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

Tropical Cyclone Forecast Programme
Report Dated 10th December, 2023

Time of Issue: 0730 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 10th December, 2023.

Dynamical and thermo-dynamical features (0300 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 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 40-50 over northeast BoB off Myanmar coast. 30-40 over southeast BoB adjoining to Equatorial Indian Ocean (EIO).	50-60 over parts of southeast AS and adjoining Lakshadweep area, 10-20 over most parts of south AS.
Low Level convergence (X10^{-5} s^{-1})	Feeble zone of 5 over southwest BoB off SriLanka coast.	5 over parts of southeast AS.
Upper Level divergence (X10^{-5} s^{-1})	5 over eastcentral BoB.	5-10 over southeast and adjoining eastcentral AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	5-15 over south and central BoB. High (>20 knots) over most parts of north BoB.	5-15 over south and adjoining central AS. High over (>20 knots) over remaining parts of AS.

Wind Shear Tendency (knots)	Decreasing over Andaman Sea.	Decreasing over southeast AS.
Upper tropospheric Ridge	Along 13°N over BoB	Along 12°N over AS.

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the BoB & Andaman Sea:-

Scattered Low and Medium Clouds with Embedded Moderate to Intense Convection lay over south Bay of Bengal & South Andaman Sea and isolated weak to moderate convection lay over eastcentral Bay of Bengal & north Andaman Sea. Scattered Low and Medium clouds lay over north & westcentral Bay of Bengal.

(b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded moderate to intense convection lay over eastcentral Arabian Sea, south Arabian Sea, Lakshadweep Island area and Comorin area. Scattered low and medium clouds lay over northwest & westcentral Arabian Sea.

(c) Convection outside India:-

Scattered low and medium clouds with embedded moderate to intense convection over Sri Lanka, Gulf of Mannar, Maldives, Tibet, China, Yellow Sea, East China Sea, Gulf of Thailand, South Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & sea Celebes islands & sea Sulu, sea Madagascar, north Mozambique Channel and over Indian Ocean between lat 5.0N to 10.0S long 40.0E to 110.0E and between lat 10.0S to 35.0S long 40.0E to 90.0E.

Broad scale features: El Nino conditions are likely to continue. Currently, positive Indian Ocean Dipole (IOD) conditions are prevailing. However, it is likely to drop to less than 1^0C by this month end. IOD is not likely to strengthen again. The NCICs based forecast for equatorial waves indicates no favourable alignment of equatorial waves over the region during next 1 month. Weak westerly winds are likely over BoB with gradual weakening trend from 16th Dec. onwards. MJO index is currently in Phase 5 with amplitude greater than 1 on today, the 10th December. It will move to phase 6 from 11th December onwards with amplitude gradually becoming less than 1 from 15th onwards. Thus, MJO would not support any convective activity over the North Indian Ocean during next 15 days. Hence, broad scale features indicate there is no likelihood of any cyclogenesis over the region during next 15 days.

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.	No significant system.
IMD-GEFS	No significant system.	Extended low on 10th Dec over southeast AS and adjoining Lakshadweep area will have westward movement without further intensification till 12th Dec.
IMD-WRF	No significant system.	No significant system.
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.	No significant system.
NCEP-GFS	No significant system.	Low pressure area over southeast and adjoining Lakshadweep area on 10th Dec. 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:

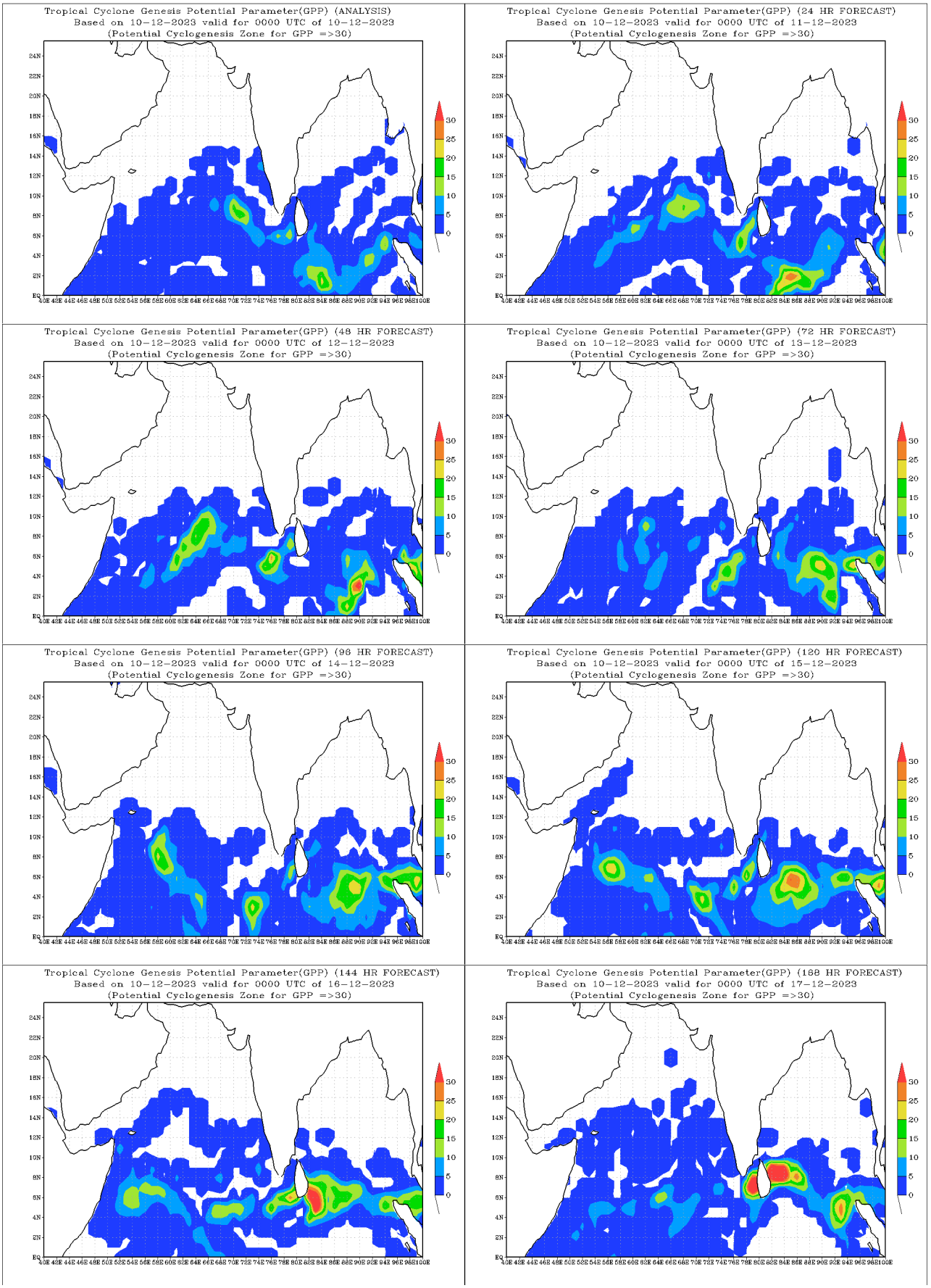
As per model guidance, no significant cyclogenesis is likely over the Bay of Bengal during next seven days.

