

Report on Extreme Weather Events during June-December 2022

1. Introduction

As per the classification of the seasons, the months June to September (JJAS) constitute the monsoon season whereas October-December (OND) constitutes the post-monsoon season. The monsoon season during JJAS is associated with the formation of Low Pressure Areas (LPAs) and monsoon Depressions over the Bay of Bengal (BoB) which move inland over India giving rise to heavy rainfall over different parts of the country. Sometimes, a Depression intensifies into a Tropical Cyclone (TC) particularly during the onset phase (June) or the withdrawal phase of monsoon (September). The heavy rainfall leading to flooding is a very common phenomenon during the monsoon season. This season is also characterized by the formation of LPAs over the north Indian Ocean and occasionally their intensification into cyclones. The post-monsoon season from October to December (OND) is mainly associated with TCs over the north Indian Ocean, easterly waves over the southern peninsula India leading to heavy rainfall over Tamil Nadu and adjoining regions. The northern part of India witnesses Western Disturbances (WDs) and Fog, particularly in the months of November and December. In this report, an attempt has been made to bring out the details of the extreme weather phenomena and their impacts during the monsoon and post-monsoon seasons of 2022.

2. Low-Pressure Systems during June-September 2022

During the season, twelve low-pressure systems (1 Deep Depression, 5 Depressions, 2 well-marked low-pressure areas, 2 low-pressure areas, and 2 land low-pressure areas) were formed. The frequency and place of origin of these low-pressure systems formed over the Indian region during the Southwest Monsoon season are shown in the table below during the monsoon season are shown in Table 1.

September over BoB. The remaining thirteen systems were WMLs/LPAs/land LPAs. Figure 1 shows the track of the intense low-pressure system

formed during the season (Depressions and Deep Depressions).

Table 1. Frequency of (Depressions and Deep Depressions). formed during Jun-Sep 2022 over North Indian Ocean.

Month /Systems	DD	D
June	0	0
July	0	1 (AS)
August	1(BOB)	2 (BOB),1 (AS)
September	0	1(BOB)

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

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

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

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

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

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

3. Significant Weather during June to September 2022

Fig.2 shows significant weather events during the Southwest season (based on real-time media reports). From 1st June to 30th September, a total of 1323 persons were reportedly claimed dead, more than 430 persons injured, more than 100 persons were missing & more than 1,18,000 livestock perished. The details of casualties are given below, which are based on real-time media reports.

Floods, Heavy Rains & Landslides: A total of 619 persons were reportedly claimed dead, more than 160 persons injured, more than 100 persons were missing & more than 1,17,000 livestock perished, during Southwest Monsoon 2022, because of

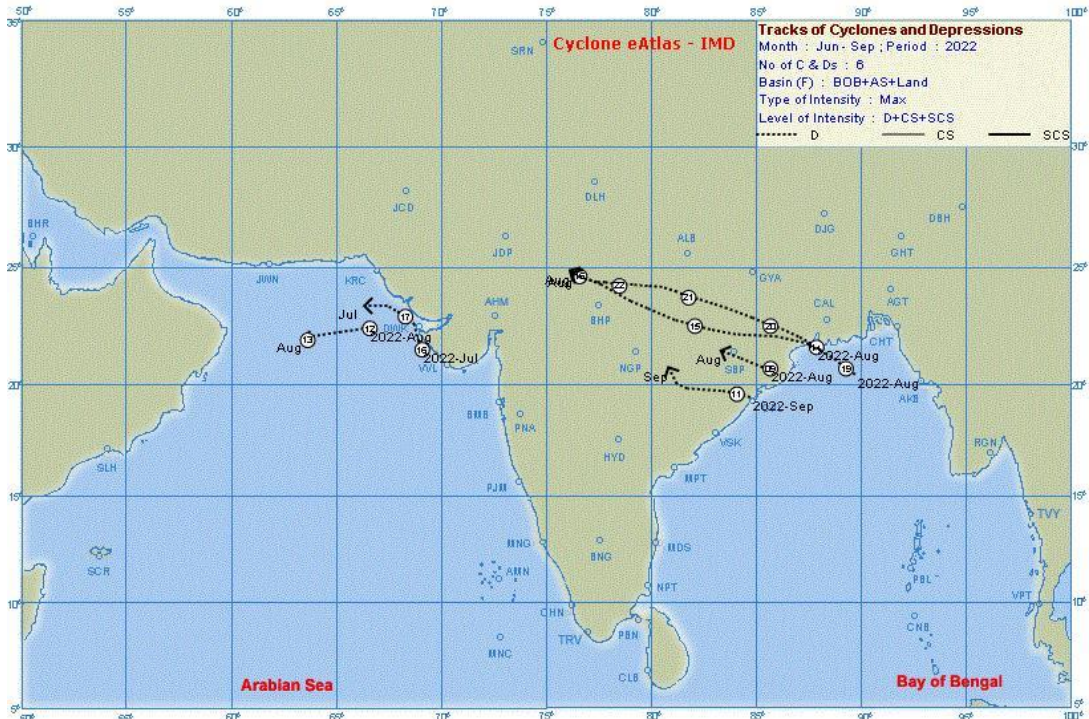


Figure 1: Tracks of intense low pressure system formed during southwest monsoon season 2022.

