



Cyclonic storms and depressions over the North Indian Ocean during 2022*

1. Introduction

During 2022, in all 15 cyclonic disturbances (CDs) formed over the Indian seas. These included; two severe cyclonic storms (ASANI & MANDOUS), one cyclonic storm (SITRANG), four deep depressions, six depressions and two land depressions. Out of these 15 CDs, ten formed over the Bay of Bengal (BoB), three over the Arabian Sea (AS) and two over land. One severe cyclonic storm, one deep depression and two depressions formed over BoB in pre-monsoon season. Monsoon season witnessed development of one depression and one deep depression over the BoB, two land depressions and two depressions over the AS. During the post monsoon season, one severe cyclonic storm, one cyclonic storm & two depressions formed over the BoB and one deep depression over the AS.

The details of these systems are discussed in Section 2 and summarised in Tables 1-3. The tracks of all CDs during 2022 are presented in Fig. 1.

2. Details of the CDs during 2022

2.1. Deep Depression over southwest Bay of Bengal and adjoining equatorial Indian Ocean (03-06 March, 2022)

2.1.1. Under the influence of the cyclonic circulation over south Andaman Sea and adjoining equatorial Indian Ocean (EIO), a **Low Pressure Area (LOW)** formed over southeast BoB and adjoining area of south Andaman Sea & EIO on 28th February evening (1730 IST). It lay over southeast BoB and adjoining EIO with associated cyclonic circulation extending upto 5.8 km above m.s.l. in the forenoon (0830 IST) of 1st March. It lay as a **Well Marked Low Pressure Area (WML)** over central parts of South BoB & adjoining EIO in the afternoon (1430 IST) of 2nd. It moved west-northwestwards and concentrated into a **Depression** and lay centered at 0530 hrs IST of the 3rd March, 2022, over southwest BoB and adjoining EIO near Lat. 5.3°N / Long. 84.0°E, about 470 km south-southeast of Trincomalee (Sri Lanka). It moved northwestwards and lay centered at 0830 hrs IST of the 3rd March 2022, over the same region near Lat. 5.6°N / Long. 83.7°E, about

420 km south-southeast of Trincomalee (Sri Lanka). It moved north-northwestwards and lay centered at 1130 hrs IST of the 3rd March, 2022, over southwest BoB near Lat. 6.1°N / Long. 83.4°E, about 360 km south-southeast of Trincomalee (Sri Lanka), 700 km south-southeast of Nagappattinam (Tamil Nadu). It continued to move north-northwestwards and lay centered at 1730 hrs IST of the 3rd March, 2022, over the same region near Lat. 7.1°N / Long. 83.2°E, about 270 km south-southeast of Trincomalee (Sri Lanka), 610 km south-southeast of Nagappattinam (Tamil Nadu). It further moved north-northwestwards and lay centered at 0830 hrs IST of the 4th March, 2022, over the same region near Lat. 8.9°N / Long. 82.9°E, about 180 km east of Trincomalee (Sri Lanka), 390 km southeast of Nagappattinam (Tamil Nadu). Continuing to move further north-northwestwards it lay centered at 1130 hrs IST of the 4th March, 2022, over the same region near Lat. 9.2°N / Long. 82.8°E. Thereafter, it moved nearly northwards and intensified into a **Deep Depression** and lay centered at 1730 hrs IST of the 4th March, 2022, over the same region near Lat. 10.0°N / Long. 82.7°E, about 220 km northeast of Trincomalee (Sri Lanka), 320 km east southeast of Nagappattinam (Tamil Nadu). It further moved northwards and lay centered at 0830 hrs IST of the 5th March, 2022, over the same region near Lat. 11.4°N / Long. 82.6°E, about 340 km north northeast of Trincomalee (Sri Lanka), 300 km east-northeast of Nagappattinam (Tamil Nadu). It moved nearly northwards till 5th evening (1730 hrs IST) & thereafter, it gradually recurved south-southwestwards and weakened into a **depression** over southwest BoB at 2330 hrs IST of the 05th March near Lat. 11.5°N / Long. 82.4°E. Continuing to move nearly south-southwestwards, it lay centered at 0530 hrs IST of the 06th March, 2022, over the same region near Lat. 11.2°N / Long. 82.2°E, about 310 km north-northeast of Trincomalee (Sri Lanka), 260 km east-northeast of Nagappattinam (Tamil Nadu). It then moved nearly southwestwards and weakened into a **WML** over the same region at 0830 hrs IST of the 06th March, 2022.

2.1.2. Other features observed

The peak maximum sustained surface wind of the deep depression was 50-60 kmph (30 knots) during

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TABLE 1

Brief summary of Cyclonic Storms and Depressions over Indian seas and neighbourhood during 2022

S. No.	Category	Life Period	Place/Time of landfall	Lowest Estimated central Pressure (hPa)	Max. wind Estimated (kts)	Highest "T" No.
1.	Deep Depression	03-06 Mar	Weakened into a well-marked low pressure area over Southwest Bay of Bengal at 0600 UTC of the 6 th March	1002	30	2.0
2.	Deep Depression	20-23 Mar	Crossed Myanmar coast during 0800-0900 UTC near 16° N/94.2° E with maximum sustained wind speed of 30 kt gusting to 40 kt Weakened into a well marked low pressure area over Myanmar at 0300 UTC of 23 rd March	1000	30	2.0
3.	Severe cyclonic storm 'ASANI'	07-12 May	Crossed Andhra Pradesh coast near latitude 16.3° N and longitude 81.3° E between Machilipatnam and Narsapur during 1730-1930 hours IST of 11 th May, 2022 as a deep depression with maximum sustained wind speed of 55-65 kmph gusting to 75 kmph Weakened into a well marked low pressure area over westcentral Bay of Bengal at 0300 UTC of the 12 th May, 2022	982	55	3.5
4.	Depression	20-21 May	Crossed South Myanmar coast close to Mawlamyine (Myanmar) near latitude 16.53° N and longitude 97.46° E between 0800 & 0900 UTC (1330 & 1430 hours IST) of 20 th May, 2022 with maximum sustained wind speed of 45-55 gusting to 65 kmph Weakened into a well marked low pressure area over Northwest Thailand and adjoining Myanmar at 0000 UTC of 21 st May, 2022	998	25	1.5
5.	Depression	16-18 Jul	Weakened into a well marked low pressure area over central parts of north Arabian Sea at 0000 UTC of 18 th July, 2022	992	25	1.5
6.	Depression	09-10 Aug	Weakened into a well-marked low pressure area over Chhattisgarh and adjoining east Madhya Pradesh at 0000 UTC of 10 th August	990	25	-
7.	Depression	12-13 Aug	Weakened into a well marked low pressure area over the northwest & adjoining northeast Arabian Sea at 1200 UTC of 13 th August	990	25	1.5
8.	Depression	14-16 Aug	Crossed West Bengal and adjoining north Odisha coast close to Digha during 0400 and 0500 UTC of 14 th August Weakened into a well-marked low pressure area over central parts of Rajasthan at 1200 UTC of 16 th August	994	25	-
9.	Deep Depression	19-23 Aug	Crossed West Bengal and adjoining North Odisha coasts between Balasore and Sagar Islands, close to Digha during 1330 to 1430 UTC of 19 th August. Weakened into a well marked low pressure area over East Rajasthan and adjoining Northwest Madhya Pradesh at 0300 UTC of 23 rd August	992	30	2.0
10.	Depression	11-12 Sep	Weakened into a well marked low pressure area over southeast Madhya Pradesh & neighbourhood at 0300 UTC of 12 th September	998	25	-
11.	Cyclonic Storm 'SITRANG'	22-25 Oct	Crossed Bangladesh coast between Tinkona and Sandwip close to Barisal during 2100 and 2330 hrs IST of 24 th October Weakened into a well marked low pressure area over northeast Bangladesh and adjoining Meghalaya at 0830 hrs IST of the 25 th October	996	45	2.5
12.	Depression	20-22 Nov	Weakened into a well marked low pressure area over Westcentral and adjoining Southwest Bay of Bengal off South Andhra Pradesh-North Tamilnadu coast at 0300 UTC of 22 nd November	1003	25	1.5
13.	Severe Cyclonic Storm "MANDOUS"	06-10 Dec	Crossed North Tamil Nadu & Puducherry and adjoining south Andhra Pradesh coasts between Puducherry and Sriharikota near latitude 12.6°N and longitude 80.15°E, close to Mamallapuram (Mahabalipuram) during 1800-2000 UTC of 09 th December as a Cyclonic Storm with the maximum sustained wind speed of 35 knots (65-75 kmph gusting to 85 kmph) Weakened into a well marked low pressure area over north interior Tamil Nadu and neighbourhood at 1200 UTC of 10 th December	990	50	3.0
14.	Deep Depression	14-17 Dec	Weakened into a well-marked low pressure area over westcentral Arabian Sea at 1200 UTC of 17 th December	1000	30	2.0
15.	Depression	22-25 Dec	Crossed Sri Lanka coast to the south of Trincomalee during 0800-0900 UTC near 8.35°N/81.4°E Weakened into a well-marked low pressure area over Sri Lanka at 0900 UTC of 25 th December	1004	25	1.5

CYCLONIC STORMS & DEPRESSIONS OVER THE NORTH INDIAN OCEAN DURING 2022

TABLE 2

Storms/Depressions statistics 2022

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	-	-	2	-	1	-	-	2	-	-	1	1	7
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	-	-	-	1	3
Cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Very severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Extremely severe cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Super cyclonic storms	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand total (Nos.)	-	-	2	-	2	-	1	4	1	1	1	3	15

TABLE 3

Ships Observations during 1st January to 31st December, 2022

Call Sign	Date/ Time (UTC)	Position of the Ship		Wind		Pressure PPPP (hPa)
		Lat. (Deg. N)	Long. (Deg. E)	Dir. (Deg.)	Speed (kts)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A) Severe cyclonic storm 'ASANI' over Bay of Bengal (7-12 May)						
9V9404	070600	6.5	90.5	270	14	1004.0
VRL17	070600	5.9	95.1	200	14	1004.5
3FB06	071200	5.4	87.6	300	04	1002.2
A8IY6	071200	5.6	89.8	270	15	1002.0
A8IY6	080000	5.4	86.3	270	30	1004.0
9V8705	080000	5.5	91.6	250	10	1005.0
C6UT5	090300	12.2	88.9	160	30	1000.5
(B) Cyclonic Storm 'SITRANG' over Bay of Bengal (22-25 October)						
No ship data						
(C) Severe Cyclonic Storm 'MANDOUS' over Bay of Bengal (6-10 December)						
VR006	061200	5.9	89.6	250	20	1006.3
VRJR3	070000	6.0	88.1	230	20	1004.1
D5RG3	071200	4.7	89.4	230	22	1006.7
TBWUK	071800	5.5	88.9	-	-	1006.2
VTLD	080000	10.8	86.6	140	30	1001.0
TBWUK78	080300	5.4	86.3	-	-	1005.4
VRJR3	081200	5.8	83.9	260	12	1003.1
VRME7	090300	5.7	86.4	200	18	-

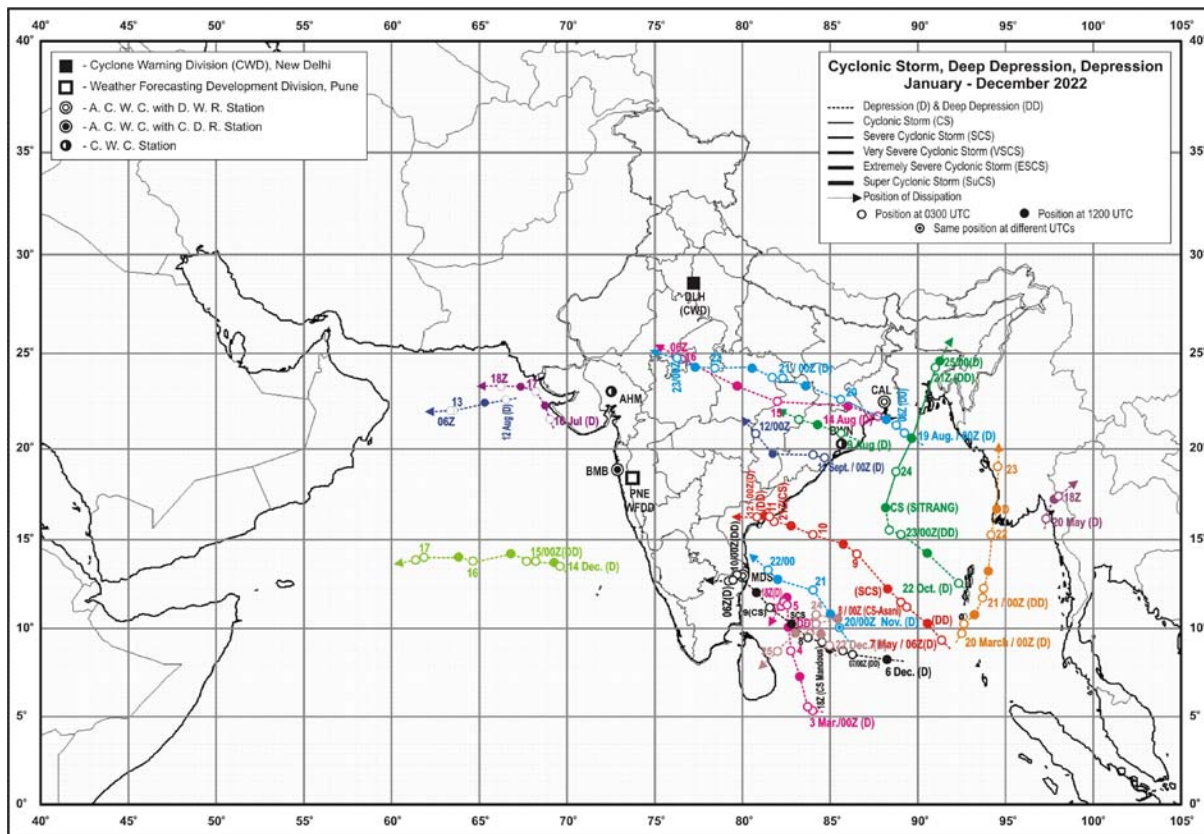


Fig. 1. Tracks of Storms and Depressions during the year 2022

1730 hrs IST of 4th to 1730 hrs IST of 5th March. The lowest estimated central pressure was 1002 hPa during the period with a pressure drop of about 6 hPa at the centre as compared to the surroundings.

