



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

**Tropical Cyclone Forecast Programme
Report Dated 30th November 2024**

Time of Issue: 1000 UTC

Synoptic features (based on 0300 UTC analysis):

The **Cyclonic Storm “FENGAL” [pronounced as FEINJAL]** over Southwest Bay of Bengal moved west-northwestwards with a speed of 10 kmph during past 6 hours and lay centred at 0600 UTC of today, the 30th November 2024 over the same region near latitude 12.3°N and longitude 80.7°E, about 100 km east-northeast of Puducherry, 100 km southeast of Chennai, 190 km north-northeast of Nagappattinam and 420 km north of Trincomalee. It is likely to move nearly westwards and cross north Tamil Nadu-Puducherry coasts between Karaikal and Mahabalipuram close to Puducherry as a cyclonic storm with a wind speed of 70-80 kmph gusting to 90 kmph around 1200 UTC of 30th November. There is possibility of slow movement while approaching the coasts.

Environmental Features:

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	<ul style="list-style-type: none"> ➤ 28-30°C over BoB. ➤ 26-28°C along & off Sri Lanka/Tamil Nadu/ Andhra Pradesh coasts. 	<ul style="list-style-type: none"> ➤ 28-30°C over most parts of AS. ➤ 26-28°C over some parts of southwest, westcentral AS along and off Somalia coast AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	<ul style="list-style-type: none"> ➤ 140-150 over system area some part of northeast, south BoB & adjoining EIO. ➤ 40-50 over southwest & adjoining westcentral BoB and along & off Sri Lanka/Tamil Nadu/ Andhra Pradesh coasts 	<ul style="list-style-type: none"> ➤ 80-100 over most parts of south, central AS, Lakshadweep Island. ➤ 20-40 over rest of the area.
Cyclonic Relative vorticity (X10⁻⁶s⁻¹)	<ul style="list-style-type: none"> ➤ 180-200 over southwest BoB along & off Tamil Nadu coast. 	<ul style="list-style-type: none"> ➤ 10-20 over central & South AS the coast of Somalia.
Low Level convergence(X10⁻⁵ s⁻¹)	<ul style="list-style-type: none"> ➤ 20-30 over westcentral and adjoining southwest BoB along & Tamil Nadu/ Andhra Pradesh coasts. ➤ 10-15 over southeast BoB 	--

Upper-Level divergence ($\times 10^{-5} \text{ s}^{-1}$)	➤ 20-30 over westcentral and southwest BoB . It is north-south oriented.	➤ 5-10 over parts of southeast AS.
Vertical Wind Shear (VWS knots) Low: 05-10 knots Moderate: 10-20 knots High: >20 knots	➤ High over north & central BoB. ➤ Low-Moderate over south & adjoining westcentral BoB and Andaman Sea.	➤ High over north AS. ➤ Low-Moderate over westcentral and adjoining south AS.
Wind Shear Tendency (knots)	➤ Increasing north BoB ➤ Decreasing over south and westcentral BoB and along and off Tamil Nadu/ Andhra Pradesh coasts.	➤ Increasing over north AS. ➤ Decreasing over central & south AS.
Upper tropospheric Ridge	➤ At 12° N.	➤ At 12° 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 central & south Bay of Bengal, (Minimum Cloud Top Temperature is minus 80-93 degrees Celsius). Scattered low and medium clouds with embedded moderate to intense convection lay over North Bay of Bengal & Andaman Sea.

b) Over the Arabian Sea:

Scattered low and medium clouds with embedded moderate to intense convection lay over southeast Arabian Sea, Lakshadweep Islands area, Maldives & Comorin area. Scattered low and medium clouds with embedded Isolated weak to moderate lay over southwest Arabian Sea.

c) Outside India:

Scattered low/med clouds with embedded moderate to intense convection lay over Sri Lanka, Palk strait, Gulf of Mannar, Maldives, China, south Thailand, Gulf of Thailand, south Cambodia, south Vietnam, 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 5.0N to 12.0S Long 60.0E to 120.0E and between Lat 20.0S to 35.0S Long 90.0E to 120.0E.

