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

Tropical Cyclone Forecast Programme
Report Dated 06th December, 2023

Time of Issue: 1300 UTC

Synoptic features (based on 0600 UTC analysis):

Yesterday's Severe Cyclonic Storm "MICHAUNG" (pronounced as MIGJAUM) over Westcentral & adjoining Southwest Bay of Bengal off south Andhra Pradesh coast moved northwards and crossed south Andhra Pradesh coast between Nellore and Machilipatnam, close to south of Bapatla during 1230 to 1430 hours IST of yesterday, the 5th December 2023 as a Severe Cyclonic Storm with maximum sustained wind speed of 90-100 kmph. After landfall, it continued to move nearly northwards and weakened into a Cyclonic Storm over south Coastal Andhra Pradesh in the afternoon (1530 hours IST), further into a Deep Depression over Central parts of Coastal Andhra Pradesh in the mid-night (2330 hours IST) of the same day. It then moved north-northeastwards and weakened into a Depression over Northeast Telangana and adjoining areas of south Chhattisgarh, south Interior Odisha and coastal Andhra Pradesh in the early morning and further weakened into a Well Marked Low Pressure Area in the forenoon (0830 hours IST) of today, the 6th December, 2023.

The system is likely to continue to move nearly north-northeastwards and weaken further into a Low Pressure Area during next 12 hours.

Dynamical and thermo-dynamical features (0600 UTC)

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	27-28 over southeast major parts of BoB & Andaman sea 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 parts of BoB.	110-120 over southeast and adjoining westcentral AS. 80-100 over parts of eastcentral AS. 70-80 along the west coast.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	10-20 over few parts of BoB and Gulf of Mannar.	10-20 over most parts of AS.

Low Level convergence ($X10^{-5}$ s^{-1})	10-15 over the westcentral BoB of the system, 5 over few parts of southwest BoB and South Andaman sea.	-5 over Northeast AS and over the coast of Karnataka and Kerala. AS. -5 over westcentral adjoining southwest AS. 10-20 over southwest AS adjoining to EIO.
Upper Level divergence ($X10^{-5}$ s^{-1})	5-10 over the parts of westcentral BoB, 5-10 over Southeast BoB adjoining South Andaman sea. -10 over Southwest adjoining westcentral BoB.	5-10 over Southeast AS, -5 along and off Gujarat and Maharashtra coasts. -5 over Westcentral adjoining southwest AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate:10-20 knots** **High: >20 knots**	5-10 over the central and adjoining south BoB, north Andaman Sea. 20 over the Southern BoB, Gulf of Mannar, south Andaman Sea. High (>20knots) over rest of BoB.	15-20 over southeast and parts of southwest and adjoining eastcentral AS. High (>20knots) over rest of AS.
Wind Shear Tendency (knots)	Decreasing over central BoB, south Andaman Sea. Increasing over northwest and south BoB, Decreasing over south Andaman Sea, Gulf of Mannar.	Decreasing over North adjoining Westcentral AS and Southwest AS, adjoining to EIO. Increasing over rest of the AS.
Upper Tropospheric Ridge	Along 15^{o}N over BoB.	Along 9^{o}N over AS.

Satellite observations based on INSAT imagery (0600 UTC):

(a) Over the Bay of Bengal & Andaman Sea:-
Scattered to broken low/med clouds with embedded intense to very intense convection lay over nortwest Bay of Bengal off South Orissa coast, eastcentral Bay of Bengal & North Andaman Sea. Scattered low/med clouds with embedded moderate to intense convection over rest Bay of Bengal, Andaman Sea.

(b) Over the Arabian Sea:-
Scattered low/med clouds with embedded intense to intense convection lay over south Arabian Sea. Scattered low/med clouds with embedded moderate to intense convection lay over Southwest Arabian Sea, Comorin area and isolated weak to moderate convection lay over eastcentral Arabian Sea, Lakshadweep island area.

(c) Convection outside India:-
Scattered low/med clouds with embedded moderate to intense convection over South Sri Lanka, Gulf of Manner, Maldives, East Nepal, Bhutan, Tibet, China, Yellow sea adjoining East China sea, Taiwan, North Myanmar Extension South Thailand Gulf of Thailand, North Laos, Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & Sea, Celebes islands & Sea, Philippines, Sulu sea, Madagascar, Mozambique channel and over Indian Ocean between lat 5.0N to 12.0S long 40.0E to 110.0E and between lat 20.0S to 35.0S long 50.0E to 95.0E.

M.J.O. Index:
MJO index is currently in Phase 4 with amplitude greater than 1, it will be in same phase till 7th Dec. It will then move to phase 5 on 8th Dec with amplitude greater than 1, it remains in same phase and with amplitude greater than 1 till 10th Dec. Later on 11th Dec it moves to phase 6 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	No significant circulation for the next 7 days.	No significant circulation for the next 7 days.
IMD-GEFS	No significant circulation for the next 7 days.	No significant circulation for the next 7 days.
IMD-WRF	No significant system during next 4 days.	No significant system during next 3 days.
NCMRWF-NCUM	No significant system during next 3 days.	An LPA over southeast AS (9N/70E) on 9th Dec. It moves northward and lay over same region (10N/70E) as LPA on 10th Dec. It will becomes extended low over the same region on 11th Dec, less marked thereafter.
NCMRWF-NEPS	No significant system during next 7 days.	An LPA over southeast AS (10N/71E) on 10th Dec. It moves northnortwesthward and lay over same region (11N/71E) as LPA on 11th Dec. It moves in same direction and lay over southeast and adjoining eastcentral AS (12N/69E) as LPA on 12th Dec. Less marked thereafter.
NCMRWF-UM (Regional)	No significant system during next 7 days.	An LPA over southeast AS (8N/69E) on 8th Dec. It moves northward and lay over same region (10N/70E) as LPA on 9th Dec.
ECMWF	No significant system during next 7 days.	An LPA over southeast AS (8.5N/72E) on 00 UTC of 9th Dec. It moves northwestward and lay over same region (10N/76E) as LPA/depression 10th Dec. less marked thereafter.
NCEP-GFS	No significant system during next 7 days.	An LPA over southeast AS (8.6N/71E) on 18 UTC of 9th Dec. It moves northwestward thereafter without further intensification.
IMD-Genesis Potential Parameter	No potential zone for the next seven days.	Potential zone over southeast Arabian Sea on 8th Dec having its northwestward movement and lay over southwest and adjoining southwest Arabian Sea on 12th Dec.

Summary and conclusion:

1. **For the Bay of Bengal**:

No significant cyclogenesis over the Bay of Bengal for the next 7 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

*Note: Every 24 hour forecast is valid upto 0300 UTC of the next day.

2. **For the Arabian Sea**:

The IMD-GFS and IMD-GEFS models are not indicating any significant system for the next seven days. However, the NUCM, NCEP-GFS and ECMWF models are indicating a low

pressure area (LPA) over southeast Arabian Sea around 9th Dec having northwestward movement without further intensification.

