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

Tropical Cyclone Forecast Programme
Report Dated 09th December, 2023

Time of Issue: 1030 UTC

Synoptic features (based on 0300 UTC analysis):

- Yesterday's cyclonic circulation over southeast Arabian Sea & adjoining Maldives area persisted over the same region extending upto 5.8 km above mean sea level at 0300 UTC of today, the 9th December, 2023

Dynamical and thermo-dynamical features (06 UTC)

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	27-28 over southeast major parts of BoB & Andaman ea and Comorin area. Around 26 over north and rest of BoB.	29-30 over southeast and adjoining eastcentral AS, along and off Karnataka, Kerala coasts. 26-27 over major parts of central and southwest AS and North AS, Around 27-28 over eastcentral adjoining southeast AS along and off the Maharashtra, Goa coast.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	70-80 over parts of Andaman Sea, parts of central BoB, Gulf of Mannar, southwest BoB close to Sri Lanka coast. 30-40 over the rest of parts of BoB.	110-120 over southeast and adjoining westcentral AS. 80-100 over parts of eastcentral AS. 70-80 along and off the west coast.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	Around 20-30 over north BoB along and off Myanmar coast. 30-40 over southeast BoB adjoining to EIO.	50-60 over parts of southeast AS and adjoining Lakshadweep area and Comorin Area, 10-20 over most parts of south and central AS.
Low Level convergence (X10^{-5} s^{-1})	Extended zone of 5 over southwest BoB adjoining east EIO.	-5 over most parts of central & south AS. 5 over parts of southwest & southeast AS.
Upper Level divergence (X10^{-5} s^{-1})	-5 to -10 over parts of south Andaman Sea, southeast BoB & westcentral BoB.	5-10 over eastcentral adjoining southeast AS. -5 to -10 over parts of south and central of AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots**	5-15 over south and central BoB, 20 over southern parts of north BoB. High (>20 knots) over most parts of north BoB.	5-15 over south and adjoining central AS, 20 southern parts of central AS, High over (>20 knots) over remaining parts of AS.

High: >20 knots		
Wind Shear Tendency (knots)	Increasing over most parts of BoB.	Increasing over southeast AS. Decreasing over remaining parts of AS.
Upper tropospheric Ridge	Along 13^{o}N over BoB	Along 12^{o}N over AS.

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the BoB & Andaman Sea:-
Scattered Low and Medium Clouds with Embedded Isolated Moderate to Intense Convection lay over Bay Of Bengal South Andaman Sea.

(b) Over the Arabian Sea:-
Scattered low and medium clouds with embedded intense convection lay over southeast Arabian Sea. Scattered low and medium clouds with embedded isolated moderate to intense convection lay over eastcentral & southwest Arabian Sea & comorin area.

(c) Convection outside India:-
Scattered low and medium clouds with embedded moderate to intense convection over Srilanka, Maldives, Tibet, China, Myanmar, Thailand, Gulf of Thailand, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & sea Celebes islands & Sea, Madagascar, north Mozambique Channel and over Indian Ocean bet lat 5.0N to 11.0S long 40.0E to 100.0E.

M.J.O. Index:
MJO index is currently in Phase 5 with amplitude greater than 1. It will move to phase 6 on 10th December with amplitude greater than 1. It will remain in phase 6 till 12th November & it will enter phase 7 on 13th December with amplitude less than 1. It will enter phase 8 with amplitude greater than 1 on 15th Dec.

Storms and Depression over South China Sea/ South Indian Ocean: Nil

Input for FDP Cyclone based on 0000 UTC for the next 7 days

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	No significant system.	Extend low on 9th Dec over southeast AS and adjoining Lakshadweep area will have westnorthwestward movement without further intensification till 12th Dec.
IMD-GEFS	No significant system.	Extended low/LPA on 9th Dec over southeast AS and adjoining Lakshadweep area will have westward movement without further intensification till 12th Dec.
IMD-WRF	No significant system.	Extend low on 9th Dec over southeast AS and adjoining Lakshadweep area will have westnorthwestward movement without further intensification till 11th Dec.
NCMRWF-NCUM	No significant system.	No significant system
NCMRWF-NEPS	No significant system.	No significant system.
NCMRWF-UM (Regional)	No significant system.	No significant system.
ECMWF	No significant system.	LPA over southeast and adjoining Lakshadweep area on 10th Dec 12 UTC. It will have west

		northwestward movement without further intensification.
NCEP-GFS	No significant system.	LPA over southeast and adjoining Lakshadweep area on 9th Dec 18 UTC. It will have west northwestward movement till 13th Dec without further intensification.
IMD-Genesis Potential Parameter	No potential zone over BoB for next 7 days.	No potential zone over AS for next 7 days.

Summary and conclusion:

1. For Bay of Bengal:

As per model guidance, no significant cyclogenesis is likely over the Bay of Bengal during next seven days.

Probability of Cyclogenesis (formation of depression and above intensity systems) over Bay of Bengal and Andaman 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

