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

Tropical Cyclone Forecast Programme
Report Dated 19th November, 2023

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

- The upper air Cyclonic Circulation over Comorin area extending upto 1.5 km above mean sea level persists.
- The upper air Cyclonic Circulation over Southeast Bay of Bengal between 3.1 km & 5.8 km above mean sea level persists.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	Around 30 over south and central BoB, Andaman Sea, 27-28 over north and adjoining central BoB.	30-31 over along and off Kerala , Karnataka coasts, adjoining sea area, Lakshadweep area, adjoining southeast AS, 29-30 over southeast and southwest AS, adjoining eastcentral AS, 28-29 over westcentral and adjoining southwest AS, north AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	100-110 over parts of south and adjoining central BoB, 70-80 over north Andaman Sea.	100-110 over parts of south and adjoining eastcentral AS.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	Around 30-40 over southwest and adjoining southeast BoB, Gulf of Mannar, Comorin Area and northeast BoB.	30-40 over few parts of southeast AS.
Low Level convergence (X10^{-5} s^{-1})	05-10 over southwest BoB, along and off Sri Lanka coast, Gulf of Mannar.	5-10 over southeast & adjoining southwest AS.
Upper Level divergence (X10^{-5} s^{-1})	5-10 over southeast BoB and adjoining Equatorial Indian Ocean	30-40 over Comorin and Kakshadweep area and along & off Kerala coast
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots**	5-15 over south and central BoB, 5 over Andaman Sea, 20 over parts of central BoB, High (> 20 knots) over remaining parts of	10-15 over the south AS, > 20 over the central AS and North AS.

High: >20 knots	BoB.	
Wind Shear Tendency (knots)	Decreasing over south BoB .	Decreasing over parts of south AS & adjoining central AS.
Upper Tropospheric Ridge	Along 15^{o}N over BoB.	Along 11^{o}N over AS.

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the Bay of Bengal & Andaman Sea:-
Scattered to broken low/med clouds with embedded int to v int convection over eastcenttral & south Bay of Bengal. Scattered low/med clouds with embedded mod to int convection over westcentral Bay of Bengal, Andaman Sea.

(b) Over the Arabian Sea:-
Scattered low/med clouds with embedded mod to int convection over southeast Arabian Sea, Comorin area and isolated weak to moderate convection over southwest Arabian Sea.

(c) Convection outside India:-
Scattered low/med clouds with embedded mod to int convection over Sri Lanka, Palk strait, Gulf of Mannar, Maldives, Thailand, Gulf of Thailand, Cambodia, Sumatra, adjacent west coast, Strait of Malacca, Malaysia, Borneo, South, China Sea, Java Sea, Celebes islands & Sea, Philippines, Sulu Sea, Madagascar and over Indian Ocean between lat 5.0N to 03.0S long 40.0E to 100.0E and bet lat 03.0S to 35.0S long 40.0E to 80.0E.

M.J.O. Index:
MJO index is currently in Phase 1 with amplitude greater than 1. It will remain in phase 1 with amplitude greater than 1 till 21st November. It will enter phase 2 with amplitude greater than 1 on 22nd November. It will remain there in phase 2 with amplitude greater than 1 till 25th November, later it will continue in phase 2 for few days with amplitude less than 1.

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	Cyclonic circulation (cycir) over South Andaman Sea on 25th Nov having its westwestward movement.	No significant system during next 7 days.
IMD-GEFS	Cyclonic circulation (cycir) over South Andaman Sea on 25th Nov having its westwestward movement.	No significant system during next 7 days.
IMD-WRF	No significant system during next 3 days.	No significant system during next 3 days.
NCMRWF-NCUM	No significant system during next 7 days.	No significant system during next 7 days.
NCMRWF-NEPS	No significant system during next 7 days.	No significant system during next 7 days.
NCMRWF-UM (Regional)	No significant system during next 3 days.	No significant system during next 7 days.
ECMWF	No significant system during next 7 days.	No significant system during next 7 days.
NCEP-GFS	No significant system during next 7 days.	No significant system.

IMD-Genesis Potential Parameter	GPP is indicating a potential zone over Comorin area on 19th and 20th Nov, over southeast BoB from 22nd to 25th Nov.	No potential zone over AS for next 7 days.

Summary and conclusion:

1. For Bay of Bengal:

Most of the models are indicating no significant system over the Bay of Bengal for the next seven days. However, IMD-GFS & IMD-GEFS models are indicating a cyclonic circulation around 25th November over South Andaman Sea having its westward movement. The likely development of this system needs to be watched.

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

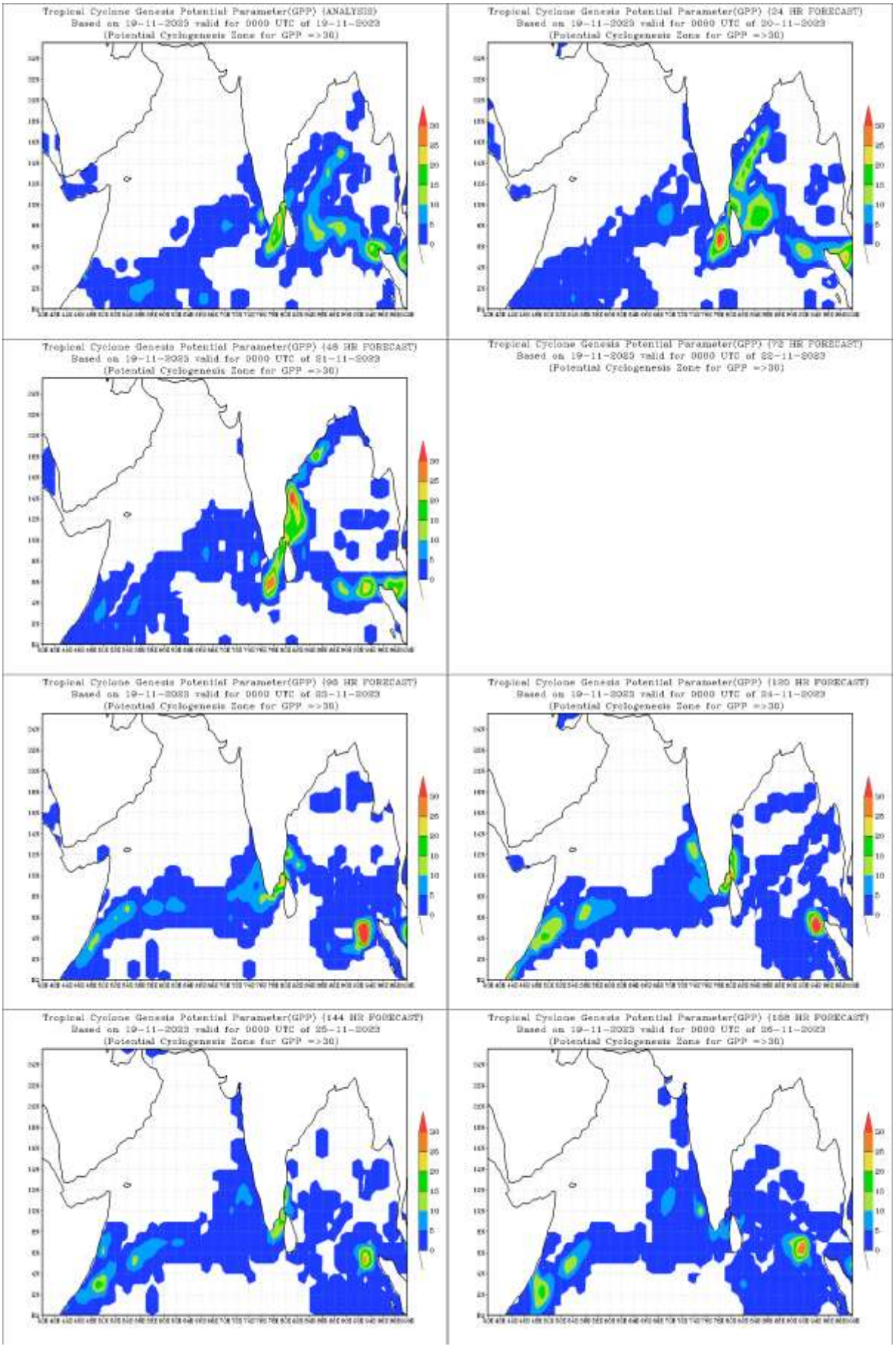
2. For the Arabian Sea:

