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Cyclones and depressions over the north Indian Ocean during 2007*

1. Introduction

During 2007, in all 12 low pressure systems formed over the Indian seas. These include one Super Cyclone (Gonu), one Very Severe Cyclonic Storm (Sidr), two Cyclonic Storms (Yemyin and Akash), 5 Deep Depressions and 3 Depressions. Out of these 12 systems, two (Cyclonic Storm 'Akash' and a Depression) occurred during the pre-monsoon season, seven (Super Cyclone 'Gonu', Cyclonic Storm 'Yemyin', 3 Deep Depressions and a Depression) occurred during the southwest monsoon season and the rest three (Very Severe Cyclonic Storm 'Sidr', a Deep Depression and a Depression) occurred during the post-monsoon season.

None of the Cyclonic Storms had their landfall over the Indian region. As such, their disastrous impacts were not very severe over India, though some areas of northeast India were affected.

The Super Cyclone 'Gonu' was the first ever Super Cyclone formed over the Arabian Sea. The Super cyclone 'Gonu' and the Cyclonic Storm 'Akash', which occurred during the advance of southwest monsoon, caused major disruption in the monsoon flow and resulted into prolonged periods of hiatus in the advance of the monsoon.

The track / intensity of these systems are given in Fig. 1. A brief history and monthly distribution are given in Tables 1 and 2. The relevant ships' and buoy observations are given in Table 3. Season wise description of these systems is given below.

2. Disturbances formed during the Winter season (January and February)

No intense system formed during the season.

3. Disturbances formed during the Pre-monsoon season (March to May)

One cyclonic storm and one depression formed during the season. The details are as follows.

3.1. *Depression over the Bay of Bengal (3 - 5 May 2007)*

3.1.1. *Life cycle*

A low pressure area became well marked over the north Andaman Sea and neighbourhood on 3rd morning and subsequently concentrated into a Depression in the evening. It lay centred at: 1200 UTC of 3rd near Lat. 13.5° N / Long. 93.0° E; 0300 UTC of 4th, near Lat. 14.5° N / Long. 93.5° E; 1200 UTC of 4th, near Lat. 15.5° N / Long. 93.5° E and at 2100 UTC of 4th, near Lat. 16.0° N / Long. 94.0° E, close to Arakan coast. Moving in a northeasterly direction, it crossed Arakan coast in the morning hours of 5th; weakened into a well marked low pressure area over central Myanmar and subsequently became unimportant in the same evening.

3.1.2. *Satellite cloud features and other observations*

The system was not tracked by RADAR as it was far away from the coast.

The system centers were fixed using satellite observations. Maximum intensity of T 1.5 was reported by satellite imagery from 1200 UTC of 3rd to 2100 UTC of 4th May.

3.1.3. *Other features observed*

The lowest Estimated Central Pressure (ECP) was 998 hPa. The maximum estimated mean wind speed was 25 kts. The system moved in northeasterly direction and crossed Arakan coast in the morning hours of 5th.

3.1.4. *Weather and damage*

Widespread rainfall activity occurred over Andaman & Nicobar Islands from 3 to 5 May with isolated heavy falls on 5th May.

The chief amounts of rainfall are :

4 May : Hut Bay 4, Maya Bandar 3.

5 May : Maya Bandar 7, Hut Bay 3.

The system did not affect the weather in main land.

3.2. *Cyclonic Storm (Akash) over Bay of Bengal (13 – 15 May 2007)*

3.2.1. *Life cycle*

Under the influence of an upper air cyclonic circulation, a low pressure area formed over the east–central Bay and neighbourhood on 11th. It became well–marked on 12th, subsequently concentrated into a

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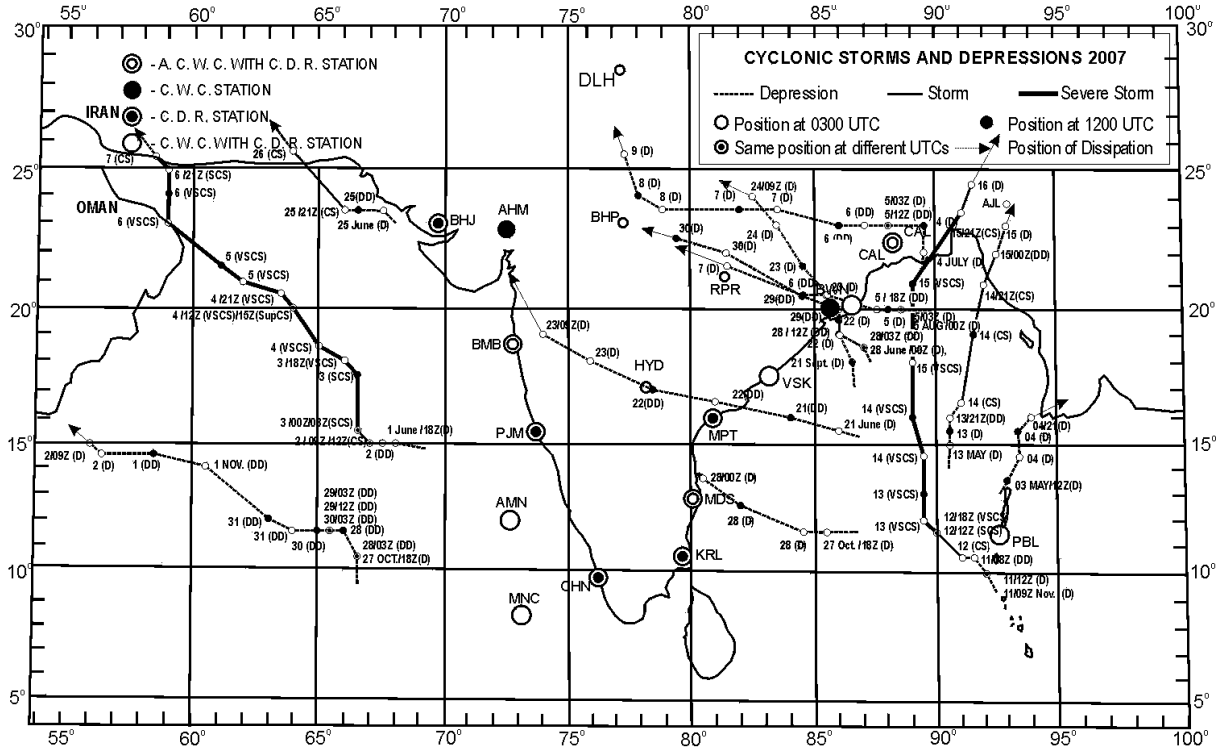


Fig. 1. Tracks of depression/storms during 2007

Depression and lay centred at 0300 UTC of 13th near Lat. 15.0° N / Long. 90.5° E (about 400 kms northwest of Port Blair) and at 1200 UTC near Lat. 15.5° N / Long. 90.5° E. Moving slowly northwards, it further intensified into a Deep Depression at 2100 UTC of 13th near Lat. 16.0° N / Long. 90.5° E. Then it moved in a northnortheasterly direction and further intensified into a Cyclonic Storm (Akash) and lay centred at 0300 UTC of 14th near Lat. 16.5° N / Long. 91.0° E (about 750 kms southeast of Kolkata) and at 1200 UTC near Lat 19.0° N / Long. 91.5° E. Continuing its northnortheasterly course, it crossed Bangladesh coast, close to Cox Bazar (near Lat. 21.2° N / Long 92.2° E) in the early morning of 15th and weakened into a Deep Depression over Bangladesh and adjoining Myanmar at 0000 UTC of 15th. It further weakened into a depression and lay centred at 0300 UTC of 15th over Mizoram and adjoining Bangladesh, about 100 kms south of Aizwal. Further moving northnortheastwards it gradually weakened and lay as a low pressure area over south Assam and adjoining Manipur in the evening of 15th and became less marked on 16th. However, the associated cyclonic circulation extended upto mid tropospheric levels and lay over Bangladesh & adjoining Assam.

3.2.2. *Satellite cloud features and other observations*

The system centres were fixed using Satellite observations, Maximum intensity of T-3.0 was reported by satellite imagery from 0800 to 2100 UTC of 14. Satellite cloud imagery of 0800 UTC of 14 is shown in Fig. 2.

3.2.3. *Other features observed*

The lowest ECP was 988 hPa. The maximum estimated maximum sustained surface wind speed was 45 kts. The system moved initially in a northerly direction and then in a northnortheasterly direction till it crossed coast. The system crossed south Bangladesh coast south of Cox's Bazar (near Lat. 21.2° N / Long 92.2° E) in the early morning of 15th as a Cyclonic Storm.

3.2.4. *Weather and damage*

Widespread rainfall activity occurred in Nagaland-Manipur-Mizoram-Tripura on 15 and over Assam & Meghalaya on 15 and 16.

