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# Cyclones and depressions over Indian seas and neighbourhood during 1995*

## 1. Chief features

During the year 1995, three deep depressions, two depressions and three cyclones formed over north Indian seas. Only one cyclonic storm formed over Arabian Sea and the rest of systems originated over Bay of Bengal. Seasonwise there were three depressions in the month of May in pre-monsoon season, two in September during monsoon season and three cyclones in the month of October and November in the post-monsoon season. One cyclone, which formed during the month of October in the Arabian Sea, moved northwestward and weakened over the west Arabian Sea. The other two cyclones attained the intensity of hurricane and the first one crossed north Andhra Pradesh coast and the other crossed southeast Bangladesh.

The tracks of the systems are given in Fig. 1. Their brief history and monthly distribution are given in Tables 1 & 2 respectively. A few crucial ship observations are recorded in Table 3.

## 2. Pre-monsoon season

### 2.1. *Deep depression (5-6 May 1995)*

On 5 May, a depression formed over southwest Bay of Bengal and was centred at 2100 UTC near 11.0°N/81.0°E. By the noon of 6 May it intensified into a deep depression and crossed north Tamilnadu coast at 1100 UTC and weakened as a depression with centre near 12.0°N/79.5°E at 1200 UTC. It weakened further over northern parts of Tamilnadu and adjoining Karnataka on 7 May. The maximum intensity of the system was T 2.0 on Dvorak's scale as estimated from the imageries of 0700 to 1000 UTC of 6 May.

#### (*i*) *Rainfall/Damages*

Under its influence, widespread rainfall with heavy fall at a few places occurred over Tamilnadu, Andhra Pradesh and Kerala on 5, 6 and 7 May. As reported the loss of lives was 12 in Tamilnadu and 5 in Kerala. Also damage to about 400 houses and standing crops was reported due to heavy rains and floods in these States.

### 2.2. *Deep depression (8-10 May 1995)*

The second system formed over west central Bay of Bengal at 0900 UTC of 8 May and was centred near 15.0°N/81.5°E (120 km southeast of Machilipatnam) at 1200 UTC. It moved in a northeasterly direction and intensified into a deep depression at 0900 UTC of May 9 and was centred near 16.5°N/82.5°E at 1200 UTC. Thereafter, it moved in a northerly direction and crossed the Andhra Pradesh coast near Tuni around 1700 UTC. It weakened gradually into a depression on 10 morning and weakened further by the evening over south Orissa and adjoining north coastal Andhra Pradesh. As per the INSAT imageries, the highest intensity was T 2.0 on Dvorak's scale from 0900 to 1400 UTC of 9 May.

#### (*i*) *Rainfall/Damages*

The system caused widespread rain with heavy falls at one or two places in 10 districts of coastal Andhra Pradesh and adjoining interior areas. Loss of 22 lives was reported from these areas. About 40,000 houses were damaged. Thousands of hectares of crops were destroyed. Total estimated damage in Andhra Pradesh was reported to be of the order of Rs. 470 crores.

### 2.3. *Deep depression (14-17 May 1995)*

A depression formed over the northwest Bay and adjoining Orissa coast on 14 night and was centred near 19.5°N/86.5°E at 1800 UTC. It intensified into a deep depression on 15 morning and moved in a north-northeasterly direction skirting the Orissa coast, crossed the West Bengal coast near Sagar Islands on 16 morning and lay centred near 22.0°N/88.5°E at 0300 UTC of 16. Thereafter, it moved in a

* Compiled by: U. S. De, D. S. Desai and S. G. Bhandari, Meteorological Office, Pune.