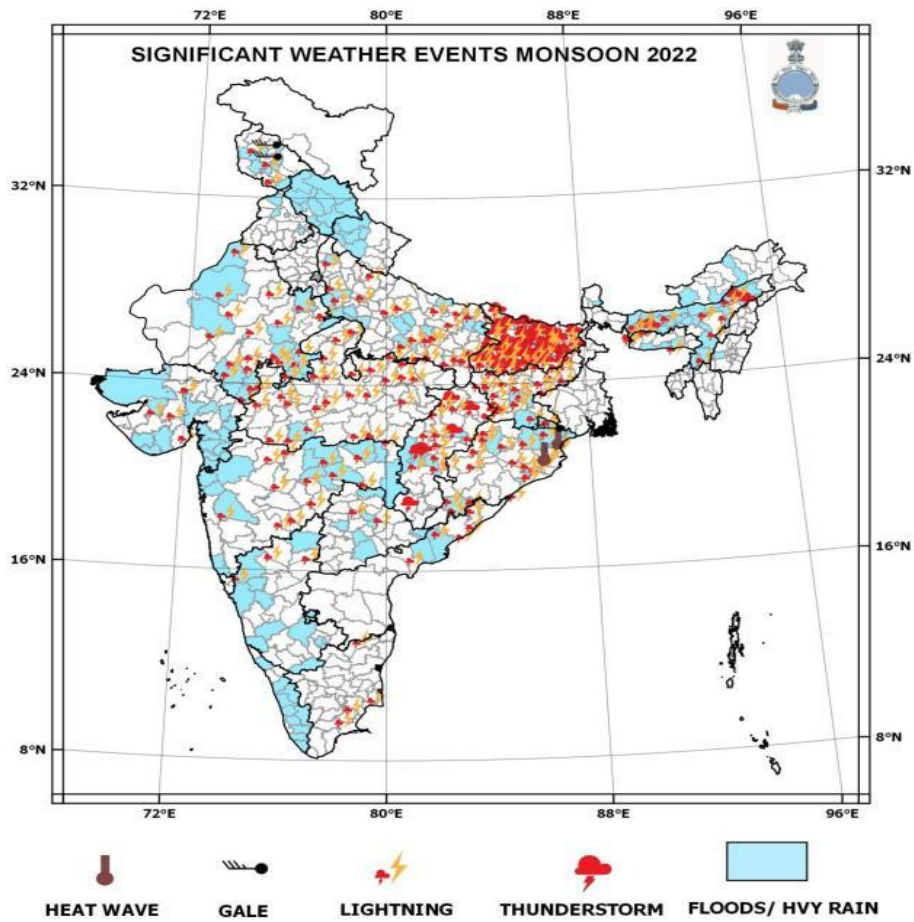


Figure 2: The significant weather events during the monsoon seasons (JJAS 2022). (CDBI, IMD Pune).

Floods, Heavy Rains & Landslides. The details of the area affected by the events are summarized and given in the Table 1.

Lightning: Total 523 persons reportedly claimed dead, 257 persons injured & 318 livestock perished, during Monsoon 2022, cause of Lightning. The details of the area affected by the events are summarized and given in the Table. 2.

Thunderstorm: Total 174 persons reportedly claimed dead, 9 person injured & 62 livestock perished, during Monsoon 2022, because of Thunderstorm. The details of the area affected by the events are summarized and given in the Table3.

Heat Wave: Total 3 person reportedly claimed dead, during Monsoon 2022, because of Heat Wave. The details of the area affected by the events are summarized and given in the Table 4.

Gale: A total of 4 persons were reportedly claimed dead and 8 persons were injured during Monsoon 2022, because of Gale. The details of the area affected by the events are summarized and given in the Table 5.

4. Cyclonic Disturbances during October-December 2022.

During the season, seven low-pressure systems (2 cyclonic storms and 3 depressions) were formed (Fig. 3). The frequency and place of origin of these low-pressure systems formed over the Indian region during the post-monsoon season are shown in the Table 6.

The 5 systems formed during the post-monsoon seasons are given below.