TABLE 1

Brief history of cyclonic storms and depressions over the Indian seas and neighbourhood during 2007

S. No.	Category	Life Period	Place / Time of landfall	Lowest estimated central pressure (hPa)	Max. wind (estimated/observed) (kts)	Highest "T" No.
1.	D	3 – 5 May	Arakan coast in the morning of 5th May	998	25	1.5
2.	CS (Akash)	13 – 15 May	South Bangladesh coast to south of Cox Bazar (near Lat. 21.2° N / Long 92.2° E) in the early morning of 15.	988	45	3.0
3.	Sup. CS (Gonu)	1 – 7 Jun	Crossed coast of Oman in the morning hours of 6th It emerged into the Gulf of Oman and Crossed Mekran coast near Long. 58.0° E between 0300 & 0400 UTC of 7	920	127	6.5
4.	DD	21 – 23 Jun	Crossed Andhra coast close to Kakinada at 2300 UTC of 21.	988	30	2.0
5.	CS (Yemyin)	25 – 26 Jun	Crossed Pakistan coast along Long. 64.0° E between 0200 & 0300 UTC of 26	986	35	2.5
6	DD	28 – 30 Jun	Crossed Orissa coast, close to Puri between 0000 and 0100 UTC of 29	986	30	2.0
7.	DD	4 – 9 Jul	The system formed over Bangladesh coast	988	30	-
8.	DD	5 – 7 Aug	Crossed Orissa coast to the north of Paradeep between 0100 and 0200 hrs UTC of 6th	983.1	25	1.5
9.	D	21 – 24 Sep	Crossed Orissa coast, close to Puri around 1300 UTC of 22nd	990	25	1.5
10.	D	27 – 29 Oct	Dissipated over WC-Bay	1004.0	25	1.5
11.	DD	27 Oct – 2 Nov	Dissipated over WC-Arabian sea	1000	30	2.0
12.	VSCS (Sidr)	11 – 16 Nov	Crossed West Bengal - Bangladesh coast near Long. 89.8° E around 1600 UTC of 15	944	108	6.0

D – Depression, DD – Deep Depression, CS – Cyclonic Storm, SCS – Severe Cyclonic Storm, VSCS – Very Severe Cyclonic Storm, Sup. CS – Super Cyclone.

TABLE 2

Storms / depressions statistics 2007

	Winter	Pre-monsoon			Monsoon				Post-monsoon			
Name of the system	Jan – Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
					Over Bay of Bengal							
Depressions/Deep Depressions	-	-	-	1	2	1	1	1	1	-	-	7
Cyclonic Storms	-	-	-	1	-	-	-	-	-	-	-	1
Severe Cyclonic Storms	-	-	-	-	-	-	-	-	-	-	-	0
Very Severe Cyclonic Storms	-	-	-	-	-	-	-	-	-	1	-	1
Super Cyclonic Storms	-	-	-	-	-	-	-	-	-	-	-	0
Total	0	0	0	2	2	1	1	1	1	1	0	9
					Over Arabian Sea							
Depressions/Deep Depressions	-	-	-	-	-	-	-	-	1	-	-	1
Cyclonic Storms	-	-	-	-	1	-	-	-	-	-	-	1
Severe Cyclonic Storms	-	-	-	-	-	-	-	-	-	-	-	0
Very Severe Cyclonic Storms	-	-	-	-	-	-	-	-	-	-	-	0
Super Cyclonic Storms	-	-	-	-	1	-	-	-	-	-	-	1
Grand Total	0	0	0	0	2	0	0	0	1	0	0	3

TABLE 3

Crucial ship/buoy observations during the storm/depression periods 2007

Call Sign (1)	Date/Time (UTC) (2)	Lat. (°N) (3)	Long. (°E) (4)	Dir. (Deg.) (5)	Speed (kts) (6)	PPPP (hPa) (7)
(A) Cyclonic Storm (Akash) over Bay of Bengal (13-15 May 2007)						
Buoy	130300	15.0	87.5	360	5	1002.9
Buoy	130300	12.3	91.6	270	5	1002.5
MB11	131200			290	15	1000.9
DS 4	131200			20	10	1000.9
DS 4	140300			320	10	1000.7
MB11	140300			250	15	1002.7
DS4	141200			270	15	998.3
(B) Super Cyclonic storm (Gonu) over the Arabian Sea (1 – 7 June 2007)						
ABKV3	021200			230	25	1008.0
A8EGS	020000			230	25	1006.0
C6FQ6	061200	21.9	60.5	180	30	994.0
C6FQ6	070000			180	05	995.0
(C) Deep Depression over the west central Bay (21 – 23 June 2007)						
Buoy	210300	14.0	83.2	70	00	995.7
Buoy	210300	17.5	87.5	90	00	996.7
Buoy	210300	12.5	85.0	270	10	996.0
VVFI	211200	13.4	84.5	230	50	991.7
(D) Deep Depression over the northwest Bay (28 – 30 June 2007)						
VVZV	281200	19.0	88.0	230	35	1000.2
(E) Depression over the west central and adjoining northwest Bay (21 – 24 September 2007)						
Buoy	23.5	87.5				994.7
Buoy	23.5	87.5				995.3
Buoy	23.5	87.5				994.4
(F) Depression over the east central (27 – 29 October 2007)						
OB8				270	15	1003.8
(G) Deep Depression over the southwest Arabian Sea (27 October – 2 November 2007)						
A8IE6	280000	9.0	69.5	250	05	1004.0
DIHC	281200	10.3	66.2			1005.0
DDDIZ	281200	11.0	62.4	340	15	1005.5
DDDIZ	290000	10.8	66.7	230	30	992.5
MTDUS	291200	9.3	64.5	290	40	999.3
A8E08	291200	10.8	62.4	290	20	1004.0

TABLE 3 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
UCKB	300000	14.9	67.8	90	35	1000.6
UCKB	301200			90	20	1001.3
ABKY	301200			230	25	1005.5
PFDH	310000	8.6	61.4	290	20	1003.9
A8KY7	310000	11.0	67.2	180	25	1004.0
AIYJM3	310000	14.8	69.0	70	35	1003.0
A8KY7	311200	13.2	62.9	200	25	998.5
A8KD7	010000	15.0	56.5	90	45	1006.0
P3BA7	010000	11.2	61.7	200	10	1002.0
VTXG	010000	11.6	62.8	200	20	1007.0
P3BA7	011200			250	30	1010.0
(H) Very Severe Cyclonic Storm (Sidr) over the Bay of Bengal (11 – 16 November 2007)						
VTEZJ	111200	11.6	90.1	70	30	1005.7
Ship23493	120000			320	02	1006.2
BUOY	121200	9.0	89.4			1003.2
Ship23493	121800			270	02	1005.9
DS5				20	15	1010.3
VTZT	131200	14.6	85.4	360	35	1005.2
DS5	141200			20	15	1006.4

4. Disturbances formed during the Monsoon Season *(June to September)*

It was an active season. In all, 7 intense low pressure systems including a super cyclone (Gonu) and one cyclonic storm (Yemyin): the details of which are given below:

4.1. *Super Cyclonic Storm (Gonu) over the Arabian Sea (1 – 7 June 2007)*

4.1.1. *Life cycle*

Under the influence of an upper air cyclonic circulation over the east central Arabian Sea off south Maharashtra – Goa coasts, a low pressure area formed over the east central Arabian Sea on 1 morning. It became well marked in the evening and concentrated into a Depression at 1800 UTC of 1 near Lat. 15.0° N/ Long. 68.0° E. Moving westwards, it further intensified into a Deep Depression and lay centred at 0300 UTC of 2 near Lat. 15.0° N / Long. 67.5° E. It further intensified into a Cyclonic Storm (Gonu) and lay centred at 0900 UTC of 2 near Lat. 15.0° N / Long. 67.0° E and remained practically stationary over there at 1200 UTC of 2. Subsequently, moving northwards, it intensified into a Severe Cyclonic Storm at 0000 UTC of 3 near Lat. 15.5° N / Long. 66.5° E and remained practically stationary at 0300 UTC of 3. Further moving northwards, it lay centred at 1200 UTC of 3, over the east central Arabian Sea, near Lat. 17.5º N / Long. 66.5º E. Then it moved northwestwards and intensified into a Very Severe Cyclonic Storm and lay centred at 1800 UTC of 3 near Lat. 18.0º N / Long. 66.0º E. Subsequently moving westnorthwestwards, it lay centred at 0300 UTC of 4, over the central parts of Arabian Sea, near Lat. 18.5º N/ Long. 65.0º E and at 1200 UTC of 4, near Lat. 20.0º N/ Long. 64.0º E. Remaining practically stationary over there, it further intensified into a Super Cyclonic Storm at 1500 UTC of 4, near Lat. 20.0º N / Long. 64.0º E. Further moving northwestwards, it weakened into a Very Severe Cyclonic Storm at 2100 UTC of 4, near Lat. 20.5º N/ Long. 63.5º E and lay centred near Lat. 21.0º N/ Long. 62.0º E and near Lat. 21.5º N / Long. 61.0º E at 0300 & 1200 UTC of 5 respectively. It crossed the Oman coast in the morning hours of 6 and lay centred near

