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

Tropical Cyclone Forecast Programme
Report Dated 20th November 2024

Time of Issue: 1100 UTC

Synoptic features (based on 0300 UTC analysis):

- An upper air cyclonic circulation is likely to form over South Andaman Sea and adjoining areas around 21st November. It is likely to move west-northwestwards and become a low pressure area over southeast Bay of Bengal around 23rd November. Thereafter, it is likely to continue move west-northwestwards and intensify into a depression over southwest Bay of Bengal during subsequent 2 days.
- A cyclonic circulation lay over south east Arabian sea off Kerala coast at 0.9 km above mean sea level at 0300 UTC of today, the 20th November, 2024.

Environmental Features:

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	➢ 26-28°C over northern Bob ➢ 29-30°C over rest part of Bob and Andaman Sea.	➢ 27-28°C over northern, west central and Southwest Arabian Sea ➢ 29-30°C over of east central and southeast Arabian Sea off Kerala & Karnataka coasts.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	➢ 140-160 over northeast & east central BoB and Andaman Sea. ➢ 100-130 over northwest adjoining westcentral and south extreme south BoB.	➢ 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^{-6}s^{-1})	➢ 20-30 over north BoB and EIO region along Sri Lanka coast.	➢ 10-20 over central and south AS. ➢ 20-30 over southeast AS adjoining Comorin area.
Low Level convergence (X10^{-5} s^{-1})	➢ 5-10 over southwest BoB, Sri Lanka.	➢ 5 over southwest Arabian Sea off Somalia coast and 10-15 over southeast AS adjoining Comorin Area.
Upper-Level divergence (X10^{-5} s^{-1})	➢ 5-10 over parts of southwest BoB & Sri Lanka.	➢ 5-10 over southeast AS adjoining Comorin area.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	➢ High over north & adjoining central BoB. ➢ Low-Moderate over rest of BoB.	➢ High over north & adjoining central AS and extreme south AS. ➢ Low-Moderate over rest of AS.
Wind Shear Tendency (knots)	Increasing over northern BoB Decreasing over Southwest	Decreasing over extreme southwest AS along Somalia

	adjoining central BoB along Sri Lanka and EIO.	coast. Increasing over north AS and extreme South AS.
Upper tropospheric Ridge	At 10^0 N.	At 15^0 N.

Satellite observations based on INSAT imagery (0300 UTC):

a) Over the BoB & Andaman Sea: -

Scattered low and medium clouds with embededd intense to very intense convection lay over southwest Bay of Bengal, Palk Strait & Gulf of Mannar. Scattered low and medium clouds with embedded moderate to intense convection lay over southeast Bay of Bengal and isolated weak to moderate convection lay over eastcentral Bay of Bengal & Andaman Sea.

b) Over the Arabian Sea:

Scattered low and medium clouds with embedded intense to very intense convection lay over south Arabian Sea, Lakshadweep Islands area, Comorin & Maldives areas. Scattered low and medium clouds with embedded moderate to intense convection lay over south parts of central Arabian Sea.

c) Outside India:

Scattered low to medium clouds with embedded moderate to intense convection lay over Sri Lanka, Palk strait, Gulf of Manner, Maldives, China, Yellow sea, East China Sea, Thailand, Gulf of Thailand Cambodia, Vietnam, Sumatra, strait of Malacca, Malaysia, Borneo, South China Sea, Java island & Sea Celebes Island & Sea Madagascar, Mozambique channel and over Indian Ocean between Lat 5.0N to 25.0S long 40.0E to 120.0E.

M.J.O. Index:

Madden Julian Oscillation (MJO) index is currently in Phase 2 with an amplitude greater than 1. It will be in same phase with amplitude greater than 1 till 22nd November, it will be in phase 4 with amplitude less than 1 on 23rd and 24th November.

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

Vortex (Bheki) over South Indian Ocean (area D60) centered near 19.0S / 63.2E. Intensity T3.0/3.5. Maximum sustained winds 48-63 kts. Associated scattered to broken low/med clouds with embedded moderate to intense convection over area between lat 15.0S to 22.0s long 61.0E to 70.0E.

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	Low pressure area over southeast BoB on 23rd Nov, moving in westnorthwestward direction and lay as Deep Depression/CS over southwest and adjoining southeast BoB (6.0 N/87.5 E) on 24th Nov, moving in the same direction and lay as SCS over southwest	Extended cyclonic circulation over southwest Arabian Sea and adjoining equatorial Indian Ocean on 24th November.