M.J.O. Index:

Madden Julian Oscillation (MJO) is in phase 5 with amplitude more than 1 and would remain in same phase during next 5 days.

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 SCS. over southwest BoB off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the north Tamil Nadu coast around the morning of 2 nd as CS. It will move over southern peninsular India and emerge into the southeast Arabian Sea on 4 th December as WML/D.	The remnant of BoB system will emerge into the southeast Arabian Sea on 4 th December as WML/D. Model is indicating its west-southwestwards movement with further intensification as CS on 5 th . It continues moving in same direction till 8 th .
IMD-GEFS	Model is indicating CS over southwest BoB far off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the morning of 3 rd as CS/DD. It will move over southern peninsular India and emerge into the southeast Arabian Sea on 5 th .	The remnant of BoB system will emerge into the southeast Arabian Sea on 4 th December as WML. It will move in west-southwestward direction towards Somalia coast till 8 th December without further intensification.
IMD-WRF	Model is indicating VSCS over southwest BoB far off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the morning of 2 nd as SCS.	No Significant circulation over AS for the next three days.
NCMRWF-NCUM(G)	Model is indicating CS/SCS over southwest BoB far off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the morning of 1 st December as CS. It will move across southern peninsular India and emerge into the southeast Arabian Sea on 4 th as WML.	The remnant of BoB system will emerge into the southeast Arabian Sea on 4 th December as WML. Model is indicating its west-southwestwards movement without further intensification.
NCMRWF-NCUM(R)	Model is indicating CS over southwest BoB far off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the morning of 1 st December as DD.	No Significant circulation over AS for the next three days.
NCMRWF-NEPS	Model is indicating CS/SCS over southwest BoB far off north Tamil Nadu coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the morning of 1 st December as CS. It will move across southern peninsular India and emerge into the southeast Arabian Sea on 4 th as WML.	The remnant of BoB system will emerge into the southeast Arabian Sea on 4 th December as WML. Model is indicating its west-southwestwards movement without further intensification.
ECMWF	Model is indicating CS/SCS over southwest BoB far off north Tamil Nadu	The remnant of BoB system will emerge into the southeast Arabian

	coast as on today, it will move west-southwestwards and cross the Tamil Nadu coast around the afternoon of 1 st December as CS. It will move across southern peninsular India and emerge into the southeast Arabian Sea on 3 rd as WML.	Sea on 3 rd December as WML. Model is indicating its west-southwestwards movement without further intensification.
NCEP-GFS	Model is indicating CS/SCS over southwest BoB far off north Tamil Nadu coast as on today, it will move very slowly in west-southwestwards direction and cross the Tamil Nadu coast around the morning of 3 rd December as CS. It will move over southern peninsular India and emerge into the southeast Arabian Sea on 4 th December as WML.	The remnant of BoB system will emerge into the southeast Arabian Sea on 4 th December 06 UTC as LPA/WML. It will have southwestward movement towards Somalia coast without intensification.

Summary:

(a) Bay of Bengal:

Model guidance indicates that there is convergence among various models with respect to track. However, there is large variation among various models with respect to intensity. Most of the models are also indicating the system to move very slow near to coast. There is again large variation with respect to landfall time by various models.

(b) Arabian Sea

Most of the models are indicating likely emergence of remnants of existing system over Bay of Bengal into southeast and adjoining eastcentral Arabian Sea around 03rd/4th December. Thereafter models are indicating the system will move west-southwestwards and without having significant intensification.

Inference:

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

Considering all the above, it is inferred that the cyclonic storm “Fengal” over southwest Bay of Bengal is likely to move nearly westwards and cross north Tamil Nadu- Puducherry coasts between Karaikal and Mahabalipuram close to Puducherry as a cyclonic storm with a wind speed of 70-80 kmph gusting to 90 kmph around 1200 UTC of 30th November.

