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

Tropical Cyclone Forecast Programme
Report Dated 14TH November, 2023

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

- Under the influence of yesterday's upper air cyclonic circulation over South Andaman Sea, a low pressure area formed over southeast Bay of Bengal and adjoining Andaman & Nicobar islands with associated cyclonic circulation extending upto upper tropospheric levels at 0000 UTC and it persisted over the same region at 0300 UTC of today, the 14th November. It is likely to move west-northwestwards and intensify into a depression over westcentral Bay of Bengal on 15th November, 2023. Thereafter, it would move northwestwards and may intensify into a deep depression over westcentral Bay of Bengal off Andhra Pradesh coast on 16th November. Subsequently, it would recurve north-northeastwards and reach northwest Bay of Bengal off Odisha coast on 17th November.
- The upper air cyclonic circulation over Southwest Bay of Bengal now lies over Southwest Bay of Bengal & adjoining Sri Lanka extending upto middle tropospheric levels.
- A trough runs from the cyclonic circulation over Southwest Bay of Bengal & adjoining Sri Lanka to the Low Pressure Area over Southeast Bay of Bengal & adjoining Andaman-Nicobar Islands and extends upto 3.1 km above mean sea level.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	29-30 over South Andaman Sea, south BoB, eastcentral and adjoining westcentral BoB, Gulf of Mannar, Comorin area, 30-31 over north Andaman Sea, parts of southeast BoB, around 28 along and off Andhra Pradesh, Odisha coasts, around 27 along and off West Bengal and north Odisha coasts.	Around 29-30 over southeast and adjoining southwest, adjoining eastcentral AS, along and off south Gujarat and north AS, 26-28 over central and adjoining southwest AS, along and off Karnataka and Kerala coasts, Comorin area, les than 24 over along and off Yemen-Oman, Somalia coasts.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	100-110 over eastcentral and adjoining southeast BoB, 80-90 over south Andaman Sea, 50-60 over most parts of BoB.	80-90 over few parts of southeast AS, 60-70 over southeast and adjoining southwest AS, adjoining estcentral AS, less than 10 over westcentral, southwest AS.

Cyclonic Relative vorticity ($X10^{-6}s^{-1}$)	60-70 over south Andman Sea, 50-60 over southwest BoB off Sri Lanka coast, 10-20 over parts of south, central and north BoB.	30-40 over parts of southwest AS, northwest AS, 10-20 over some parts of south AS.
Low Level convergence ($X10^{-5}$ s^{-1})	5-10 over south and adjoining central BoB, South Andaman Sea.	5-10 over parts of southwest AS, -5 over some parts of north AS.
Upper Level divergence ($X10^{-5}$ s^{-1})	10-20 over most parts of central, adjoining north BoB and south BoB, Comorin area.	5-10 over parts of southwest AS, -10 to -20 north AS and adjoining central AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate: 10-20 knots** **High: >20 knots**	5-10 over southwest and adjoining southeast BoB, South Andaman Sea, adjoining eastcentral BoB, 20 over central and adjoining southwest BoB, and southern parts of south BoB, High (> 20 knots) over remaining parts of BoB.	5-15 over southwest and adjoining southeast AS, 20 over south part of central AS, adjoining southeast AS, High (>20 knots) over remaining parts of AS.
Wind Shear Tendency (knots)	Decreasing over south and adjoining central BoB and Andaman Sea, increasing over along and off Andhra Pradesh, Odisha and west Bengal coasts and adjoining area.	Decreasing over south and adjoining central AS, increasing over central and north AS.
Upper Tropospheric Ridge	Along 16^{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 to broken low and medium clouds with embedded intense to very intense convection lay over central & south Bay of Bengal, Andaman Sea. Scattered low and medium clouds with embedded isolated weak convection lay over North Bay of Bengal.

(b) Over the Arabian Sea:-
Scattered low and medium clouds with embedded intense to very intense convection lay over comorin area adjoining southeast Arabian Sea off south Kerala coast and moderate to intense convection lay over south Arabian sea.

