

Issued on 10.10.2024

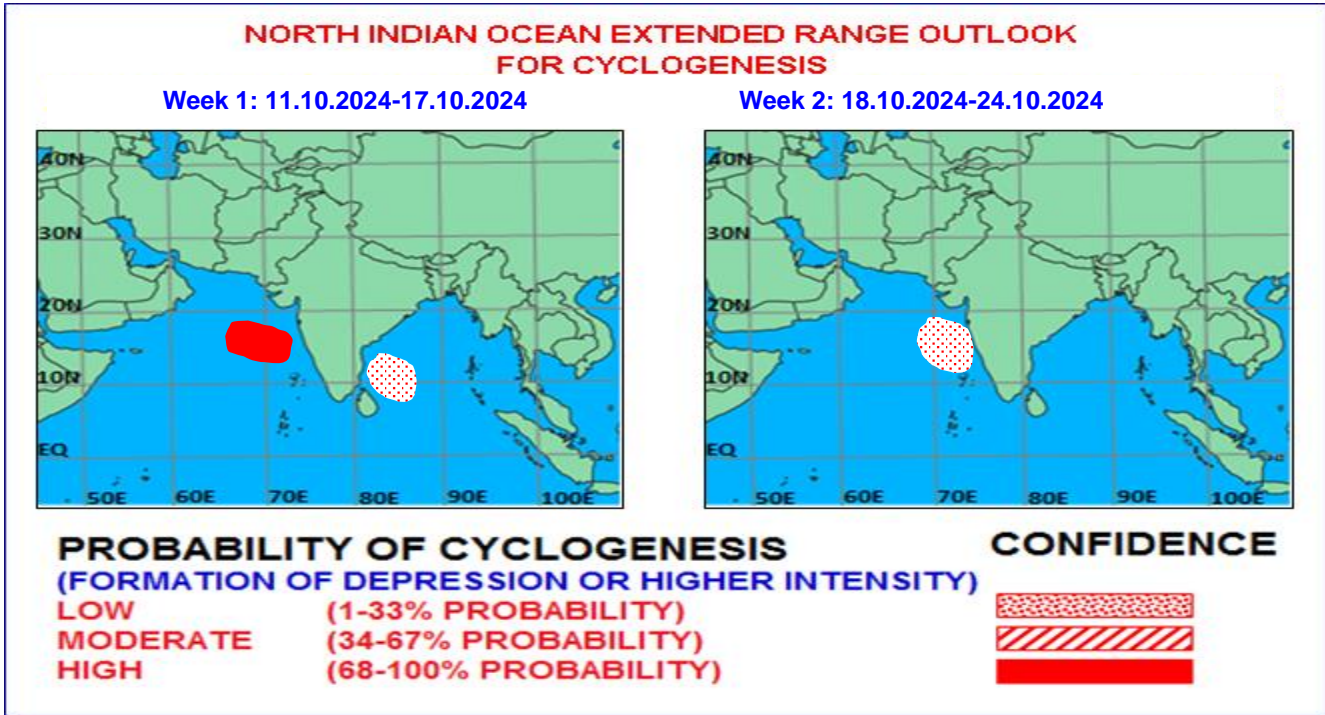


Fig. 1: Graphical Cyclogenesis over the north Indian Ocean during next two weeks

I. Environmental features:

The Madden Julian Oscillation (MJO) index is currently in Phase 3 with amplitude close to 1. According to the forecasts by various models, it is likely to propagate eastward through phases 3 and 4 during the first week with rapid changes in amplitude (decrease and increase thereafter) during the first week. Subsequently, the MJO is likely to move eastward in phase 5 and enter into phase 6 at the end of the second week. The GEFS and ECMWF forecasts indicate eastward propagation of the MJO with fluctuations in the amplitude. The GEFS ensemble members indicate a large spread in the forecast period. The ECMWF ensemble members indicate a little coherency at the beginning of the forecast period and show a large spread during the second week. Therefore, the MJO phase and amplitude are likely to provide support for the enhancement of convective activities in the region over the Arabian Sea (AS) during the first week and over Bay of Bengal (BoB) during the entire forecast period.

The model forecast for Equatorial Waves illustrates that the Equatorial Rossby Wave (ERW) activities are likely to prevail over southwest AS and adjoining North Equatorial Indian Ocean during the first half of the coming week. The ERW is also likely to be noticed over the south and adjoining westcentral BoB during the second half of the first week. The ERW is likely to progress gradually westward moving across peninsular India during the end of the first week and across central AS during the second week. The Kelvin waves are also likely to propagate eastwards across the equatorial Indian Ocean and adjoining southwest AS in the beginning and across southeast BoB at the end of the first week. The forecasts do not indicate any Kelvin waves during the second week. Therefore, the equatorial waves are likely to support the enhancement of convective activity over south and central AS during both weeks and over the south BoB in week 1 only.

