

Issued on 03.10.2024

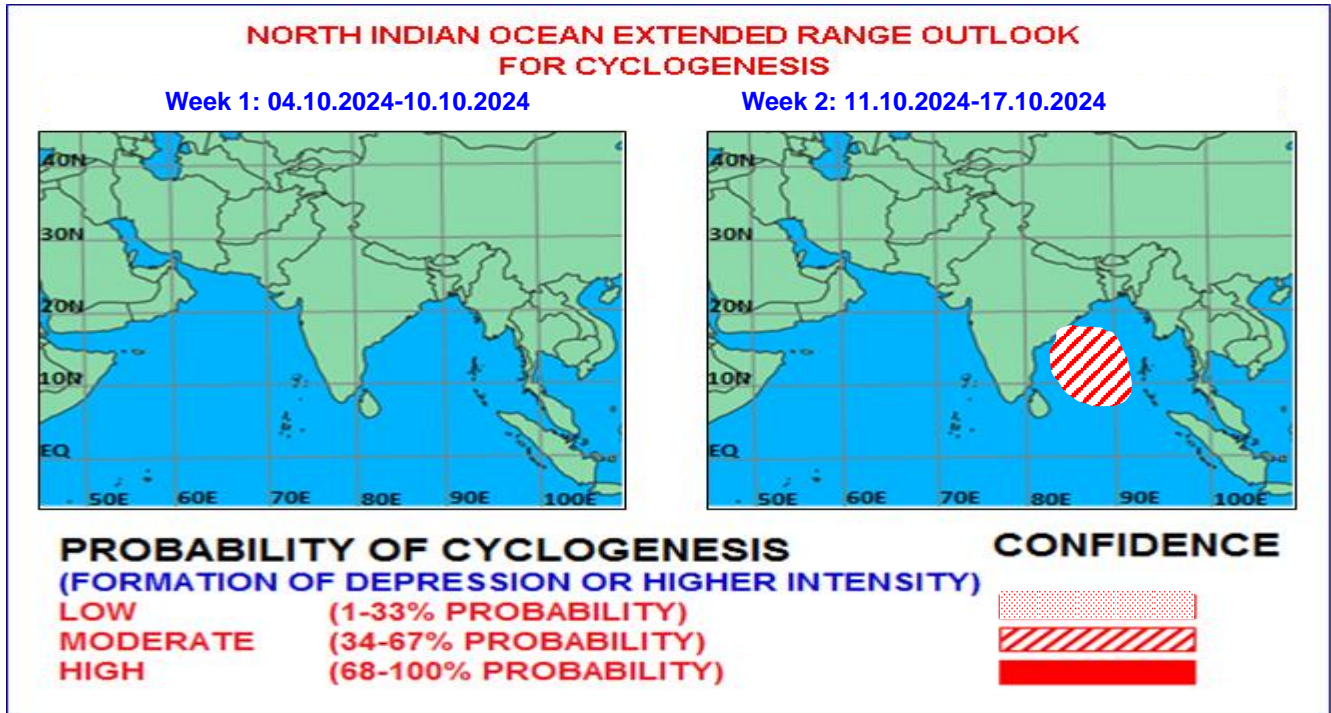


Fig. 1: Graphical Cyclogenesis over north Indian Ocean during next two weeks

I. Environmental features:

The Madden Julian Oscillation (MJO) index is currently in Phase 2 with amplitude less than 1. According to the forecasts by various models, it is likely to move eastward through phases 2 during the first half of the first week and 3 & 4 during the second half of the first week respectively with a decreasing amplitude below 1. Thereafter, the MJO signal is likely to amplify while moving eastward within phase 4 during the first half of the second week and reaching phase 5 by the end of the second week. However, the GEFS ensemble members indicate large variations in the eastward propagation of MJO during both weeks. The ECMWF ensemble members indicate a little coherency during the first week, whereas they show a large spread during the second week. Thus, the MJO phase and amplitude are favourable towards the enhancement of convective activity in the North Indian Ocean (NIO) region over both the sub-basins viz., Arabian Sea and Bay of Bengal (BoB) during the forecast period.