Probability of Cyclogenesis (formation of depression and above intensity systems) over 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**

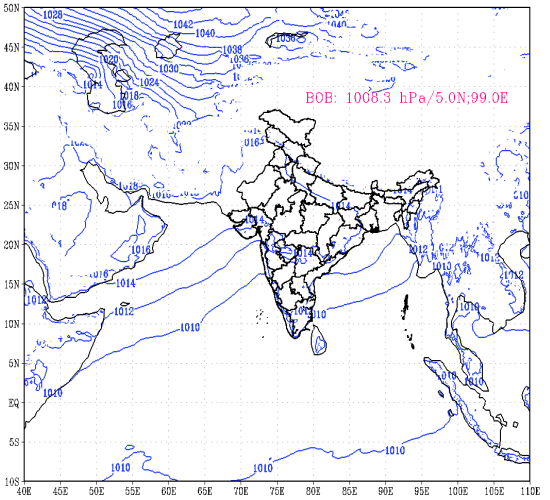
IOP: Nil**.**

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 10-12-2023 valid for 0000 UTC of 10-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 11-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 12-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 13-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 14-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 15-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 16-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 10-12-2023 valid for 0000 UTC of 17-12-2023
(Potential Cyclogenesis Zone for GPP =>30)

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

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



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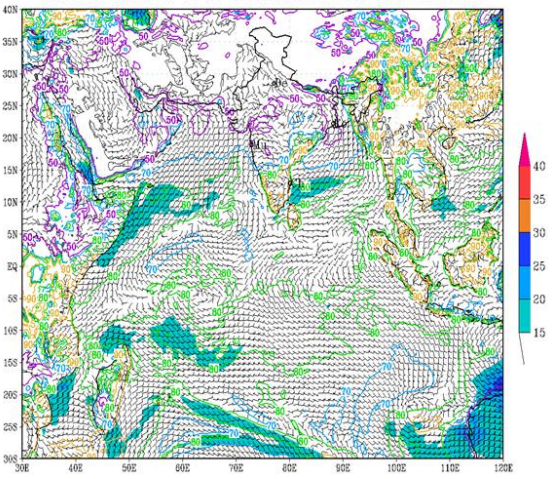
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)

based on UTC of -- valid for 05 UTC of 10-12-2023



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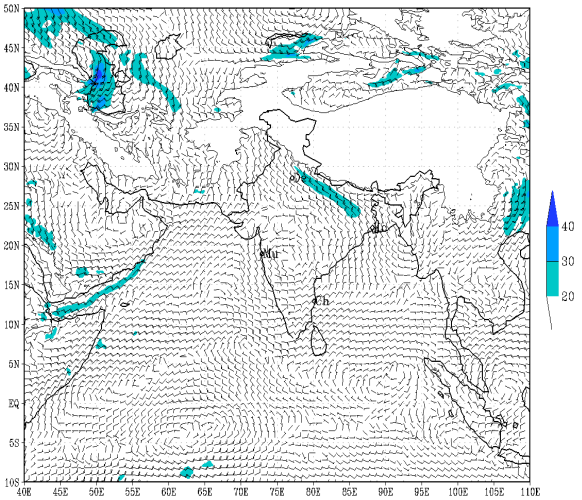
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)

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



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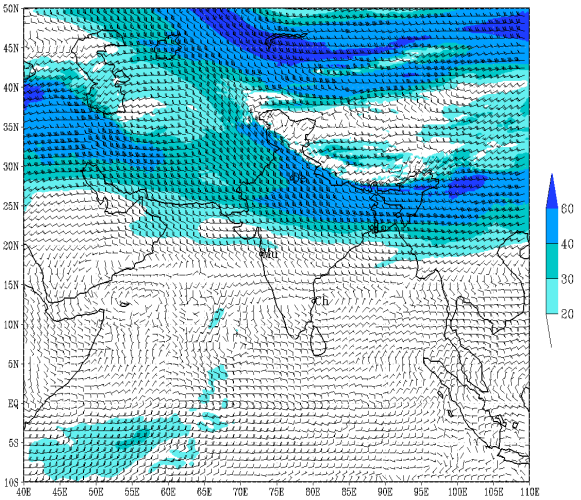
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)

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



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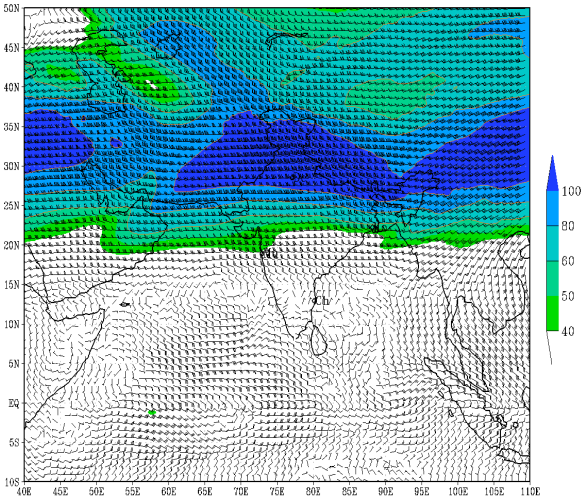
based on 00 UTC of 10-12-2023 valid for 00 UTC of 10-12-2023