Most of the models are indicating that there will be no significant system for the 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


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 19-11-2023 valid for 0000 UTC of 19-11-2023
(Potential Cyclogenesis Zone for GPP =>36)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
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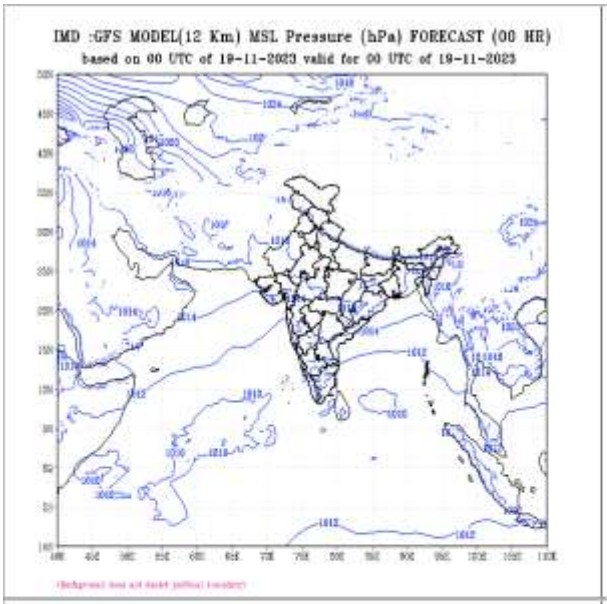
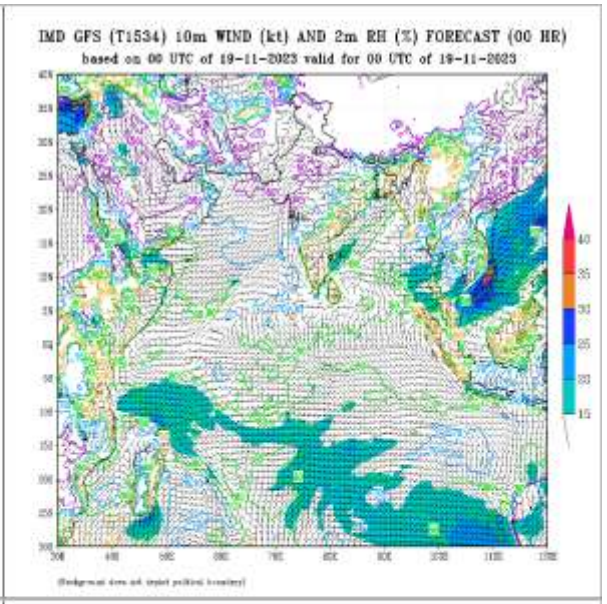
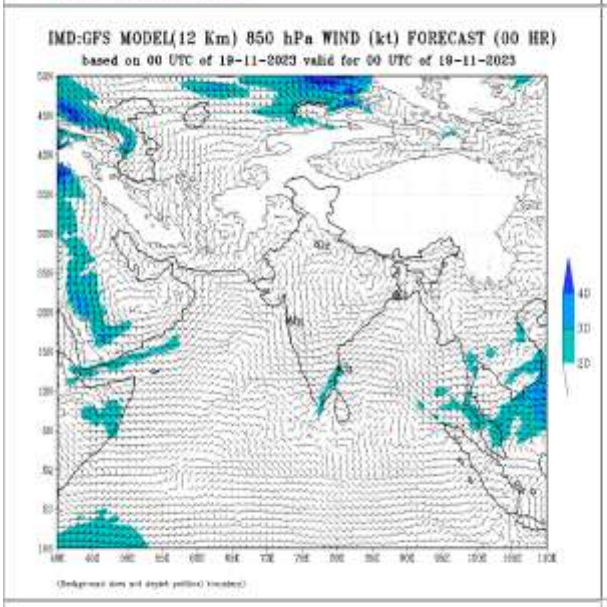