The CICS-NC model forecast for Equatorial Waves indicates westerly wind anomaly over South & Central BoB and easterly wind anomaly over Bangladesh & adjoining eastern parts of India during week 1. These features indicate that equatorial waves would support the formation of a low pressure area over north BoB and adjoining areas around 4th October. Similarly, during week 2, it indicates stronger easterly wind anomaly over central and north BoB and Northern plains of India along with stronger westerly wind anomaly over north equatorial Indian Ocean and adjoining south BoB & As. The MJO will be active over the west equatorial Indian Ocean and adjoining AS along with low frequency background waves. These environmental conditions are likely to continue to support the enhancement of convective activity over the central and south BoB as well as southeast and adjoining eastcentral AS during the second week.

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 Oman, Yemen and Somalia where the Sea is cooler (SST ~ 24-28°C). Tropical Cyclone Heat Potential (TCHP) is high (>100 KJ/cm²) over north BoB and southwest BoB off Tamil Nadu

coast. Higher values of TCHP ($> 100 \text{ KJ/cm}^2$) are also found over the equatorial North Indian Ocean and southwest AS.

Considering all the environmental features, it is inferred that the conditions are favourable in the development of a low pressure area over north BoB during the first half and over westcentral BoB during the second half of the first week. Large-scale environmental features will also support convective activity over south and central BoB during the second week as well.

II. Model Guidance:

Most of the models (ECMWF, IMD GFS, NCEP GFS, NCUM) do not indicate any cyclogenesis over entire north Indian Ocean till 10th October. However, all the models indicate a likely formation of a low pressure area over North BoB around 4th October, 2024. The NCEP GFS and ECMWF models indicate a likely formation of a low-pressure area over west-central and adjoining southwest BoB around 7th October, 2024, whereas, IMD GFS and NCUM do not support the similar activity over the region. The NCEP GFS, ECMWF and NCUM models are suggesting a possible formation of cyclonic circulation/Low pressure area over eastcentral AS around 11th October which is likely to move west-northwestwards during subsequent 2 days. According to NCEP GFS model, there is the probable formation of a low pressure area around 12th October over southeast BoB which is likely to move west-northwestwards across southwest BoB, Comorin, and southeast AS during next 4-5 days. The system is likely to intensify into a depression around 16th October and reaching the intensity of a cyclone during subsequent 2 days.

The 850 hPa mean wind forecast by IMD Extended Range Model indicates cyclonic circulation over Sub Himalayan West Bengal and adjoining North Bangladesh during week 1 and a fresh cyclonic circulation over westcentral BoB off north Andhra Pradesh coast during week 2. The mean wind anomaly at 850 hPa indicates an east-west trough over Sub Himalayan West Bengal and adjoining North Bangladesh, an east-west trough over central parts of South AS and another over southwest BoB during week 1. During week 2, the anomaly wind field indicates an east-west trough over south & adjoining central parts of India. These features indicate that (a) existing cyclonic circulation over South Bangladesh would move slowly north-northwestwards during the next 2-3 days, (b) existing cyclonic circulation over Lakshadweep is likely to move nearly westwards during next 2-3 days and (c) a fresh cyclonic circulation is likely to form over southeast & adjoining central BoB during later part of week 1. It is likely to become a low pressure area over westcentral BoB during week 2 and move west-northwestwards.

The model indicates a low probability (30-40%) of cyclogenesis over coastal areas of Gangetic West Bengal and Bangladesh during the first week. The model also indicates a low probability (10-20%) over southeast and adjoining central BoB during week 1 and over westcentral BoB during week 2. 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 model also suggests moderate probability (40-60%) of cyclogenesis over westcentral and adjoining south Bay of Bengal 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 there is no probability of cyclogenesis over the north India Ocean region during the first week.

- (i) However, a low pressure area is likely to form over north Bay of Bengal and neighbourhood around 4th October and another cyclonic circulation/low pressure area over westcentral Bay of Bengal around 6th October.
- (ii) There is a low to moderate probability of cyclogenesis over the central Bay of Bengal during the first half of the second week.

IV. Verification of forecast issued during last two weeks:

- (i) **Week 2 forecast issued on 19th September for the second week (27.09.2024-03.10.2024)** indicated: No cyclogenesis for week 2
- (ii) **Week 1 forecast issued on 26th September for first week (27.09.2024-03.10.2024)** indicated: No cyclogenesis for week 1.
- (iii) **Realised:** A fresh cyclonic circulation lay over Comorin area and adjoining equatorial Indian Ocean and extends up to 1.5 km above mean sea level at 0300 UTC on 1st October, 2024. Another upper air cyclonic circulation formed over the north Andaman Sea and adjoining south Myanmar coast at 0000 UTC on 2nd and persisted over southeast Bangladesh on 3rd October. However, no cyclogenesis occurred during the period.

