



**Ministry of Earth Sciences
India Meteorological Department
Cyclone Warning Division, New Delhi**

**Tropical Cyclone Forecast Programme
Report Dated 22nd November 2024**

Time of Issue: 1000 UTC

Synoptic features (based on 0300 UTC analysis):

- Yesterday's upper air cyclonic circulation moved west-northwestwards and lay over east Equatorial Indian Ocean and adjoining South Andaman Sea, extending upto mid-tropospheric level at 0300 UTC of today, the 22nd November, 2024. Under its influence a low pressure area is likely to form over southeast Bay of Bengal around 23rd November. Thereafter, it is likely to continue to move west-northwestwards and intensify into a depression over central parts of south Bay of Bengal during subsequent 2 days.

Environmental Features:

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	<ul style="list-style-type: none"> ➤ 28-31°C over entire BoB. 	<ul style="list-style-type: none"> ➤ 27-28°C over northern, west central and Southwest Arabian Sea. ➤ 29-31°C over northeast, east central and southeast Arabian Sea off Kerala & Karnataka coasts.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	<ul style="list-style-type: none"> ➤ 140-160 over northeast, east central BoB and Andaman Sea. ➤ 100-130 over northwest adjoining west central and extreme south BoB. 	<ul style="list-style-type: none"> ➤ 70-100 over entire AS except 20-40 over extreme west central and southwest AS over the coast of Somalia, Yemen and Oman.
Cyclonic Relative vorticity (X10⁻⁶s⁻¹)	<ul style="list-style-type: none"> ➤ 20-30 over north BoB and EIO region along Sri Lanka coast. 	<ul style="list-style-type: none"> ➤ 10-20 over central and south AS. ➤ 20-30 over southeast AS adjoining Comorin area.
Low Level convergence (X10⁻⁵ s⁻¹)	<ul style="list-style-type: none"> ➤ 10-15 over extreme southeast BoB along the coast of Southern Myanmar. 	<ul style="list-style-type: none"> ➤ 5-10 over southeast AS adjoining Comorin Area and southwest AS.
Upper-Level divergence (X10⁻⁵ s⁻¹)	<ul style="list-style-type: none"> ➤ 5 over parts of central BoB. ➤ 10-20 over extreme south BoB adjoining EIO. 	<ul style="list-style-type: none"> ➤ 5-10 over parts of central AS. ➤ 20-30 over southeast AS adjoining Comorin area.
Vertical Wind Shear (VWS knots) Low: 05-10 knots Moderate: 10-20 knots High: >20 knots	<ul style="list-style-type: none"> ➤ High over north adjoining central BoB and along EIO. ➤ Low-Moderate over rest of BoB. 	<ul style="list-style-type: none"> ➤ High over north & adjoining central AS and extreme south AS. ➤ Low-Moderate over rest of AS.

Wind Shear Tendency (knots)	Increasing over Southern BoB adjoining central BoB along Sri Lanka and EIO. Decreasing over North BoB.	Decreasing over East central, near Comorin area, extreme Southwest along Somalia coast. Increasing over West central AS along the coast of Yemen & Oman and extreme southeast AS.
Upper tropospheric Ridge	At 12 ⁰ N.	At 14 ⁰ N.

Satellite observations based on INSAT imagery (0300 UTC):

a) Over the BoB & Andaman Sea: -

Scattered to broken low and medium clouds with embedded intense to very intense convection lay over southeast Bay of Bengal & Andaman sea (minimum CTT minus 93 degree celcius). Scattered low and medium clouds with embedded moderate to intense convection lay over southwest Bay of Bengal and isolated weak to moderate convection lay over central Bay of Bengal.

b) Over the Arabian Sea:

Scattered low and medium clouds with embedded intense to very intense convection lay over southeast Arabian sea, Maldives & Comorin area. Scattered low and medium clouds with embedded isolated weak to moderate convection lay over eastcentral & southwest Arabian sea & Lakshadweep islands area.

c) Outside India:

Scattered low and medium clouds with embedded moderate to intense convection lay over Sri Lanka, Palk Strait, Gulf of Mannar, Maldives, Tibet, China, east China sea, north Myanmar, extreme south Thailand, Gulf of Thailand, Sumatra, Strait of Malacca, Malaysia, Borneo, south China sea, Java islands & sea, Celebes islands & sea, Philippines, Madagascar, Mozambique channel and over Indian ocean between Lat 5.0⁰N to 16.0⁰S Long 50.0⁰E to 120.0⁰E.

M.J.O. Index:

Madden Julian Oscillation (MJO) is in phase 3 with amplitude more than 1 and would move to phase 4 during next 4 days with amplitude remaining more than 1. It will enter phase 4 on 27th with amplitude more than 1 and will be in the same phase till 29th.

