India Meteorological Department
Ministry of Earth Sciences
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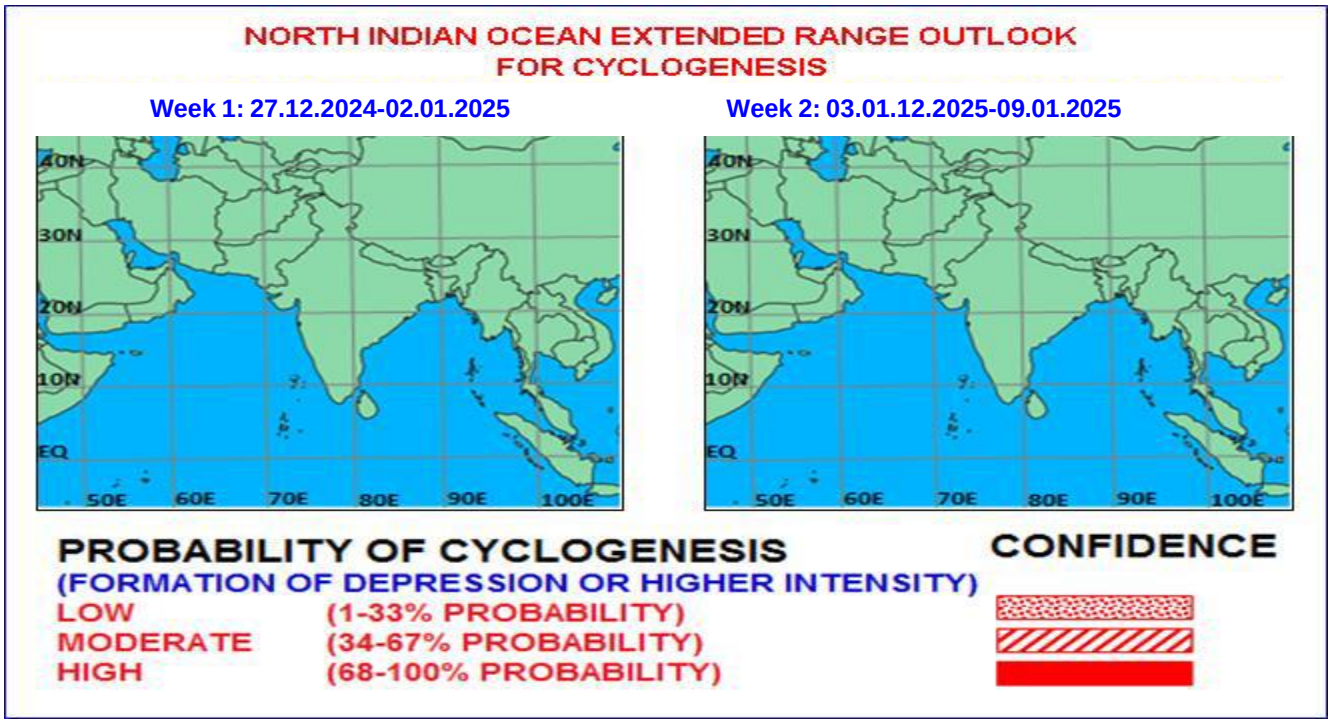


**Fig. 1: Graphical Cyclogenesis over the north Indian Ocean during next two weeks**

## I. Environmental features:

The continuous monitoring of the Madden Julian Oscillations (MJO) indicates that it has currently entered into phase 7 with an amplitude close to 1. The forecasts of various dynamical models suggest that the MJO is likely to advance very quickly eastwards across phase 7 during first half of the week 1. However, the MJO movement is likely to show a looping characteristic in phase 7 during the second half of the first week. The MJO is likely to propagate eastwards and enter into phase 8 in the beginning of the second week. Thereafter, it is likely to further eastwards across phase 8 and reach up to phase 1 at the end of week 2. The models are showing a fair agreement amongst them with ECMF & ECMM group of models suggesting a faster movement compared to the GEFS and CFS group of models. Therefore, the MJO is not likely to support the convective activity over North Indian Ocean during week 1 and likely to favour convective activity during later part of week 2.

