



## Severe Cyclonic Storm ASANI over the Bay of Bengal (7<sup>th</sup>-12<sup>th</sup> May, 2022): A Report

### Life History of ASANI:

- A **low pressure area** formed over South Andaman Sea and adjoining Southeast Bay of Bengal in the morning (0830 hrs IST) of 6<sup>th</sup> May, 2022. It lay as a **well marked low pressure** area over Southeast Bay of Bengal and adjoining south Andaman Sea in the early morning (0530 hours IST) of 7<sup>th</sup> May.
- Under favourable environmental conditions, it concentrated into a **depression** over the same region around noon (1130 hrs IST) of same day, the 7<sup>th</sup> May, 2022.
- It moved northwestwards and intensified into a **deep depression** over southeast Bay of Bengal in the same evening (1730 hrs IST) of 7<sup>th</sup> May.
- Continuing to move northwestwards, it intensified into the **cyclonic storm “ASANI”** in the early morning (0530 hrs IST) of 8<sup>th</sup> May and into a **severe cyclonic storm** in the same evening (1730 hrs IST) over southeast Bay of Bengal. Continuing to move northwestwards, it reached peak intensity of 55 knots (100-110 kmph gusting to 120 kmph) on 9<sup>th</sup> early morning (0530 hrs IST). It maintained its peak intensity till 10<sup>th</sup> noon (1130 hrs IST), thus for 30 hrs.
- From 10<sup>th</sup> evening, it started gradually moving north-northwestwards and weakened into a **cyclonic storm** over westcentral Bay of Bengal about 60 km south-southeast of Machilipatnam in the early hours (0230 hrs IST) of 11<sup>th</sup> May.
- Thereafter, it started moving nearly northwards with a very slow speed and weakened into a **deep depression** over westcentral Bay of Bengal close to Andhra Pradesh coast in the evening (1730 hrs IST) of 11<sup>th</sup> May.
- It **crossed** Andhra Pradesh coast near latitude 16.3°N and longitude 81.3°E between Machilipatnam and Narsapur during 1730-1930 hours IST of 11<sup>th</sup> May, 2022 as a **deep depression** with maximum sustained wind speed of 55-65 kmph gusting to 75 kmph.
- It then moved slowly west-southwestwards and weakened into a depression in the early morning (0530 hrs IST) and further into a well marked low pressure area in the morning (0830 hrs IST) of 12<sup>th</sup> May over coastal Andhra Pradesh. The observed track of the system is presented in **Fig. 1**.

### Salient Features

#### (i) Weakening before touching coast

The severe cyclonic storm, “ASANI” weakened into a deep depression before touching the coast mainly due to following reasons:

- It entered a region with lower sea surface temperature and lower ocean heat content
- It moved very slow (5-6 kmph against normal speed of 13 kmph) near the coast and remained within 50 km from the coastline from morning to evening of 11<sup>th</sup> May. The slow movement led to upwelling of sea water and rainfall over the Sea leading to further cooling of sea surface.
- Due to slow movement, there was also land interaction for longer time leading to weakening due to increased friction with land surface.
- There was cold and dry air incursion from Indian landmass in the middle and upper troposphere which are unfavourable for maintaining the intensity of any cyclonic storm.

## **(ii) Multiple recurvatures**

Severe cyclonic storm "Asani" exhibited multiple recurvatures in its track/path. Most of the models suggested change in direction of movement of the system from northwest to northeast near the coast. However, the deep depression (remnant of cyclone Asani) moved slowly northward/northwestwards on 11th May till evening and slowly west-southwestwards thereafter. It was mainly due to the fact the cyclonic storm was supposed to move northeastwards near the coast under the influence of a short amplitude westerly trough in middle and upper tropospheric levels approaching from the west. However, as the storm weakened while approaching towards coast, the height of the storm decreased being limited to middle tropospheric levels. As a result the steering wind of the storm changed being dominated by southeasterly winds and led to northwestward movement. However, the northwestward movement was restricted/ blocked due to an anticyclone lying over the peninsular India. Thus, the system moved slowly & remained practically stationary near to the coast followed with slow west-southwestward movement till its weakening into a well marked low pressure area in the morning of 12<sup>th</sup> May over the region.