The sea surface temperature over the entire BoB is 28-32°C. The values of SST remain within the same range over the entire AS except western sectors of westcentral and southwest AS near coasts of south Oman, Yemen and Somalia where the Sea is cooler with SST ~ 24-28°C. Tropical Cyclone Heat Potential (TCHP) is high (>100 KJ/cm²) over north BoB and south BoB except over a few parts over southwest BoB east of Sri Lanka coast and southeast BoB near Andaman & Nicobar Islands. Higher values of TCHP (> 100 KJ/cm²) are also found over the equatorial North Indian Ocean and southwest AS except the area near the Somalia coast. The TCHP is about 50-100 KJ/cm² over the central AS except the western near Yemen-Oman coasts.

Considering all the environmental features, it is inferred that the conditions are favourable toward the development of cyclonic disturbances over south and central AS during the first week and over southwest BoB during the second half of the first week. Large-scale environmental features will also support convective activity over south and central AS during the second week as well.

II. Model Guidance:

Arabian Sea: Most of the deterministic models (ECMWF, ECAI, IMD GFS, GEFS, NCEP GFS, NCUM, NEPS) are correctly capturing existing well marked low pressure areas over eastcentral AS with some spatial variations. All the models indicate intensification of this system into a depression over eastcentral Arabian Sea during 12th – 13th October. There is consensus among various models with respect to the movement of the system towards Oman – Yemen coast with weakening on reaching westcentral AS. Most of the models indicate the system to cross Oman-Yemen coasts as a low-pressure area. ECMM model is indicating 60-80% probability of the formation of a depression over central AS during next 4 days and weakening over westcentral AS towards Oman-Yemen. There is a large spread among various ensemble members regarding the movement of system. However, all members are indicating movement over central AS towards Oman-Yemen coasts. Thus, the probability of cyclogenesis over eastcentral Arabian Sea is considered Moderate to High during week 1.

Bay of Bengal: Various deterministic models like ECMWF, ECAI, NCEP GFS, IMD GFS and IMD GEFS are indicating the development of a low-pressure area over central parts of South Bay of Bengal around 13th October. Models like ECAI, NCEP GFS & IMD GFS are also indicating intensification of this system into a depression around 14th October over southwest & adjoining westcentral BoB. These models are also indicating emergence of the remnant of this system into eastcentral AS around 17th October and west-northwestwards movement thereafter. Further, these models are also indicating re-intensification of the system into a depression around 19th October. However, ECMWF, NCUM & NEPS models do not indicate any formation of depression either over BoB or over AS. ECMM is also indicating 40-60% probability of the formation of a depression over southwest BoB around 14th October. The ensemble members are also indicating the emergence of this system into eastcentral AS and 40-60% probability of formation of depression over AS during first half of week 2.

The IMD's ERF model indicates a moderate to high probability (50-80%) of cyclogenesis over eastcentral and adjoining westcentral AS during the first week. The model also indicates a low-moderate probability (30-50%) over southwest BoB off Sri Lanka & Tamil Nadu coasts during the first week. No zone is indicated with a significant probability of cyclogenesis during the second week. The ECMWF ensemble forecast Model also indicates low probability (20-30%) over the eastcentral Arabian Sea off Konkan Goa coast during the 2nd half of the first week. The ECMWF ERF model also suggests moderate to high probability (50-80%) of cyclogenesis over central parts of AS during the first half and over westcentral AS during the second half of week 1. Low to moderate probability (30-60%) is indicated by the model over southwest Bay of Bengal during the second half of the first week. Low probability (10-30%) of cyclogenesis is predicted over eastcentral and northeast 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: National Centre for Environment Prediction GFS, GEFS: GFS ensemble forecast system, 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:

- (i) The well marked low pressure area over eastcentral Arabian Sea off Karnataka-Goa Coasts is likely to move northwestwards and intensify into a depression during next 2-3 days.

- (ii) A fresh upper-air cyclonic circulation is likely to form over central parts of south Bay of Bengal around 12th October. Under its influence a low pressure area is likely to form over southwest Bay of Bengal off Tamil Nadu coast and intensify further into a depression during later part of week 1.
- (iii) The remnant of low pressure system over the Bay of Bengal of week 1, is likely to move across peninsular India and emerge into eastcentral Arabian Sea and re-intensify into a depression during the first half of the second week.
- (iv) The cyclonic circulation over southwest Bay of Bengal off Tamil Nadu coast is likely to become less marked over Tamil Nadu during next 24 hours.

Hence, there is a high probability of cyclogenesis over Central Arabian Sea during the middle of the first week and a Low to moderate probability over southwest Bay of Bengal in the later part of week 1. A low to moderate probability of cyclogenesis is also indicated over eastcentral Arabian Sea during the first half of week 2.