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	NIL	NIL

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

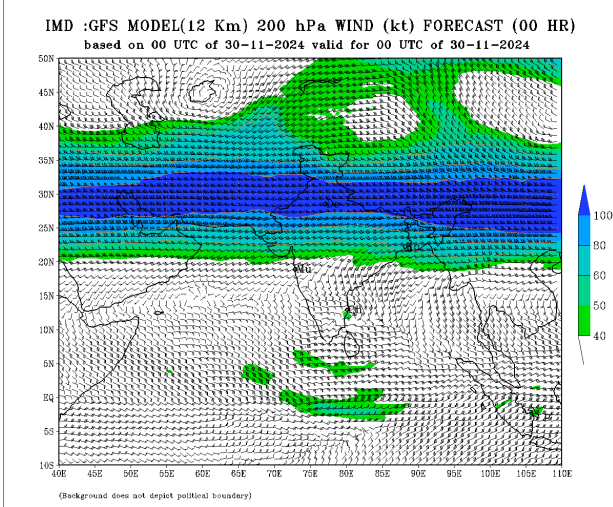
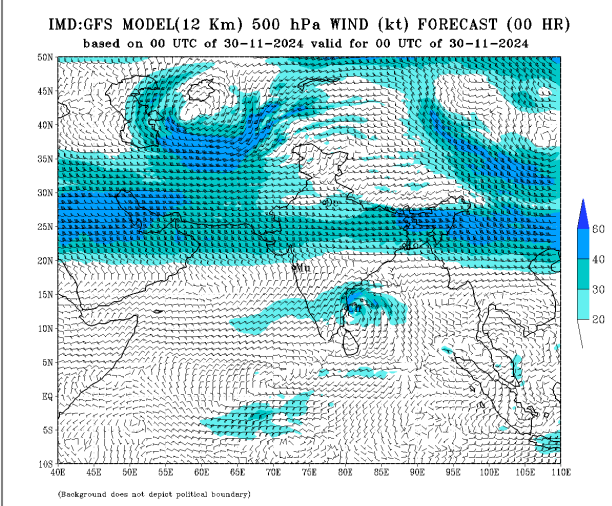
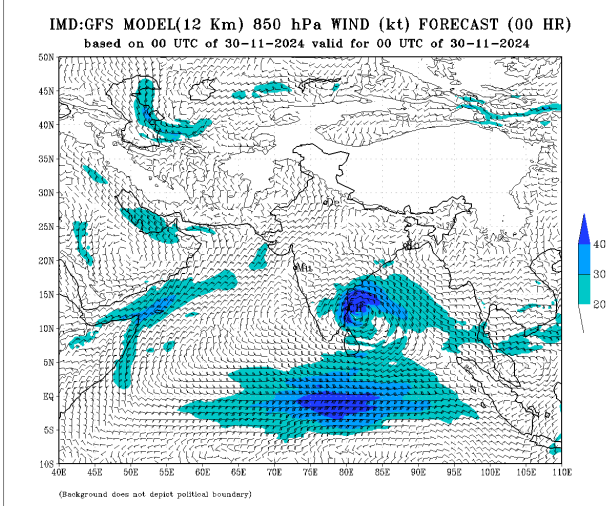
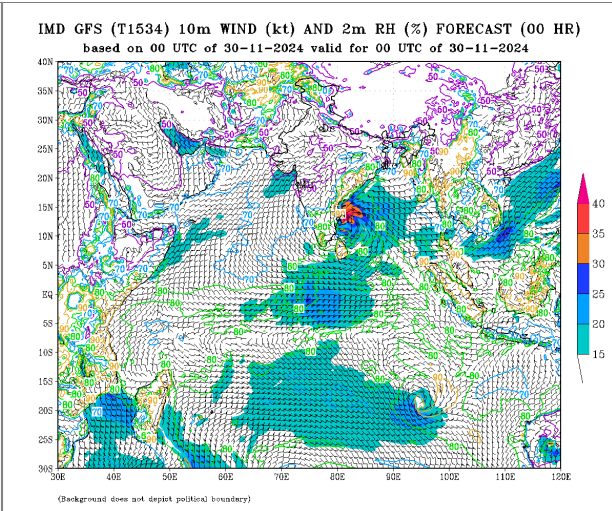
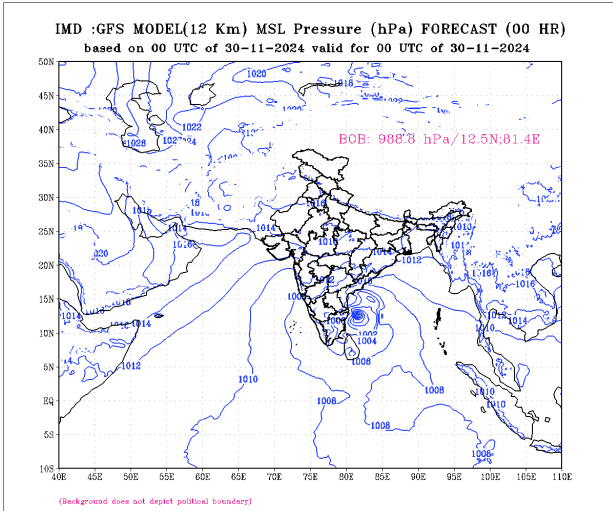
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	LOW	LOW	LOW	LOW

