

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

I. Environmental features:

Madden Julian Oscillation (MJO) index is currently in phase 3 with amplitude greater than 1. Both GEFS and ECMWF forecasts show that it would move eastwards and enter into phase 4 during first half of week 1 with no variation in amplitude. During the later part of week 1, the MJO index forecasts suggest further unambiguous eastward propagation across phase 4 although ECMWF forecast show amplitude more than 1 contrary to GEFS forecast with values less than 1. The GEFS ensembles indicate that MJO enters into phase 5 in the beginning of week 2 and quickly reach upto phase 7 across phase 6 by the end of week 2. The ECMWF ensembles furnish comparative slow propagation across phase 4 and MJO is likely to enter into phase 5 at the end of week 2. Thus, MJO would be favourable for the cyclogenesis (formation of Depression) over the Bay of Bengal (BoB) on 1st December and neutral over BoB during rest of the forecast period. MJO is likely to be neutral for the cyclogenesis over Arabian Sea (AS) during the entire forecast period.

NCICS based CFS forecast for equatorial zonal wind indicates strong westerly winds (7 to 9 mps) over south BoB & adjoining North Equatorial Indian Ocean (NEIO) and easterly winds (7 to 9 mps) over central parts of BoB during first half of week 1. The strong westerly winds are continued to prevail over entire BoB during second half of week 1 and 1st half of week 2. The westerly winds (3-5 mps) are likely over South and central AS during week 1 and first half of week 2. The westerly winds are likely to weaken over south BoB and disappear over entire AS is during second half of week 2. The CFS forecast indicates Equatorial Rossby Waves (ERW) activity over NEIO and adjoining south BoB and southeast AS during week 1 and 1st half of week 2. Eastward moving Kelvin wave activity is indicated over south BoB & south Andaman Sea as it is propagating out of the Indian Ocean region during week 1. Thus, circulation pattern and equatorial waves are likely to contribute towards cyclogenesis during week 1 only.

Sea surface temperature (SST) is 29-30°C over South & adjoining Central BoB. SST is 27-28°C over Central & North BoB. Tropical cyclone Heat potential (TCHP) is more than 100KJ/cm² Southeast BoB and 60-70KJ/cm² over remaining parts of BoB. Thus, sea conditions are also favourable for cyclogenesis over the south BoB and southeast AS.

II. Model Guidance:

Most of the models including IMD GFS, GEFS, NCUM, ECMWF, ECMWF ensemble, MME are indicating a consensus amongst them. The models indicate likely intensification of the existing well marked low pressure system over southeast Andaman Sea during next 24 hours and further into a cyclonic storm around 2nd December over southeast BoB. The models are also indicating slight further intensification of this system into a severe cyclonic storm except ECMWF. These models are also indicating a probable west-northwestwards initially and then northwestwards reaching near north Tamil Nadu & Puducherry and south coastal Andhra Pradesh coasts around 4th early morning. Thereafter regarding movement, most of the models are predicting nearly northward movement along north Tamil Nadu and south Andhra Pradesh coasts till 5th morning. The landfall points for various models are located over north Tamil Nadu and south Andhra Pradesh coasts between 13.5°N to 17.0°N. Only NCEP GFS is showing a track with early recurvature towards northeast direction compared to other models and no landfall over Indian coast. IMD GPP is indicating a significant potential zone for cyclogenesis over southeast BoB on 30th which move west-northwestwards over southwest BoB covering larger area on 1st December. The significant GPP zone move northwards over westcentral BoB off North Tamil Nadu and South Andhra Pradesh coasts till 5th December. The extended range model IMD CFS V2 is also indicating more than 80% probability of cyclogenesis over southwest westcentral BoB during week 1. During week 2, it also shows 20-30% probability of cyclogenesis over south Andaman Sea and southeast BoB. The ECMWF ERF5 indicates more than 70% probability during week 1 and no cyclogenesis during week 2.

Legends: 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, European Centre for Medium Range Weather Forecasting, GPP: Genesis Potential Parameter, National Centre for Environment Prediction (NCEP) GFS, ECMM: ECMWF multi model, GEFS: GFS ensemble, NEPS: NCUM ensemble prediction system, CNCUM: Coupled NCUM, CPC: Climate Prediction Center, NWS: National Weather Service.

III. Inference:

Considering all environmental conditions and model guidance, it is inferred that

1. The existing yesterday's Well Marked Low Pressure Area over Southeast Bay of Bengal & adjoining South Andaman Sea moved west-northwestwards and lay over Southeast Bay of Bengal at 0830 hours IST of today, the 30th November, 2023. It is likely to move west-northwestwards and intensify into a Depression over southeast Bay of Bengal during next 24 hours. Continuing to move further west-northwestwards, it would intensify gradually into a Cyclonic Storm over Southwest Bay of Bengal around 3rd December. Thereafter, it would move northwestwards and reach near North Tamil Nadu and South Andhra Pradesh coasts around early morning of 4th December as a cyclonic storm.
2. There is no probability of cyclogenesis over North Indian Ocean region during week 2.

