India Meteorological Department
Ministry of Earth Sciences
Mausam Bhawan, Lodhi Road, New Delhi-110003

Issued on 15.05.2025

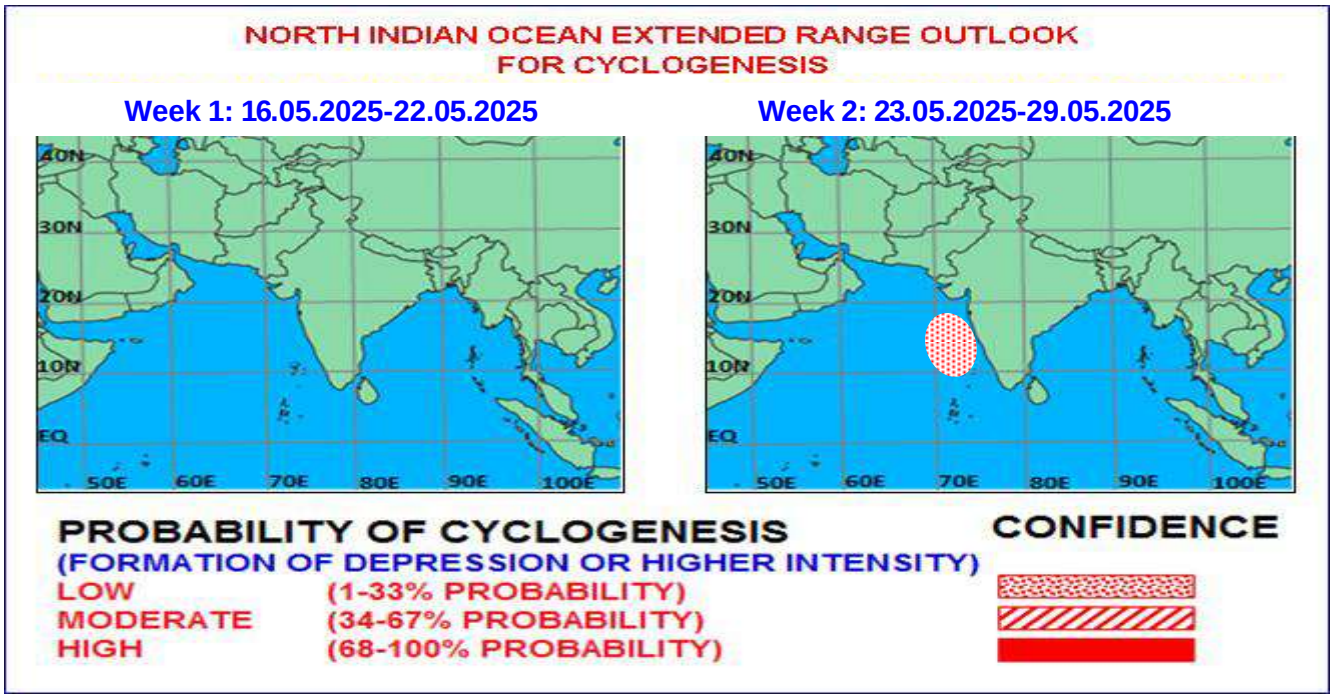


Fig. 1: Graphical Cyclogenesis over the north Indian Ocean during next two weeks

I. Environmental features:

The guidance from the ECMM model indicates that the Madden Julian Oscillation (MJO) is currently in phase 5 with amplitude close to zero. It is likely to move rapidly to phase 4 during beginning of week 1. Thereafter, it is very likely to move very slowly and continue in same phase with gradually increasing amplitude. Similar features are indicated by NCEP and ECMWF also. However, NOAA CFS V2 is indicating that MJO is currently in phase 8 and would continue in same phase during first half of week 1 with gradually decreasing amplitude. Thereafter, it would move rapidly and enter into phase 3 during week 2. Thereafter, it would move across phase 3 with amplitude becoming more than 1 towards the end of week 2. Thus, the guidance from various numerical weather prediction models indicates that MJO would support enhancement of convective activity and cyclogenesis (formation of depression) over the Bay of Bengal (BoB) during the entire forecast period.