“- “indicates genesis has already occurred.

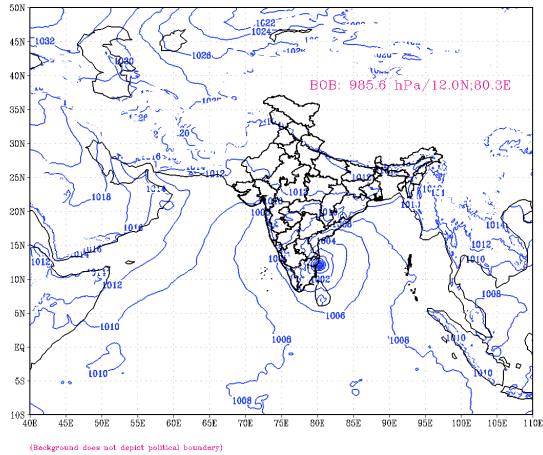
Probability is indicated as NIL for 0%, LOW for 1-33%, MOD for 34-67% and High for 68-100%.

Intense Observation Period (IOP): Sri Lanka coasts during 30th November, Tamil Nadu coast during 30th November – 02nd December and Andhra Pradesh coast during 30th November – 02nd December.

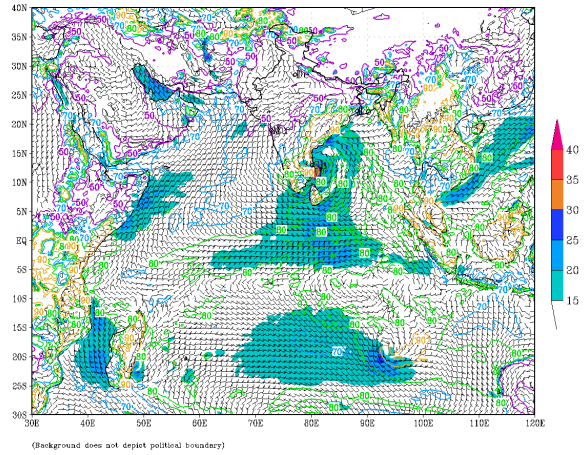
ANNEXURE



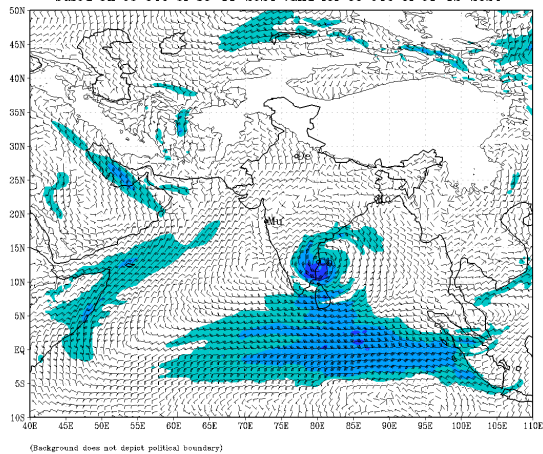
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)
 based on 00 UTC of 30-11-2024 valid for 00 UTC of 01-12-2024



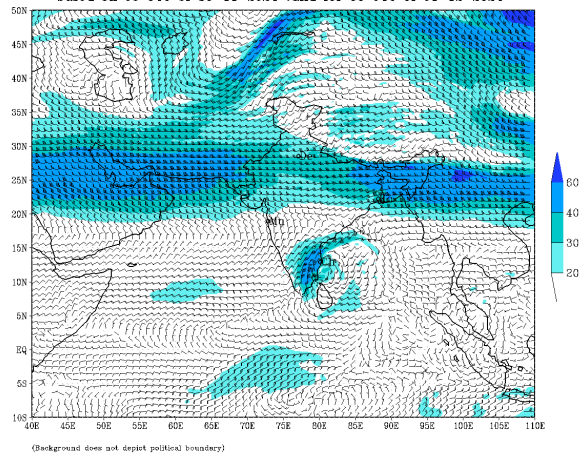
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)
 based on 00 UTC of 30-11-2024 valid for 00 UTC of 01-12-2024



