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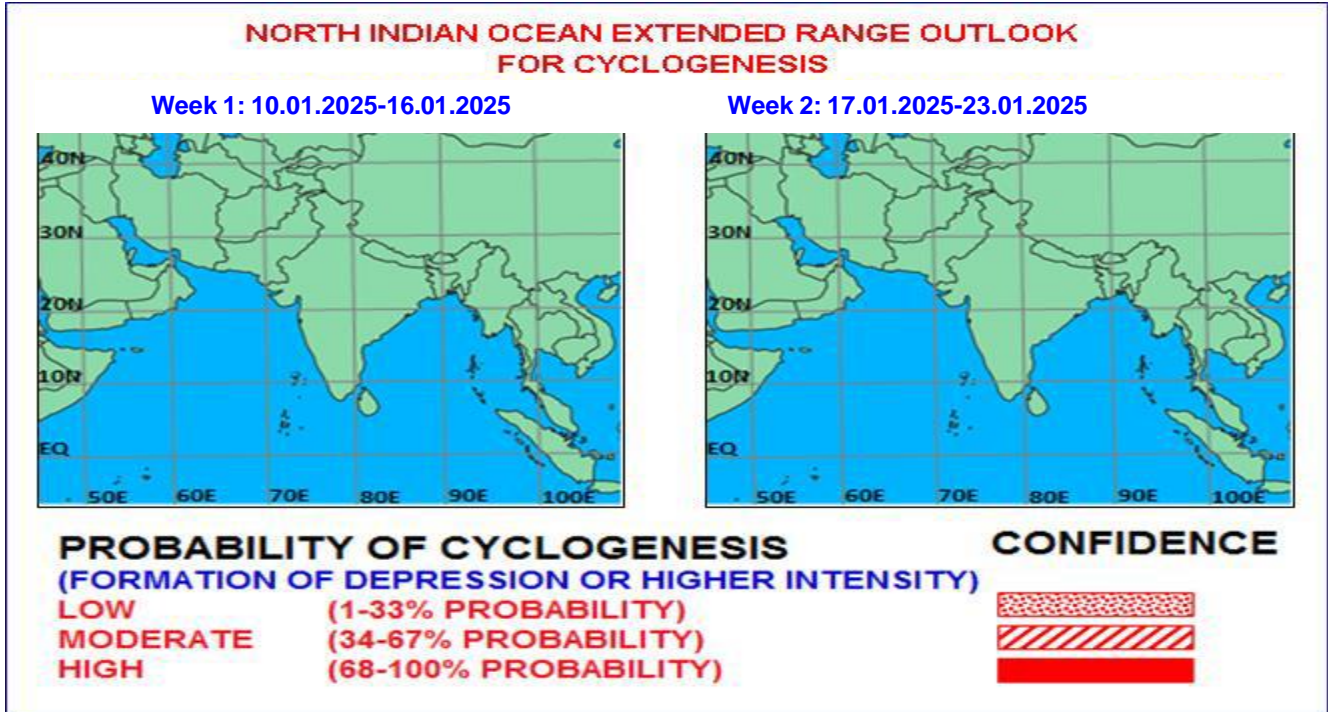


Fig. 1: Graphical Cyclogenesis over the north Indian Ocean during next two weeks

I. Environmental features:

As per ECMM guidance, Madden Julian Oscillation (MJO) is currently in phase 1 with amplitude more than 1. It will continue in same phase during week 1 with amplitude remaining more than 1. It would move across phases 2 and 3 during week 2. Thus, MJO would contribute to enhancement of convective activity over the Arabian Sea (AS) during entire week 2 and the Bay of Bengal (BoB) during later half of week 2.

The NCICS CFS model forecast indicates Equatorial Rossby Wave (ERW) and westerly wind anomaly (5-7 mps) over south BoB during beginning of week 1 with easterly winds to the north of it. Over the Arabian Sea, westerly wind anomaly (5-7 mps) along with ERW, Kelvin Wave (KW) is indicated off Somalia coast and adjoining southwest AS and easterly wind anomalies (2-3 mps) are seen to its north during the beginning of week 1. Thereafter, no significant waves are seen over the entire region. Easterly wind anomaly (1-3 mps) is indicated over the region.

