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

Tropical Cyclone Forecast Programme
Report Dated 14th December 2024

Time of Issue: 1200 UTC

Synoptic features (based on 0300 UTC analysis):

- Yesterday's upper air cyclonic circulation over central parts of Andaman Sea and adjoining Gulf of Thailand lay over south Andaman Sea and adjoining areas at 0300 UTC of today 14th December, 2024 and extends upto 3.1 km above mean sea level. Under its influence, a low-pressure area is likely to form over southeast Bay of Bengal around 15th December. Thereafter, it is likely to become more marked and move west-northwestwards towards Tamil Nadu coast during subsequent two days.

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

- Yesterday's low-pressure area over Lakshadweep & adjoining Maldives area persists over the same region at 0300 UTC of today, the 14th December, 2024. The associated upper air cyclonic circulation extends upto 5.8 km above mean sea level. It is likely to move westwards and become less marked during the next 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 extreme north BoB. ➢ 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	➢ 130-190 over north BoB and adjoining east central BoB. ➢ 110-150 over Andaman Sea. ➢ 100-120 over southeast BoB and adjoining areas 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 southeast AS, Maldives Islands, Lakshadweep Islands and adjoining EIO. ➢ 20-60 over rest AS.
Cyclonic Relative - vorticity (X10^{-6}s^{-1})	➢ 40-50 over south & adjoining north Andaman Sea and on & off Sri Lanka coast.	30-40 over Gulf of Mannar, Comorin area and south Lakshadweep Islands & adjoining areas.
Low-Level convergence	➢ 10-15 over Andaman Sea.	➢ 10-15 over Comorin area and Lakshadweep areas.

($X10^{-5}$ s^{-1})		➢ 5-10 over central parts of south AS.
Upper-Level divergence ($X10^{-5}$ s^{-1})	➢ 20-30 over Andaman Sea & adjoining areas	➢ 05-10 over Comorin area and Lakshadweep areas.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	➢ High over north, westcentral and extreme south BoB. ➢ Low-Moderate over rest of BoB.	➢ High over north AS. ➢ Low-Moderate over central AS
Wind Shear Tendency (knots)	➢ Increasing over southwest BoB. ➢ Decreasing over Andaman Sea.	➢ Decreasing over lakhshadweep most parts of AS
Upper tropospheric Ridge	➢ At 11^0 N.	➢ At 15^0 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 eastcentral and southeast Bay of Bengal, Andaman Sea and Tenasserim coasts. Scattered low and medium clouds with embedded moderate to intense convection lay over southwest Bay of Bengal.

b) Over the Arabian Sea:
Scattered low and medium clouds with embedded moderate to intense convection lay over south Arabian Sea, Lakshadweep Island area, Maldives and Comorin area. Scattered low and medium clouds with embedded isolated weak to moderate convection lay over northwest & central Arabian Sea.

c) Outside India:
Scattered low & medium clouds with embedded moderate to intense convection over Sri Lanka, Palk Strait, Gulf of Mannar, Maldives, Pakistan, China, 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, Madagascar and over Indian Ocean between latitude 5.0N to 15.0S longitude 50.0E 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 17th December 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 cyclonic circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over	Model indicates extended cycir over Lakshadweep and adjoining areas, having west-southwestwards movement without

	southeast BoB as LPA on 15th. Then it will move in the same direction & lay over southwest BoB as WML/D on 16th. It will move in the same direction and lay over southwest BoB as CS on 17th. It will make landfall along Tamil Nadu coast around 1200 UTC of 17th while weaknening.	intensification.
IMD-GEFS	The model is indicating extended cyclonic circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over southeast BoB as WML on 15th. Then it will move in the same direction & lay over southwest BoB as DD/CS on 16th. Moving in the same direction, and will make landfall along Tamil Nadu coast around 1200 UTC of 17th as an LPA.	Model indicates extended cycir over Lakshadweep and adjoining areas, having west-southwestwards movement without intensification.
IMD-WRF	Model indicates no significant system over BoB during next 3 days.	Model indicates no significant system over AS during next 3 days.
NCMRWF-NCUM(G)	The model is indicating extended cyclonic circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over southeast BoB as LPA on 15th. Then it will move in the same direction & lay over southwest BoB as WML on 16th. Moving in the same direction, and lay over southwest BoB as DD/CS on 17th. Moving in the same direction, and touch the Tamil Nadu coast as DD/CS on 18th. It will cross the coast on 19th as DD and less marked thereafter.	Model indicates extended cycir over Lakshadweep and adjoining areas, having west-southwestwards movement without intensification.
NCMRWF-NCUM(R)	Model indicates no significant system over BoB during next 3 days.	Model indicates no significant system over AS during next 3 days
NCMRWF-NEPS	The model is indicating extended cyclonic circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over southeast BoB as LPA on 15th. Then it will move in the same direction & lay over southwest BoB as WML on 16th. Moving in the same direction, and lay over southwest BoB as DD/CS on17th. Moving in the same direction, and touch the Tamil Nadu coast as DD/CS on 18th. It will cross the coast on 19th as DD and less marked thereafter.	Model indicates extended cycir over Lakshadweep and adjoining areas, having west-southwestwards movement without intensification.
ECMWF	The model is indicating a cyclonic	Model indicates cycir over

	circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over southeast BoB as LPA on 15th. Then it will move in the same direction & lay over southwest BoB as WML on 17th. It will move in the same direction and make landfall along Tamil Nadu coast around 1200 UTC of 18th while weaknening.	Lakshadweep and adjoining areas, having west-southwestwards movement and will become LPA on 16th over southwest & adjoining southeast Arabian Sea, less marked thereafter.
NCEP-GFS	The model is indicating a cyclonic circulation over south Andaman Sea and adjoining southeast BoB as of today, 14th December, it will have west-northwestwards movement and lay over southeast BoB as WML on 15th. Then it will move in the same direction & lay over southwest BoB as CS on 16th. It will move in the same direction and lay over southwest BoB as SCS on 17th. Moving in the same direction, it will make landfall along Tamil Nadu coast around 19th/20th as LPA.	Model indicates cycir over Lakshadweep and adjoining areas, having west-southwestwards movement without intensification.