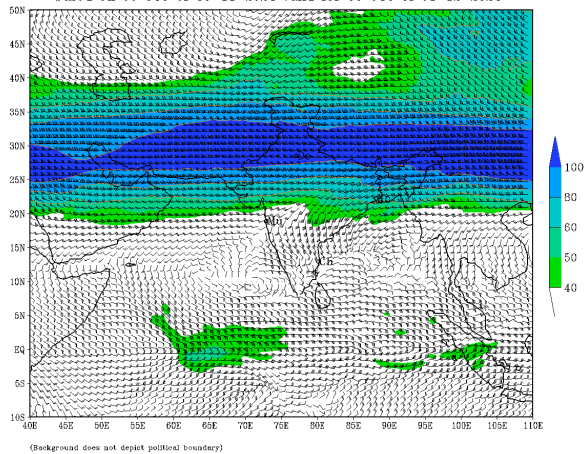
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (24 HR)
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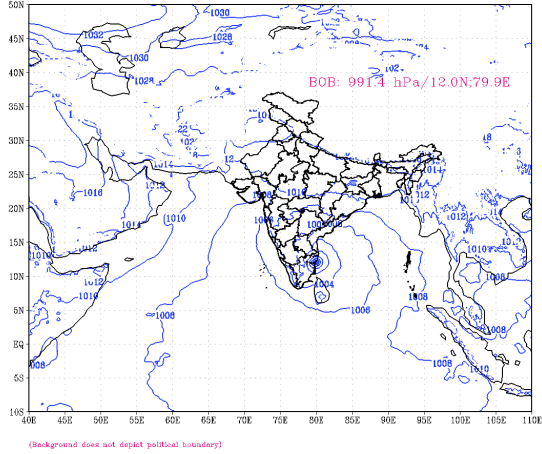
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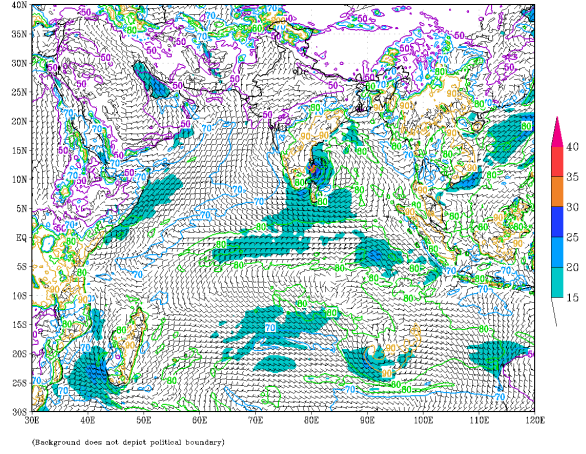
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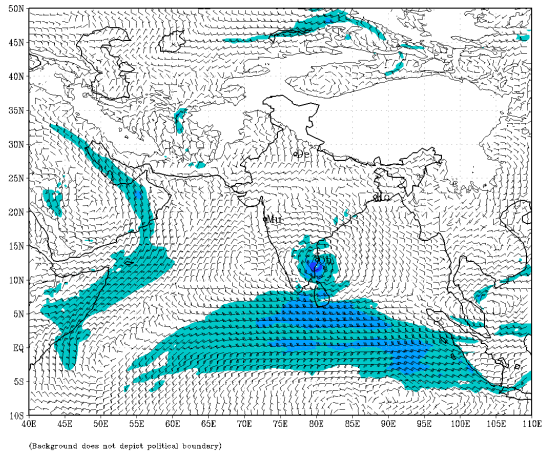
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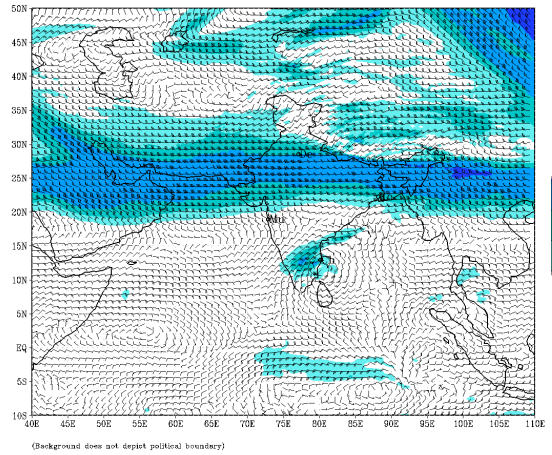
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
 based on 00 UTC of 30-11-2024 valid for 00 UTC of 02-12-2024