2. For the Arabian Sea:

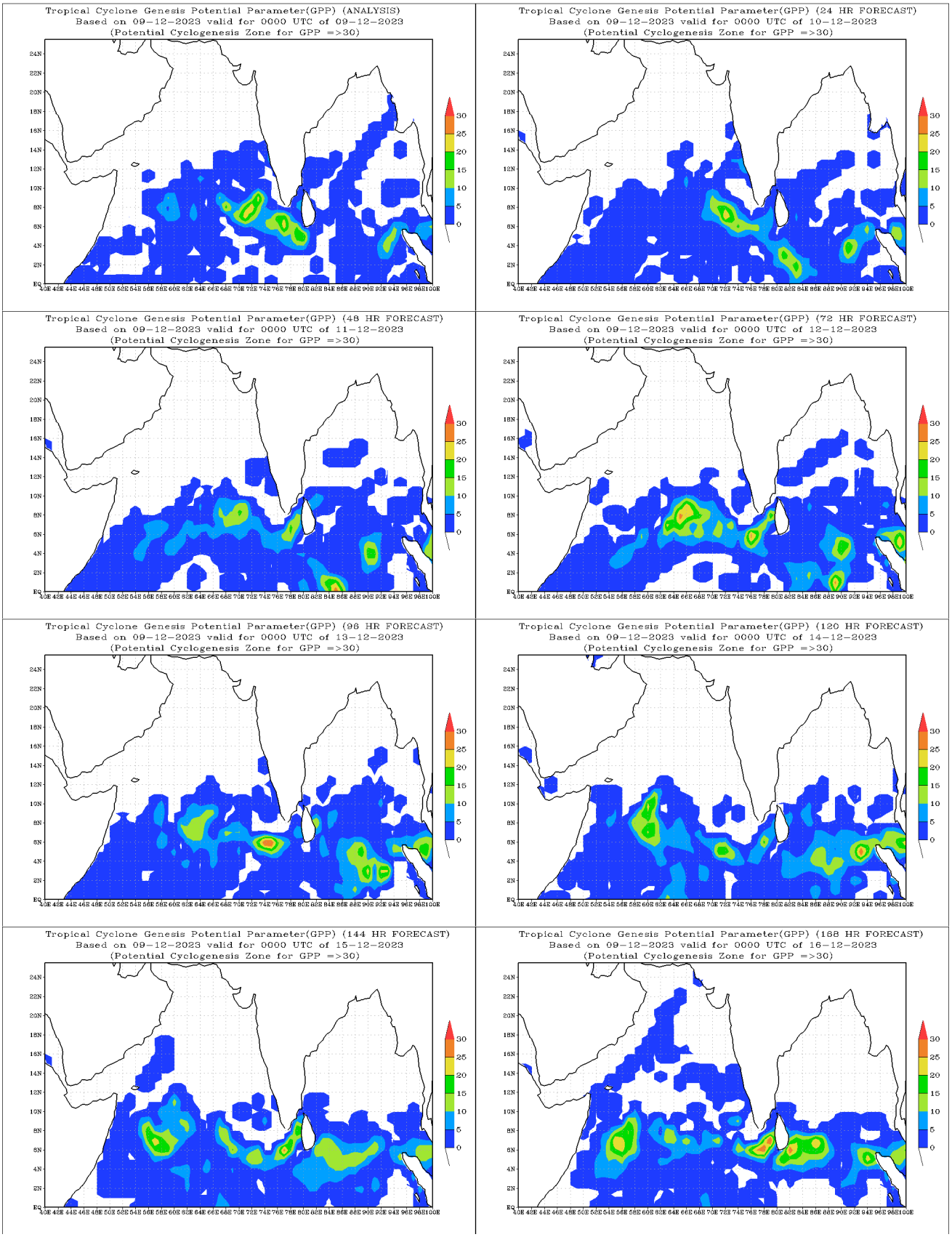
IMD-GFS, IMD-GEFS, IMD-WRF, NCEP-GFS and ECMWF models are indicating a low pressure area (LPA) or extended low over southeast Arabian Sea and adjoining Lakshadweep area around 9th December. It will have west northwestward movement without further intensification.

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

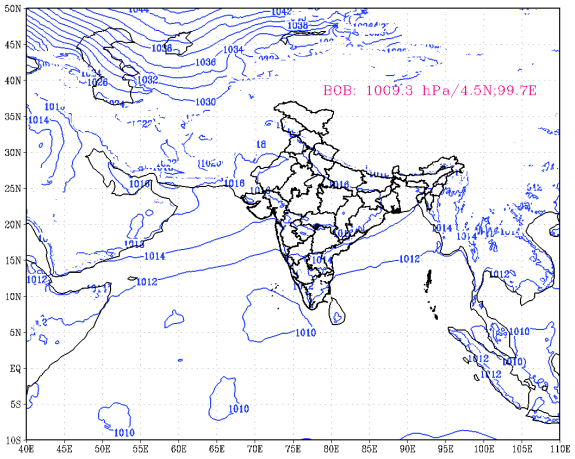
IOP: Nil**.**

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 09-12-2023 valid for 0000 UTC of 09-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 10-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 11-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 12-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 13-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 14-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 15-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 09-12-2023 valid for 0000 UTC of 16-12-2023
(Potential Cyclogenesis Zone for GPP =>30)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)

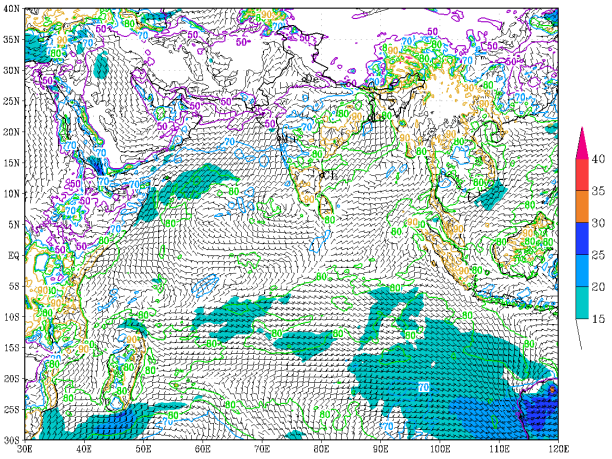
based on 00 UTC of 09-12-2023 valid for 00 UTC of 09-12-2023



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 09-12-2023



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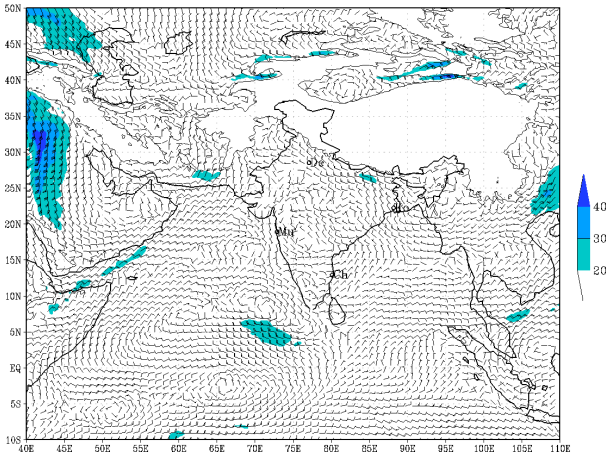
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 09-12-2023



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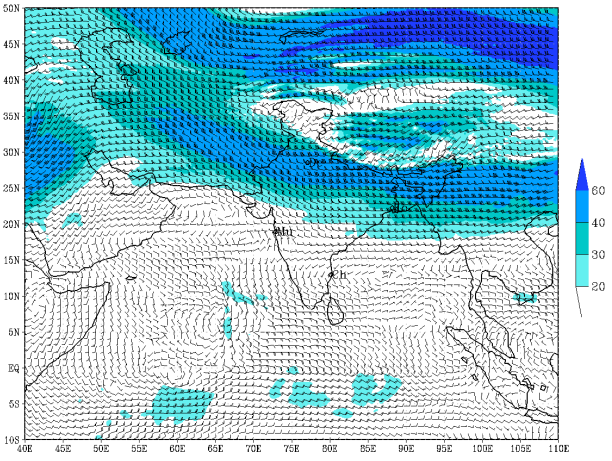
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 09-12-2023