2.1.3. *Realized weather*

Under the influence of the deep depression, rainfall occurred mainly over the sea area throughout the life period. However, widespread rainfall with isolated heavy rainfall occurred over eastern Sri Lanka during 3rd and 4th March and light to moderate rainfall over east coastal Sri Lanka occurred on 5th March. Light to moderate rainfall occurred over Tamil Nadu and Puducherry on 4th and 5th March.

2.2. *Deep Depression over southeast Bay of Bengal and adjoining south Andaman Sea (20-23 March, 2022)*

2.2.1. A cyclonic circulation formed over central parts of south BoB & adjoining EIO on 10th March, 2022. It persisted over EIO & adjoining southwest BOB during 13th-15th March. Under the influence of the cyclonic

circulation over EIO and adjoining southwest BoB, a **LOW** formed over the same region with the associated cyclonic circulation extending upto mid tropospheric level on 15th March evening (1730 hrs IST). It lay over central parts of south BoB at 0830 hrs IST of 16th March. It then moved east-northeastwards and lay at 0830 hrs IST of the 17th March over southeast BoB and adjoining east EIO. It moved east-northeastwards and lay over southeast BoB and adjoining south Andaman Sea at 0830 hrs IST of the 18th March. It further moved east-northeastwards and lay as a **WML** over southeast BoB and adjoining south Andaman Sea at 0530 hrs IST of the 19th March. It concentrated into a **Depression** and lay centered at 0530 hrs IST of 20th March, 2022, over southeast BoB and adjoining south Andaman Sea, near Lat. 9.8°N / Long. 92.5°E, about 80 km north-northwest of Car Nicobar (Nicobar Islands) and 210 km south-southwest of Port Blair (Andaman Islands). It moved north-northeastwards and lay centered at 0830 hrs IST of the 20th March over the same region, near Lat. 10.1°N / Long. 92.6°E, about 110 km north-northwest of Car Nicobar (Nicobar Islands). It further moved north-northeastwards and lay centered at 1730 hrs IST of the 20th March, over north Andaman Sea and adjoining

southeast BoB, near Lat. 10.9°N / Long. 93.2°E, about 100 km south-southeast of Port Blair (Andaman Islands). Continuing to move further north-northeastwards, it intensified into a **Deep Depression (DD)** and lay centred at 0530 hrs IST of the 21st March, over the same region, near Lat. 11.9°N / Long. 93.7°E, about 110 km east-northeast of Port Blair (Andaman Islands). Further moving north-northeastwards, it lay centered at 0830 hrs IST of 21st March, over the same region, near Lat. 12.3°N / Long. 93.8°E, about 120 km southeast of Maya Bandar (Andaman Islands). It continued to move north-northeastwards, and lay centered at 1730 hrs IST of 21st March over north Andaman Sea and adjoining southeast & eastcentral BoB, near Lat. 13.3°N / Long. 94.0°E, about 120 km east-northeast of Mayabandar (Andaman Islands). It further moved north-northeastwards, and lay centered at 0530 hrs IST of the 22nd March, over north Andaman Sea and adjoining east central BoB, near Lat. 14.9°N / Long. 94.1°E, about 250 km north-northeast of Mayabandar (Andaman Islands). Thereafter, it moved nearly northwards and lay centered at 0830 hrs IST of the 22nd March, over the same region near Lat. 15.2°N / Long. 94.2°E, about 290 km north-northeast of Mayabandar (Andaman Islands). It continued to move nearly north-northeastwards and crossed Myanmar coast near Lat. 16.0°N / Long. 94.2°E as a DD between 1330 -1430 hrs of 22nd March. IST and lay centered at 1430 hrs IST of the 22nd March, over coastal Myanmar. Continuing to move north-northeastwards, it weakened into a **Depression** and lay centered at 1730 hrs IST of the 22nd March, over coastal Myanmar and adjoining eastcentral BoB near Lat. 16.6°N / Long. 94.4°E. It further moved nearly north-northeastwards and weakened into a **WML** at 0830 hrs IST of the 23rd March, over the same region.

2.2.2. Other features observed

The peak maximum sustained surface wind associated with the deep depression was 50-60 kmph gusting to 70 kmph (30 knots) during 0000 UTC of 21st to 0009 UTC of 22nd March. The lowest estimated central pressure was 1000 hPa during the period with a pressure drop of about 5 hPa at the centre as compared to surroundings.

2.2.3. Realized weather

Under the influence of this system, rainfall occurred mainly over the sea area. However, widespread rainfall occurred over Long Island (13 cm) and Port Blair (5 cm) on 21st March; Coco Island (8 cm) of Myanmar on 22nd March; Nyaungu (6 cm), Sinphyugyun (5 cm), Kyaukphyu (5 cm), Thandwe (6 cm), Maungaung (6 cm) of Myanmar on 23rd March; Pyinoolwin (5 cm), Myingyan (5 cm) of Myanmar on 24th March.

2.3. Severe Cyclonic Storm 'ASANI' over Bay of Bengal (07-12 May, 2021)

2.3.1. A cyclonic circulation formed over South Andaman Sea and neighbourhood at 0530 hrs IST of 4th May. It persisted over the same region during 4th-6th May. Under its influence, a **LOW** formed over south Andaman Sea and adjoining southeast BoB on 6th May morning (0830 hrs IST). It persisted over the same region with the associated cyclonic circulation extending upto mid tropospheric levels. It lay as a **WML** over southeast BoB and adjoining south Andaman Sea on 7th May morning (0830 hrs IST). It moved northwestwards and concentrated into a **Depression** and lay centered at 1130 hrs IST of the 7th May, over the same region near Lat. 9.4°N / Long. 91.3°E, about 170 km west of Car Nicobar (Nicobar Islands). It further moved northwestwards, intensified into a **DD** and lay centered at 1730 hrs IST of the 7th May, over southeast BoB near Lat. 10.2°N / Long. 90.5°E, about 280 km west-northwest of Car Nicobar (Nicobar Islands). Thereafter, it moved west-northwestwards, intensified into a **Cyclonic Storm (CS) 'Asani' (pronounced as Asani)** and lay centered at 0530 hrs IST of the 8th May, over southeast BoB near Lat. 11.3°N / Long. 89.3°E, about 380 km west of Port Blair (Andaman Islands). Continuing to move west-northwestwards, it lay centered at 0830 hrs IST of the 8th May, over the same region near Lat. 11.5°N / Long. 89.0°E, about 400 km west of Port Blair (Andaman Islands). It moved nearly northwestwards, intensified into a **Severe Cyclonic Storm (SCS)** and lay centered at 1730 hrs IST of the 08th May, over the southeast and adjoining eastcentral Bay of Bengal near Lat. 12.3°N / Long. 88.2°E, about 500 km west of Port Blair (Andaman Islands). It moved nearly north-northwestwards and lay centered at 0530 hrs IST of the 09th May, over westcentral and adjoining south BoB, near Lat. 13.9°N / Long. 86.8°E. It then moved nearly northwestwards and lay centered at 0830 hrs IST of the 09th May, over the same region, near Lat. 14.2°N / Long. 86.5°E. It moved northwestwards and lay centered at 1730 hrs IST of the 09th May, over westcentral and adjoining southwest Bay of Bengal near Lat. 14.9°N / Long. 85.8°E. It then moved west-northwestwards and lay centered at 0830 hrs IST of the 10th May, over westcentral Bay of Bengal near Lat. 15.4°N / Long. 84.0°E. It moved west-northwestwards and lay centered at 1730 hrs IST of the 10th May, over westcentral Bay of Bengal near Lat. 15.7°N / Long. 82.8°E. It weakened into a **CS** at 0230 hrs IST of 11th May near Lat. 16.0°N / Long. 81.9°E. It moved west-northwestwards and lay centered at 0530 hrs IST of 11th May, over westcentral Bay of Bengal near Lat. 16.1°N / Long. 81.6°E. It moved further west-northwestwards and lay centered at 1430 hrs IST of 11th May, over the same region near Lat. 16.2°N / Long. 81.4°.

It moved nearly northwards and weakened into a **DD** and lay centered at 1730 hrs IST of 11th May over westcentral BoB close to Andhra Pradesh coast near Lat. 16.3°N / Long. 81.4°E, about 30 km northeast of Machilipatnam (Andhra Pradesh). It crossed Andhra Pradesh coast near latitude 16.3°N and longitude 81.3°E between Machilipatnam and Narsapur during 1730-1930 IST of 11th May, 2022 with maximum sustained wind speed of 55-65 kmph gusting to 75 kmph. It then weakened into a **Depression** over coastal Andhra Pradesh & lay centered at 0530 hrs IST of the 12th May, 2022 near Lat. 16.2°N / Long. 80.9°E, close to west of Machilipatnam. It further weakened into a **WML** over the same region at 0830 hrs IST of the 12th May, 2022 with the associated cyclonic circulation extending upto 7.6 km above mean sea level tilting southwestwards with height.

2.3.2. Other features observed

The estimated maximum sustained wind speed was about 30 knots (50-60 kmph) along and off Andhra Pradesh coast around the centre of the storm during landfall. The High Wind Speed Recorder at IMD, Machilipatnam reported peak wind speed of 30 knots (55 kmph) at 2056 hrs IST of 11th May during landfall.

2.3.3. Realized Weather

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

11 May, 2022

Coastal : Narsipatnam, Kavali,
Andhra Visakhapatnam, Kandukur,
Pradesh & Bapatla, Mentada, Pusapatirega &
Yanam Gantayada 7 each

Rayalaseema : Duvvur 11, Chapad 8, Cuddapah,
Vallur & Proddutur 7 each

Odisha : Anandpur & Ghasipura 7 each

12 May, 2022

Coastal : Kandukur 26, Atmakur 20,
Andhra Bestavaripeta 13, Kavali & Ongole
Pradesh & 12 each, Racherla & Cumbum 11
Yanam each

Rayalaseema : Badvel 8 and Atlur 7

2.4. Depression over Gulf of Martaban and adjoining Myanmar (20-21 May, 2021)

2.4.1. Under the influence of the cyclonic circulation over Gulf of Martaban and adjoining Myanmar, a **LOW** formed over the same region on 19th May evening (1730 hrs IST) with the associated cyclonic circulation extending upto mid tropospheric level. It lay as a **WML** over the same region on 20th May morning (0830 hrs IST). It intensified into a **Depression** over Gulf of Martaban & adjoining Myanmar and lay centered at 0830 hrs IST of the 20th May, 2022 near Lat. 16.2°N / Long. 97.3°E, about 40 km southwest of Mawlamyine (Myanmar). It moved north-northeastwards and lay centered at 1130 hrs IST of the 20th May, 2022 over Gulf of Martaban close to south Myanmar coast near Lat. 16.4°N / Long. 97.4°E, about 20 km west-southwest of Mawlamyine (Myanmar), 140 km east-southeast of Yangon (Myanmar) and 720 km northeast of Port Blair (Andaman Islands). It crossed south Myanmar coast close to Mawlamyine (Myanmar) near Lat. 16.53°N / Long. 97.46°E between 1330 and 1430 hrs IST of the 20th May, 2022 and lay centered at 1730 hrs IST of the 20th May, 2022 over south coastal Myanmar and adjoining Thailand near Lat. 17.1°N / Long. 97.8°E, about 70 km north-northeast of Mawlamyine (Myanmar). It then moved north-northeastwards and weakened into a **WML** over northwest Thailand and adjoining Myanmar at 0530 hrs IST of the 21st May, 2022.

2.4.2. Other features observed

The system crossed South Myanmar coast close to Mawlamyine (Myanmar) near Lat. 16.53°N / Long. 97.46°E between 1330 & 1430 hours IST (0800 & 0900 UTC) of 20th May, 2022 with maximum sustained wind speed of 45-55 gusting to 65 kmph. The lowest estimated central pressure was 998 hPa during 1430-1730 IST of 20th May with a pressure drop of about 4 hPa at the centre as compared to surroundings.