## **Monitoring of Severe Cyclonic Storm, ASANI:**

India Meteorological Department (IMD) maintained round the clock watch over the north Indian Ocean and the cyclone was monitored since 28<sup>th</sup> April, about 8 days prior to the formation of low pressure area over south Andaman Sea on 6<sup>th</sup> May and 9 days prior to the formation of depression over southeast Bay of Bengal. The cyclone was monitored with the help of available satellite observations from INSAT 3D and 3DR, polar orbiting satellites and available ships & buoy observations in the region. The system was also monitored by Doppler Weather RADAR (DWR) Machilipatnam from 10<sup>th</sup> May morning. Various global models and dynamical-statistical models run by Ministry of Earth Sciences (MoES) institutions, were utilized to predict the genesis, track, landfall and intensity of the cyclone. A digitized forecasting system of IMD was utilized for analysis and comparison of various models' guidance, decision making process and warning products generation. Typical imagery from INSAT 3D (R) and DWR Machilipatnam is presented in **Fig.2**.

## **Forecast Performance:**

### **i) Genesis Forecast**

- First information about likely formation of depression over south Andaman Sea and adjoining Southeast Bay of Bengal was released on 28<sup>th</sup> April in the Extended Range Outlook (about 9 days prior to formation of depression).
- Subsequent information about the development of low pressure area over south Andaman Sea around 6<sup>th</sup> May and depression around 7<sup>th</sup> May was issued in the daily Tropical Weather Outlook and the National Weather Forecast Bulletin issued on 29<sup>th</sup> April about 7 days prior to the formation of low pressure area over south Andaman Sea on 6<sup>th</sup> May and 8 days prior to formation of depression over Southeast bay of Bengal.

### **ii) Cyclone warnings**

- **Considering the development of cyclonic** storm over southeast Bay of Bengal, IMD issued first Special Message and Press Release at 1300 hours IST of 6<sup>th</sup> May on formation of low pressure area over South Andaman Sea. It was indicated that the system would intensify into a depression by 7<sup>th</sup> May evening and into a cyclonic storm by 8<sup>th</sup> May. The message also indicated that the system would move northwestwards and reach westcentral Bay of Bengal off North Andhra Pradesh-Odisha coasts on 10<sup>th</sup> May. Heavy rainfall, strong wind and tidal waves warnings were issued alongwith advisories for fishermen. Prior to the formation of depression,

pre-genesis track was also issued indicating probable point of genesis and path of expected system.

- The Special Message and Press Release were further updated on 7<sup>th</sup> May on development of well marked low pressure area.

### iii) Track and intensity forecast

- The first numbered bulletin issued at 1430 hrs IST of 7<sup>th</sup> May on formation of depression indicated that the system would intensify into a cyclonic storm on 8<sup>th</sup> May and would reach close to north Andhra Pradesh coast on 11<sup>th</sup> May. It was also indicated that the system would gradually recurve northeastwards after reaching close to Andhra Pradesh coast and weaken gradually.
- The next bulletin issued at 2120 hrs IST of 7<sup>th</sup> May further indicated that the system would intensify into a cyclonic storm on 8<sup>th</sup> May morning and into a severe cyclonic storm in the evening of 8<sup>th</sup> May. It was also indicated that the system would weaken into a cyclonic storm in the morning of 11<sup>th</sup> May.
- Actually, the depression formed on 7<sup>th</sup> May, intensified into a cyclonic storm in the morning and into a severe cyclonic storm in the evening of 8<sup>th</sup> May. Thereafter it weakened into a cyclonic storm in the early morning of 11<sup>th</sup> May. Thus, intensification and weakening were correctly predicted from 7<sup>th</sup> May itself.

### Realised weather:

#### a) Wind:

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

#### b) Heavy rainfall

The 24 hrs cumulative rainfall ( $\geq 7$ cm) realised at 0830 hrs IST of 11<sup>th</sup> and 12<sup>th</sup> May are given below. The text within the parenthesis next to the place indicates the name of district.

#### 11<sup>th</sup> May 2022

##### **Coastal Andhra Pradesh & Yanam**

Narsipatnam (Vishakhapatnam), Kavali (Nellore), Vishakhapatnam (Vishakhapatnam), Kandukur (Prakasam), Bapatla (Guntur), Mentada (Vizianagaram), Pusapatirega (Vizianagaram) & Gantyada (Vizianagaram) 7 each.