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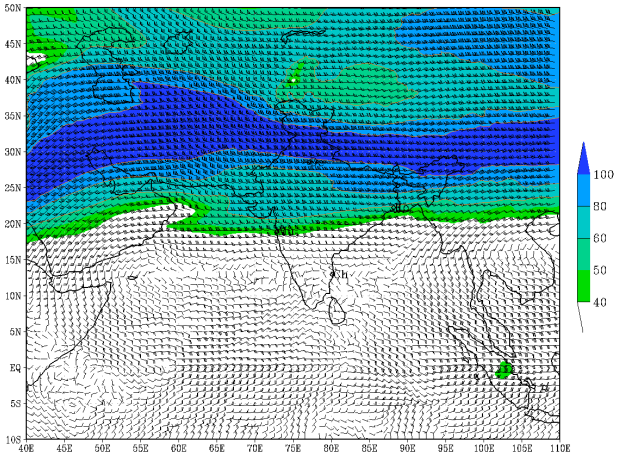
based on 00 UTC of 09-12-2023 valid for 00 UTC of 09-12-2023



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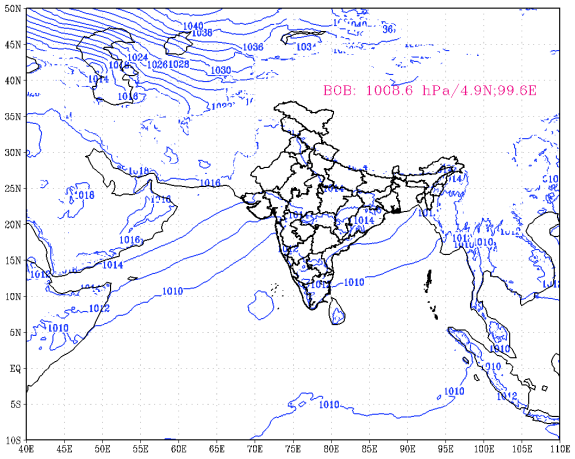
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 10-12-2023



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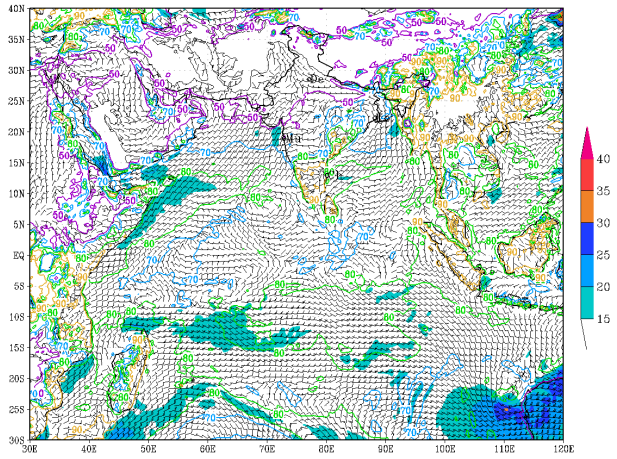
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 10-12-2023



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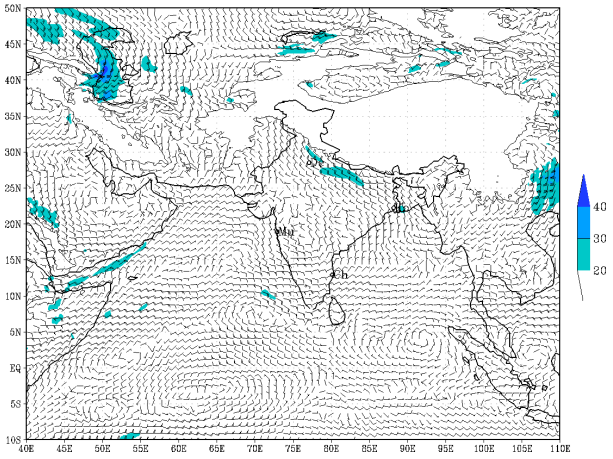
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 10-12-2023



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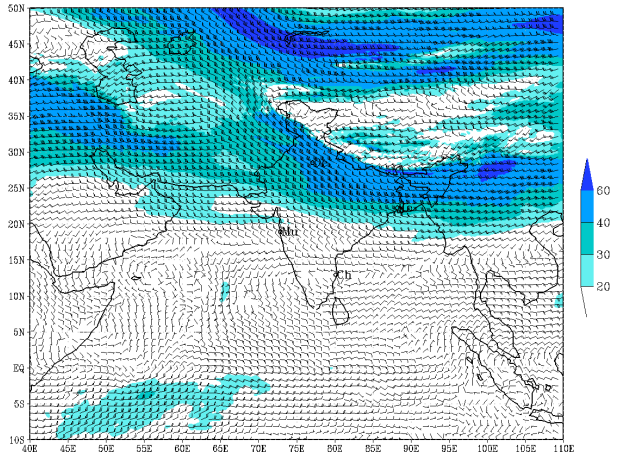
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 10-12-2023



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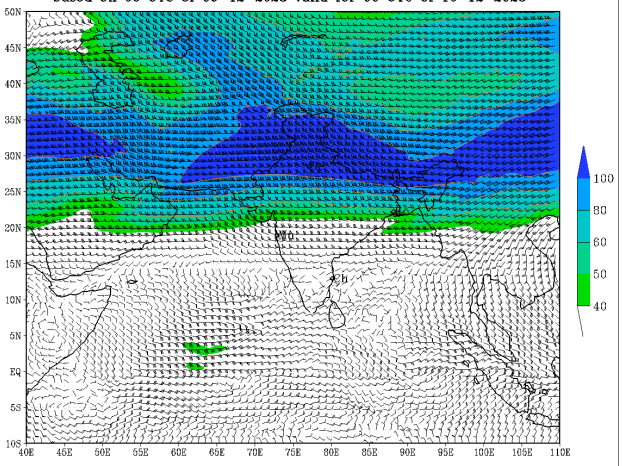
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 09-12-2023 valid for 00 UTC of 10-12-2023