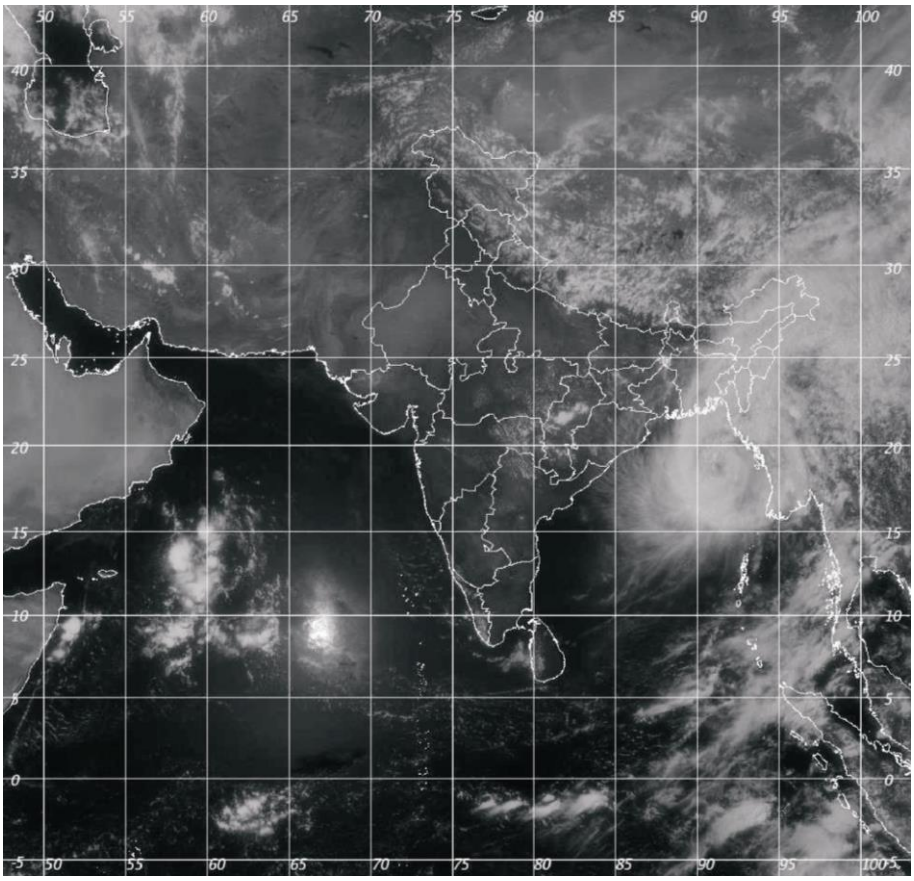


Fig. 2. VIS image showing the vortex with centre 18.0° N / 91.7° E and intensity T3.0

Lat. 23.0º N / Long. 59.0º E at 0300 UTC of 6. It emerged into Gulf of Oman and lay centred at 1200 UTC of 6, near Lat. 24.0° N / Long. 59.0º E. Subsequently, it weakened into a Severe Cyclonic Storm and lay centred at 2100 UTC of 6, near Lat. 25.0º N / Long. 59.0º E. It further weakened into a Cyclonic Storm and lay centered at 0000 UTC of 7 near Lat. 25.0º N / Long. 59.0º E and at 0300 UTC near Lat. 25.5º N / Long. 58.5º E. The cyclonic storm crossed Mekran coast, along Long. 58º E, between 0300 & 0400 UTC of 7.

4.1.2. *Satellite cloud features and other observations*

The system centers were fixed using satellite observations. Maximum intensity of T 6.5 was reported by satellite imagery from 1500 to 1800 UTC of 4th June 2007. Visible EYE with broken to solid intense to very intense convection was seen at 0000 UTC of 4th and with solid intense to very intense convection was seen from 0300 to 1800 UTC of 4th. Satellite cloud imagery of 1200 UTC of 4 is shown in Fig. 3.

The system was not tracked by Radar, as it was far away from the coast.

4.1.3. *Other features observed*

The lowest ECP was 920 hPa. The estimated maximum sustained wind speed was 127 kts. It moved in a northwesterly direction. It crossed the Oman coast in morning hours of 6th as Very Severe Cyclonic Storm and remerged into the Gulf of Oman and weakened into a cyclonic storm. The Cyclonic Storm crossed Mekran Coast near Long. 58.0° E between 0300 and 0400 UTC of 7th June 2007.

4.1.4. *Weather and damage*

As the system moved away from the Indian coast, it did not affect the weather in country.

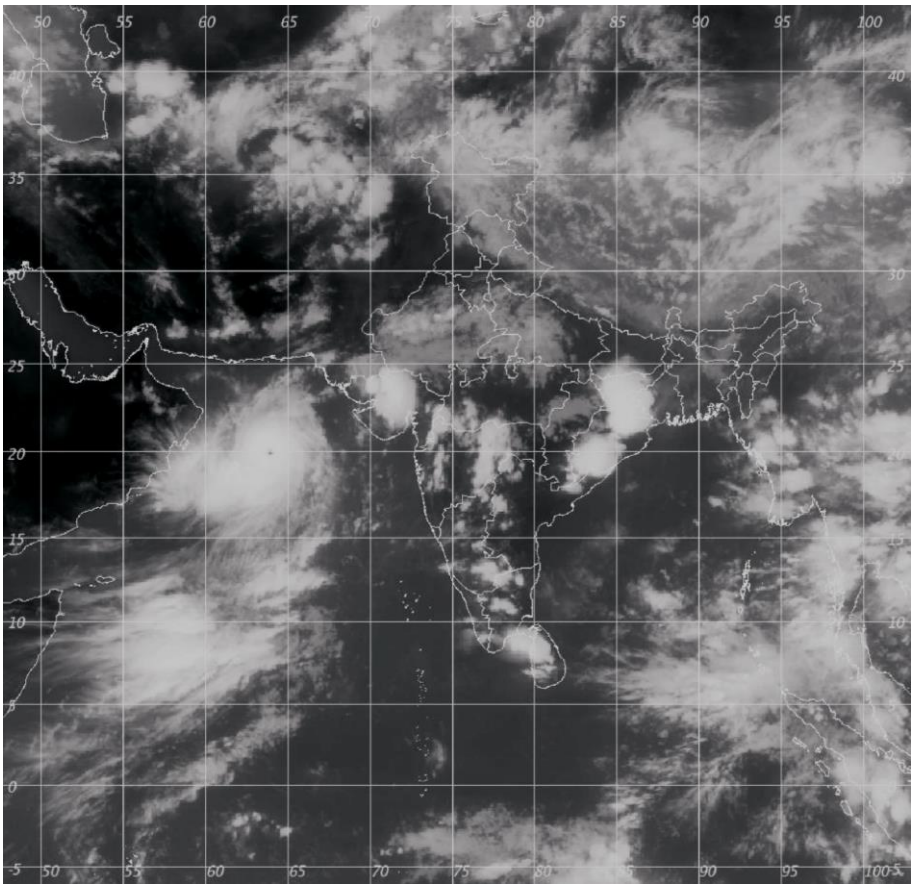


Fig. 3. Vortex centered at 19.9° N / 64.1° E with intensity T6.5

4.2. *Deep Depression over the west central Bay of Bengal (21 – 23 June 2007)*

4.2.1. *Life cycle*

A low pressure area formed over the east central Bay on 19 and became well marked over the central parts of Bay on 20. It concentrated into a Depression and lay centred at 0300 UTC of 21 over the west central Bay near Lat. 15.5º N / Long. 86.0º E (about 430 km eastsoutheast of Kakinada). Moving westnorthwestwards, it intensified into a Deep Depression and lay centred at 1200 UTC of 21, near Lat. 16.0º N / Long. 84.0º E. The system crossed north Andhra Pradesh coast north of MPT in the early hrs of 22 June 2007 between 0100 & 0300 UTC. Further moving westwards, it lay centred at 0300 UTC of 22, over coastal Andhra Pradesh, near Gannavaram and at 1200 UTC over Telangana, 50 km southeast of Hyderabad. It continued to move in a westnorthwesterly direction and weakened: into a Depression which lay centred at 0300 UTC of 23, over Marathwada, near 'Osmanabad' and lay close to Ahmednagar at 0900 UTC of 23. It weakened into a well marked low pressure area over north Konkan and neighbourhood at 1200 UTC of 23 and emerged into the Arabian Sea and lay over the northeast Arabian Sea and adjoining Saurashtra & Kutch in the morning of 24.