	BoB (8.5.0 N/81.0 E) close to Sri Lanka on 26th, weaken thereafter.	
IMD-GEFS	LPA on 23rd November, having nearly westward direction and lay close to Sri Lanka coast (6.0 N/ 83.5 E) on 25th November as a deep depression. It will then move northwestward along the Sri Lanka coast towards Tamil Nadu coast and reach Tamil Nadu coast as LPA/depression on 27th November.	No Significant circulation over AS.
IMD-WRF	No Significant circulation over BoB during the next three days.	No Significant circulation over AS during the next three days.
NCMRWF-NCUM(G)	Extended low over southwest BoB on 25th November, having west northwestwards without intensification.	Extended cyclonic circulation over southwest Arabian Sea and adjoining equatorial Indian Ocean on 26th November.
NCMRWF-NCUM(R)	No Significant cyclonic circulation over BoB.	No Significant cyclonic circulation over AS.
NCMRWF-NEPS	No Significant cyclonic circulation over BoB.	No Significant cyclonic circulation over AS.
ECMWF	LPA over southeast BoB around 23rd, it will have nearly west-northwestwards movement & intensification into depression around 25th, reach close to South Sri Lanka coast around 25th/1200 UTC as a depression/ deep depression.	No Significant cyclonic circulation over AS.
NCEP-GFS	Low pressure area over southeast BoB on 23rd Nov with nearly westwards movement, depression over southeast BoB on 24/00 UTC, moving west-northwestwards and lay over westcentral BoB (6.0 N/87.4 E) as deep depression on 25th 00 UTC. Moving then northwesterly and lay over southwest BoB (9 N/ 85.6 E) as VSCS on 26th/00 UTC, it will intensify further and lay over southwest BoB (10.6 N/83.5 E) on 27th/00 UTC. It will move in same direction while weakening and reach south Andhra Pradesh and adjoining Tamil Nadu coast (14.35 N/ 80.25 E) as deep depression/CS by 29th/12 UTC.	No Significant cyclonic circulation over AS.

Summary:

(a) Bay of Bengal:

Guidance from various models indicate formation of cyclonic circulation over South Andaman Sea around 21st, LPA over southeast BoB around 23rd, and depression over southwest BoB around 24th. There is large divergence among various models wrt peak intensification of system. GFS group of models are indicating higher intensification, ECMWF upto depression/deep depression stage and NCUM upto low pressure area stage. However, there is good consensus among various models that the system would weaken before crossing coast Tamil Nadu coast. Most of the models are indicating west-northwestwards to northwestwards movement towards Sri Lanka – South Tamil Nadu coasts. Only NCEP GFS is indicating initial west-northwestwards movement followed by north-northwestwards movement and crossing over Andhra Pradesh coast.

(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 an upper air cyclonic circulation is likely to form over South Andaman Sea and adjoining areas around 21st November. It is likely to move west-northwestwards and become a low pressure area over southeast Bay of Bengal around 23rd November. Thereafter, it is likely to continue move west-northwestwards and intensify into a depression over southwest 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	NIL	LOW	MOD	HIGH	-

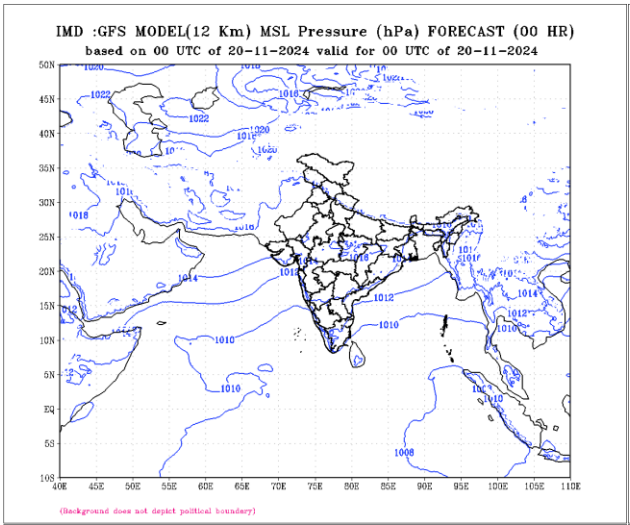
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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): NIL