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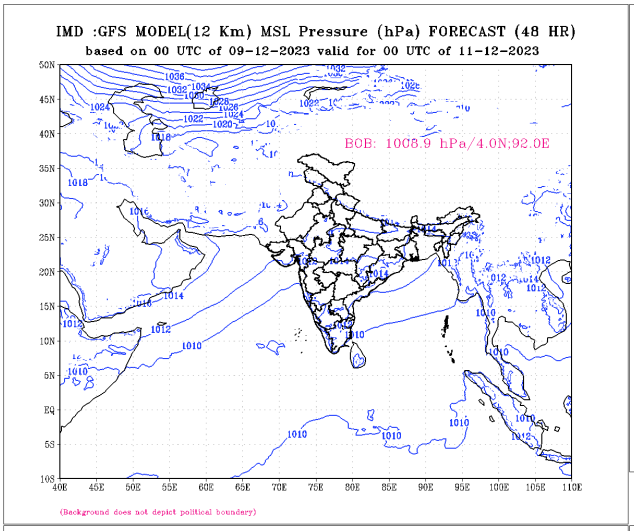
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 11-12-2023
BOB: 1008.9 hPa/4.0N;92.0E
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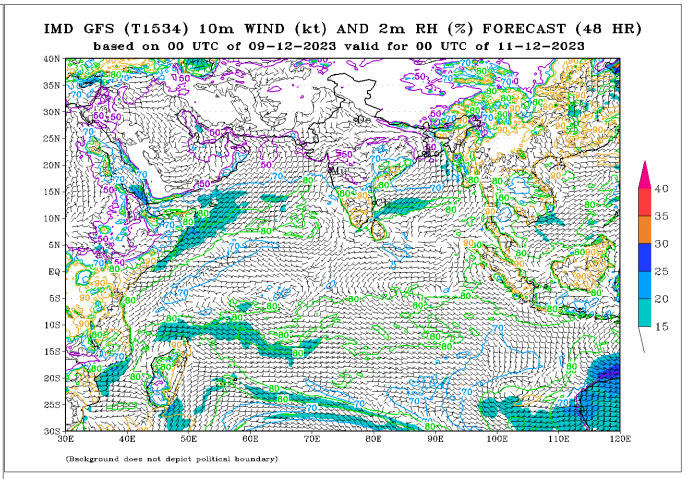
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 11-12-2023
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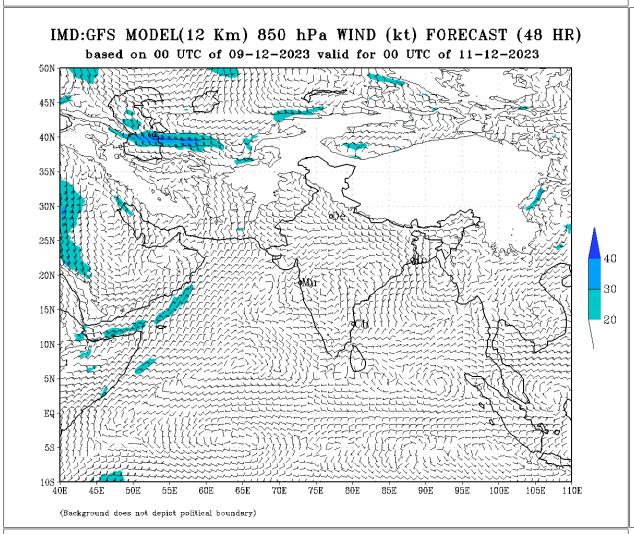
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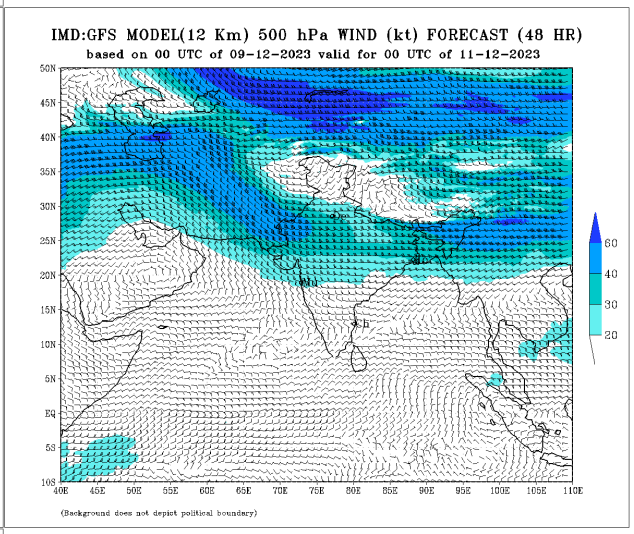
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 11-12-2023
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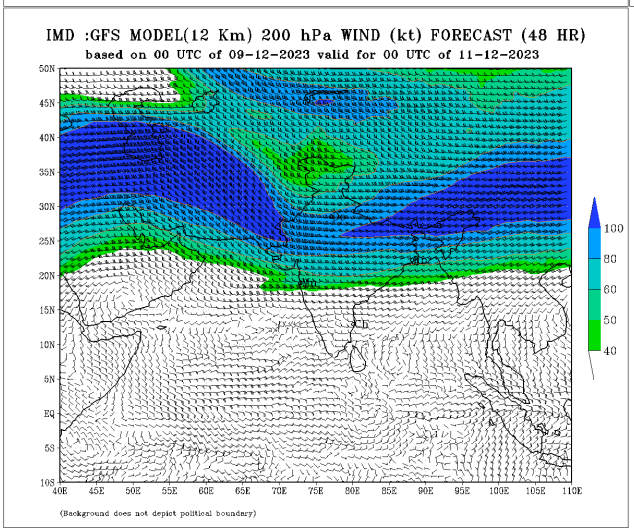
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 11-12-2023
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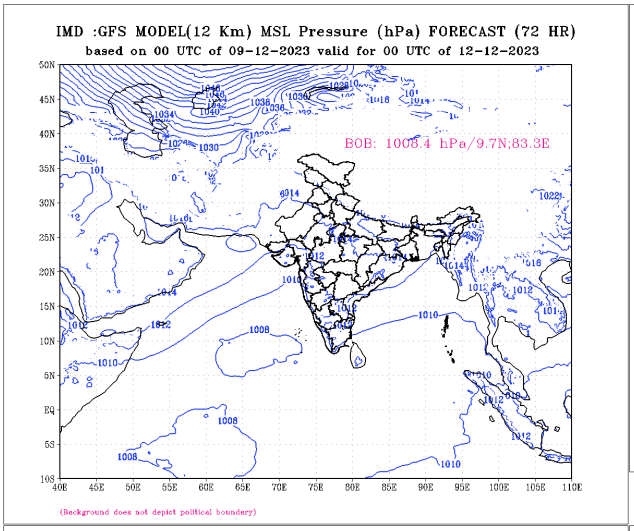
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 12-12-2023