(i) **Cyclonic Storm ‘SITRANG :** (22-25 October), Crossed Bangladesh coast between Tinkona and Sandwip close to Barisal during 2100 and 2330 hrs IST of 24th October Weakened into a well-marked low pressure area over northeast Bangladesh and adjoining Meghalaya at 0830 hrs IST of the 25th October.

(ii) **Depression :**(20-22 November), Weakened into a well-marked low pressure area over West central and adjoining Southwest Bay of Bengal off

South Andhra Pradesh-North Tamilnadu coast at 0300 UTC of 22nd November.

(iii) **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 09th 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 10th December.

(iv) **Deep Depression:** (14-17 December), Weakened into a well-marked low pressure area over westcentral Arabian Sea at 1200 UTC of 17th December.

(v) **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 25th December.

Details about the two cyclones formed in the post-monsoon seasons are given below.

Cyclonic Storm ‘SITRANG : (22-25 October): 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 east central 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 east central

Table 1. Areas affected and loss of life due to Floods, Heavy Rains & Landslides.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
14 to 30 Jun.; 1 to 9,12,14, 17,19 Jul.	161	3	31	113355	Bajali, Barpeta, Biswanath, Cachar, Chirang, Darrang, Dhemaji, Dhubri, Dibrugarh, Dima Hasao, Goalpara, Golaghat, Hailakandi, Hojai, Kamrup Rural, Kamrup Metro, Karimganj, Kokrajhar, Lakhimpur, Morigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Tamulpur, Udalguri, (Assam)
24 Jun.; 6, 9, 10 to 14, 18, 19 Jul.; 4 to 10 Aug.; 11 to 14 & 16 Sep.	75	14	5	3597	Akola, Amaravati, Aurangabad, Bhandara, Gadchiroli, Mumbai Suburban, Nagpur, Nashik, Palghar, Pune, Sindhudurg, Thane, Washim, Yavat mal (Maharashtra)
29, 30 Jun.; 6, 14 Jul.; 11, 15, 19, 20; Aug.; 25, 26 Sep.	64	32	11	37	Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Lahaul & Spiti, Mandi, Shimla, Sirmaur, Solan, Una (Himachal Pradesh)
30 Jun.	56	18	5		Noney (Manipur) [Massive Landslide]
2,8,13 to 20 & 24 to 28 Jul.; 1,8,10,16, 20, 22 Aug.	47	4	2		Banswara, Baran, Bikaner, Bundi, Dholpur, Dungarpur, Ganganagar, Jhalawar, Jodhpur, Kota, Pratapgarh, Tonk, Udaipur (Rajasthan)
16, 17,21, 23, 24, 26 Sep.	36	20			Agra, Aligarh, Amethi, Balrampur, Deoria, Etawah, Fatehpur, Firozabad, Gorakhpur, Lucknow, Mathura, Muzaffarnagar, Unnao (Uttar Pradesh)
19 Jun.; 7, 8, 13, 20, 27,30, 31 Jul.; 11 Aug.	31	25	40	0	Anantnag, Budgam, Kathua, Poonch, Rajouri, Ramban, Reasi (Jammu & Kashmir)
16 Jul.; 1, 2, 29 Aug.	26		5		Ernakulam, Idukki, Kannur, Kollam, Kottayam, Malappuram, Pathanamthitta, Palakkad, Thrissur, Thiruvananthapuram & Parts of Kerala
12 Jun.; 11 to 13 Jul.	24				Ahmedabad, Amreli, Bharuch, Chhota Udepur, Dang, Gir Somnath, Junagadh, Kheda, Kutch, Morbi, Narmada, Navsari, Panchmahal, Surat, Tapi, Valsad & parts of Gujarat
4,6,22 Jul.; 1,4,30,31 Aug.; 4, 5, 6, 9, 11, 12 Sep.	23	10		804	Bangalore Urban, Belgaum, Chamarajanagar, Chikmagalur, Dakshina Kannada, Dharwad, Gulbarga, Haveri, Tumkur, Uttara Kannada (Karnataka)
19 Jul.; 19, 28 Aug.; 22 Sep.	13	9	7		Dehradun, Pauri Garhwal, Rudraprayag, Tehri Garhwal, Uttarkashi (Uttarakhand)
13,14,17, 19, 21, 22 Aug.	12	7			Balasore, Keonjhar, Khordha, Koraput, Mayurbhanj, Sambalpur (Odisha)
8, 12, 14, 22, 23 Jul.	11	3			Karimnagar, Kumuram Bheem Asifabad, Medak, Nalgonda, Warangal Urban, Yadadri Bhuvanagiri (Telangana)
9, 16 Jun.	9	0			East Khasi Hills, South West Khasi Hills, South Garo Hills, South West Garo Hills (Meghalaya)
11,14 Jul.; 10 Aug.	7	1			Dhamtari, Durg, Janjgir Champa, Rajnandgaon (Chhattisgarh)
18 to 25 Jul.	7				Eluru, Konaseema, West Godavari (Andhra Pradesh)
18,19, 28, 29 Jun.	5	5			Papum Pare, West Kameng West Siang (Arunachal Pradesh)
20, 21 Aug.	5	3			Ramgarh, Ranchi, West Singhbhum (Jharkhand)
28 Jun.	3	8			Gangtok / East Sikkim (Sikkim)
19 Jun.	3				Fatehgarh Sahib, Gurdaspur, Kapurthala (Punjab)
22 Jun.	1				Khandwa (Madhya Pradesh)

