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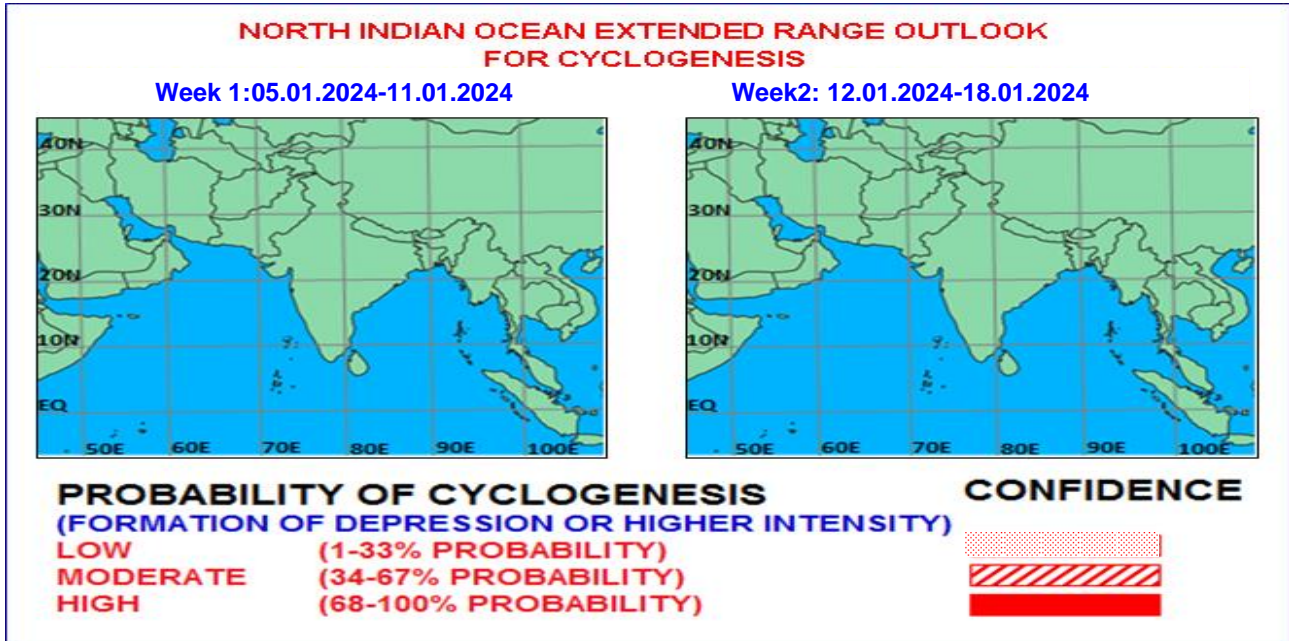


Fig. 1: Graphical Cyclogenesis over north Indian Ocean during next two weeks

I. Environmental features:

Madden Julian Oscillation (MJO) index is currently in phase 3 (Indian Ocean) with amplitude greater than 1. The GEFS and ECMWF forecasts suggest that MJO index is likely to remain in phase 3 during entire first week and first half of second week. As there are large spread amongst various members of both GEFS and ECMWF forecasts, there is a low probability for the MJO to migrate from phase 3 to phase 4 during later half of second week. Thus, MJO would be neutral to the convection over Arabian Sea (AS) but support enhancement of convective activity over Bay of Bengal (BoB) during week 1 and first half of week 2.

NCICS based forecast for equatorial waves indicates strong westerly winds (5-9 mps) over south Arabian Sea (AS) during entire first week. The easterly winds over south Bay of Bengal (BoB) is likely to strengthen (becoming 3-5 mps) gradually during later part of week 1. Equatorial Rossby Waves (ERW) is active over southwest BoB, southeast AS and adjoining Equatorial India Ocean (EIO) during first half of week 1 which gradually disappear from the region in the second half of the week 1 except over southeast AS. During 2nd half of week 1, strong westerly winds (9 mps) along with ERW over southeast AS. As the zone of strong westerly gradually shifts southwards to the south of equator over West EIO, in the second week westerly winds over AS are likely to be very weak (1-3 mps). During second week, the weak easterly winds are likely to prevail over BoB. ERW is likely to be absent over both the basins during week 2. Only, in the last few days of second week, ERW is likely to be seen over Andaman Sea. It is clearly indicated that a potential interference is likely between MJO and other modes that is ERW over southeast AS and adjoining southwest BoB & EIO during week 1.

II. Model Guidance:

IMD GFS, GEFS, NCUM, ECMWF and NCEP GFS are indicating convective activity over southeast AS, Lakshadweep area and adjoining costal areas of Karnataka and Kerala during next 3-4 days due to cyclonic circulation over southeast Arabian Sea and southeast-northeast oriented trough from the cyclonic circulation to south Karnataka coast. All models are indicating a north-south trough in easterly winds along west coast extending from Kerala to south Gujarat is likely to prevail most of the days till 9th January, 2024. Thereafter the northward extension of the trough is likely to reduce and would run along the entire west coast. Due to the presence of anticyclone in the lower tropospheric levels over Jharkhand & Odisha and adjoining areas of East India, strong easterly/northeasterly winds would prevail over westcentral, southwest BoB and adjoining Andhra Pradesh and Tamil Nadu coasts during week 1. In the same duration, strong northeasterly winds are also likely over Palk Strait, Gulf of Mannar and Comorin area. All models within their forecast range are predicting a decrease in rainfall activity over peninsular India at the end of the first week after 9th January and in the beginning of week 2.