BOB: 1003.4 hPa/9.7N;83.3E
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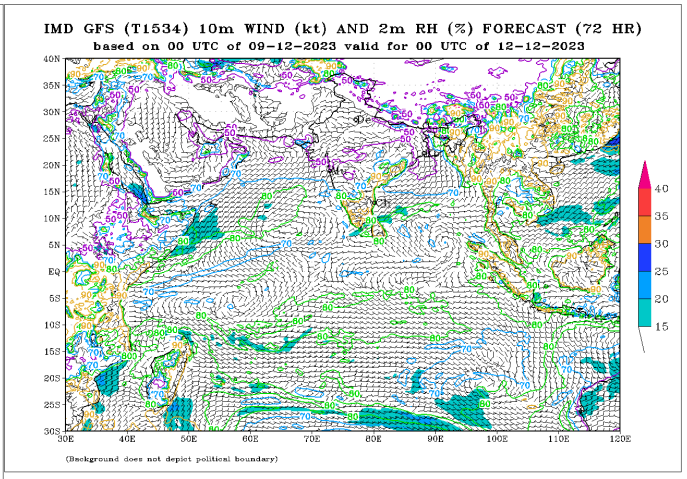
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 12-12-2023
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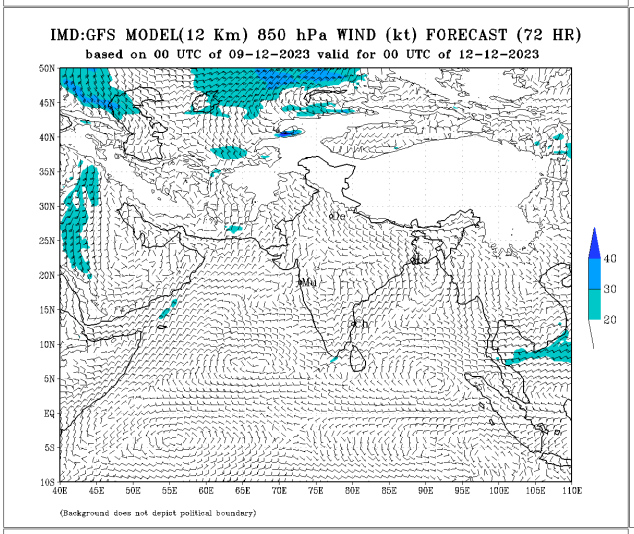
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 12-12-2023
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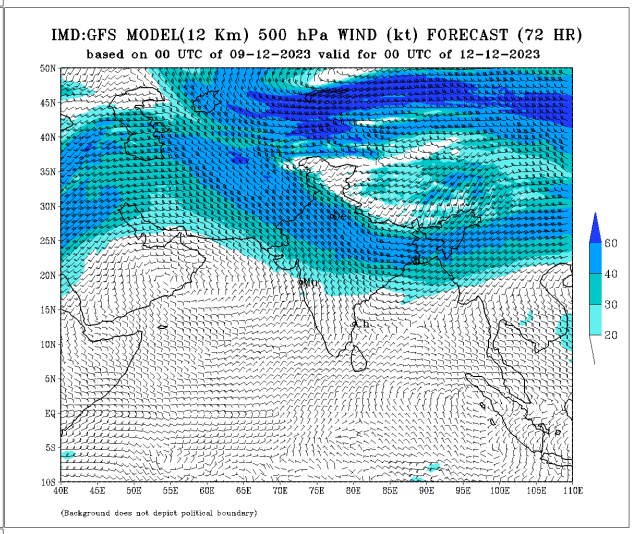
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (72 HR)
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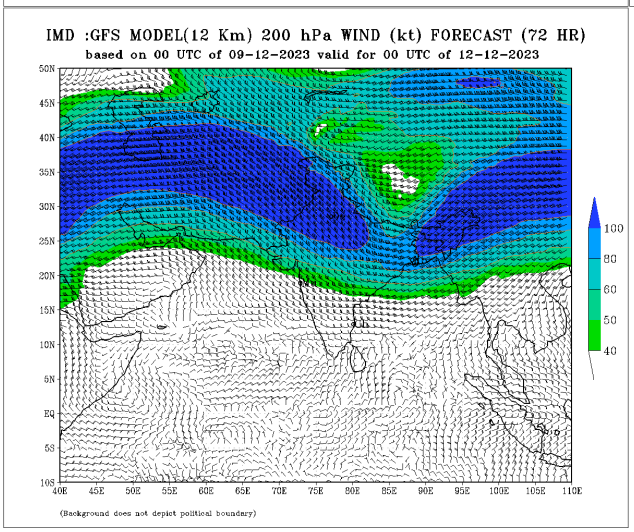
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (72 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 12-12-2023
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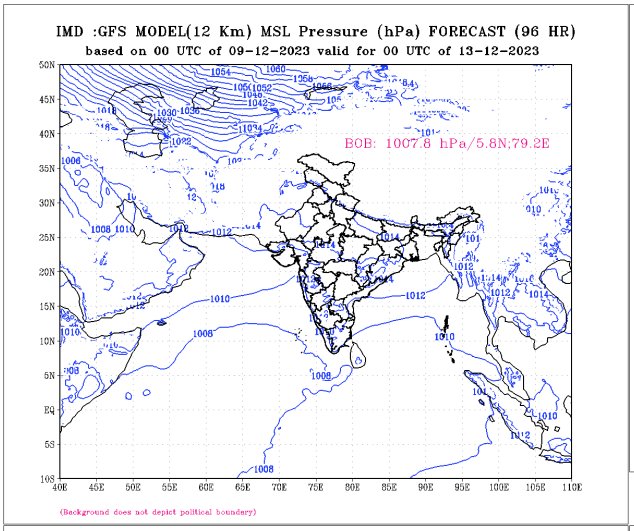
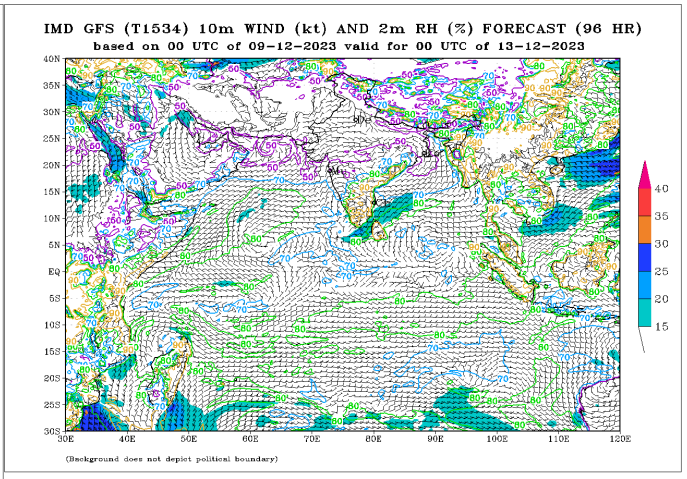

