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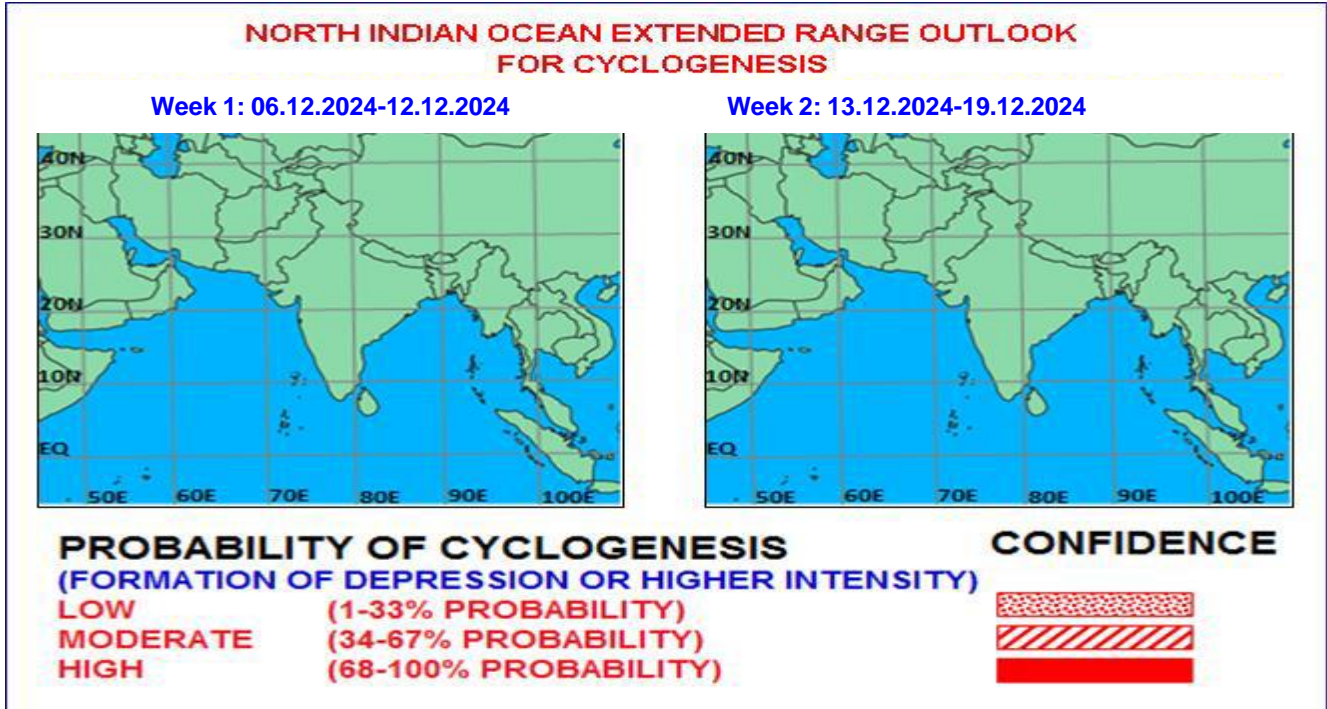


Fig. 1: Graphical Cyclogenesis over the north Indian Ocean during next two weeks

### I. Environmental features:

Monitoring of Madden Julian Oscillations (MJO) indicates that it is currently making transition from phase 4 to phase 5 with a decreasing amplitude greater than 1. Various model forecasts suggest that the MJO signal is very likely to propagate eastward within phase 5 during the first week with a wave-like variation in amplitude. However, the GEFS-CFS group of models show an initial delay in the transition from phase 4 to 5 with a zigzag path in the phase diagram. The ECMF-ECMM group of models indicates a smooth and fast propagation in phase 5 within week 1. Thereafter, the ensemble members of both group models show a large spread. The GEFS-CFS in general suggests the MJO is likely to propagate eastward and enter into phase 6 nearly at the end of the second week with coherent movement during the early part of the week. The ECMF-ECMM model group indicates comparatively early entry into phase 6 and thereafter very slow eastward propagation during the second week. Thus, the MJO is likely to support the enhancement of convective activity over the Bay of Bengal (BoB) during the first week. The support is unlikely during the second week.

The CFS-NCICS model-based forecast indicates that the westerly wind anomaly (5-7 mps) is likely to prevail over the southeast Arabian Sea (AS) adjoining Indian Equatorial Indian Ocean. Sea during week 1. Comparatively weak (3-5 mps) easterly wind anomaly is likely over south and central BoB and over eastcentral AS during the first week. The westerly wind anomaly is likely to prevail over the northern part of BoB and adjoining east India during the first week. The westerly winds anomaly is likely to disappear over south BoB and AS and easterly winds is likely to prevail over the region from the later part of the first week till the end of the second week. The easterly wind anomaly is only persisting over north BoB during the second week. The Equatorial Rossby Waves (ERW) activity over south AS is likely to progress westwards and

disappear over southwest AS at the end of week 1. No ERW activity is likely over the North Indian Ocean (NIO) region during week 2. The Kelvin waves are likely to be absent over the region during the entire forecast period. Moreover, the ERW activity is getting very much active over South Equatorial Indian Ocean from the second half of the first week. Therefore, the environmental characteristics, including zonal wind anomaly, MJO, and other equatorial waves are not likely to be very much supportive for the convective activity over NIO region except over South BoB and the adjoining Andaman Sea during the forecast period.