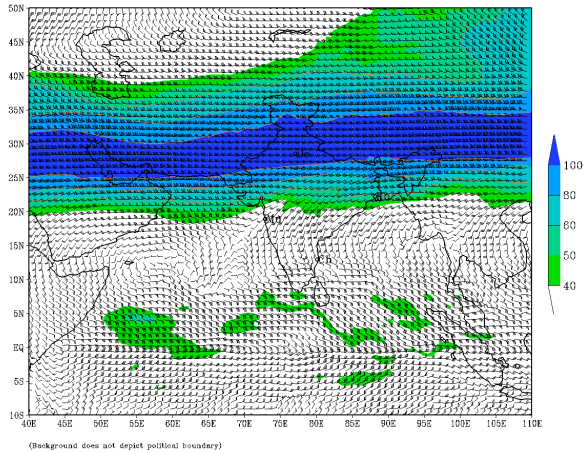
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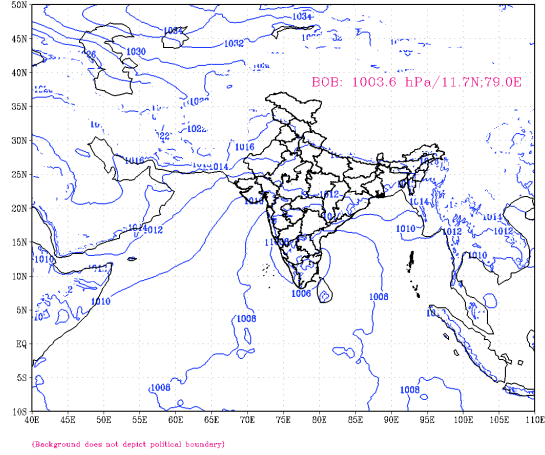
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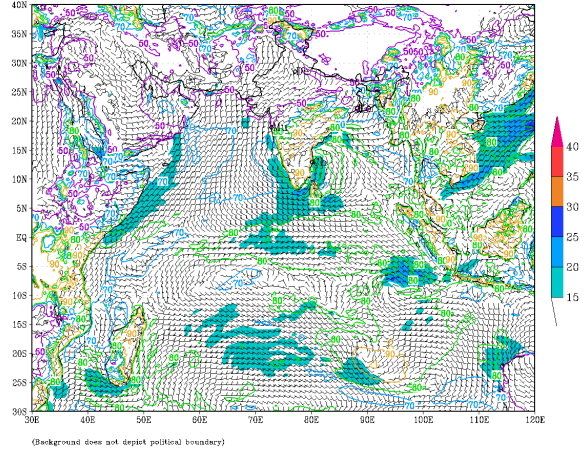
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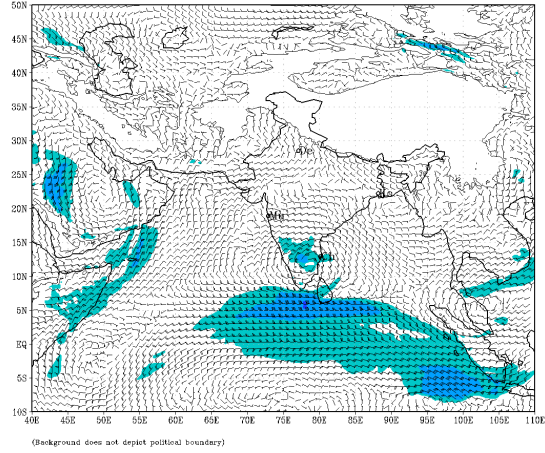