Storms and Depression over East China Sea adjoining Taiwan/ South Indian Ocean:

Vortex (Bheki) over south Indian ocean (area D55) centered near 21.8⁰S / 54.6⁰E. Intensity T1.5/2.0. Maximum sustained winds 28-33 Kts. Associated scattered to broken low and medium clouds with embedded moderate to intense convection lay over area between Lat 20.0⁰S to 30.0⁰S Long 55.0⁰E to 65.0⁰E.

NWP Guidance for FDP Cyclone based on 0000 UTC for the next 7 days:

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	Model is indicating cyclonic circulation (Cycir) over Equatorial Indian Ocean (EIO) & adjoining South Andaman Sea	No significant circulation over AS.

	at 0000 UTC of 22 nd , low pressure area (LPA) over southeast BoB on 23 rd with nearly west-northwestwards movement and intensification into depression over southeast BoB on 24/0000 UTC, moving in same direction and further intensifying into a cyclonic storm over southwest BoB on 25/0000. It is moving northwestwards and lay over southwest BoB as a CS around 26/0000. It will then move towards Tamil Nadu coast while weakening and cross the coast as a LPA around 27/0000.	
IMD-GEFS	LPA on 22 nd November over Equatorial Indian Ocean (EIO), having nearly westward direction and lay over EIO and adjoining southeast BoB (4.9 N/89 E) as a depression. It will move in the same direction and lay over southwest BoB (6 N/83 E) as DD/CS around 25 th November, moving in northwestward direction and lay over southwest BoB (9 N/ 82 E) as CS/SCS on 26 th November. Continue to move in the same direction and touch the Tamil Nadu coast (10 N/ 80 E) on 27 th November as depression, less marked thereafter.	No Significant circulation over AS.
IMD-WRF	Cycir over Equatorial Indian Ocean (EIO) & adjoining South Andaman Sea as of today having westnorthwestwards till 25 th November.	No Significant circulation over AS during the next three days.
NCMRWF-NCUM(G)	Model is indicating an extended low over central parts of south BoB on 23 rd with nearly westwards movement, LPA over southwest BoB off south Sri Lanka coast on 25 th , D over Sri Lanka coast on 26 th and crossing Tamil Nadu coast as a LPA on 28/1200.	No Significant circulation over AS.
NCMRWF-NCUM(R)	Cycir over Equatorial Indian Ocean (EIO) & adjoining South Andaman Sea as of today having westnorthwestwards and will become LPA over southeast BoB and adjoining EIO (5 N/87 E) on 24 th November, depression over southwest BoB (7 N/ 84.5 E) on 25 th November.	No Significant circulation over AS.
NCMRWF-NEPS	No Significant cyclonic circulation over BoB.	No Significant cyclonic circulation over AS.
ECMWF	Model is indicating LPA over central parts of south BoB around 24/0000. It is indicated to move west-northwestwards towards south Sri Lanka coast as an	No Significant cyclonic circulation over AS.

	LPA till 28 th . Thereafter, it will move north-northwestwards and cross coast around 29/0600.	
NCEP-GFS	NCEP GFS: is indicating Cycir over EIO & adjoining South Andaman Sea at 0000 UTC of 22 nd , LPA over southeast BoB at 23/0000 with west-northwestwards movement and intensification into depression over southeast BoB around 23/1200 UTC. Moving in the same direction, it intensifies into SCS over southwest BoB around 25 th . It will then move towards north Tamil Nadu coast, weaken gradually and cross the coast as a DD/CS around 30/0600.	No Significant cyclonic circulation over AS.

Summary:

(a) Bay of Bengal:

Thus, guidance from various models indicate cycir over EIO & adjoining south Andaman Sea on 22nd with formation of LPA over southeast BoB on 23rd. However, there is large variation among various models with respect to intensification of the system. GFS group of models are indicating formation of D/DD around 24th over southeast BoB. NCUM is indicating formation of D around 26th off Sri Lanka coast and ECMWF is not indicating any significant intensification of this system (only upto LPA stage).

(b) Arabian Sea

Most of the models are indicating no significant cyclonic circulation over Arabian Sea for the next seven days.

Inference:

Considering various environmental conditions and model guidance, it is inferred that:

Considering all the above, it is inferred that yesterday's upper air cyclonic circulation moved west-northwestwards and lay over east Equatorial Indian Ocean and adjoining South Andaman Sea, extending upto mid- tropospheric level at 0300 UTC of today, the 22nd November, 2024. Under its influence a low pressure area is likely to form over southeast Bay of Bengal around 23rd November. Thereafter, it is likely to continue to move west-northwestwards and intensify into a depression over central parts of south Bay of Bengal during subsequent 2 days.

Probability of cyclogenesis (formation of depression and above intensity systems) over the Bay of Bengal during next 168 hours:

24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	LOW	MOD	HIGH	-	-

Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

“- “indicates genesis has already occurred.

Probability is indicated as NIL for 0%, LOW for 1-33%, MOD for 34-67% and High for 68-100%.

Intense Observation Period (IOP): Andaman Islands during 22nd-23rd, East coast of Sri Lanka during 24th-26th, Tamil Nadu coast during 24th-27th November.

ANNEXURE















