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

Tropical Cyclone Forecast Programme
Report Dated 16th December 2024

Time of Issue: 1200 UTC

Synoptic features (based on 0300 UTC analysis):

- Under the influence of yesterday's upper air cyclonic circulation over south Andaman Sea and adjoining south east Bay of Bengal, a low-pressure area is formed over central parts of south Bay of Bengal at 0300 UTC of today the 16th December, 2024 and associated cyclonic circulation extended up to 3.1 km above mean sea level. It is likely to become more marked and move west-northwestwards towards Tamil Nadu coast during the subsequent two days.

  A continuous watch is being maintained for further intensification and movement of the system.

- Yesterday's upper air Circulation over Lakshadweep and adjoining south east Arabian Sea lay over southeast Arabian Sea and adjoining Lakshadweep area extended up to 3.1 km above mean sea level and persists at 0300 UTC of today, the 16th December, 2024.

Environmental Features based on 0300 UTC:

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	➢ 26-28°C over some parts of north BoB and along Andhra Pradesh coast. ➢ 28-30°C over rest of BoB	➢ 28-30°C over southeast & eastcentral AS and adjoining areas. ➢ 25-28°C over rest of AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	➢ 130-200 over north BoB and adjoining east central BoB. ➢ 110-160 over Andaman Sea. ➢ 100-120 over southeast BoB and adjoining southern parts of southwest BoB. ➢ 20-30 over northern parts of southwest BoB and adjoining westcentral BoB off Sri Lanka coast. ➢ 60-80 over rest of BoB.	➢ 100-120 over southern parts of southeast AS, Maldives Islands, Lakshadweep Islands and adjoining EIO. ➢ 20-60 over rest AS.
Cyclonic Relative - vorticity (X10^{-6}s^{-1})	➢ 40-50 over central parts of south BoB extending upto 500 hPa level.	➢ 40-50 over southern parts of southeast AS and adjoining southwest AS & adjoining EIO.
Low-Level	➢ 05-15 over north	➢ 5-10 over southcentral parts

convergence ($X10^{-5}$ s^{-1})	Andaman Sea and adjoining areas. ➢ 5 over some parts of southwest BoB off Sri Lanka coast & adjoining EIO.	of south AS and adjoining EIO.
Upper-Level divergence ($X10^{-5}$ s^{-1})	➢ 05-10 over eastcentral, South Andaman Sea & adjoining areas and some parts of southwest BoB off Sri Lanka coast.	➢ 05 over central parts of south AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	➢ High over north & adjoining eastcentral BoB, extreme south BoB and northern parts of north Andaman Sea. ➢ Low-Moderate over rest of BoB.	➢ High over north and adjoining central AS off Oman, Yemen & Somalia coasts. ➢ Low-Moderate over rest of AS.
Wind Shear Tendency (knots)	➢ Decreasing over westcentral BoB & north Andaman Sea. ➢ Increasing over southern parts of southeast BoB.	➢ Decreasing over some parts of southwest AS & adjoining southeast AS and Comorin area. ➢ Increasing over southeast AS, Lakshadweep islands area and adjoining areas.
Upper tropospheric Ridge	➢ At 15^0 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 embedded intense to very intense convection lay over south adjoining central Bay of Bengal and Andaman Sea (minimum CTT minus 70-80 deg cel). Scattered low and medium clouds with embedded moderate to intense convection lay over north Andaman Sea & Tenasserim coast.

b) Over the Arabian Sea:
Scattered low and medium clouds with embedded intense to very intense convection lay over south Arabian Sea and Maldives (minimum CTT minus 70-80 deg cel). Scattered low and medium clouds with embedded isolated weak to moderate convection lay over Lakshadweep Island Area, Maldives & Comorin Area.

c) Outside India:
Scattered low & medium clouds with embedded moderate to intense convection over Sri Lanka, Palk Strait, Gulf of Mannar, Maldives, Tibet China, East China Sea, Taiwan, South Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea, Philippines, Sulu Sea, West Madagascar,

Mozambique channel and over Indian Ocean between latitude 5.0N to 15.0S longitude 40.0E to 120.0E.

M.J.O. Index:

MJO is currently in phase 5 with amplitude greater than 1. It will be in same phase till 18th December with amplitude greater than 1 afterwards it will be in phase 6 with amplitude greater than 1.

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	The model is indicating a Low Pressure area (LPA) over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA around 17th/00 UTC. Then it will move in the same direction and cross Tamil Nadu coast on 19th as LPA, less marked thereafter.	Model indicates extended cyclonic circulation over southcentral parts of south Bay of Bengal having west-southwestwards movement without intensification.
IMD-GEFS	The model is indicating a Low Pressure area (LPA) over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA around 17th/00 UTC. Then it will move in the same direction and cross Tamil Nadu coast on 19th as LPA, less marked thereafter.	Model indicates extended cyclonic circulation over southcentral parts of south Bay of Bengal having west-southwestwards movement without intensification.
IMD-WRF	The model is indicating a Low Pressure area (LPA) over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA around 17th/00 UTC. Then it will move in the same direction and cross Tamil Nadu coast on 19th as LPA.	Model indicates no significant system over Arabian Sea during next 3 days.
NCMRWF-NCUM(G)	The model is indicating cyclonic circulation over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA on 18th. Then it will move in the same direction touch the Tamil Nadu coast as LPA on 20th, it will then move along the coast till 22nd while weakening.	Model indicates no significant circulation over Arabian Sea.
NCMRWF-NCUM(R)	The model is indicating an extended low over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA around 18th/00 UTC. Moving in the same direction and touch Tamil Nadu coast as LPA on 19th.	Model indicates no significant cyclonic circulation over Arabian Sea during next 3 days

NCMRWF-NEPS	The model is indicating cyclonic circulation over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA on 18th. Then it will move in the same direction touch the Tamil Nadu coast as LPA on 20th, it will then move along the coast till 22nd while weakening.	Model indicates no significant cyclonic circulation over Arabian Sea.
ECMWF	The model is indicating a LPA over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as LPA on 17th. Moving in the same direction and touch the Tamil Nadu coast as LPA on 20th, it will then move along the coast and becoming less marked. n	Model indicates extended cyclonic circulation over southeast Arabian Sea having west-southwestwards movement without intensification.
NCEP-GFS	The model is indicating a Low Pressure area (LPA) over central parts of south Bay of Bengal as of today, 16th December, it will have west-northwestwards movement and lay over southwest Bay of Bengal as depression around 18th/00 UTC. Then it will move in the same direction and will intensify into DD/CS around 19th/00 UTC, thereafter, it will recurve and move towards Myanmar coast with slight intensification till 21st/00 UTC, weakening thereafter.	Model indicates extended cyclonic circulation over southeast Arabian Sea having west-southwestwards movement without intensification.