IV. Verification of forecast issued during last two weeks:

The forecast issued on 23rd November for week 1 (24.11.2023-30.11.2023) indicated high probability of formation of depression over southeast & adjoining southwest Bay of Bengal. The Forecast issued on 16th November for week 2 (24.11.2023-30.11.2023) indicated low probability of formation of depression over the same region. Actually, a cyclonic circulation emerged into South Andaman Sea in the early morning (0000 UTC) of 26th November. Under its influence a low pressure area formed over

South Andaman Sea and adjoining Malacca Strait in the forenoon (0300 UTC) of 27th. It lay as a well marked low pressure area over southeast BoB in the early morning (0000 UTC) of 29th and 30th November.

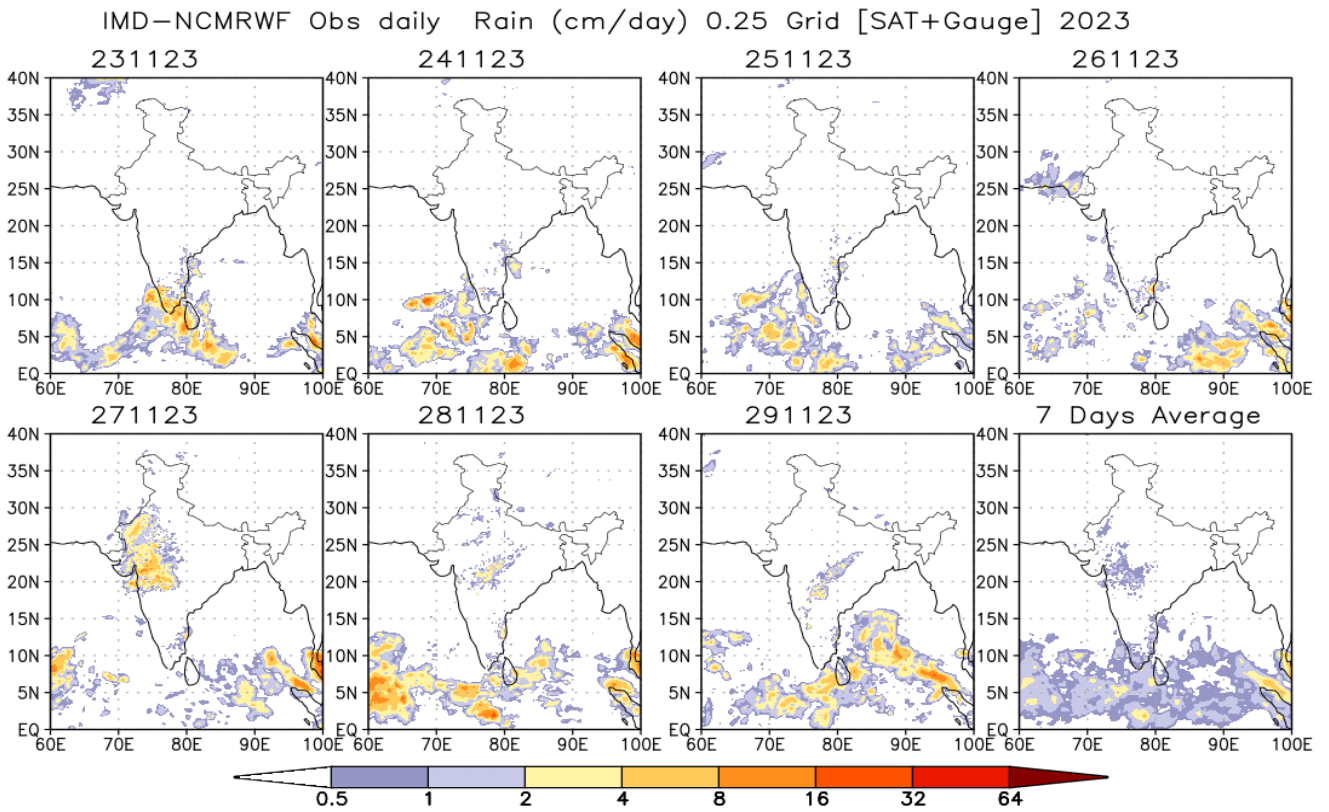


Fig.2: NCMRWF-IMD satellite gauge merged data plots of 24 hours accumulated realized rainfall during 23rd November to 29th November

Next update: 07.12.2023