The El Niño–Southern Oscillation (ENSO) is neutral condition, but on the negative side. The Indian Ocean Dipole (IOD) is likely to remain neutral, but weakly negative, during next 2 weeks. These broadscale features (transition towards LaNina and slightly negative IOD conditions) indicate a favorable environment for convective activity/cyclogenesis over the BoB.

## II. Model Guidance:

Various deterministic model forecasts (IMD GFS, NCUM-G, ECMWF and NCEP GFS) are suggesting formation of a low pressure area over southwest BoB around 7th December. It is likely to move west-northwestwards and reach near Sri Lanka coast by 9th. There after it is likely to move towards Tamil Nadu coast till 12th December. However, individual models show slight variations in their forecasts. ECMWF and NCUM-G model indicates only cyclonic circulation over south BoB, moving westward reaching south Sri Lanka coast around 10th December with no further intensification. NCEP GFS model forecast indicates formation of a low pressure area over the central parts of south BoB around 9th December. With gradual west-northwestwards movement, it is likely to intensify into a depression over southwest BoB off north Sri Lanka coast around 12th and subsequently towards south Tamil Nadu coast around 13th December. The IMD GFS model shows the formation of a low pressure system over the central parts of the BoB around 9th December similar to NCEP GFS. However, the model forecast suggests that the system is likely to move west-northwestwards and reach over southwest BoB off Tamil Nadu coast around 12th December.

The GPP guidance products indicate that a zone of significant values of GPP (>25) is prevailing over south Andaman on 5th December. The zone gradually moves west-northwestwards initially across southeast BoB for subsequent 4 days till 9th Dec and over the central parts of BoB on 10th. While moving northwestwards across southwest BoB, the GPP value further increases exceeding 30 over southwest BoB off Sri Lanka and Tamil Nadu coast on 11 and 12 December. IMD-CFS V2 (Extended Range Model) mean wind forecasts at 850 hPa indicate a cyclonic circulation over southeast BoB and adjoining east equatorial Indian Ocean in week 1, which is seen as an east-west trough over the same region from southeast BoB to southwest BoB in week 2. The wind anomaly at 850 hPa for the first week portrays an anomalous cyclonic circulation over southeast and adjoining east equatorial Indian Ocean in week 1. Whereas, in week 2 a feeble trough is seen over southeast Arabian Sea in week 2. The model also indicates a low probability (20 to 30%) of cyclogenesis over southeast-BoB and extending westward upto Southwest BoB off Sri Lanka coast during first week. The ECMWF ensemble forecasts indicate a moderate probability of cyclogenesis (about 70%) over central parts of south BoB during first week. ECMWF extended range forecast suggests moderate probability of cyclogenesis over south-east BoB in 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 all the above environmental conditions and model guidance it is inferred that there is no probability of cyclogenesis over both the basins of North Indian Ocean during next two weeks.

- (i) However, a low pressure area is likely to form over central parts of south Bay of Bengal around 7th December. The system is likely to move west-northwestwards and reach over southwest Bay of Bengal off Sri-Lanka – Tamil Nadu coasts around 12th December.
- (ii) There is a possibility of the formation of low pressure area over southeast Bay of Bengal during week 2 as well.