Summary:

(a) Bay of Bengal:
All the models are indicating a low pressure area over central parts of south Bay of Bengal as on today the 16th, all the models are indicating its west-northwestwards movement. NCUM and ECMWF models are indicating the system will reach the Tamil Nadu coast as LPA and then its movement along the coast without getting intensified further. NCEP-GFS model is indicating its intensification upto cyclonic storm over southwest Bay of Bengal on 19th and its recurving towards Myanmar coast thereafter.

(b) Arabian Sea
Most of the models are indicating an extended cyclonic circulation over southeast Arabian Sea having west-southwestwards movement without intensification.

Inference:

- Under the influence of yesterday's upper air cyclonic circulation over south Andaman Sea and adjoining south east Bay of Bengal, a low-pressure area is formed over central parts of south Bay of Bengal at 0300 UTC of today the 16th December, 2024 and associated cyclonic circulation extended up to 3.1 km above mean sea level. It is likely to become more marked and move west-northwestwards towards Tamil Nadu coast during the subsequent two days.

A continuous watch is being maintained for further intensification and movement of the system.

- Yesterday's upper air Circulation over Lakshadweep and adjoining south east Arabian Sea lay over southeast Arabian Sea and adjoining Lakshadweep area extended up to 3.1 km above mean sea level and persists at 0300 UTC of today, the 16th December, 2024.

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	NIL	NIL

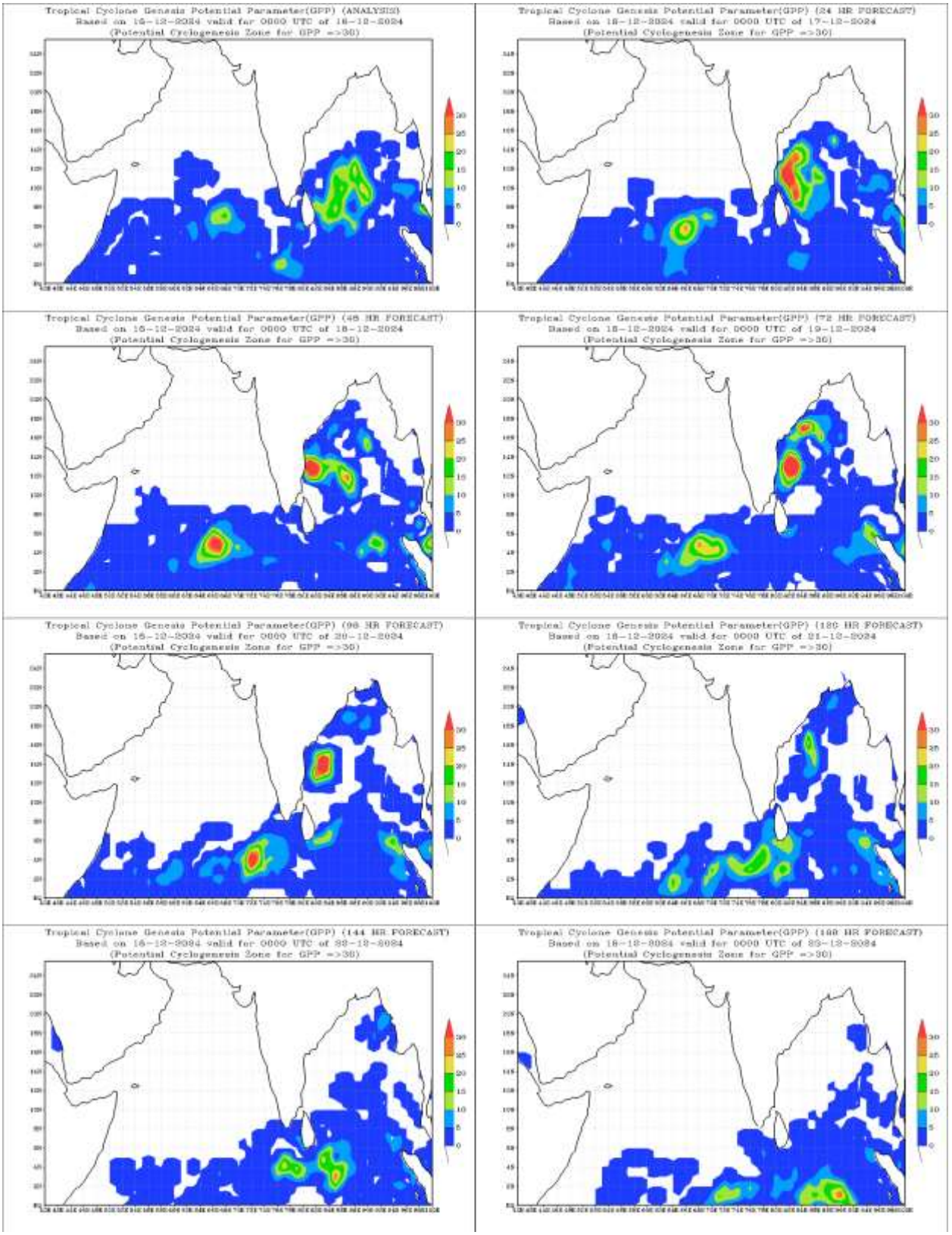
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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 16-12-2024 valid for 0000 UTC of 16-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 17-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 18-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 19-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 20-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 21-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 16-12-2024 valid for 0000 UTC of 22-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
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Based on 16-12-2024 valid for 0000 UTC of 23-12-2024
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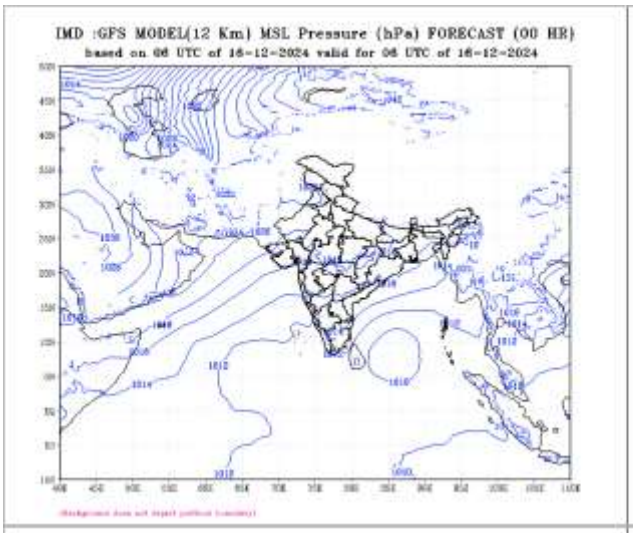
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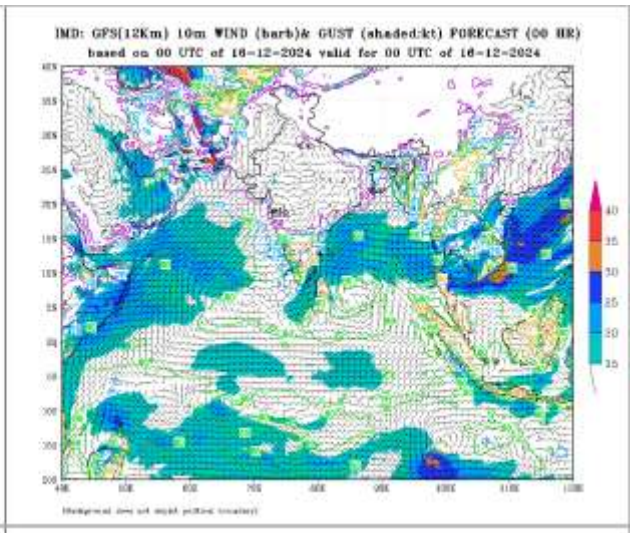
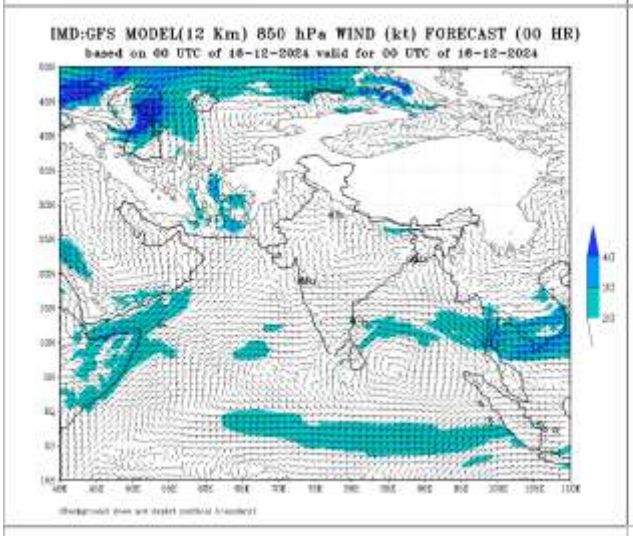
based on 06 UTC of 16-12-2024 valid for 06 UTC of 16-12-2024


IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (00 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 16-12-2024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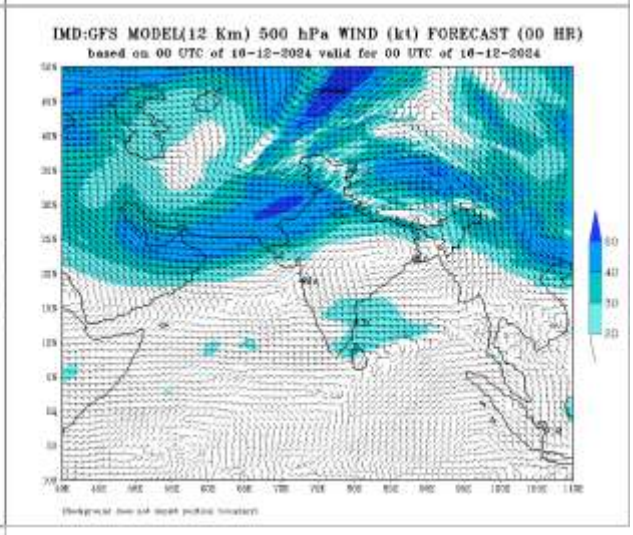
based on 00 UTC of 16-12-2024 valid for 00 UTC of 16-12-2024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based on 00 UTC of 16-12-2024 valid for 00 UTC of 16-12-2024


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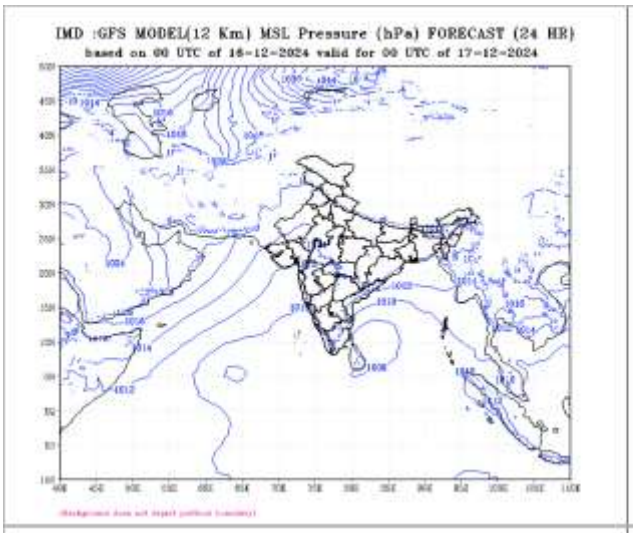
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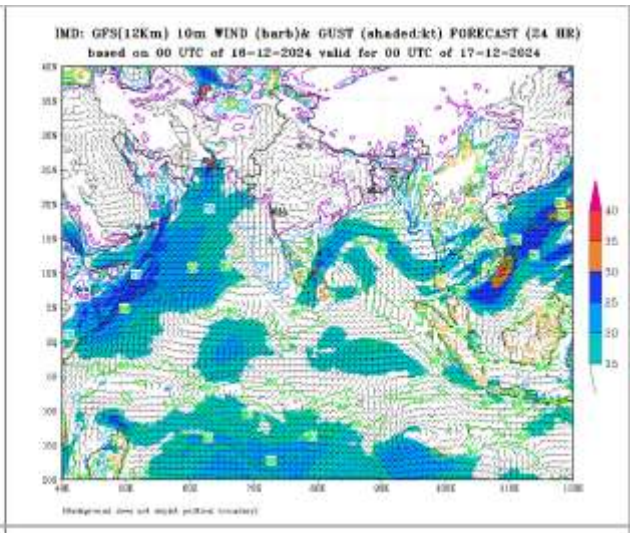
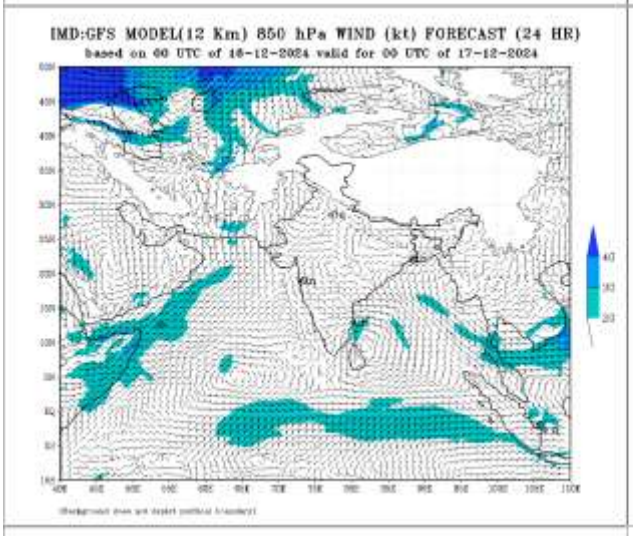
based on 00 UTC of 16-12-2024 valid for 00 UTC of 17-12-2024


IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (24 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 17-12-2024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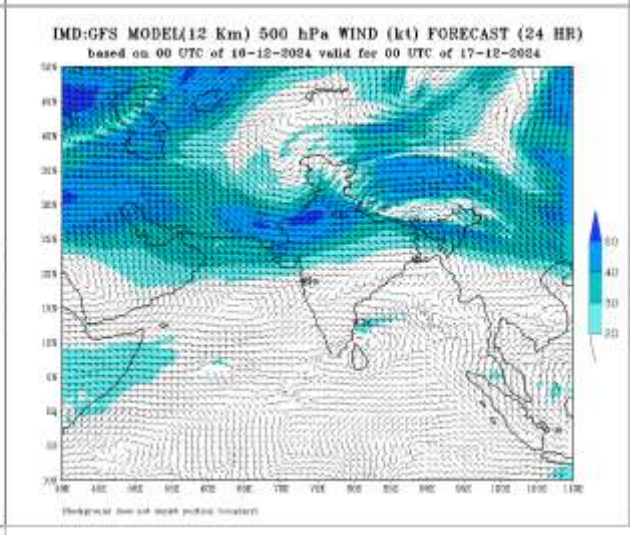
based on 00 UTC of 16-12-2024 valid for 00 UTC of 17-12-2024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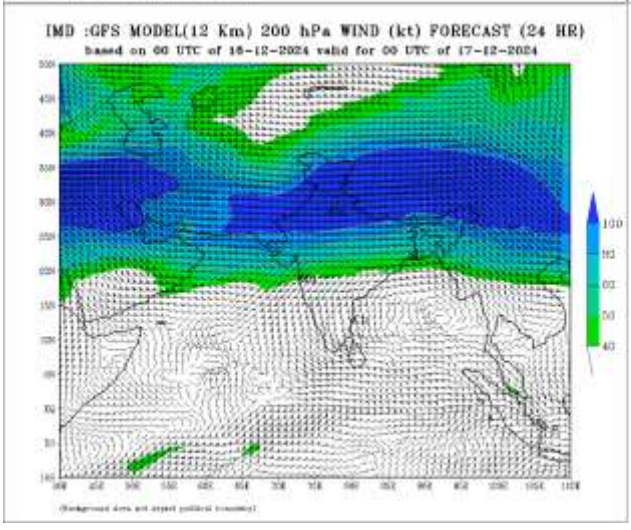
based on 00 UTC of 16-12-2024 valid for 00 UTC of 17-12-2024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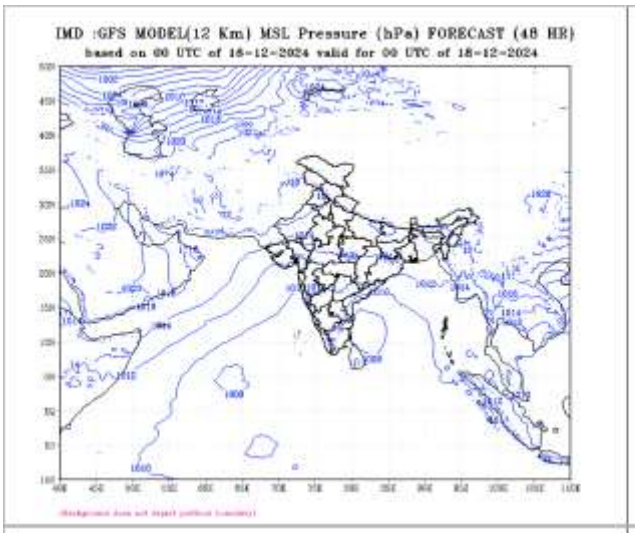
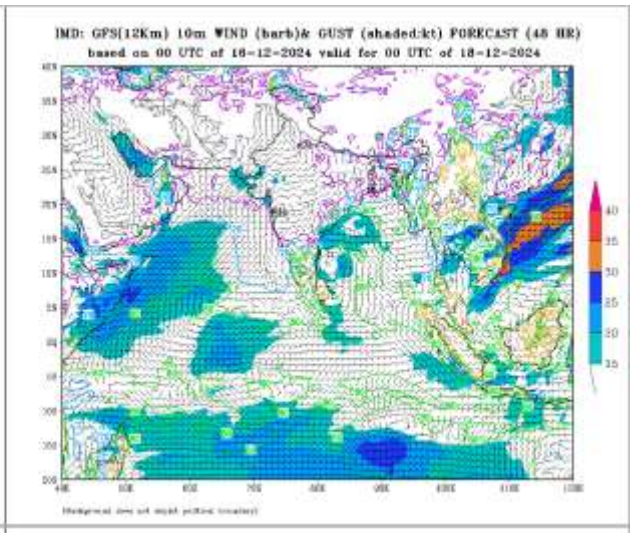

