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

Tropical Cyclone Forecast Programme
Report Dated 20th December 2024

Time of Issue: 1200 UTC

Synoptic features (based on 0300 UTC analysis):

- Yesterday's well marked low pressure area over southwest and adjoining westcentral Bay of Bengal has moved nearly northwards and now lay over westcentral and adjoining southwest Bay of Bengal at 0300 UTC of today, the 20th December 2024. The associated upper cyclonic circulation extends up to 5.8 km above mean sea level. The system is likely to move nearly northwards and concentrate into a depression over westcentral Bay of Bengal during next 12 hours. Thereafter, it is likely to move north-northeastwards maintaining the intensity of depression for subsequent 24 hours.

Environmental Features based on 0300 UTC:

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	➢ 26-28°C over north & central BoB ➢ 28-30°C over southeast & adjoining southwest BoB.	➢ 28-30°C over southeast AS, Lakshadweep Islands, Maldives and adjoining eastcentral & southwest AS. ➢ 25-28°C over rest of AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	➢ 160-210 over some parts northeast BoB and adjoining parts of eastcentral BoB. ➢ 110-150 over southeast BOB & Andaman Sea. ➢ 20-30 over some parts of southwest BoB along & off north Sri Lanka coast. ➢ 60-80 over rest of BoB.	➢ 100-130 over southeast AS, Maldives Islands, Lakshadweep Islands and areas of eastcentral AS along Karnataka-Kerala coasts. ➢ 20-60 over rest AS.
Cyclonic Relative - vorticity (X10^{-6}s^{-1})	➢ 50-60 over southwest & adjoining westcentral BoB off Tamil Nadu and south Andhra coasts extending upto 500 hPa level.	➢ 20-30 over along & off Saurashtra & Kutch.
Low-Level convergence (X10^{-5} s^{-1})	➢ 10-15 over westcentral & adjoining southwest BoB along & off Andhra coast. ➢ 5 over southeast BoB.	➢ 5 over southeast adjoining eastcentral AS.
Upper-Level divergence (X10^{-5} s^{-1})	➢ 20-30 over westcentral BoB. ➢ 5 over southeast AS and adjoining south Andaman	➢ 5-10 over center parts of westcentral AS

	sea.	
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	➢ Low-Moderate over many parts of south & central BoB and Andaman Sea. ➢ High over rest of BoB.	➢ Low-Moderate over Lakshadweep Islands, Maldives and south AS & adjoining EIO region. ➢ High over rest of Arabian Sea.
Wind Shear Tendency (knots)	➢ Increasing over eastcentral & parts of southwest BoB along and off Tamil Nadu coast. ➢ Decreasing over south BoB & adjoining parts of south Andaman Sea.	➢ Increasing over north & parts of south AS.
Upper tropospheric Ridge	➢ At 11^0 N.	➢ At 11^0 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 westcentral, adjoining eastcentral & South Bay of Bengal (minimum CTT minus 70-80 Degree Celsius). Scattered low and medium clouds with embedded moderate to intense convection lay over north Bay of Bengal and south Andaman sea.

b) Over the Arabian Sea:

Scattered low and medium clouds with embedded intense to very intense convection lay over southeast Arabian sea adjoining Equatorial Indian ocean (minimum CTT minus 70-75 Degree Celsius). Scattered low and medium clouds with embedded moderate to intense convection lay over Maldives & Comorin area and isolated weak to moderate convection lay over rest Arabian sea.

c) Outside India:

Scattered low & medium clouds with embedded moderate to intense convection over Sri Lanka, Maldives, China, Yellow Sea, Myanmar, South Thailand, Gulf of Thailand, Cambodia, Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea, Philippines, Sulu Sea, North Madagascar, Mozambique Channel and over Indian Ocean between latitude 5.0N to 20.0S longitude 40.0E to 125.0E.

M.J.O. Index:

MJO is currently in phase 6 with amplitude greater than 1. It will be in same phase till 24th December with amplitude greater than 1.

NWP Guidance for FDP Cyclone:

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	The model is indicating the Well Marked Low Pressure area (WML) over westcentral and adjoining southwest Bay of Bengal as of today 20th/00 UTC, moving northeastwards till tomorrow, the 21st and less marked thereafter.	The model indicates no significant system over AS.
IMD-GEFS	The model is indicating the Well Marked Low Pressure area (WML) over westcentral and adjoining southwest Bay of Bengal as of today, the 20th/00 UTC, moving northeastwards till tomorrow, the 21st and less marked thereafter.	The model indicates no significant system over AS.
IMD-WRF	The model is indicating the Well Marked Low Pressure area (WML) over westcentral and adjoining southwest Bay of Bengal as on today, the 20th/00 UTC, having northeastwards movement till 22nd while maintaining the same intensity. thereafter, it moves west-southwestwards while weakening.	The model indicates no significant system over AS.
NCMRWF-NCUM(G)	The model is indicating a Low Pressure area (LPA) over westcentral and adjoining southwest Bay of Bengal as of today, the 20th/00 UTC, having northeastwards movement without intensification till 22nd. Thereafter, it moves west-southwestwards till 24th without intensification.	The model indicates no significant system over AS.
NCMRWF-NCUM(R)	The model is indicating a Low Pressure area (LPA) over westcentral Bay of Bengal as on today, the 20th/00 UTC, having northeastwards movement & lay over the same region as Depression on 22nd. Thereafter it will move west-southwestward direction while weakening till 24th.	The model indicates no significant system over AS.
NCMRWF-NEPS	The model is indicating a Low Pressure area (LPA) over westcentral Bay of Bengal as on today, the 20th/00 UTC, having northeastwards movement & lay over the same region as Depression on 22nd. Thereafter it will move in west-southwestward direction while weakening till 24th.	The model indicates no significant system over AS.
ECMWF	The model is indicating the Well Marked Low Pressure area (WML) over westcentral Bay of Bengal as of today, the 20th December, having northeastwards movement while maintaining the same intensity till 22nd.	The model indicates no significant system over AS.

	Thereafter it will move in west-southwestward direction while weakening till 24th/ 15 UTC.	
NCEP-GFS	The model is indicating a Well Marked Low Pressure area (WML) over westcentral Bay of Bengal as of today, the 20th/00 UTC, having northeastwards movement and lay over westcentral Bay of Bengal as Depression on 22nd. Thereafter it will move in west-southwestward direction till 25th/06 UTC while weakening.	The model indicates no significant system over AS.