4.2.2. *Satellite cloud features and other observations*

The maximum intensity of the system as reported by satellite imagery was T 2.0 from 1200 UTC of 21st to 0200 UTC of 22nd.

The system was tracked by DWR Machilipatnam on 21st and 22nd and CDR Mumbai from 0000 to 2100 UTC of 23rd. CDR Goa also tracked the system on 23rd.

As per the hourly observations of HWSR data, the highest maximum wind speed recorded at Machilipatnam was westnorthwesterly/26 kts at 2200 UTC of 21st.

4.2.3. *Other features observed*

The maximum mean wind speed was 30 kts. The system moved in a westnorthwesterly direction and

crossed Andhra coast close to Kakinada around 2300 UTC of 21st June. It maintained intensity of depression over land and weakened into a well marked low pressure area over north Konkan and neighbourhood on 23rd evening and reemerged into the Arabian Sea.

4.2.4. *Weather and damage*

Andhra Pradesh

The southwest monsoon was vigorous in coastal Andhra Pradesh on 22nd and 23rd and in Rayalaseema on 23rd and was active over Telangana on 23rd and over coastal Andhra Pradesh on 24th. Extremely heavy rainfall occurred at isolated places in coastal Andhra Pradesh and Rayalaseema on 22nd.

The chief amounts of rainfall (cm) are:

22 Jun ′07 Avanagadda 32, Baptla 25, Repalla 20, Ongole 17.

23 Jun ′07 Cumbum & Yerragondapalem 18 each.

Damage

58 people died in Andhra Pradesh due to torrential rain, sea water inundation etc. Houses, roads, railway lines and crops were damaged in the districts of Prakasam, Kurnool and Guntur.

Orissa

The southwest monsoon was active on 22nd and 23rd. Very heavy rain occurred at isolated places on 22nd.

The chief amounts of rainfall (cm) are:

22 Jun ′07 Pottangi 14.

Maharashtra

The southwest Monsoon was vigorous in Konkan & Goa on 23rd and 24th and on 24th in Madhya Maharashtra. Very heavy to extremely heavy rainfall occurred at a few places in Konkan & Goa from 23rd to 25th. Widespread to fairly widespread rainfall activity also occurred in Marathwada from 21st to 24 and in Vidarbha on 24th and 25th.

The chief amounts of rainfall (cm) are:

23 Jun ′07 Gaganbavada 28, Rajapur 27, Ratnagiri & Sanguem 21 each, Marmugoa 20, Quepem 19, Mahad 18, Malvan & Canacona 17 each, Lanja & Jat 16 each, Guhagar 15, Mhasala, Chiplun, Shirol, Sangli, Shrivardhan, Vita, Murud & Pune (Pashan) 13 each.

24 Jun ′07 Mhasala 30, Mumbai (CLB) & Mahad 28 each, Dapoli 27, Vaibhavwadi 25, Rajapur 24, Alibag, Pali & Mahabaleshwar 23 each, Poladpur 22, Mumbai (SCZ) 21, Roha, Tala & Khed 19 each each, Mandangad 18, Matheran & Sawantwadi 17 each, Panjim & Shrivardhan 16 each, Mangaon, Pen, Mevad, Kolhapur & Murud 15 each, Harnai, Kankavali, Thane & Alibag 14 each, Devgad, Bhiwandi & Hatkanangale 13 each.

25 Jun ′07 Alibag 17, Igatpuri & Rajapur, Mahabaleshwar 15 each, Thane 13.

33 people died in Maharashtra due to torrential rain. Also 13 crew members died in a ship wreck caused by strong winds and high seas off the west coast.

Karnataka

The southwest monsoon was vigorous on 23rd and 24th in interior Karnataka and active in coastal Karnataka during the same period. Very heavy to extremely heavy rain occurred at isolated places on 23rd and 24th in interior Karnataka.

The chief amounts of rainfall (cm) are:

23 Jun ′07 Agumbe 42, Bhagamandala 39, Kollur 33, Siddapura 28, Sahahpur 21, Sidhanur 19.

24 Jun ′07 Kollur 25, Kottingehara 21, Talaguppa 18, Sirsi 17, Belgaum 10.

Heavy rain accompanied with gusty winds and rough sea claimed two lives as Den Den Ship sank off Mangalore coast. Many trees and electric poles were uprooted. Very strong and gusty winds resulted into sea erosion, which damaged houses. Many villages were marooned. Heavy loss of life and property due to heavy rain were reported from the state during the period. As a whole 43 people were reported dead between 21st and 24th and about 1300 houses were damaged.

Gujarat

Monsoon was active (with isolated heavy falls) in Saurashtra & Kutch on 24.

The chief amounts of rainfall are:

24 Jun ′07 Veraval 10.

4.3. *The Cyclonic Storm (Yemyin) over the north Arabian Sea (25 – 26 June 2007)*

4.3.1. *Life Cycle*

The remnant low pressure area of a Deep Depression formed over the west central Bay, emerged into north Arabian Sea on 24 evening. It became well marked during the night and concentrated into a Depression over the northeast Arabian Sea, lay centred at 0300 UTC of 25, near Lat. 23.5º N / Long. 67.5º E (about 150 km. westnorthwest of Naliya). Slowly moving westwards, it intensified into a Deep Depression in the evening and lay centred at 1200 UTC of 25 near Lat. 23.5º N / Long. 66.5º E. Moving northwestwards, it further intensified into a Cyclonic Storm 'Yemyin' and lay centred at 2100 UTC of 25 near Lat. 23.5º N/ Long. 66.0º E. Further moving northwestwards, it crossed the west coast of Pakistan between 0200 & 0300 UTC along Long. 64.0º E. It lay centred near Lat. 25.5º N/ Long. 64.0º E at 0300 UTC of 26 as a Cyclonic Storm and weakened thereafter.

4.3.2. *Satellite cloud features and other observations*

Maximum intensity of T 2.5 was reported by satellite imagery from 2100 UTC of 25th to 0000 UTC of 26th.

4.3.3. *Other features observed*

The estimated mean wind speed was 35 kts. The remnant of the Deep Depression over Bay (21–23 June 2007) emerged into the Arabian Sea and re–intensified into a depression on 25th. The system moved northwestwards and crossed the southwest coast of Pakistan between 0200 & 0300 UTC of 26th as Cyclonic Storm (Yemyin) near Long. 64° E. Even after crossing the coast, it maintained its intensity as Cyclonic Storm for some time.

4.3.4. *Weather and damage*

As the system moved away from the coast, it did not cause any damage in India.

Monsoon was vigorous on 25 and active on 26 in Saurashtra & Kutch. It was also active on 25 in Gujarat region.

The chief amounts of rainfall (cm) are:

25 Jun ′07 Kesod, Navsari & Surat 7 each.

4.4. *Deep Depression over the northwest Bay (28 – 30 June 2007)*

4.4.1. *Life cycle*

A low pressure area formed over the northwest Bay off Orissa coast on 26. It became well marked over the northwest and adjoining central Bay on 27. Subsequently it concentrated into a Depression and lay centred at 0000 UTC of 28, near Lat. 18.5º N / Long. 87.0º E, about 200 km southeast of Puri. It remained practically stationary and intensified into a Deep Depression by 0300 UTC of 28. Moving northwestwards, it lay near Lat. 19.0º N/ Long. 86.0º E at 1200 UTC of 28 and crossed Orissa coast, close to Puri between 0000 & 0100 UTC of 29. It lay over coastal Orissa, close to Bhubaneswar, at 0300 UTC of 29. Further moving westnorthwestwards, it lay centred about 50 km. east of Sambalpur at 1200 UTC of 29, subsequently weakened into a Depression and lay centred at 0300 UTC of 30, over east Madhya Pradesh, about 150 km southeast of Jabalpur and at 1200 UTC, about 50 km southwest of Jabalpur. Moving further westwards, it weakened into a well marked low pressure area and lay over west Madhya Pradesh and adjoining east Rajasthan on the morning of 1 July and over southwest Madhya Pradesh and adjoining southeast Rajasthan and Gujarat region in the evening. It lay as a low pressure area over southeast Rajasthan and adjoining Gujarat and west Madhya Pradesh on 2 & 3 July and became less marked on 4 July.

4.4.2. *Satellite cloud features and other observations*

The system was tracked by DWR Kolkata.

4.4.3. *Other features observed*

The system moved generally in a northwesterly direction. Before crossing the coast, it moved in a northerly direction. The system crossed Orissa coast near Puri between 0000 & 0100 UTC of 29th.