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 18-12-2024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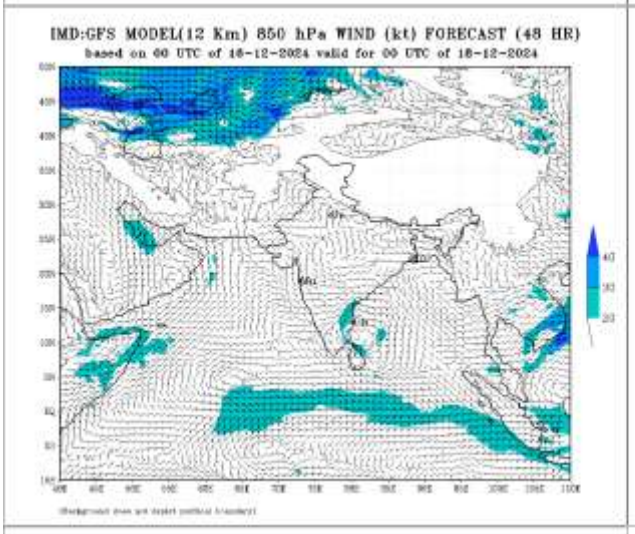
based on 00 UTC of 16-12-2024 valid for 00 UTC of 18-12-2024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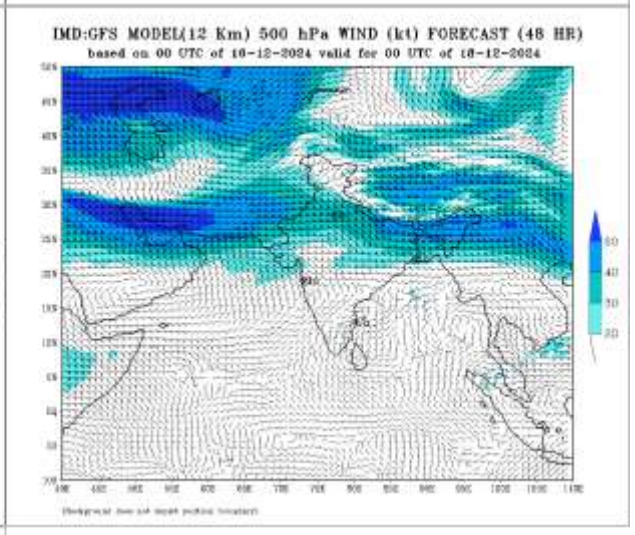
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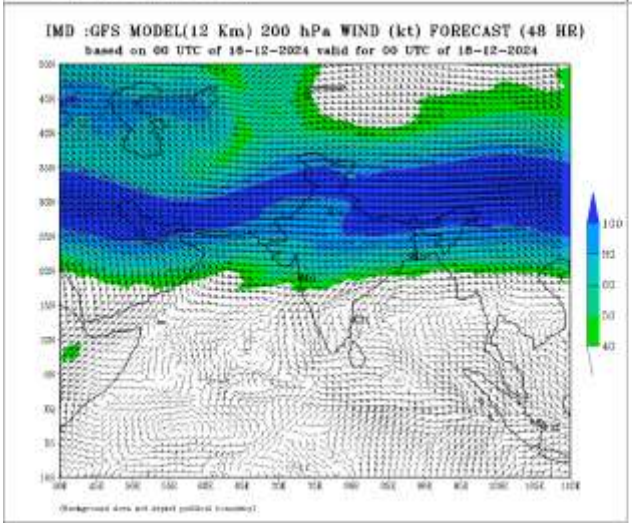
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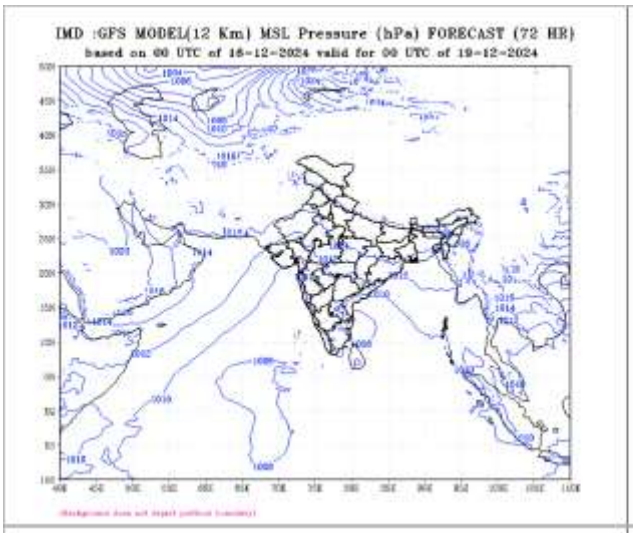
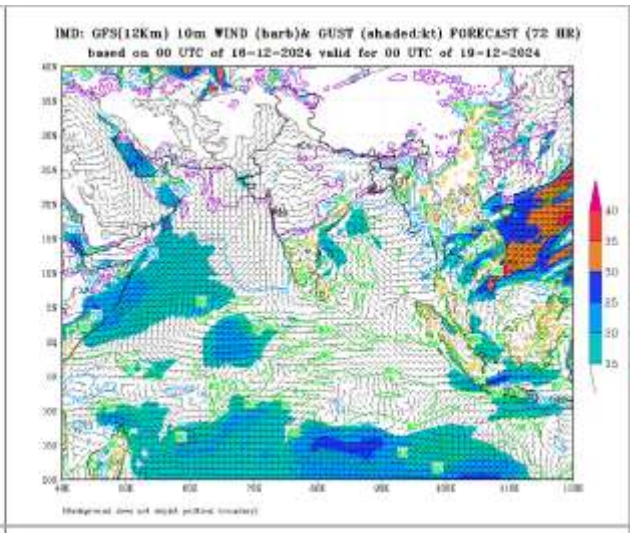