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 19-11-2023


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 19-11-2023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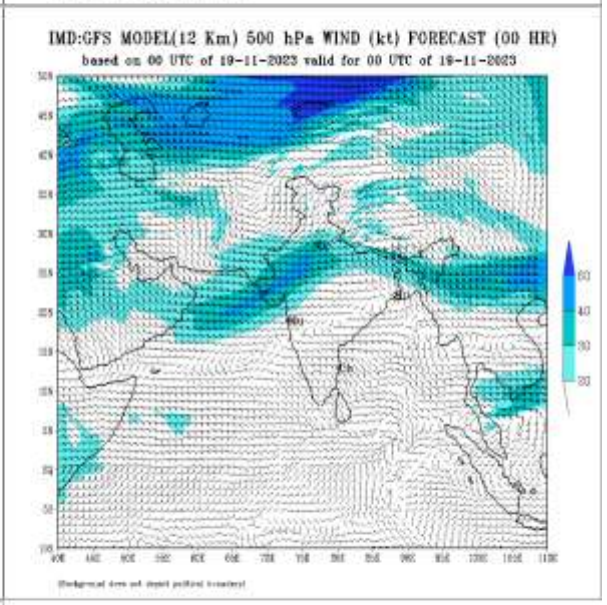
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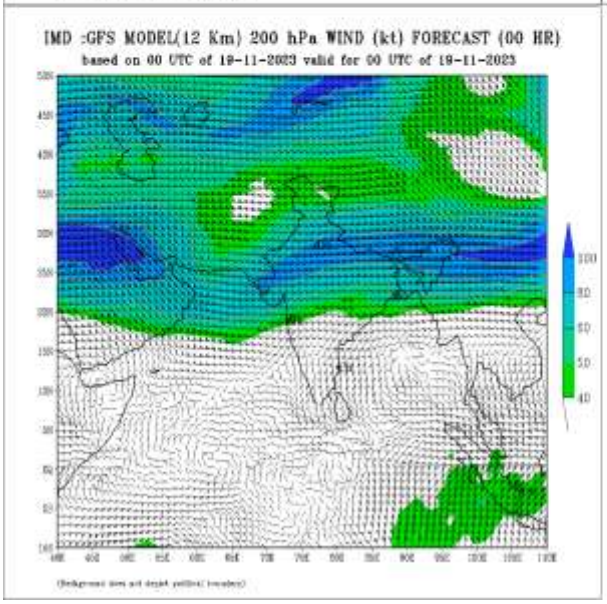
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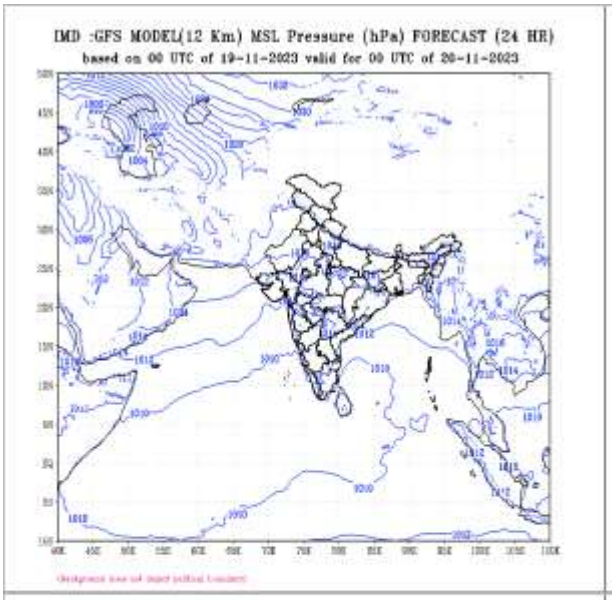
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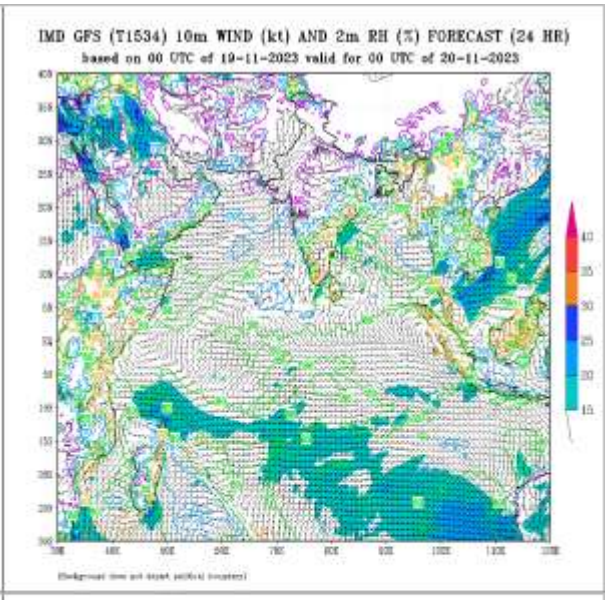
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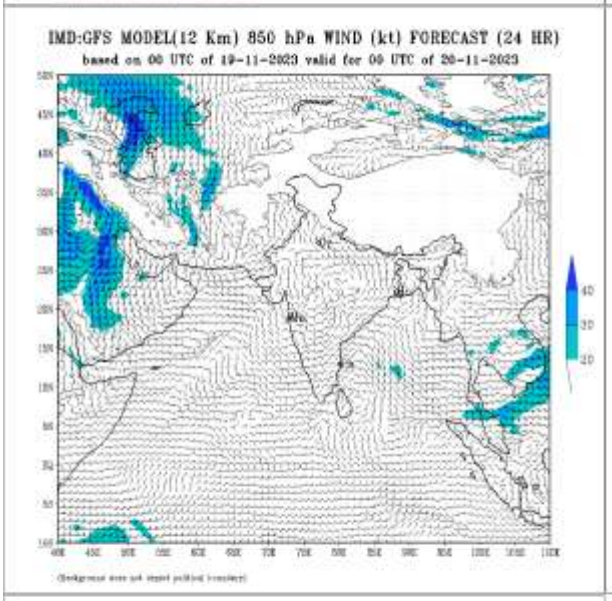