2.4.3. Realized weather

Under the influence of depression, widespread rainfall occurred mainly over the sea area, Myanmar and adjoining Thailand.

2.5. Depression over northeast Arabian Sea off Saurashtra coast (16-18 July, 2022)

2.5.1. A cyclonic circulation lay over northeast AS and adjoining coastal areas of Gujarat extending upto 5.8 km above mean sea level (m.s.l.) on 14th July evening (1730 hrs IST). Under its influence, a **LOW** formed over the same region on 15th July morning (0830 hrs IST). It

then lay as a **WML** over northeast AS and adjoining coastal areas of Saurashtra and Kutch with the associated cyclonic circulation extending upto 7.6 km above m.s.l. It intensified into a **Depression** over northeast AS off Saurashtra coast and lay centered at 0830 hrs IST of the 16th July, 2022 near Lat. 21.6°N / Long. 69.0°E, about 70 km west of Porbandar (Gujarat). It then moved north-northwestwards and lay centered at 1730 hrs IST of the 16th July, 2022 over the same region near Lat. 22.1°N / Long. 68.8°E, about 110 km west-northwest of Porbandar (Gujarat), 50 km southwest of Okha (Gujarat). It then moved west-northwestwards and lay centered at 0830 hrs IST of the 17th July, 2022 over the same region near Lat. 23.0°N / Long. 68.2°E, about 80 km west-southwest of Naliya (Gujarat) which moved nearly westwards and weakened into a **WML** at 0530 hrs IST of the 18th July, 2022 over central parts of north AS.

2.5.2. Other features observed

The peak maximum sustained surface wind of the depression was 45-50 kmph (25 knots). The lowest estimated central pressure was 992 hPa during the period with a pressure drop of about 4 hPa at the centre as compared to surrounding.

2.5.3. Realized weather

Under the influence of depression, widespread rainfall occurred mainly over the sea area.

2.6. Depression over coastal Odisha and neighbourhood (9-10 August, 2022)

2.6.1. Under the influence of the cyclonic circulation over northwest BoB and neighbourhood, a **LOW** formed over northwest BoB off Odisha - West Bengal coasts on 6th August evening (1730 hrs IST). It lay as a **WML** over northwest and adjoining westcentral BoB off Odisha and adjoining north Andhra Pradesh coasts with the associated cyclonic circulation extending upto 7.6 km above m.s.l. tilting southwestwards with height on 7th August morning (0830 hrs IST). It moved slowly west-northwestwards, concentrated into a **Depression** and lay centered at 0830 hrs IST of the 9th August, 2022, over coastal Odisha and neighbourhood near Lat. 20.8°N / Long. 85.6°E, about 70 km north-northwest of Bhubaneswar (Odisha). It further moved west-northwestwards and lay centered at 1730 hrs IST of the 09th August, 2022 over interior Odisha near Lat. 21.2°N / Long. 84.2°E about 30 km southeast Sambalpur (Odisha). It continued to move west-northwestwards and lay centered at 2330 hrs IST of the 9th August, 2022 over interior Odisha and adjoining Chhattisgarh near Lat. 21.5°N / Long. 83.3°E, about 70 km west of

Sambalpur (Odisha). It weakened into a **WML** at 0530 hrs IST of the 10th August, 2022, over Chhattisgarh and adjoining east Madhya Pradesh with associated cyclonic circulation extending upto 5.8 km above m.s.l.

2.6.2. Other features observed

The peak maximum sustained surface wind speed of the depression was 40-50 kmph (25 knots) during 0830-1730 IST of 9th August with lowest estimated central pressure of 990 hPa during the period and a pressure drop of about 4 hPa at the centre as compared to surroundings.

2.6.3. Realized Weather

The system caused vigorous rainfall activity during 8th to 11th August over Odisha, Chhattisgarh, Madhya Pradesh and adjoining Madhya Maharashtra & Telangana.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

8 August, 2022

Odisha : Barmul 23, Padmapur 18, Tikabali & R Guda 14 each, Jaipatna, Nuagada, Raikia & Hindol 12 each, Astaranga, Puri, Brahmagiri, Sankheimundi & Daspalla 11 Each, Ranpur, Sonepur & Satyabadi 10 each, Naugaon, Dharakote, Odagaon, Kendrapara, Pipili, Aska, Polsara, Kendrapada & Daringibadi 9 each, G Udayagiri, Bhapur, Aul, Kakatpur, Chandbali, Gania, Kotpad, Bolagarh, Kalinga, Narsinghpur & Mundali 8 each, Sorada, Banki, Chakapad, Khandapara, Marsaghai, Akhuapada, Khajuripada, Dhenkanal & Tentulikhunti 7 each

Coastal Andhra : Koyyalagudem 8, Palasa 7
Pradesh &
Yanam

Telangana : Aswaraopeta & Wankdi 9 each, Aswaraopet (A), Thollada, Manthani, Julurpad & Kotapalle 8 each, Mulug, Bejjur, Kothaguda, Kothagudem, Bijjur, Peddapalle & Palakurthi 7 each

9 August, 2022

Odisha : Dabugan 23, Kotpad, Papadahandi, Pottangi & Kosagumda 15 each, Junagarh & Nawarangpur 14 each, Mathili 13, Aska, Kalampur & Dharakote 11 each, Nawarangpur, Malkangiri & Narla 10 each, Nandahandi & Borigumma 9 each, Jaipatna, Bhawanipatna & R. Udaigiri 8 each, Lanjigarh, Dharmagarh, Similiguda, Koksara, Kotagarh & Tentulikhunti 7 each

Chhattisgarh : Katekalyan 36, Bastanar & Bijapur 20 each, Chhindgarh 18, Usoor & Pakhanjur 15 each, Darbha, Gidam & Konta 14 each, Lohandiguda 12, Tokapal, Kuakonda, Dantewara & Jagdalpur 10 each, Sukma, Bhairamgarh & Deobhog 9 each, Durg & Balrampur 8 each, Bhopalpatnam 7

Coastal Andhra Pradesh & Yanam : Chintapalle 10

Telangana : Bijjur 11, Bejjur 10, Julurpad, Asifabad & Perur 9 each, Venkatapuram, Peddapalle, Sathupalle, Asifabad & Venkatapur 8 each, Gandeed, Doma, Eturnagaram, Jammikunta, Rudrur (A), Tadwai & Aswaraopeta 7 each

10 August, 2022

Odisha : Kosagumda & Bhapur 16 each, Chhatrapur, Nuagada & Sankheimundi 14 each, Patrapur & Ganjam 13 each, Kukudahandi 12, Berhampur, Sheragada, Ambadola, Banki, Narla, Digapahandi & Kotagarh 11 each, Kotpad, Muniguda, Khandapara, Belgaon, Purushottampur, Bhawanipatna, Madanpur Rampur & Dhenkanal 10 each, Mohana, Dabugan, R. Udaigiri & Dharakote 9 each, Daspalla, Phiringia, Aska, Kotraguda, Lanjigarh, Soro, Bhanjagar, Sinapali,

Bhubaneswar Aero, Dharmagarh & Titlagarh 8 each, Gudari, Hindol, Sorada, Komna, Bolangir, Bissem Cuttack, Khajuripada, Polsara, Deogaon, Mundali, Gania, Kodala, Th Rampur & Kesinga 7 each

Vidarbha : Bhandara 14, Bramhapuri 13, Sadakarjuni, Washim & Narkheda 10 each, Armori, Mulchera & Bhiwapur 9 each, Mohadi & Desaiganj 8 each, Kuhi, Saoli, Gadchiroli, Gondpipri, Pauni, Dhanora, Mul, Malegaon, Bhamragad, Nagbhir, Lakhani, Deori & Ahiri 7 each

Chhattisgarh : Bhairamgarh 16, Bakavand 10, Katekalyan 10, Arang 9, Darbha, Pakhanjur, Mana Raipur Ap & Dhamtari 8 each, Gurur, Magarlod, Nagari, Bijapur & Bastanar 7 each

Telangana : Wankdi 9, Kerameri 7

East Madhya Pradesh : Amarwara & Lakhnadon 7 each

Madhya Maharashtra : Radhanagari 20, Mahabaleshwar Imd Obsy 19, Gaganbawada 18, Shahuwadi 15, Lonavalaagri 14, Chandgad 11, Velhe 8, Chopda, Patan & Kagal 7 each

11 August, 2022

Odisha : Jamankira 15, Lakhanpur 14, Sambalpur 13, Dhankauda 12, Bijepur, Burla & Angul 11 each, Raighar, Reamal, Th Rampur, Naktideul, Banki, Salebhata, Hirakud, Chendipada, Dunguripalli & Banarpal 9 each, Bhadrak, Sinapali, Karlamunda, Ambabhona, Thakurmunda, Bamra, Jharbandh, Laikera, Jujumura & Saintala 8 each, Athmalik, Rairakhol, Daspalla, Bhandaripokhari, Sohela, Jajpur, Kamakhyanagar, Barmul & Chandikhol 7 each

East Madhya Pradesh : Gadarwara 17, Barghat 16, Sausar & Mohkheda 12 each, Bichhua

11, Kirnapur, Tirodi, Lalburra & Chindwara AWS 10 Each, Chand, Birsa & Kurai 9 each, Chauri, Lanji, Kareli & Umreth 8 each, Waraseoni, Pandhurna, Seoni & Baihar 7 each

West Madhya Pradesh : Hatpiplaya 15, Sonkatch, Timarni & Bareli 13 each, Agar & Khilchipur 12 each, Betul, Kolar, Indore, Khirkiya, Badi & Barod 11 each, Babai (Makhan Nagar), Bankhedi, Depalpur, Rajgarh & Godadongri 10 each, Multai, Barwaha, Shahpur, Sultanpur, Harda & Gautampura 9 each, Zirapur, Bhopal Arera Hills, Udaipura, New Harsud, Dolariya, Goharganj, Dhar, Pipariya, Sohagpur, Bagli, Petlawad & Pachmarhi 8 each, Raoti, Bhimpur, Khargone, Mahidpur, Ratlam AWS, Udainagar, Budhni, Sailana, Nagda, Jharda, Ghatiya, Alot & Narmadapuram 7 each

2.7. Depression over northeast Arabian Sea (12-13 August, 2022)

2.7.1. A **LOW** formed over Saurashtra and adjoining northeast AS with the associated cyclonic circulation extending upto 5.8 km above m.s.l. on 10th August morning (0830 hrs IST). It lay as a **WML** in the morning (0830 hrs IST) of 11th August with the associated cyclonic circulation extending upto 7.6 km above m.s.l. It lay over northeast AS and adjoining coastal areas of Saurashtra, Kutch and southeast Pakistan on 12th August morning (0830 hrs IST). It then concentrated into a **Depression** over northeast AS and lay centered at 0830 hrs IST of the 12th August, 2022 near Lat. 22.5°N / Long. 66.5°E, about 260 km west-southwest of Naliya (Gujarat). It then moved westwards and lay centered at 1730 hrs IST of the 12th August, 2022 over northeast and adjoining northwest AS near Lat. 22.4°N / Long. 65.2°E, about 340 km southwest of Karachi (Pakistan). It continued to move westwards and lay centered at 0530 hrs IST of the 13th August, 2022, over northwest and adjoining northeast AS near Lat. 22.2°N / Long. 63.7°E, about 540 km west-southwest of Naliya (Gujarat). It further moved westwards and lay centered at 0830 hrs IST of the 13th August, 2022, over the same region near

Lat. 22.1°N / Long. 63.6°E, about 560 km west-southwest of Naliya (Gujarat) & weakened into a **WML** at 1730 hrs IST of the 13th August, 2022, over the northeast and adjoining northwest AS with the associated cyclonic circulation extending upto mid tropospheric level.

2.7.2. Other features observed

The peak maximum sustained surface wind speed was 40-50 kmph (25kt) with the lowest central pressure of 990 hPa during the period and a pressure drop of about 4 hPa at the centre as compared to surroundings.

2.7.3. Realized Weather

In conjunction with another low pressure area over Saurashtra and adjoining area, heavy rainfall at a few places occurred over Saurashtra and north Konkan on 11th August. However, due to low pressure system and depression over the region, the heavy rainfall was realized over northeast Arabian Sea. The system did not cause rainfall activity over Indian land mass, as the system moved away from the Indian region.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented.