ANNEXURE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based on 00 UTC of 20-11-2024 valid for 00 UTC of 20-11-2024
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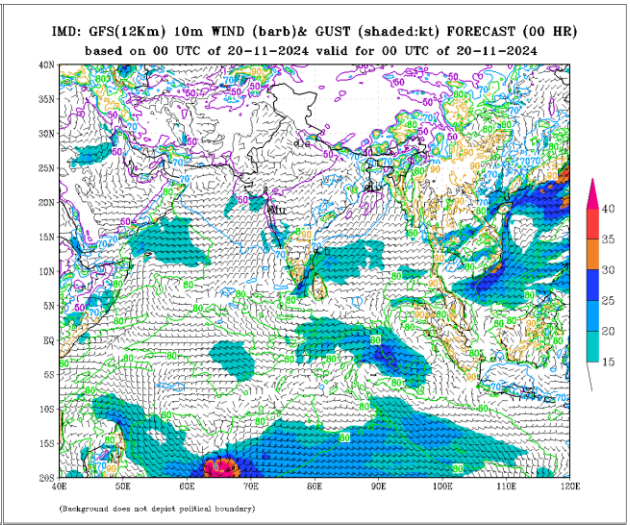
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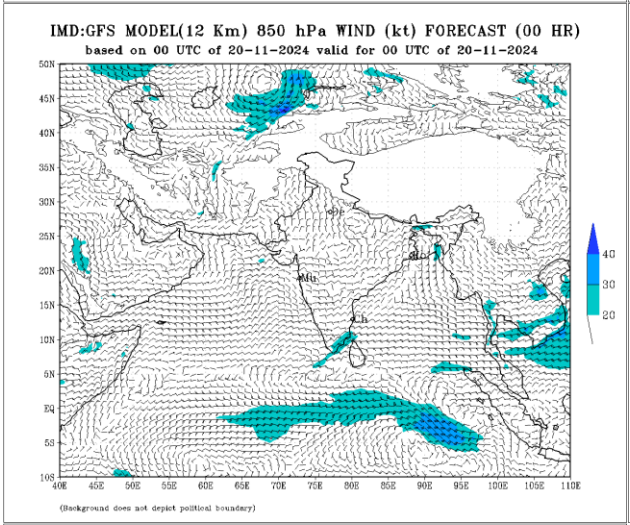
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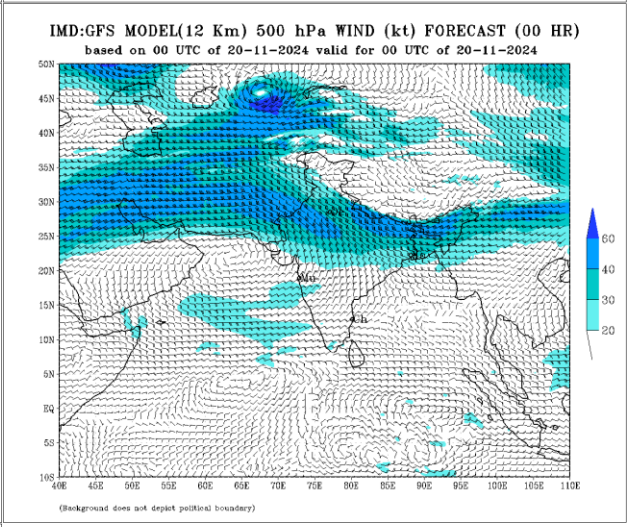
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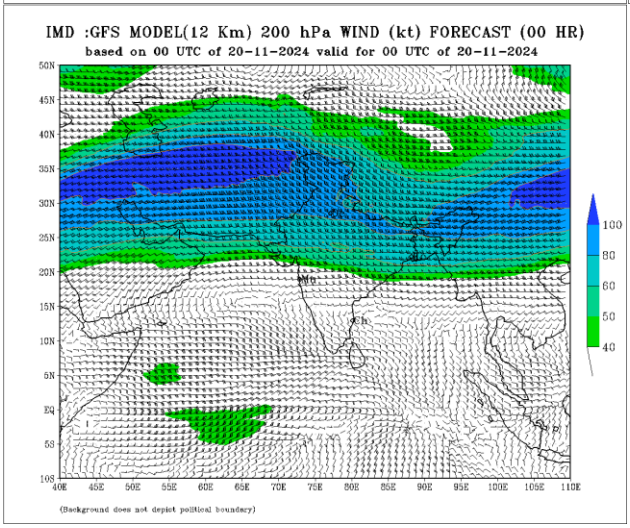
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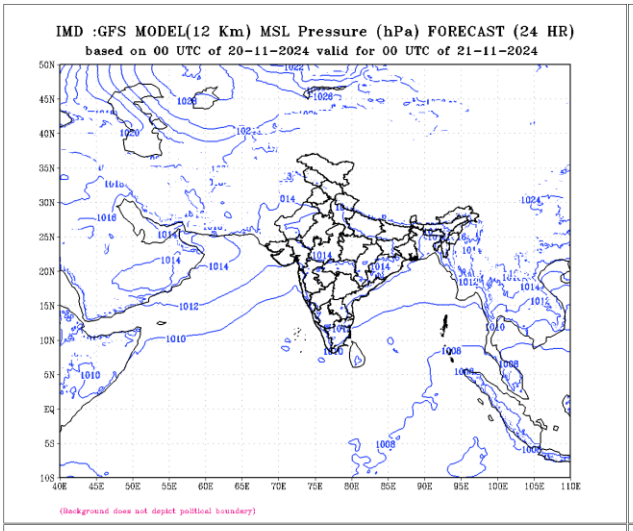
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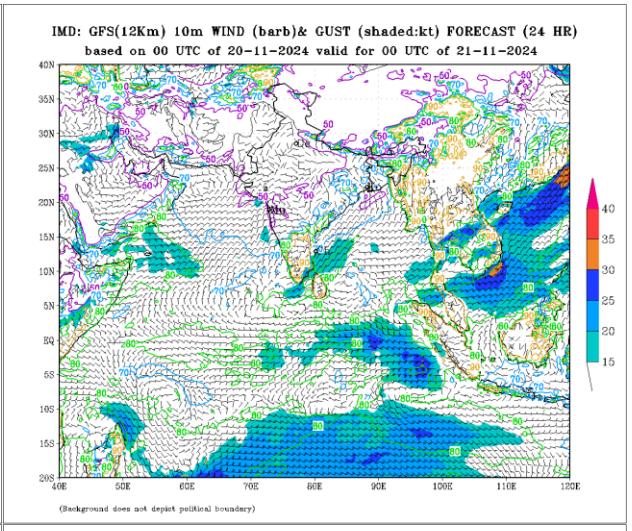
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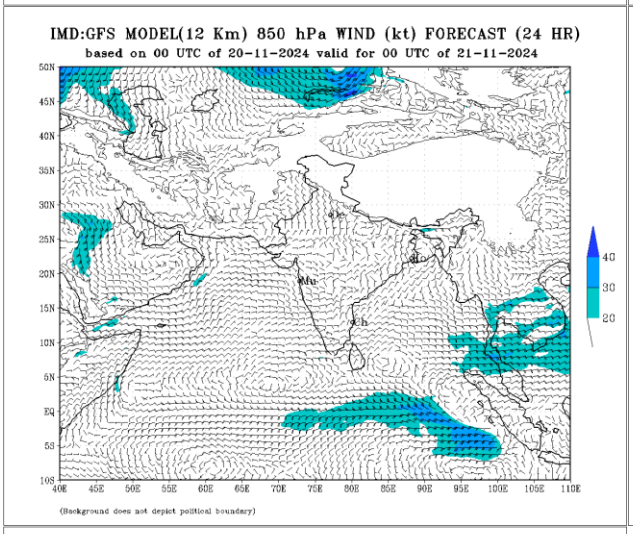
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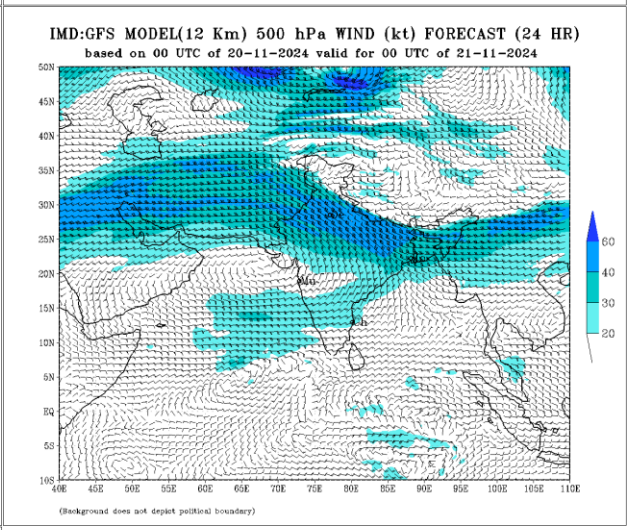
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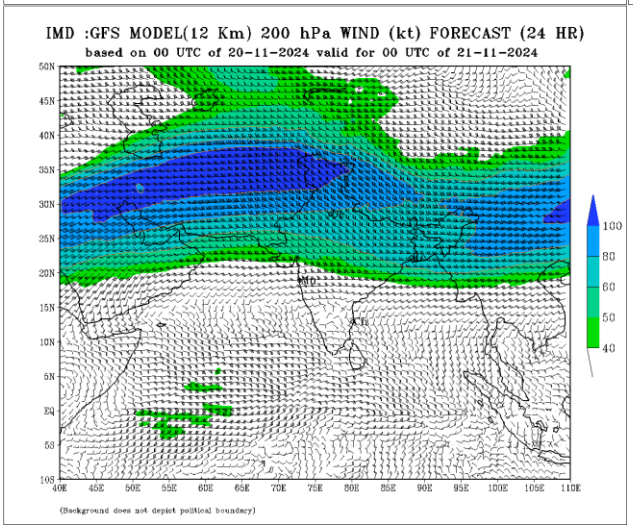
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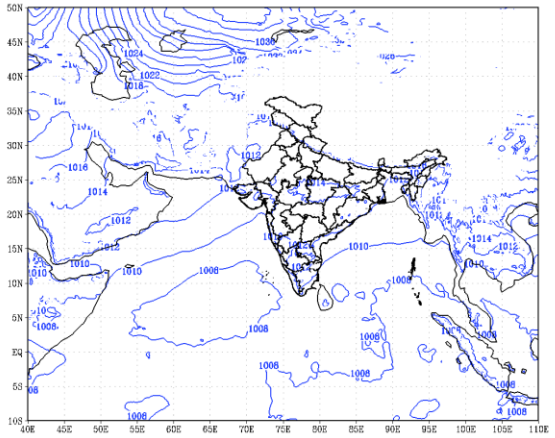