Summary:

(a) Bay of Bengal:
Most of the models are indicating that, **well marked low pressure area** over westcentral Bay of Bengal as of today, the 20th December and its northeastwards movement till 22nd. Models are also indicating its west- southwestward movement thereafter till 24th while weakening. NCEP -GFS is indicating the intensification up to depression on 22nd December over westcentral Bay of Bengal.

(b) Arabian Sea
Most of the models are indicating no significant system over Arabian Sea.

Inference:

- Yesterday's well marked low pressure area over southwest and adjoining westcentral Bay of Bengal has moved nearly northwards and now lay over westcentral and adjoining southwest Bay of Bengal at 0300 UTC of today, the 20th December 2024. The associated upper cyclonic circulation extends up to 5.8 km above mean sea level. The system is likely to move nearly northwards and concentrate into a depression over westcentral Bay of Bengal during next 12 hours. Thereafter, it is likely to move north-northeastwards maintaining the intensity of depression for subsequent 24 hours.

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	LOW	LOW	--	--	NIL	NIL

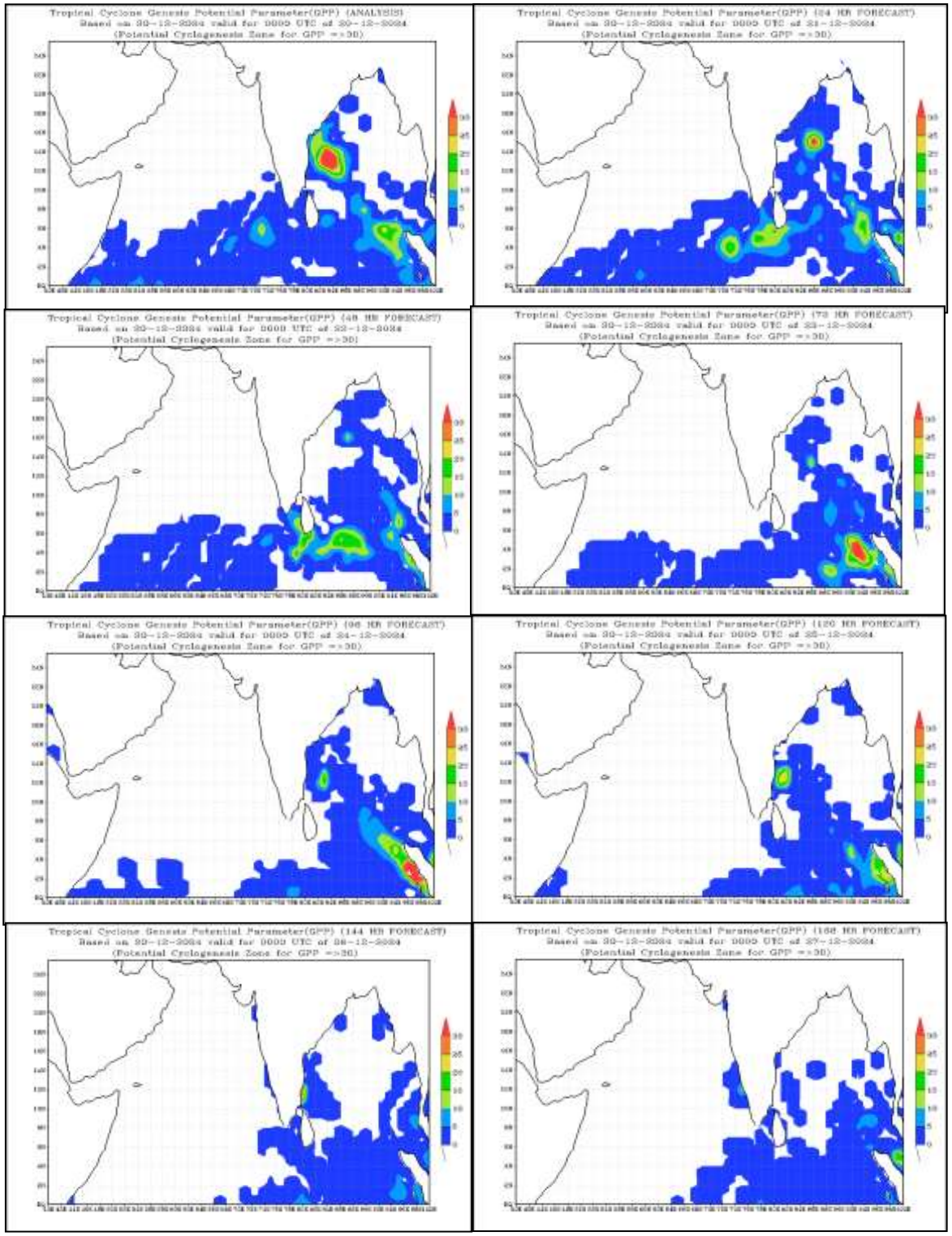
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 30-12-2024 valid for 0000 UTC of 30-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 31-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 01-01-2025
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 02-01-2025
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 03-01-2025
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 04-01-2025
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 30-12-2024 valid for 0000 UTC of 05-01-2025
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
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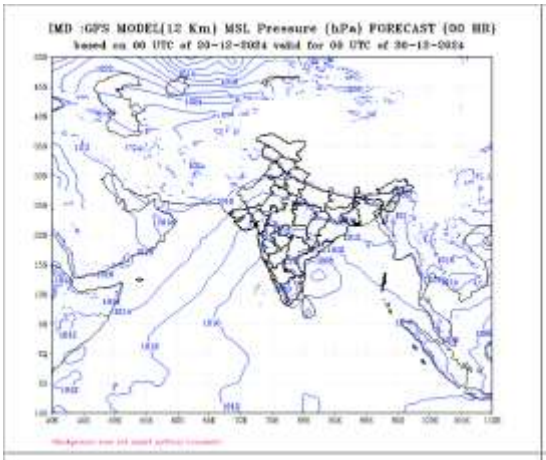
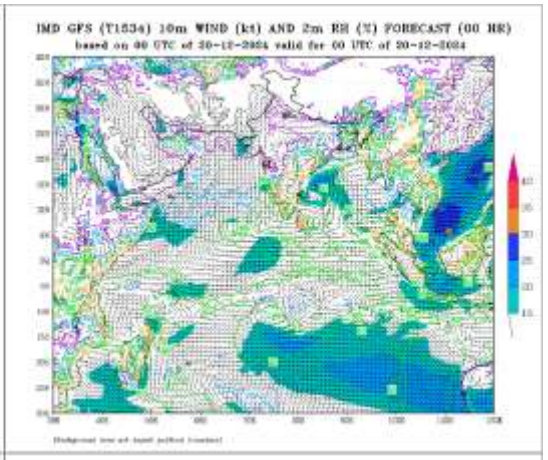
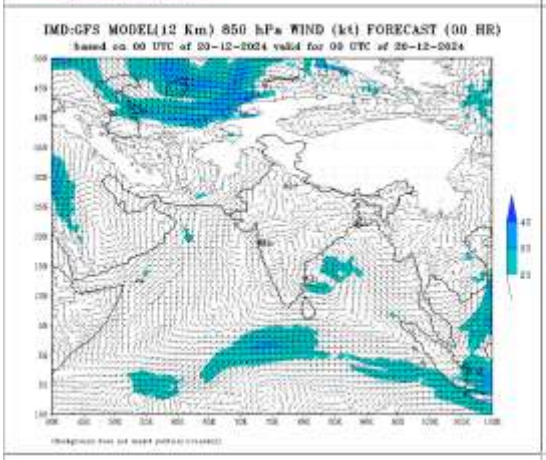
(Potential Cyclogenesis Zone for GPP =>30)