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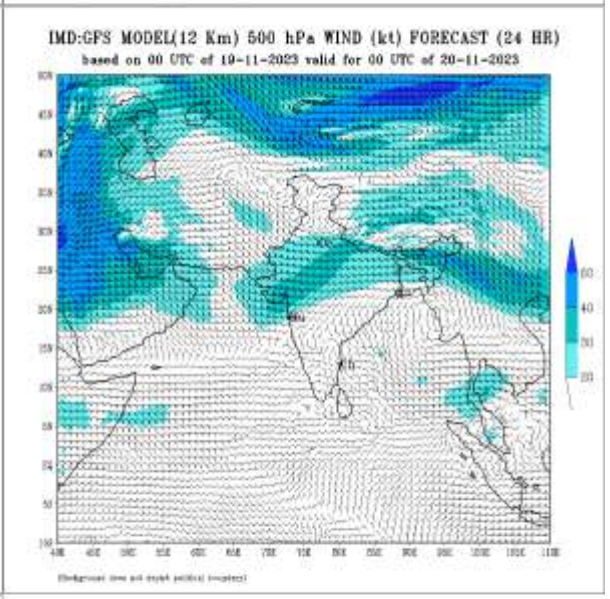
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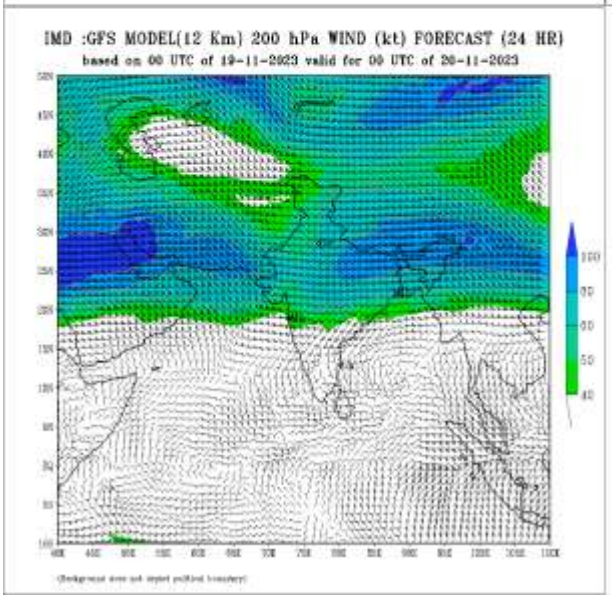
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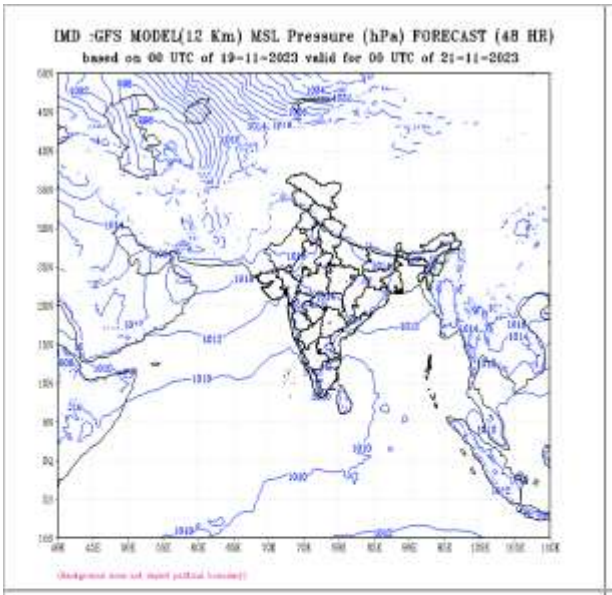
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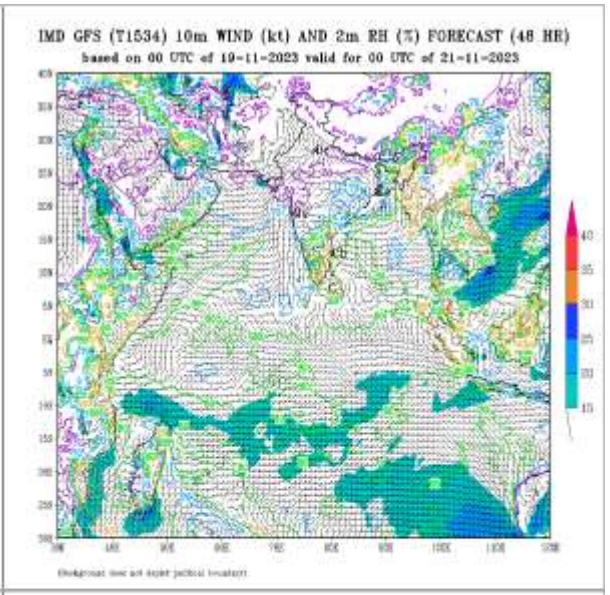
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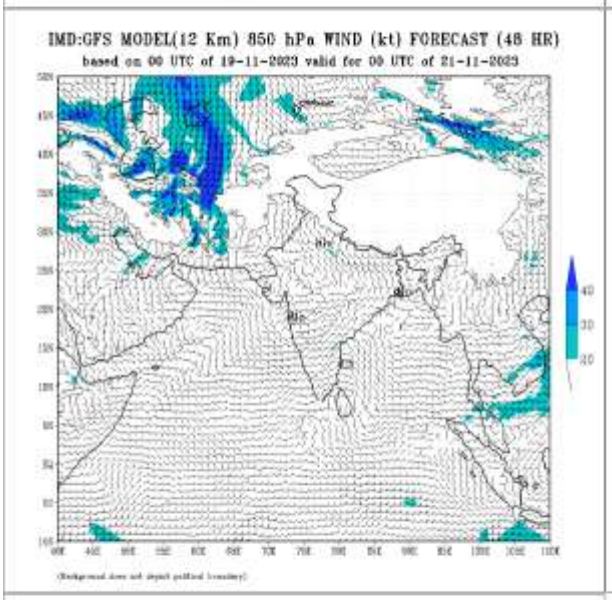
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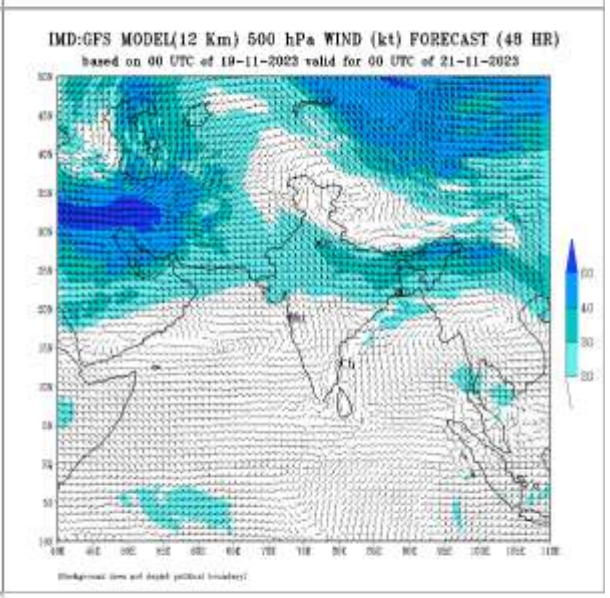
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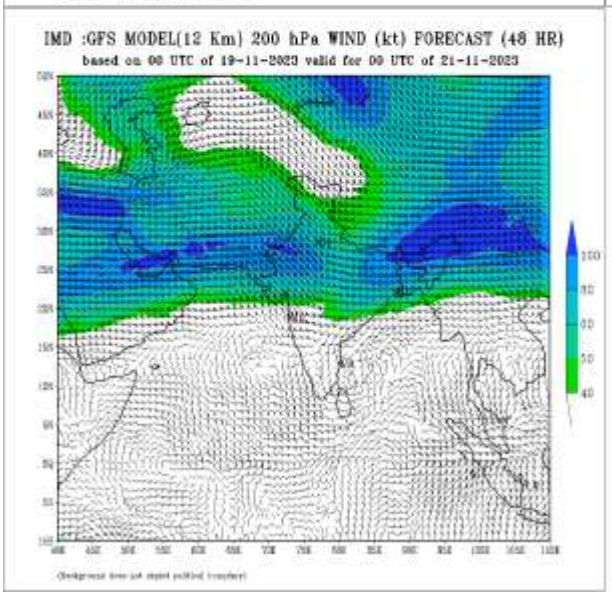