Table 2. Area affected and death due to lightning.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
1, 11, 15, 16, 17, 23, 25, 28, 29 Jun.; 2, 3, 6, 8, 9, 11, 12, 15, 19, 25 Jul.; 4 to 7Aug.	88	78		57	Agar Malwa, Ashoknagar, Balaghat, Bhind, Bhopal, Burhanpur, Chhatarpur, Chhindwara, Damoh, Khandwa, Guna, Gwalior, Harda, Mandsaur, Panna, Ratlam, Rewa, Sagar, Satna, Shajapur, Sheopur, Shivpuri, Tikamgarh, Umaria, Vidisha, Khargone/West Nimar (Madhya Pradesh)
20, 27 Jun.; 1, 2, 25, 27 Jul.; 3 Aug.; 19 Sep.	84				Araria, Arwal, Aurangabad, Banka, Begusarai, Bhojpur, Buxar, East Champaran, Gaya, Gopalganj, Jamui, Jehanabad, Kaimur, Katihar, Khagaria, Madhepura, Madhubani, Muzaffarpur, Nalanda, Nawada, Patna, Purnia, Rohtas, Saharsa, Saran, Sheikhpura, Siwan, Supaul, West Champaran (Bihar)
28 Jun.; 3, 20, 25, 26 Jul.; 6 Aug.; 22 to 24 Sep.	62	31			Allahabad / Prayagraj, Aligarh, Amethi, Banda, Balrampur, Ballia, Basti, Badaun, Bulandshahr, Chandauli, Chitrakoot, Fatehpur, Ghazipur, Hardoi, Kaushambi, Maharajganj, Mirzapur, Muzaffarnagar, Prayagraj, Raebareli, Siddharthnagar, Sitapur, Sultanpur, Varanasi (Uttar Pradesh)
1 to 8, 10, 14 to 17, 19 to 21, 27Jul.;	61	8		40	Ajmer, Alwar, Banswara, Baran, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Ganganagar, Jaipur, Jhalawar, Jhunjhunu, Jodhpur, Kota, Nagaur, Pratapgarh, Rajsamand,
1, 4, 5, 6, 8, 9, 16 Aug.; 11, 12Sep.					Udaipur (Rajasthan)
10, 11, 12, 14 to 17, 19, 20, 23, 24, 29, 30 Jun.; 1, 2, 4 Jul.	49	32			Angul, Balasore, Bargarh, Bhadrak, Balangir, Cuttack, Deogarh, Dhenkanal, Ganjam, Jajpur, Jharsuguda, Keonjhar, Khordha, Koraput, Mayurbhanj, Nabarangpur, Naupada, Rayagada, Sundargarh (Odisha)