Summary:

(a) Bay of Bengal:
All the models are indicating a cyclonic Circulation over South Andaman Sea & adjoining southeast Bay of Bengal on 14th, under its influence, a low-pressure area will form on 15th over southeast Bay of Bengal (SWB). All the models are indicating its west-northwestwards movement with further intensification. IMD GFS, IMD GEFS models are indicating WML/D on 16th over SWB, CS on 17th over SWB. NCUM models is indicating WML on 16th over SWB, CS on 17th over SWB. ECMWF is indicating intensification upto WML on 17th over SWB. NCEP GFS is indicating WML on 15th over southeast Bay of Bengal, CS on 16th and SCS on 17th. All the models are indicating the systems' landfall on 18th/19th while weakening.

(b) Arabian Sea
Most of the models are indicating an extended cyclonic circulation over Lakshadweep and adjoining areas, having west-southwestwards movement without intensification. ECMWF is indicating an LPA on 16th over southwest & adjoining southeast Arabian Sea.

Inference:

Yesterday's low-pressure area over Lakshadweep & adjoining Maldives area persists over the same region at 0300 UTC of today, the 14th December, 2024. The associated upper air cyclonic circulation extends upto 5.8 km above mean sea level. It is likely to move westwards and become less marked during the next 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	NIL	NIL	NIL	NIL	NIL	NIL

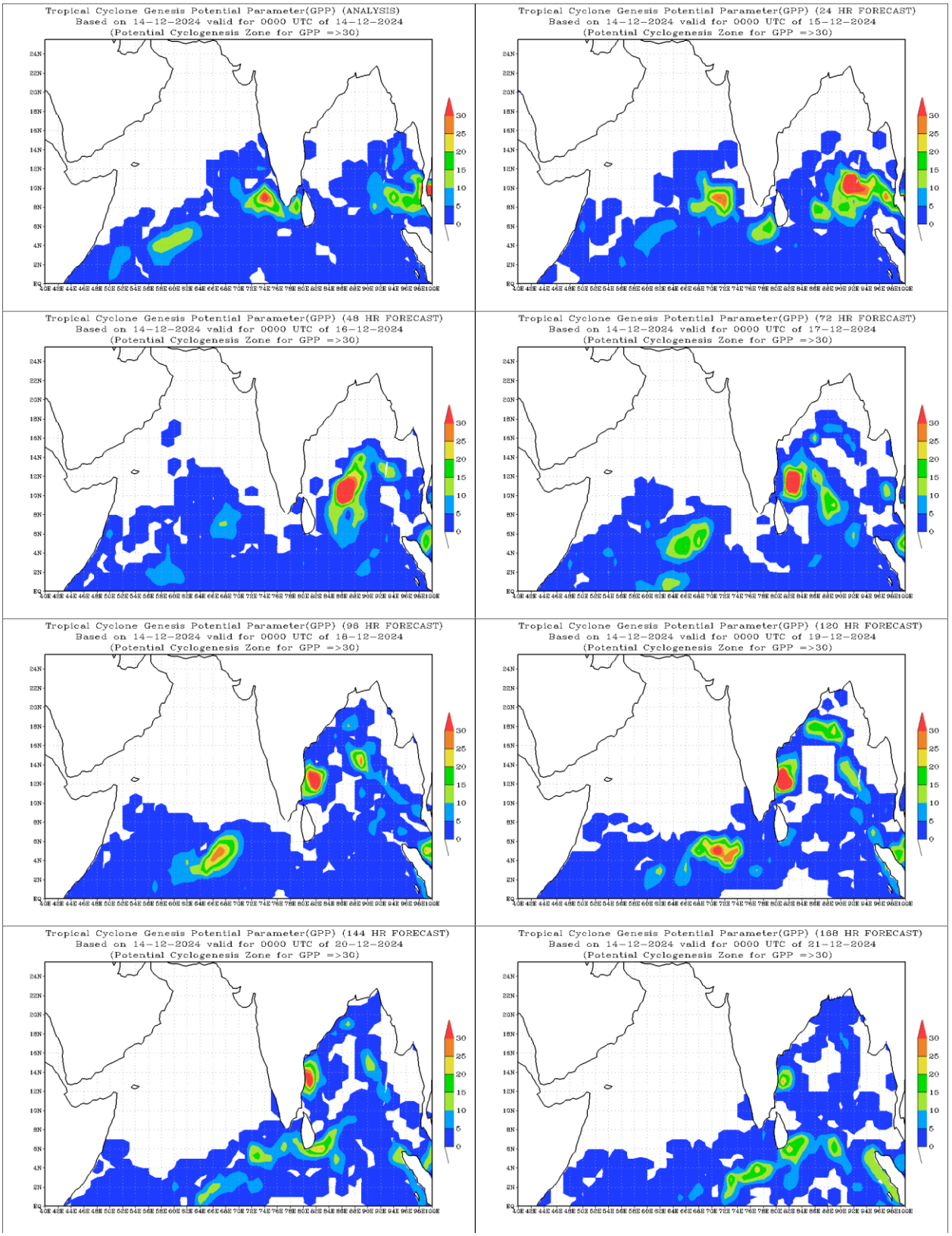
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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 14-12-2024 valid for 0000 UTC of 14-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 15-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 16-12-2024
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Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
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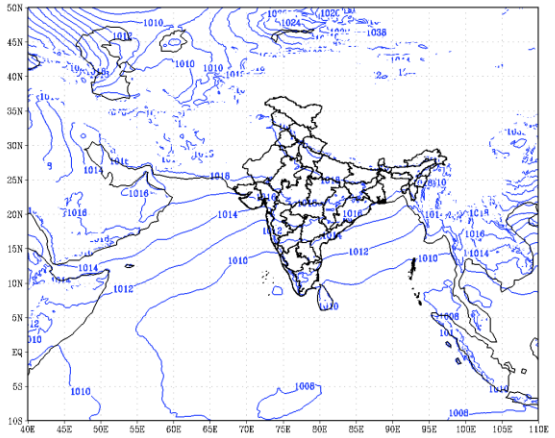
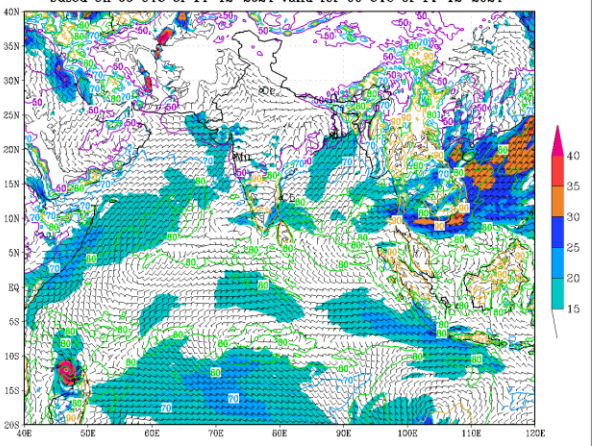
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 18-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 19-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 20-12-2024
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 14-12-2024 valid for 0000 UTC of 21-12-2024
(Potential Cyclogenesis Zone for GPP =>30)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 14-12-2024