12 August, 2022

East Rajasthan : Aklera 13, Mandana Sr 12, Bhainsroadgarh Sr 11, Bijoliya 10, Manohar Thana & Sangod 8 each, Ramganjmandi & Pirawa 7 each

West Madhya Pradesh : Biaora 22, Ashoknagar Aws 18, Rajgarh 13, Khilchipur & Narsingarh 12 each, Neemuch Aws 11, Zirapur 10, Bamori, Ganjbasoda & Jawad 8 each, Mungaoli, Malhargarh, Shyampur, Manasa, Guna Aws, Nateran & Chanderi 7 each

East Madhya Pradesh : Badamalhera 18, Birsa 12, Simariya 11, Pawai, Jaitpur & Hatta 10 each, Bijawar 9, Lalburra & Shahpura 8 each, Malanjkhanda, Patan, Bakal, Batiyagarh & Bina 7 each

Saurashtra & Kutch : Porbandar 8, Mandvi 7

2.8. Depression over Bay of Bengal (14-16 August, 2022)

2.8.1. Under the influence of cyclonic circulation over northeast Bay of Bengal (BoB), a **LOW** formed over north BoB with associated cyclonic circulation extending upto 7.6 km above m.s.l. tilting southwards with height on 13th. It lay as a **WML** over northwest BoB off north Odisha and West Bengal coasts at 1730 hrs IST of the 13th August. It then moved slightly west-northwestwards, concentrated into a **Depression** and lay centered at 0830 hrs IST of the 14th August over northwest BoB and adjoining coastal areas of West Bengal and north Odisha near Lat. 21.7°N / Long. 87.8° E, about 10 km southeast of Digha (West Bengal) and 90 km east-northeast of Balasore (Odisha). It then moved west-northwestwards and crossed West Bengal & adjoining north Odisha coasts close to Digha between 1030 IST and 1130 IST and lay centered at 1130 hrs IST of the 14th August over coastal West Bengal and adjoining north Odisha near Lat. 21.9°N / Long. 87.5°E about 20 km west of Digha (West Bengal) and 70 km east-northeast of Balasore (Odisha). It continued to move west-northwestwards and lay centered at 1730 hrs IST of the 14th August over south Jharkhand and adjoining north Odisha near Lat. 22.1°N / Long. 86.0°E about 80 km south-southwest of Jamshedpur (Jharkhand) and 70 km north-northeast of Keonjhar (Odisha). It then moved west-northwestwards and lay centered at 0530 hrs IST of the 15th August over north Chhattisgarh and neighborhood near Lat. 22.4°N / Long. 82.8°E, close to Korba (Chhattisgarh) and 100 km east-southeast of Pendra Road (Chhattisgarh). It further moved west-northwestwards and lay centered at 0830 hrs IST of 15th August over northwest Chhattisgarh and adjoining east Madhya Pradesh near Lat. 22.6°N / Long. 82.0°E, about 20 km southwest of Pendra Road (Chhattisgarh). It continued to move west-northwestwards and lay centered at 1130 hrs IST of the 15th August over east Madhya Pradesh and adjoining Chhattisgarh near Lat. 22.8°N / Long. 81.1°E, about 80 km west of Pendra Road (Chhattisgarh). It further moved west-northwestwards and lay centered at 1730 hrs IST of the 15th August over east Madhya Pradesh near Lat. 23.3°N / Long. 79.8°E, about 20 km northwest of Jabalpur (Madhya Pradesh). It then moved west-northwestwards and lay centered at 0530 hrs IST of the 16th August over west Madhya Pradesh near Lat. 24.6°N / Long. 77.3°E, close to Guna (Madhya Pradesh) and 160 km east-southeast of Kota (Rajasthan). It then moved nearly westwards and lay centered at 0830 hrs IST of the 16th August over east Rajasthan and adjoining west Madhya Pradesh near Lat. 24.7° N / Long. 76.5°E, about 80 km southeast of Kota (Rajasthan). It then moved west-northwestwards and weakened into a **WML** over central parts of Rajasthan at 1730 hrs IST of the 16th August.

2.8.2. Other features observed

System crossed West Bengal and adjoining north Odisha coast close to Digha during 0400 and 0500 UTC on 14th August. The peak maximum sustained surface wind speed was 40-50 kmph (25kts) with the lowest central pressure of 994 hPa during the period and a pressure drop of about 4 hPa at the centre as compared to surroundings.

2.8.3. Realized Weather

The system caused heavy to extremely heavy rainfall over various sub-divisions along the track of the depression over Odisha, Chhattisgarh, Madhya Pradesh, south Rajasthan and adjoining areas of Vidarbha and Maharashtra and Gujarat Region during 14th to 17th August.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

14 August, 2022

Odisha	: Hemgiri 20, Astaranga & Rajgangpur 17 each, Sundargarh, Banki, Phiringia, Tangarpali, Dhankauda & Lephripura 16 each, Balikuda & Sambalpur 15 each, Gop 14, Tirtol, Naugaon, Alipingal, Binika, Burla & Nawana 13 each, Jagatsinghpur, Kakatpur, Kantapada & Niali 12 each, Mandira Dam, Biridi, Telkoi & Hirakud 11 each, R. Udaigiri, Banpur, Raghunathpur, Jagannath Prasad, Lakhanpur, Balisankara, Krishnaprasad & Kotpad 10 each, Puri, Deogaon, Paradeep Cwr, Kusumi, Tensa, Koraput, Josphipur, Jhumpura, Nh 5 Gobindpur, Bargarh, Binjharpur, Bargaon, Harichandanpur, Banspal & Belpada 9 each, Kankadahad, Rajnagar, Dhenkanal Pto, Sukruli, Keonjhar, Jharsuguda, Phulbani, Narsinghpur, Bijepur, Raruana, Odagaon, Jujumura, Tikarpara, K Nuagaon & Kujanga-8 each, Kosagumda, Atabira, Ullunda, Ambabhona, Altuma, Chandrapur, Remuna, Nawarangpur, Bonth, Satyabadi, Garadapur, Sohela, Ghatagaon,
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Thakurmunda, Nuagada, Khordha Pto, Athgarh, Batli, Panposh, Joda, Similiguda, Kendrapara, Nawarangpur Pto, Hatadihi, Derabis, Tigiria, Jaleswar, Talcher, Kutra, Brahmagiri, Barpalli, Nimpara & Jharbandh 7 each

Jharkhand : Bano Simdega 8

Chhattisgarh : Seovrinarayan, Baloda Bazar & Pamgarh 15 each, Bilaigarh, Gidam, Pusaur, Kashdol, Sarangarh & Raigarh 9 each, Ambikapur, Mahasamund & Darbha 8 each, Bhatapara, Dhabhara, Bastanar, Pakhanjur, Bhairamgarh, Basana, Bastar & Pithora 7 each

East Madhya Pradesh : Hanumana 9, Niwas, Bijadandi & Jabalpur 7 each

West Madhya Pradesh : Shivpuri 21, Pohri 18, Karhal 16, Karera 9, Pathari 8, Sheopur 7

15 August, 2022

Chhattisgarh : Bhanupratappur, Narayanpur & Makadi 19 each, Pakhanjur 18, Chhuria & Pusaur 17 each, Raigarh, Jagdalpur & Bastar 16 each, Bijapur, Antagarh & Darbha 15 each, Keshka, Kanker, Pharasgaon & Bakavand 14 each, Charama, Durgkondal, Mohla, Bastanar & Doundi 13 each, Dongargarh, Ambagarh Chowki, Dongargaon, Baderajpur, Kondagaon, Pali & Manpur 12 each, Lohandiguda & Dhamtari 11 each, Magarlod, Sarangarh, Kharsiya & Rajim 10 each, Tamnar, Tokapal, Katghora, Orcha, Dhabhara, Chhura, Dondilohara & Mahasamund 9 each, Balod, Baramkela, Malkharoda, Dantewara, Gurur & Bagbahara 8 each, Nerharpur, Bhairamgarh, Gariabund, Nagari, Kurud, Pithora, Katekalyan, Lailunga, Kusmi, Seovrinarayan, Korba, Bilaspur, Jajaiapur,

Jashpurnagar, Kuakonda, Saraipali & Gundardehi 7 each

East Madhya Pradesh : Paraswada 20, Kirnapur 18, Malanjkhanda 17, Lanji 16, Balaghat Aws 14, Tamia & Waraseoni 13 each, Lalburra & Mandla 12 each, Baihar, Niwas, Birsa, Tirodi & Bichhia 11 each, Pushprajgarh & Kesli 10 each, Bijadandi, Kurai, Nainpur, Gadarwara & Raipura 9 each, Katangi, Amarpur, Jaisinagar, Rahatgarh, Narayanganj & Parasia 8 each, Sagar, Umreth, Gotegaon, Seoni, Deori, Mawai, Patera, Harrai & Junnardeo 7 each

West Madhya Pradesh : Pipariya 25, Pachmarhi 17, Begumganj 15, Sohagpur & Bareilly 4 each, Udaipura 13, Bankhedi 12, Gairatgang 11, Badi 10, Salwani & Raghogarh 9 each, Pathari 8, Kumbhraj, Deori & Raisen 7 each

Vidarbha : Salekasa 24, Amgaon 22, Goregaon 19 & Deori 19 each, Sadakarjuni 17, Gondia & Korchi 16 each, Arjuni Morgaon 14, Kurkheda, Tirora, Gondia Ap & Sakoli 12 each, Mohadi 11, Etapalli 10, Ahiri, Tumsar, Mulchera & Lakhani 9 each, Desaignaj, Mauda, Kuhi, Armori, Pombhurna, Ramtek & Bramhapuri 7 each

Odisha : Th Rampur 37, Kotpad 29, K Nuagaon 23, Kalampur 22, Dabugan, Baliguda & Batagaon 21 each, Madanpur Rampur 20, Papadahandi & Mandira Dam 19 each, Rajgangpur, Lanjigarh, Jaipatna, Phiringia & Borigumma 18 each, Ambabhona, Ambadola, Kosagumda, Bhawanipatna, Narla, Gudvela, Nawarangpur, Bamra & Nawarangpur Pto 17 each, Chakapad & Jharsuguda 16 each, Kashipur, Nandahandi, Boudhgarh, Tikabali, Sohela, Tentulikhunti & Karlamunda 15 each, Junagarh, Kotagarh, Hemgiri, Dharmagarh & Kutra

14 each, Laikera, Belgaon, Jeypore, Jhorigam, Muniguda & Umarkote 13 each, Kirmira, Barkote, Athmalik, Lakhanpur, Raikia & Jamankira 12 each, Kuchinda, Naktideul, Kolabira, Deogarh, Rajkishorenagar, Deogaon, Kotraguda, Kolnara, Bargaon, Phulbani & Batli 11 each, Lephripara, Bargarh, Kalinga, G Udayagiri & Koksara 10 each, Gurundia, Deogaon, Rairakhol, Chandahandi, Daringibadi, Champua, Koraput, Kesinga, Tangarpali, Similiguda, Lathikata, Bissem-Cuttack & Burla 9 each, Jujumura, Atabira, Reamal, Hirakud, Raigarh, Dhenkanal Pto, Balisankara, Titlagarh, Nischintakoili & Rengali 8 each, Banaigarh, Gaisilet, Padampur, Bhograi, Sambalpur, Sundargarh, Binjharpur, Joda, Bolangir, Bijepur, Panposh, Lamataput, Kantamal, Rayagada Pto, Mathili, Jajpur & Jaleswar 7 each

16 August, 2022

West Madhya Pradesh : Dhundhadaka 19, Shamshabad & Narsingarh 18 each, Gairatgang & Raisen Aws 17 each, Begumganj 16, Sehore Aws 15, Nateran, Pachmarhi, Vidisha, Barod & Pipariya 14 each, Khilchipur, Jaora, Badi, Bhopal Arera Hills, Navibagh Aet, Suvasara, Chachoda, Bareli, Ashoknagar Aws & Kolar 13 each, Dolariya, Bairagarh Airport, Budhni, Susner, Pachore, Goharganj, Piploda & Shyampur 12 each, Udaipura, Kalapipal, Bhimpur, Jawad, Mandsaur Aws, Ichhawar & Berasia 11 each, Sohagpur, Biaora, Deori, Aron, Sultanpur, Shahpur, Godadongri, Agar & Sarangpur 10 each, Sitamau, Shamgarh, Ganjbasoda, Gulabganj, Kayampur, Garoth, Shujalpur, Narmadapuram & Salwani 9 each, Nasrullahganj, Rehti, Bankhedi, Mungaoli, Bajna, Alot, Moman Badodiya, Gwalior & Sironj 8

each, Multai, Pathari, Lateri, Jharda, Chanderi, Itarsi, Rajgarh, Chicholi, Ashta Aws, Babai (Makhan Nagar), Mahidpur, Karera, Tal, Sailana & Seoni Malwa 7 each

East Rajasthan : Bhungra Sr 18, Dug 17, Mounntabu Tehsil Sr 12, Pipalkhunt Sr & Asnawar Sr 10 each, Arnod Sr, Pira wa, Gangdhar Sr, Jagpura Sr & Garhi 9 each, Manohar Thana & Jhalarpatan Sr 8 each, Sheoganj 7, Khushalgarh, Ghatol, Jhalawar, Mandrayal Sr & Pratapgarh 7 each

West Rajasthan : Sayla Sr 8

Gujarat Region : Palsana 22, Vyara 20, Ukai 18, Dolvan & Bardoli 17 each, Songadh 15, Mandvi & Mahuva 13 each, Valod 12, Navasari Aws, Navsari, Khanvel, Madhbun & Umerpada 11 each, Dantiwada & Meghraj 10 each, Jalalpor, Surat Kvk Aws, Dharampur, Daman Arg, Surat City & Daman Fmo 9 each, Daman, Kaprada, Subir, Surat Aws, Choryasi, Silvassa & Deesa 8 each, Dangs (Ahwa) & Vandsa 7 each

Saurashtra & Kutch : Kodinar 8, Kandla New 7

17 August, 2022

West Madhya Pradesh : Alot 16, Tal 14, Jaora 10, Piploda, Bajna, Barod & Zirapur 8 each

East Rajasthan : Arnod Sr & Mountabu Tehsil Sr 17 each, Dug 16, Kotda Sr & Abu Road Sr 13 each, Sabla Sr 12, Sheoganj, Pratapgarh & Pindwara 11 each, Chikali Sr, Gangdhar Sr & Aspur 10 each, Nithuwa Sr 9, Bakani Sr, Salumber, Phagi & Dhariabad 8 each, Jagpura Sr, Reodar Sr, Pirawa & Sarara 7 each

West Rajasthan : Sumerpur 10, Erinpura/Jawai Dam & Raniwada 8 each, Jaswantpura 7

Gujarat Region : Songadh 19, Khergam & Dantiwada 16, Vadgam, Poshina & Khanvel 15 each, Mahesana, Danta, Deodar & Siddhpur 14 each, Deesa, Dharampur, Satlasana, Daman, Madhbun, Nanipalson & Amirgadh 13 each, Kaprada, Umerpada, Dahegam, Chikhli, Vapi, Daman Fmo, Pardi & Idar 12 each, Becharaji, Vadali, Palanpur, Dhanera, Dolvan & Valsad 11 each, Kankrej, Silvassa, Valsad Kvk Aws & Navsari 10 each, Visnagar, Chhota Udepur, Dehgamarg, Dangs (Ahwa), Unjha & Jalalpor 9 each, Kheralu, Dharoi Colony, Mandvi, Bhiloda, Kamrej, Mahuva & Chanasma 8 each, Wav, Lakhani, Bayadarg, Navasariaws, Palsana, Sagbara, Santrampur, Vijaynagar, Vansda, Umernagar, Lunawada, Bayad, Ukai & Valod 7 each.