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 19-12-2024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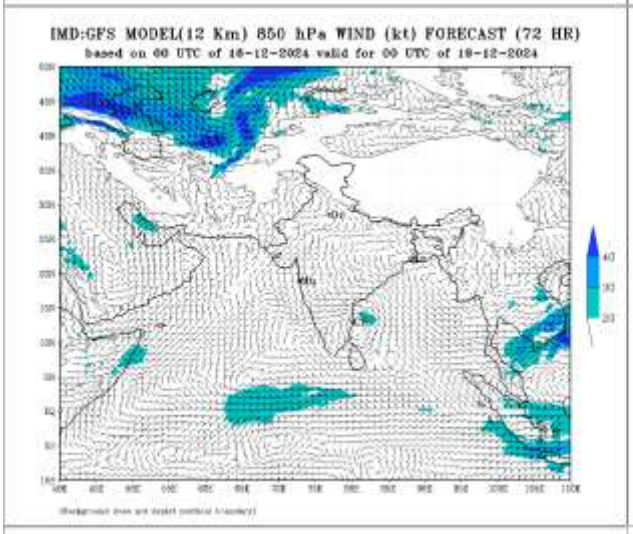
based on 00 UTC of 16-12-2024 valid for 00 UTC of 19-12-2024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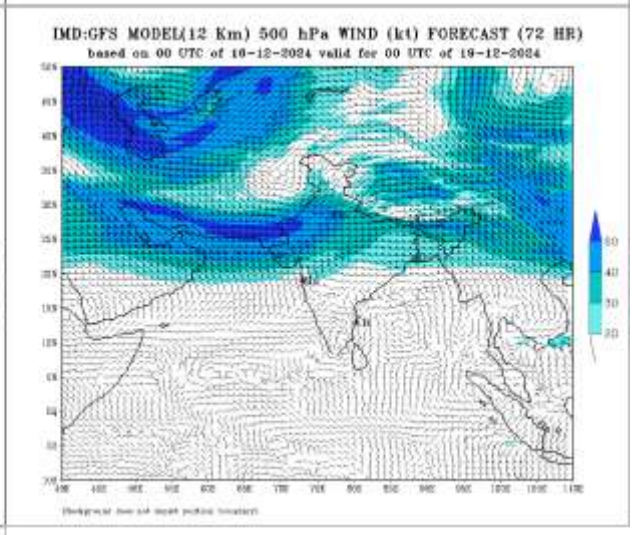
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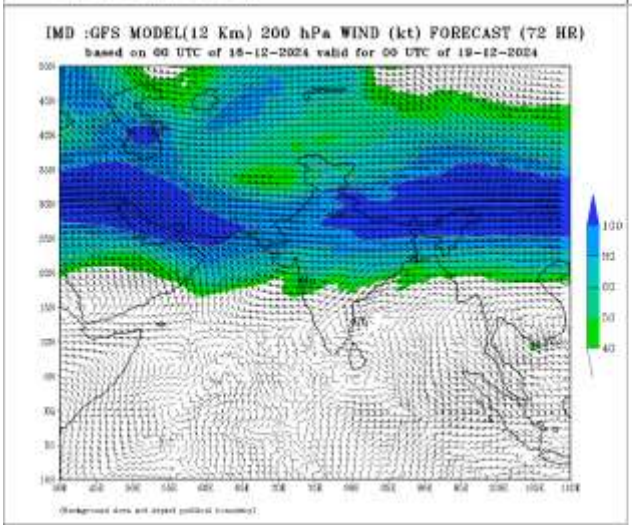
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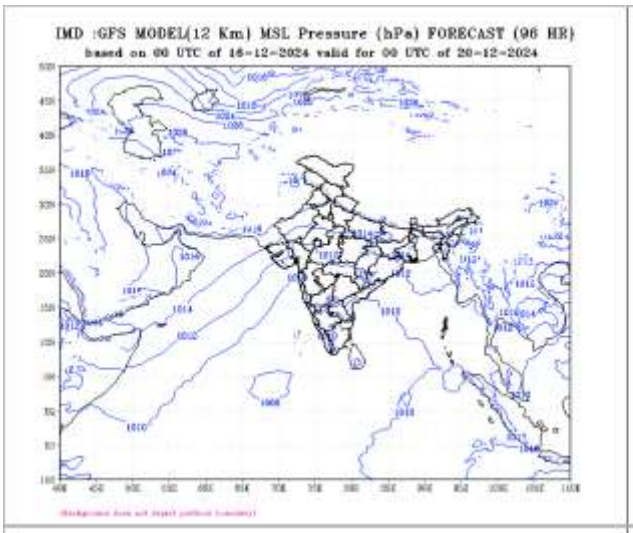
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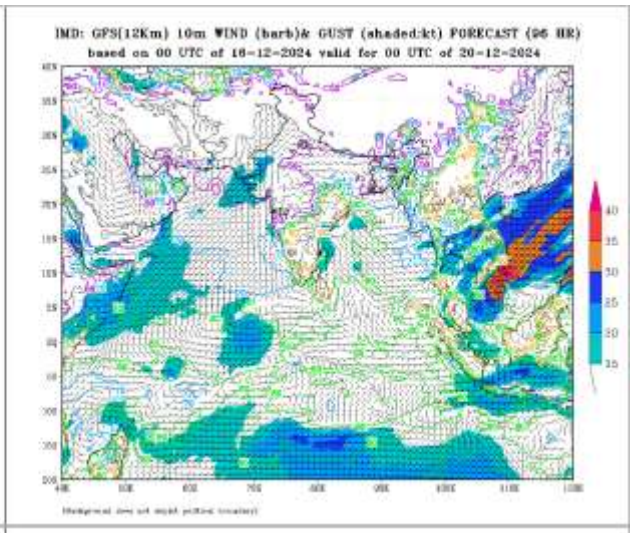
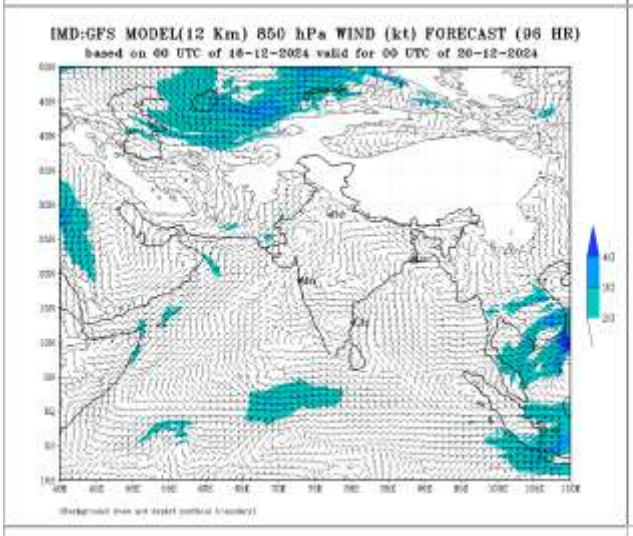
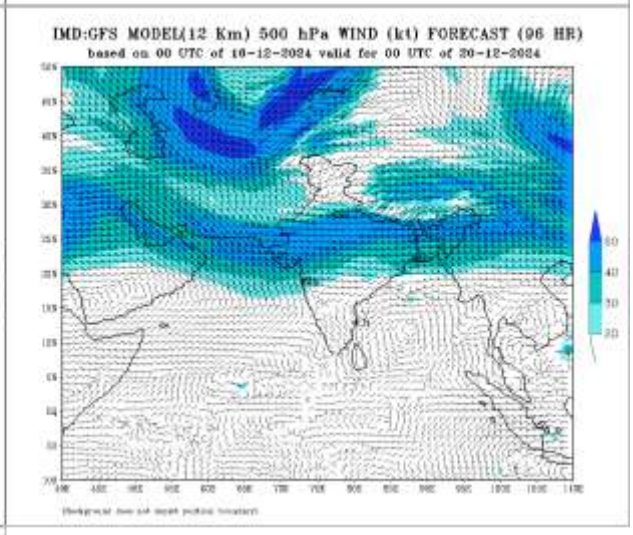
based on 00 UTC of 16-12-2024 valid for 00 UTC of 20-12-2024


IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (96 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 20-12-2024


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 20-12-2024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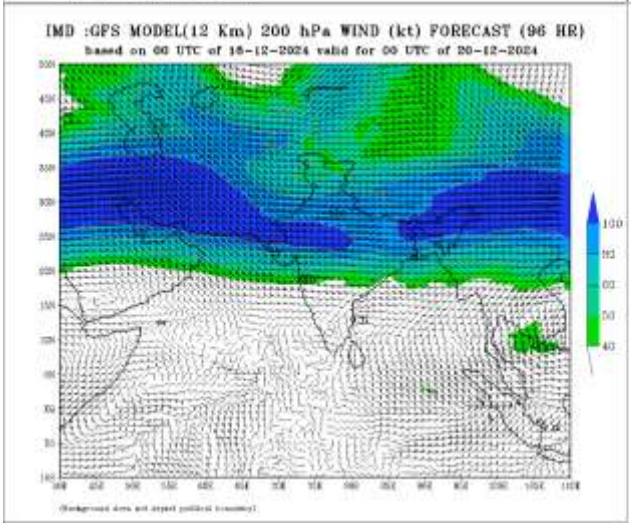
based on 00 UTC of 16-12-2024 valid for 00 UTC of 20-12-2024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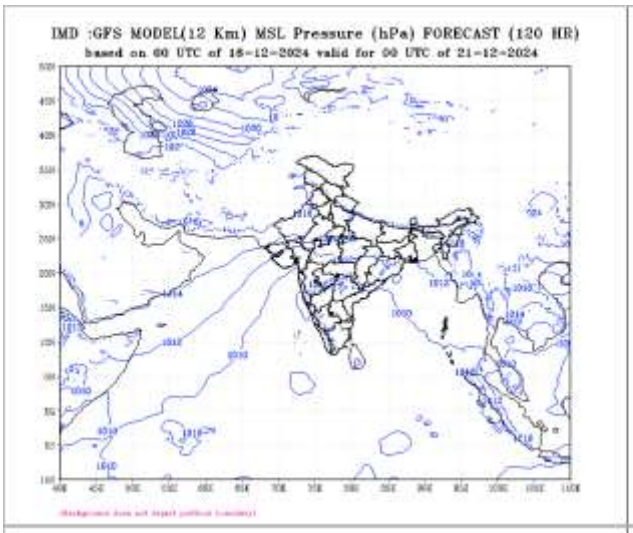
based on 00 UTC of 16-12-2024 valid for 00 UTC of 20-12-2024