4.4.4. *Weather and damage*

Orissa

No significant damage was caused by the system. However, the southwest Monsoon was vigorous on 29th and 30th June 2007. Very heavy to extremely heavy rainfall occurred in Orissa during 27th and 30th June 2007.

The chief amounts of rainfall (cm) are:

26 Jun ′07 Umerkote 16.

27 Jun ′07 Koraput 24, Jeypore 14.

28 Jun ′07 Jeypore 27.

29 Jun ′07 Koraput 22, Jeypore 21, Pottangi & Nawarangpur 20 each, Umerkote 18, Krishnaprasad 17, Koshagumda 16, Jaleswar 13.

30 Jun ′07 Paikmal 25, Tikabali 24, Khairamal 21, Kantamal & Sonepur 19 each.

Andhra Pradesh

The southwest monsoon was vigorous in coastal Andhra Pradesh on 28 & 29. It was vigorous in Rayalaseema and active in Telangana on 28.

The chief amounts of rainfall (cm) are:

28 Jun ′07 Koida 12, Puspatirga 10, Anandpuram 9, Kakinada, Prathipadu & Ranasthalam 8 each, Manthani 7.

29 Jun ′07 Hukumpeth 11, Paderu 10, Ranasthalam 9.

Chattisgarh

The southwest monsoon was vigorous with extremely heavy rainfall on 30 and active on 29.

The chief amounts of rainfall (cm) are:

29 Jun ′07 Raipur 11, Mul 10.

30 Jun ′07 Raipur 30, Mana AP 27, Baloda Bazar 22, Simga 18, Durg 17.

2 persons died and more than 200 houses were under water due to torrential rain.

4.5. *Deep Depression over Bangladesh coast (4 – 9 July 2007)*

4.5.1. *Life cycle*

Under the influence of an upper air cyclonic circulation, a low pressure area formed over the northeast Bay on 3 morning. It became well marked on 3 evening and concentrated into a Depression at 0300 UTC of 4, over Bangladesh coast, near Lat. 22.0° N / Long. 89.5 E about 150 km southeast of Kolkata. It lay near Lat. 23.0° N / Long. 89.5° E at 1200 UTC of 4 and near Lat. 23.0º N / Long. 88.0º E at 0300 UTC of 5. It remained practically stationary over there and intensified into a Deep Depression at 1200 UTC of 5. Moving slowly westwards, it lay centred at 0300 UTC of 6, near Lat. 23.0º N / Long. 87.0º E, close to Bankura and at 1200 UTC, near Jamshedpur. Further moving westnorthwestwards, it weakened into a Depression and lay centred at 0300 UTC of 7, near Lat. 23.5º N / Long. 83.5º E, close to Ambikapur and at 1200 UTC, near Lat. 23.5º N / Long. 82.0º E about 50 km north of Pendra. Subsequently it lay centred at 0300 UTC of 8, near Lat. 23.5º N / Long. 79.0º E, about 50 km southeast of Sagar and at 1200 UTC, near Lat. 24.0º N / Long. 78.0º E, about 50 km northwest of Sagar. It lay over northwest Madhya Pradesh and neighbourhood, close to Shivpuri at 0300 UTC of 9 and weakened into a well marked low pressure area over northwest Madhya Pradesh and adjoining east Rajasthan in the evening. It further weakened into a low pressure area over southeast Rajasthan and neighbourhood on 10 and became less marked on 11.

4.5.2. *Satellite cloud features and other observations*

The system was tracked by DWR Kolkata.

4.5.3. *Other features observed*

The system formed over Bangladesh coast and intensified into a Deep Depression over land, about 50 kms north of Kolkata. It then moved in a westerly direction till 8th. It finally moved in a northwesterly direction and weakened into a low pressure area over northwest Madhya Pradesh and adjoining east Rajasthan on 9th.

4.5.4. *Weather and damage*

Widespread to fairly widespread rainfall with isolated very heavy to extremely heavy spells occurred in Gangetic West Bengal from 3rd to 6th; Orissa on 6th & 7th; Jharkhand on 5th & 6th ; Chattisgarh on 7th; east Madhya Pradesh on 8th; west Madhya Pradesh on 7th & 8th; Vidarbha on 8th; east Rajasthan on 8th & 9th; Gujarat Region from 9th to 11th. Widespread rainfall activity with isolated heavy rainfall also occurred in Bihar on 6th.

The chief amounts of rainfall (cm) are:

Gangetic West Bengal

03 Jul ′07 Diamond Harbour & Kolkata 17 each, Uluberia 11.

04 Jul ′07 Haldia & Durgachak 22 each, Diamond Harbour 19, Canning Town 18, Kontai 16, Kolkata 14.

05 Jul ′07 Phoolberia 28, Kharidwar 24, Bankura & Durgapur 22 each, Kolkata AP 11.

06 Jul ′07 Kharagpur 27, Mohanpur 26, Purihansa, Midnapur & Kalaikunda 23 each.

Orissa

06 Jul ′07 Jamsolaghat 27, Jhumpura, Joshipur & Rairangpur 21 each, Rajghat 20.

07 Jul ′07 Deogarh 22, Jamankira 20.

Jharkhand

05 Jul ′07 Putki 15, Panchet 13.

06 Jul ′07 Jamshedpur 19.

Chattisgarh

05 Jul ′07 Katghora 17, Pali 14, Mahasamund 13.

06 Jul ′07 Pali 9, Katghora 8.

East Madhya Pradesh

08 Jul ′07 Amrawara 14.

West Madhya Pradesh

07 Jul ′07 Narsinghgarh 18.

08 Jul ′07 Harda 40, Betul 37, Agar 22, Bhasdehi 19.

09 Jul ′07 Ratlam 31, Agar 19, Ujjain 19, Dhar 18.

Vidarbha

08 Jul ′07 Amravati 11.

East Rajasthan

08 Jul ′07 Ramganjmandi 25, Rawatbhata 21, Bakni 15.

09 Jul ′07 Garhi 49, Danpur 39, Sagwara 35, Kesarpura 33, Banswara 32, Bagidora 31, Ghatol & Kushalgarh 25 each.

10 Jul ′07 Mount Abu 12.

Gujarat Region

09 Jul ′07 Bhiloda 24, Kadana 20, Idar 15.

10 Jul ′07 Dhansura 47, Bayad 41, Prantij 37, Vijapur 33, Himmatnagar 30.

11 Jul ′07 Bayad 26, Kapadvanj 19.

Torrential rain took a toll of 137 persons (51 in Gangetic West Bengal, 37 in Madhya Pradesh, 17 each in Vidarbha and Orissa and 15 in Jharkhand). Road and rail traffic were disrupted; huge crops and thatched houses were damaged in Gangetic West Bengal. Many villages in Madhya Pradesh marooned. Kharif corps damaged in Orissa. 784 villages were cutoff in Orissa.

4.6. *Deep Depression over the northwest Bay (5 – 7 August 2007)*

4.6.1. *Life cycle*

Under the influence of an upper air cyclonic circulation, a low pressure area formed over the northwest Bay off West Bengal – Orissa coasts on 4 morning. It concentrated into a Depression at 0000 UTC of 5, lay centred near Lat. 20.0° N / Long. 88.5° E, at 0300 UTC near Lat. 20.0° N / Long. 88.5° E and at 1200 UTC, near Lat. 20.0º N / Long. 88.0º E. Moving slightly westwards, it intensified into a Deep Depression at 1800 UTC of 5 and lay centered near Lat. 20.0º N / Long. 87.5º E and at 0000 UTC of 6 near Lat. 20.5° N / Long. 87.0° E, close to Paradeep. Moving westwards, it crossed Orissa coast between Paradeep and Chandabali between 0100 & 0200 UTC of 6 and lay centred close to Cuttack at 0300 UTC. Moving further westwards, it lay centred close to Phulbani, at 1200 UTC of 6. Subsequently moving in a westnorthwesterly direction, it weakened into a Depression over Chattisgarh and lay centred close to Raipur at 0300 UTC of 7. It further weakened into a well marked low pressure area over central parts of Madhya Pradesh and neighbourhood in the evening of 7; lay over northwest Madhya Pradesh and neighbourhood on 8 morning; as a low pressure area over north Gujarat and

neighbourhood on 9; Saurashtra & Kutch and neighbourhood on 10 and moved away northwestwards on 11.

4.6.2. *Satellite cloud features and other observations*

The maximum intensity of T 1.5 was reported by satellite imagery from 0000 UTC of 5th to 0600 UTC of 6th.