Saurashtra & Kutch : Dayaparaws 10, Sutrapada & Lakhpat 8 each

2.9. Deep depression over Northwest and adjoining northeast Bay of Bengal (19-23 August, 2021)

2.9.1. Under the influence of the cyclonic circulation over south Myanmar and neighbourhood, a **LOW** formed over northeast and adjoining areas of eastcentral BoB & adjoining Bangladesh-Myanmar coasts at 0530 hrs IST of the 18th August with the associated cyclonic circulation extending upto 7.6 km above m.s.l. It then moved northwestwards and lay as a **WML** over northeast BoB and adjoining southeast Bangladesh coast on 18th August afternoon (1730 hrs IST). Continuing to move further northwestwards, it concentrated into a **Depression** and lay centered 0530 hrs IST of the 19th August, 2022, over northwest and adjoining northeast BoB near Lat. 20.5°N / Long. 89.7°E, about 210 km east-southeast of Sagar Islands. It then moved west-northwestwards and lay centered at 0830 hrs IST of the 19th August, 2022 over northwest and adjoining northeast BoB near Lat. 20.8°N / Long. 89.2°E, about 150 km southeast of Sagar Islands (West Bengal). Thereafter, it moved northwestwards, intensified into a **DD** and lay centered at 1130 hrs IST of the 19th August, 2022 over northwest and adjoining northeast BoB near Lat. 21.1°N / Long. 88.8°E, about 100 km southeast of Sagar Islands (West Bengal) and 120 km south-southeast

of Canning (West Bengal). It then moved west-northwestwards and lay centered at 1730 hrs IST of the 19th August, 2022 over northwest BoB near Lat. 21.5°N / Long. 88.1°E, about 20 km south of Sagar Islands (West Bengal). It continued to move west-northwestwards and crossed West Bengal and adjoining north Odisha coasts between Balasore and Sagar Islands, close to Digha during 1900 to 2000 hrs IST of 19th August, 2022. It further moved west-northwestwards and lay centered at 0530 hrs IST of the 20th August, 2022 over south Jharkhand and adjoining north Odisha, West Bengal near Lat. 22.5°N / Long. 86.0°E, about 40 km south-southwest of Jamshedpur (Jharkhand). Continuing to move further west-northwestwards, it lay centered at 0830 hrs IST of the 20th August, 2022 over south Jharkhand and adjoining north Odisha near Lat. 22.7°N / Long. 85.6°E, about 60 km west-southwest of Jamshedpur (Jharkhand). It moved west-northwestwards and lay centered at 1130 hrs IST of the 20th August, 2022 over southwest Jharkhand and adjoining northwest Odisha and north Chhattisgarh near Lat. 22.8°N / Long. 84.8°E, about 150 km west of Jamshedpur (Jharkhand). It then moved west-northwestwards and lay centered at 1730 hrs IST of the 20th August, 2022 over north Chhattisgarh and adjoining Jharkhand near Lat. 23.3°N / Long. 83.6°E, about 30 km east-northeast of Ambikapur (Chhattisgarh). It continued to move west-northwestwards, weakened into a **Depression** and lay centered at 0530 hrs IST of the 21st August, 2022 over the same region near Lat. 23.6°N / Long. 82.1°E, about 120 km west-northwest of Ambikapur (Chhattisgarh). It further moved west-northwestwards and lay centered at 0830 hrs IST of the 21st August, 2022 over northwest Chhattisgarh and adjoining northeast Madhya Pradesh near Lat. 23.8°N / Long. 81.7°E, about 80 km east-northeast of Umariya (Madhya Pradesh). It further moved west-northwestwards and lay centered at 1130 hrs IST of the 21st August, 2022 over northeast Madhya Pradesh near Lat. 24.0°N / Long. 81.2°E, about 60 km north-northeast of Umariya (Madhya Pradesh). It moved west-northwestwards and lay centered at 1730 hrs IST of the 21st August, 2022 over northeast Madhya Pradesh near Lat. 24.2°N / Long. 80.5°E, about 50 km south-southeast of Satna (Madhya Pradesh). It then moved westwards and lay centered at 0530 hrs IST of the 22nd August, 2022 over central parts Madhya Pradesh and adjoining south Uttar Pradesh near Lat. 24.4°N / Long. 78.8°E, about 60 km north of Sagar (Madhya Pradesh). It further moved nearly westwards and lay centered at 0830 hrs IST of the 22nd August, 2022 over northwest Madhya Pradesh and adjoining southwest Uttar Pradesh near Lat. 24.3°N / Long. 78.4°E, about 60 km north-northwest of Sagar (Madhya Pradesh). It moved nearly westwards and lay centered at 1730 hrs IST of the 22nd August, 2022 over northwest Madhya Pradesh and adjoining east Rajasthan near Lat. 24.4°N / Long. 77.4°E, about 20 km

south-southeast of Guna (Madhya Pradesh). moving further westwards, it weakened into a **WML** over east Rajasthan and adjoining northwest Madhya Pradesh at 0830 hrs IST of 23rd August with the associated cyclonic circulation extending upto 7.6 km above m.s.l. tilting southwards with height.

2.9.2. Other features observed

It crossed West Bengal and adjoining North Odisha coasts between Balasore and Sagar Islands, close to Digha during 1900 to 2000 hrs IST of 19th August, 2022. The peak maximum sustained wind speed of the system was 50-60 kmph (30 knots) during 1730 hrs IST of 19th August to 2330 hrs IST of 20th August.. The lowest estimated central pressure (ECP) was 992 hPa during the period with a pressure drop of about 6 hPa at the centre as compared to the surroundings.

2.9.3. Realized Weather

Under the influence of the deep depression, heavy to very heavy rainfall occurred over Gangetic West Bengal, Odisha and Jharkhand on 19th August. Extremely heavy rainfall at a few places occurred over Odisha, Jharkhand, Himachal Pradesh and Uttarakhand on 20th Aug, heavy to very heavy rainfall at a few places over Madhya Pradesh, east Rajasthan and Chattisgarh on 21st August. On 23rd Aug., extremely heavy rainfall at isolated places over east Rajasthan and west Madhya Pradesh.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

19 August, 2022

Gangetic West Bengal : Durgapur 17, Panagarh (IAF) 13, Luchipur 9, Purulia & Simula 8 each, Gheropara & Burnpur 7 each

Odisha : Gop 12, Paradeep Cwr & Kantamal 11 each, Phiringia, Deogarh, Angul, Phulbani & Mohakalapada 9 each, Boudhgarh, K Nuagaon & Batagaon 8 each, Jujumura, Athmalik, Tensa, Kujanga & Rajnagar 7 each

Jharkhand : Maithon 9, Panchet 8

20 August, 2022

SubHimalayan West Bengal & Sikkim : Chengmari/Diana 7

Gangetic West Bengal : Digha 18, Contai 15, Kharidwar 12, Phulberia & Jhargram (Pto) 11 each, Purihansa 10, Kalaikunda (Iaf) 9, Kansabati Dam, Tusuma, Lalgargh & Amfu Kharagpur 8 each, Durgachack 7

Odisha : Bhograi 23, Phiringia 21, Nawana & Tikabali 20 each, Chakapad, Bahalda & Batagaon 19 each, Kusumi 18, Phulbani, Tiring & Udala 17 each, Junagarh, Joshipur & Tikarpara 16 each, Rajghat, Betanati & Balasore 15 each, Baliguda, Boudhgarh & Kotagarh 14 each, Lanjigarh, Madanpur Rampur, K Nuagaon & Khajuripada 13 each, G B Nagar, Golamunda, Harabhanga, Muruda, Tensa, Jaleswar & Jaipur 12 each, Nh 5 Gobindpur, Balimundali, Baripada, Remuna, Jamda, Rairangpur & Dharmagarh 11 each, Kotraguda, Jamsolaghat, Samakhunta, Lamataput, Champua, Joda, Suliapada, Talcher & Jhumpura 10 each, Naktideul, Muniguda, Narla, Raruana, Barmul, Sukruli, Bangiriposi, Thakurmunda, Kalampur & Chendipada 9 each, Udayagiri, Bahanga, Kaniha, Rampur, Bissem Cuttack, Bhawanipatna, Karanjia, Deogarh, Reamal, Ambadola, Nandapur & Chandanpur 8 each, Gurundia, Similiguda, Banaigarh, Kotpad, Jeypore, Rajkishorenagar, Barkote, Karlamunda, Raikia, Kesinga, Dabugan & Pallahara 7 each

Jharkhand : Ramgarh & Jamshedpur Aero 14 each, Jaganathpur Bau Kvk Aws-13, Kharsema & Mandar 12 each, Chakradharpur, Chandil, Nimdih & Arki 11 each, Ramgarh (Bdo) 10, Gomia, Ghatsila, Jamshedpur, Icar Namkum & Parsabad 9 each, Chatra, Mandu & Balumath 8 each, Bano Simdega Kvk Aws, Chandrapura, Tenughat, Kuru, Koderma, Koner, Diyakel Khunti Kvk Aws, Ramgarh Aws & Chandankiary 7 each

Bihar : Dharhara 13, Rajauli & Itarahi 10, Motihari, Bihar Shrif, Barhampur & Jahanabad 9 each, Kako, Simri & Ekangersarai 8 each, Charpokhiri, Arwal, Hisua, Narhat, Islampur, Nawada & Barhiya 7 each

East Uttar Pradesh : Fatehpur Tehsil 5, Elgin Bridge & Karwi 9 each, Chanderdeepghat 8, Nawabganj Tehsil 7, Hasanganj & Kaiserganj 7 each

West Uttar Pradesh : Baheri 10, Bilaspur 7

Uttarakhand : Rishikesh 29, Narendranagar 18, Khatima 16, Mussoorie 14, Jollygrant & Kashipur 14 each, Yamkeshwar 13, Uttar Kashi (Cwc) & Nainital 12 each, Uttar Kashi 11, Chakrata, Betalghat, Hardwar & Gairsain 10 each, Dhanaulti & Sama 9 each, Kotdwara & Haldwani 8 each, Jakholi, Loharkhet, Pithoragarh, Banbasa, Deoprayag & Someshwar 7 each

Himachal Pradesh : Kangra Aero 35, Dharmasala 33, Jogindarnagar 21, Naina Davi 18, Baijnath 15, Gohar & Bijahi 13 each, Mandi & Pandoh 12 each, Palampur, Dalhousi Alha Aws, Sarkaghat & Mashobra Aws 11 each, Theog 9, Sundarnagar 8, Kandaghat, Hmo Shillaro, Kahu & Kufri Aws 7 each

Jammu, Kashmir & Ladakh : Reasi Arg 8, Udampur (Iaf) 7

East Rajasthan : Rajakhera 8, Bari 7

West Madhya Pradesh : Bhind-Aws 10, Alipur (Jaura) 9, Ambah 7

East Madhya Pradesh : Umaria-Aws 9, Nagode & Teonthar 8 each, Rewa Aws, Majhgaon & Dindori Aws 7 each

Chhattisgarh : Kusmi 9, Odagi 8

21 August, 2022

Odisha : Banaigarh 14, Ambadola & Deogarh 10 each, Bargaon 9, K Nuagaon, Lahuni para, Jamankira & Tikabali 8 each, Phiringia, Balisankara, Kutra, Rajgangpur & Kantamal 7 each

East Uttar Pradesh : Karwi & Kunda 9 each, Ghorawal 8

West Uttar Pradesh : Mauranipur 12, Lalitpur & Talbehat 9 each

West Madhya Pradesh : Chanderi 15, Pichhore 13, Pathari 12, Khaniyadana 10, Gairatgang 9, Isagarh, Begumganj & Mungaoli 8 each, Udaipura, Badarwas, Ater, Pipariya, GunaAws, Kumbhraj & Ganjbasoda 7 each