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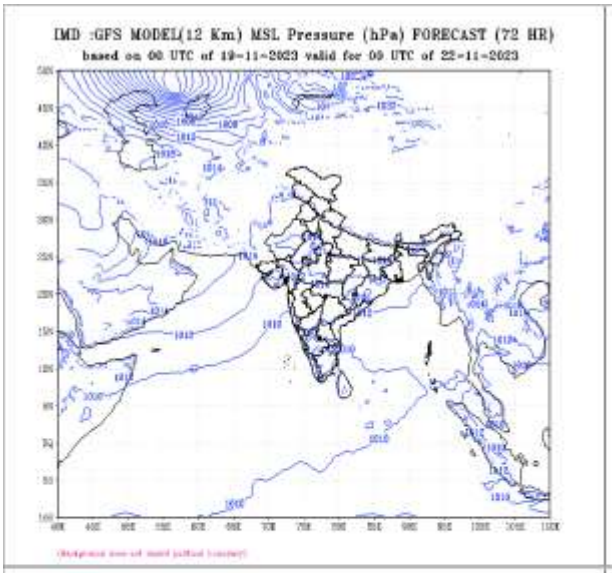
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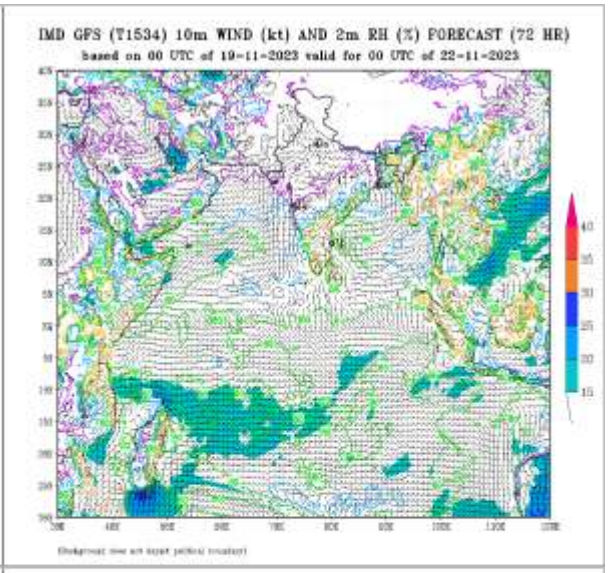
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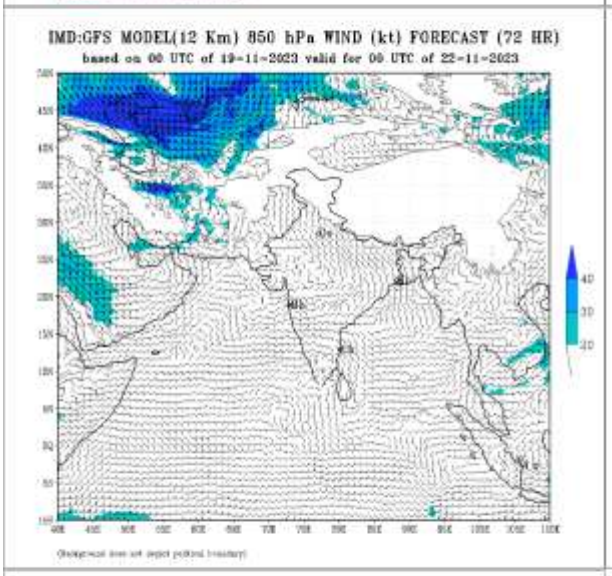
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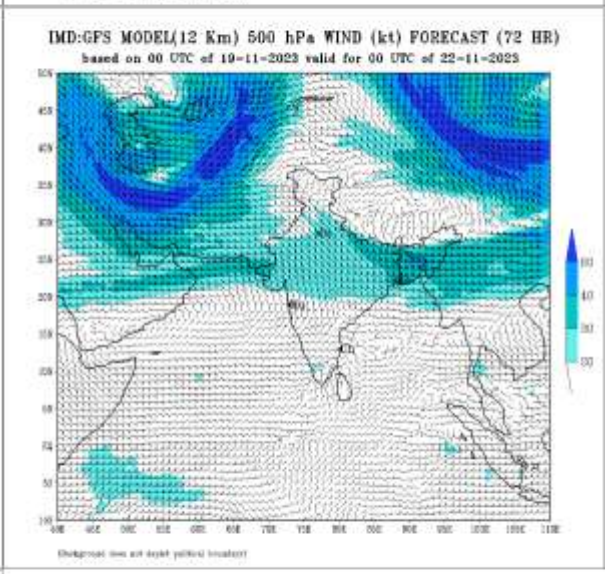
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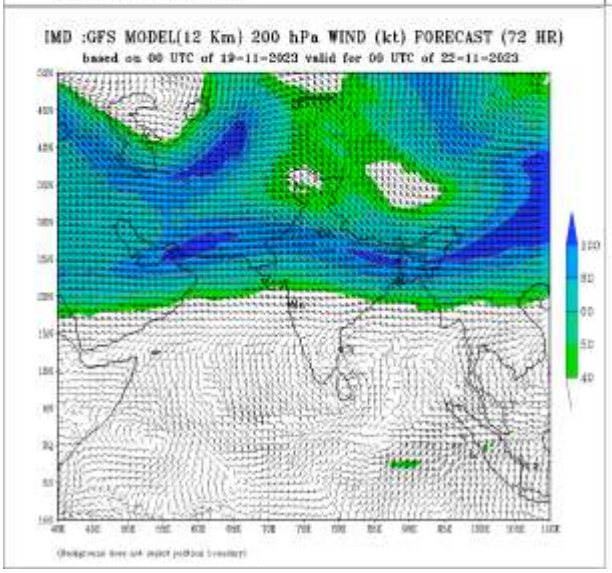
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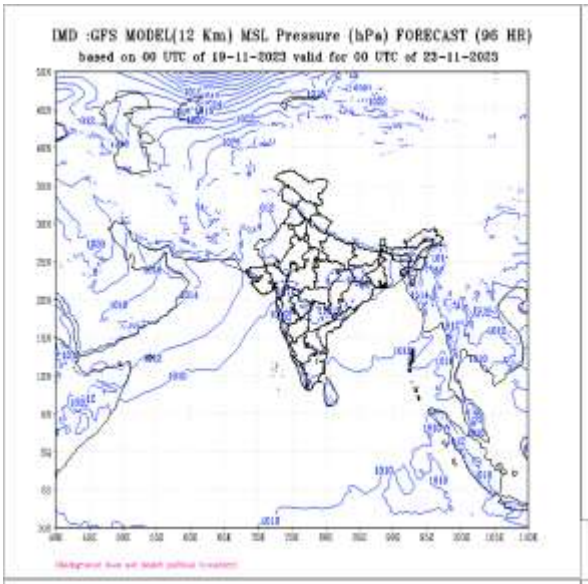
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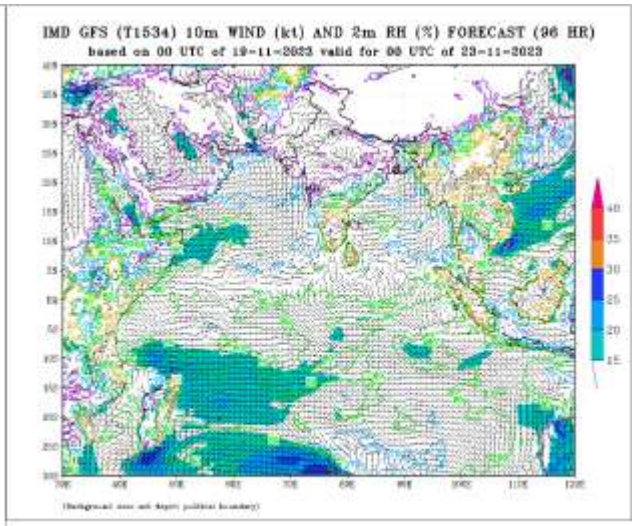