4.6.3. *Other features observed*

The system moved in a westerly direction before crossing the coast and then in a westnorthwesterly direction. The system crossed Orissa coast, north of Paradeep between 0100 UTC & 0200 UTC on 6th and lay close to Cuttack as a Deep Depression at 0300 UTC of 6th. The maximum estimated mean wind speed was 25 kts. The lowest pressure of 983.1 hPa was reported by Paradeep at 2200 UTC of 5th.

4.6.4. *Weather and damage*

Monsoon was vigorous / active from 5th to 7th August in Orissa with isolated very heavy to extremely heavy falls and on 7th and 8th in west Madhya Pradesh. Widespread rainfall activity also occurred (with isolated very heavy falls on 7th) from 6th to 8th in Chattisgarh and on 7th & 8th in Vidarbha.

The chief amounts of rainfall (cm) are:

Orissa

05 Aug ′07 Alipingal 35, Cuttack 33, Mundali & Naraj 27 each, Kakatpur 25.

06 Aug ′07 Puri 22, Bhubaneswar 19, Nimapara 18, Baliguda 15, Kendrapada & Cuttack 13 each

07 Aug ′07 Umarkote 35, Daringabadi 24, Junagarh, Koshagumuda & Navrangpur 23 each, Madhabarida 22, Sorada 21, Mohana 14.

Chattisgarh

07 Aug ′07 Dongargaon 23, Dondilohara & Kanker 19 each, Rajnandgaon 18, Jagdalpur 14.

Vidarbha

07 Aug ′07 Armori 37, Arjunimorgaon 23, Chimur 16.

08 Aug ′07 Selu 19, Chandur 15, Brahamapuri 14.

West Madhya Pradesh

08 Aug ′07 Dhar 24, Harda 23, Chicholi 16.

In all, 56 people died due to flood, thunderstorm (30 in Bihar, 15 in Orissa, 5 in Jharkhand, 3 each in Madhya Pradesh and Vidarbha). Lakhs of people were affected. Many villages were flooded. Incidents of wall collapse were reported. Rail/ road traffic was disrupted.

In Andhra Pradesh, due to heavy rain/ floods in Vamsadhara and Nagavali rivers, the following damages occurred in Srikakulam and Vizianagaram districts of north coastal Andhra Pradesh respectively.

Srikakulam Districts

(*i*)	No. of human lives lost	:	3 (missing)
(*ii*)	Population affected	:	14,567
(*iii*)	Crops damaged	:	16,153 hectare
(*iv*)	Horticulture	:	33, 720 hectare
(*v*)	Impact on infrastructure	:	2, 16,787 lakhs

Vizianagaram

Roads breached at Kuneru, Komrada, Mandal. In Bihar 30 persons and 5 in Jharkhand were reported dead due to floods.

4.7. *Depression over the west central and adjoining northwest Bay (21 – 24 September 2007)*

4.7.1. *Life cycle*

Under the influence of an upper air cyclonic circulation, a low pressure area formed over the west central Bay off Andhra coast on 17. Subsequently it became well marked and persisted there on 18 & 19, lay over west central and adjoining northwest Bay off north Andhra-south Orissa coasts on 20 & 21. Subsequently it concentrated into a Depression at 1200 UTC of 21, near Lat. 18.0° N / Long. 86.5° E, about 230 km. southsoutheast of Puri. It lay centred at 0300 UTC of 22, near Lat. 19.0° N / Long. 86.0° E and lay centred close to Puri at 1200 UTC. It crossed Orissa coast close to Puri around 1300 UTC of 22 and lay centred at 0300 UTC of 23, close to Angul; at 1200 UTC near Jharsuguda and at 0300 UTC of 24, over Chattisgarh, close to Ambikapur.

Moving further northwestwards, it weakened into a well marked low pressure area over northeast Madhya Pradesh and adjoining southeast Uttar Pradesh and lay as a low pressure area over east Uttar Pradesh and neighbourhood on 25 and became less marked on 26.

4.7.2. *Satellite cloud features and other observations*

The highest T number of 1.5 was given by satellite imagery from 1200 UTC of 21st to 0900 UTC of 24th. DWR Kolkata was unserviceable.

The system was tracked by CDR Paradeep. Hourly RAREP observations were taken from 1600 UTC of 21st to 1500 UTC of 22nd.

4.7.3. *Other features observed*

The maximum estimated wind speed was 25 kts. The system moved in a northerly direction and after crossing the coast then in a westnorthwesterly direction and weakened into a well marked low pressure area over northeast Madhya Pradesh and adjoining southeast Uttar Pradesh.

4.7.4. *Weather and damage*

The southwest Monsoon was vigorous or active from 20th to 24th with isolated heavy to very heavy rainfall (extremely heavy on 23rd.) in Orissa. The southwest Monsoon was also vigorous in Gangetic West Bengal and Jharkhand on 24th and 25th and in Bihar on 25th and 26th (with extremely heavy falls). Monsoon was active with isolated heavy to very heavy falls from 20th to 22nd in coastal Andhra Pradesh. Very heavy rainfall occurred in east Uttar Pradesh on 26th.

The chief amounts of rainfall (cm) are :

Orissa

20 Sep ′07 Chhatrapur 13, Nilgiri 12.

21 Sep ′07 Mundali 11.

22 Sep ′07 Chandbali 19, Alipingal 18, Patamundi 15, Akhuapada 14, Kendrapada, Jamsolaghat & Kakatpur 13 each.

23 Sep ′07 Athagarh 27, Nilgiri & Udala 23 each, Ghatgaon 22, Gobindpur 18, Jeyopore, Hindol, Baudhgarh & Tikabali 15 each.

24 Sep ′07 Jamankira 19, Sambalpur 18, Binika 17, Hirakud 16, Rajkishorenagar 15.

Andhra Pradesh

20 Sep ′07 Kalwakurthy 15.

21 Sep ′07 Arakuvally 11, Mentada 9.

22 Sep ′07 Kakinada 11, Peddapuram 9.

Gangetic West Bengal

24 Sep ′07 Canning Town 19, Bankura 18, Kolkata AP 16, Kalaikunda 13.

25 Sep ′07 Bagati Magra 20, Sriniketan 18, Kolkata 17, Berhampore 16, Diamond Harbour & Durgachak 15 each, Uluberia 14.

Jharkhand

24 Sep ′07 Patki 15, Panchet 14, Messengaore 13.

25 Sep ′07 Puphuki 11.

Bihar

25 Sep ′07 Munger 17, Sikandarpur 15.

26 Sep ′07 Sikandarpur 45, Bevibud 21, Sandighat 20, Hayaghat 19.

East Uttar Pradesh

26 Sep ′07 Gorakhpur 15.

About 75 people died (39 in Orissa, 17 in West Bengal, 16 in Bihar, 3 in Andhra Pradesh). Lakhs of people were affected due to floods. Crops over thousands of acres affected and many houses damaged.

5. Disturbances formed during the Post-Monsoon Season (October to December)

Two depressions/deep depressions and one very severe cyclonic storm formed during the season. The details are given below.

5.1. *Depression over the east central Bay (27–29 October 2007)*

5.1.1. *Life cycle*

A low pressure area formed over the southeast Bay of Bengal on 27th. It concentrated into a Depression at 1800 UTC of 27th and lay centred near Lat 11.5° N /

Long. 85.5° E. Moving westwards, it lay centred at 0300 UTC of 28th near Lat 11.5° N / Long. 84.5° E (about 480 kms southeast of Chennai) and near Lat 12.5° N / Long. 82.0° E at 1200 UTC. It weakened into a well marked low pressure area and lay over the west central and adjoining southwest Bay off north Tamil Nadu–south Andhra coasts on 29th.

5.1.2. *Satellite cloud features and other observations*

The maximum intensity of T 1.5 was reported by satellite imagery from 1800 UTC of 27th to 0000 UTC of 29th.

5.1.3. *Other features observed*

The system moved initially in a westerly direction and then in a westnorthwesterly direction. It dissipated over west central and adjoining southwest Bay off north coastal Tamil Nadu and south coastal Andhra Pradesh. The system did not cross the coast. The maximum estimated wind speed was 25 kts. The lower estimated central pressure was 1004.0 hPa.

