

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

I. Environmental features:

The Madden Julian Oscillation (MJO) index currently entered phase 3 with an amplitude greater than 1. The ensemble members of GEFS indicate large spread and incoherency in their eastward propagation of MJO index. Contrary to that the member's forecasts of ECMWF ensemble show more agreement about the eastward progress of the MJO. However, the MJO signal is likely to move eastward within phase 3 and then in phase 4 while the amplitude is likely to decrease gradually to less than 1 during the first week. The further eastward progress in phase 5 over the Maritime continent during the second week, the models do not show consensus. While the GEFS indicates looping within phase 4, the ECMWF predicts slow eastward movement in phase 5. Though the ensemble prediction systems portray limited spread with synchronous propagation in the forecast duration. Therefore, the MJO index is likely to enhance the convective activity over eastern part of Arabian Sea (AS) during first half the week 1 and over the Bay of Bengal (BoB) during the whole week. The MJO is likely to continue its support to convective activity over BoB during first half of the second week and it will subside gradually thereafter.

The NCICS forecasts indicate significant presence of convectively coupled Equatorial Rossby Waves (ERW) propagating westwards starting from south China Sea and BoB to southeast and eastcentral AS during the first week. The ERW activity is likely to persist over southeast AS during first half of 2nd week. The weak westerly winds (1-3 mps) are likely over southern and adjoining central parts of AS and BoB during both the weeks. The intermittent easterly winds (1-3 mps) are likely over northeast India during first half of week 1 and over northern parts of central BoB, central India, and central AS during the second week. The eastward-moving Kelvin Waves (KW) are likely over northern parts of AS and south BoB during week 1. Therefore, the zonal winds and equatorial waves are likely to support

convective activities associated with the cyclonic circulations /low pressure areas over northern parts of BoB and northern Plains of India during the first week and over central and adjoining north BoB during the second week.

II. Model Guidance:

Most of the numerical weather prediction models (IMD GFS, NCEP GFS, GEFS, ECMWF, and NCUM) indicate that the existing low pressure area over north Bangladesh & neighbourhood is likely to move nearly westwards across West Bengal during next 2 days. A cyclonic circulation is likely to form over North Bay of Bengal & neighbourhood around 24th August. Thereafter, it is likely to move initially west-northwestwards and then nearly westwards across Gangetic West Bengal, Jharkhand and adjoining north Odisha and north Chhattisgarh and intensify further reach over Madhya Pradesh and neighborhood during subsequent 3-4 days. The low pressure area over eastcentral Arabian sea off Karnataka-Goa coasts is likely to move nearly northwards over northeast AS off south Gujarat & Maharashtra coasts during next 24 hours. The model forecasts are also suggesting that there will be a likely formation of a cyclonic circulation/Low pressure area over central and adjoining north BoB around 29th August which will move initially northwestwards towards Odisha.

The weekly mean wind field of IMD Extended Range Forecast (ERF) system indicates a well-established monsoon trough with strong westerly (southwesterly) flow over AS and BoB during both the weeks. The wind anomaly indicates a cyclonic circulation over eastcentral AS off Konkan coast during the first week. The anomaly field also portrays a feeble cyclonic circulation over the Gujarat region and easterly winds covering whole of north and central India during the second week. The model also suggests a moderate to high probability of cyclogenesis (40-70%) over Northern plains of India from Gangetic West Bengal, Jharkhand across Uttar Pradesh and adjoining Madhya Pradesh to northwest India during first and low to moderate probability (20-40%) over central and west India during the second week. The ECMWF ensemble forecasts indicate 10-20% probability of cyclogenesis over westcentral BoB during the end and beginning of the second week. The model also indicates a zone of cyclogenesis with moderate to high probability (60-70%) over Gujarat region and adjoining areas of northeast AS during the first 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 the North Indian Ocean (NIO) region including the Bay of Bengal (BoB) and the Arabian Sea (AS) during the entire forecast period. However,

- (i) Existing low pressure area over north Bangladesh & neighbourhood is likely to move nearly westwards across west Bengal during next 2 days.