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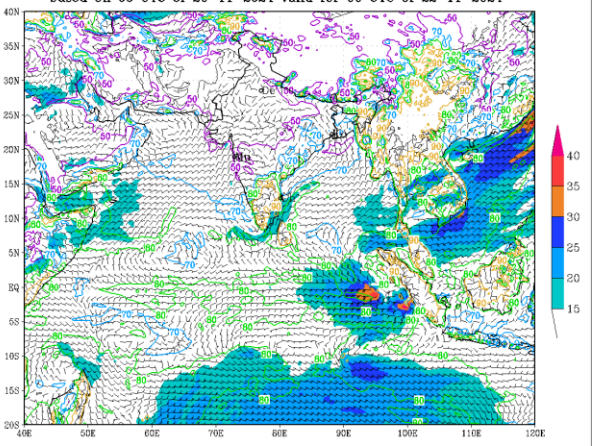

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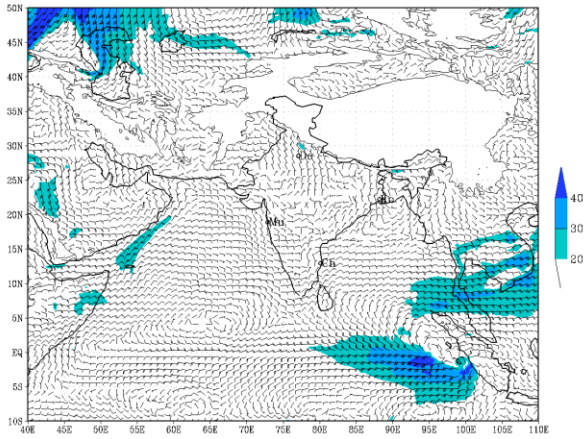