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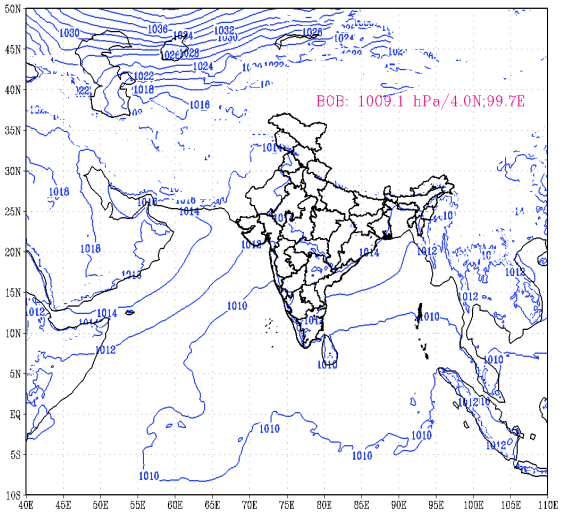
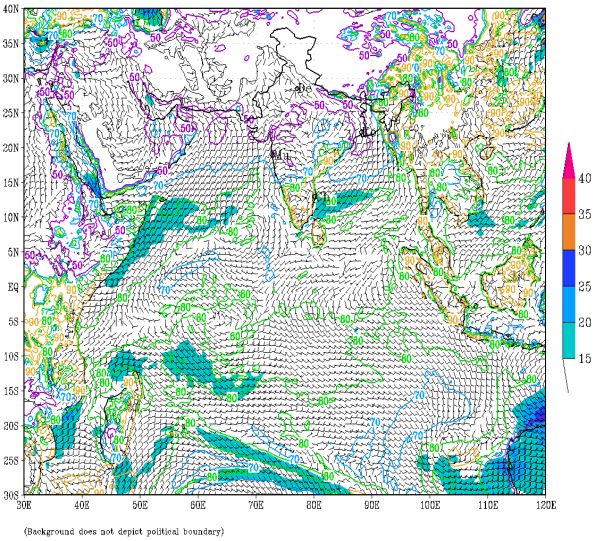
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 11-12-2023



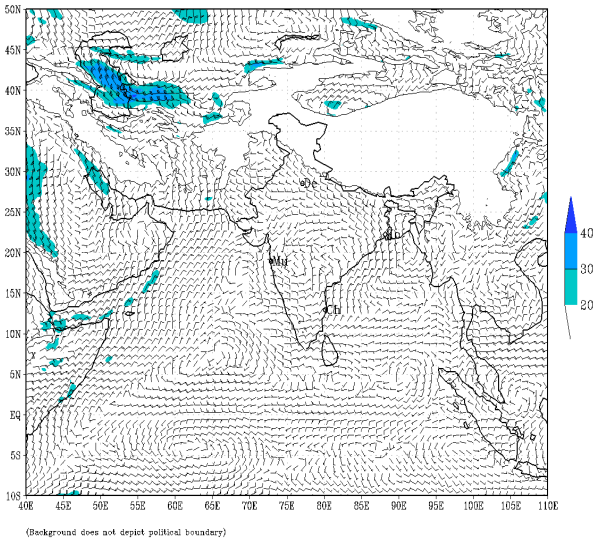
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 11-12-2023



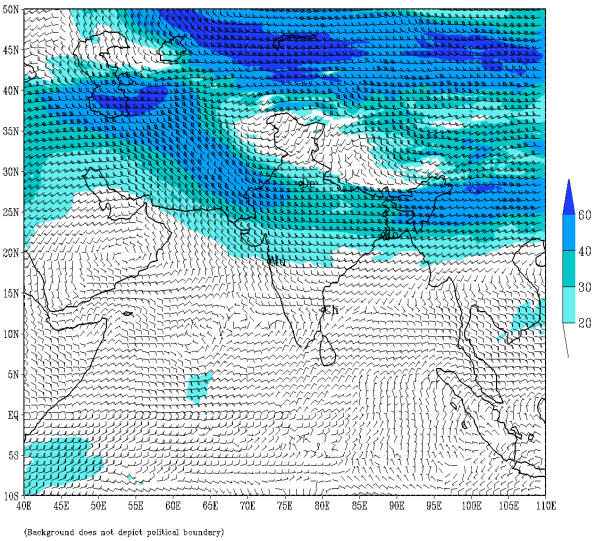
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 11-12-2023



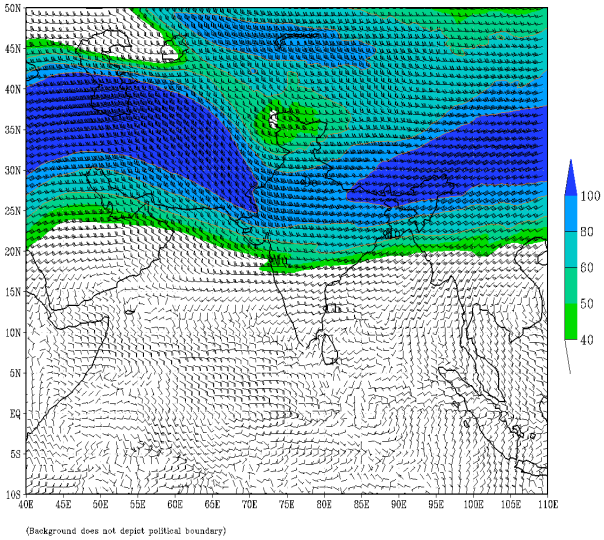
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 11-12-2023



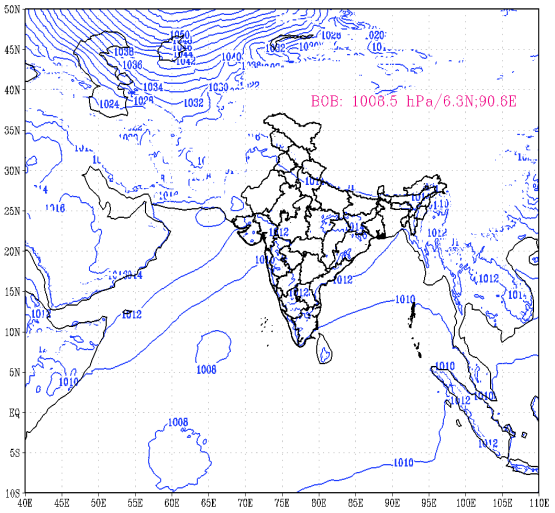
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 11-12-2023



IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)

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



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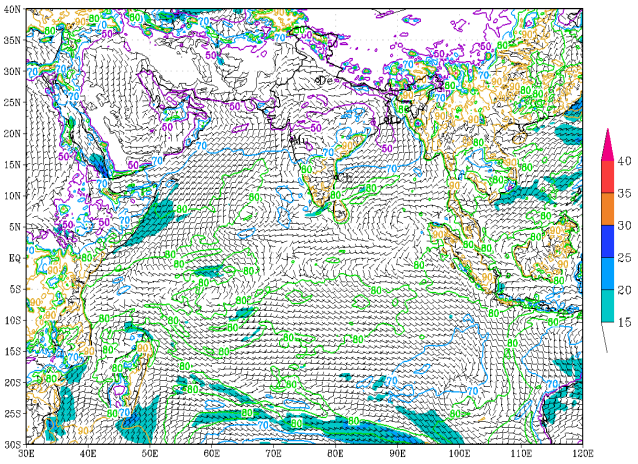
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)

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



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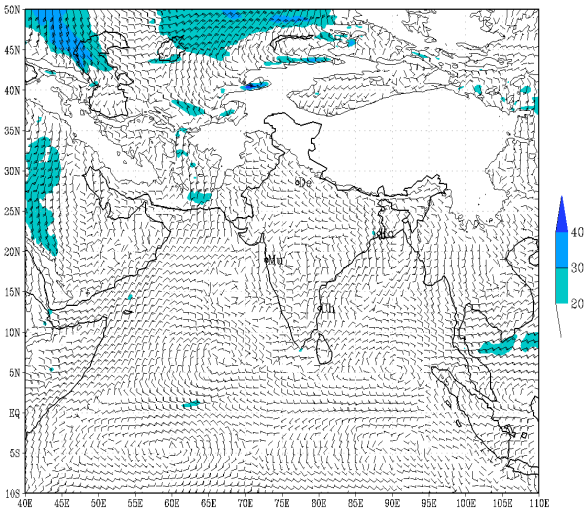
based on 00 UTC of 10-12-2023 valid for 00 UTC of 12-12-2023



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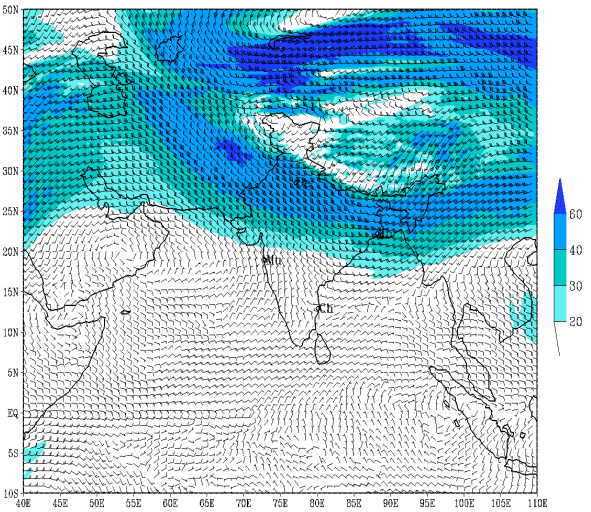
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)

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



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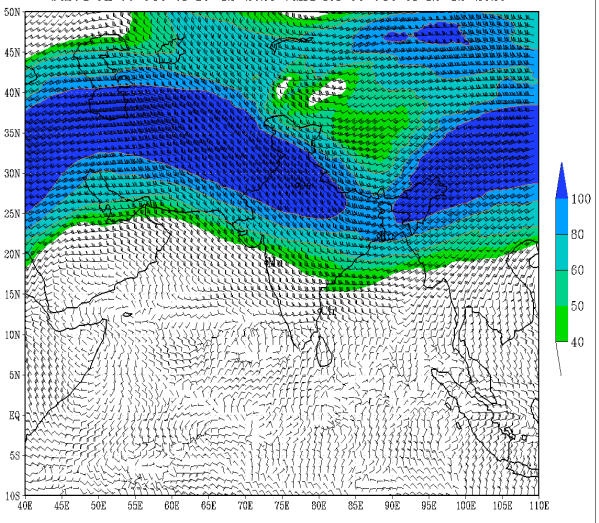
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)

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



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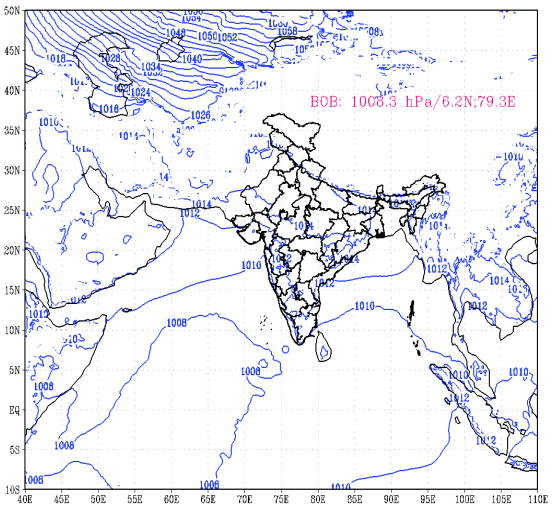
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 13-12-2023



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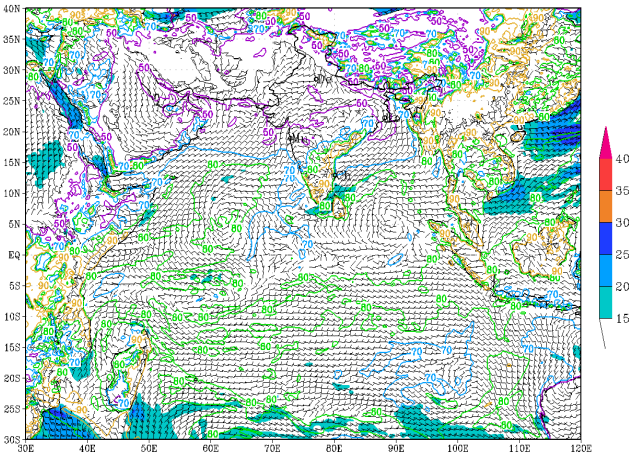
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 13-12-2023