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 13-12-2023
BOB: 1007.8 hPa/5.8N;79.2E
(Background does not depict political boundary)


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 13-12-2023
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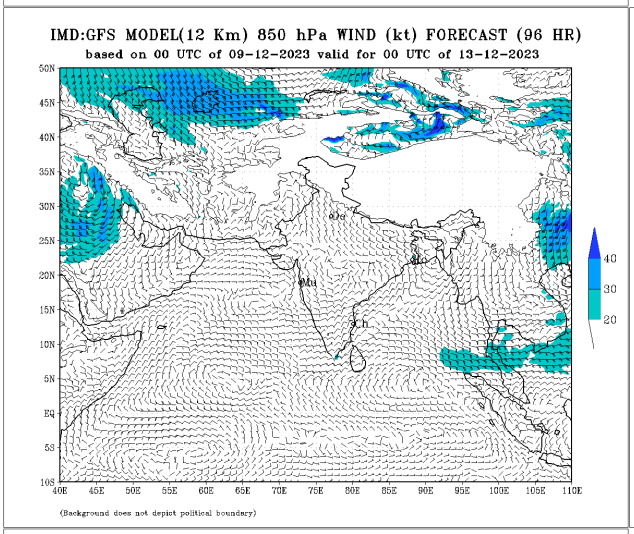
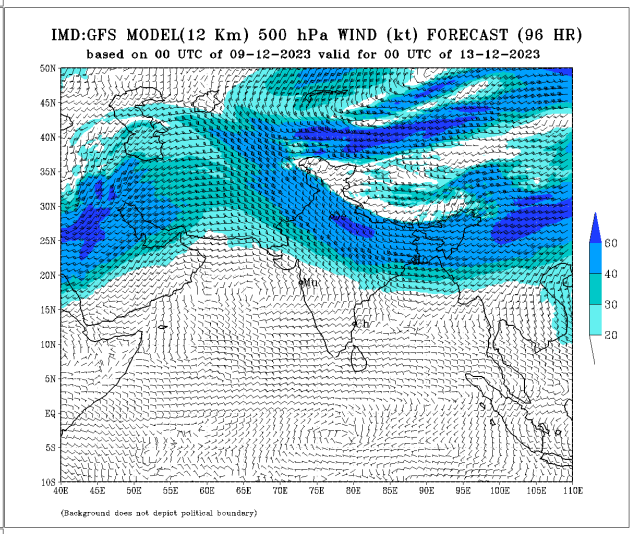

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 13-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 13-12-2023
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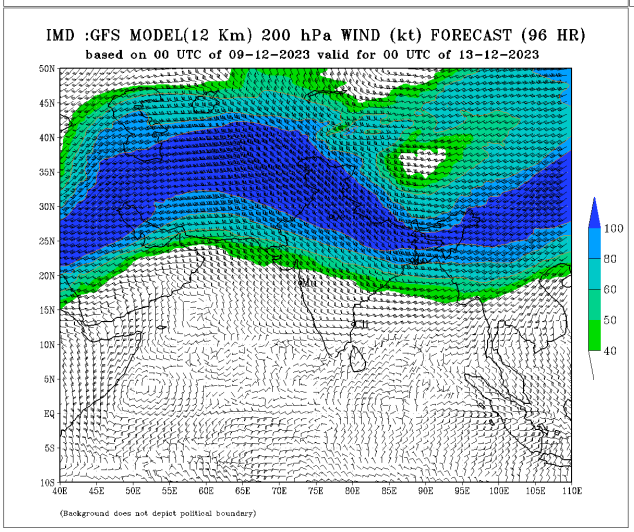
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 13-12-2023
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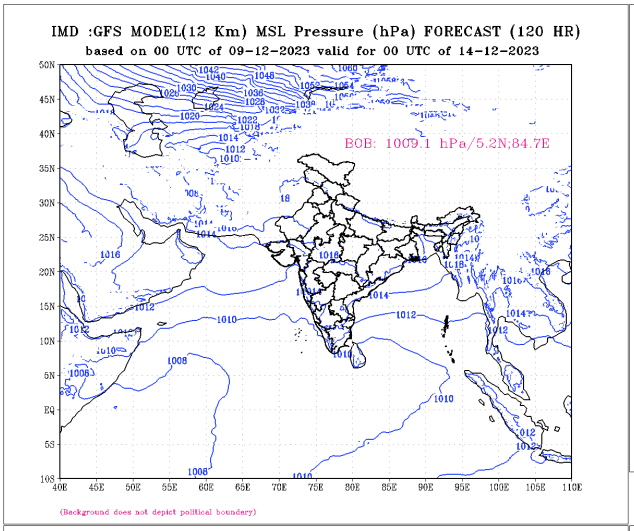
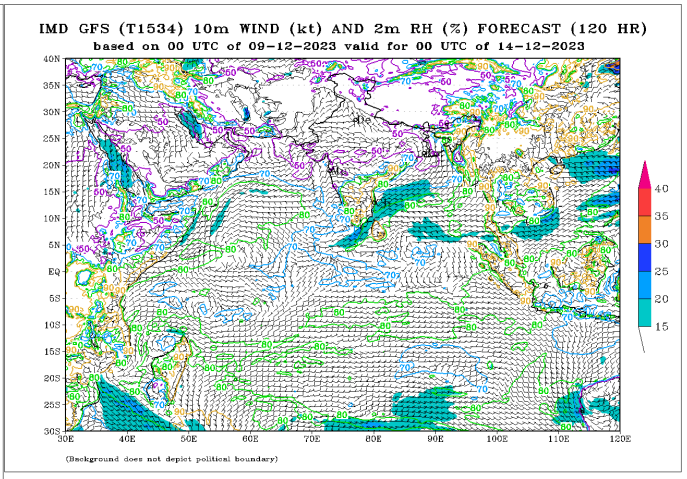
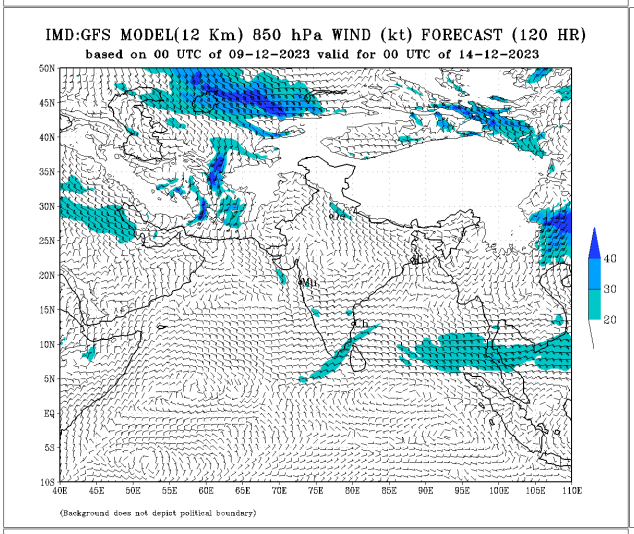