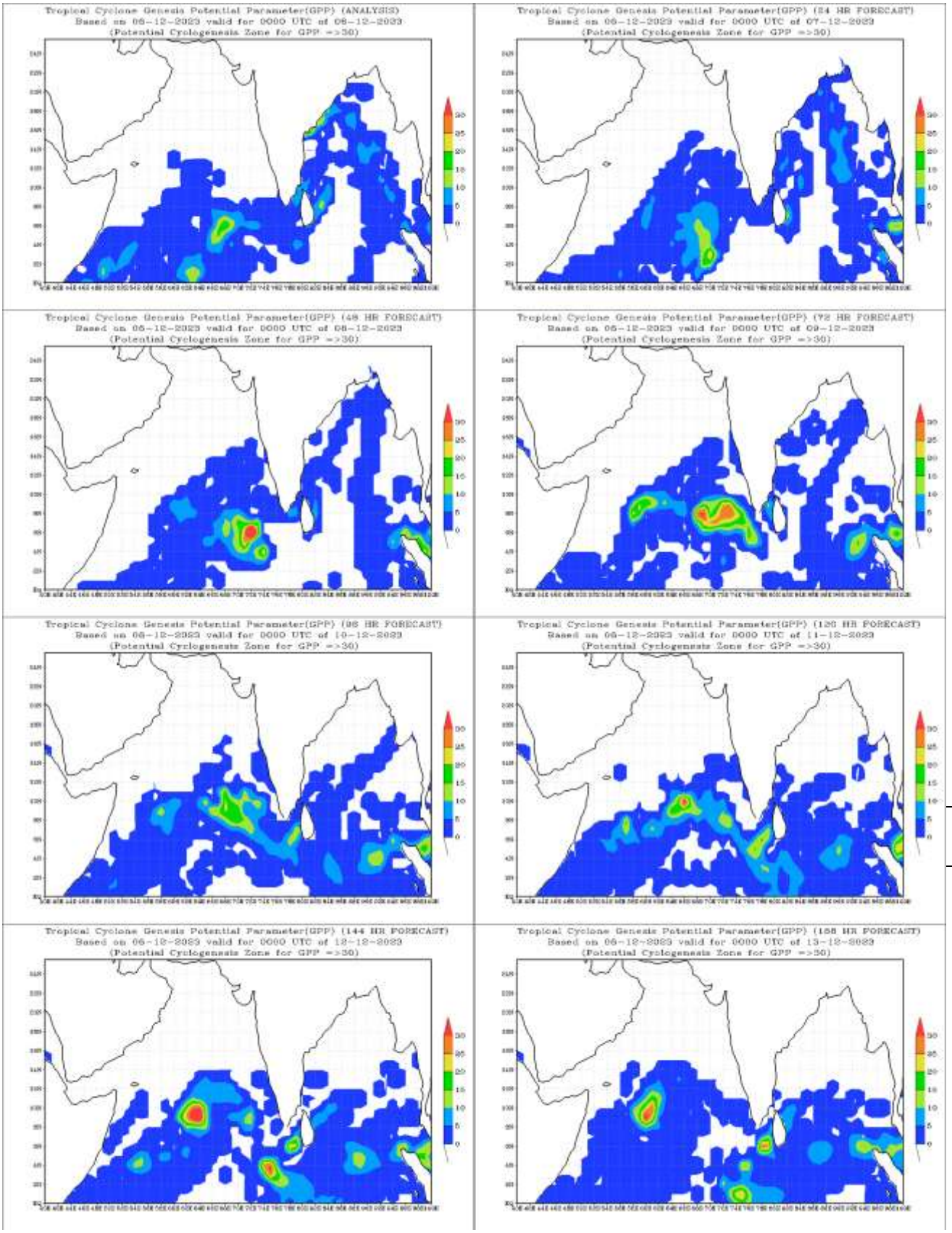
Probability of Cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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

*Note: Every 24 hour forecast is valid upto 0300 UTC of the next day.

IOP: Nil.