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


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 20-12-2024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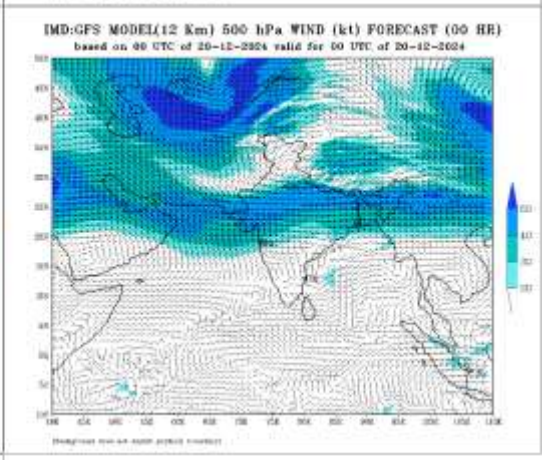
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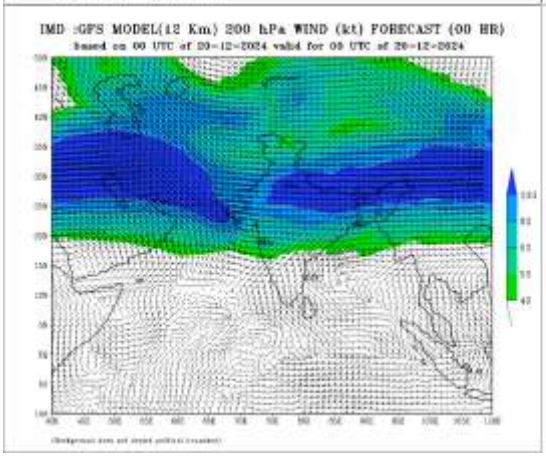
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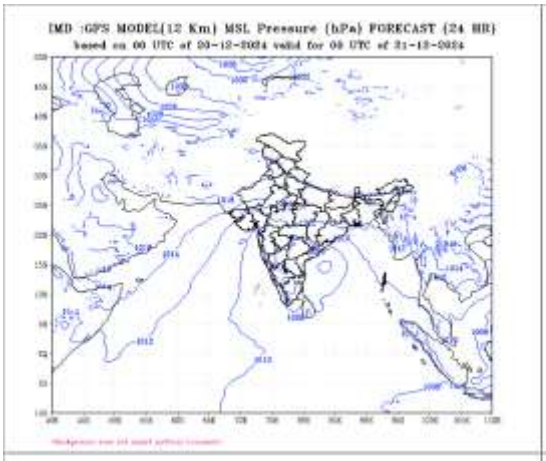
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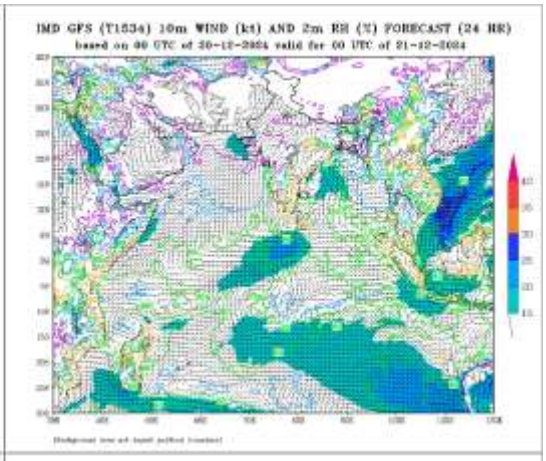
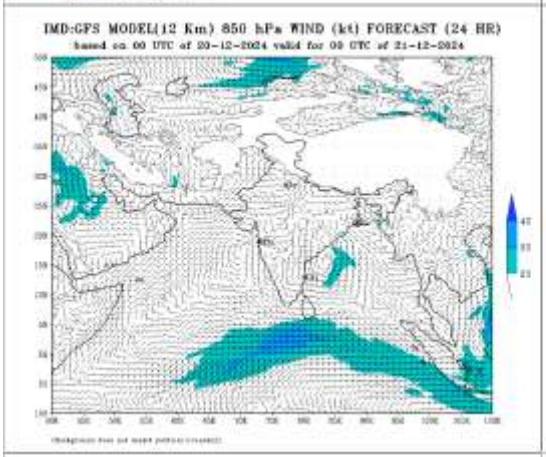
based on 00 UTC of 20-12-2024 valid for 00 UTC of 21-12-2024