(Background does not depict political boundary)

IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (00 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 14-12-2024



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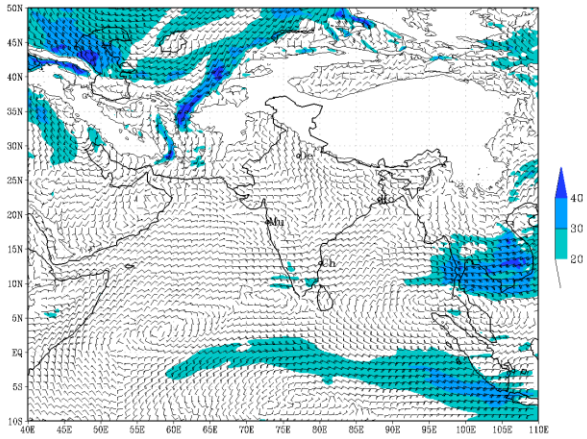

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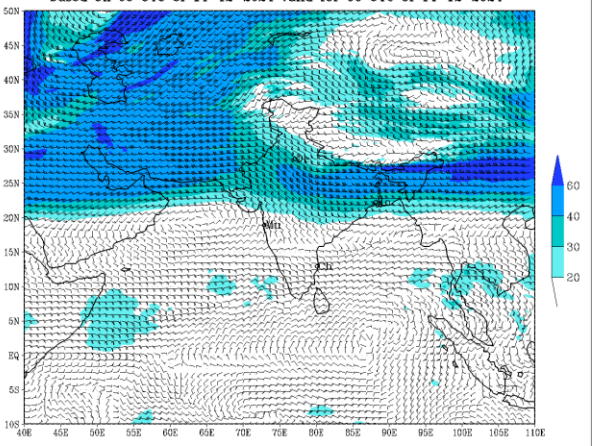

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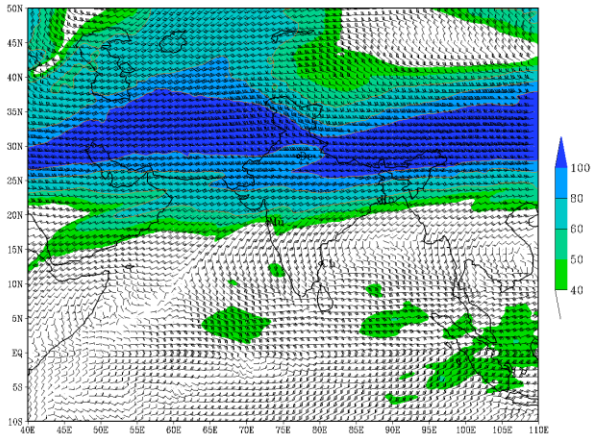

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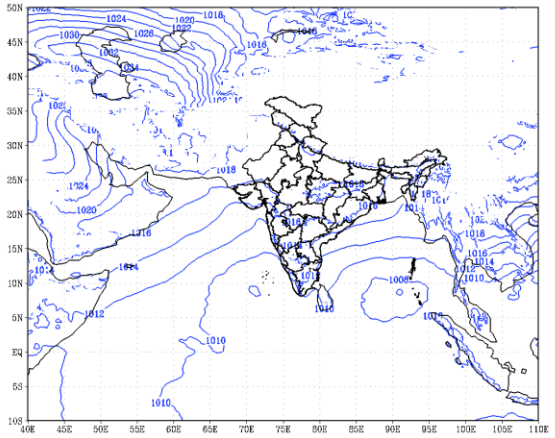
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 15-12-2024



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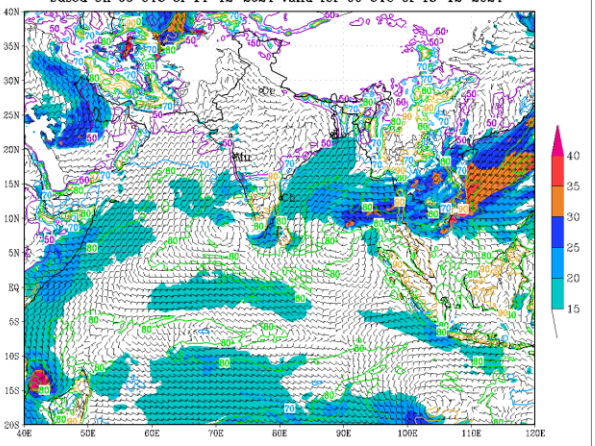

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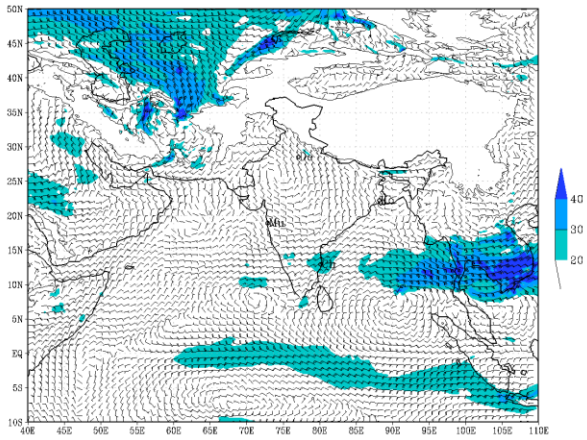