5.1.4. *Weather and damage*

Extremely heavy rainfall occurred in Rayalaseema on 29th and in coastal Andhra Pradesh on 29th & 30th. Heavy to very heavy rainfall occurred in Tamil Nadu from 27th to 29th. The northeast Monsoon was vigorous on 29th & 30th in Rayalaseema and on 31st in coastal Andhra Pradesh

The chief amounts of rainfall (cm) are:

Coastal Andhra Pradesh

27 Oct ′07 Venkatagiri Town 10.

28 Oct ′07 Sulurpet 10.

29 Oct ′07 Naidupetta 31, Kota 28, Pellakur, Vakadu 26.

30 Oct ′07 Kavali 35, Bogole 34, Jaladanki 26, Dagadarthi, Sangam 25.

Rayalaseema

29 Oct ′07 Srikalahasti 27, Tirupathi 18.

Tamil Nadu

27 Oct ′07 Jayamkondam 14, Parangipettai 11.

28 Oct ′07 Usilampatti 12, Mayanur 11.

29 Oct ′07 Tiruvallur & Red Hills 16 each, Chengalpattu 15.

18 people lost their lives in Nellore district of coastal Andhra Pradesh. Paddy and other crops over thousands of acres of land were affected. Thousands of houses were either fully / severely damaged. Lakhs of population was affected. Several irrigation projects were overflowed. Roads were washed away. Traffic and transport was disrupted. Damage worth crores of rupees is estimated. In Tamil Nadu, 8 persons died due to heavy rain and electrocution. Paddy field in 1500 acres were submerged.

5.2. *Deep Depression over southwest Arabian Sea (27 October – 2 November 2007)*

5.2.1. *Life cycle*

Under the influence of the cyclonic circulation over Lakshadweep area and neighbourhood, a low pressure area formed over there on 25th. It lay over Lakshadweep area and adjoining southeast Arabian Sea on 26th and became well-marked in the same evening. Subsequently, it concentrated into a Depression at 1800 UTC of 27th and lay centred near Lat 10.5° N / Long. 66.5° E. It remained practically stationary and further intensified into a Deep Depression which lay centered at 0300 UTC of 28th near Lat 10.5° N / Long. 66.5° E. Moving slightly northwestwards, it lay centred near Lat. 11.5° N / Long 66.0° E at 1200 UTC. At 0300 UTC of 29th, it lay near Lat 11.5° N / Long. 65.5° E. It remained practically stationary there upto 0300 UTC of 30th. Then, it moved westwards and lay centred near Lat. 11.5° N / Long. 65.0° E at 1200 UTC of 30th and near Lat. 11.5° N / Long. 64.0° E at 0300 UTC of 31st. It moved westnorthwestwards and lay centred at 0300 UTC of 1 November near Lat. 14.0° N / Long. 60.5° E and at 1200 UTC near Lat. 14.5° N / Long. 58.5° E. Subsequently, it weakened into a depression and lay centred at 0300 UTC of 2nd near Lat. 14.5° N / Long. 56.5° E and at 0900 UTC near Lat. 15.0° N / Long. 56.0° E. It further weakened into a well marked low pressure area in the evening over the west central and adjoining southwest Arabian sea. It weakened into a low pressure area over there and become less marked on 3rd morning.

5.2.2. *Satellite cloud features and other observations*

The system was tracked by satellite. The highest T number of 2.0 was given by satellite imageries from 0300 UTC of 28th October to 0000 UTC of 2nd November.

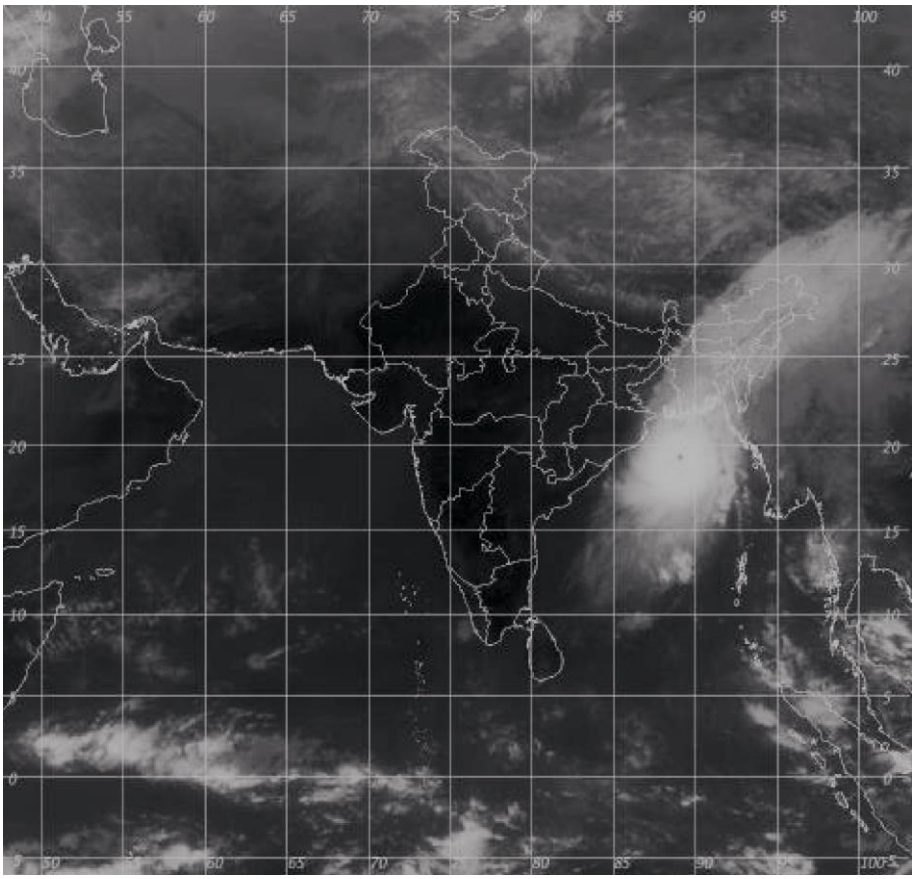


Fig. 4(a). IR Image at 0500 UTC of 15 Nov 2007 showing centre at 19.3° N / 89.0° E and intensity T6.0

As the system was far away from the coast, it was not tracked by RADAR.

5.2.3. *Other features observed*

The maximum estimated wind speed was 30 kts. The system initially moved in a westnorthwesterly direction. It dissipated over the west central and adjoining southwest Arabian Sea in the evening of 2nd November. The lowest ECP was 1000 hPa.

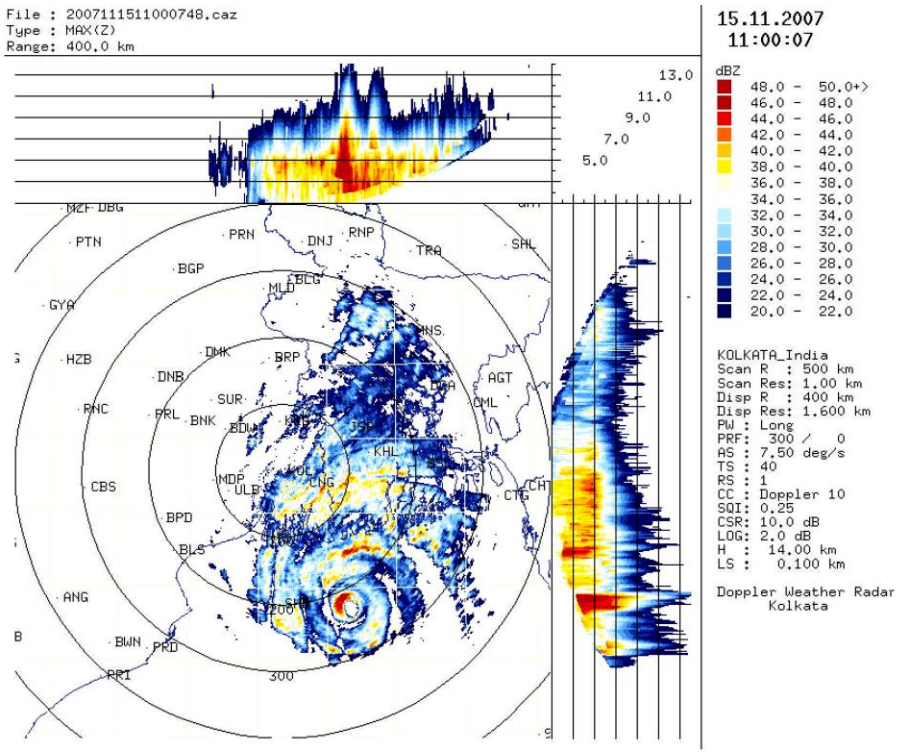
5.2.4. *Weather and damage*

As the system was far away from the Indian coast, it did not affect the weather in India.