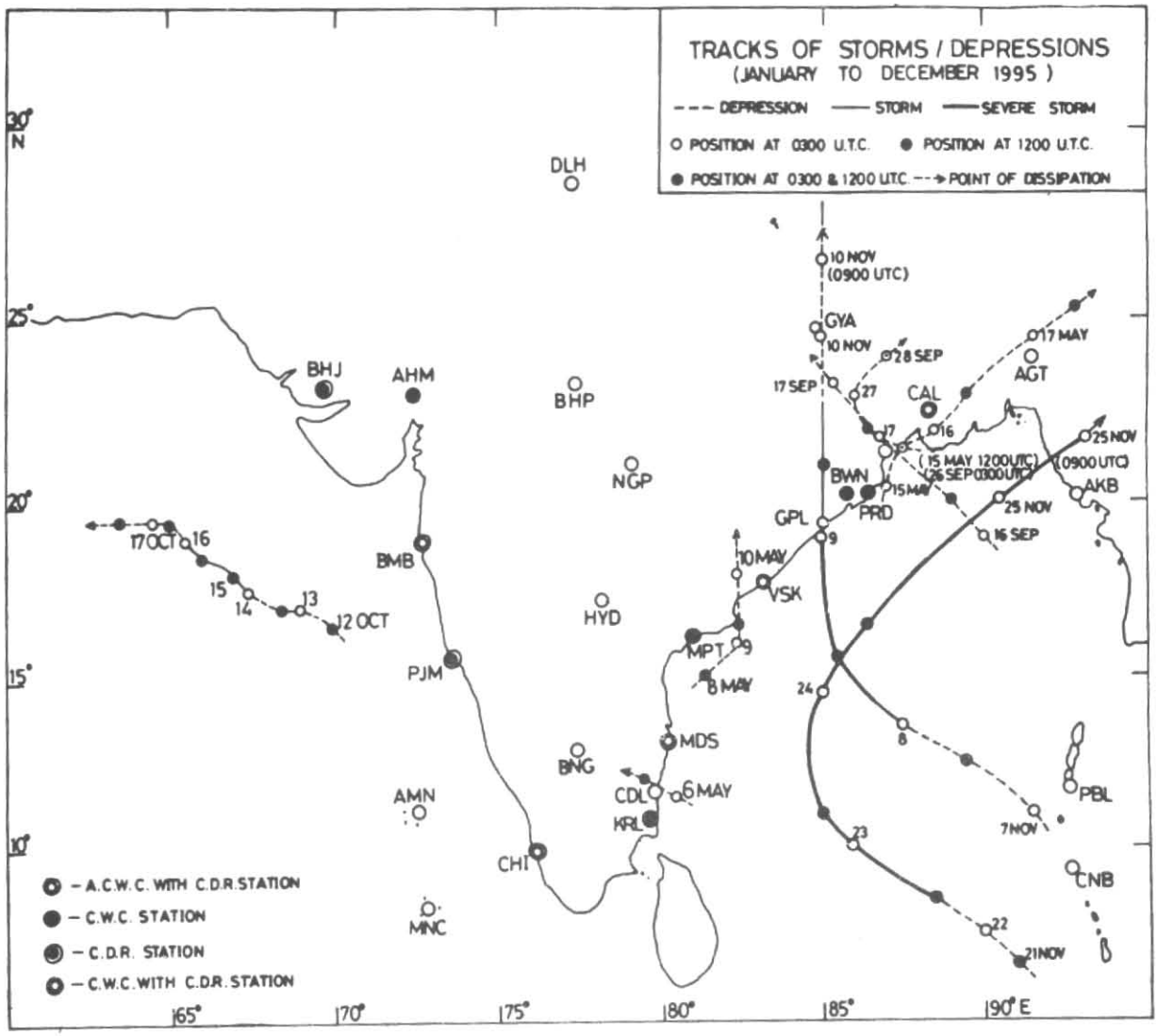


Fig. 1. Tracks of storms/depressions for the year 1995

**TABLE 1**

**Brief history of cyclonic storms and depressions over Indian seas and neighbourhood during 1995**

| S. No. | Type of system | Life period | Point of crossing the coast | Estimated central pressure (hPa) | Recorded max. wind | Highest "T" No. (Estimated) |
|---|---|---|---|---|---|---|
| 1. | DD | 5-7 May | North Tamil Nadu coast near Cuddalore | 996 | — | 2.0 |
| 2. | DD | 8-10 May | Andhra coast near Tuni | 996 | — | 2.0 |
| 3. | DD | 14-17 May | West Bengal coast near Sagar Island | 996 | W-ly/28-30 kt at Paradip at 1000 UTC of 15 | 2.0 |
| 4. | D | 16-17 Sept | N-Orissa-West Bengal coast near Balasore | 998 | — | 2.0 |
| 5. | D | 26-28 Sept | N-Orissa-West Bengal coast near Balasore | 1000 | — | 1.5 |
| 6. | CS | 12-17 Oct | All the time over the sea | 994 | — | 3.0 |
| 7. | SCS (H) | 7-10 Nov | N-A.P.-Orissa coast south of Ichchapuram in Andhra Pradesh | 976 | S-ly/60 kt at Gopalpur at 0500 UTC of 9 | 4.5 |
| 8. | SCS (H) | 21-25 Nov | Bangladesh coast south of Cox's Bazar | 956 | NE-ly/30 kt at Cox's Bazar at 0300 UTC of 25 | 5.5 |

D — Depression, DD — Deep depression, CS — Cyclonic storm, SCS (H) — Severe CS with a core of hurricane winds

northeasterly direction and lay centred as deep depression near 24.5°N/91.5°E about 100 km north of Agartala at 0300 UTC of 17. It weakened into a depression by 17 evening and further weakened into a low pressure area over north Assam by 18 morning.