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

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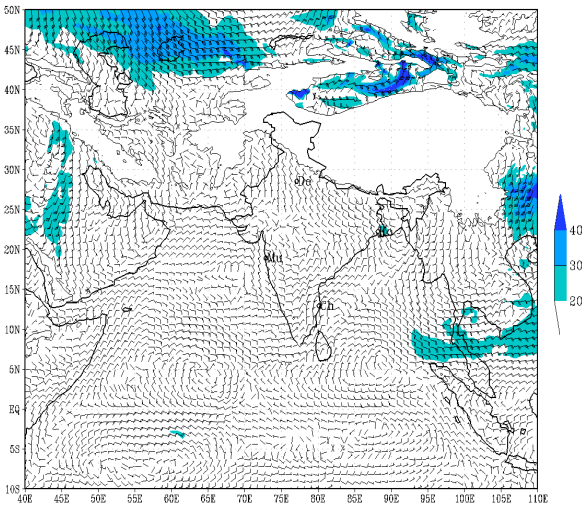

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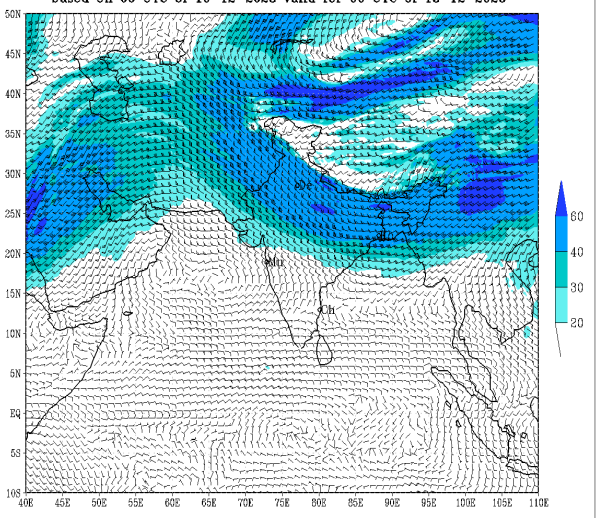
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (72 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 13-12-2023



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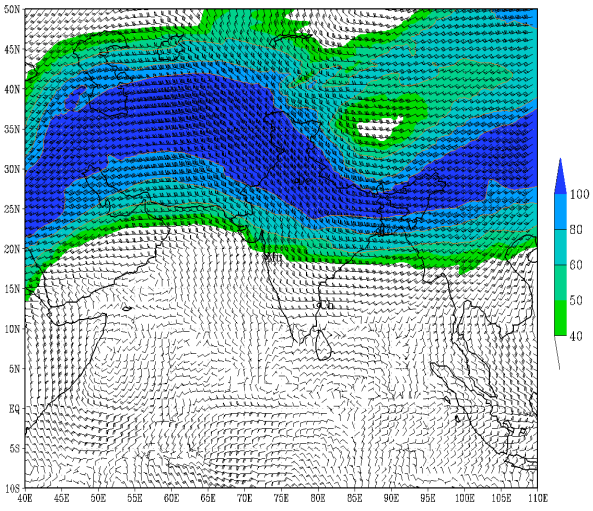
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (72 HR)

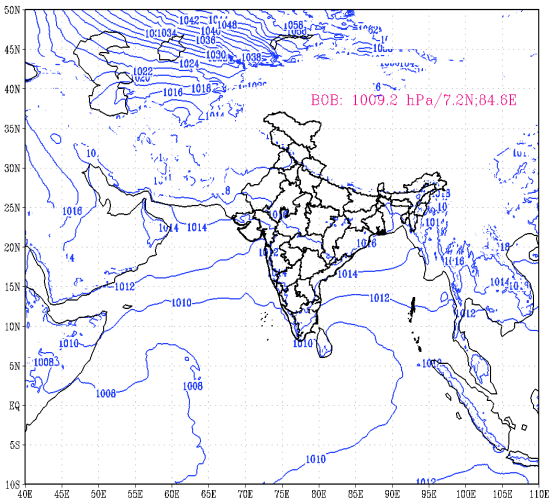
based on 00 UTC of 10-12-2023 valid for 00 UTC of 13-12-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)

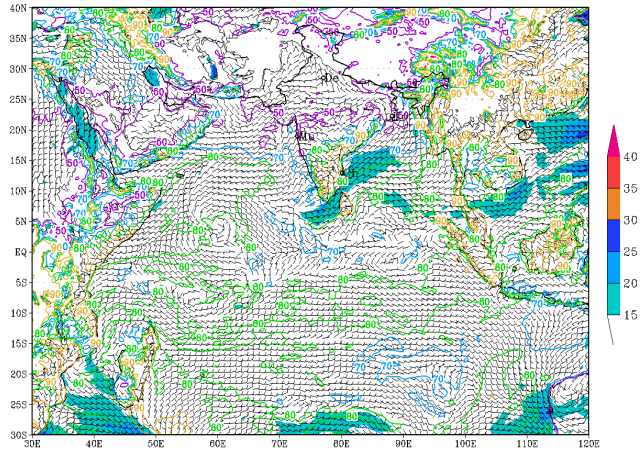
based on 00 UTC of 10-12-2023 valid for 00 UTC of 14-12-2023



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)

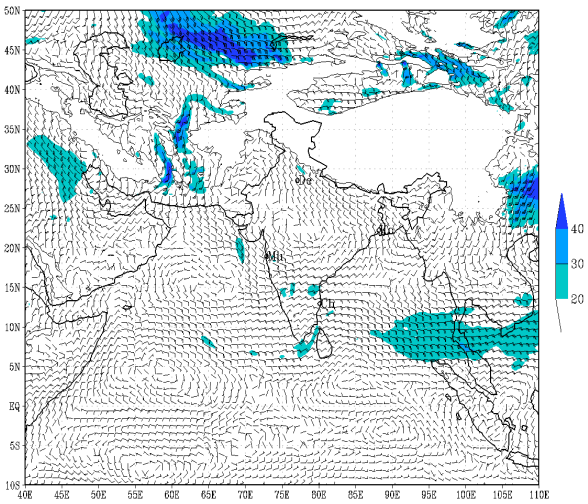
based on 00 UTC of 10-12-2023 valid for 00 UTC of 14-12-2023