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 21-12-2024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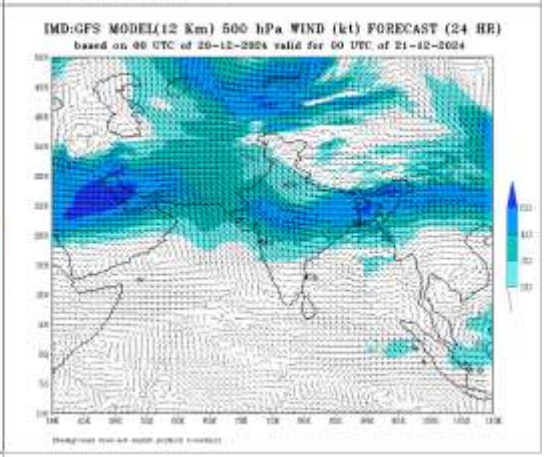
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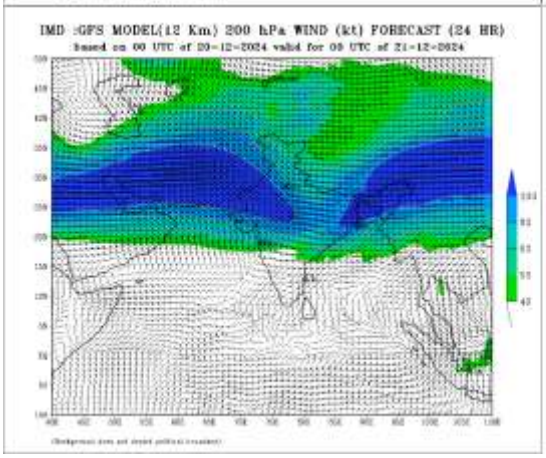
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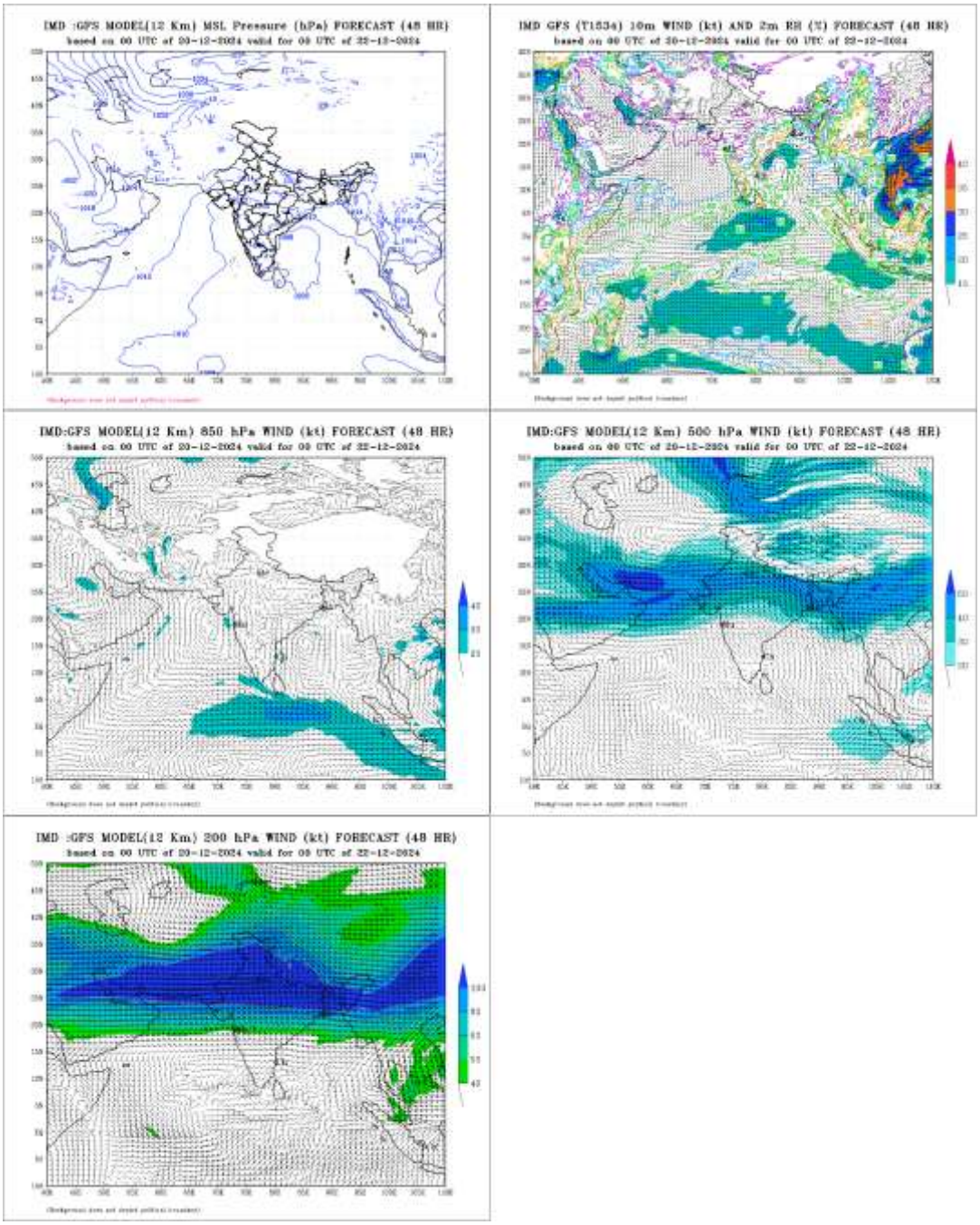
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 22-12-2024
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 22-12-2024
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (48 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 22-12-2024
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 22-12-2024
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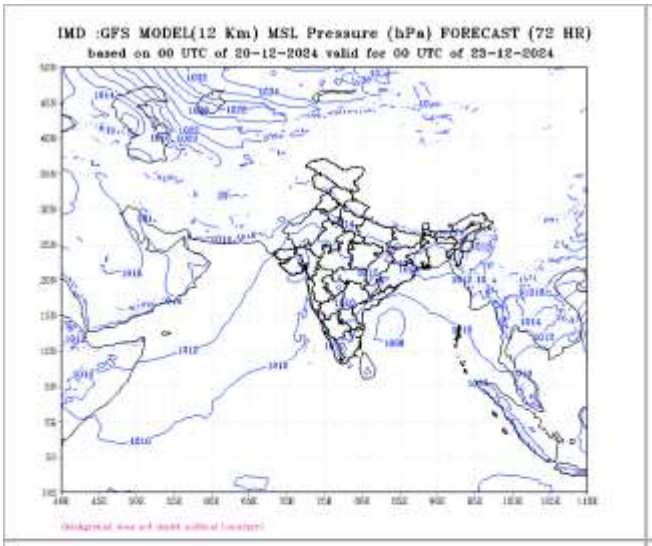
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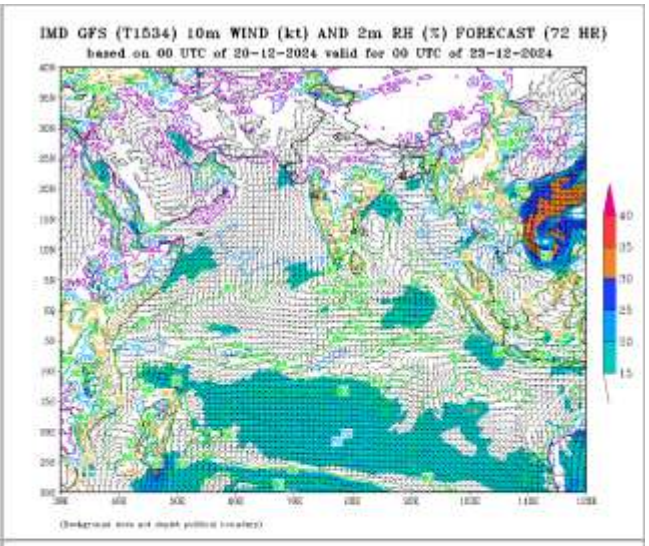
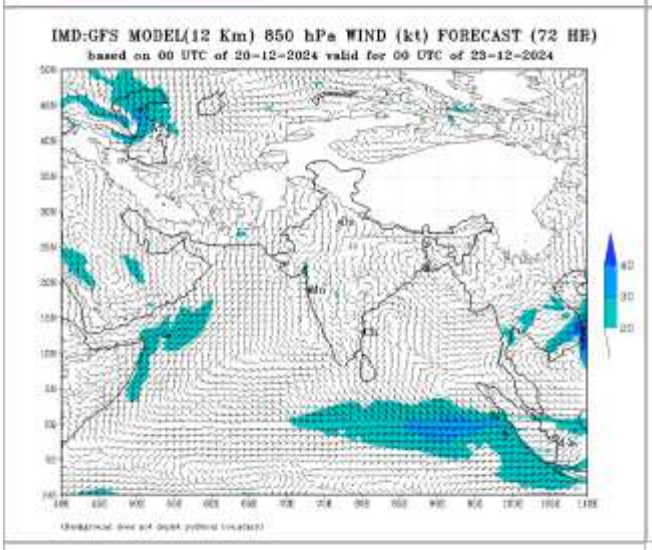
based on 00 UTC of 20-12-2024 valid for 00 UTC of 23-12-2024