The maximum intensity as estimated with the help of INSAT imageries was T 2.0 at 0500 UTC of 15 to 0900 UTC of 16.

*(i) Rainfall/Damages*

The system caused widespread rainfall with heavy falls at a few places from 13 to 16 May in Orissa and from 15 to 17 May in west Bengal. Heavy damages to property and crops were reported in Orissa and Gangetic West Bengal. Very heavy rains claimed 35 lives in Orissa and 12 lives in West Bengal. Tidal waves and heavy rains and floods caused breaches in a number of embankments and damaged 20,000 houses affecting 65,000 people. In Mizoram, 40 people were killed and 700 houses were damaged.

It is reported that in Bangladesh, heavy rains and tidal waves claimed 60 lives and rendered more than 60,000 people homeless.

### 3. Monsoon season (June-September)

Only two depressions against the average seasonal frequency of 4 to 5 formed over the Bay of Bengal in September 1995.

#### 3.1. *Depression (16-17 September 1995)*

A well marked low pressure area formed over the east central Bay of Bengal on 14 evening and concentrated into a depression on 16 morning. Moving in a northwesterly direction it crossed the north Orissa-West Bengal coast near Balasore on the morning of 17. The system continued to move in a northwesterly direction and lay centred near 23.4°N/85.3°E close to Ranchi on 17 evening. By 18 morning, the system weakened into a well marked low pressure area over northeast Madhya Pradesh and adjoining parts of Bihar and east Uttar Pradesh.

TABLE 2

Storm/depression statistics, 1995

| Name of the system | Winter | Pre-monsoon | | | Monsoon | | | | Post-monsoon | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan to Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | |
| **Over Bay of Bengal** | | | | | | | | | | | | |
| Depression | — | — | — | 3 | — | — | — | 2 | — | — | — | 5 |
| Cyclonic Storm | — | — | — | — | — | — | — | — | — | — | — | — |
| Severe Cyclonic Storm | — | — | — | — | — | — | — | — | — | — | — | — |
| SCS (H) | — | — | — | — | — | — | — | — | — | 2 | — | 2 |
| Total | — | — | — | 3 | — | — | — | 2 | — | 2 | — | 7 |
| **Over Land** | | | | | | | | | | | | |
| Depression | — | — | — | — | — | — | — | — | — | — | — | — |
| **Over Arabian Sea** | | | | | | | | | | | | |
| Depression | — | — | — | — | — | — | — | — | — | — | — | — |
| Cyclonic Storm | — | — | — | — | — | — | — | — | 1 | — | — | 1 |
| Severe Cyclonic Storm | — | — | — | — | — | — | — | — | — | — | — | — |
| SCS (H) | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | — | — | — | — | — | — | — | 1 | — | — | 1 |

INSAT imagery of 0300 UTC of 16 May indicated the intensity of the system as T 2.0 on Dvorak's scale and remained upto 2100 UTC of 16.

(*i*) *Rainfall/Damages*

Widespread rain with heavy falls at one or two places occurred over Gangetic West Bengal, Orissa and Bihar Plateau on 17 and 18 and over Sub-Himalayan West Bengal and Bihar Plains on 18 and 19 September.

3.2. *Depression (26-28 September 1995)*

A well marked low pressure area over the northwest Bay of Bengal concentrated into a depression at 0300 UTC of 26 near 21.5°N/87.5°E (close to Balasore). It moved in a northwesterly direction and crossed the north Orissa-West Bengal coasts near Balasore around noon of 26 and lay centred near 22.0°N/86.5°E at 1200 UTC of 26 and near 23.0°N/86.0°E on 27 morning. Thereafter, it moved in a northeasterly direction and remained practically stationary near 24.0°N/87.0°E upto the morning of 28. The system weakened into a well marked low pressure area over northeast Bihar Plateau and adjoining West Bengal by 28 evening.

