dam, Omalur, Dam & Danishpet-10 each, Kallakurichi, Gomugi Dam, Palacode, Pelandurai & Hogenekal-9 each, Vadapudupattu, Bhuvanagiri, Bahour, Palacode, Denkanikottai, TNAU CRI Yethapur & Vaniyambadi-8 each, Dharamapuri, Arasoor, Kuppanatham, Gudalur Bazar, Thiruvannainal, Tirupattur, Natrampalli, Ambur, Lakkur, Kodanad, Tirupattur, Avalurpettai, Mangalapuram, Kilacheruvai, Kethandapatti, Chengam, Chidambaram & Vridhachalam-7 each,

Kerala : Kodungallur-19, Kottayam-18, Kurudamannil -17, Konni, Kanjirappally & Ranni-16 each, Kochi, Haripad & Peerumedu-15 each, Perumbavur-14, Aluva, Laha & Aluva-13 each, Cherthala, Kunnathanam & Thycattusery-12 each, Kalamassery-11, Kumarakom & Konni-8 each, Kozhikode, Vaikom & Piravam-7 each.

Coastal Andhra Pradesh & Yanam :Yanam-8.

2.13. Depression over westcentral Bay of Bengal off north Andhra Pradesh coast(20th-21st December 2024)

2.13.1. Under the influence of upper air cyclonic circulation over southeast Bay of Bengal, a **Low Pressure**

Area formed over central parts of south Bay of Bengal at 0300 hours UTC of 16th. It lay over southwest Bay of Bengal on 17th and became more marked and lay as a **Well Marked Low Pressure Area** over the same region 18th. It lay over southwest and adjoining westcentral Bay of Bengal on 19th. It moved nearly northwards and lay over westcentral & adjoining southwest Bay of Bengal on 20th. It moved slightly northwards and concentrated into a **Depression** and lay over westcentral Bay of Bengal off Andhra Pradesh coast centered near Lat. 13.7° N/Long. 83.5° E at 1200 UTC of 20th. It moved east-northeastwards and lay over the same region centered near Lat. 13.9° N/Long. 84.2° E at 0000 UTC of 21st. It further moved east-northeastwards and lay over the westcentral Bay of Bengal centered near Lat. 14.0° N/Long. 84.5° E, about 430 km south-southeast of Visakhapatnam (Andhra Pradesh) at 0300 UTC of 21st. It continued to move east-northeastwards and weakened into a **Well Marked Low Pressure Area** over the same region at 1200 UTC of 21st. It persisted over the same region at 0300 UTC of 22nd. It moved west-southwestwards and lay over westcentral and adjoining southwest Bay of Bengal off south Andhra Pradesh- north Tamil Nadu coasts at 0000 UTC of 23rd and over southwest and adjoining westcentral Bay of Bengal off south Andhra Pradesh- north Tamil Nadu coasts at 0300 UTC of 23rd & 24th. It moved westwards and weaken into a **Low Pressure Area** over the same region at 0000 UTC of 25th Dec., 2024.

2.13.2. Other features observed

The lowest estimated central pressure was 1002 hPa with the pressure drop of about 3 hPa and estimated maximum sustained surface wind speed (MSW) was 25 knots at the centre.

2.13.3. Weather and damage caused

Rainfall associated with the depression seen that light to moderate rainfall occurred at isolated places with heavy to very heavy rainfall at isolated places over coastal areas of Tamil Nadu, Puducherry & Karaikal, South Odisha and Andhra Pradesh & Yanam on 19th December. Light to moderate rainfall occurred at isolated places with heavy rainfall at isolated places over coastal areas of Odisha and Gangetic West Bengal on 20th December.

Chief amounts of 24 hrs rainfall (≥ 7 cm) ending at 0300 hrs UTC of from 20th - 21st December are given below:

20 December 2024

Tamil Nadu : Needamangalam-7.
Puducherry
& Karaikal

21 December 2024

Tamil Nadu,: Sandhiyur-8, Kodumudiyaru Dam,
Puducherry Balamore, Oothu & Nandhiyar-7 each
& Karaikal

Coastal : Bondapalle-9, Merakamudidam-8,
Andhra Bobbili, Therlam, Mentada &
Pradesh & Bheemunipatnam-8 each, Nellimarla,
Yanam Garividi, Cheepurupalle &
Gajapathinagaram-7 each.

Odisha: Ranpur-11, Begunia & Berhampur 8
each, Jatni, Khordha, Pipili, Naugaon,
Banpur, Belaguntha, Krishnaprasad,
Gop & Purushottampur-7 each.