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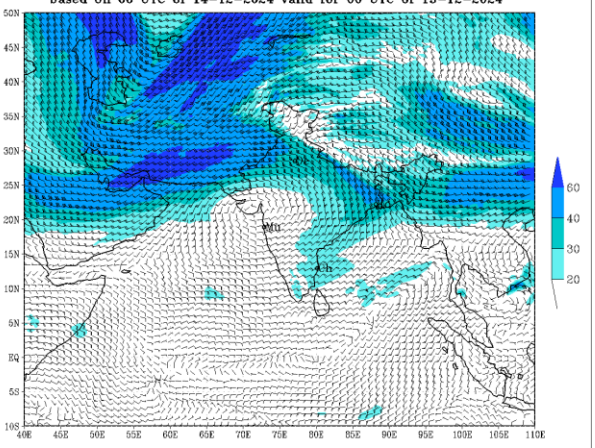

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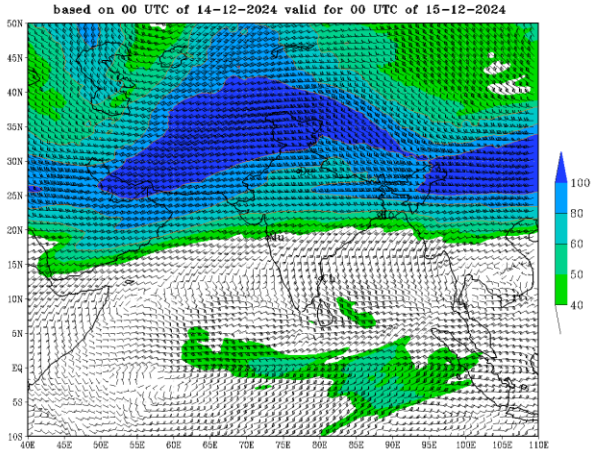
based on 00 UTC of 14-12-2024 valid for 00 UTC of 15-12-2024



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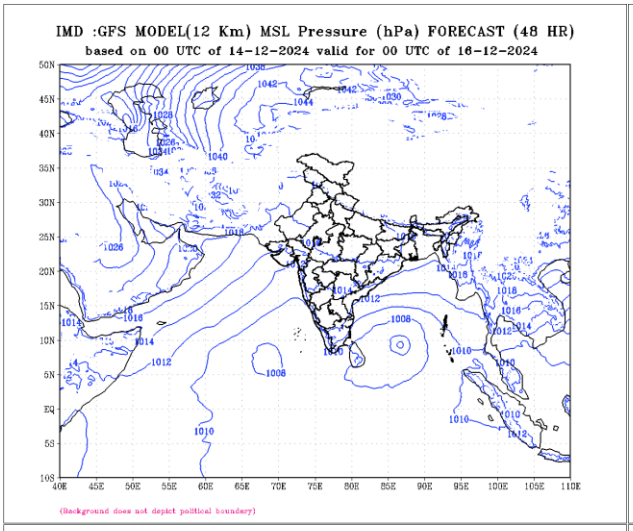
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 16-12-2024
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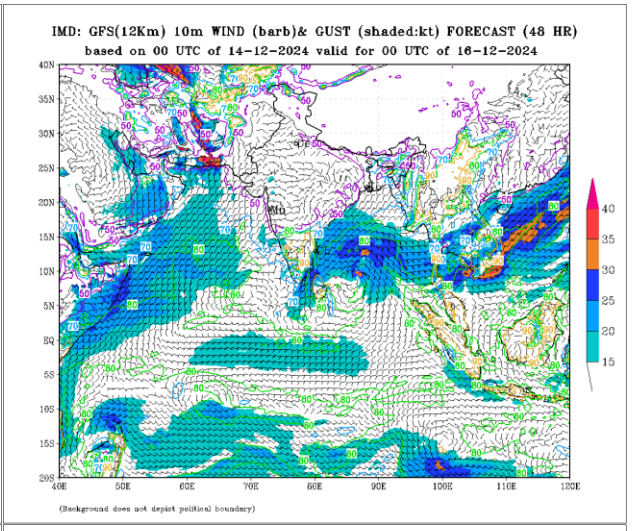
IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (48 HR)
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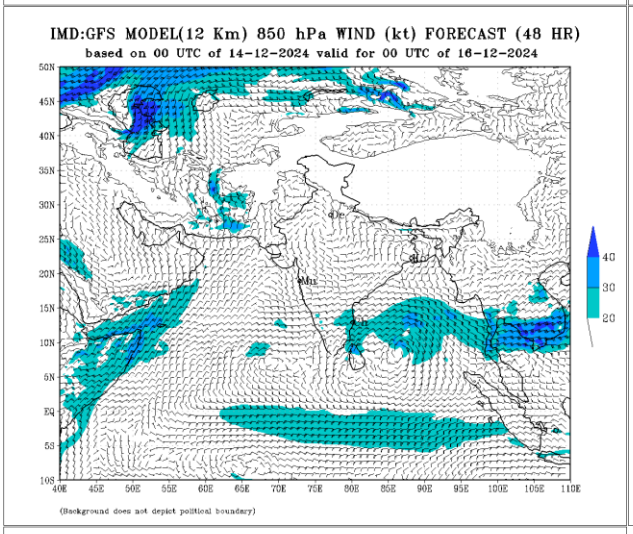
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based on 00 UTC of 14-12-2024 valid for 00 UTC of 16-12-2024
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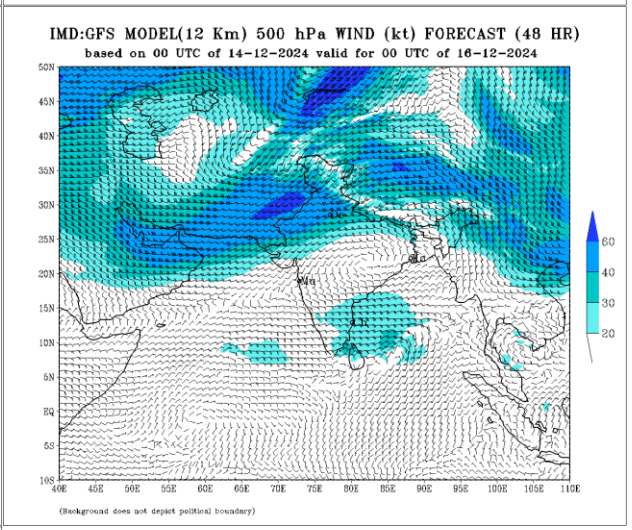
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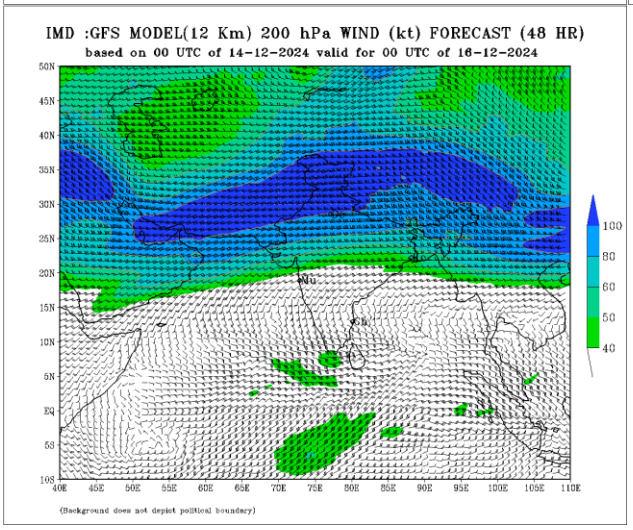
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 16-12-2024
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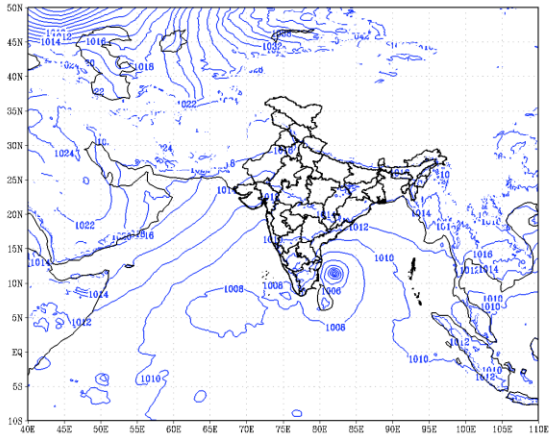
based on 00 UTC of 14-12-2024 valid for 00 UTC of 17-12-2024