The maximum intensity of the system was T 1.5 on Dvorak's scale at 0300 UTC on 26.

(*i*) *Rainfall/Damages*

Widespread rain with heavy falls at one or two places occurred over Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal and Orissa. Due to heavy rains and floods normal life was disrupted and many highways in West Bengal were blocked. Millions of people were affected due to vast floods in West Bengal.

TABLE 3

**Ship's observations**

| S. No. | Call sign | Date and time (UTC) | Position | | Wind | | Pressure (hPa) |
|---|---|---|---|---|---|---|---|
| | | | Lat. (°N) | Long. (°E) | Dir. (Deg.) | Speed (kt) | |
| | | **(A) CS over Arabian Sea (12-17 October 1995)** | | | | | |
| 1. | KIBN | 130600 | 22.1 | 67.1 | 360 | 26 | 1007.5 |
| 2. | VWTL | 140600 | 17.3 | 68.4 | 250 | 35 | 1005.7 |
| 3. | VWTL | 140900 | 17.7 | 68.2 | 250 | 38 | 1002.7 |
| 4. | DBBH | 150000 | 15.6 | 68.5 | 200 | 22 | 1005.7 |
| 5. | DPUE | 151200 | 17.0 | 67.0 | 230 | 30 | 1002.5 |
| 6. | DABC | 161200 | 16.4 | 67.3 | 200 | 70 | 1007.0 |
| 7. | WCYQ | 171200 | 18.7 | 64.7 | 170 | 26 | 1007.7 |
| | | **(B) SCS (H) over Bay of Bengal (7-10 November 1995)** | | | | | |
| 1. | OXIK6 | 060700 | 6.0 | 92.5 | 160 | 17 | 1007.3 |
| 2. | ATKA | 080900 | 15.5 | 85.3 | 050 | 40 | 987.3 |
| 3. | ATKA | 081200 | 15.0 | 84.9 | 310 | 40 | 992.8 |
| | | **(C) SCS (H) over Bay of Bengal (21-25 November 1995)** | | | | | |
| 1. | FNOM | 211200 | 6.0 | 90.1 | 320 | 22 | 1006.5 |
| 2. | JNBO | 211200 | 5.9 | 88.2 | 340 | 25 | 1005.0 |
| 3. | VRID | 211200 | 5.9 | 85.8 | 340 | 12 | 1007.7 |
| 4. | FNOM | 220000 | 5.9 | 86.2 | 320 | 20 | 1009.0 |
| 5. | 9VWM | 220000 | 5.9 | 91.3 | 170 | 19 | 1005.3 |
| 6. | 9VOM | 221200 | 5.8 | 788.1 | 230 | 24 | 1003.7 |
| 7. | 9VOM | 230000 | 5.8 | 84.7 | 230 | 16 | 1006.4 |

## 4. Post-monsoon season (October-December)

### 4.1. *Cyclonic storm over the Arabian Sea (12-17 October 1995)*

A well marked low pressure area formed over east-central Arabian Sea and neighbourhood on 12 October and concentrated into a depression *in situ* and lay centred near 16.5°N/70.0°E at 1200 UTC of 12 October. It intensified into a deep depression with centre near 17.0°N/68.5°E at 1200 UTC of 13 and further intensified into a cyclonic storm with its centre near 17.5°N/67.5°E about 600 km westsouthwest of Bombay at 0300 UTC of 14. The system then slowly moved in a northwesterly direction for sometime and then remained practically stationary and lay centred near 18.0°N/67.0°E at 0300 UTC of 15. Thereafter, it moved in a west-northwesterly direction till the morning of 16 when it was centred near 19.0°N/65.5°E. Later the system gradually weakened into a deep depression by 16 evening and into a depression by 17th morning and was centred near 19.5°N/63.5°E at 1200 UTC of 17. The system further moved away westwards and weakened.

The system was tracked mainly with the help of INSAT imageries. The maximum intensity of the system reported by the INSAT was T 3.0 from 0800 to 2300 UTC of 14.