15, 17, 24 Jun.; 30, 31 Jul.; 1, 2, 13, 15, 28 Aug.; 10 Sep.	45	49		17	Chatra, Deoghar, Dhanbad, Dumka, East Singhbhum, Garhwa, Giridih, Godda, Gumla, Hazaribagh, Latehar, Palamu, Ramgarh, Ranchi, Saraikela Kharsawan (Jharkhand)
8, 11, 12, 18, 19, 20, 21, 23, 24 Jun.; 9, 30 Jul.; 30 Aug.; 8, 11, 28 Sep.	44	4		37	Amravati, Aurangabad, Chandrapur, Jalgaon, Jalna, Latur, Nagpur, Nanded, Osmanabad, Pune, Washim, Yavatmal (Maharashtra)
15, 17, 19 , 22, 23, 26, 29 Jun.; 26, 29 Jul.; 19 Sep.	30	12		88	Balod, Baloda Bazar, Bilaspur, Garianband, Gaurela Pendra Marwahi, Jashpur, Koriya, Mahasamund, Mungeli, Raigarh, Surajpur (Chhattisgarh)
15, 16, 22 Jun.; 3, 4, 6, 23, 26 Jul.; 6, 7, 8, 13, 18 Aug.; 3 Sep.	20	10		19	Baksa, Biswanath, Cachar, Chirang, Dhemaji, Dhubri, Goalpara, Golaghat, Karbi Anglong, Kokrajhar, Lakhimpur, South Salmara (Assam)
5, 12 Jun.; 3, 16, 28 Aug.	11	13		60	Alluri Seetarama Raju, Anakapalli, Chittoor, Eluru, Manyam, Vizianagaram (Andhra Pradesh)
14 Jun.; 6, 31 Aug.; 10, 28 Sep.	9	1			Belgaum, Bijapur, Yadgir (Karnataka)
7, 12, 19 Jun.	7	3			Bhavnagar, Morbi, Patan, Surendranagar (Gujarat)
12 Jun.; 18, 26	4	3			Pudukkottai, Sivaganga, Thiruvaur (Tamil Nadu)
Sep.					
3 Aug.; 4 Sep.	4				Jayashankar Bhupalpally, Jagtial (Telangana)
10, 22 Jun.; 29 Jul.	3	9			Baramulla, Kulgam, Udhampur (Jammu & Kashmir)
21 Aug.	1	2			East Khasi Hills (Meghalaya)
18 Sep.	1	2			Udham Singh Nagar (Uttarakhand)

Table 3. Area affected and death due to Thunderstorm.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
18 to 21, 23, 24, 28, 29 Jun.; 1, 2, 3, 9, 11, 14, 15, 19 to 31 Jul.; 1, 2, 4, 6, 7, 8, 13, 19, 23, 31, Aug.	152				Araria,Aurangabad, Banka, Begusarai, Bhagalpur, Bhojpur, Buxar, Darbhanga,East Champaran,Gaya, Gopalganj, Jamui, JehanabadKaimur,Katihar, Khagaria,Lakhisarai,Madhepura,Madhu bani, Munger, Muzaffarpur,Nalanda,Nawada, Patna,Rohtas,Saharsa,Samastipur, Saran, Sheikhpura,Sitamarhi,Siwan,Supaul, Vaishali,West Champaran (Bihar)
2, 3, 23, 28, 29 Jul.; 6 Aug.	19	7		58	Bijapur, Durg, Janjgir Champa, Jashpur, Koriya, Rajnandgaon, Surguja (Chhattisgarh)
21 Jun.; 15 Jul.; 8 Aug.	3	2		4	Goalpara, Lakhimpur, Sivasagar (Assam)

Table 4. Area affected and death due to Heatwave

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
7,8,13 Jun.	3				Balasore, Jajpur (Odisha)

Table 5. Area affected and death due to Gale

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
7 Jun.	1				Mayurbhanj (Odisha)
10, 15 Jun.	3	8			Ganderbal, Shopian (Union Territory-Jammu & Kashmir)

Table 6. Frequency of low pressure systems in Oct-Dec 2022 over North Indian Ocean.

Month /Systems	CS and above	DD	D
October	1 (BOB)		
November			1(BOB)
December	1 (BOB)	1 (AR SEA)	1 (BOB)