ANNEXURE


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 06-12-2023 valid for 0000 UTC of 06-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 06-12-2023 valid for 0000 UTC of 07-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 06-12-2023 valid for 0000 UTC of 08-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 06-12-2023 valid for 0000 UTC of 09-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 06-12-2023 valid for 0000 UTC of 10-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
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(Potential Cyclogenesis Zone for GPP =>30)
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Based on 06-12-2023 valid for 0000 UTC of 12-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
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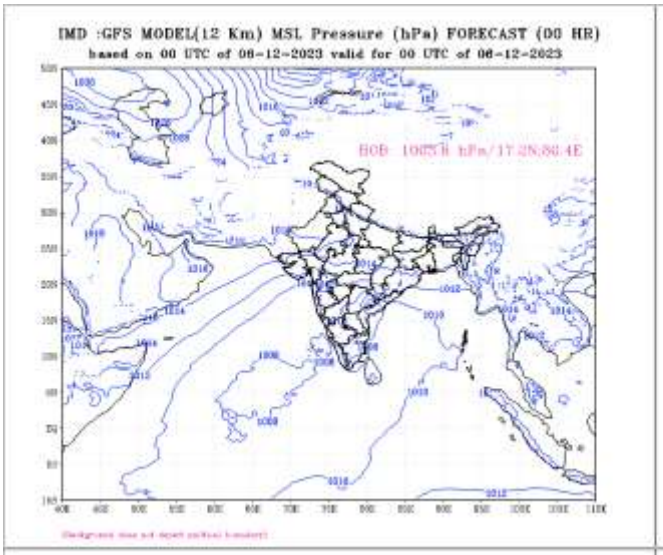
(Potential Cyclogenesis Zone for GPP =>30)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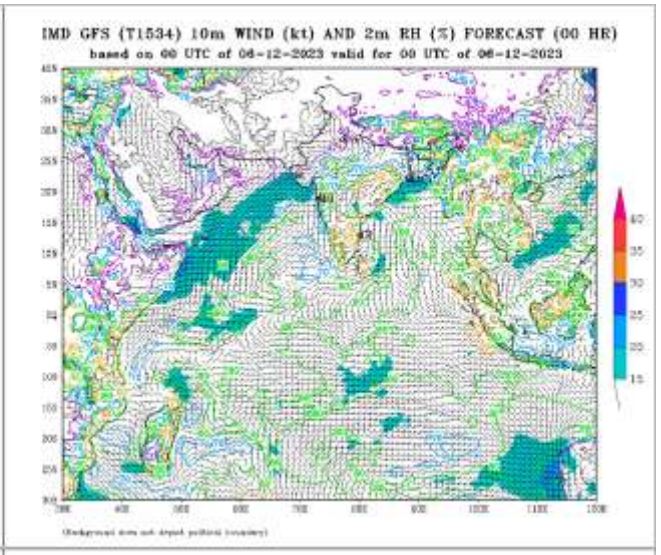
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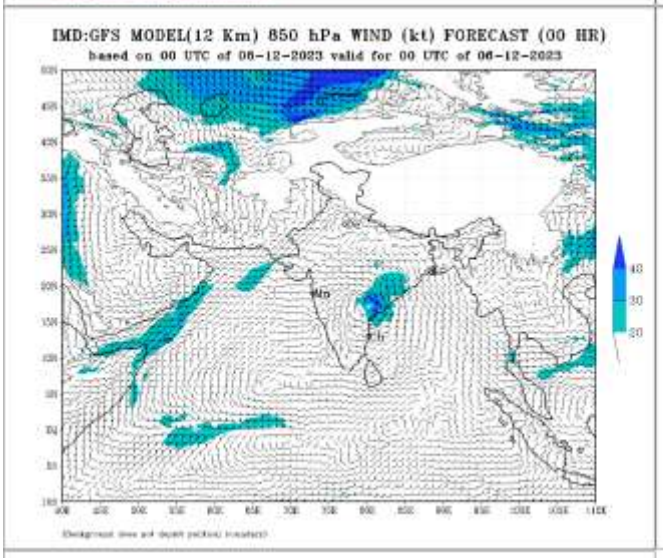
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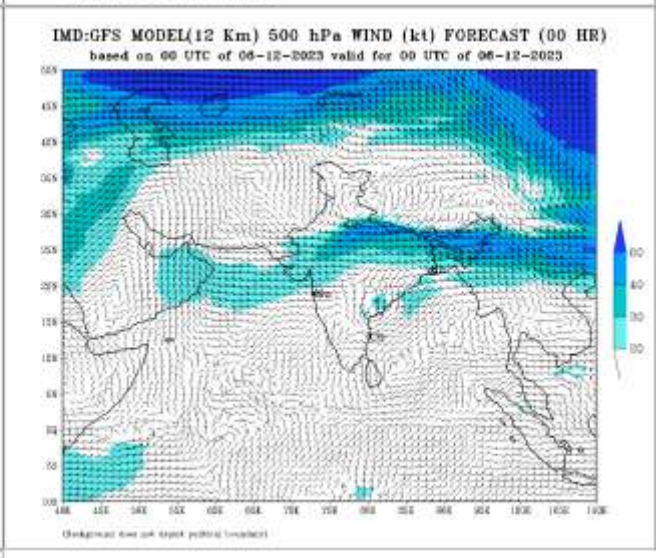
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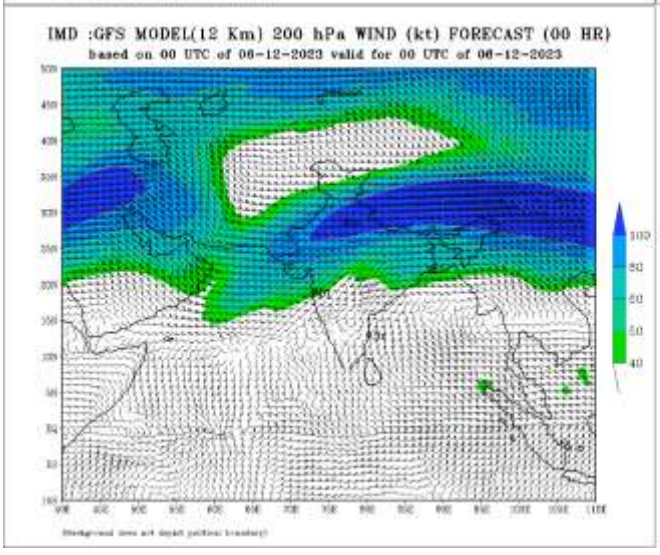
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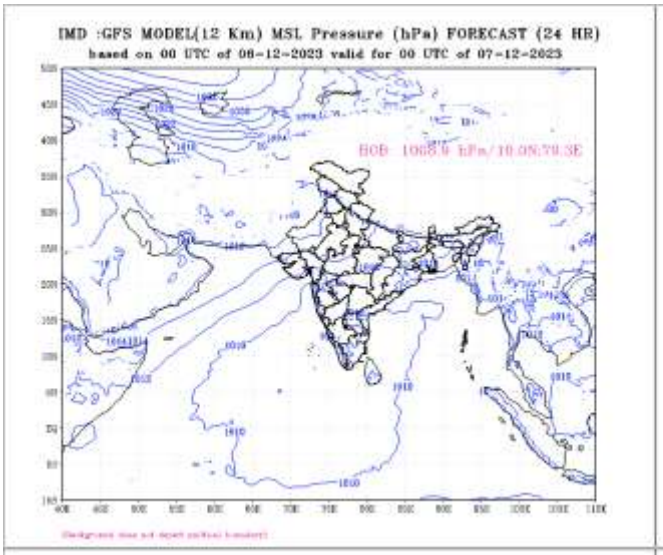
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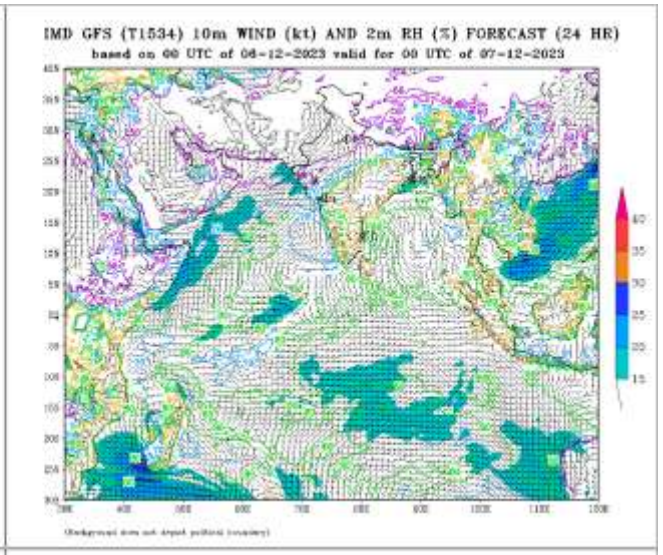
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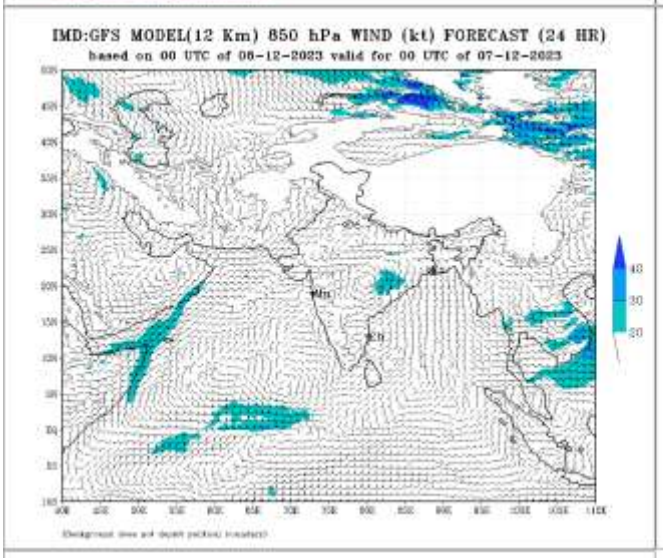