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IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (72 HR)
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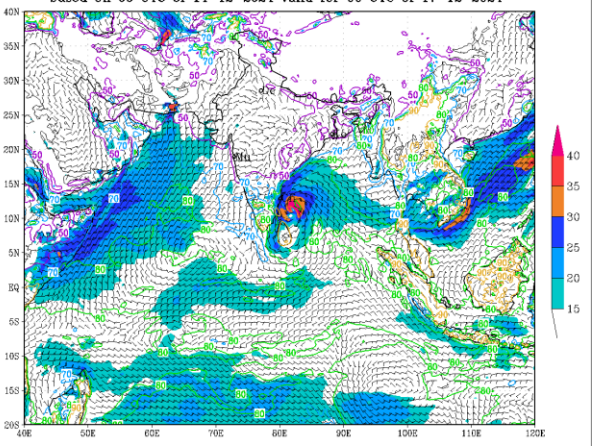

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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)
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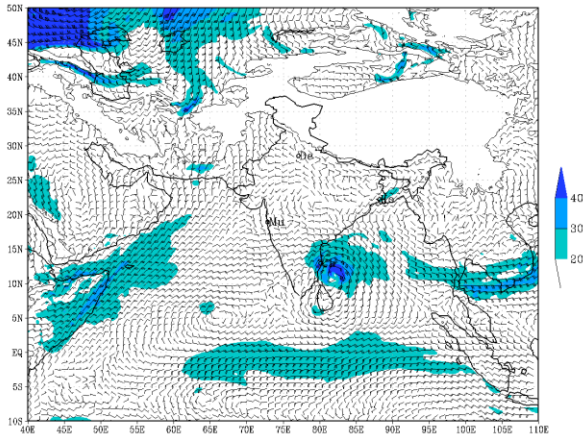

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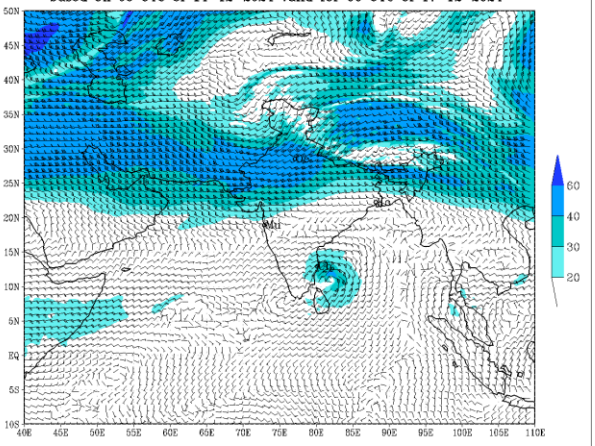

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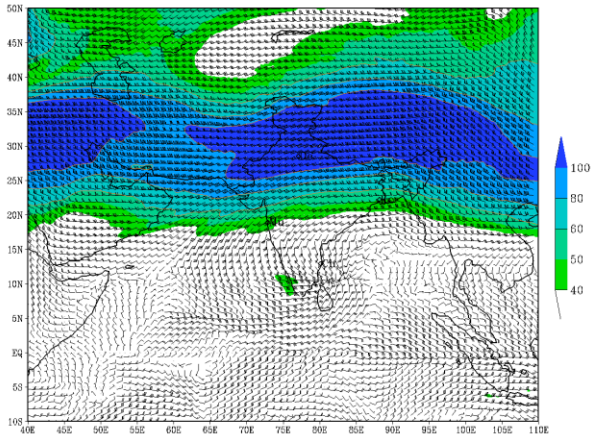