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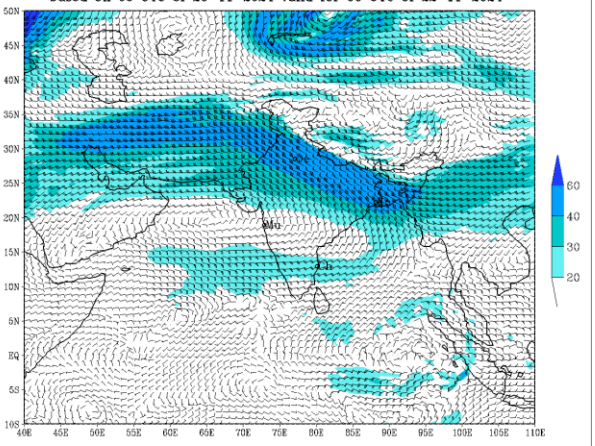

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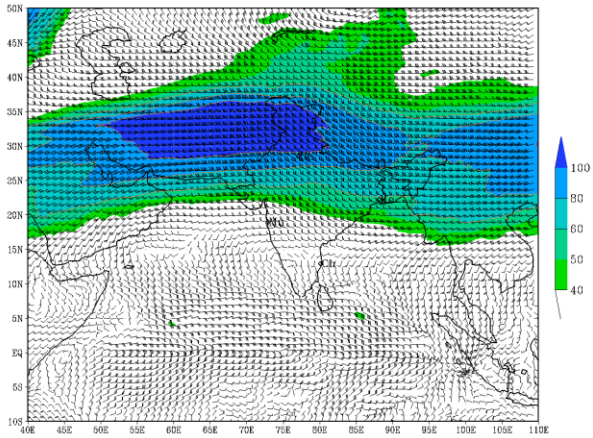

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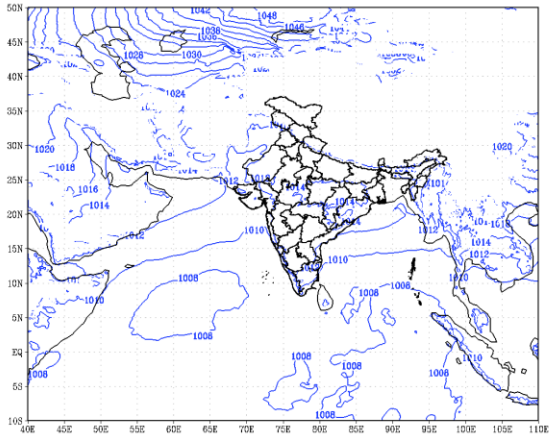

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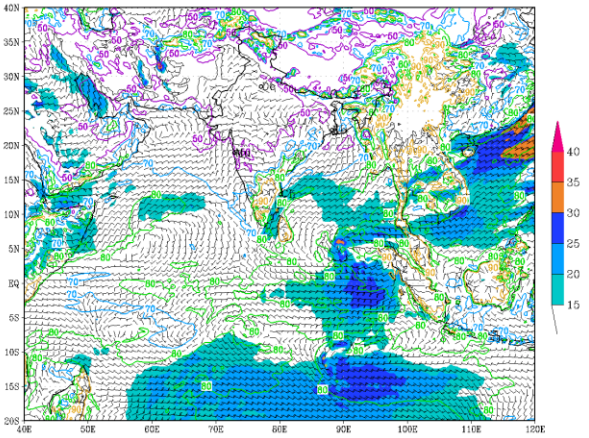

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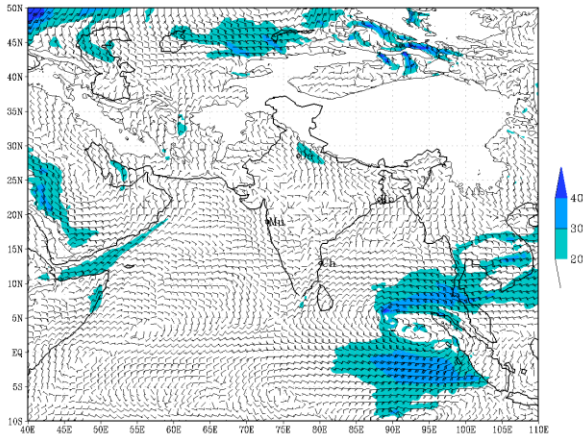

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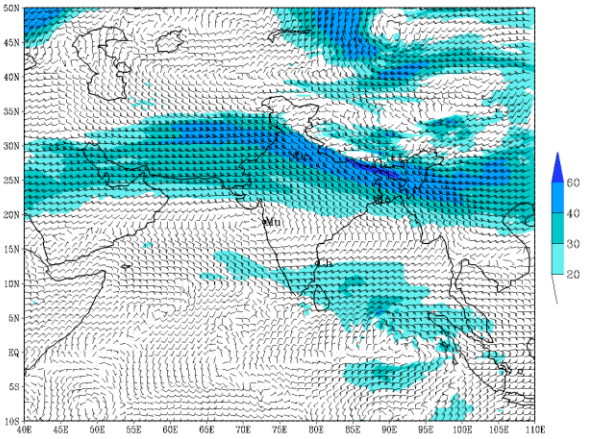