Both the mean and associated anomaly of wind fields in extended range (CFS V2) forecast of IMD are indicating a cyclonic circulation over southeast AS and adjoining Lakshadweep area off Karnataka-Kerala coasts during first week. The easterly/northeasterly mean wind flow pattern is likely over peninsular India during week 2. The anomaly wind pattern is also suggesting the easterlies over the region during second week. The model is indicating a low to moderate (30-40%) probability of cyclogenesis over southeast AS during week 1. During first week, similar probability is also likely over East EIO and adjoining south BoB. Very low probability of cyclogenesis (20%) is expected over EIO during week 2. Extended range forecasts of ECMWF do not indicate any probability of cyclogenesis over North Indian Ocean region during the entire forecast period.

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 Centre, NWS: National Weather Service.

III. Inference:

Considering all the environmental conditions and model guidance, it is inferred that there is no probability of cyclogenesis over North Indian Ocean during the entire forecast period. However, there is a likelihood of formation of a cyclonic circulation/low pressure area over southeast Arabian Sea and adjoining west Equatorial Indian Ocean during week 1.

IV. Verification of forecast issued during last two weeks:

Forecast issued on 22nd December for week 2 (29.12.2023-04.01.2024) indicated low probability of cyclogenesis over south Arabian Sea during first half of second week and forecast issued on 28th December for week 1 (29.12.2023-04.01.2024) predicted low probability of cyclogenesis over the south Arabian Sea during later half of week 1.

Actually, an upper air cyclonic circulation lay over west Equatorial Indian Ocean and adjoining Southeast Arabian Sea at 1200 UTC of 29th December 2023, moved nearly west-

northwestwards and under its influence a low pressure area formed over the same region at 0300 UTC of 30th December, 2023. The low pressure area moved initially west-northwestwards, then north/northeastwards and lay over southeast Arabian Sea at 0300 UTC of 3rd January, 2024. It became less marked at 0300 UTC of 4th January, 2024. Therefore, the formation of cyclonic circulation/low pressure area over Southeast Arabian Sea was correctly predicted in the extended range forecast.

NCMRWF-IMD satellite gauge merged data plots of 24 hours accumulated realized rainfall during 28th December, 2023 to 03rd January, 2024 are presented in Fig.2.

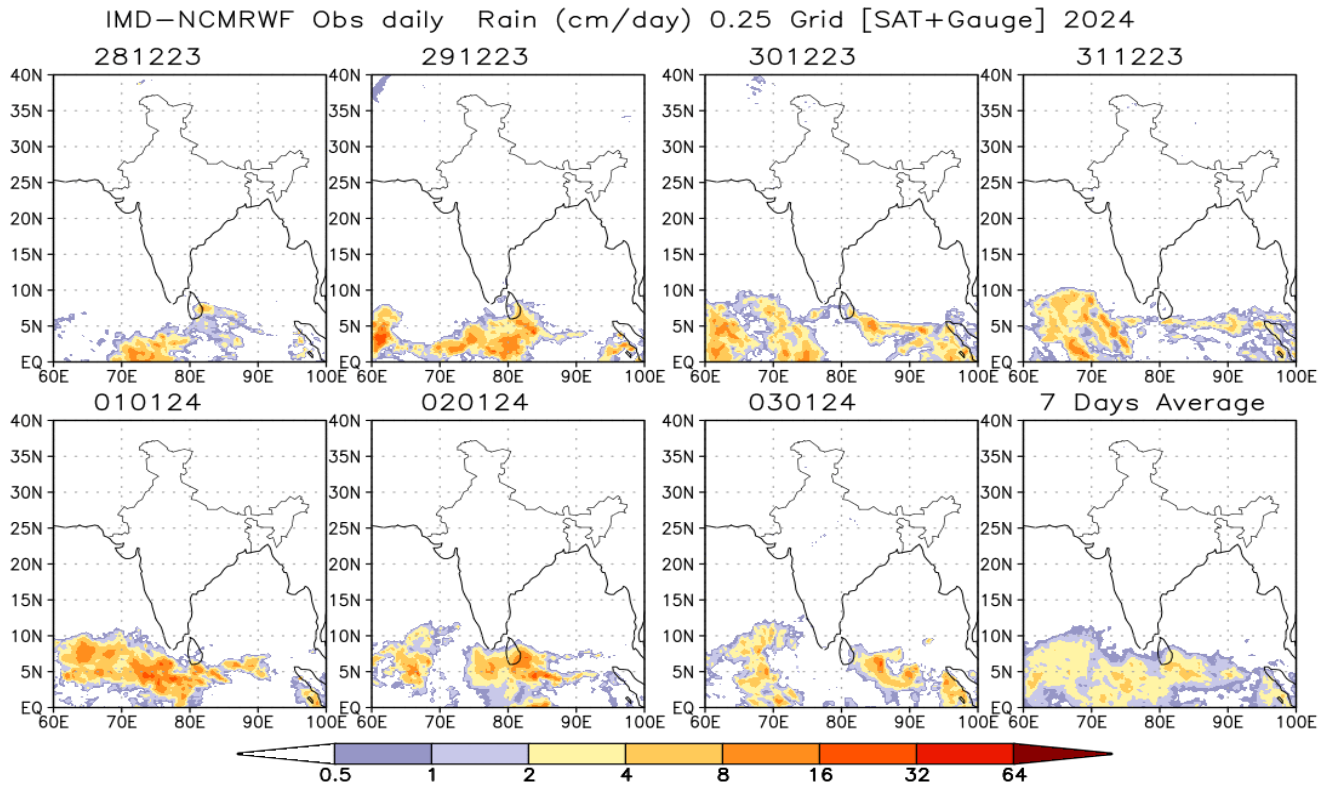


Fig.2: NCMRWF-IMD satellite gauge merged data plots of 24 hours accumulated realized rainfall during 28th December, 2023 to 3rd January, 2024.

Next update: 11.01.2024