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 14-12-2023
BOB: 1005.1 hPa/5.2N;84.7E
(Background does not depict political boundary)


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 14-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 14-12-2023
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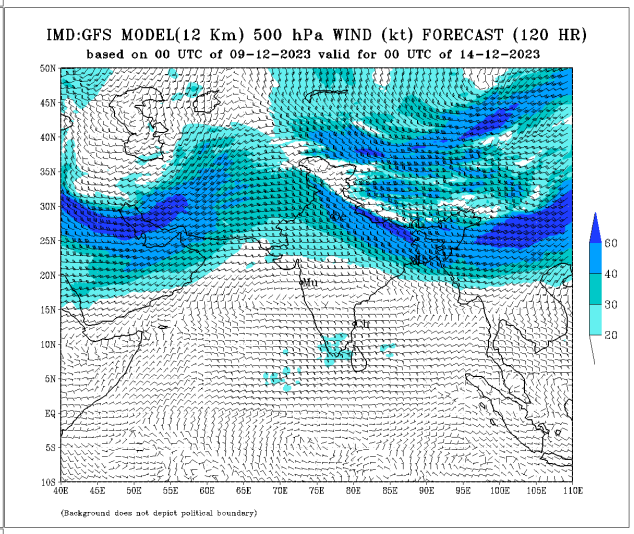
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 14-12-2023
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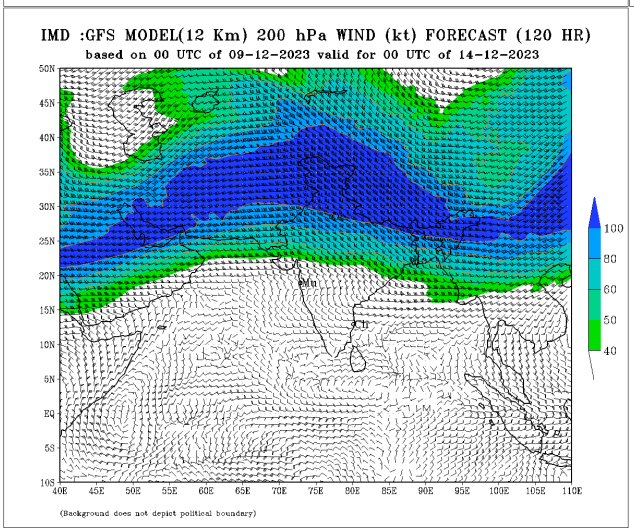
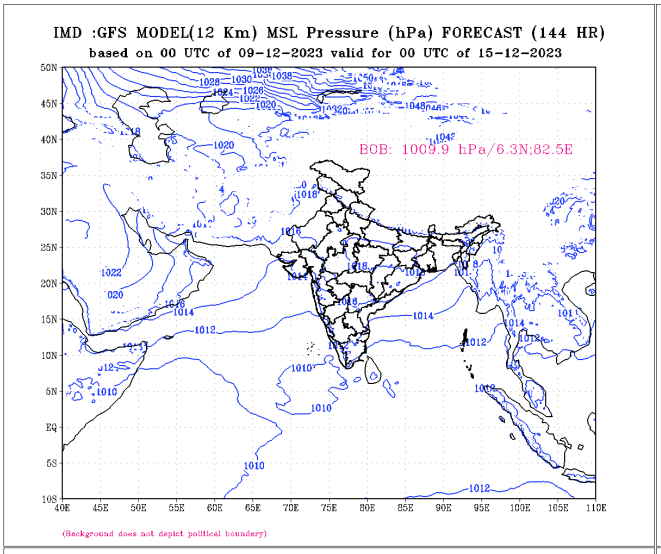
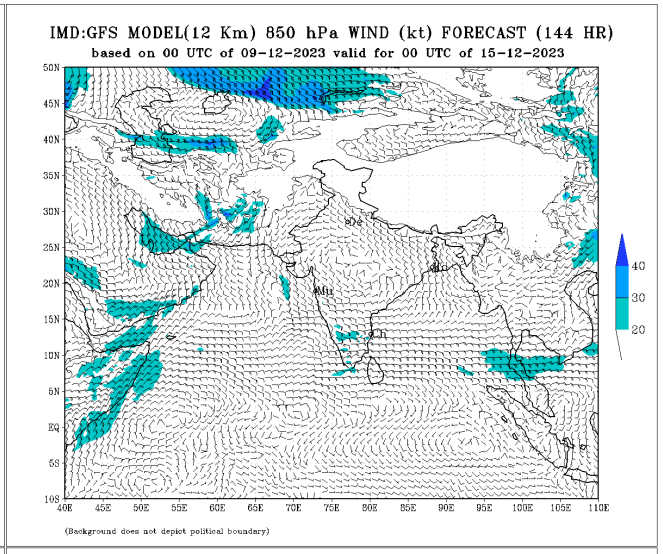
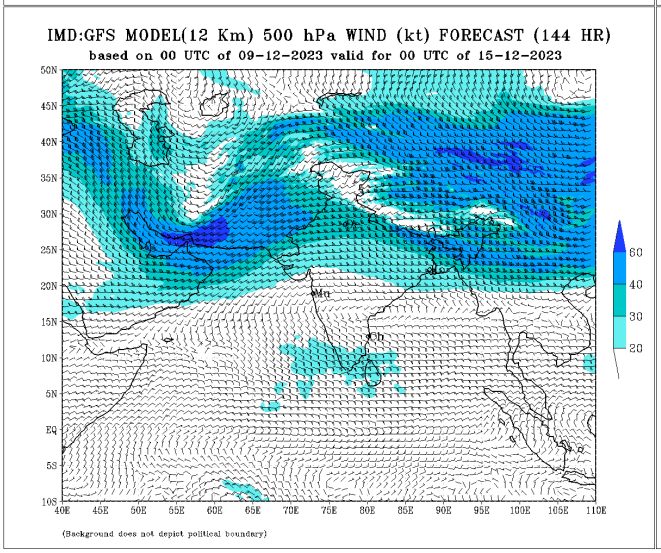
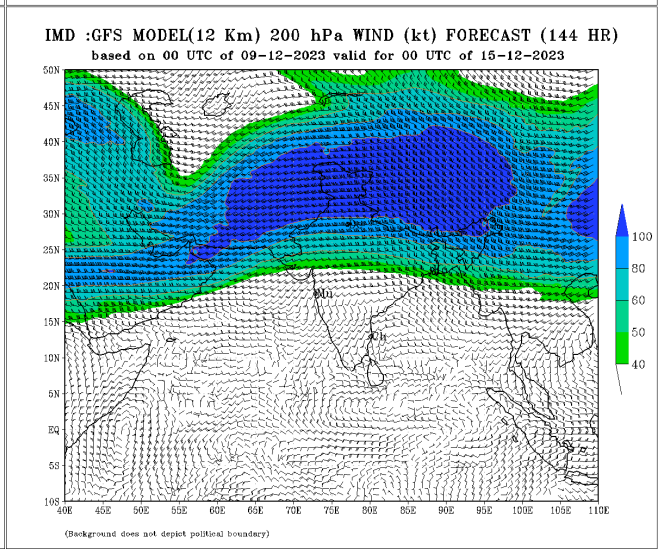
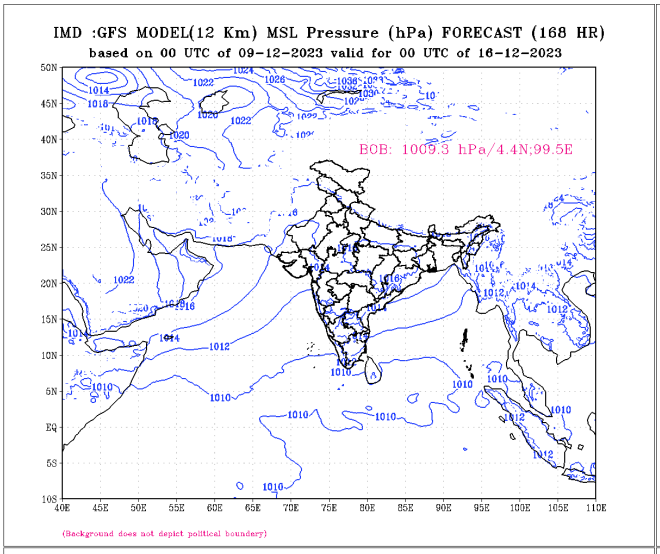