The guidance from NCICS, CFS model indicates prevalence of westerly wind anomaly (5-7 mps) over East Equatorial Indian Ocean (EEIO) and adjoining south BoB & south Andaman Sea alongwith a large amplitude Rossby waves (ERW), Low frequency background wave (LW) and Kelvin wave (KW) over EEIO & adjoining southeast BoB and easterly wind anomaly (3-7 mps) over major parts of BoB during beginning of week1. During the later half of week 1, the ERW is likely to move westwards and KW eastwards. The model is also indicating weakening of westerly wind anomaly over EEIO & adjoining areas during later half of week 1. The easterly wind anomaly is likely to shift further northwards. These features would support the existing cyclonic circulation over the southeast BoB and adjoining areas during beginning of week1. Over the Arabian Sea (AS), the model is indicating weak westerly wind anomaly (1-3 mps) over south AS alongwith LW and easterly wind anomaly (1-3 mps) over the north AS. Thus, equatorial waves are not likely to support any convective activity over the AS during week 1.

During first half of week 2, the model is indicating enhancement of westerly wind anomaly along with prevalence of LW over south BoB and Andaman Sea and easterly wind anomaly (3-5 mps) over north BoB. Over the AS, westerly wind anomaly is predicted over the entire region alongwith an ERW and LW over West Equatorial Indian Ocean (WEIO) and adjoining south AS. These features indicate

enhancement of monsoonal flow over both the basins. During later part of week2, further enhancement of cross equatorial flow is indicated along with prevalence of an ERW over the entire south BoB & south AS. A KW is also seen over southwest AS. These features indicate enhancement of monsoonal flow during week 2, with conditions becoming favourable for cyclogenesis over central parts of BoB and southwest AS during later half of week 2.

II. Model Guidance:

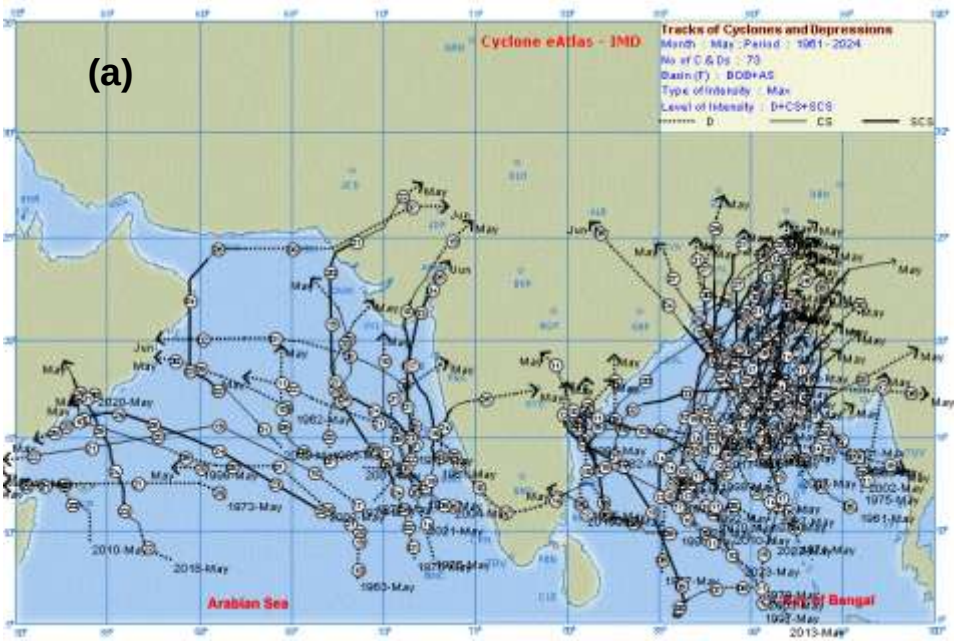
Most of the models including IMD GFS, NCUM, GEFS, NEPS, ECMWF and NCEP-GFS are in consensus about the advancement of southwest monsoon over south BoB and Andaman Sea during next 7 days. There is a development of a shear zone over central BoB and associated upper-air cyclonic circulation over westecentral BoB around middle of week 1. However, models are not suggesting any cyclogenesis (formation of any depression) over BoB during the forecast period. The model forecasts over AS is not showing any consensus after the first week. The ECMWF model is suggesting the formation of a low pressure area over eastcentral AS around 23rd May. Subsequently, the system is likely to move initially northwards till 25th May and then recurve northwestwards away from Indian coast. IMD GFS is also indicating formation of a low pressure area over the same region around 24th May and further intensification into a depression on 25th May. However, the NCEP GFS and NCUM (G) are not indicating any low pressure system over the AS.