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 14-12-2023



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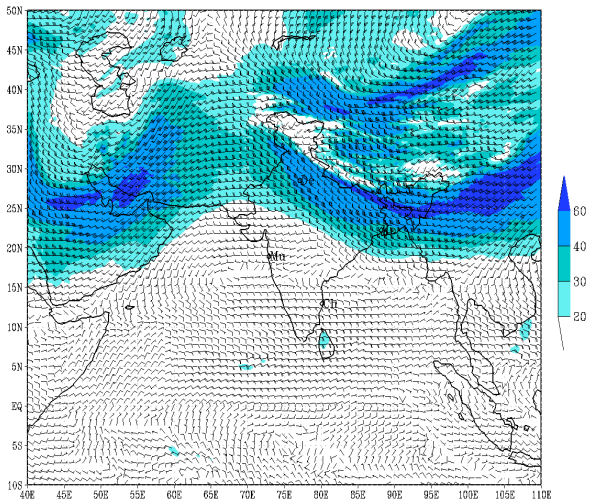
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 14-12-2023



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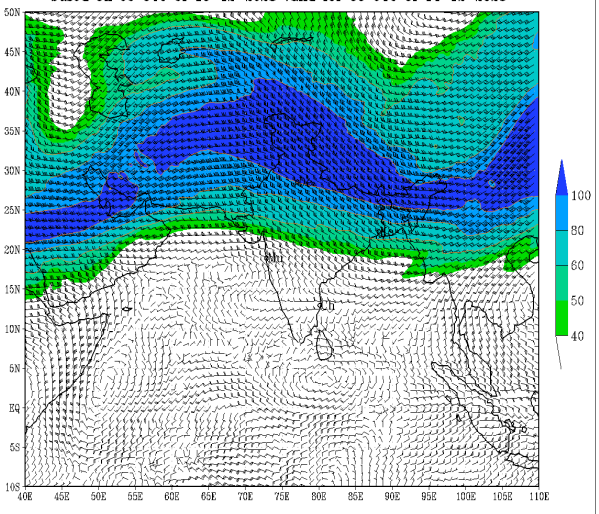
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 14-12-2023



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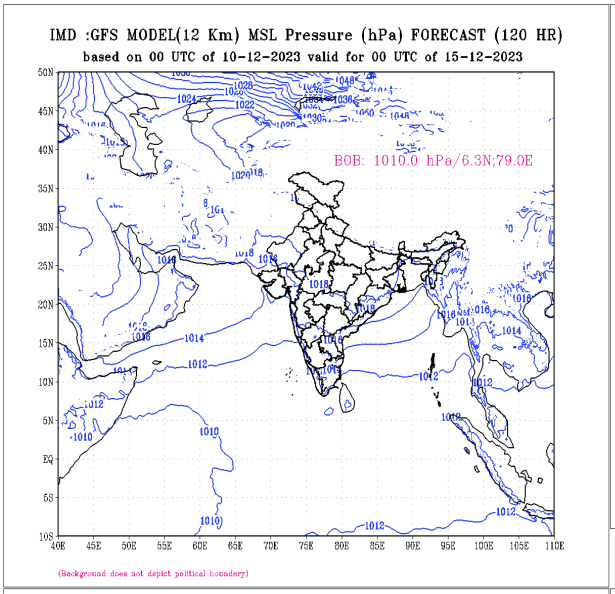
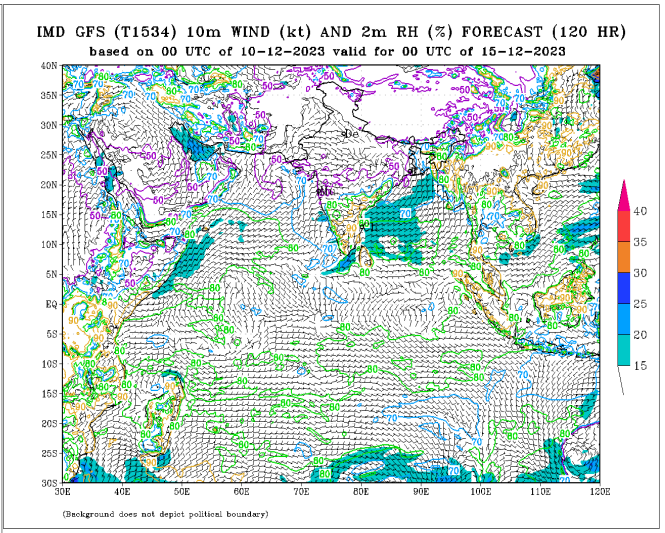
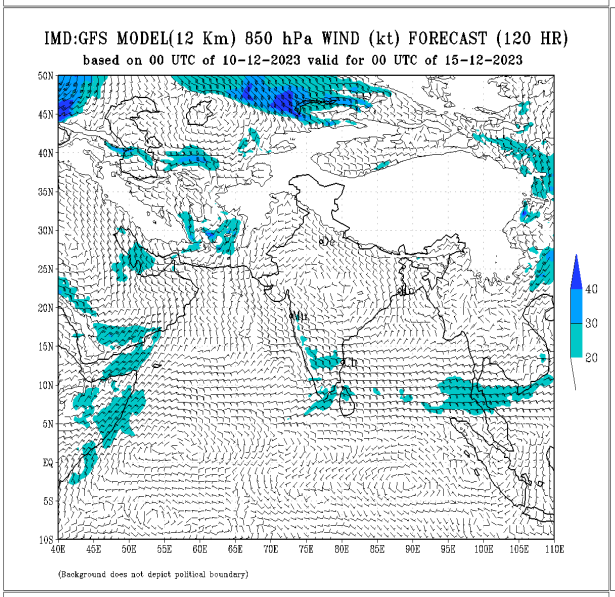
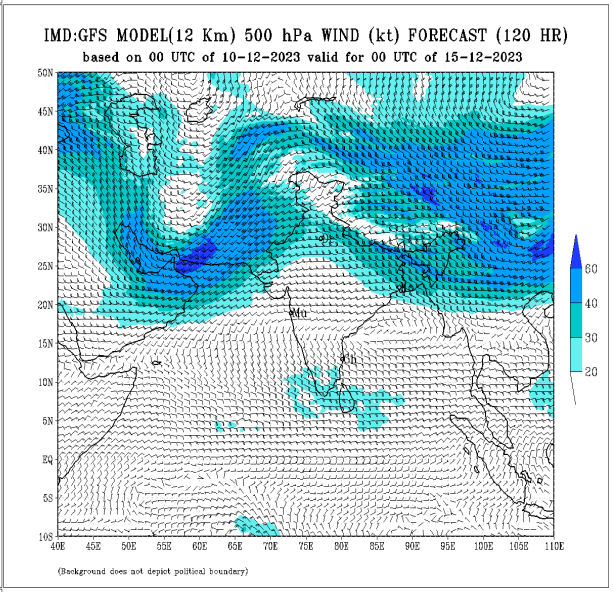