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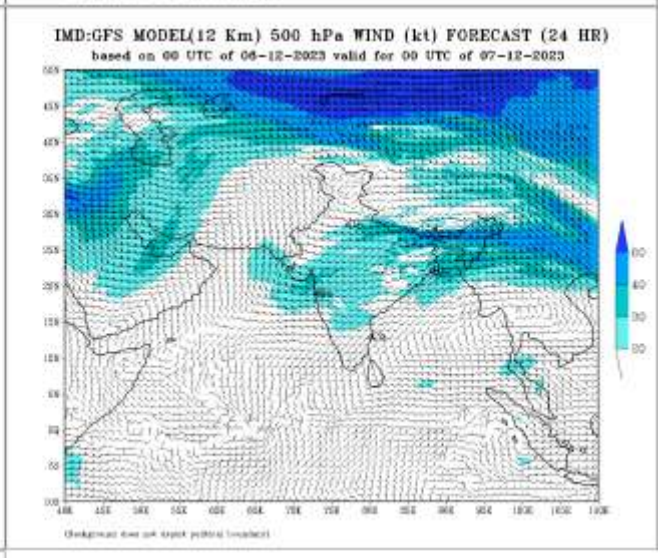
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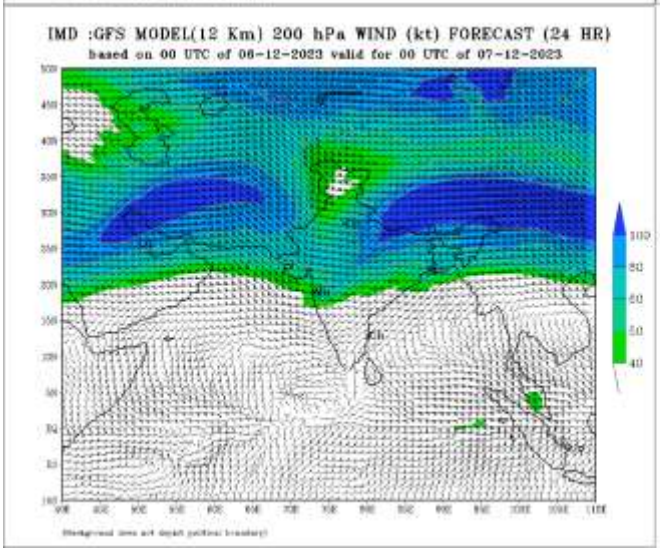
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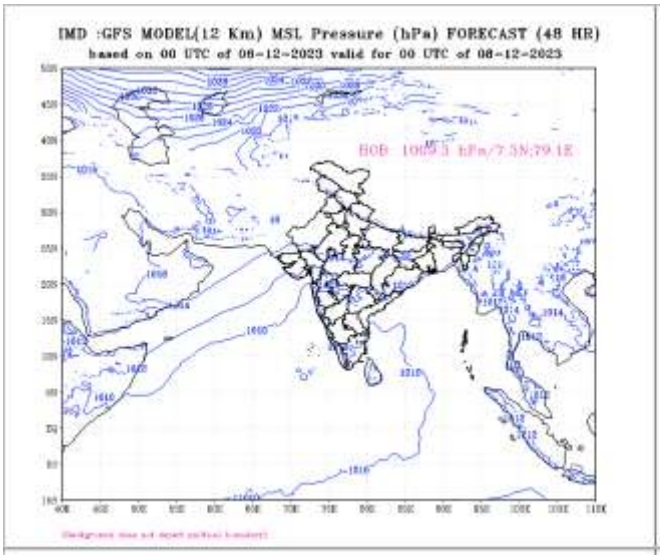
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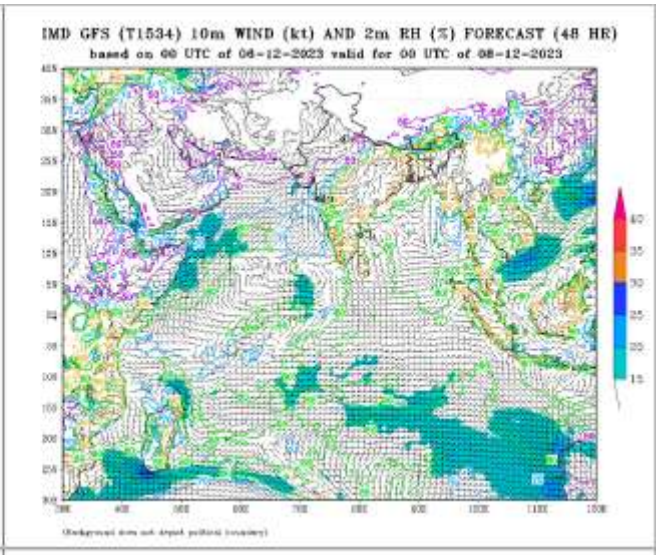
based on 00 UTC of 06-12-2023 valid for 00 UTC of 08-12-2023
BOB 1009.3 hPa/7.5N:79.1E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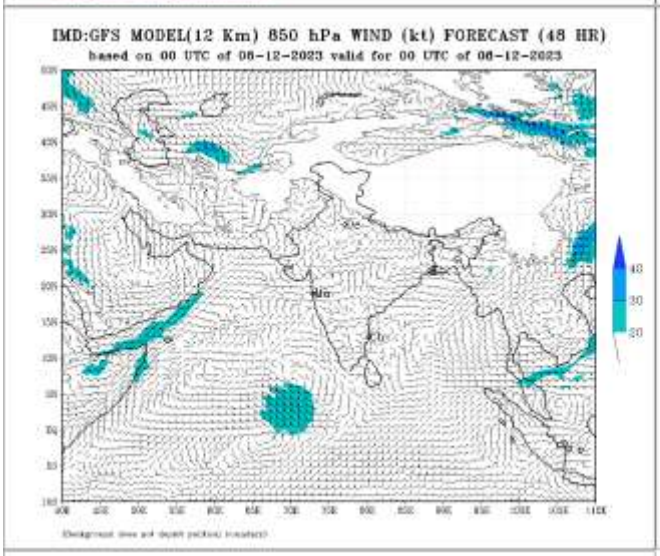
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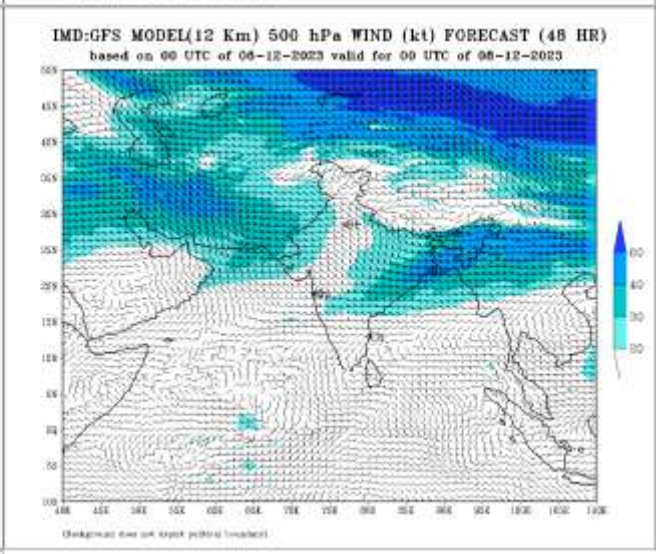
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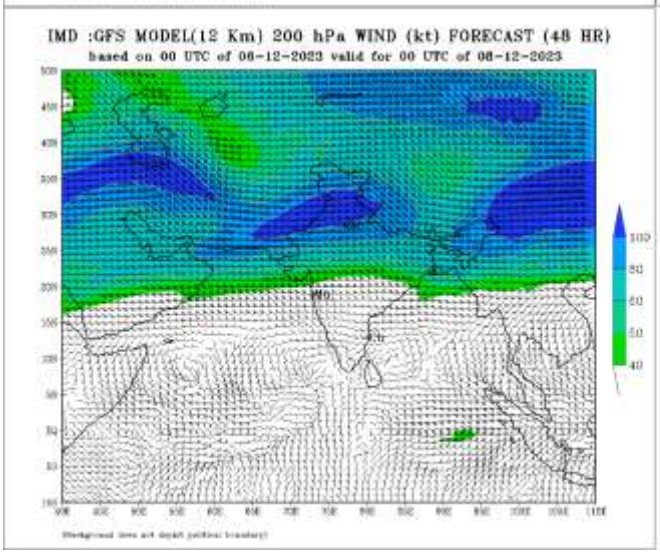