These features indicate that MJO and equatorial waves would support the convective activity associated with the existing cyclonic circulations over southeast BoB and southeast AS during next 2 days.

II. Model Guidance:

The IMD GFS, NCUM (R), NCEP GFS and ECMWF models are indicating likely formation of a cyclonic circulation over southwest BoB & adjoining Equatorial Indian Ocean (EIO) on 9th January, 2025. It is likely to move west-northwestwards towards south Sri Lanka till 11th January, 2025. IMD WRF model is indicating a cyclonic circulation over southwest BoB on 9th January, 2025 with westwards movement till 10th. NCUM (G) and NEPS (G) are not indicating any cyclonic circulation. IMD GFS is indicating another cyclonic circulation over South Andaman Sea & adjoining EIO during

the second half of week 1 and first half of week 2 with west-northwestwards movement. NCEP GFS is indicating another cyclonic circulation during the first half of week 2 over South Andaman Sea & adjoining EIO off Sumatra coast with west-northwestwards movement. IMD GFS, NCEP GFS and ECMWF are showing cyclonic circulation over southeast AS & adjoining EIO as on 9th January, 2024 with westwards movement till 11th January, 2025. The GPP guidance products for next 7 days indicate that a zone of significant values of GPP (>25) is prevailing over southeast BoB & adjoining EIO along Sumatra coast on 12th. January. Another zone of significant values of GPP is indicated over southeast BoB and adjoining EIO on 16th. Another zone of significant values of GPP (>25) is prevailing over along southwest Sri Lanka coast on 11th.

The 850 hPa mean wind field of the IMD ERF Model indicates easterly/northeasterly winds over southern and central parts of Bay of Bengal and Arabian Sea dominated by an anticyclone over Odisha and neighborhood (eastcentral India) during week 1. An east-west trough is likely to prevail over south BoB & south AS and adjoining Equatorial Indian Ocean (EIO) nearly along 5°N latitude. The forecast for week 2 also indicates nearly similar features with the anticyclone shifted a bit westward over Chhattisgarh & adjoining east Madhya Pradesh. The east-west trough as seen during week 1 become less marked in week 2. The wind anomaly indicates southerly/southeasterly wind over entire BoB and peninsular India during week 1. The model indicates a cyclonic circulation over central parts of AS and a northeast-southwest trough extending up to southwest AS & adjoining EIO region during the first week. The wind anomaly forecast during week 2 indicates that southerly/southeasterly/ winds prevail over both BoB & AS except over south BoB & AS where southwesterly winds are likely to prevail.

The IMD ERF model also indicates a moderate to high probability (40-70 %) of cyclogenesis southwest BoB during week 1, whereas, low to moderate (30 to 40%) of cyclogenesis over southeast BoB and adjoining EIO during week 2. The ECMWF ensemble and ECMM forecasts for week 1 indicates a moderate to high probability (70-80%) of cyclogenesis over southwest BoB moving gradually westwards. The model also suggests a low probability (~20%) over southwest BoB during week 2.

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 the North Indian Ocean region during the entire forecast period. However, existing cyclonic circulations over southeast Bay of Bengal and southeast Arabian Sea are likely to move gradually westwards during next 2-3 days. There is also a likelihood for the formation of a cyclonic circulation/low pressure area over southeast Bay of Bengal and adjoining Equatorial Indian Ocean during beginning of week 2 with subsequent westwards movement across southwest Bay of Bengal during week 2.

IV. Verification of forecast issued during last two weeks:

The forecast issued on 26th December for week 2 (03 Jan-09 Jan, 2025) indicated no probability of cyclogenesis during week 2. The forecast issued on 02nd January for week 1 (03 Jan-09 Jan, 2025) indicated no probability of cyclogenesis during week 1.

Actually, no cyclogenesis occurred over North Indian Ocean region during 03 Jan-09 Jan, 2025. However, as mentioned in the extended-range outlook on 02nd January, a cyclonic circulation formed over Equatorial India Ocean and adjoining Southeast Bay of Bengal on 06th January and lay over Southeast Bay of Bengal & adjoining Equatorial Indian Ocean on 9th January, 2025. Hence, non-occurrence of cyclogenesis was correctly predicted 2 weeks in advance. The likely development of cyclonic circulation over southeast Bay of Bengal was also correctly captured.

NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from, 2nd January to 8th January, 2025 are presented in **Fig. 2**.

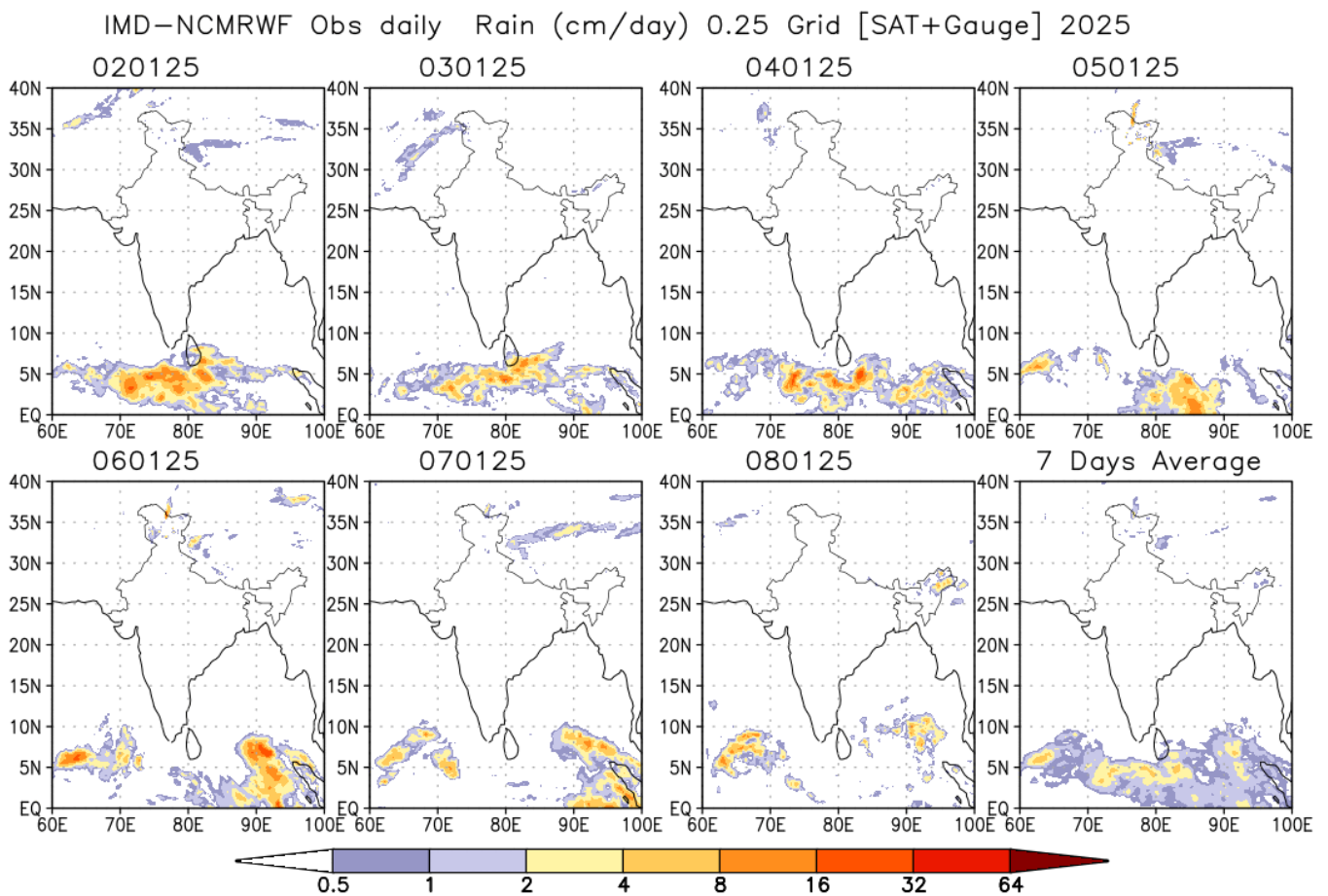


Fig.2: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 2nd January to 8th January, 2025.

Next update: 16.01.2025