##### **Rayalaseema**

Duvvur (YSR) 11, Chapad (YSR) 8 and Cuddapah (YSR), Vallur (YSR), Proddutur (YSR) 7 each.

##### **Odisha**

Anandpur (Keonjargarh) and Ghasipura (Keonjargarh) 7 each

#### 12<sup>th</sup> May 2022

##### **Coastal Andhra Pradesh & Yanam**

Kandukur (Prakasam) 26, Atmakur (Nellore) 20, Bestavaripeta (Prakasam) 13, Kavali (Nellore) & Ongole (Prakasam) 12 each, Racherla (Prakasam) & Cumbum (Prakasam) 11 each

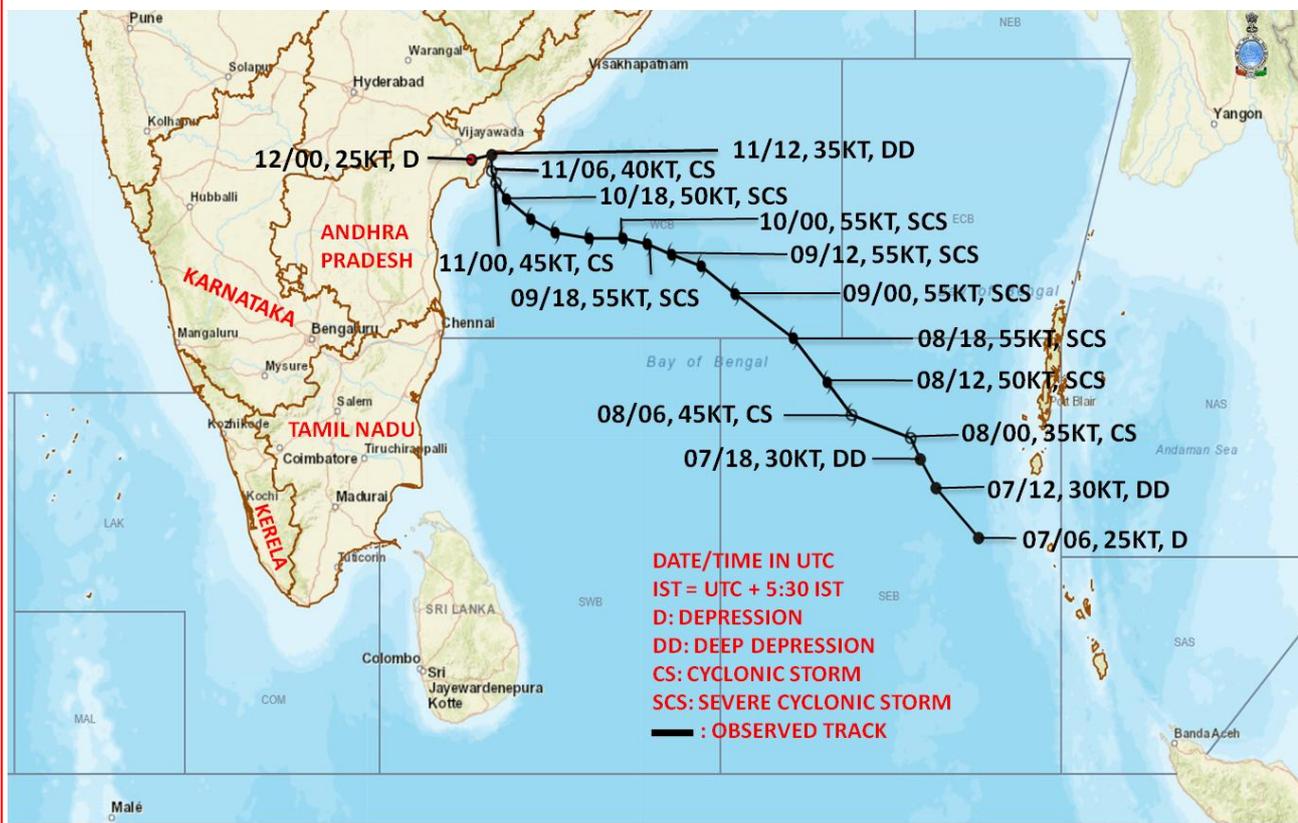
##### **Rayalaseema**

Badvel (YSR) 8 and Atlur (YSR) 7

**(vi) Warning advisories issued**

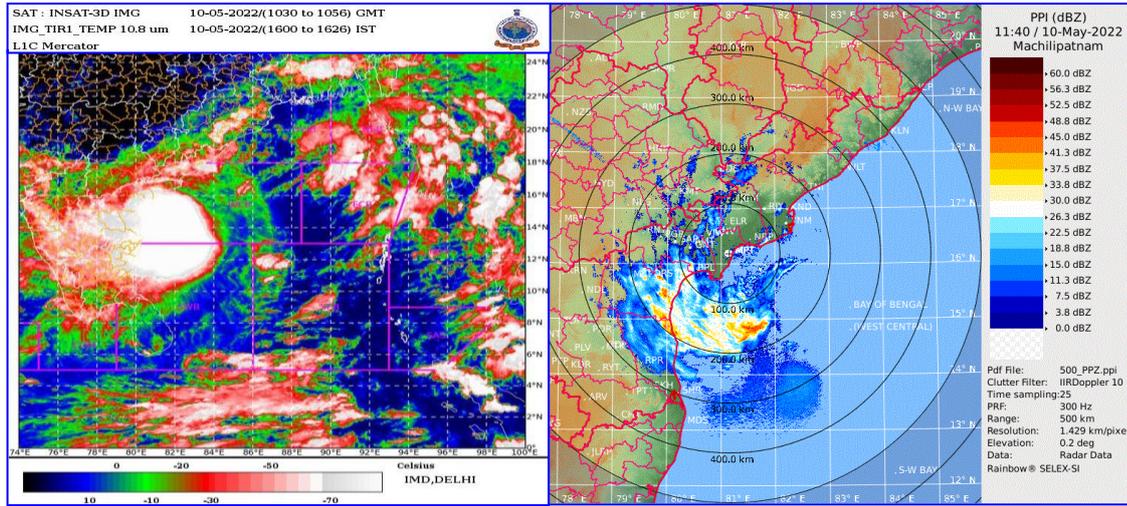
A total of 38 National bulletins including 2 special messages for national level disaster managers, 7 press releases for print & electronic media, 9 hourly bulletins when system lay close to Andhra Pradesh coast, 38 tropical cyclone advisories for WMO/ESCAP Panel member countries, 17 tropical cyclone advisories for International Civil Aviation, 38 advisories for sea area under Global Maritime Distress Safety System, daily video updates, regular updates on social media (facebook, whatsapp, twitter), SMS to disaster managers, general public, fishermen and farmers were issued by IMD Headquarter alongwith with similar action by state level offices at Andhra Pradesh, Odisha, West Bengal, Tamilnadu & Puducherry and Andaman & Nicobar Islands.