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 10-12-2023 valid for 00 UTC of 15-12-2023
BOB: 1010.0 hPa/6.3N;79.0E
(Background does not depict political boundary)


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 10-12-2023 valid for 00 UTC of 15-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 10-12-2023 valid for 00 UTC of 15-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 10-12-2023 valid for 00 UTC of 15-12-2023
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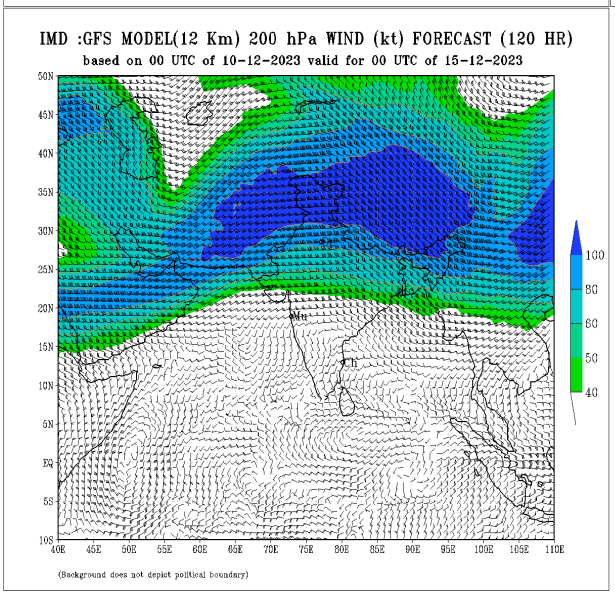
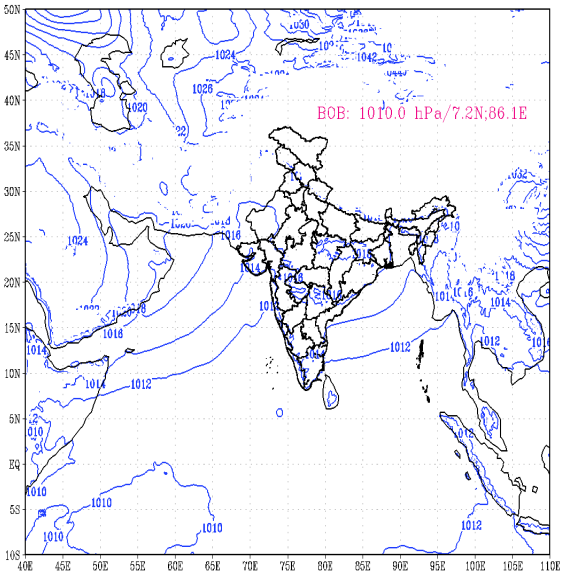

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 10-12-2023 valid for 00 UTC of 15-12-2023
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)

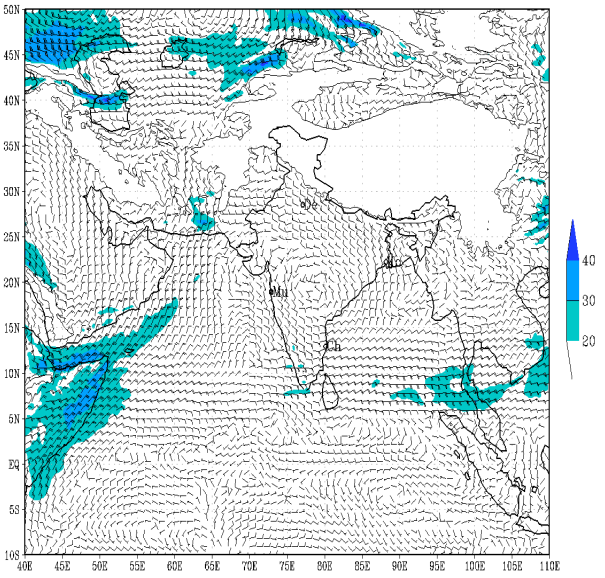
based on 00 UTC of 10-12-2023 valid for 00 UTC of 16-12-2023



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)

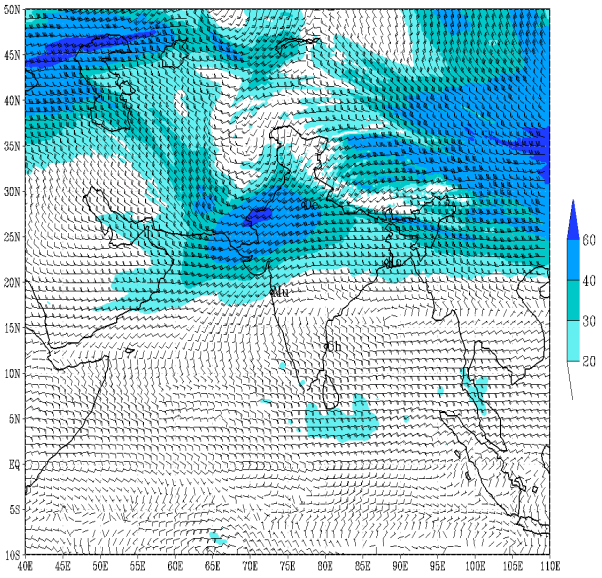
based on 00 UTC of 10-12-2023 valid for 00 UTC of 16-12-2023