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
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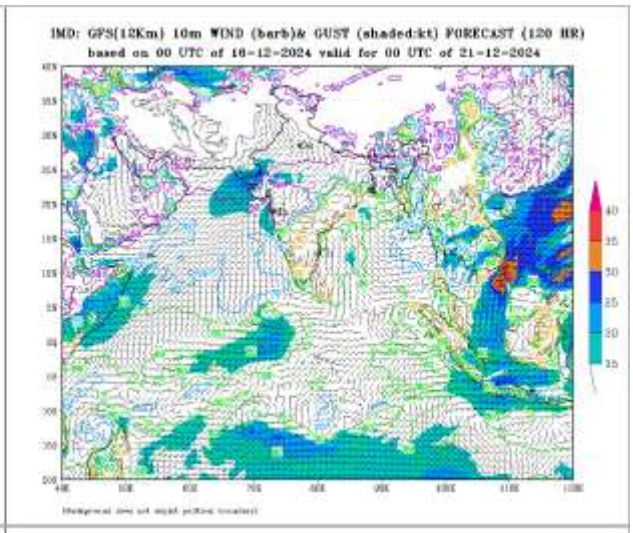
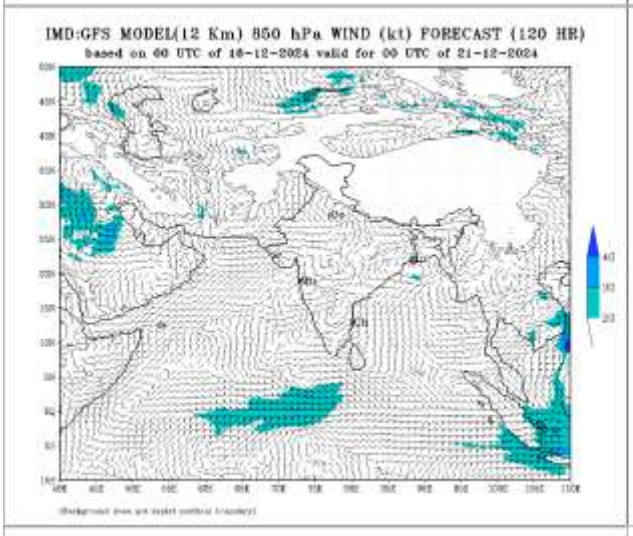
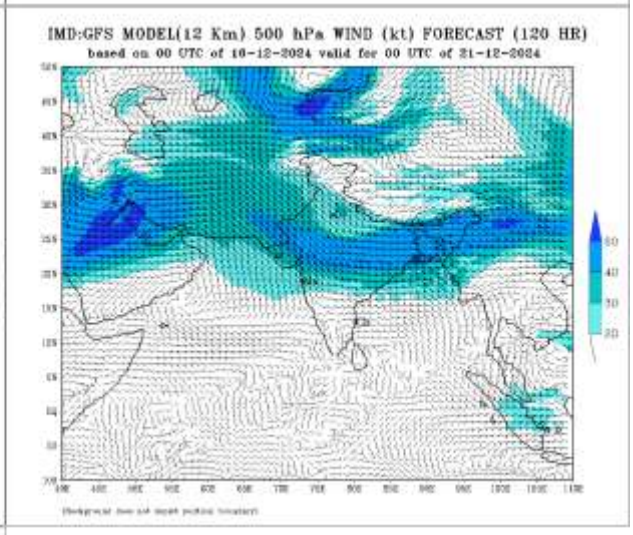
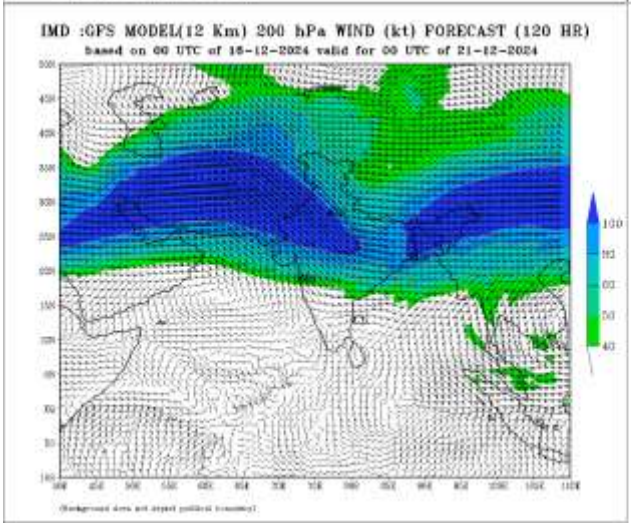
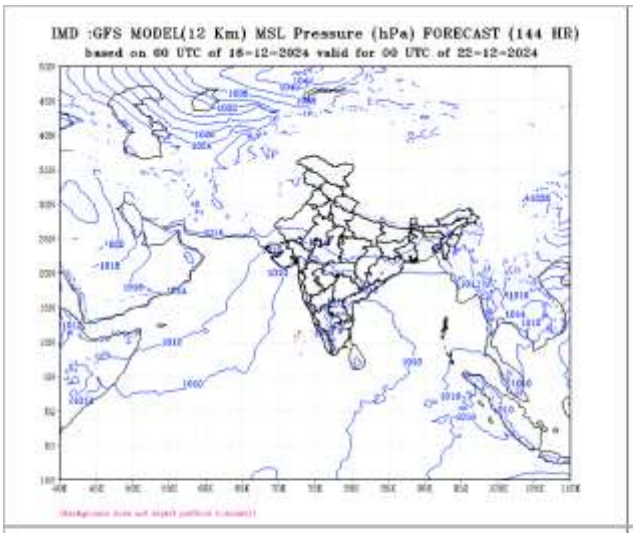
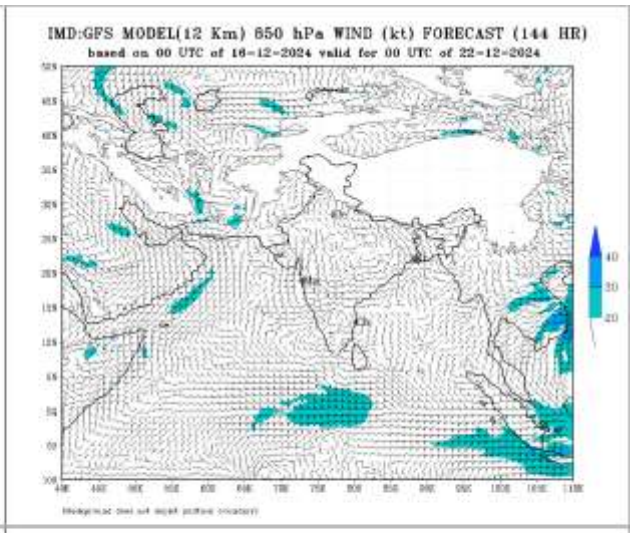

IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (120 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 21-12-2024