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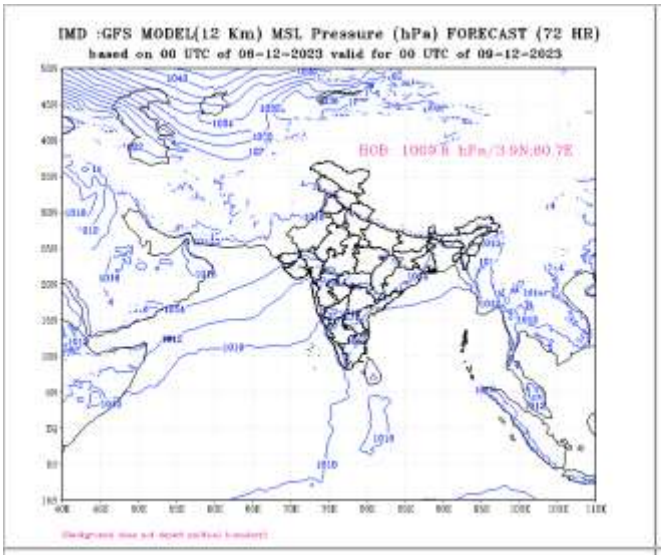
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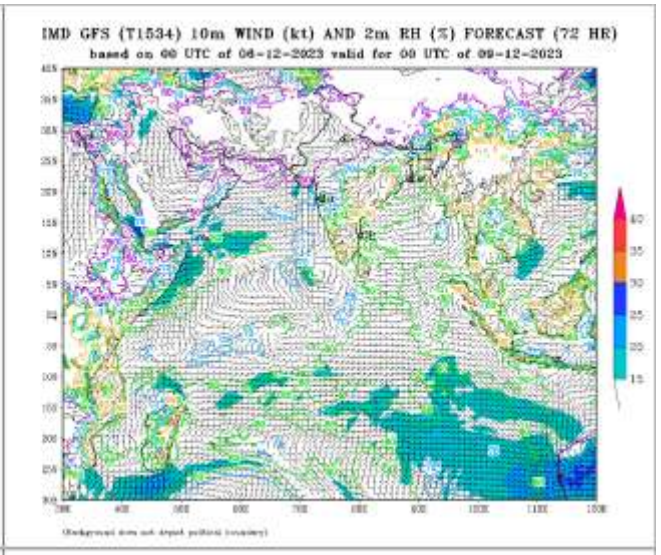
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
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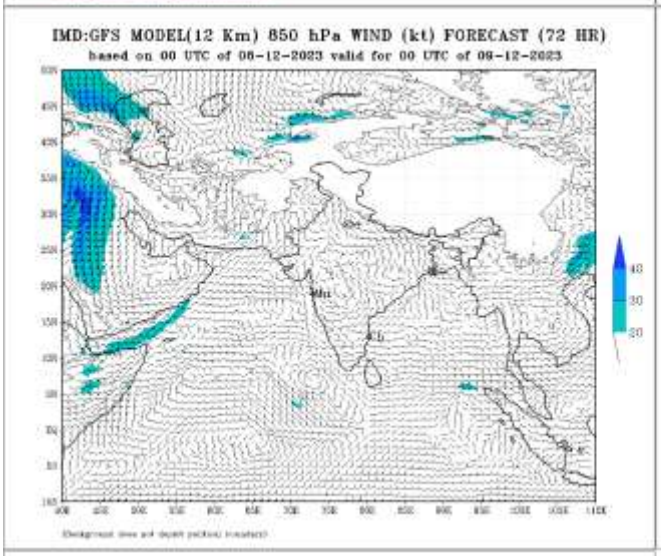
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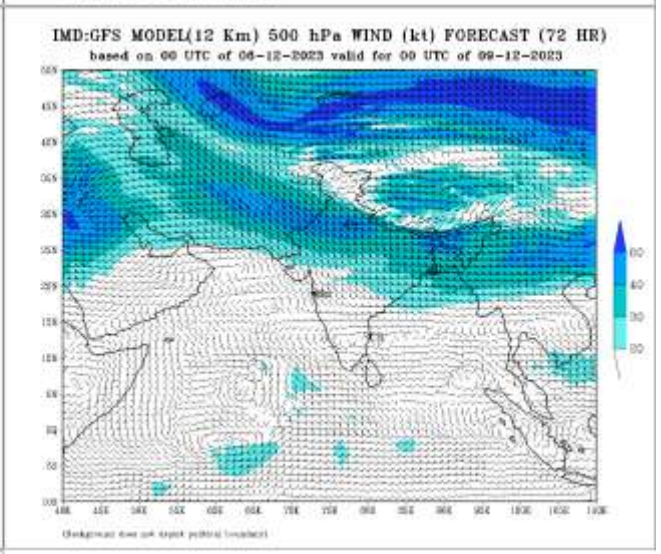
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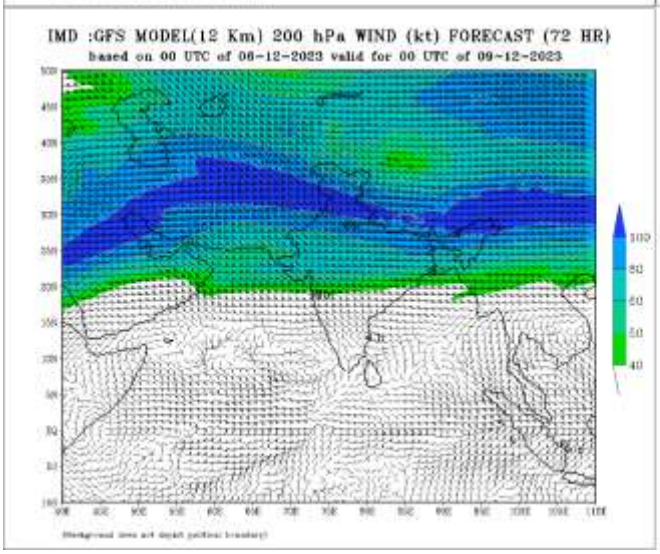
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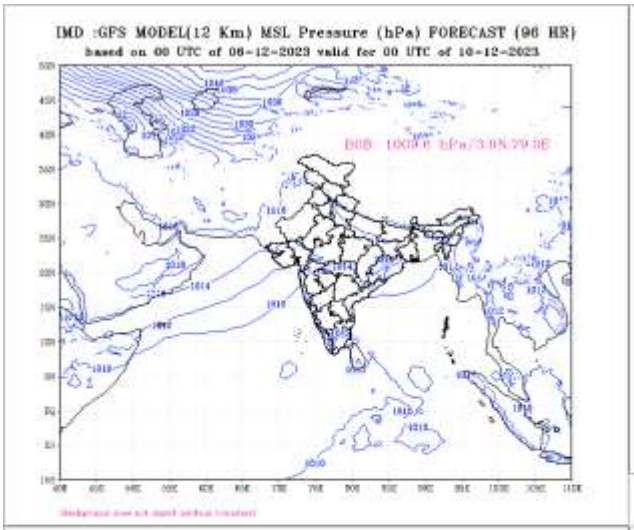
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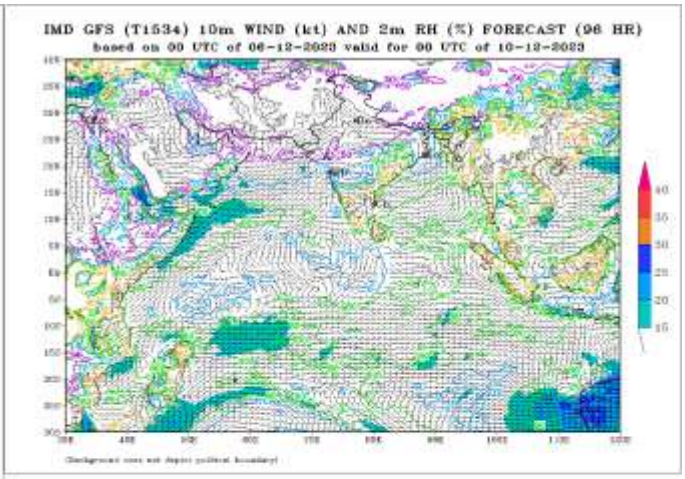
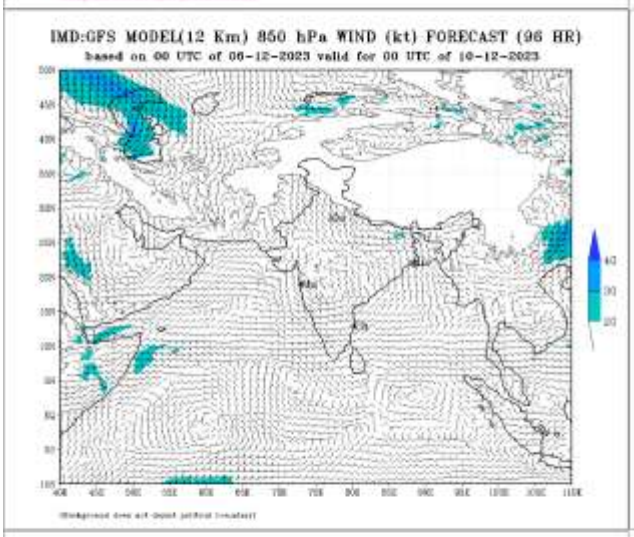