The 850 hPa mean wind field of IMD ERF Model indicates a cyclonic circulation over westcentral BoB during week 1. However, the 850 hPa anomaly field is indicating a cyclonic circulation over eastcentral AS during week 1 which is indicated to persist over the same region during week 2. Over the BoB, easterly wind anomaly is seen during both the weeks. The models is also indicating a significant zone of cyclogenesis (30-40%) over eastcentral BoB off Myanmar coast during week 1. During week 2, the model is indicating moderate probability (40-50%) of cyclogenesis over eastcentral AS and another zone of cyclogenesis with low probability (30-40%) over North BoB.

The ECMWF ensemble model is predicting low (10-20%) probability of cyclogenesis over westcentral BoB during week 1 (around 22nd May). The ECMWF extended range prediction system suggests low to moderate probability of cyclogenesis (30-40%) over eastcentral AS during week 2.

III. Climatology:

A total of 73 cyclonic disturbances (maximum sustained wind speed (MSW) ≥31 kmph) developed over the NIO during 1961-2024 (Fig 2[a]). Out of these 52 formed over BoB and 21 over AS. Out of these 39 intensified into cyclones (MSW≥63 kmph) over BoB and 16 over AS.



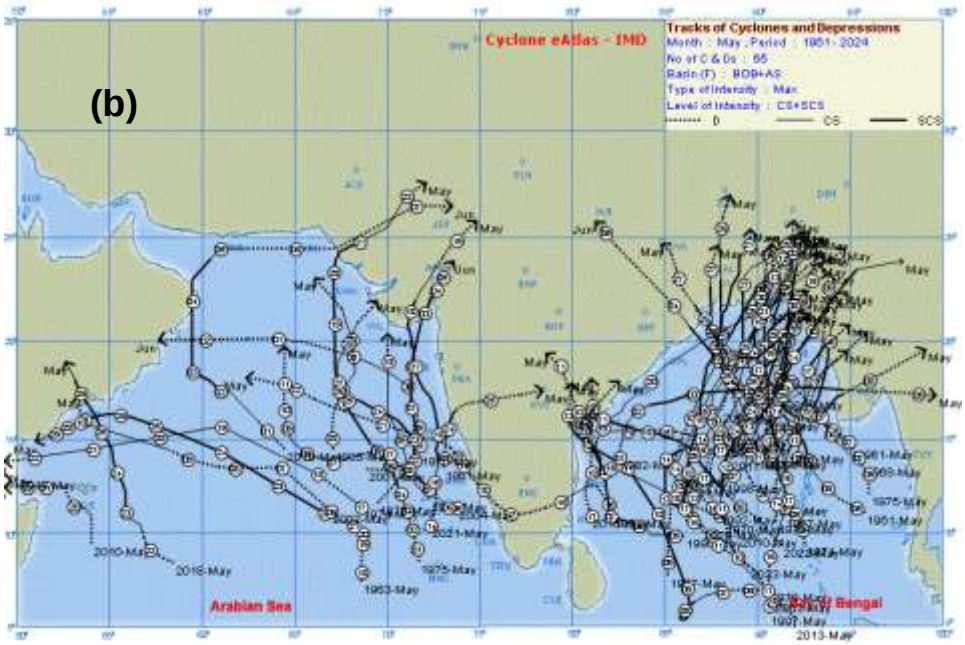


Fig. 2: (a) Cyclonic disturbances over NIO in the month of May during 1961-2024 (Total 73),

(b) Cyclones over NIO in the month of May during 1961-2024 (Total 55)

The details of the statistics in the month of May for Cyclonic disturbances and Cyclonic Storms over NIO, BoB and AS are presented in the table 1 below.