East Madhya Pradesh : Channodi 17, Orchha & Benibari 16 each, Niwari, AnuppurAws, PannaAws & Mohangarh 15 each, UmariaAws & Venkatnagar 14 each, Amarpur 13, Jaitpur, Pushprajgarh, Kareli, Pali & Dindori Aws 12 each, Jaisingh Nagar, Mohgaon, Bajag, Chandia, Lidhora, Naigarhi, Gohparu & Gudh 11 each, Bijadandi 10, Niwas, Bina, Palera, Prithvipur, Shahpura & Majhauri 10 each, Ramnagar 9, Mada, Katni (Mudwara), Sidhi (Gopadbanas), Hanumana, Mawai, Kotma, Bijawar, Tikamgarh Aws, Barhi, Manpur, Budhar & Amarkantak 9 each, Khurai, Karanjia, Mangawan, Ajaigarh, Beohari, Jaithari, Sihawal, Kusmi, Shahdole (Sohagpur), Rahatgarh, Simariya, Harrai & Deori 8 each, Devendranagar, Baihar, Rajnagar, Samnapur, Bijuri, Pawai, Bichhia, Mauganj, Gadarwara, Singrauli Aws, Huzur, Narsinghpur Aws, Ghughri & Gaurihar 7 each

Chhattisgarh : Kusmi 15, Ramanujnagar 13, Premnagar, Rajpur, Khadgava, Surajpur, Balrampur & Odagi 9 each, Bhaiyathan, Sonhat, Baikunthpur, Bagicha & Lailunga

8 each, Duldula, Janakpur, Jashpurnagar, Pendra Road, Ambikapur & Manora 7 each

Coastal Karnataka : Udupi 11, Karkala & Kota 8 each

22 August, 2022

Nagaland, Manipur, Mizoram & Tripura : Khowai 10

Odisha : Banki 11, Athgarh 7

East Rajasthan : Dug 23, Kota-Aero 22, Degod Sr & Nainwa 22 each, Ladpura Sr 19, Tonk Tehsil Sr 18, Pipalda Sr & Anta Sr 17 each, Patan & Nagrarfort Sr 16 each, Ramganjmandi Sr 14, Bhainsroadgarh Sr 13, Mangrol, Mandana Sr, Pachpahar Sr & Manohar Thana 13 each, Uniara/Aligarh, Chothkabarwara Sr & Aklera 12 each, Sangod 11, Khanpur & Asnawar Sr 11 each, Gangdhar Sr, Bundi, Kishanganj, Bonli & Chabra 10 each, Pirawa, Jhalarapatan Sr, Khandar Sr & Bakani Sr 9 each, Jhalawar, Niwai, Hindoli & Sawaimadhpor Tesil Sr 8 each, Talera Sr 7, Lalsot, Sapotra, Indergarh Sr, Sikrai & Atru Sr 7 each

West Madhya Pradesh : Biaora 35, Raghogarh & Chachoda 29 each, Lateri 21, Zirapur & Begumganj 20 each, Bairargarh Airport, Aron, Bhanpura 19 each, Guna Aws, Kumbhraj, Gairatgang & Shamshabad 17 each, Udaipura 16, Raisen Aws & Rajgarh 16 each, Bamori, Vidisha, Pathari, Kalapipal, Narsingarh, Pachmarhi, Ganjbasoda & Ashoknagar Aws 15 each, Bhopal Arera Hills, Shujalpur, Navibagh Aet, Sironj & Pachore 14 each, Deori, Shyampur, Kolar, Berasia, Barod, Kurwai, Sheopur Aws, Sarangpur, Gulabganj, Isagarh & Khilchipur 13 each, Nateran, Moman Badodiya, Suvasara & Salwani 12

each, Badoda, Sehore Aws, Gulana, Garoth, Agar, Sohagpur, Pipariya & Nalkheda 11 each, Itarsi, Goharganj, Pichhore, Narmadapuram, Bankhedi & Ichhwar 10 each, Budhni, Manasa, Sultanpur, Chanderi, Bareli, Badi, Mungaoli, Babai (Makhan Nagar) & Jawad 9 each, Shajapur, Susner, Khaniyadana, Jawar & Badarwas 8 each, Ashta Aws, Bhimpur, Gyarpur, Malhargarh & Rehti 7 each

East Madhya Pradesh : Jaisinagar 19, Kesli, Simariya & Rehli 18 each, Sagar Aws 17, Jabalpur Aws & Rahatgarh 16 each, Banda, Patharia & Hatta 15 each, Garhakota, Tendukheda, Tendukheda & Deori 14 each, Bina 13, Badagaon Dhasan, Narsinghpur Aws & Bargi 12 each, Gotegaon, Shahgarh, Buxwaha, Batiyagarh, Patan, Niwas & Jabera 11 each, Patera, Damoh Aws, Malthone, Lakhnadon, Kareli & Khurai 10 each, Sihora, Ajaigarh, Raipura, Amanganj, Kumdam, Sleemanabad, Panna Aws & Umreth 9 each, Chhapara, Mehadwani, Tamia, Rajnagar, Majhgaon, Dheemarkheda, Shahpura, Barela, Prithvipur, Gadarwara & Pali 8 each, Vijayraghgarh, Maihar, Khajuraho Aero, Ramnagar, Umariyapan, Majholi, Manpur, Badamalhera, Panagar, Amarpatan, Singodi, Narayanganj, Shahrpura & Orchha 7 each

Tamilnadu, Puducherry & Karaikal : Panruti 7

Coastal Karnataka : Gersoppa & Siddapura 7 each

23 August, 2022

Assam & Meghalaya : Williamnagar 17, Williamnagar Aws 12, Margherita & Bihubar 7 each

Odisha : Khairamal 9

West Rajasthan : Jaitran 11, Marwar Junction & Desuri 7 each

East Rajasthan : Dug 29, Arnod Sr 26, Pirawa & Bakani Sr 23 each, Pachpahar Sr & Gangdhar Sr 17 each, Aklera 16, Asnawar Sr 15, Jhalarapatan Sr 13, Jahazpur 12, Manohar Thana, Pratapgarh, Bijoliya Sr & Kekri Sr 11 each, Pipalkhunt Sr, Chabra, Jhalawar & Chhotisadri 10 each, Chipabarod Sr, Nimbahera, Piplu Sr, Hindoli, Danpur, Bhungra Sr, Kotkasim Sr, Khanpur, Nagrarfort Sr, Deoli & Mandalgarh 9 each, Uniara / Aligarh, Garhi, Kotri & Chittorgarh 8 each, Todoraisingh Sr, Nainwa, Vijaynagar Sr, Begu Sr, Chothkabarwara Sr, Ghatol, Nithuwa Sr, Rashmi Sr, Gangrar, Banera Sr, Jagpura Sr, Nayanagar/Beawar, Ramganjmandi Sr, Dhariabad, Bundi & Atru Sr 7 each

West Madhya Pradesh : Zirapur 29, A lot 28, Narsingarh & Nalkheda 25 each, Biaora, Khilchipur & Shamgarh 24 each, Sehore Aaws & Jaora 23 each, Goharganj, Susner, Chachoda, Berasia, Sanjeet, Lateri & Barod 21 each, Kalapipal 20, Shyampur, Sarangpur, Nagda & Agar 19 each, Suvasara, Bairagarh Airport, Rajgarh, Mahidpur & Khachrod 18 each, Bhopal Arera Hills, Raisen Aaws, Tal & Navibagh Aet 17 each, Begumganj, Bhanpura, Kayampur, Gairatgang, Sailana, Budhni, Pachore & Raghogarh 16 each, Ichhwar, Narmadapuram, Kolar, Bajna, Kumbhraj, Sitamau & Moman Badodiya 15 each, Shamshabad, Ghatiya, Shajapur, Dhundhadaka & Piploda 14 each, Manasa, Tarana, Gulana, Garoth, Mandaur Aaws, Ratlam Aaws, Raoti, Vidisha, Shujalpur & Ujjain Aaws 12 each, Ashta Aaws & Babai (Makhan Nagar) 11 each, Jharda & Rehti 10 each, Tonkhurd, Nasrullahganj, Jawad, Jawar & Sonkatch 9 each, Sohagpur, Malhargarh, Neemuch Aaws, Kannod & Aron 8 each, Dolariya,

Bareli, Gulabganj, Salwani, Guna Aaws, Udaipura, Ganjbasoda & Khategaon 7 each

Gujarat Region : Patanaws 7

Konkan & Goa : Dapoliagri 8

Madhya Maharashtra : Mahabaleshwar 10, Gaganbawada 7

Coastal Andhra Pradesh & Yanam : Sompeta 7

Tamilnadu, Puducherry & Karaikal : Nagapattinam & Nannilam 10 each, Kodavasal, Chinnakalar & Arantangi 9 each, Uthiramerur & Vedaranyam 7 each

Coastal Karnataka : Mani 16, Mulki 15, Mangaluru Ap Obsy 11, Puttur Hms, Sulya & Panambur Obsy 9 each, Mangaluru 8, Uppinangadi & Karkala 7 each

South Interior Karnataka : Bhagamandala 12

Kerala & Mahe : Hosdurg 16, Tellichery 12, Irikkur, Cheruthazham Arg, Vadakara & Peruvannamuzhi Arg 11 each, Kannur, Kozhikode, Kudulu, Mattannur Arg & Quilandi 10 each, Karipur Ap, Idukki & Mahe 9 each, Kannur Airport Aaws 8, Angadipuram, Perinthalamanna, Taliparamba, Vellanikkara, Alapuzha, Pattembi, Ernakulam South, Kodungallur, Nilambur & Kayamkulam Agri 7 each

2.10. Depression over south coastal Odisha (11-12 September, 2022)

2.10.1. Under the influence of cyclonic circulation over central parts of BoB, a **LOW** formed over westcentral and adjoining eastcentral BoB with associated cyclonic circulation extended upto 7.6 km above m.s.l. It lay over westcentral BoB on 8th September evening (1730 hrs IST). It then lay over westcentral and adjoining northwest BoB off north Andhra Pradesh-south Odisha coasts at 0830 hrs IST of 9th September. It lay as a **WML** over the same region at 0830 hrs IST of 10th September. It then moved west-northwestwards, concentrated into a **Depression** and lay centered at 0530 hrs IST of the 11th September, 2022, over south coastal Odisha and

neighbourhood near Lat. 19.5°N / Long. 84.7°E, about 20 km northwest of Gopalpur. It further moved west-northwestwards and lay centered at 0830 hrs IST of the 11th September, 2022, over south Odisha near Lat. 19.7°N / Long. 84.0°E, about 80 km east-southeast of Bhawanipatna (Odisha). It moved nearly westwards and lay centered at 1730 hrs IST of the 11th September, 2022, over south Chhattisgarh near Lat. 19.9°N / Long. 81.7°E, about 40 km south-southeast of Kanker (Chhattisgarh). It moved nearly north-northwestwards and lay centered at 0530 hrs IST of the 12th September, 2022, over south Chhattisgarh & adjoining southeast Madhya Pradesh and Vidarbha near Lat. 20.8°N / Long. 80.8°E, about 95 km south-southeast of Gondia (Vidarbha). It moved nearly northwestwards and weakened into a **WML** at 0830 hrs IST of the 12th September, 2022 over southeast Madhya Pradesh and neighbourhood with associated cyclonic circulation extending upto mid tropospheric levels.

2.10.2. *Other features observed*

The peak maximum sustained wind speed (MSW) of the depression was 40-50 kmph (25 knots) during 0530 hrs IST to 2330 hrs IST of 11th September. The lowest estimated central pressure was 998 hPa during the period with a pressure drop of about 4 hPa at the centre as compared to the surroundings.

2.10.3. *Realized weather*

This system caused heavy to very heavy rainfall over Gangetic West Bengal, Odisha, Bihar, West Madhya Pradesh, Marathwada, Vidarbha, Coastal Andhra Pradesh & Telangana and extremely heavy rainfall over Chattisgarh during 11th and 12th September.