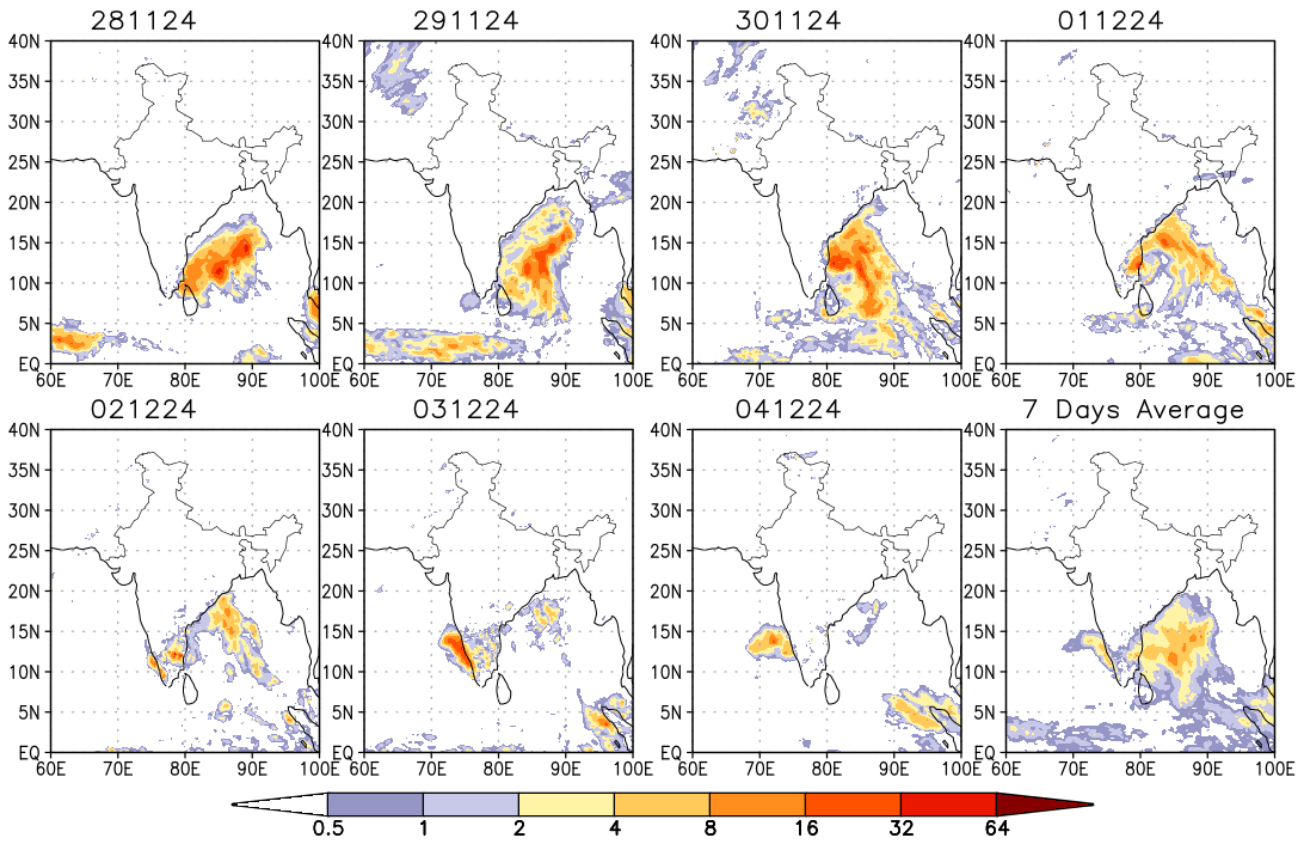
### **IV. Verification of forecast issued during last two weeks:**

The forecast issued on 21ST November for week 2 (29 Nov-05 Dec) indicated there is a low probability of cyclogenesis over the south Bay of Bengal during the first half of the second week.

The forecast issued on 28th November for week 1 (29 Nov-05 Dec) indicated the deep depression over southwest Bay of Bengal is very likely to move nearly northwards skirting Sri Lanka coast during next 12 hours. Thereafter, it will move north-northwestwards and cross north Tamil Nadu-Puducherry coasts between Karaikal and Mahabalipuram around morning of 30th November as a deep depression. Thereafter, it is likely move further northwestwards across peninsular India as a low-pressure area and emerge into southeast and adjoining east-central Arabian Sea during middle of week 1. There is low probability of its intensification into a depression (cyclogenesis) over central parts of Arabian Sea later part of week 1.

Actually, the Deep Depression over Southwest Bay of Bengal moved nearly north-northwestwards and intensified into a cyclonic storm “FENGAL” [pronounced as FEINJAL] over the same region in the afternoon (1430 hours IST) of the same day, the 29th November. It moved north-westwards and lay centered at 0830 hours IST of 30th November over the same region, and moved initially westwards till evening, then west-southwestwards and crossed North Tamil Nadu & Puducherry coasts close to Puducherry, between 2230 hrs IST and 2330 hrs IST of 30th November as a cyclonic storm with a wind speed of 70-80 kmph gusting to 90 kmph. Thereafter, it remained practically stationary for 12 hours, weakened into a deep depression and lay centered at 1130 hours IST and moving west-northwestwards weakened into a depression over the same region in the evening (1730 hours IST) of 1st December. Thereafter, it moved nearly westwards, weakened into a Well-Marked Low-Pressure Area over North Interior Tamil Nadu in the morning (0530 hrs IST) of 2nd December and into a Low-Pressure Area over east-central & adjoining southeast Arabian Sea at 0300 UTC of 04th December, 2024. NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 28<sup>th</sup> November – 04<sup>th</sup> December, 2024 are presented in **Fig. 2**.

IMD-NCMRWF Obs daily Rain (cm/day) 0.25 Grid [SAT+Gauge] 2024



**Fig.2: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 28<sup>th</sup> November – 04<sup>th</sup> December, 2024.**

**Next update: 12.12.2024**