Table 1. Climatology of Cyclonic disturbances and cyclonic storms for the month of May (1961-2024)

For month of May (from 1961 to 2024)	North Indian Ocean	Bay of Bengal	Arabian Sea
Cyclonic disturbances formed (maximum sustained wind speed (MSW) ≥31 kmph)	73	52	21
Cyclonic Storm formed (MSW≥63 kmph)	55	39	16
Crossed coast as Cyclone (coasts)	43	36 (Bangladesh-18, Myanmar-7, Andhra Pradesh -4, West Bengal -3 , Odisha-3, Tamil Nadu-1)	7 (Gujarat-2, Pakistan-1 Konkan and Goa-1, Iran-Arabia-Africa-3)
Dissipated over Sea	-	3	4

IV. Inference:

Considering large-scale environmental features and model guidance, it is inferred that:

(i) there is no probability of cyclogenesis over the North Indian Ocean region during week 1. However, existing upper air cyclonic circulation over southeast Bay of Bengal is likely to move northwestwards towards westcentral Bay of Bengal during next 2 days without any significant intensification.

(ii) In association with the advance of southwest monsoon over south Arabian Sea, the conditions would become favourable for the development of an upper air cyclonic circulation/low pressure

area over eastcentral Arabian Sea in the beginning of week 2. There is low probability of its further intensification into a depression over the same region during middle of week 2.

(iii) With the likely advancement of southwest monsoon over central & north Bay of Bengal, an upper air cyclonic circulation is likely to form over north and adjoining central Bay of Bengal towards the end of week 2. Under it's influence, a low pressure area is likely to develop over North Bay of Bengal.

V. Anticipatory actions suggested:

In view of advancement of southwest monsoon over the south Arabian Sea, central & north Bay of Bengal and likely development of low pressure systems during week 2, following anticipatory actions are suggested:

- ✓ Disaster managers, media and general public are advised to closely monitor official weather forecasts from India Meteorological Department available on websites, social networking channels, face book, X and mobile Apps
- ✓ Fishermen are advised to be cautious while venturing into sea and stay updated
- ✓ Judicious regulation of recreational and tourism activities
- ✓ Judicious regulation of offshore and onshore activities
- ✓ Forecasters may maintain round the clock watch and continuously monitor weather over the region as per SOP

VI. Verification of forecast issued during last two weeks:

The forecast issued on 1st May for week 2 (9th May– 15th May) indicated no probability of cyclogenesis (formation of depression) over NIO region. The forecast issued on 8th May for week 1 (9th May– 15th May) also indicated no probability of cyclogenesis (formation of depression) over NIO region. However, during week 1 with the expected advancement of southwest monsoon over southeast Bay of Bengal and south Andaman Sea around 13th May, it was indicated that an east-west shear zone would develop over the region. Under its influence, likelihood of development of a cyclonic circulation was indicated during the same period.

Actually, no cyclogenesis occurred during this period over NIO region. However, an upper air cyclonic circulation formed over southeast Bay of Bengal and adjoining south Andaman Sea on 7th May and it became less marked on 11th May 2025.

Another upper air cyclonic circulation ormed over Andaman Sea at 0300 UTC of 13th May, 2025 and it persisted over same region on 15th May 2025.

Another upper air cyclonic circulation formed over southwest Bay of Bengal and adjoining Tamil Nadu coast at 1.5 km above mean sea level on 14th May, 2025 and it persisted over the same region on 15th May.

Hence, the nil probability of cyclogenesis and formation of cyclonic circulation in lower-middle tropospheric levels were predicted correctly in week 1 forecast.

NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from, 08th – 14th May, 2025 are presented in **Fig. 2**.