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 10-12-2023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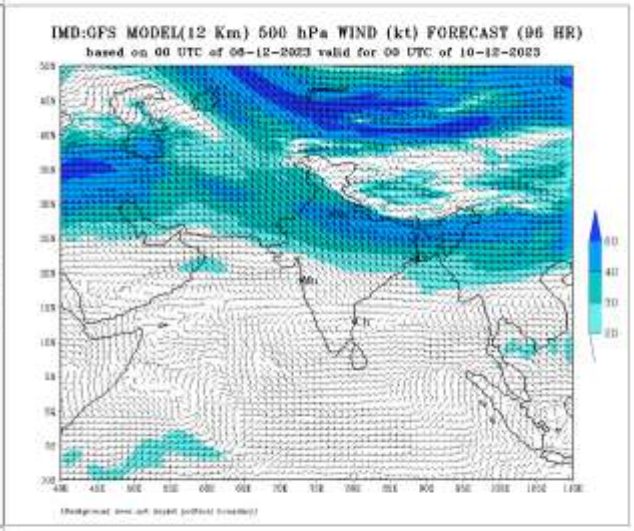
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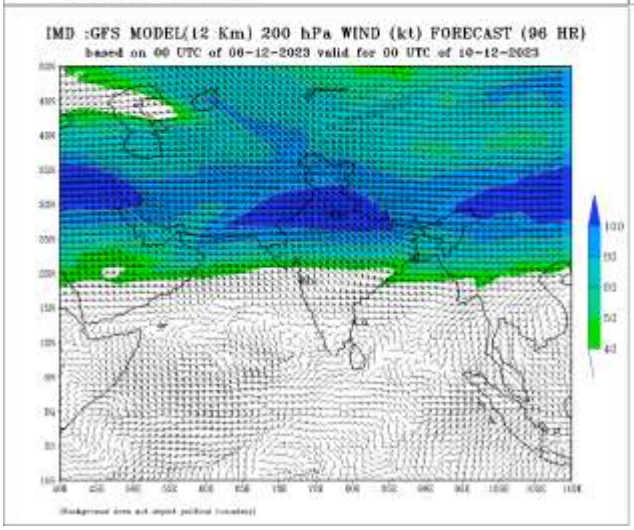
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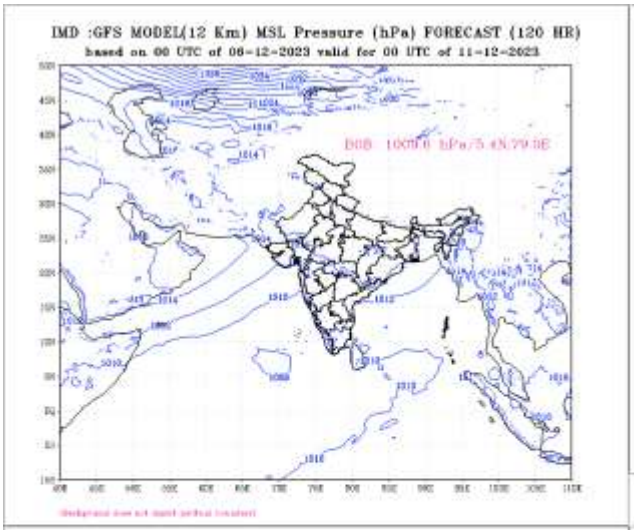
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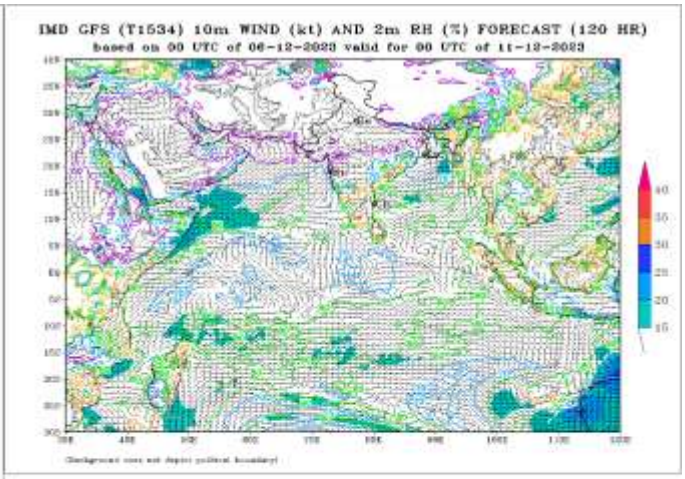
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
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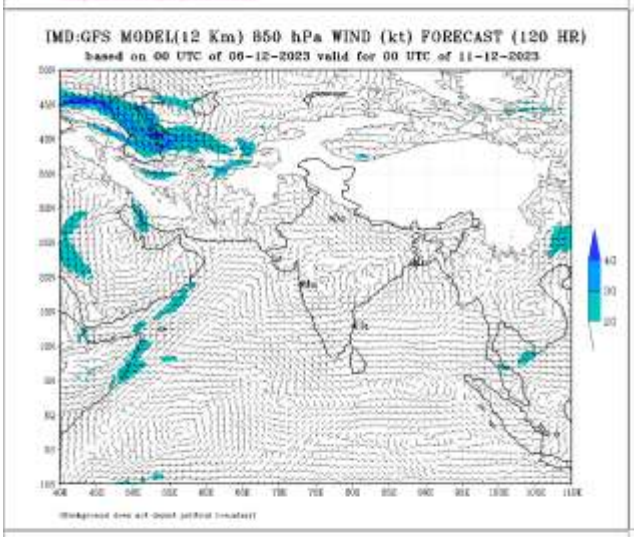
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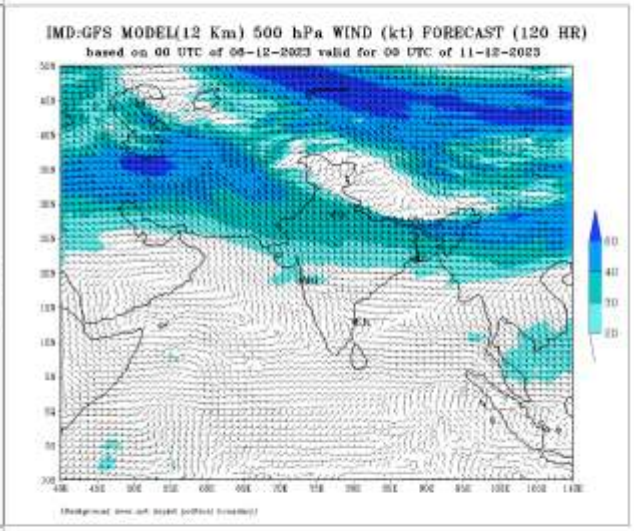
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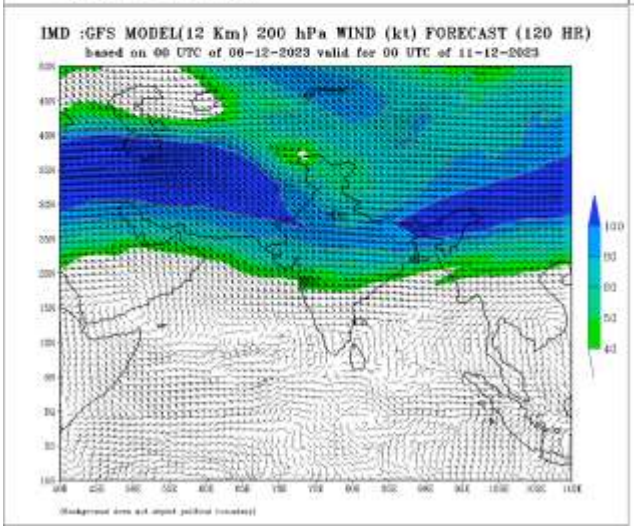
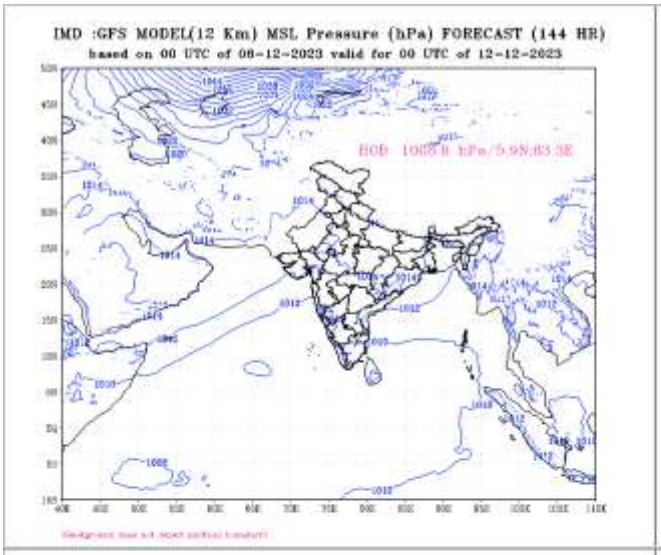
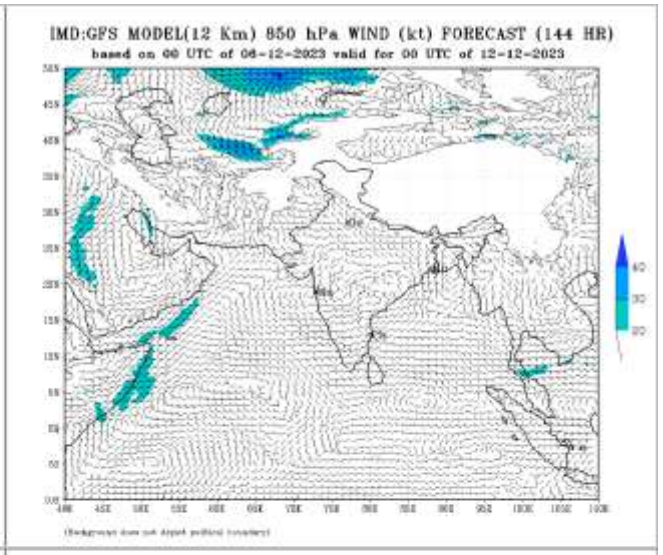
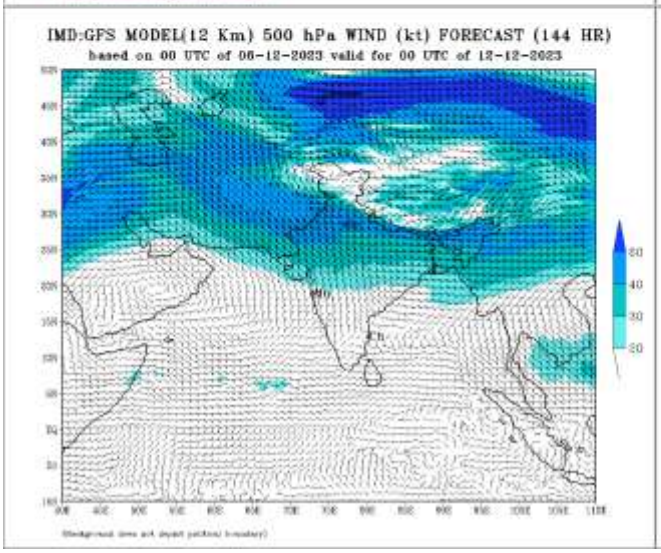
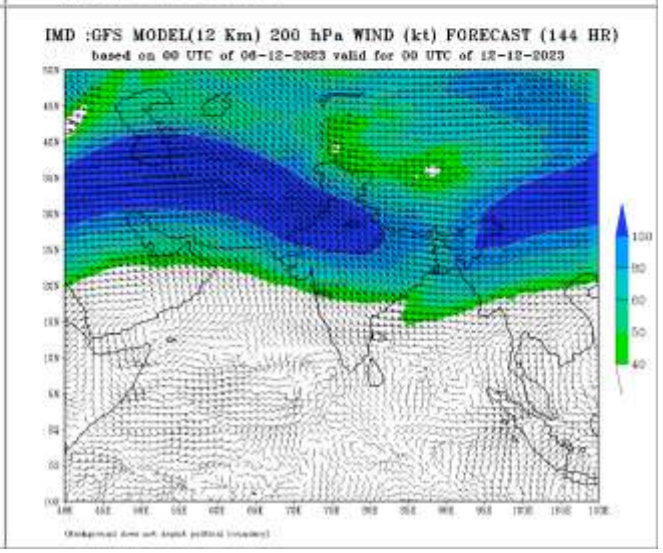
based on 00 UTC of 06-12-2023 valid for 00 UTC of 11-12-2023