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

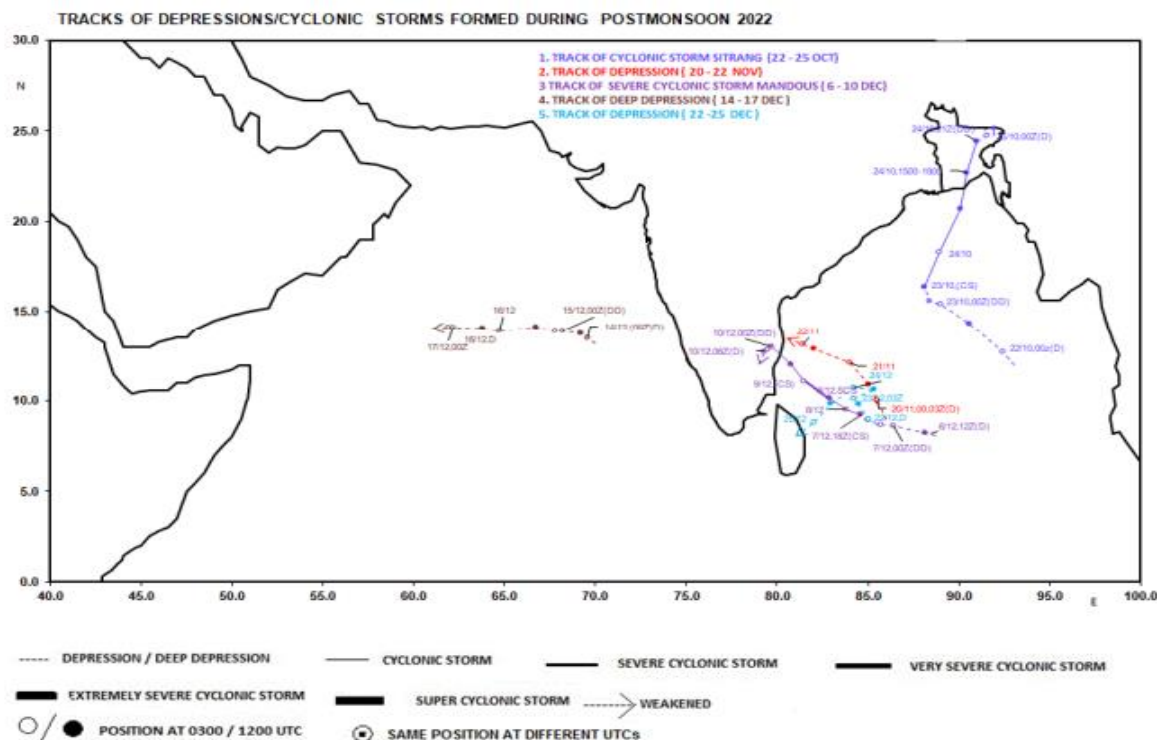


Figure 3: Tracks of intense low pressure system formed during southwest monsoon season 2022.

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 DDover 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 WMLover northeast Bangladesh and adjoining Meghalaya at 0830 hrs IST of the 25th October with the associated cyclonic circulation extending upto mid tropospheric levels. Fig. 4 shows the INSAT 3D visible imageries during the life cycle of CS : SITRANG during 22-25 Oct, 2022.

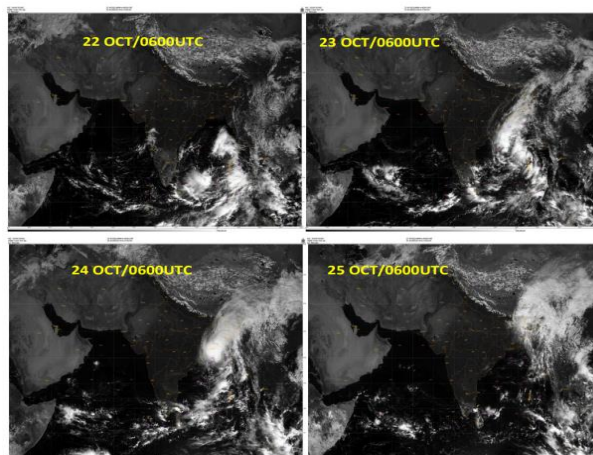


Figure 4: The INSAT 3D visible imageries during the life cycle of CS : SITRANG during 22-25 Oct, 2022.

Severe Cyclonic Storm “MANDOUS (06-10 Dec): 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 centered 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 centered 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. The Satellite and Radar Imagery Of Severe Cyclonic Storm, "Mandous" is shown in Fig. 5.

5. Other Significant Weather Events during October-December 2022.

From 1st October to 31st December, a total of 157 persons were reportedly claimed dead, more than 85 persons injured, more than 15 persons missing & 68 livestock perished. The details of casualties are