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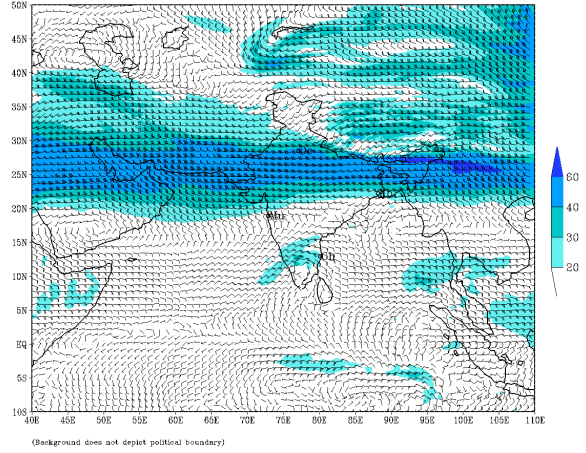
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 30-11-2024 valid for 00 UTC of 03-12-2024



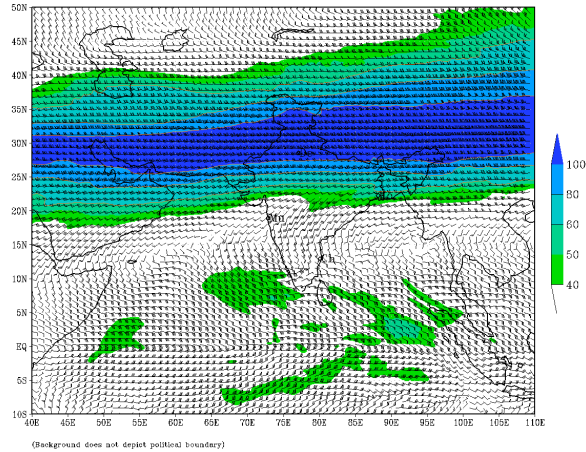
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based on 00 UTC of 30-11-2024 valid for 00 UTC of 03-12-2024