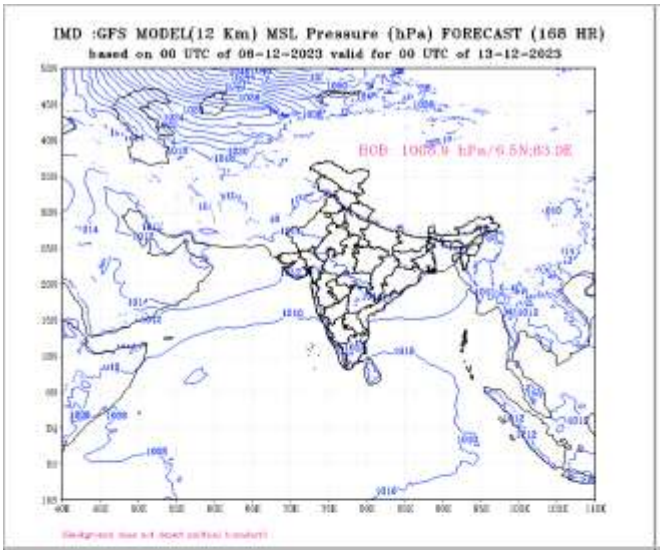

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 11-12-2023

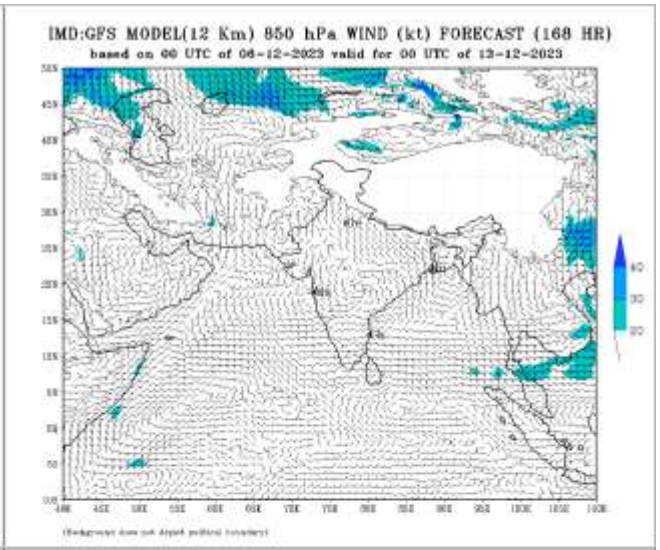

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 12-12-2023
BOB 1005.8 hPa/5.9N:83.3E

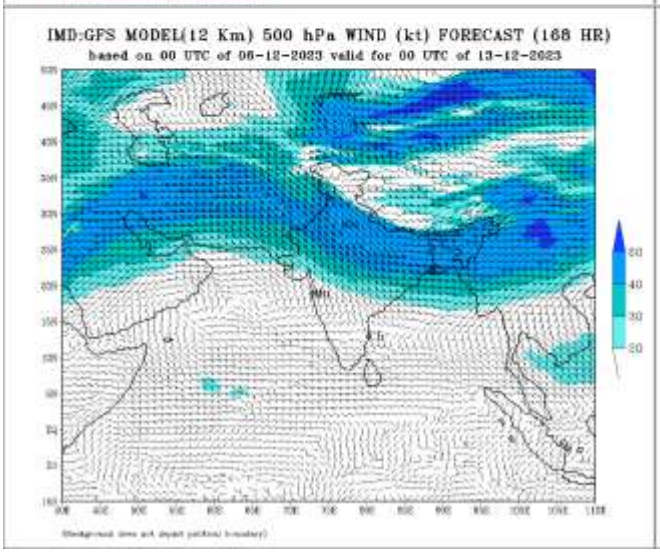

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 12-12-2023

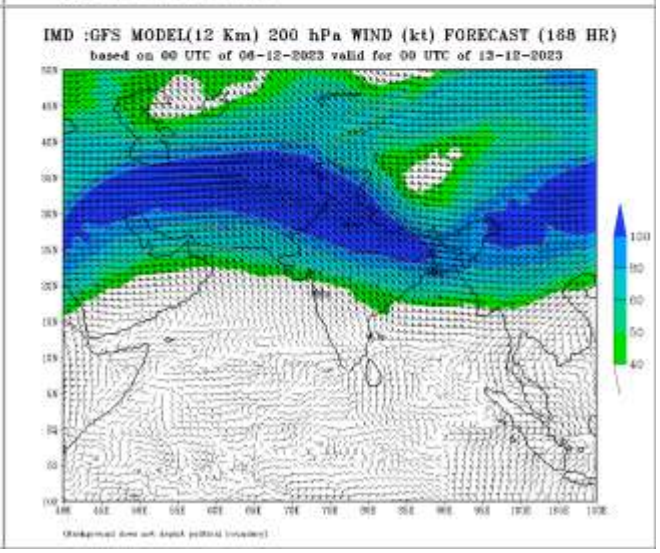

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 12-12-2023


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 12-12-2023


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 13-12-2023


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 13-12-2023


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 13-12-2023


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 06-12-2023 valid for 00 UTC of 13-12-2023