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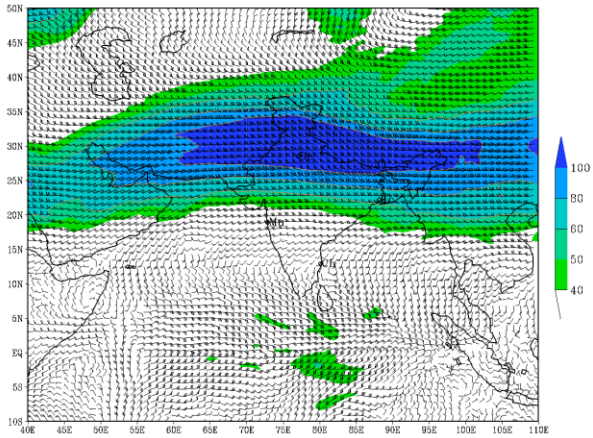

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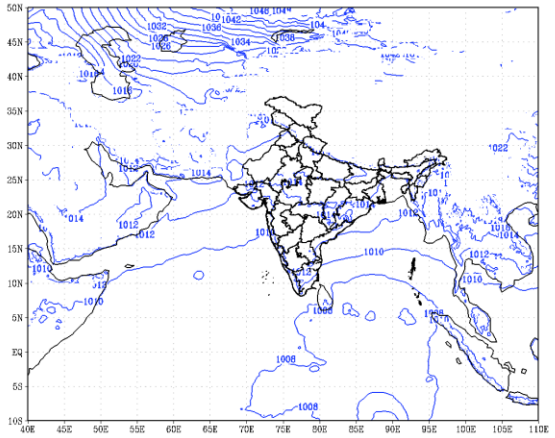

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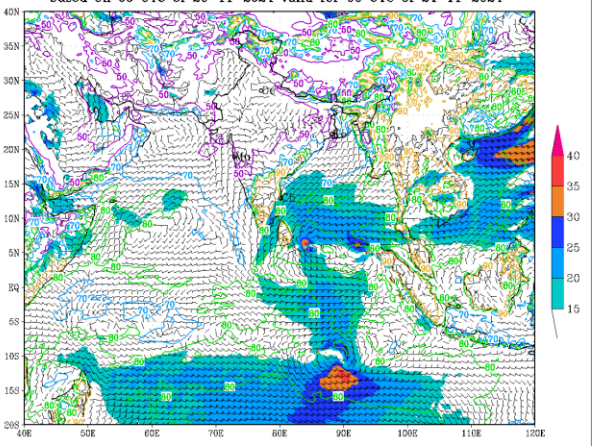

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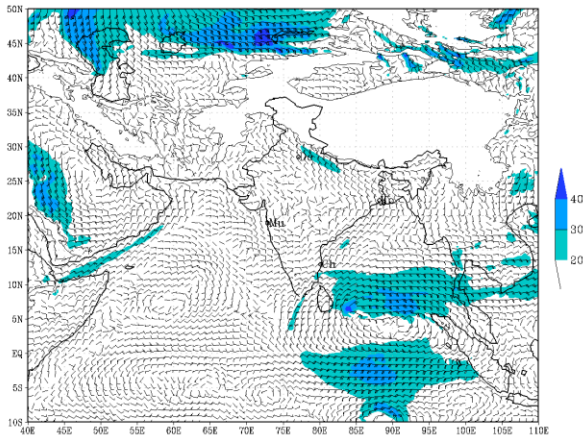

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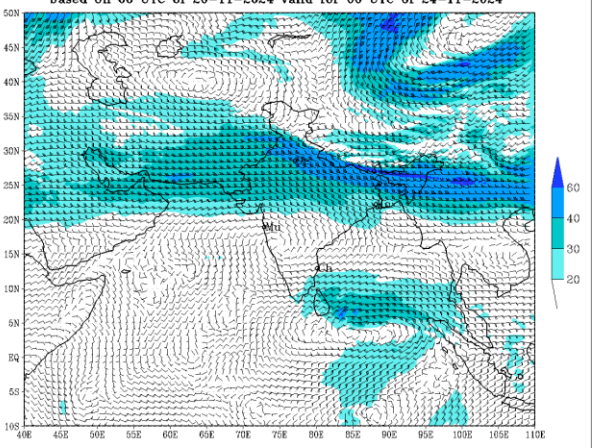

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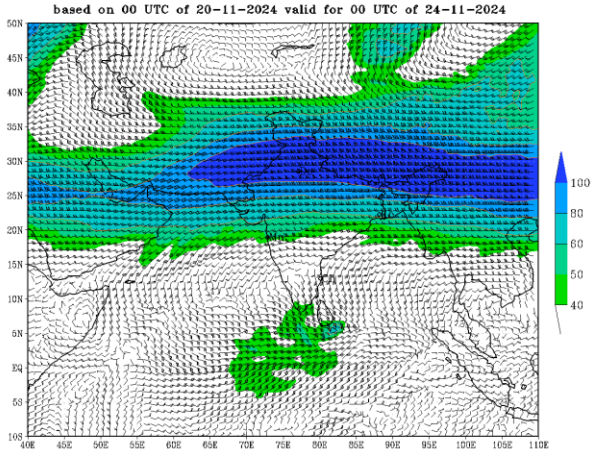