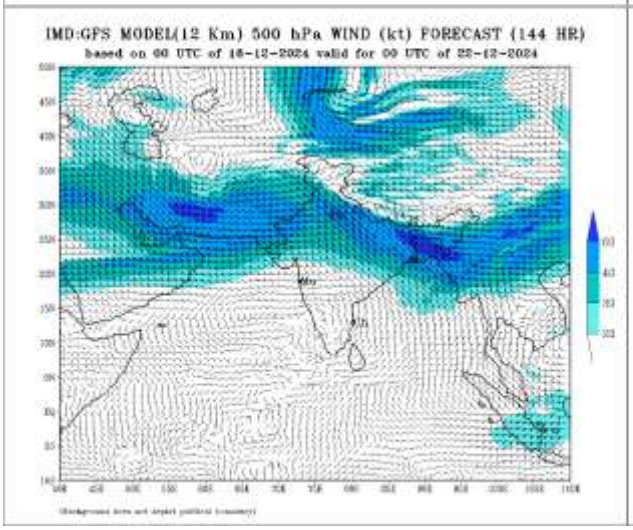

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 21-12-2024

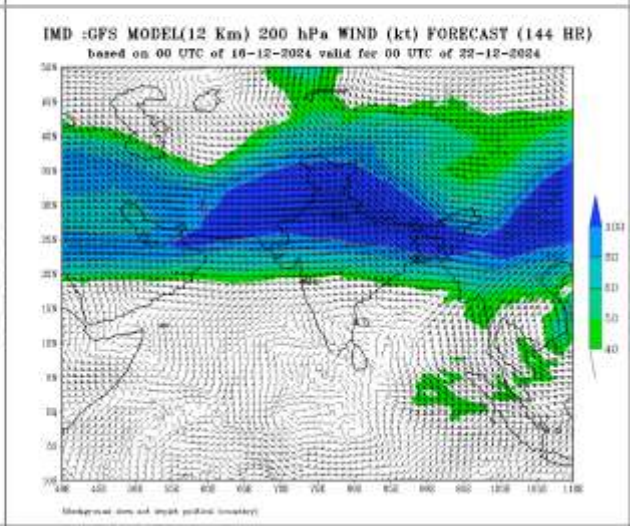

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 21-12-2024

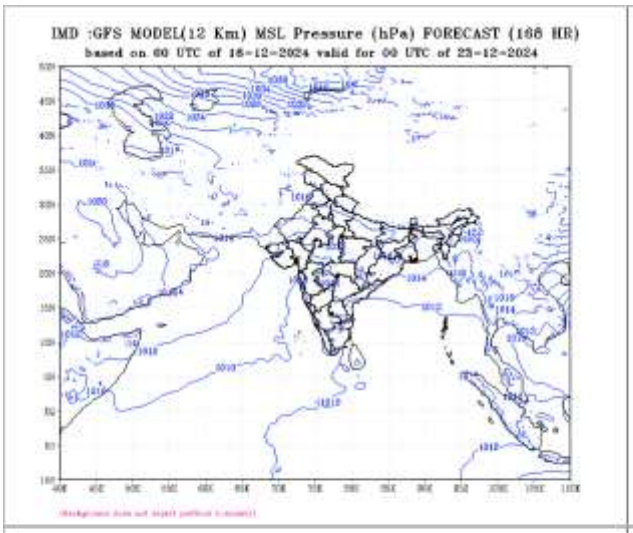

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 21-12-2024

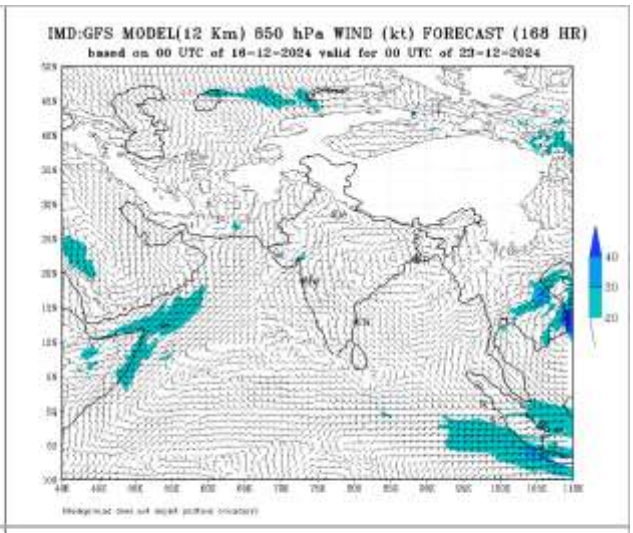

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 22-12-2024

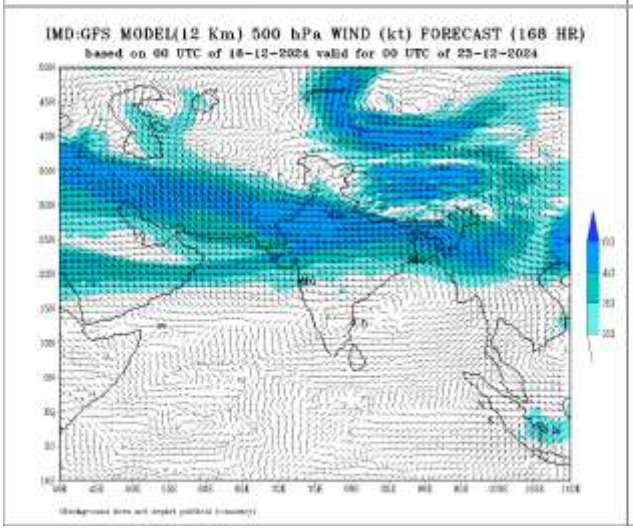

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 22-12-2024

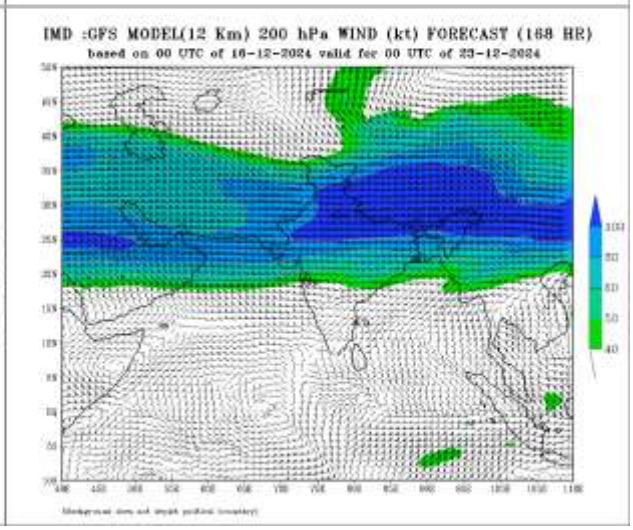

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 22-12-2024


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 22-12-2024


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 23-12-2024


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 23-12-2024


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 23-12-2024


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 16-12-2024 valid for 00 UTC of 23-12-2024