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)

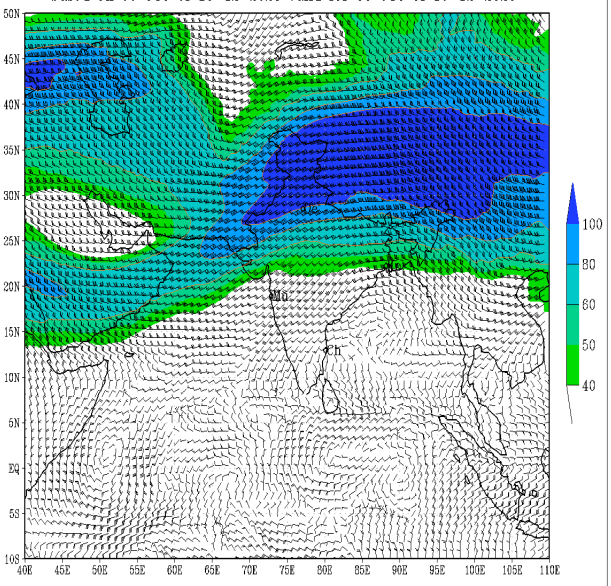
based on 00 UTC of 10-12-2023 valid for 00 UTC of 16-12-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)

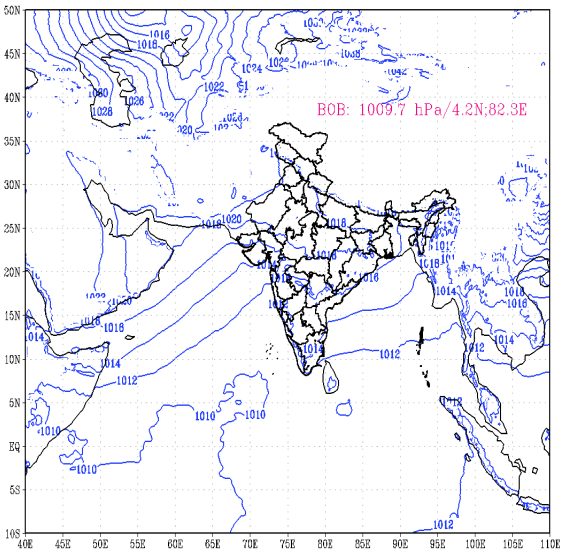
based on 00 UTC of 10-12-2023 valid for 00 UTC of 16-12-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)

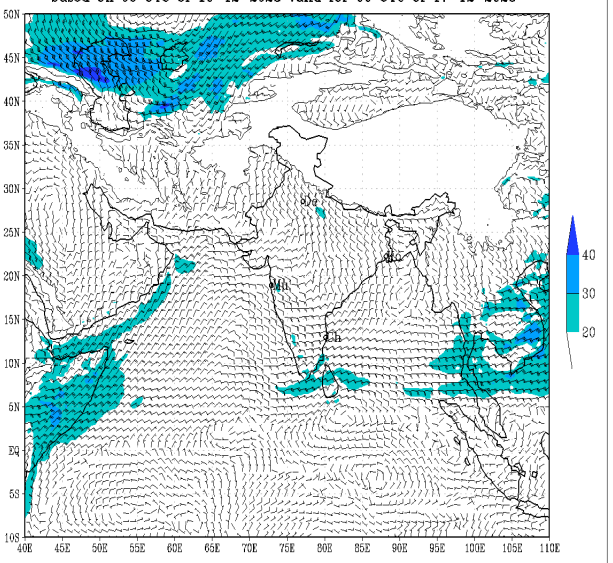
based on 00 UTC of 10-12-2023 valid for 00 UTC of 17-12-2023



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)

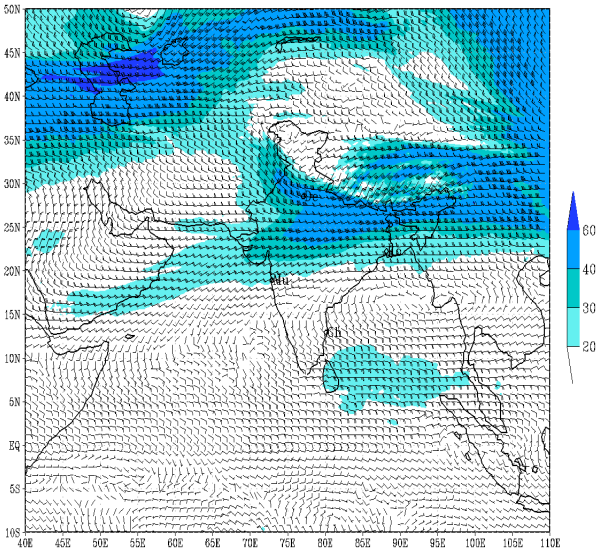
based on 00 UTC of 10-12-2023 valid for 00 UTC of 17-12-2023



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)

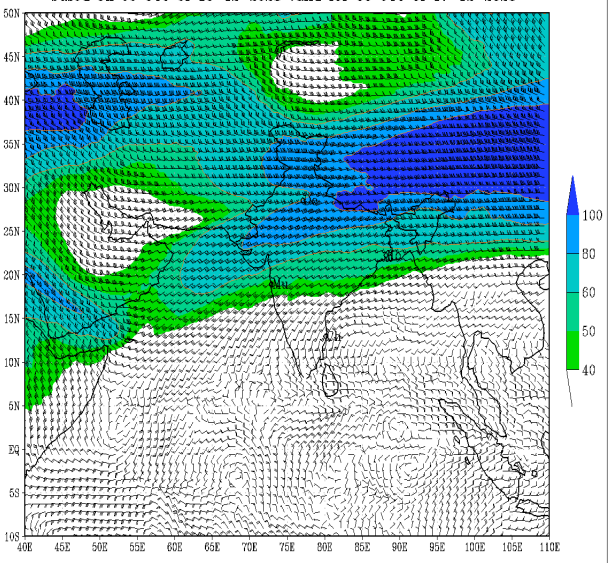
based on 00 UTC of 10-12-2023 valid for 00 UTC of 17-12-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)

based on 00 UTC of 10-12-2023 valid for 00 UTC of 17-12-2023



(Background does not depict political boundary)