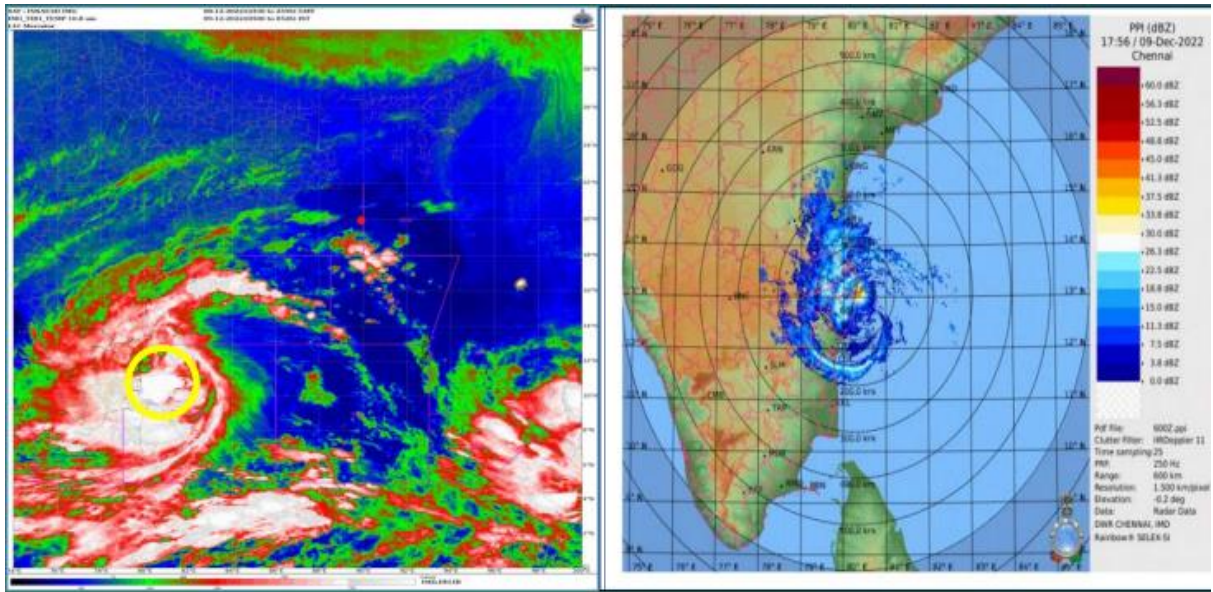


Figure 5: Satellite And Radar Imagery Of Severe Cyclonic Storm, "Mandous".

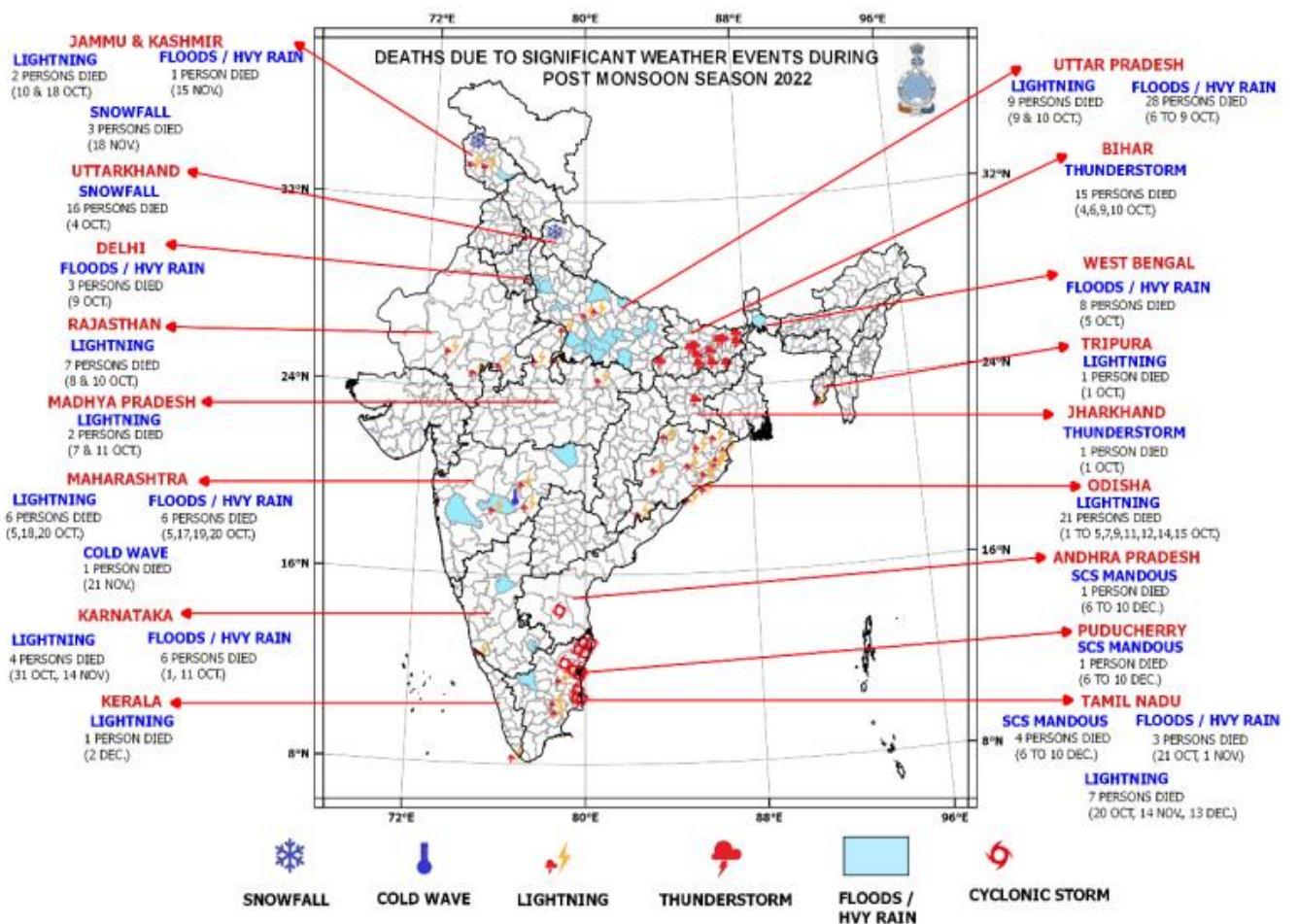


Figure 6: Significant Weather Events During Post Monsoon (October-December) 2022 (Based On Real Time Media Report).