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 23-12-2024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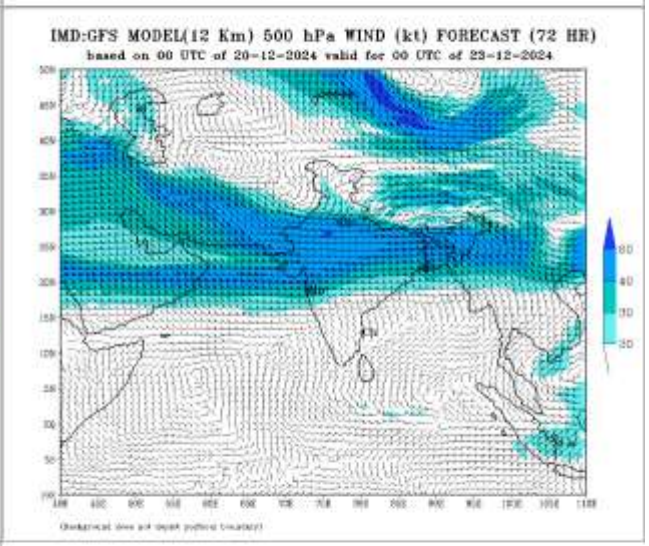
based on 00 UTC of 20-12-2024 valid for 00 UTC of 23-12-2024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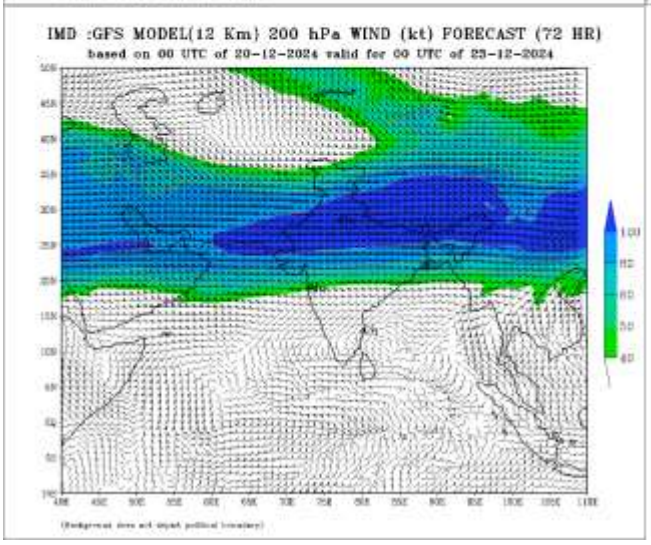
based on 00 UTC of 20-12-2024 valid for 00 UTC of 23-12-2024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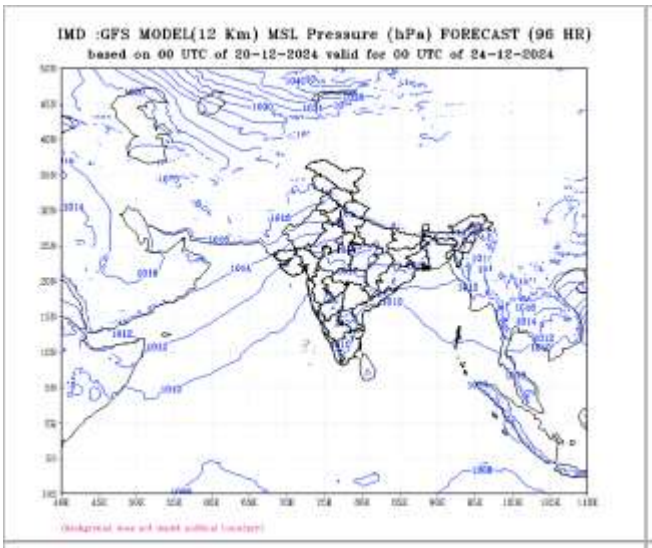
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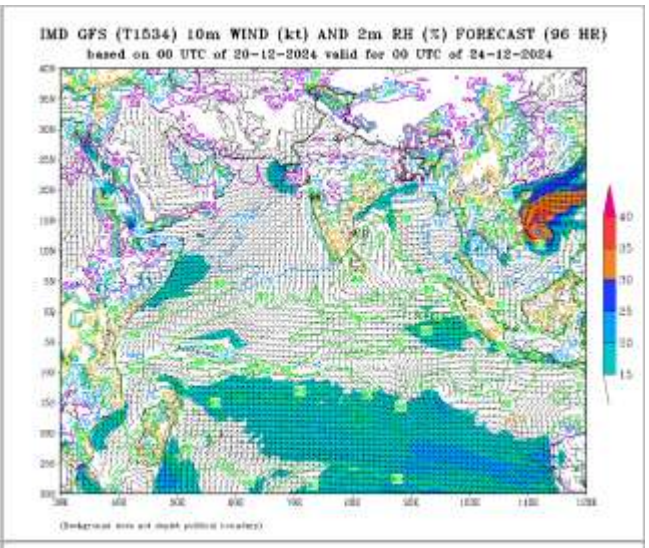
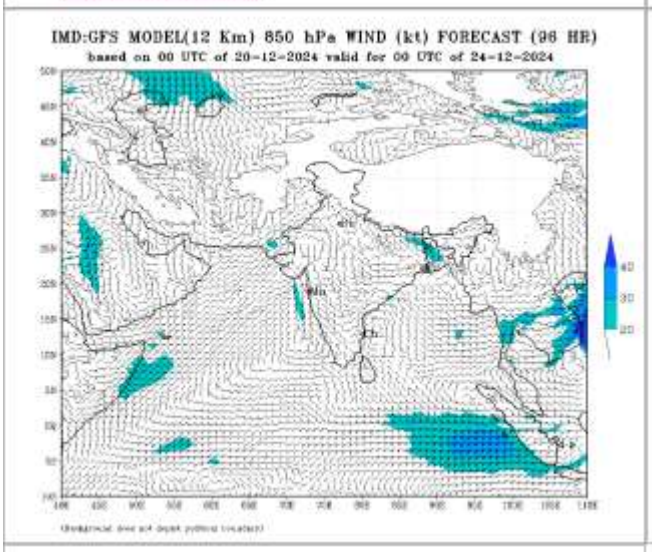