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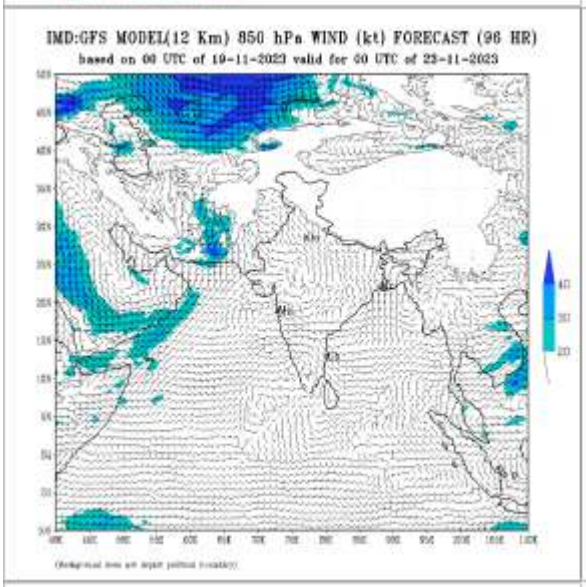
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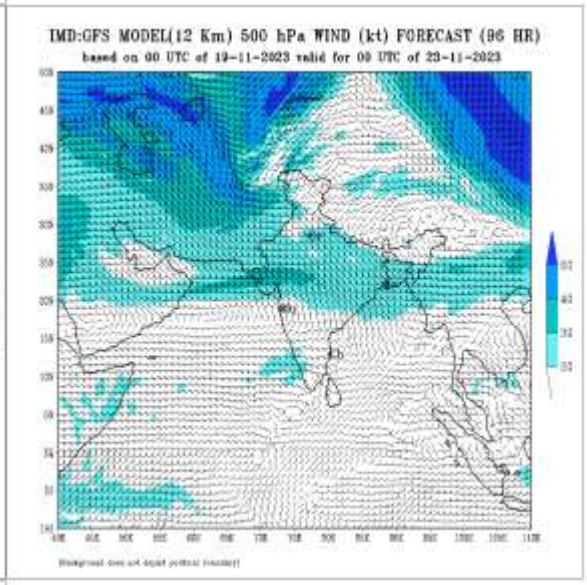
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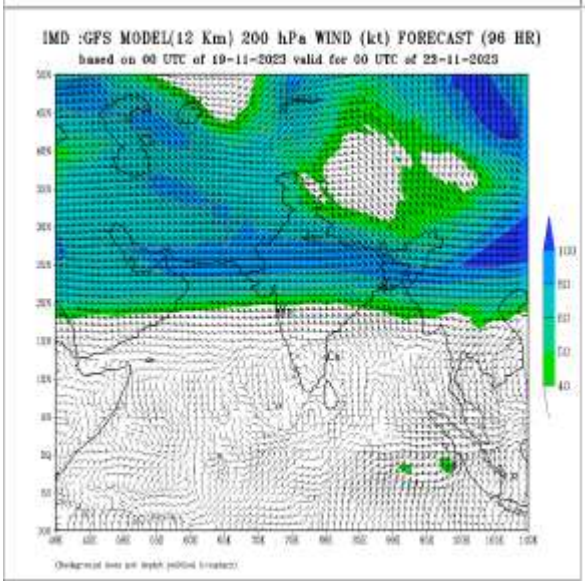
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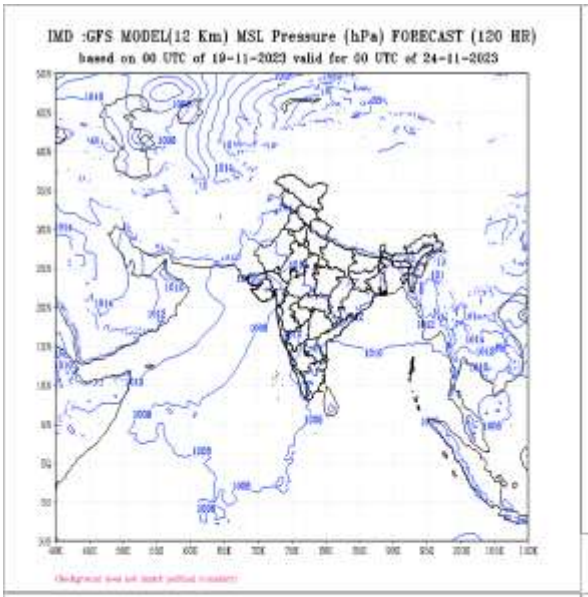
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
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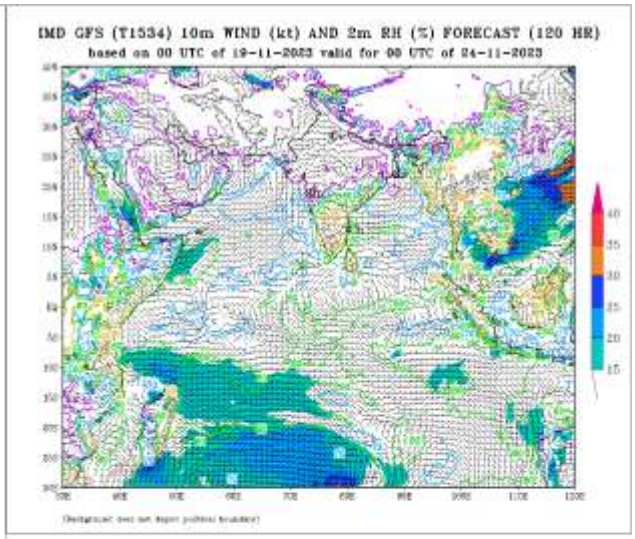
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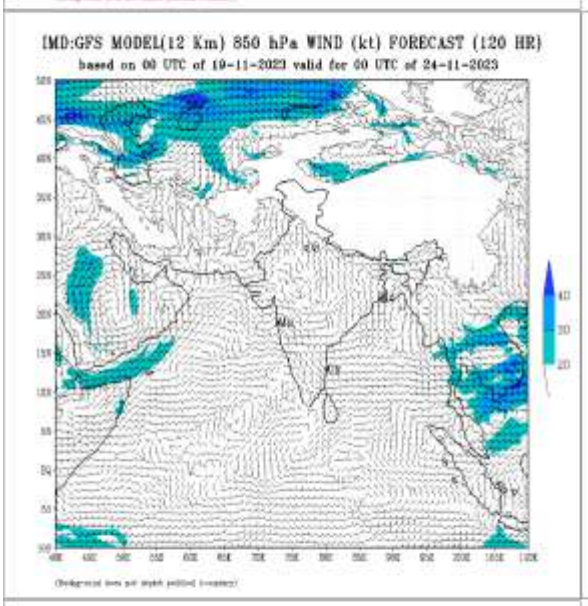