The chief amount of 24 hrs accumulated rainfall (≥7cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

11 September, 2022

Gangetic West Bengal	: Durgachack 7
Odisha	: Dhenkanal Pto 15, Jaipur 14, Gobindpur 13, Kotpad 11, Bhuban, Balasore, Banki & Remuna 10 each, Balimundali, Patrapur, Tigiria, Udala, Tangi, Ghasipura, & Sukinda 9 each, G B Nagar, Kalinga, Nawana, Khandapara, Jhorigam, Barmul, Sheragada, Bahanga, G Udayagiri & Dhenkanal 8 each, Betanati,

Pottangi, Khaira, Malkangiri, Chakapad, Bhapur, Begunia, Balikuda, Bolagarh, Dabugan, Lamataput, Mathili, Nandpur, Daringibadi & Basudevpur 7 each

Bihar	: Katihar North 7
West Madhya Pradesh	: Ghatiya 7
Madhya Maharashtra	: Gaganbawada 16, Ajra 11, Chandgad 8
Marathwada	: Kinwat 12, Mahur 7
Vidarbha	: Sironcha 7
Chhattisgarh	: Bijapur 25, Bastanar 14, Konta & Sukma 12, Darbha, Chhindgarh & Dantewara 11 each, Kuakonda, Katekalyan, Jagdalpur, & Lohandiguda 10 each, Gidam, Bastar & Usoor 7 each
Coastal Andhra Pradesh & Yanam	: Palakoderu 14, Nuzvid 11, Pusapatirega & Balajipeta 9 each, Bhimadole, Kalingapatnam & Bheemavaram 8 each, Chintalapudi, Therlam, Jiyyamma Valasa & Bobbili 7 each
Telangana	: Yellareddypeta, Alladurg, Venkatapuram & Vavipet 19 each, Mustabad, Tekmal & Papannapet 17 each, Sirsilla 16, Regode, Govindaraopet & Konaraopeta 15 each, Yeda Palle 14, Balkonda, Shayampet, Ranjal & Peddapalle 13 each, Naga Reddipet & Boinpalle 13 each, Chigurumamidy, Kamareddy & Parkal 12 each, Venkatapur, Armur, Machareddy & Gambhiraopet 11 each, Kotapalle, Sultanabad, Medak, Makloor, Tadwai Mlg, Medak (Arg), Velpur & Mortad 10 each, Bodhan, Dubbak, Chandurthi, Bejjanki, Atmakurwrgl, Tamsi, Dich Palle, Armoor (Arg), Garla & Jakranpalle 9 each, Shankarapatnam, Kowdipalle, Thimmapur, Laxmanchanda, Huzurabad, Yellareddy, Bhiknur,

Pinapaka, Mulug, Gandhari & Elagaid 8 each, Boath, Jammikunta, Srirampur, Bheemgal, Bhupalpalle, Karimnagar, Lingampet, Ramayampet, Nizam Sagar, Sadasivanagar, Mogullapalle, Mirdoddi & Narayankhed 7 each

Doundi & Bhairamgarh 8 each, Korba, Kartala & Chhuria 7 each

12 September, 2022

Odisha : Jajpur 9, Lamataput 8, Derabis, Bhograi, Kalinga, Jaleswar, Bolangir, Bijepur & Rajghat 7 each

East Rajasthan : Reodar 7

West Madhya Pradesh : Neapanagar & Khaknar 11 each, Bhainsdehi 10, Jhirnya 9, Khargone Aws & Gogawan 8 each, Khandwa, Bhikangaon, Pansemal, Pandhana & burhanpur 7 each

East Madhya Pradesh : Seoni 9, Sausar 8

Madhya Maharashtra : Gaganbawada 11, Chandgad 9, Paud Mulshi & Radhanagari 7 each

Marathwada : Bhokar & Mahur 8 each

Vidarbha : Arjuni Morgaon & Ballarpur 13 each, Chandrapur, Gadchiroli, & Dhanora 12 each, Arni, Korchi, Chandur Rlwy & Ahiri 11 each, Darwha, Dhamangaon Rlwy, & Lakhandur 10 each, Wani, Gondpipri, Kurkheda, Ner & Pandharkawara 9 each, Chamorshi, Bhamragad, Nagpur Aerodrome, Zarizamni, Nandgaonkazi, Babulgaon, Mulchera, Bhiwapur, & Ghatanji 8 each, Saoli, Pombhurna, Sangrampur, Deori, Armori, Arvi, Narkheda, Deoli & Kalamb 7 each

Chhattisgarh : Mohla 13, Durgkondal 12, Pakhanjur & Bijapur 11 each, Manpur 10, Bhanupratappur, Usoor & Katekalyan 9 each,

Telangana : Laxmanchanda 15, Khanpur 13, Sarangapur, Dahegaon & Bazar Hathnoor 12 each, Bejjur, Boath, Mudhole, Kotapalle & Nirmal 10 each, Dilawarpur, Navipet & Metpalle 9 each, Mallapur 8, Chennur, Yellareddy, Velpur, Kathlapur, Ramgundam, Yeda Palle, Mortad, Kammar Palle, Jainoor, Wankdi & Mancherial 7 each

2.11. Cyclonic Storm 'SITRANG' over the Bay of Bengal (22nd - 25th October, 2022)

2.11.1. Under the influence of the cyclonic circulation over north Andaman Sea and neighbourhood, a **LOW** formed over north Andaman Sea and adjoining areas of south Andaman Sea & southeast BoB at 0830 hrs IST of 20th October. It then lay over the same region with the associated cyclonic circulation extending upto 7.6 km above m.s.l. and persisted over the same region on 21st October evening (1730 hrs IST). It lay as a **WML** over north Andaman Sea and adjoining southeast BoB at 1730 hrs IST of the 21st October, 2022. It then moved northwestwards and lay over southeast & adjoining areas of eastcentral BoB and north Andaman at 0530 hrs IST of the 22nd October 2022. Thereafter, it moved west-northwestwards and concentrated into a **Depression** in the morning (0830 hrs IST) of 22nd October, 2022 over southeast and adjoining eastcentral BoB, close to west of Andaman Islands near Lat. 12.7°N / Long. 92.4°E, about 110 km north-northwest of Port Blair. It then moved northwestwards and lay centered at 1130 hrs IST of the 22nd October over eastcentral and adjoining southeast BoB near Lat. 13.7°N / Long. 91.4°E. It further moved northwestwards and lay centered at 1730 hrs IST of the 22nd October over eastcentral BoB near Lat. 14.3°N / Long. 90.6°E, about 370 km northwest of Port Blair. It continued to move northwestwards, intensified into a **DD** and lay centered at 0530 hrs IST of the 23rd October over the same region near Lat. 15.4°N / Long. 89.0°E, about 580 km northwest of Port Blair. It moved further northwestwards and lay centered at 0830 hrs IST of the 23rd October over the westcentral and adjoining eastcentral BoB near Lat. 15.6°N / Long. 88.4°E, about 640 km northwest of Port Blair. Thereafter, it moved nearly northwards, intensified into the **CS "SITRANG" (pronounced as "Si-Trang")** and lay centered at 1730 hrs IST of 23rd October over the same region near

Lat. 16.4°N / Long. 88.1°E, about 580 km south of Sagar Island. It then moved north-northeastwards and lay centered at 0530 hrs IST of the 24th October over eastcentral and adjoining areas of westcentral & northwest BoB near Lat. 17.8°N / Long. 88.6°E, about 430 km south of Sagar Island. It further moved north-northeastwards and lay centered at 0830 hrs IST of the 24th October over northwest and adjoining central BoB near Lat. 18.3°N / Long. 88.9°E, about 380 km south of Sagar Island. It further moved north-northeastwards and lay centered at 1730 hrs IST of the 24th October over north BoB near Lat. 20.7°N / Long. 90.1°E, about 230 km east-southeast of Sagar Island. It crossed Bangladesh coast between Tinkona and Sandwip close to Barisal during 2100 and 2330 hrs IST of 24th October. Thereafter, it weakened into a **DD** over Bangladesh at 0230 hrs IST of 25th October. It further moved north-northeastwards and weakened into a **Depression** and lay centered at 0530 hrs IST of 25th October over northeast Bangladesh and neighborhood near Lat. 24.7°N / Long. 91.5°E, about 90 km north-northeast of Agartala. Continuing to move north-northeastwards, it further weakened into a **WML** over northeast Bangladesh and adjoining Meghalaya at 0830 hrs IST of the 25th October with the associated cyclonic circulation extending upto mid tropospheric levels.

2.11.2. Other features observed

Estimated maximum sustained wind speed of intensity 80-90 kmph gusting to 100 kmph prevailed along & off Bangladesh coast during landfall. Maximum sustained wind of intensity 60-70 kmph gusting 80 kmph prevailed along & off North and South 24 Parganas including Sunderbans forest area during the time of landfall.

2.11.3. Realized weather

Light to moderate rainfall occurred at isolated places over Odisha and at a few places over coastal West Bengal. Rainfall occurred at most places with extremely heavy rainfall at isolated places over Meghalaya; isolated heavy to very heavy rainfall over Arunachal Pradesh and isolated heavy rainfall over Assam and Manipur on 24th October.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

Meghalaya	: Mawphlang 25, Pynursla 25, Williamnagar 23, Shora 22, Secretariat Hills (ARG) 21, Shillong (AWS) 21, Shillong C.S.O. 20, Mawkyrwat (ARG) 18,
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	: Barapani 18, Nongstoin 13, Khliehria 12 and Baghmara 10
Arunachal Pradesh	: Bomdila 12, Kalaktang 10, Kibithu 9, Basar & Ziro 8, Koloriang, Jung_ARG, Kabu Basti & Palin (ARG) 7
Assam	: Khanapara 10, Dudhnoi Kvk (AWS), Khetri (ARG) & Chandmari 9 each, Pandu, Nongpoh, Goibergaon & Udaipur 8 each, Umrangshu (ARG), Motunga, Nalbari, Tamulpur, Chandrapur ARG, Kheronighat & Guwahati 7 each
Manipur	: Ukhrul 10, Ukhrul AWS 9, Churachandpur & Senapati 7 each

2.12. Depression over southwest Bay of Bengal (20-22 November, 2022)

2.12.1. Under the influence of the cyclonic circulation over south Andaman Sea and neighbourhood, a **LOW** formed over southeast BoB and adjoining north Andaman Sea on 17th November morning (0530 hrs IST). It lay as a **WML** over central parts of south BoB on 19th November morning (0530 hrs IST). It then moved west-northwestwards, concentrated into a **Depression** and lay centered at 0530 hrs IST of the 20th November, 2022 over southwest and adjoining southeast BoB, near Lat. 10.0° N / Long. 85.5°E, about 600 km east of Jaffna (Sri Lanka). It remained practically stationary and lay centered at 0830 hrs IST of the 20th November, 2022 over the same region. It then moved north-northwestwards and lay centered at 1730 hrs IST of the 20th November, 2022 over the southwest BoB, near Lat. 10.9°N / Long. 85.0°E, about 560 km east-northeast of Jaffna (Sri Lanka). It then moved northwestwards and lay centered at 0530 hrs IST of the 21st November, 2022 over the southwest BoB, near Lat. 11.9°N / Long. 84.2°E, about 450 km east-southeast of Chennai. Continuing to move further northwestwards, it lay centered at 0830 hrs IST of the 21st November, 2022 over the same region, near Lat. 12.1°N / Long. 84.0°E, about 420 km east-southeast of Chennai. It then moved west-northwestwards and lay centered at 1730 hrs IST of the 21st November, 2022 over southwest and adjoining westcentral BoB, near Lat. 12.9°N / Long. 82.0°E, about 190 km east of Chennai. Continuing to move further west-northwestwards it lay centered at 0530 hrs IST of the 22nd November, 2022 over westcentral and adjoining southwest BoB, near Lat. 13.1° N / Long. 81.4° E, about

130 km east-northeast of Chennai. It further moved west-northwestwards and weakened into a **WML** over westcentral and adjoining southwest BoB off south Andhra Pradesh-north Tamil Nadu coasts with the associated cyclonic circulation extending upto mid tropospheric levels at 0830 hrs IST of the 22nd November, 2022.

2.12.2. Other features observed

The peak maximum sustained wind speed of the depression was 40-50 kmph (25 knots) during 0530 hrs IST of 20th November to 2330 hrs IST of 21st November. The lowest estimated central pressure was 1003 hPa during the period with a pressure drop of about 4 hPa at the centre as compared to the surroundings.

2.12.3. Realized weather

The system caused fairly widespread light to moderate rainfall over south Andhra Pradesh and north Tamil Nadu coasts on 21st November. During 22nd to 24th November, widespread light to moderate rainfall with isolated heavy rainfall occurred over south Andhra Pradesh, north Tamil Nadu and adjoining areas of Rayalaseema.