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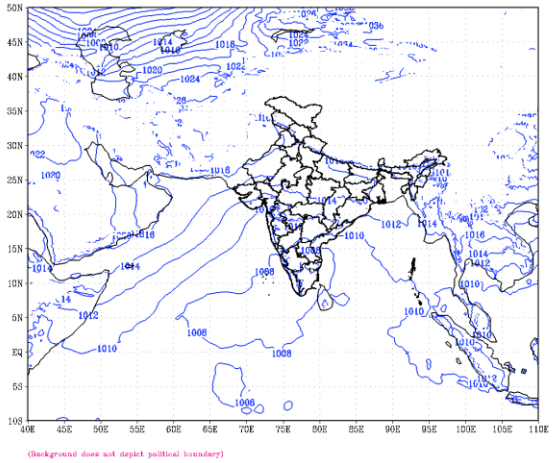
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 18-12-2024



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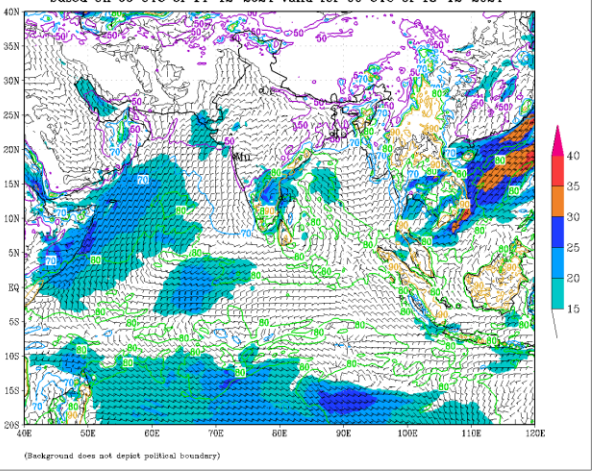
IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (96 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 18-12-2024



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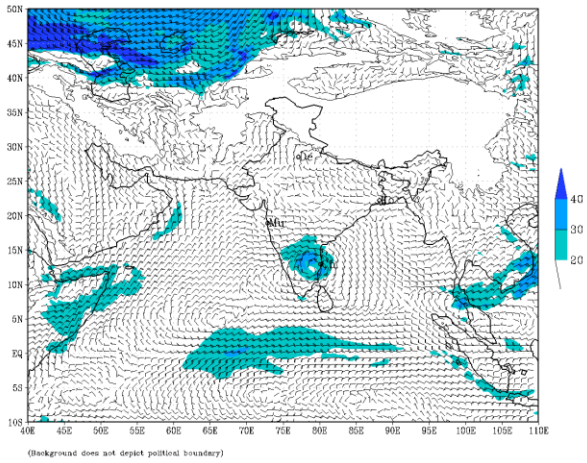
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 18-12-2024



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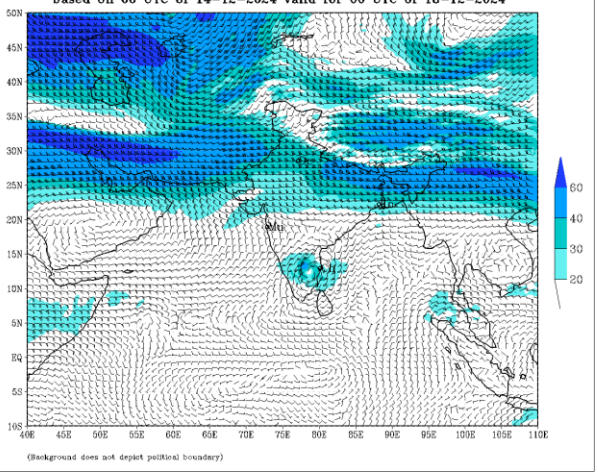

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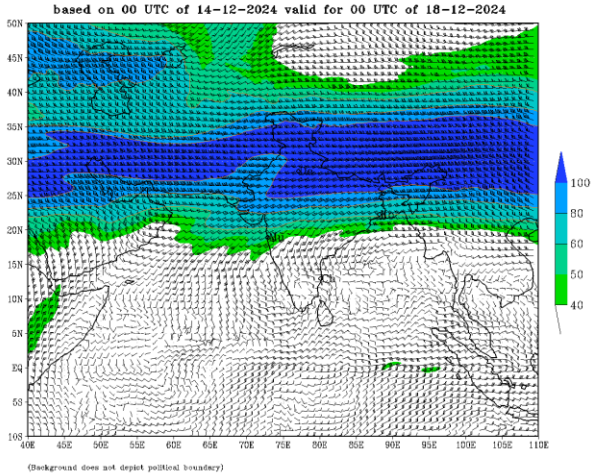
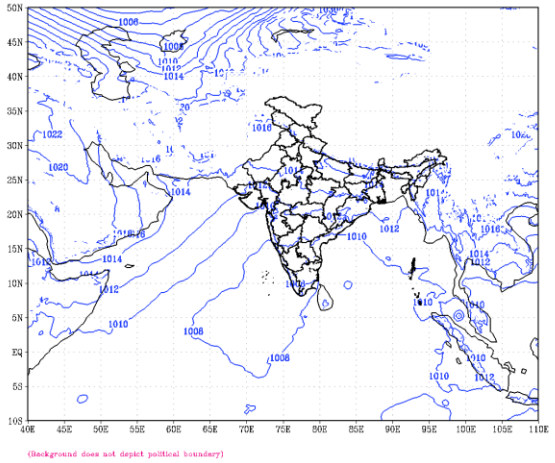


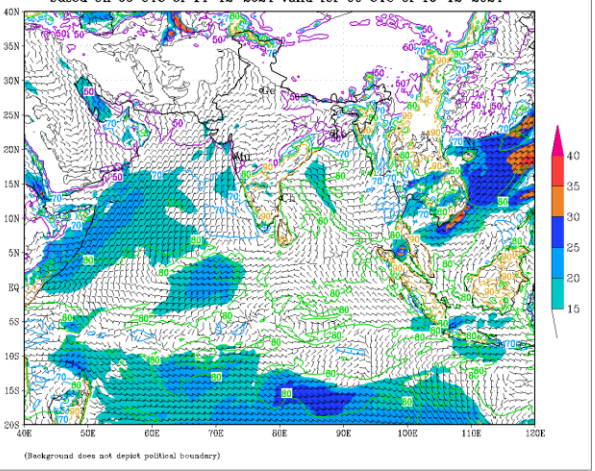
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 19-12-2024