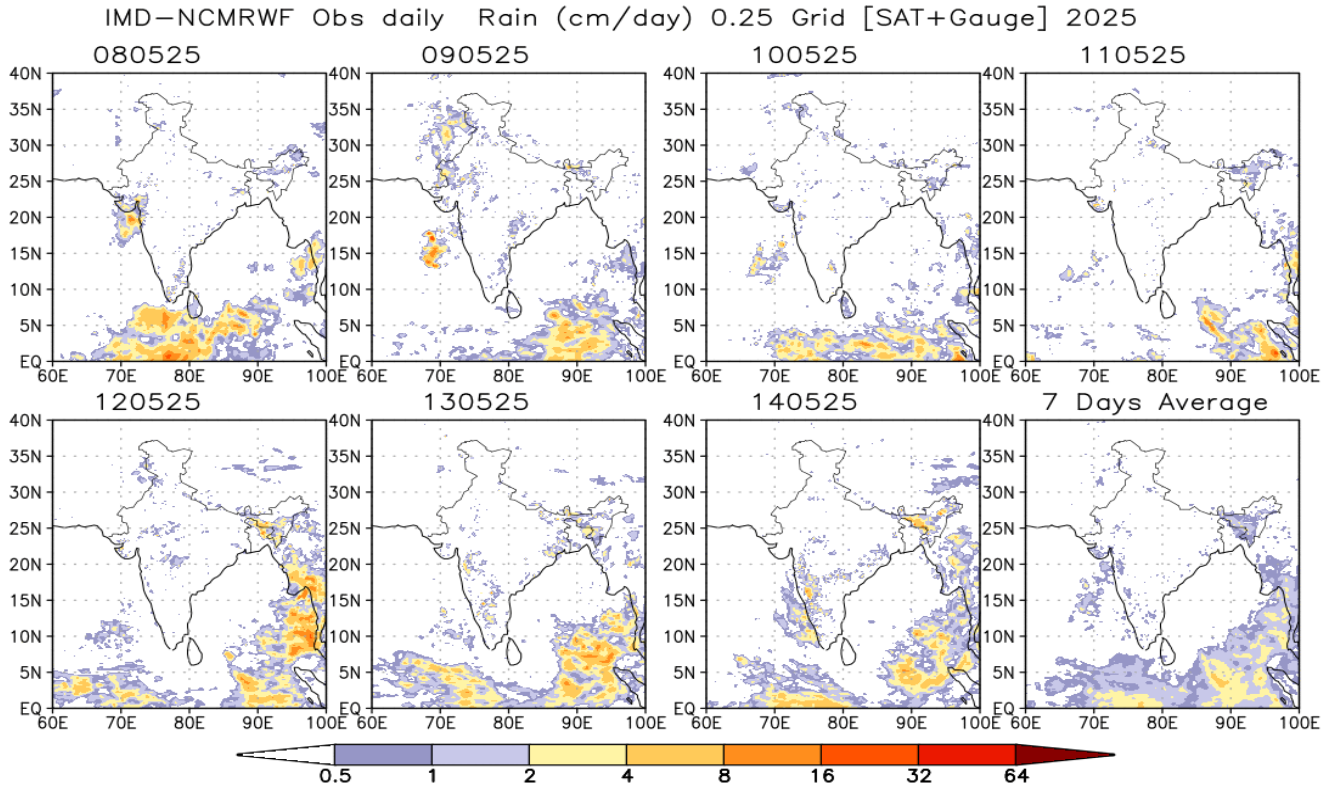


Fig.2: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 08th to 14th May, 2025.

Legends: MJO: Madden Julian Oscillation, ERW: Equatorial Rossby Waves, KW: Kelvin Waves, NCICS: North Carolina Institute for Climate Studies (for Equatorial waves Forecast), IMD GFS: India Meteorological Department Global Forecast System, NCUM: National Centre for Medium-Range Weather Forecasting Centre (NCMRWF) Unified Model, ECMWF: European Centre for Medium-Range Weather Forecasting, EC-AIFS: ECMWF Artificial Intelligence Forecasting System, ECMM: ECMWF-Ensemble System Bias Corrected, GPP: Genesis Potential Parameter, NCEP GFS/GEFS/CFS: National Centre for Environment Prediction GFS/GEFSv12/CFSV2, CPC: Climate Prediction Center (for MJO update), IMD-GEFS: GFS ensemble forecast system of IMD, NEPS: NCUM ensemble prediction system, CNCUM: Coupled NCUM, CPC: Climate Prediction Centre, NWS: National Weather Service, INCOIS: Indian National Centre for Ocean Information Services.

Next update: 22.05.2025