The CFS-NCICS model-based forecast indicates easterly wind anomaly (1-3 mps) over entire Bay of Bengal (BoB) along with the presence of low frequency waves over south BoB during week 1. The easterly wind anomaly (1-3 mps) is likely to become predominant over south Arabian Sea from second half of week 1. The Low frequency waves are also likely to prevail over southeast AS during the first week. The easterly wind anomaly is likely to prevail over south BoB and south AS during the second week as well. However, westerly wind anomaly is likely to appear over northwest AS and gradually cover entire north AS and northern parts of BoB by middle of the week 2. Thereafter, westerly wind anomaly is likely to disappear gradually over entire BoB with easterly wind anomaly (1-3 mps) at the end of the second week. Equatorial Rossby Waves and Kelvin Waves are likely to be absent during the entire forecast period. The zonal wind characteristics and equatorial wave activities are not likely to be favorable towards convective activity during entire forecast period except beginning of the first week.

## II. Model Guidance:

Most of the models (GFS, NCEP GFS, WRF and ECMWF) are indicating a cyclonic circulation over southwest Bay of Bengal off Tamil Nadu coast as on 26th December, 2024 becoming less marked thereafter. The GEFS model indicates a trough in easterlies and associated cyclonic circulation over southwest BoB off south Andhra Pradesh-North Tamil Nadu coasts. The trough in easterlies in the lower levels is likely to advance westwards and likely to induce an extended low pressure area over southeast AS off north Kerala coast on 27$^{th}$ December which is likely to persist over the region during next 2 days. The NCUM-Global model is also indicating similar propagation of trough of low in easterlies during next 3 days.

Another low pressure area embedded within the trough in easterlies in lower levels may likely to form over central parts of south BoB on 29$^{th}$ December. The low pressure area is likely to persist and move westwards during next 2-3 days across south Sri Lanka. The ECMWF model is not indicating any other fresh formation of low pressure area over BoB. However, a prominent trough of low in easterlies is likely to propagate from southeast BoB up to Comorin area from 28$^{th}$ to 31$^{st}$ December along south BoB and Comorin area.

The GPP guidance products indicate that a zone of significant values of GPP (>25) is likely to prevail over South Andaman Sea and neighbourhood on 26th December. The zone gradually moves west-northwestwards till 30th December towards central parts of south Bay of Bengal with slightly reduced intensity till 30th December, 2024 and it further moved westwards to southwest Bay of Bengal off Sri Lanka coast on 2nd January, 2025.

The 850 hPa wind field of the IMD ERF Model indicates easterly/northeasterly wind over southern and central parts of Bay of Bengal during week 1 and week 2. The forecast wind anomaly indicates easterly/northeasterly wind over the south and central parts of BoB in week 1 and week 2. The model also indicates a low probability (20-30 %) of cyclogenesis over central and western parts of south BoB, whereas, moderate probability (30 to 40%) of cyclogenesis over south Andaman Sea and adjoining south-east Bay of Bengal in week 2. There is also moderate probability (30 to 40%) region of cyclogenesis over south-east and adjoining Arabian Sea during week 2. ECMWF ensemble indicates a low probability (20-30%) of cyclogenesis over south BoB during week 1. However, it suggests a moderate probability (40-50%) over southeast BoB, Comorin and adjoining southeast AS during the 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/GEFS/CFS: National Centre for Environment Prediction GFS/GEFSv12/CFSv2, 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.

## III. Inference:

Considering various environmental conditions and model guidance it is inferred that there is no cyclogenesis over North Indian Ocean region during the entire forecast period. However, there is likelihood for the formation of a low pressure area/cyclonic circulation over central parts of south Bay of Bengal during middle of the week 1. The system is likely to move westwards during subsequent 2-3 days across southwest Bay of Bengal and south Sri Lanka.

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

The forecast issued on 12th December for week 2 (20 Dec-26 Dec) indicated no probability of cyclogenesis during week 2. The forecast issued on 19th December for week 1 (20 Dec-26 Dec) indicated low probability of cyclogenesis over westecentral Bay of Bengal during first half of week 1.