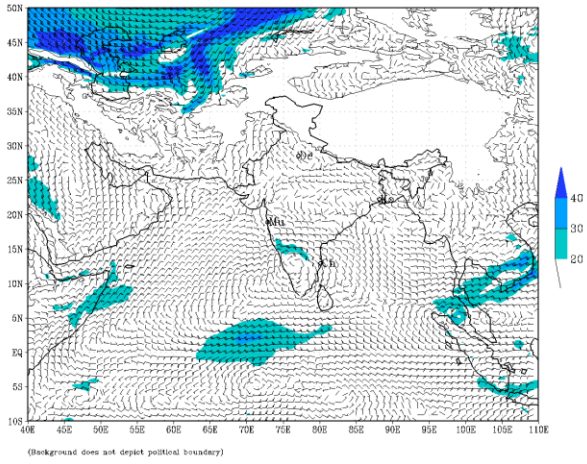
(Background does not depict political boundary)

IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (120 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 19-12-2024



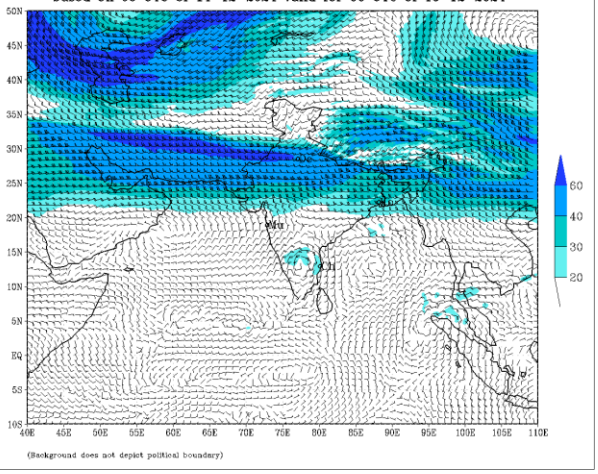
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 19-12-2024



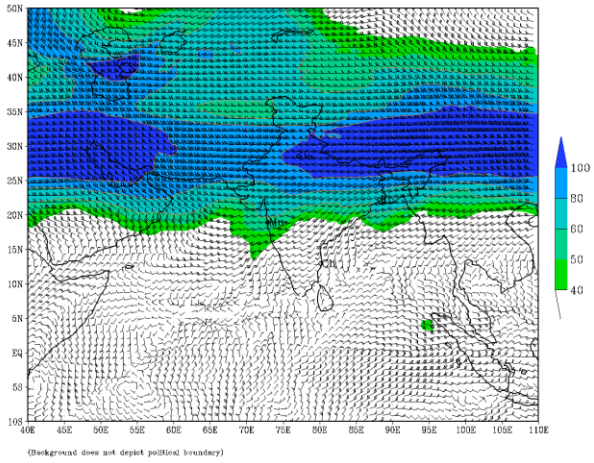
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 19-12-2024

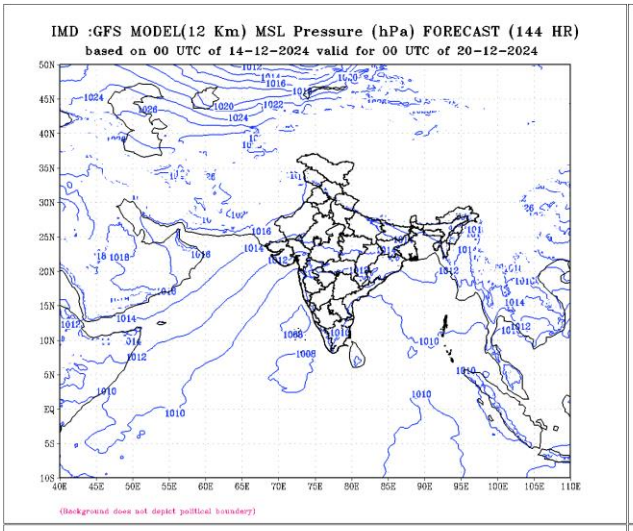


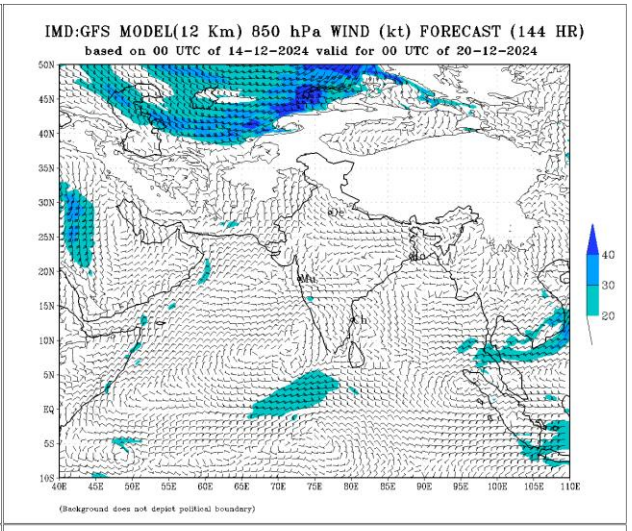
(Background does not depict political boundary)

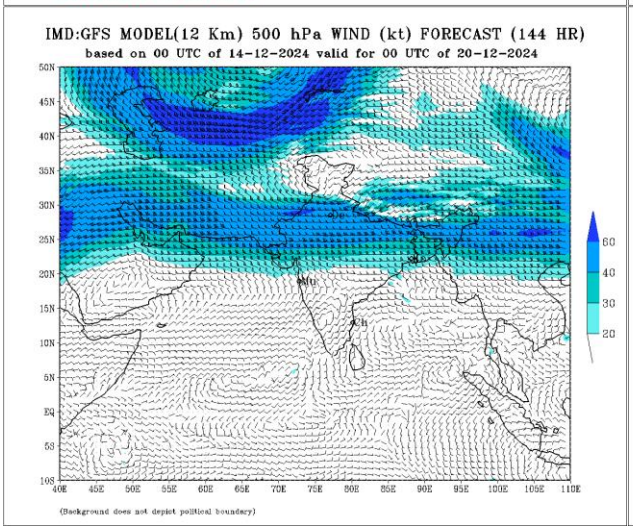
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 19-12-2024