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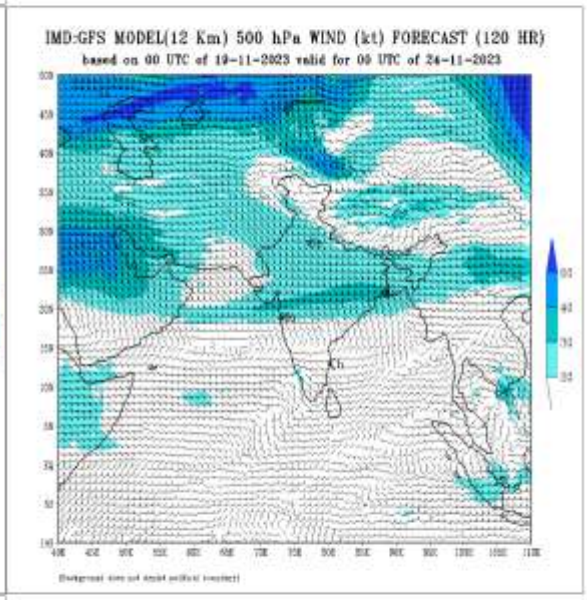
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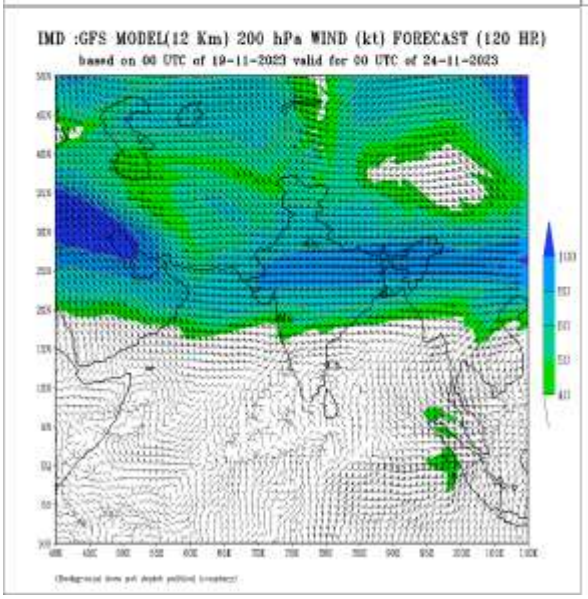
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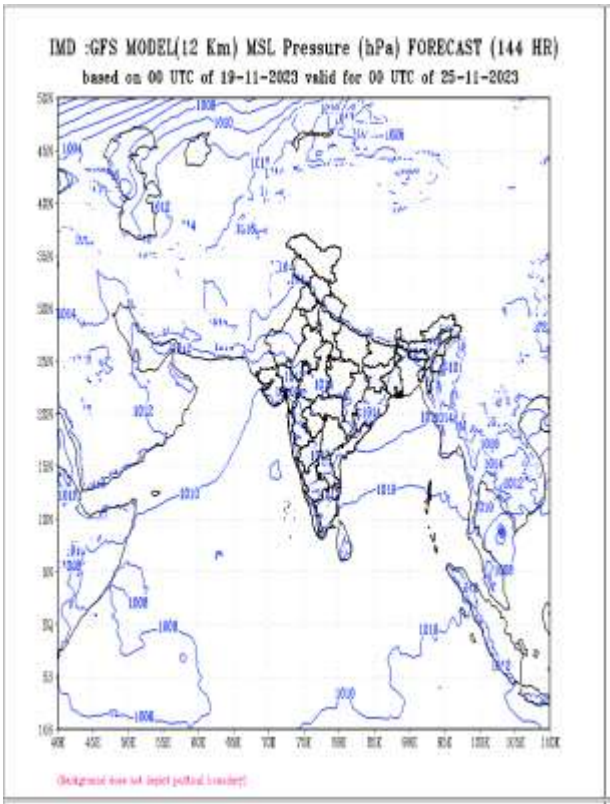
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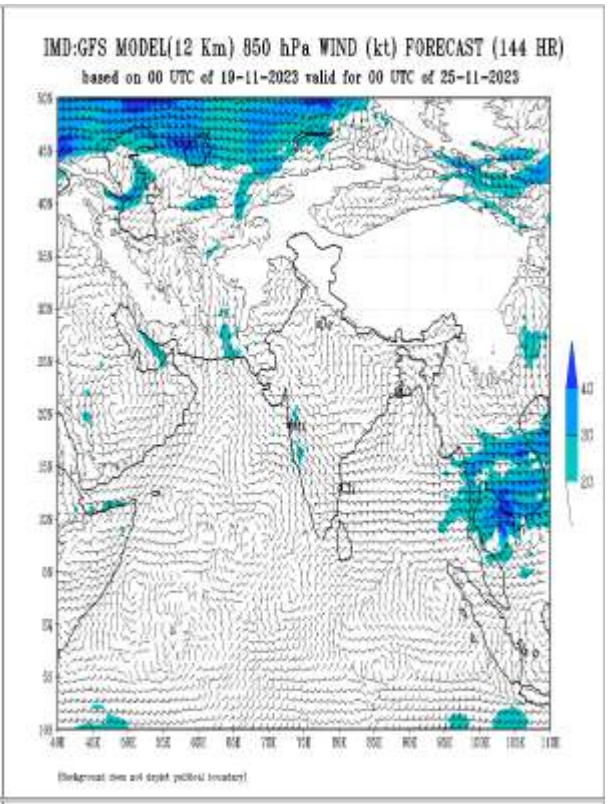
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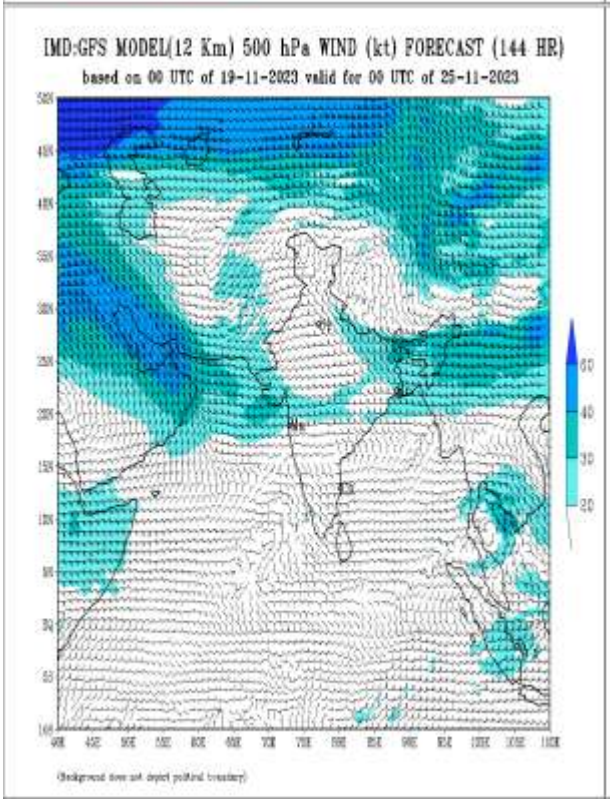
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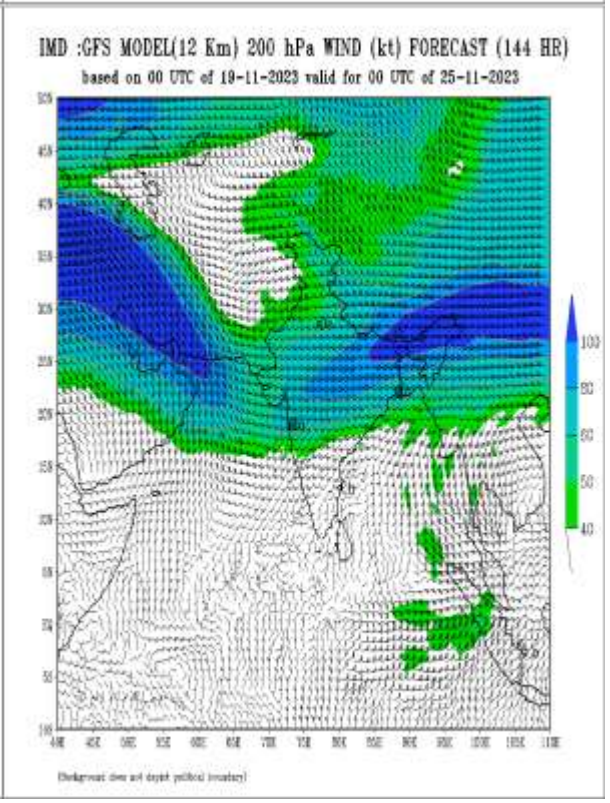
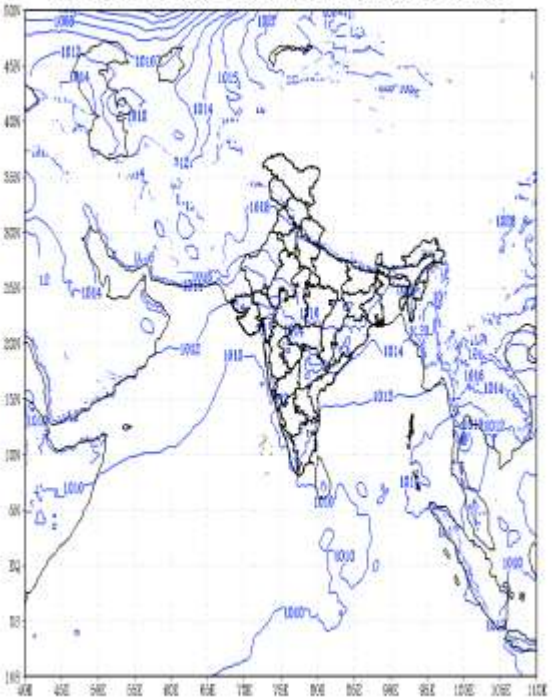
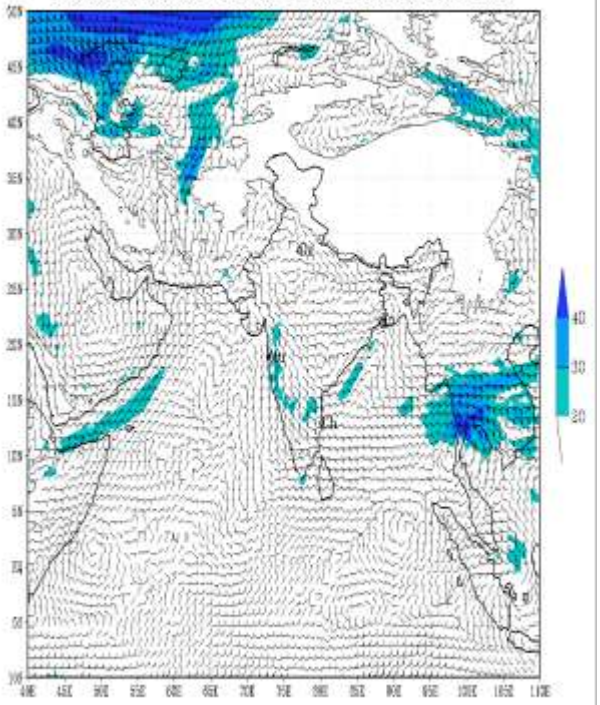