The chief amount of 24 hrs accumulated rainfall (≥ 7 cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

23 November, 2022

Coastal : Tada & Sullurpeta 9 each
Andhra Pradesh & Yanam

Rayalaseema : Satyavedu 9

2.13. Severe Cyclonic Storm "MANDOUS" over the Bay of Bengal (6-10 December, 2022)

2.13.1. Under the influence of cyclonic circulation over south Andaman Sea and adjoining EIO & Strait of Malacca, a **LOW** formed over south Andaman Sea and neighbourhood on 5th December morning (0530 hrs IST). It lay as a **WML** over southeast BoB on 6th December morning (0530 hrs IST). It concentrated into a **Depression** and lay centred at 1730 hrs IST of the 6th December, 2022 over southeast BoB, near Lat. 8.2°N / Long. 88.2°E, about 770 km east-southeast of Trincomalee (Sri Lanka). It then moved west-northwestwards, intensified into a **DD** and lay centered at 0530 hrs IST of the 07th December, 2022

over southeast and adjoining southwest BoB, near Lat. 8.6°N / Long. 86.4°E, about 570 km east of Trincomalee (Sri Lanka). Continuing to move further west-northwestwards, it lay centred at 0830 hrs IST of the 07th December, 2022 over southwest and adjoining southeast BoB, near Lat. 8.7°N / Long. 85.7°E, about 500 km east of Trincomalee (Sri Lanka). Further moving west-northwestwards, it lay centred at 1730 hrs IST of the 07th December, 2022 over southwest and adjoining southeast BoB, near Lat. 8.9°N / Long. 85.0°E, about 410 km east of Trincomalee (Sri Lanka). It intensified into **the CS "Mandous" pronounced as "Man-Dous"** over southwest BoB at 2330 hrs IST of the 07th December, 2022 near Lat. 9.2°N / Long. 84.6°E, about 370 km east-northeast of Trincomalee (Sri Lanka). Continuing to move further west-northwestwards, it lay centered at 0530 hrs IST of the 08th December, 2022 over southwest BoB, near Lat. 9.4°N / Long. 84.1°E, about 340 km east-northeast of Trincomalee (Sri Lanka). Continuing to move further west-northwestwards, it lay centered at 0830 hrs IST of the 08th December, 2022 over southwest BoB, near Lat. 9.5°N / Long. 83.8°E, about 300 km east-northeast of Trincomalee (Sri Lanka). It further intensified into an SCS and lay centered at 1730 hrs IST of the 08th December, 2022 over southwest BoB near Lat. 10.1°N / Long. 82.9°E, about 250 km northeast of Trincomalee (Sri Lanka). Continuing to move further west-northwestwards, it lay centered at 0530 hrs IST of 09th December, 2022 over southwest BoB near Lat. 11.0°N / Long. 81.7°E, about 270 km north-northeast of Trincomalee (Sri Lanka). It then moved west-northwestwards and weakened into a **CS** and lay centered at 0830 hrs IST of the 09th December, 2022 over southwest BoB off north Tamil Nadu and Puducherry coasts near Lat. 11.1°N / Long. 81.5°E, about 180 km east-northeast of Karaikal. It then moved northwestwards and lay centered at 1730 hrs IST of the 09th December, 2022 over the same region near Lat. 12.0°N / Long. 80.8°E, about 90 km southeast of Mamallapuram. It then crossed north Tamil Nadu coast close to Mamallapuram (Mahabalipuram) during 2330 hrs. IST of 9th December and 0130 hrs IST of 10th December as a CS with the maximum sustained wind speed of 65-75 kmph gusting to 85 kmph. Thereafter, it weakened into a **DD** over north Tamil Nadu and lay centered at 0530 hrs IST of 10th Dec near Lat. 13.0°N / Long. 79.7°E, about 70 km northwest of Mamallapuram (Mahabalipuram) and 50 km west of Chennai. It then moved nearly west-southwestwards and lay centred at 0830 hrs IST of the 10th December, over north Tamil Nadu near Lat. 12.8°N / Long. 79.5°E, about 40 km west-southwest of Vellore. It then moved nearly west-southwestwards, weakened into **depression** and lay centred at 1130 hrs IST of the 10th December over north Tamil Nadu near Lat. 12.7°N / Long. 79.3°E, about 30 km south-southwest of Vellore. Continuing to move further west-

southwestwards, it weakened into a **WML** over north interior Tamil Nadu and neighbourhood with the associated cyclonic circulation extending upto upper tropospheric levels at 1730 hrs IST of the 10th December, 2022.

2.13.2. *Other features observed*

The system did not exhibit any rapid intensification/weakening during its life cycle. The system reached its peak intensity of 50 knots at 1730 hrs IST of 8th December and maintained its intensity till 0530 hrs IST of 9th December. The estimated central pressure during this period was 990 hPa with a pressure drop of about 12 hPa at the centre as compared to the surroundings. The system crossed North Tamil Nadu, Puducherry and adjoining south Andhra Pradesh coasts between Puducherry and Sriharikota near Lat. 12.6°N / Long. 80.15°E, close to Mamallapuram (Mahabalipuram) during 2330 hrs IST of 9th December -0130 hrs IST of 10th December as a CS with maximum sustained wind speed of 35 knots (65-75 kmph gusting to 85 kmph).

2.13.3. *Realized weather*

Light to moderate rainfall at most places with isolated heavy to very heavy rainfall occurred over Andaman and Nicobar Islands on 5th and 6th December, isolated heavy to very heavy rainfall occurred over north Tamil Nadu, Rayalaseema and south coastal Andhra Pradesh on 8th December, isolated heavy to very heavy rainfall at a few places and isolated extremely heavy rainfall occurred over north Tamil Nadu, Puducherry, Rayalaseema and south coastal Andhra Pradesh on 9th, isolated heavy to very heavy rainfall over south coastal Andhra Pradesh and isolated heavy rainfall over north Tamil Nadu, Rayalaseema, south Interior Karnataka and Kerala on 10th December.

The chief amount of 24 hrs accumulated rainfall (≥7cm) ending at 0830 hrs IST of date during the life cycle of the system is presented below.

6 December	: Long Island 14
7 December	: Long Island 8
8 December	: Nil
9 December	: -
Tamil Nadu	: Nungambakkam, Meenambakkam, CD Hospital Tondiarpet, AWS Chennai, Madhavaram AMFU, YMCA Nandanam ARG 7 each

10 December, 2022

Tamil Nadu and Puducherry	: Vembakkam 25, Minnal & Panapakkam 20 each, Kancheepuram 19, Cheyyar 18, Avadi 17, Tiruttani & KVK Kattukuppam Agro 16 each, Ayanavaram Taluk Office & Kundrathur 15 each, Arakonam, Uthiramerur & Perambur 14 each, Gummidipoondi, Tambaram, Sriperumbudur, Mahabalipuram, Cholavaram, Pallipattu, MGR Nagar, Alandur & Uthukottai 13 each, Ambathur, Red Hills, Chengalpattu, Koratur, Chennai Ap 12 each
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Rayalaseema	: Srikalahasti 23, Thottambedu 22, Kodur 20, Nagari 18, Satyavedu & Tirupati Aero 13 each, Palasamudram & Rajampet 8 each, Pullampeta 7
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Coastal Andhra Pradesh	: Gudur 20, Venkatagiri 17, Sullurpeta 16, Nellore 13, Tada 12, Rapur 12, Atmakur & Kavali 7 each
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11 December, 2022

Coastal Andhra Pradesh	: Atmakur 13, Markapur & Amalapuram 10 each, Veligandla & Kandukur 9 each, Marripudi, Ongole & Udayagiri 8 each, Podili, Avanigada & Konakanamitla 7 each
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Rayalaseema	: Thambalapalle, Venkatagiri Kota, Penagaluru & Arogyavaram 7 each
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Tamil Nadu	: Yercaud 10, Vadapudupattu 9, Ambur 8, Wallajah, Arcot & Ammoor 7 each
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South Interior Karnataka	: Chintamani 7
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Kerala	: Palluruthy ARG 11, Mancompu 9, NAS Kochi 8, Piravam, Ernakulam South & Vynthala 7 each
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2.14. *Deep Depression over Arabian Sea (14-17 December, 2022)*

2.14.1. Under the influence of the cyclonic circulation (remnant of Cyclonic Storm MANDOUS) over north Kerala and neighbourhood; a **LOW** formed over southeast and adjoining eastcentral Arabian Sea (AS) off north Kerala-Karnataka coasts with the associated cyclonic circulation extending upto 7.6 km above m.s.l. It lay over eastcentral and adjoining southeast AS off north Kerala and Karnataka coasts in the early morning (0530 hrs IST) of 13th Dec. It lay as a **Well Marked Low Pressure Area (WML)** over the same region on 13th Dec evening (1730 hrs IST). It lay over eastcentral and adjoining southeast AS on 14th December morning (0830 hrs IST). It moved northwestwards and concentrated into a **Depression** over the same region and lay centered at 1430 hrs IST of the 14th December, 2022 near Lat. 13.5°N / Long. 69.6°E about 430 km west-northwest of Amini Divi (Lakshadweep). It then moved west-northwestwards and lay centered at 1730 hrs IST of the 14th December, 2022 near Lat. 13.7°N / Long. 69.2°E over the same region. Continuing to move further west-northwestwards, it intensified into a **DD** over the same region and lay centered at 0530 hrs IST of the 15th December, 2022 near Lat. 13.9°N / Long. 68.2°E. Continuing to move further west-northwestwards, it lay centered at 0830 hrs IST of the 15th December, 2022 over eastcentral AS near Lat. 13.9°N / Long. 67.8°E about 620 km west-northwest of Amini Divi (Lakshadweep). Continuing to move further west-northwestwards, it lay centered at 1730 hrs IST of the 15th December, 2022 over the same region near Lat. 14.10°N / Long. 66.80°E, about 770 km west-southwest of Panjim (Goa). Thereafter, it moved west-southwestwards and lay centered at 0830 hrs IST of the 16th December, 2022 over westcentral and adjoining eastcentral AS near Lat. 13.9°N / Long. 64.7°E, about 930 km west-northwest of Amini Divi (Lakshadweep). Thereafter, it moved west-northwestwards and weakened into a **Depression** at 1730 hrs IST of the 16th December, 2022 over westcentral and adjoining eastcentral AS near Lat. 14.0°N / Long. 63.8°E about 1020 km west-northwest of Amini Divi (Lakshadweep). It then moved westwards and lay centered at 0530 hrs IST of the 17th December, 2022 over westcentral AS near Lat. 14.1°N / Long. 62.2°E about 1190 km west-northwest of Amini Divi (Lakshadweep). It then moved west-southwestwards and lay centered at 0830 hrs IST of the 17th December, 2022 over the same region near Lat. 14.0°N / Long. 61.9°E about 1220 km west-northwest of Amini Divi (Lakshadweep). Continuing to move further west-southwestwards, it weakened into a **WML** over the same region on 17th December evening.

2.14.2. *Other features observed*

The peak maximum sustained wind speed (MSW) of the depression was 50-60 kmph (30 knots) during 0530 hrs IST of 15th December to 1130 hrs IST of 16th December. The lowest estimated central pressure was 1000 hPa during the period with a pressure drop of about 6 hPa at the centre as compared to the surroundings.

2.14.3. *Realized weather*

Under the influence of the system, rainfall occurred mainly over the sea area throughout the life period. However widespread rainfall occurred along and off Kerala and Karnataka coasts during 12th and 13th December, 2022.

2.15. *Depression over Southwest Bay of Bengal (22-25 December, 2022)*

2.15.1. Under the influence of the cyclonic circulation over south Andaman Sea and adjoining strait of Malacca & Sumatra, a **LOW** formed over EIO and adjoining areas of south Andaman Sea and southeast BoB at 1430 hrs IST of 14th December, 2022. It moved northwestwards and lay over southeast BoB and adjoining areas of East EIO and south Andaman Sea on 14th December evening (1730 hrs IST). It lay over southeast BoB and adjoining East EIO, on 15th morning (0530 hrs IST) and persisted over the same region on 16th & 17th December. It lay over central parts of south Bay of Bengal and adjoining East EIO on 18th December morning (0530 hrs IST) and persisted over the same region till 20th December. It lay as a **Well Marked Low Pressure Area** over southwest BoB and adjoining East EIO on 21st December morning (0530 hrs IST). It lay over southwest and adjoining southeast BoB on 22nd morning (0530 hrs IST). It moved north-northwestwards and concentrated into a **Depression** at 0830 hrs IST of the 22nd December over southwest and adjoining southeast BoB near Lat. 9.0°N / Long. 85.0°E about 420 km east-northeast of Trincomalee (Sri Lanka). It then remained practically stationary and for some time and lay centered at 0830 hrs IST of the 23rd December over southwest BoB near Lat. 10.1°N / Long. 84.2°E about 370 km east-northeast of Trincomalee (Sri Lanka). Thereafter, it moved east-northeastwards and lay centered at 1730 hrs IST of the 23rd December over southwest and adjoining southeast BoB near Lat. 10.6°N / Long. 85.4°E about 510 km east-northeast of Trincomalee (Sri Lanka). It then moved west-northwestwards and lay centered at 0530 hrs IST of the 24th December over southwest BoB near Lat. 10.8°N / Long. 84.5°E about 430 km east-northeast of Trincomalee (Sri Lanka). It recurved gradually west-southwestwards and lay centered at 0830 hrs IST of the 24th December

over the same region near Lat. 10.7°N / Long. 84.2°E about 400 km east-northeast of Trincomalee (Sri Lanka). Thereafter, it moved southwestwards and lay centered at 0830 hrs IST of 25th December over southwest BoB and adjoining Sri Lanka coast near Lat. 8.8°N / Long. 82.0°E about 80 km east-northeast of Trincomalee (Sri Lanka). It then moved west-southwestwards and crossed Sri Lanka coast to the south of Trincomalee near Lat. 8.35°N / Long. 81.4°E as a depression with maximum sustained wind speed of 45-55 kmph gusting to 65 kmph during 1230 to 1330 hrs IST. Thereafter, it continued to move west-southwestwards and weakened into a **WML** over Sri Lanka with the associated cyclonic circulation extending upto mid tropospheric levels at 1430 hrs IST of the 25th December, 2022.

2.15.2. *Other features observed*

The peak maximum sustained wind speed (MSW) of the depression was 40-50 kmph (25 knots) during its lifeperiod till landfall. The lowest estimated central pressure was 1004 hPa during the period with a pressure drop of about 4 hPa at the centre as compared to the surroundings.

2.15.3. *Realized weather*

The system caused light to moderate rainfall over south India, southwest BoB, southeast BoB and north Sri Lanka region. No heavy rainfall episode was reported in association with this system.