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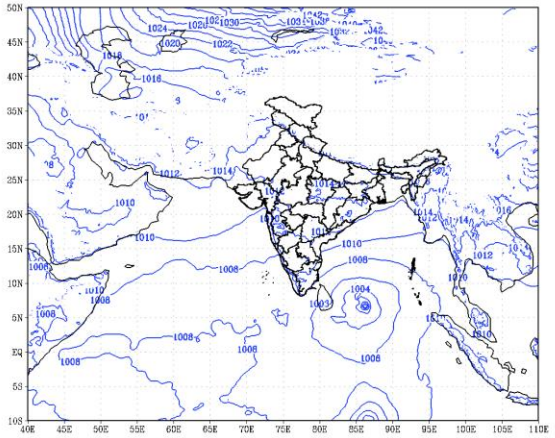

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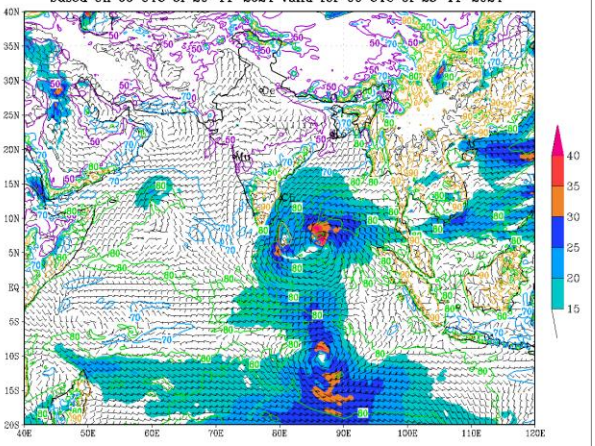

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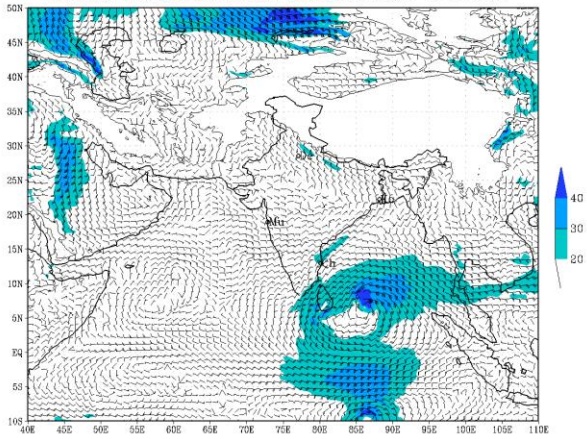

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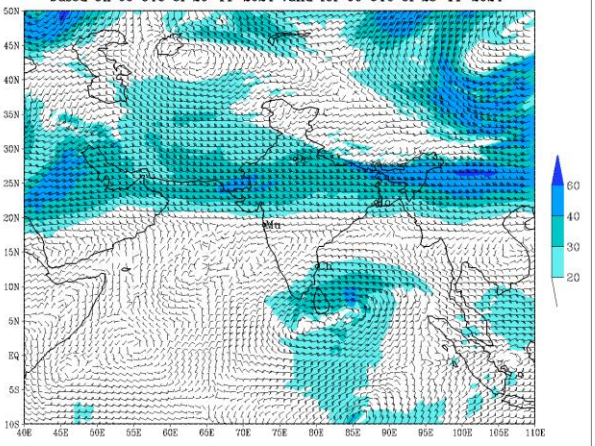

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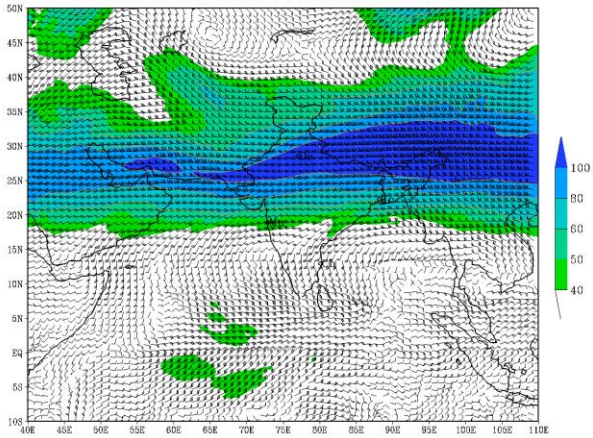