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 14-12-2023
(Background does not depict political boundary)

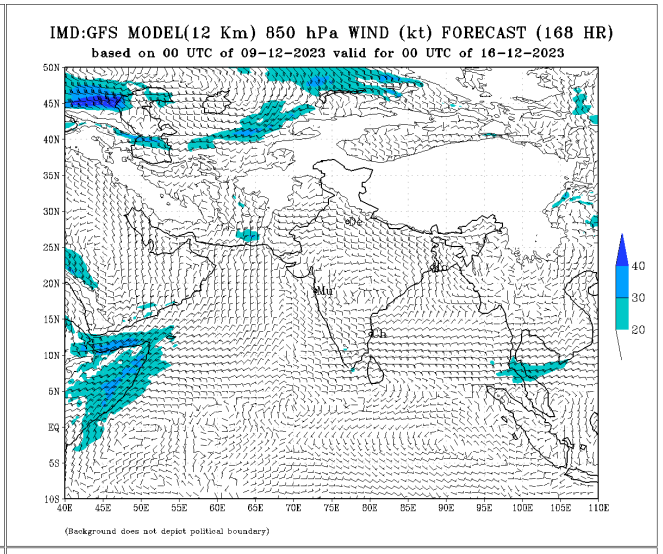

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 15-12-2023
BOB: 1009.9 hPa/6.3N;82.5E
(Background does not depict political boundary)

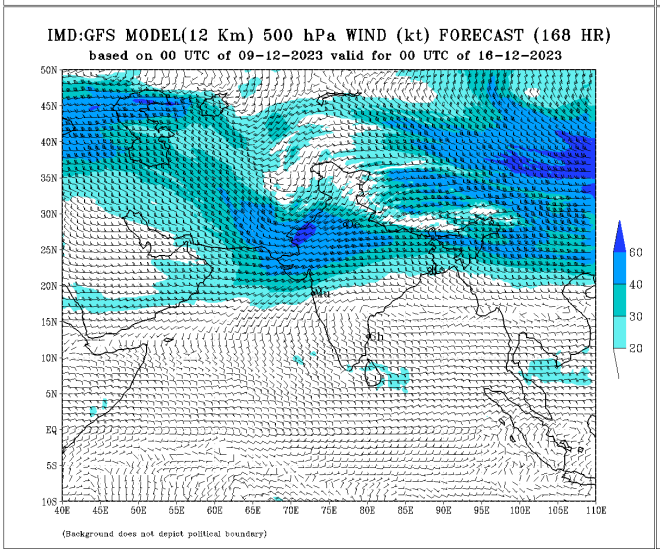

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 15-12-2023
40
30
20
(Background does not depict political boundary)

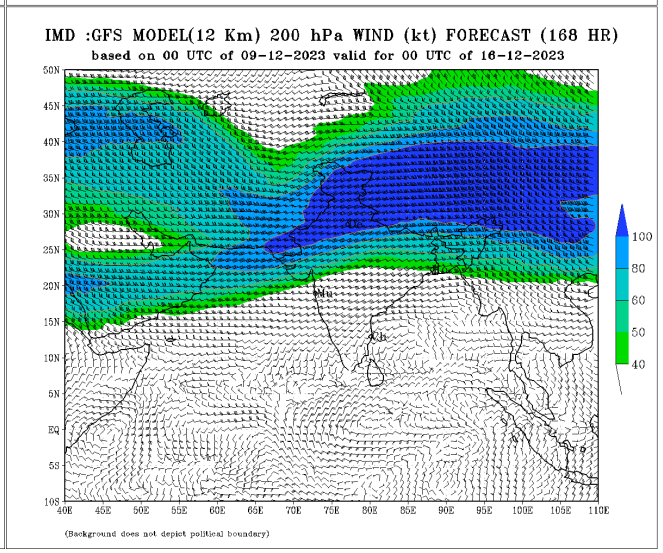

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 15-12-2023
60
40
30
20
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 15-12-2023
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 09-12-2023 valid for 00 UTC of 16-12-2023
BOB: 1009.3 hPa/4.4N;99.5E
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 16-12-2023
40
30
20
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 16-12-2023
60
40
30
20
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 09-12-2023 valid for 00 UTC of 16-12-2023
100
80
60
50
40
(Background does not depict political boundary)