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 25-11-2023

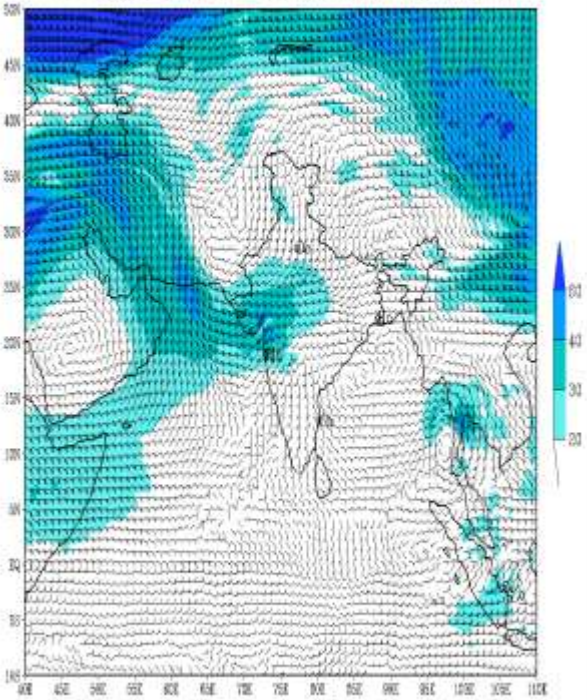
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 26-11-2023



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 26-11-2023



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 26-11-2023



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 19-11-2023 valid for 00 UTC of 26-11-2023