- (ii) Existing low pressure area over eastcentral Arabian Sea off Kartaka-Goa coasts is likely to move nearly northwards during next 24 hours.
- (iii) Another fresh cyclonic circulation is likely to form over north Bay of Bengal and neighbourhood around 24th August. Under its influence, a low pressure area is likely to form over Gangetic West Bengal and adjoining areas of Northwest Bay of Bengal around 25th August. It would move west-northwestwards across Gangetic West Bengal, North Odisha, and Jharkhand & adjoining Chhattisgarh during the subsequent 3-4 days.
- (iv) There could be another cyclonic circulation or low pressure area over the central and adjoining north Bay of Bengal towards the end of the first week or in the beginning of the second week around 29th August in association with favorable environmental conditions as discussed above.

IV. Verification of forecast issued during last two weeks:

The forecast issued on 8th August for second week (16.08.2024-22.08.2024) indicated no cyclogenesis over the region. The forecast issued on 15th August for first week (16.08.2024-22.08.2024) indicated moderate probability of cyclogenesis over Eastern parts of country with nearly west-northwestwards movement.

Actually, a cyclonic circulation formed over South Bangladesh and adjoining Gangetic West Bengal on 15th August. It lay as a low pressure area over northwest BoB and adjoining areas of West Bengal and Bangladesh on 16th. It moved slowly west-northwestwards, lay over North Bengal & neighbourhood on 21st August and persisted over the same region. The observed satellite-gauge merged analysis of 24 hours accumulated rainfall from 15th to 21st August, 2024 is shown in **Fig. 2**.

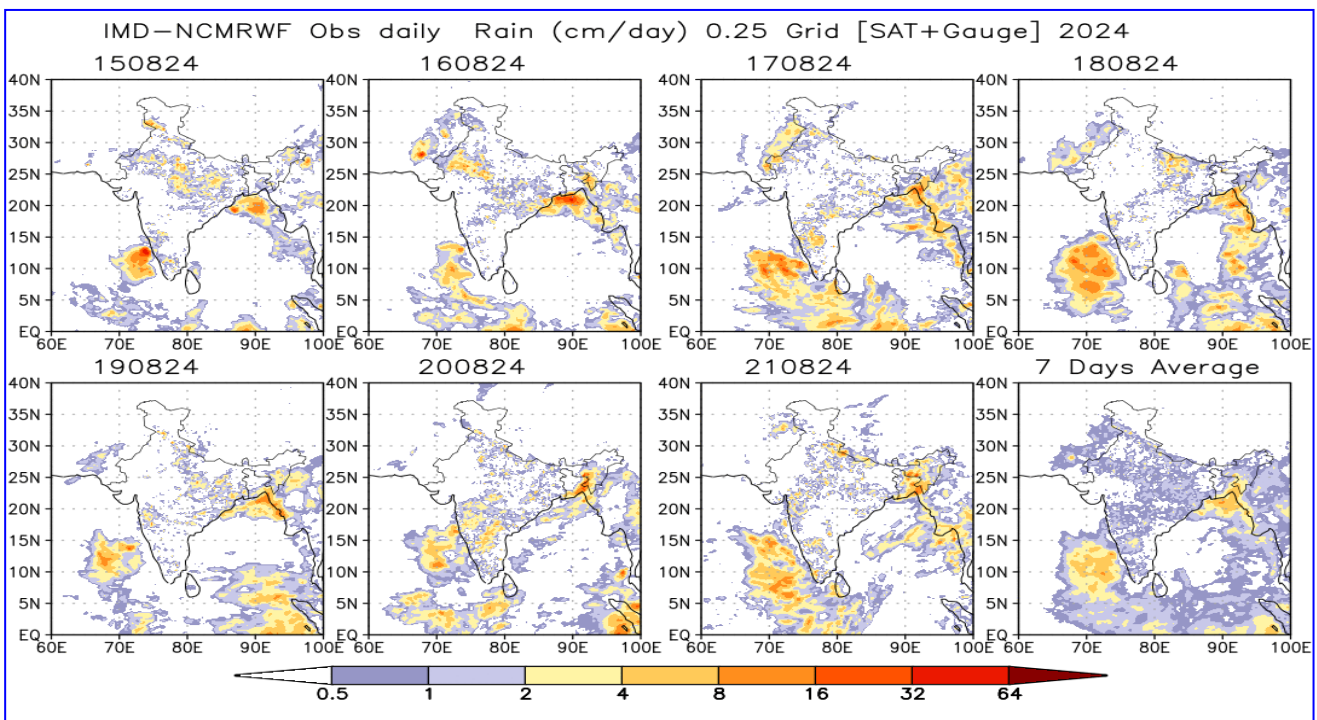


Fig. 2: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 15th to 21st August, 2024.

Next update: 29.08.2024