The observed satellite-gauge merged analysis of 24 hours accumulated rainfall from 26th September to 02nd October, 2024 is shown in Fig. 2.

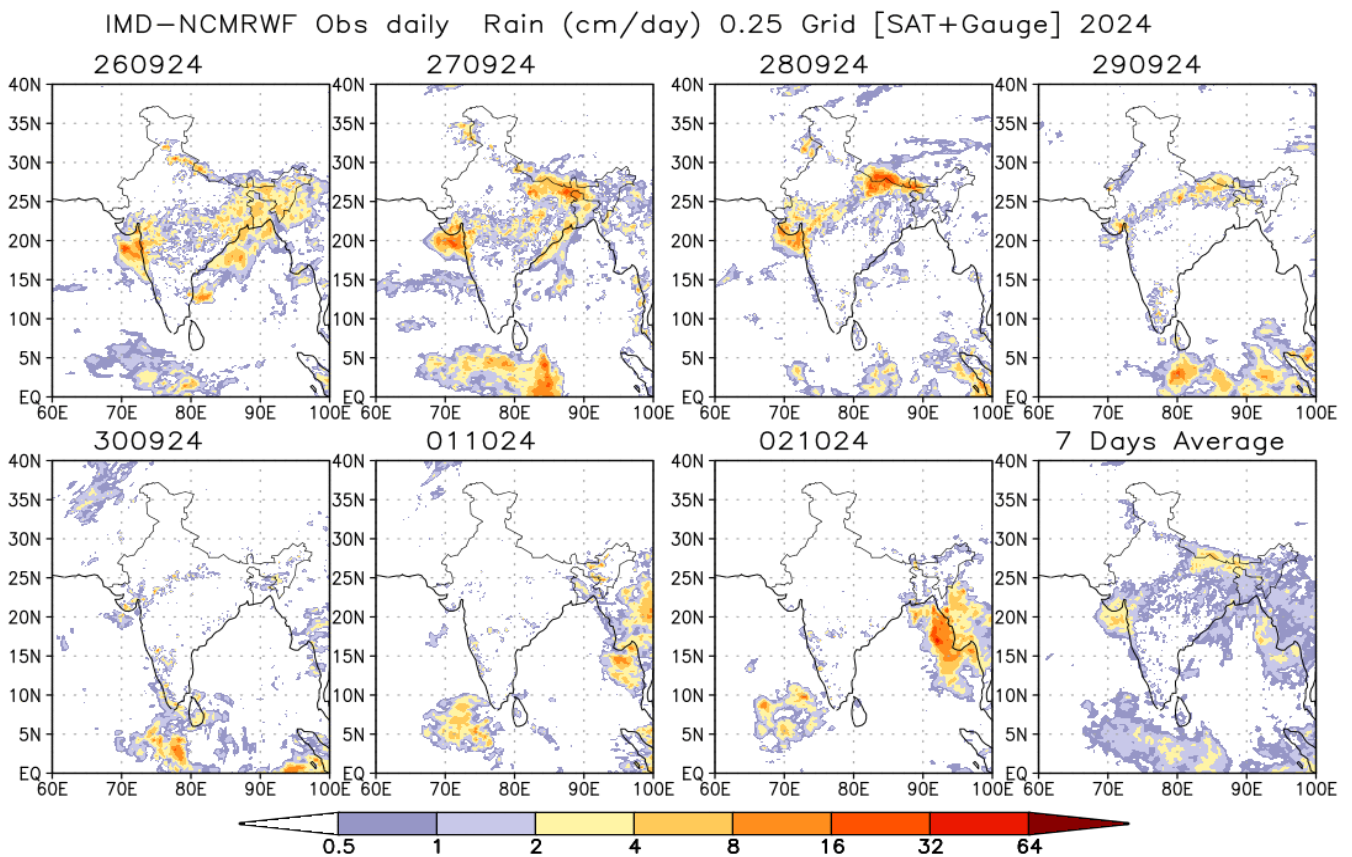


Fig. 3: NCMRWF-IMD satellite gauge merged data plots of realized 24 hours accumulated rainfall from 26th September to 02nd October, 2024.

Next update: 10.10.2024