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 24-12-2024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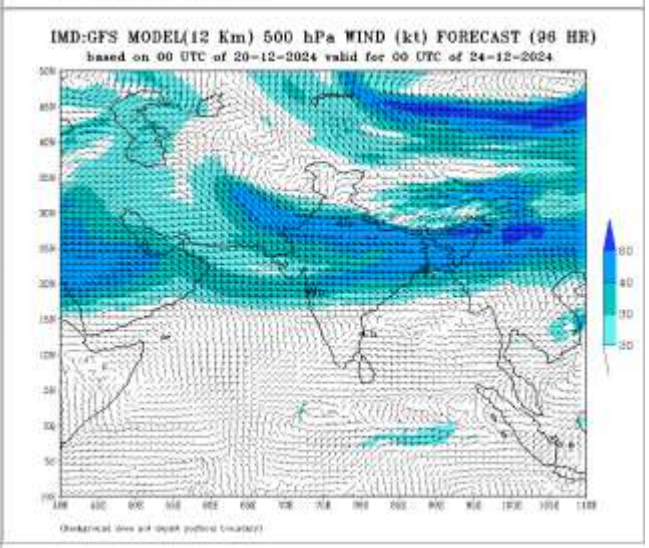
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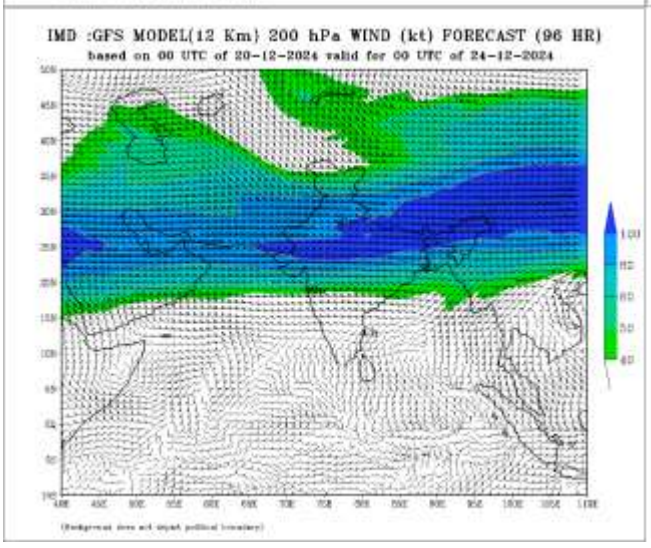
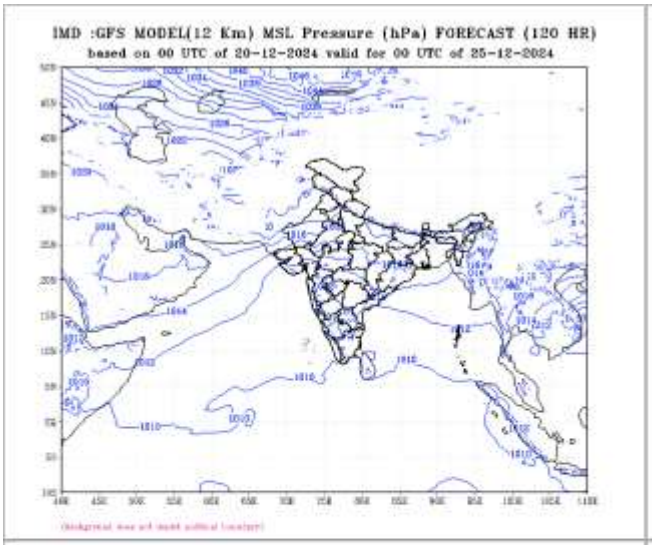
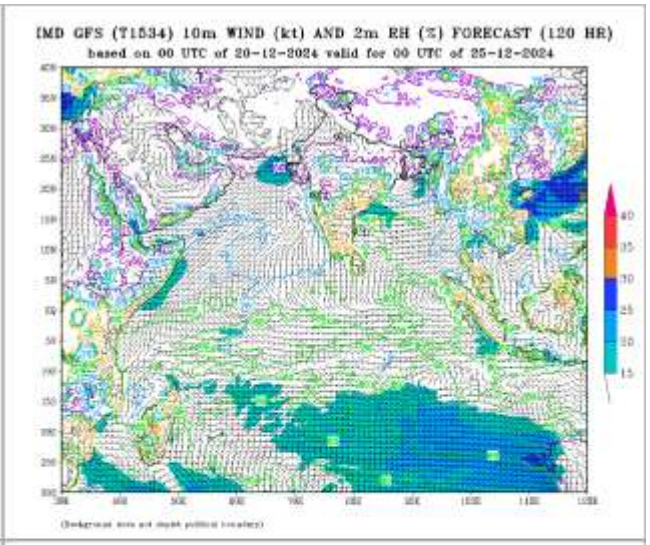
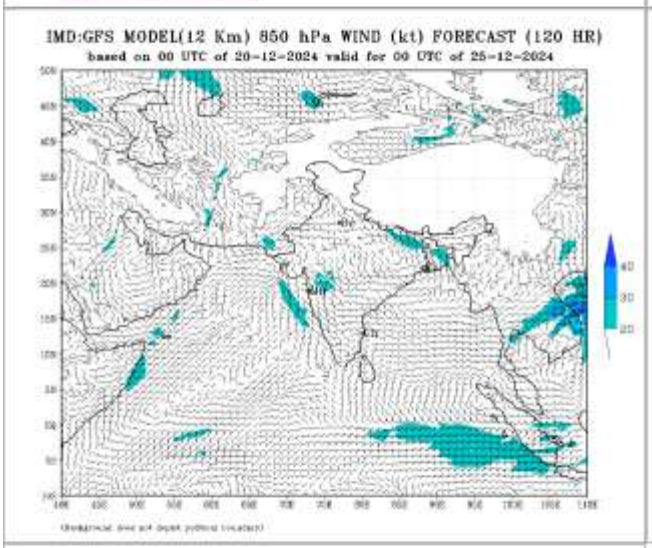
based on 00 UTC of 20-12-2024 valid for 00 UTC of 24-12-2024