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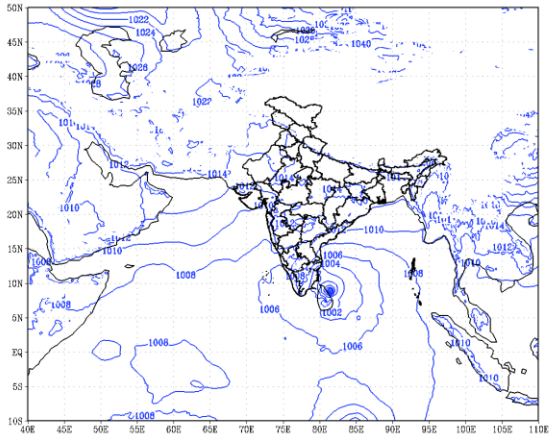
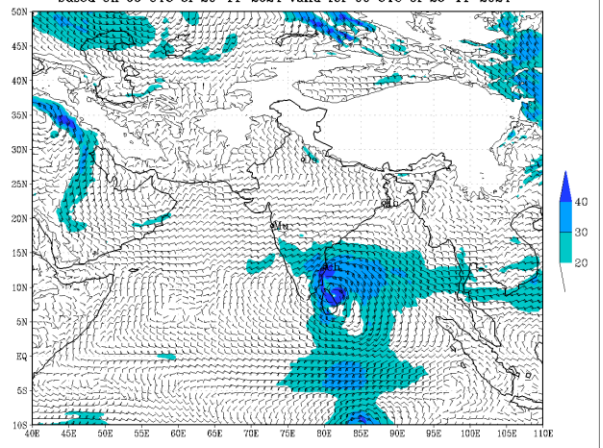
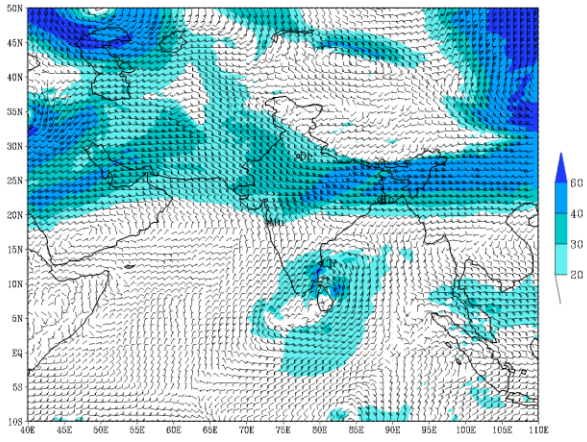
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 26-11-2024



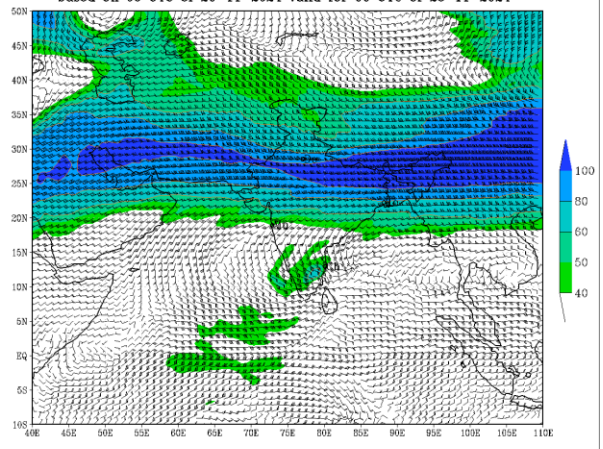
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 26-11-2024



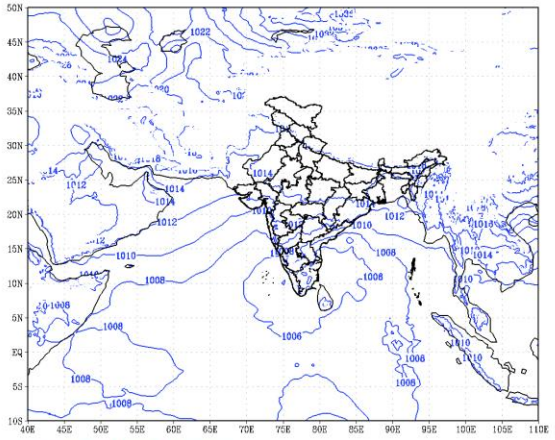
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 26-11-2024



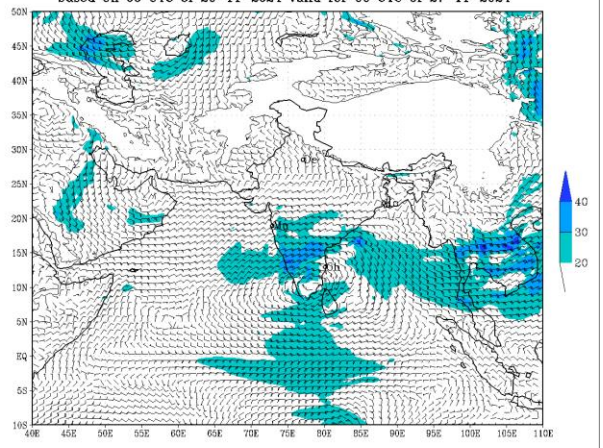
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 26-11-2024



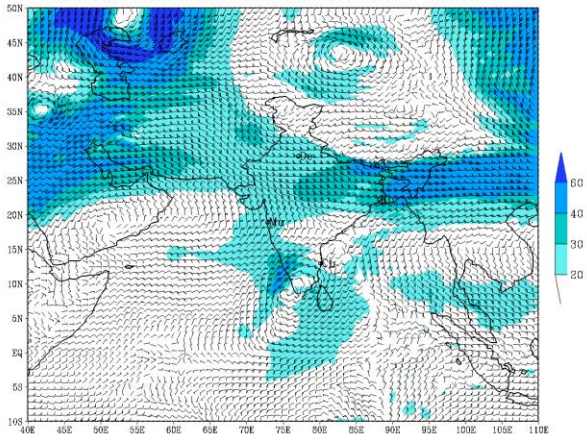
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 27-11-2024



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 27-11-2024



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 27-11-2024



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 20-11-2024 valid for 00 UTC of 27-11-2024