

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

**I. Environmental features:**

The Madden Julian Oscillation (MJO) index is currently in Phase 7 with amplitude more than 1. According to the forecasts by various models, it is likely to move eastward through phases 8 in the first half of week 1 and in phase 1 during the second half of first week without any significant variation in the amplitude. However, the GEFs ensemble members indicate slow propagation of MJO index compared to the ECMWF ensemble members. The MJO reaching phase 1 at the end of the first week, it is likely to reach up to phase 2 during the latter part of week 2. Thus, MJO phase and amplitude are not favourable towards enhancement of convective activity over the North Indian Ocean (NIO) region during the first week and it would become gradually favourable during the latter part of second week.

The NCICS based forecast indicates the westerly winds (1-3 mps) are weak over north & central parts of Bay of Bengal (BoB) and relatively strong (3-7 mps) over the south and central parts of Arabian Sea (AS) during first week. The weak easterly winds (1-5 mps) are simultaneously noticed over southern parts of BoB and adjoining equatorial Indian Ocean. Equatorial Rossby Waves (ERW) is noticed over northern parts of BoB during 2nd half of the first week, whereas Kelvin Waves are noticed over central parts of BoB during first half of the week and gradually progress eastward. During week 2, westerly winds (1-3 mps) are weakening over entire BoB & AS. However, the weak easterly winds (1-5 mps) still prevails over southern parts of BoB and AS & adjoining equatorial Indian Ocean. Equatorial Waves are absent over the region during the second week. The zonal winds and intermittent wave activities over the NIO region do not support convective activity during entire forecast period.

The sea surface temperature over the entire BoB is 28-32<sup>o</sup>C. The values of SST remain within the same range over entire AS except western sectors of westcentral and southwest AS near coasts of Oman, Yemen and Somalia where the Sea is colder (SST ~ 24-28<sup>o</sup>C). Tropical Cyclone Heat Potential (TCHP) is high (>100 KJ/cm<sup>2</sup>) over north, eastcentral and,

southwest BoB. Higher values of TCHP ( $> 100 \text{ KJ/cm}^2$ ) are also found over equatorial North Indian Ocean and southwest AS.

Considering all the environmental features, it is inferred that the conditions are entirely favourable in the development of cyclonic disturbances over central and northern parts of BoB and AS regions during the entire period.

## II. Model Guidance:

Most of the models (ECMWF, IMD GFS, NCEP GFS, NCUM) are not indicating the formation of any cyclonic disturbances over entire north Indian Ocean till 5<sup>th</sup> October. However, the NCEP GFS and ECMWF models indicate a likely formation of a low-pressure area over west-central and adjoining southwest BoB around 6<sup>th</sup> October, 2024, whereas, IMD GFS indicates formation of a low pressure area over Gangetic West Bengal and neighbourhood around 5<sup>th</sup> October 2024.

As per the models forecast, it can be inferred that a low pressure area is likely to form over west-central BoB and adjoining areas around 6<sup>th</sup> October, 2024

The 850 hPa mean wind field of IMD CFS v2 system indicates monsoon trough at near normal position along with a cyclonic circulation over Gujarat region and adjoining south Rajasthan during the first week. The anomaly wind field also indicates a cyclonic circulation over the over the same region during week 1. The low level wind indicates a cyclonic circulation over north BoB and adjoining eastern India without any established monsoon trough but the anomaly wind field indicates an east-west oriented trough over the Indo-Gangetic plains.

The model indicates a moderate probability (40-60%) of cyclogenesis over western parts of India during first week. The model also indicates a low probability (10-20%) over eastern parts of India during week 2. The ECMWF ensemble forecast Model also indicates low probability (10-20%) over the east-central Arabian Sea off Konkan Goa coast during the 2<sup>nd</sup> half of the first week. The ECMWF model also suggests low probability (20-30%) of cyclogenesis over westcentral and adjoining south Bay of Bengal during second week.

**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, ECMF: ECMWF-Ensemble System, ECMM: ECMWF-Ensemble System Bias Corrected, GPP: Genesis Potential Parameter, NCEP GFS: National Centre for Environment Prediction GFS, GEFS: GFS ensemble forecast system, NEPS: NCUM ensemble prediction system, CNCUM: Coupled NCUM, CPC: Climate Prediction Centre, NWS: National Weather Service, INCOIS: Indian National Centre for Ocean Information Services.

## III. Inference:

Considering various environmental conditions and model guidance, it is inferred that there is no probability of cyclogenesis over north India Ocean region during the entire forecast period.

However, a low pressure area is likely to form over west-central BoB and neighbourhood around 6<sup>th</sup> October, 2024.