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 24-12-2024


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 25-12-2024


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 25-12-2024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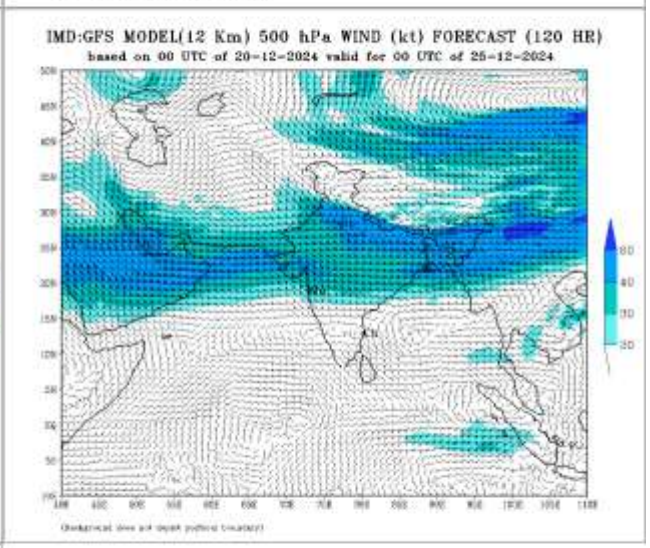
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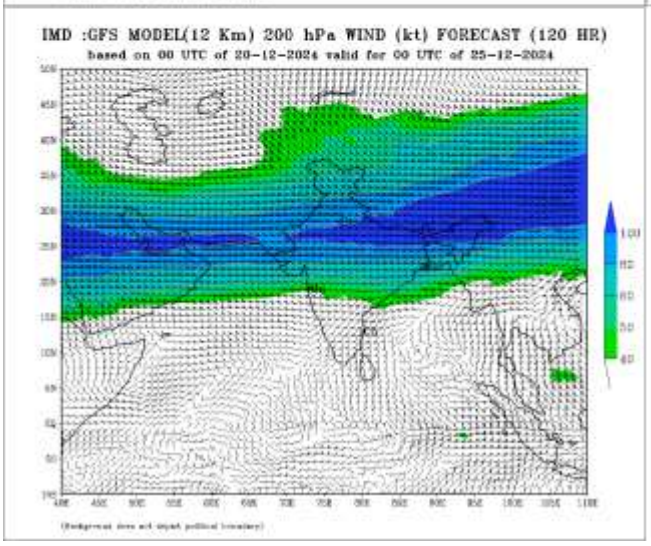
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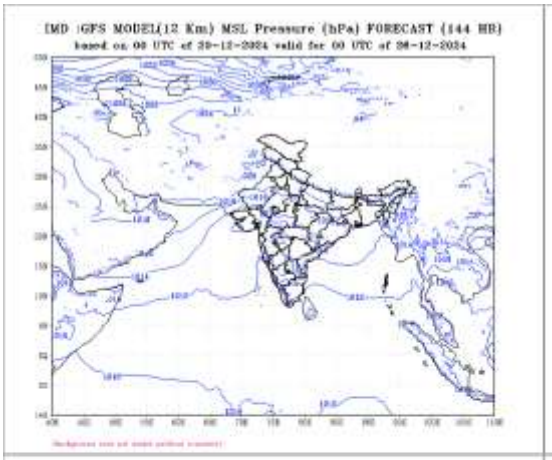
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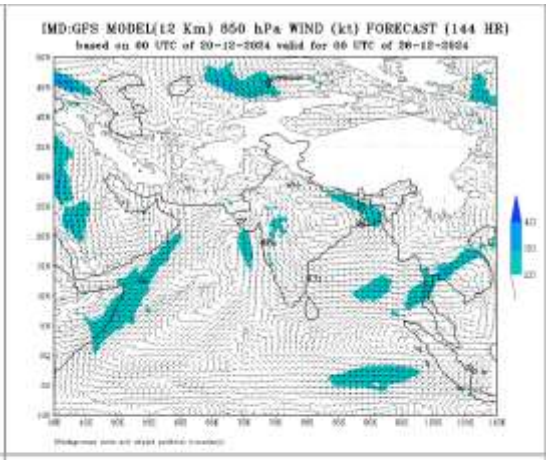
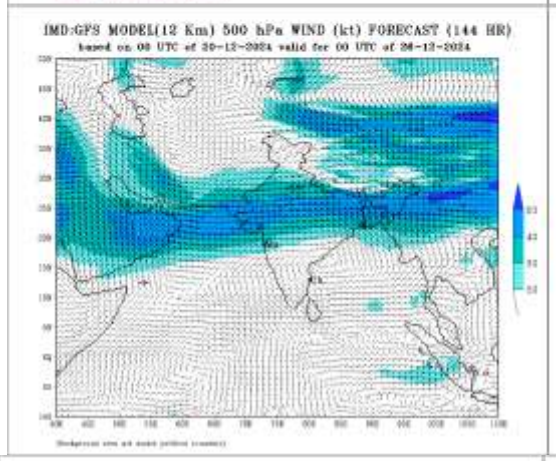
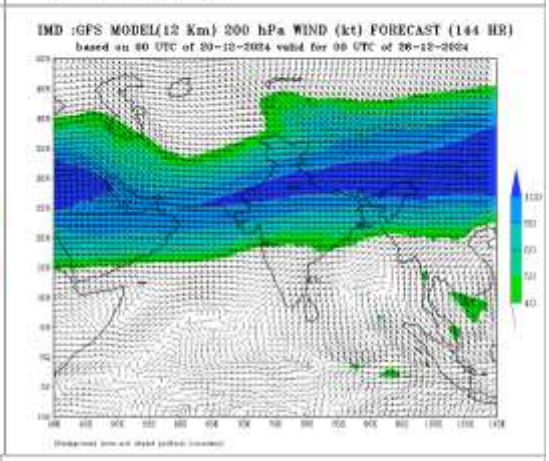