5.3. *Very severe cyclonic storm (SIDR) over the Bay of Bengal (11 – 16 November 2007)*

5.3.1. *Life cycle*

Under the influence of an upper air cyclonic circulation a low pressure area formed over the southeast Bay and adjoining Andaman Sea on 11. It rapidly concentrated into a Depression at 0900 UTC of 11 and lay centred near Lat. 10.0° N / Long. 92.0° E (about 200 km. southsouthwest of Port Blair). It remained practically stationary over there at 1200 UTC and intensified into a Deep Depression which lay centred near Lat. 10.5° N / Long. 91.5° E at 1800 UTC of 11. Moving slightly westwards, it further intensified into a Cyclonic storm (SIDR) and lay centred at 0300 UTC of 12, near Lat. 10.5° N / Long. 91.0° E. Subsequently it moved northwestward, intensified into a Severe cyclonic storm and lay centred at 1200 UTC of 12, near Lat. 11.5° N / Long. 90.0° E. It remained practically stationary and further intensified into a Very severe cyclonic storm of 1800 UTC of 12 and lay centred at 0300 UTC of 13, near Lat. 12.0° N / Long. 89.5° E. Subsequently, it moved northwards and lay centred near Lat. 13.0° N / Long. 89.5° E at 1200 UTC of 13; at 0300 UTC of 14, near Lat. 14.5° N / Long. 89.5° E. Continuing the northward movement, it lay centred at 0300 UTC of 15, Lat. 18.0° N / Long. 89.0° E and at 1200 UTC, near Lat. 21.0° N / Long. 89.0° E (about 200 km. southsoutheast of Kolkata). Subsequently it began to re-curve northeastwards and



RADAR picture at 1100 UTC of 15 Nov 2007
EYE Diameter 20 km

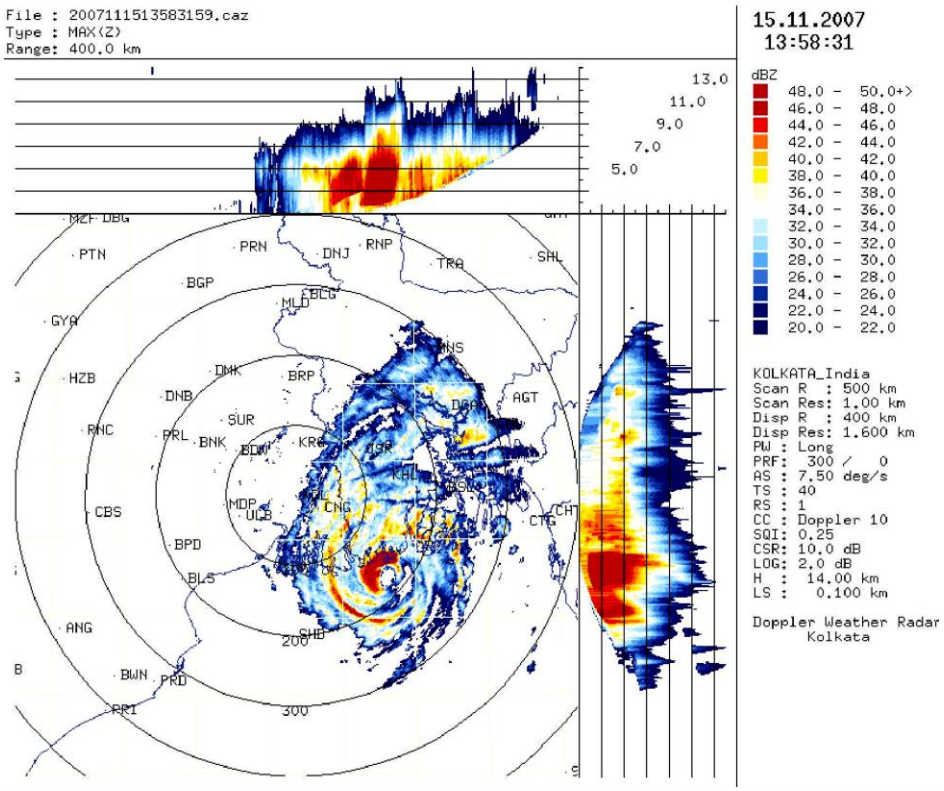


Fig. 4(b). Radar picture at 1358 UTC of 15 Nov 2007 EYE wall thickness 34 km

crossed West Bengal – Bangladesh coast, near Long. 89.8° E around 1600 UTC of 15th. Moving northnortheastwards, it rapidly weakened into a Cyclonic storm at 2100 UTC of 15th, over Bangladesh and adjoining Tripura centred near Lat. 23.5° N / Long. 91.0° E. It continued to move northnortheastwards and further weakened rapidly into a Depression and lay centred at 0300 UTC of 16, near Lat. 24.5° N / Long. 91.5° E (about 50 kms. north of Agartala). It further weakened into a low pressure area over there in the evening and became less marked in the morning of 17. The associated upper air cyclonic circulation became less marked on 20th.

5.3.2. *Satellite cloud features and other observations*

The system was mainly tracked by satellite. The maximum intensity of T 6.0 was reported by satellite imagery from 0300 UTC to 2100 UTC of 15th.

The system was also tracked by DWR Kolkata and CDR Paradeep. The center fixed by RADAR is based on spiral Band/EYE. Satellite imagery at 0500 UTC of 15 is given in Fig. 4(a).

DWR Kolkata

The DWR Kolkata tracked the system from 0500 UTC of 15th when 1st spiral band with semi circular 'EYE' appeared. Well-structured 'EYE' along with spiral bands appeared from 0700 UTC of 15th. Details of observations on 15 November are given below.

Time (UTC)	Centre Lat. °N/Long. °E	Diameter of EYE (km)	Thickness of eye wall (km)	Estimated wind speed (m/s)
5:34:00	19.160/89.1	33	14	N/a
6:10:00	19.270/89.2	29	19	N/a
7:04:00	19.430/89.31	29	11	N/a
8:00:00	19.560/89.5	26	14	39
9:00:00	20.120/89.1	21	18	39
10:00:00	20.260/89.15	24	21	43
11:00:00	20.430/89.21	20	24	45
12:00:00	20.590/89.27	26	25	45
12:58:00	21.160/89.31	24	27	51
13:58:00	21.310/89.38	21	34	51
14:58:00	21.440/89.43	24	32	51
15:58:00	21.550/89.48	-	-	51
16:58:00	22.300/89.967	-	-	-

RADAR pictures at 1100 UTC and 1358 UTC of 15 is given in Fig. 4(b).

Three-hourly RADAR observations were taken CDR Paradeep from 15 November 0000 UTC. Additional observations were taken at 15/0700 UTC, 15/1100 UTC and 15/1400 UTC. The details of the CYREP taken by CDR Paradeep from 0300 UTC to 1500 UTC of 15th are given below.

Date/Time (UTC)	Centre Lat. °N/Long. °E	Character	Radius of EYE (km)
15/0300	19.0/89.3	Spiral	-
15/0600	19.7/89.3	EYE	18
15/0700	19.8/89.3	EYE	18
15/0900	20.3/89.6	EYE	20
15/1100	21.3/89.6	EYE	14
15/1200	21.5/89.6	EYE	18
15/1400	21.8/89.5	Spiral	-
15/1500	22.0/89.5	Spiral	-

5.3.3. *Other features observed*

The system moved initially in a northwesterly direction and then in a northerly direction. Finally it recurved and crossed west Bengal coast near Long. 89.8° E around 1700 UTC of 15th, west of Khepupura and rapidly weakened into a depression and lay over Bangladesh and adjoining Tripura, Meghalaya and Assam with its center near Sylhat, 50 kms north of Agartala at 0300 UTC of 16th and moved in a northnortheasterly direction and weakened gradually.

Irrigation minister, Government of West Bengal reported 80-90 kmph in the place like Namkhana, Kakdi, Gosaba, Sagar Island, Hindalganj and Sandeshkhali (coastal areas of north & south 24 Paraganas). At Kolkata city, Dines PT Anemograph recorded average speed of 25 to 30 kmph, 50 kmph in gust around 1430 UTC of 15th. No report of storm surge available. The maximum estimated surface mean wind speed was 200 kmph. The lowest ECP was 944 hPa at 1200 UTC of 15th. The system moved with an average speed of 22 kmph.

5.3.4. *Weather and damage*

Widespread rainfall activity with heavy to very heavy falls occurred in Andaman & Nicobar Islands from 10 to 12 and in Assam & Meghalaya and Nagaland-Manipur-Mizoram-Tripura on 16.

The chief amounts of rainfall (cm) are:

Andaman & Nicobar Islands

10 Nov ′07 Nancowry 7.

11 Nov ′07 Car Nicobar 18, Port Blair 11, Hut Bay 8.

12 Nov ′07 Long Islands 7.

Assam & Meghalaya

16 Nov ′07 Cherrapunji 15, Shillong 14.

Nagaland-Manipur-Mizoram-Tripura

16 Nov ′07 Agartala 10, Sonamura 7.

One person died in West Bengal. Crops damaged in thousands of hectares of land. 46 villages and thousands of people affected. Some houses were partially / totally damaged in Mizoram. The Guwahati-Shillong road was also affected at several places. There was disruption of electricity supply in the costal belt due to breaking of dam of Bidyadhari river. Extensive areas were flooded near Gajikhali and Kheaghat.