Actually, a **low pressure area** formed over central parts of south Bay of Bengal on 16th December, 2024. It concentrated into a **depression** over westcental Bay of Bengal off Andhra Pradesh coast on 20th December 2024. I**t** weakened into a well-marked low pressure over westcentral Bay of Bengal off Andhra Pradesh coast on 21st December 2024. Then it moved westwards and weakened into a low pressure area over Southwest & adjoining Westcentral Bay of Bengal off South Andhra Pradesh-North Tamil Nadu coasts on 26th December, 2024.

Thus, likely formation of depression over westcentral Bay of Bengal was correctly was captured in week 1 forecast.

NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from, 19th December – 25th December, 2024 are presented in **Fig. 2**.

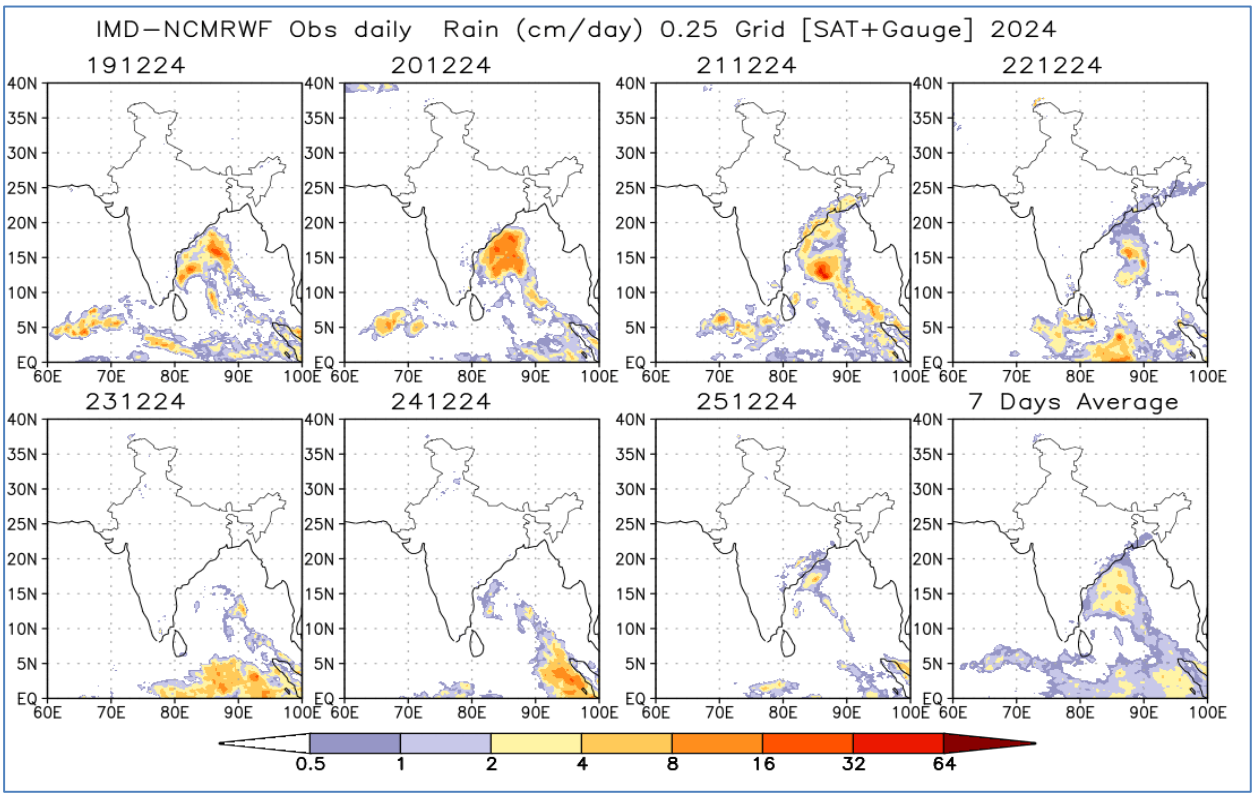


**Fig.2: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 19th December – 25th December, 2024.**

**Next update: 03.01.2025**

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