#### IV. Verification of forecast issued during last two weeks:

(i) **Week 2 updated forecast issued on 12th September for the second week (20.09.2024-26.09.2024)** indicated:

A cyclonic circulation is likely to develop over north & adjoining central BoB during second week

(ii) **Week 1 forecast issued on 19th September for first week (20.09.2024-26.09.2024)** indicated:

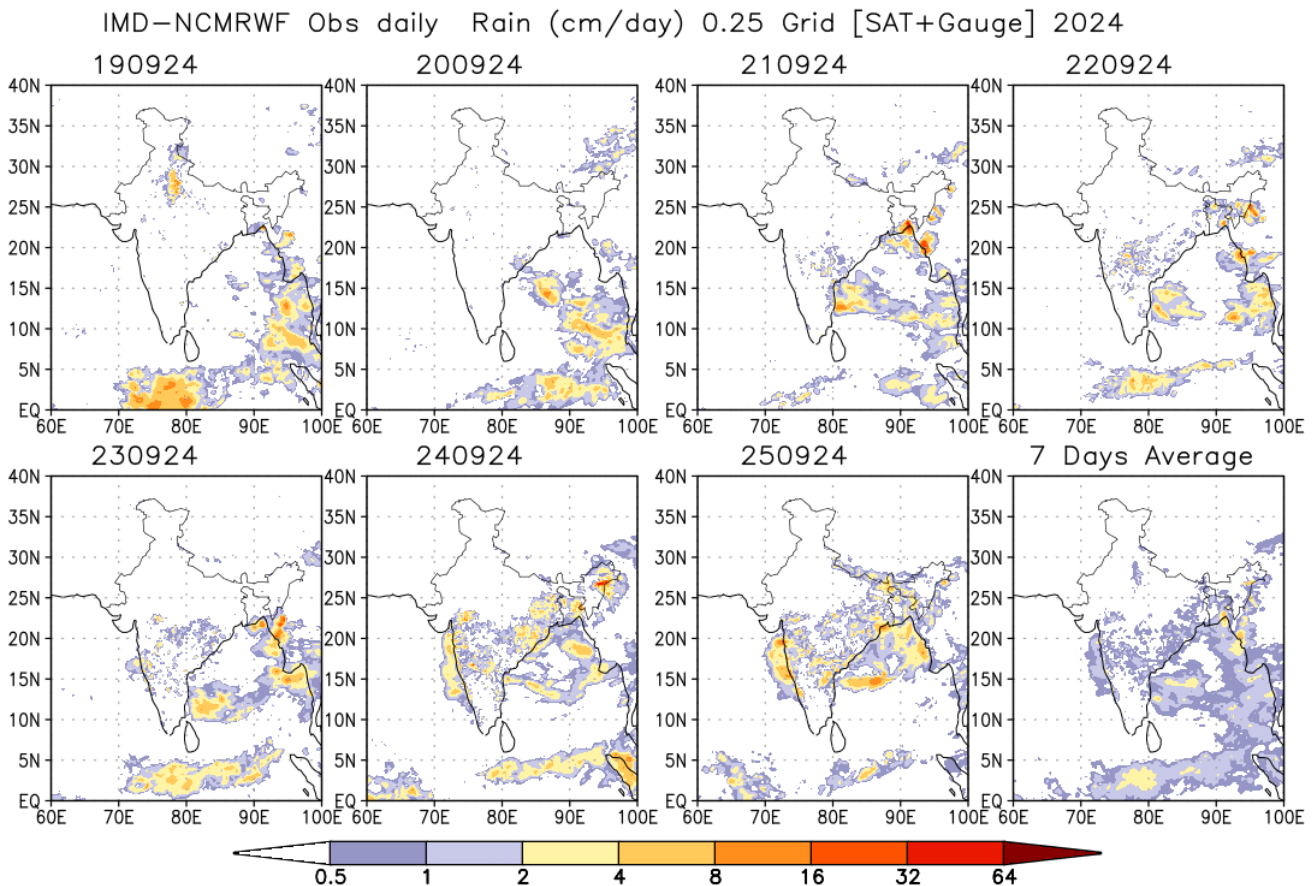
There is a low probability of cyclogenesis over northwest and adjoining central Bay of Bengal & Odisha coast during the first week.

(iii) **Realised:**

Under the influence of cyclonic circulation over Central Bay of Bengal, A low-pressure area formed over Westcentral and adjoining northwest Bay of Bengal off north Andhra & south Odisha coasts with the associated cyclonic circulation extending upto 7.6 km above mean sea level at 0300 UTC of 24th September, 2024. It moves over Westcentral & adjoining Northwest Bay of Bengal off North Andhra Pradesh-South Odisha Coasts became less marked at 0300 UTC of 25th September, 2024.

However, no cyclogenesis occurred during the period.

**The observed satellite-gauge merged analysis of 24 hours accumulated rainfall from 19<sup>th</sup> September to 25<sup>th</sup> September, 2024 is shown in Fig. 2.**



**Fig. 3: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 19<sup>th</sup>September to 25<sup>th</sup>September, 2024.**

**Next update: 03.10.2024**