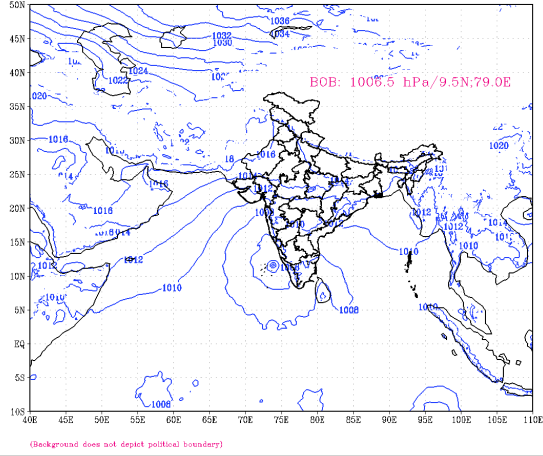
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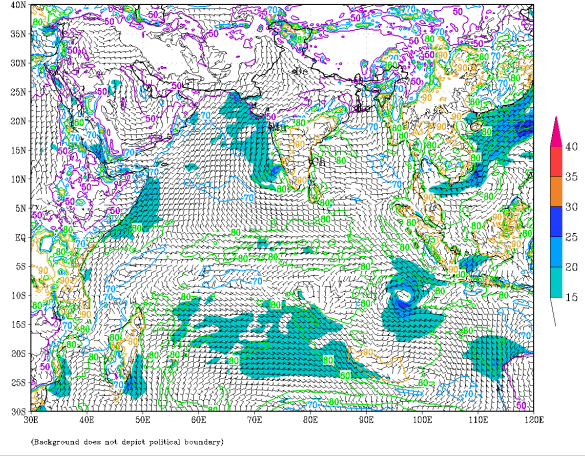
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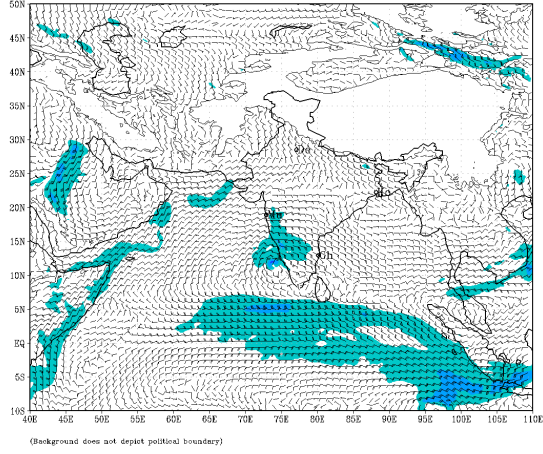
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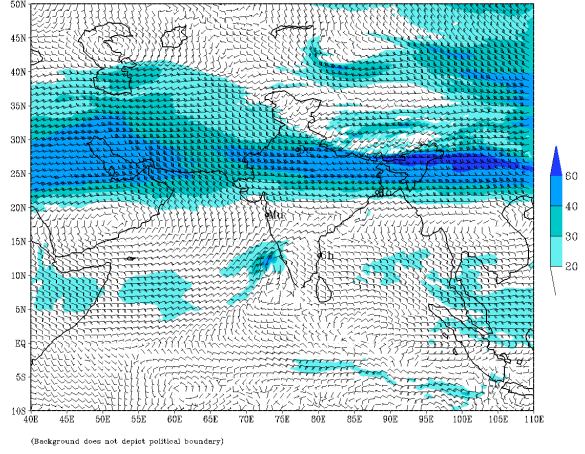
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 30-11-2024 valid for 00 UTC of 04-12-2024



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 30-11-2024 valid for 00 UTC of 04-12-2024



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 30-11-2024 valid for 00 UTC of 04-12-2024



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 30-11-2024 valid for 00 UTC of 04-12-2024