IV. Verification of forecast issued during last two weeks:

- (i) **Week 2 forecast issued on 26th September for the second week (03.10.2024- 10.10.2024)** indicated: No cyclogenesis for week 2
- (ii) **Week 1 forecast issued on 03rd October for first week (03.10.2024-10.10.2024)** indicated: A low pressure area is likely to form over the north Bay of Bengal and neighborhood around 4th October and another cyclonic circulation/low pressure area over westcentral Bay of Bengal around 6th October.
- (iii) **Realised:** Under the influence of cyclonic circulation over southwest Bangladesh and its surrounding areas, a low-pressure area formed over the North Bay of Bengal and adjoining coastal areas of Bangladesh and West Bengal at 0300 UTC of 4th October and became less marked on 5th October. A fresh upper-air cyclonic circulation formed over the west-central and adjoining south Bay of Bengal at 0300 UTC 4th of October and became less marked over southwest and adjoining westcentral Bay of Bengal, off the North TamilNadu-South Andhra Pradesh coasts at 0300 UTC on 7th October.

The observed satellite-gauge merged analysis of 24 hours accumulated rainfall from 03rd October to 09th October, 2024 is shown in Fig. 2.

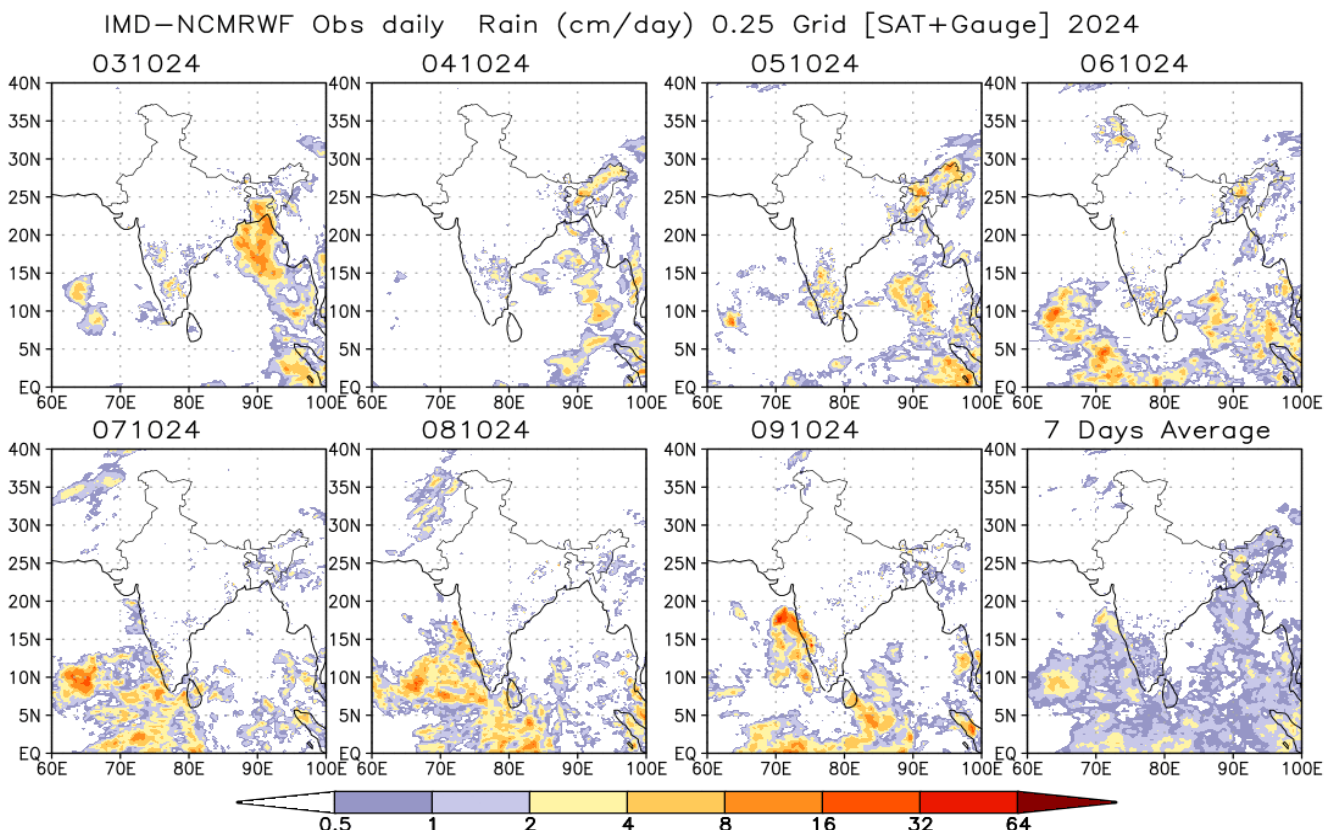


Fig. 3: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 03rd October to 09th October, 2024.

Next update: 17.10.2024