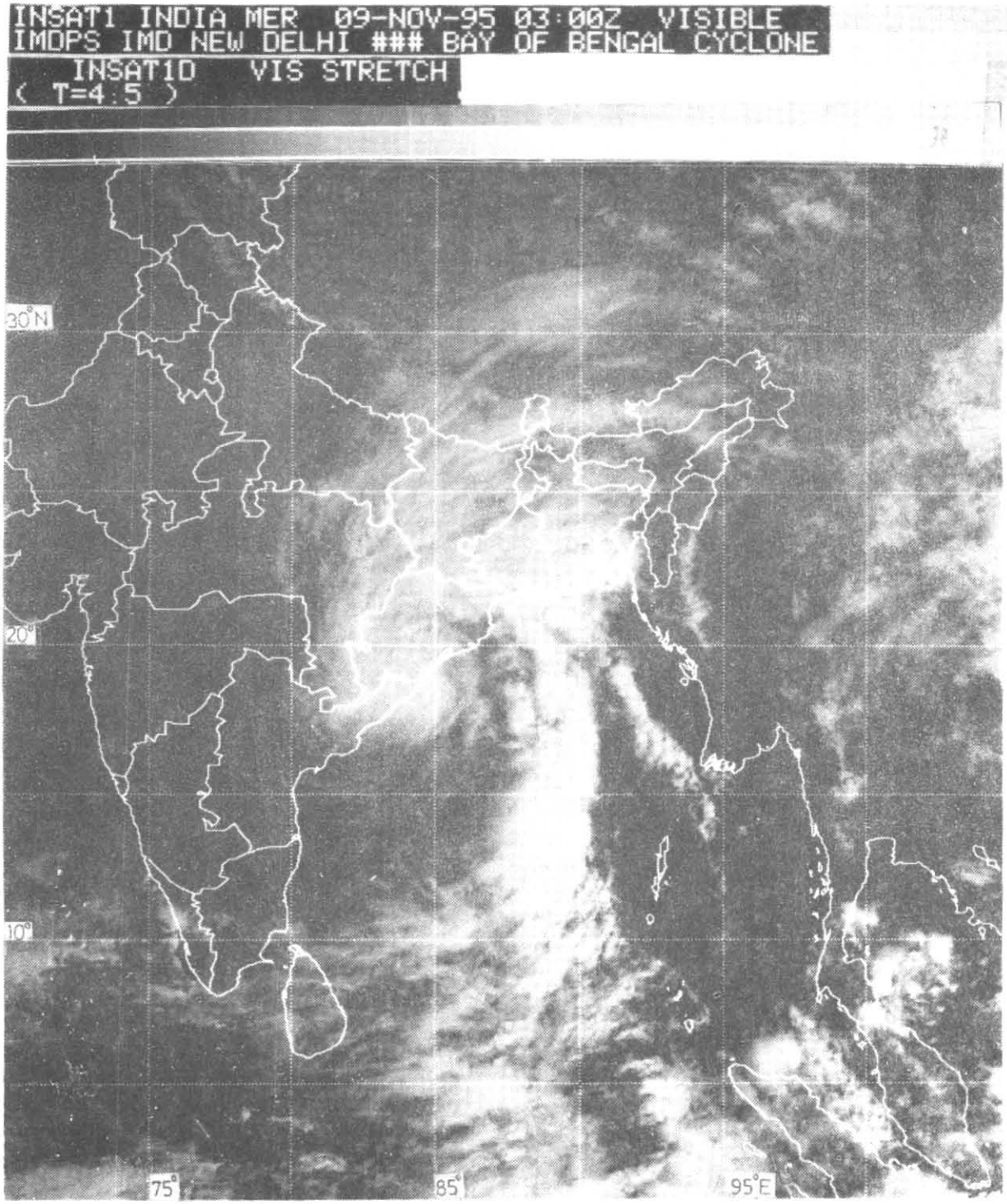


Fig. 2. INSAT-1D cloud picture of 9 November 1995 at 0300 UTC

(*i*) *Weather and damages*

The system did not cause any weather or damage over India.

4.2. *Severe cyclonic storm with a core of hurricane winds over the Bay of Bengal (7-10 November 1995)*

A depression formed over southeast Bay of Bengal and neighbourhood with centre near 11.0°N/91.5°E at 0300 UTC of 7 November. Moving in a northwesterly direction it intensified into a deep depression and further intensified into a cyclonic storm at 0000 UTC of 8 and was centred near 13.5°N/87.5°E at 0300 UTC of 8. It further intensified into a severe cyclonic storm and was centred near 15.5°N/85.5°E about 350 km southeast of Visakhapatnam at 1200 UTC of 8. It then moved in a northerly direction and intensified further into a severe cyclonic storm with a core of hurricane winds at 1500 UTC of 8 and lay close to north Andhra Pradesh—south Orissa coast with its centre near 19.0°N/85.0°E at 0300 UTC of 9. It crossed north Andhra Pradesh-Orissa coast near Ichchapuram in Kalingapatnam district between 0400 and 0500 UTC of 9. The system then moved northwards and gradually weakened into a cyclonic storm and lay centred near 21.0°N/85.0°E at 1200 UTC of 9 and into a deep depression on 10 morning close to Gaya in Bihar. It continued to move northwards and weakened into a well marked low pressure area over north Bihar Plains by 10 evening.