Table 7. Area affected and death due to lightning.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
1 to 5, 7, 9, 11, 12, 14, 15 Oct.	21	24			Angul, Balasore, Balangir, Bhadrak, Cuttack, Ganjam, Jajpur, Keonjhar, Koraput, Mayurbhanj, Puri, Sundargarh (Odisha)
9, 10 Oct.	9	12			Etawah, Hardoi, Jhansi, Sitapur (Uttar Pradesh)
8 & 10 Oct.	7	7			Chittorgarh, Kota, Pali (Rajasthan)
20 Oct., 14 Nov., 13 Dec.	7				Kallakurichi, Pudukottai, Tiruchirappalli (Tamil nadu)
5, 18, 20 Oct.	6	11		2	Beed, Nanded, Washim (Maharashtra)
31 Oct., 14 Nov.	4			16	Dakshina Kannada (Karnataka)
7 & 11 Oct.	2	3			Satna, Shivpuri (Madhya Pradesh)
10 & 18 Oct.	2	1		50	Poonch, Shopian (Jammu & Kashmir)
1 Oct.	1				South Tripura (Tripura)
2 Dec.	1				Thiruvananthapuram (Kerala)

Table 8. Area affected and death due to Floods, Heavy Rains & Landslides.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
6 to 9 Oct.	28	Several			Ambedkar Nagar, Amethi, Banda, Bulandshahr, Etah, Fatehpur, Gautam Buddha Nagar, Ghaziabad, Gorakhpur, Hamirpur, Jalaun, Kanpur, Lakhimpur Kheri, Prayagraj / Allahabad, Raebareli, Shravasti (Uttar Pradesh)
5 Oct.	8	15	Several		Jalpaiguri (West Bengal)
1, 11 Oct.	6	3			Bangalore Urban, Koppal (Karnataka)
5, 17 to 20 Oct.	6	1			Beed, Nagpur, Pune (Maharashtra)
9 Oct.	3	9			Central Delhi (Delhi)
21 Oct.; 1 Nov.	3				Chennai, Erode (Tamil Nadu)
15 Nov.	1				Doda (Jammu & Kashmir)

given below, which are based on real-time media reports and other state government agencies. Fig. 6 shows significant weather events during the post-monsoon season. (Based on real-time media reports).

Lightning: A total of 60 persons were reportedly claimed dead, 58 persons injured & 68 livestock perished, from 1st October to 31st December, because of Lightning. The details of the area affected by the events are summarized and given in the Table 7.

Floods, Heavy Rains & Landslides: A total of 55 persons were reportedly claimed dead, more than

25 persons injured, & several others missing from 1st October to 31st December, because of Floods, Heavy Rains & landslides. The details of the area affected by the events are summarized and given in the Table 8.

Snowfall: A total of 19 persons were reportedly claimed dead & 15 others missing, from 1st October to 31st December, because of Snowfall. The details of the area affected by the events are summarized and given in the Table 9.

Thunderstorm: A total of 16 persons were reportedly claimed dead & 2 persons injured, from 1st October to 31st December, because of

Table 9. Area affected and death due to snowfall.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
4 Oct.	16		15		Uttarkashi (Uttarakhand)
18 Nov.	3				Kupwara (Jammu & Kashmir)

Table 10. Area affected and death due to snowfall.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
4, 6, 9, 10 Oct.	15				Araria, Banka, Begusarai, Jamui, Kaimur/Bhabua, Madhepura, Nalanda, Nawada, Patna, Purnia, Saharsa, Vaishali (Bihar)
1 Oct.	1	2			Ranchi (Jharkhand)

Table 11. Area affected and death due to Cyclone.

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE/UT) AFFECTED
6 to 10 Dec.	4				Chennai, Chinglepet, Cuddalore, Kanchipuram, Mayiladhurai, Nagapattinam, Thanjavur, Thiruvarur, Tiruvannamalai, Viluppuram & north coastal districts of Tamil Nadu
6 to 10 Dec.	1				Cuddapah (Andhra Pradesh)
6 to 10 Dec.	1				Parts of Puducherry

Thunderstorm. The details of the area affected by the events are summarized and given in the Table 10.

Cyclonic Storm: Total 6 persons reportedly claimed dead, because of Severe Cyclonic Storm "MANDOUS". The details of the area affected by the events are summarized and given in the Table 11.

Acknowledgements

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