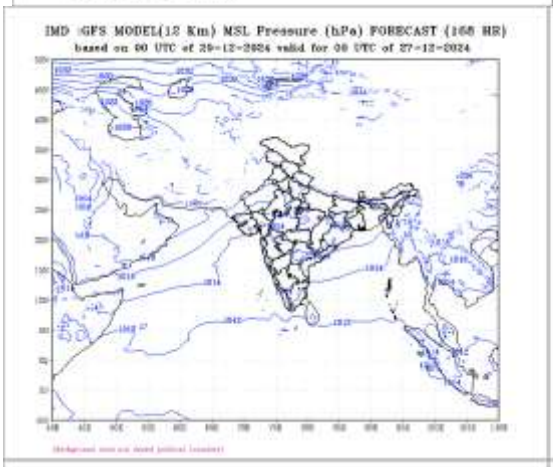
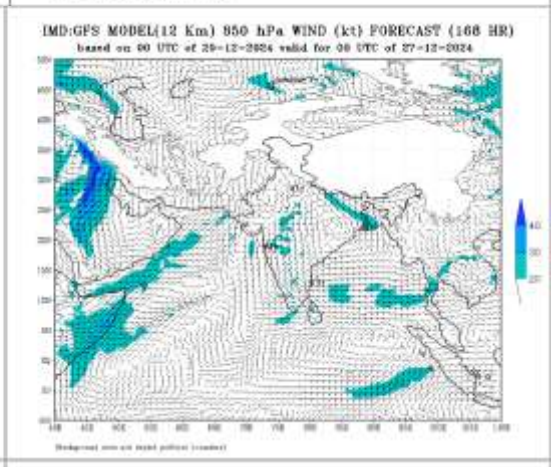
based on 00 UTC of 20-12-2024 valid for 00 UTC of 26-12-2024

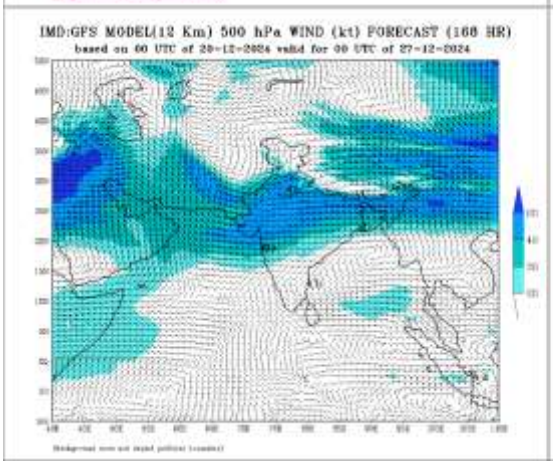

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 26-12-2024

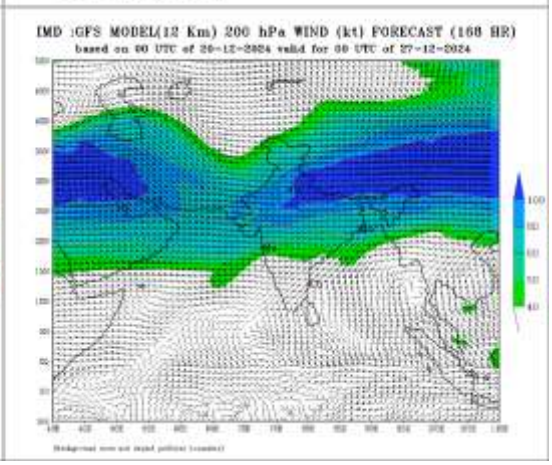

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 20-12-2024 valid for 00 UTC of 26-12-2024


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


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


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


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


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