**OBSERVED TRACK OF CYCLONIC STORM 'ASANI' OVER BAY OF BENGAL DURING 07<sup>th</sup> TO 12<sup>th</sup> MAY**



<b>DATE/TIME IN UTC</b> <b>IST=UTC + 0530</b> <b>L: LOW PRESSURE AREA</b> <b>WML: WELL MARKED LOW PRESSURE AREA</b> <b>D: DEPRESSION (17-27 KT)</b> <b>DD: DEEP DEPRESSION (28-33 KT)</b> <b>CS: CYCLONIC STORM (34-47 KT)</b> <b>SCS: SEVERE CYCLONIC STORM (48-63KT)</b> <b>VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)</b> <b>ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)</b> <b>SuCS: SUPER CYCLONIC STORM (≥ 120 KT)</b>	<ul style="list-style-type: none"> <li> LESS THAN 34 KT</li> <li> 34-47 KT</li> <li> ≥ 48 KT</li> <li> OBSERVED TRACK</li> <li> FORECAST TRACK</li> <li> CONE OF UNCERTAINTY</li> </ul>
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**Fig. 1: Observed track of severe cyclonic storm 'ASANI' over the Bay of Bengal during 7<sup>th</sup>-12<sup>th</sup> May, 2021**



**Fig. 2: Typical (a) INSAT 3D (R) imagery at 1600 hrs IST and (b) DWR Machilipatnam imagery at 1720 hrs IST of 10<sup>th</sup> May of severe cyclonic storm ‘ASANI’**