(*i*) *INSAT cloud features and other observations*

The INSAT imageries were very helpful in tracking the system particularly after 0300 UTC of 7 when the system moved very fast. Observations from the ships were very crucial and were consistent with the position and intensity given by satellite fixes. Maximum intensity of the system reported by the INSAT was T4.5 on Dvorak's scale at 0300 UTC of 9. Fig. 2 is the satellite cloud photograph taken at 0300 UTC of 9 November 1995.

(*ii*) *Pressure, wind and other features*

Prior to the recurvature, the system moved very fast with average speed of 25 kmph from 070300 to 081200 UTC. Between 1200 UTC and 0300 UTC of 9 the system moved towards north with speed around 27 kmph.

Estimated lowest central pressure was 976 hPa at 090300 UTC.

(*iii*) *Weather and damages*

Widespread rainfall with heavy to very heavy falls occurred over northern parts of coastal Andhra Pradesh on 9, over Orissa on 9 and 10 and over Gangetic West Bengal on 8 and 9.

According to press reports 3 districts of Andhra Pradesh, 20 districts of Orissa and 4 districts of Gangetic West Bengal were affected by the cyclone.

According to press reports, there were 49 deaths in Andhra Pradesh, 20 deaths in Orissa and 4 deaths in West Bengal due to the cyclone. About 240 persons were also reported missing from these areas. Crops of about 2 million hectares area were badly damaged in these States. About 52000 houses were damaged/partially damaged due to the gale winds and heavy rains in the region. Severe damage to roads, electric poles and telecommunication was also reported from these areas.

4.3. *Severe cyclonic storm with a core of hurricane winds over the Bay of Bengal (21-25 November 1995)*

A depression formed over southeast Bay of Bengal and neighbourhood at 1200 UTC of 21 November with centre near 6.5°N/91°E. It moved in a west-northwesterly direction and intensified into a deep depression with centre near 7.5°N/90.0°E at 0300 UTC of 22 and into a cyclonic storm at 0900 UTC of 22 and its centre was near 8.5°N/88.5°E at 1200 UTC of 22. The system then moved in a northwesterly direction and further intensified into a severe cyclonic storm and was centred near 10°N/86°E at 0300 UTC of 23. The system then moved northward and further intensified into a severe cyclonic storm with a core of hurricane winds at 1800 UTC of 23 and its centre was near 14.5°N/85.0°E at 0300 UTC of 24. Thereafter, it moved rather fast in a northeasterly direction and lay centred near 20°N/90.5°E about 360 km southeast of Calcutta at 0300 UTC of 25 and crossed the Bangladesh coast south of Cox's Bazar by 0600 UTC of 25. It weakened into a cyclonic storm at 0900 UTC of 25 and further weakened into a well marked low pressure area over Manipur and neighbourhood by evening of 25.

(*i*) *INSAT cloud features*

The system was mainly tracked by INSAT cloud imageries. In the initial stage of the system few ship observations were very useful in fixing the position and intensity of the system. The peak intensity reported by INSAT was T5.5 from 0900 to 1700 UTC of 24, when the system had recurved north-eastwards. INSAT reported well defined "circular eye" at 0900 UTC of 24.

(*ii*) *Radar observations*

Cyclone Detection Radar (CDR), Visakhapatnam observed very small curved portion of the "eye wall". The CDR, Paradeep reported "spiral eye" during 1600 to 1900 UTC of 24 and at 0000 UTC of 25 and "open eye" at 1200 UTC of 24.

(*iii*) *Pressure and wind*

Cox's Bazar reported wind 050°/30 kt and pressure 999.8 hPa at 0600 UTC of 25.

Lowest pressure within the storm field is estimated to be 956 hPa between 0900 and 1500 UTC of 24.

(*iv*) *Weather and damages*

The system did not cause any weather or damage over India.