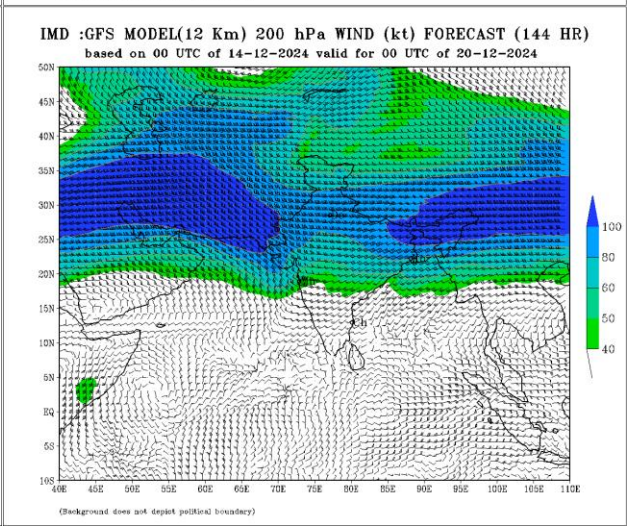


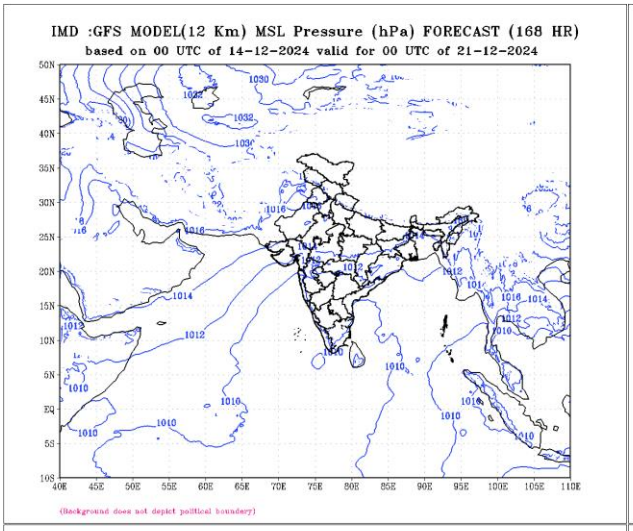
(Background does not depict political boundary)

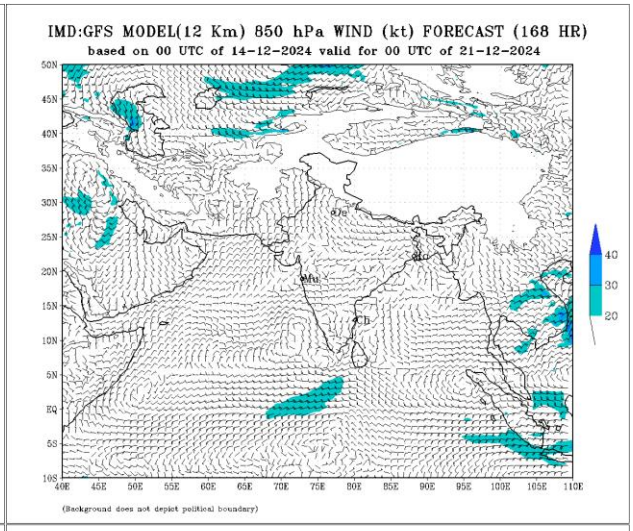

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 20-12-2024
(Background does not depict political boundary)

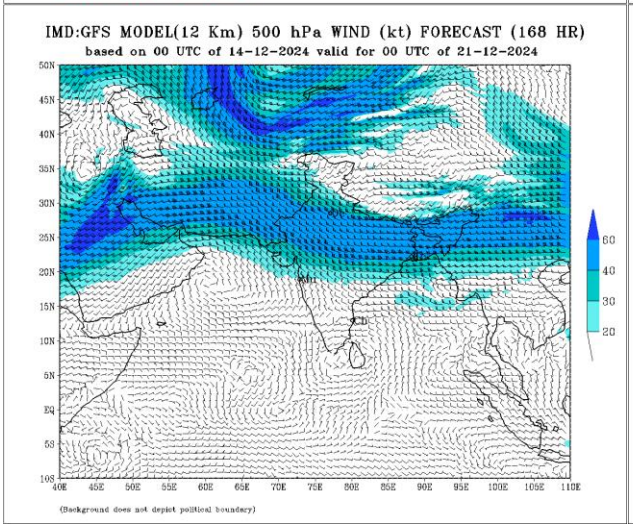

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 20-12-2024
40
30
20
(Background does not depict political boundary)

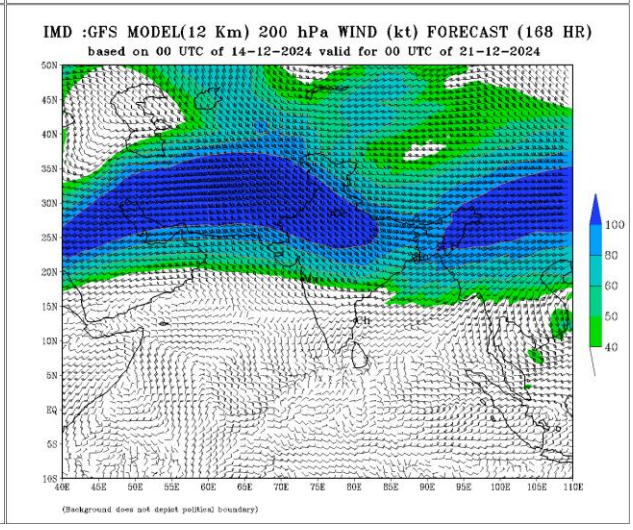

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 20-12-2024
60
40
30
20
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 20-12-2024
100
80
60
50
40
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 21-12-2024
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 21-12-2024
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 21-12-2024
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 14-12-2024 valid for 00 UTC of 21-12-2024
(Background does not depict political boundary)