(c) Convection outside India:-
Scattered low and medium clouds with embedded moderate to intense convection lay over Sri Lanka, Palk strait, Gulf of Mannar, Maldives, Tibet, china, South Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, South Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & sea, Celebes islands & sea, Philippines, North Madagascar, North Mozambique channel and over Indian ocean between latitude equator to 5.0N longitude 50.0E to 100.0E.

M.J.O. Index:
MJO index is currently in Phase 7 with amplitude close to 1. It will be in phase 8 with amplitude greater than 1 on 15th November, and remain in same phase with amplitude greater than 1 till 17th November. It will be in phase 1 on 18th November with amplitude greater than 1 and will remain there for next few 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	LPA over westcentral BoB as on today i.e., 14th Nov, moves westnorthwestwards and will becomes deep depression over westcentral BoB on 15th Nov, moves then northeastwards and lay over northwest BoB close to Odisha coast as deep depression on 17th Nov, moves in same direction and reaches close to north Odisha coast on 17th Nov as LPA, then moves along the coast and lay along the West Bengal-Bangladesh coast al LPA on 19th Nov.	No significant system during next 7 days
IMD-GEFS	An extended low over southwest BoB on 14th Nov. To move initially west-northwestwards and lay as LPA over westcentral BoB on 15th Nov.	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	An extended cycir over southwest BoB on 14th Nov, to move westnorthwestward and lay as LPA over westcentral and adjoining southwest BoB on 16th Nov, no further intensification.	No significant system during next 7 days
NCMRWF-NEPS	An extended LPA over southwest BoB on 14th Nov, to move westnorthwestward and lay over southwest BoB as LPA on 15th Nov, continue to move in the same direction and lay over westcentral BoB as LPA on 20th Nov.	No significant system during next 7 days
NCMRWF-UM (Regional)	An extended cycir over southwest BoB on 14th Nov, to move westnorthwestward and lay as LPA over westcentral and adjoining southwest BoB on 16th Nov.	No significant system during next 7 days
ECMWF	LPA over southeast BoB on 14th. To move westnorthwestwards and intensify into a depression over westcentral BoB on 15th Nov, Therafter weakening is indicated and the system is predicted to reach south Odisha coast as a low pressure area on 17th Nov, then move parallel to the coast and reaches West Bengal-Bangladesh coast as LPA on 18th Nov and crosses the Bangladesh coast on afternoon of 18th Nov.	No significant system during next 7 days.
NCEP-GFS	LPA over southeast and southwest BoB on 14th. To move westnorthwestward and will become depression over westcentral BoB on 15th Nov. Weakening thereafter.	No significant system.
IMD-Genesis Potential Parameter	GPP is indicating a potential zone over westcentral BoB as on today i.e., 14th Nov, moves northwestwards and lay over westcenttal and adjoining northwest BoB on 15th Nov. Another potential zone over eastcentral and adjoining Andaman Sea during 18th and 19th Nov.	No potential zone over AS for next 7 days.

Summary and conclusion:

1. **For Bay of Bengal**:

The guidance from various numerical models (IMD GFS, NCEP GFS & ECMWF AND IMD MME) are indicating formation of depression around 15th. Peak intensification is suggested upto deep depression stage. These models are also indicating gradual northeastwards recurvature of the system on 17th and weakening while moving over Northwest Bay of Bengal (BoB) on 18th November. NCUM is not indicating any significant system over BoB during the forecast period.

Considering all these, the low pressure area over southeast BoB is likely to move west-northwestwards and intensify into a depression over westcentral BoB on 15th November, 2023. Thereafter, it would move northwestwards and may intensify into a deep depression over westcentral BoB off Andhra Pradesh coast on 16th November. Subsequently, it would recurve north-northeastwards and reach northwest BoB off Odisha coast on 17th November.

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
LOW	**MODERATE**	**HIGH**	-	-	-	-

2. For the Arabian Sea:

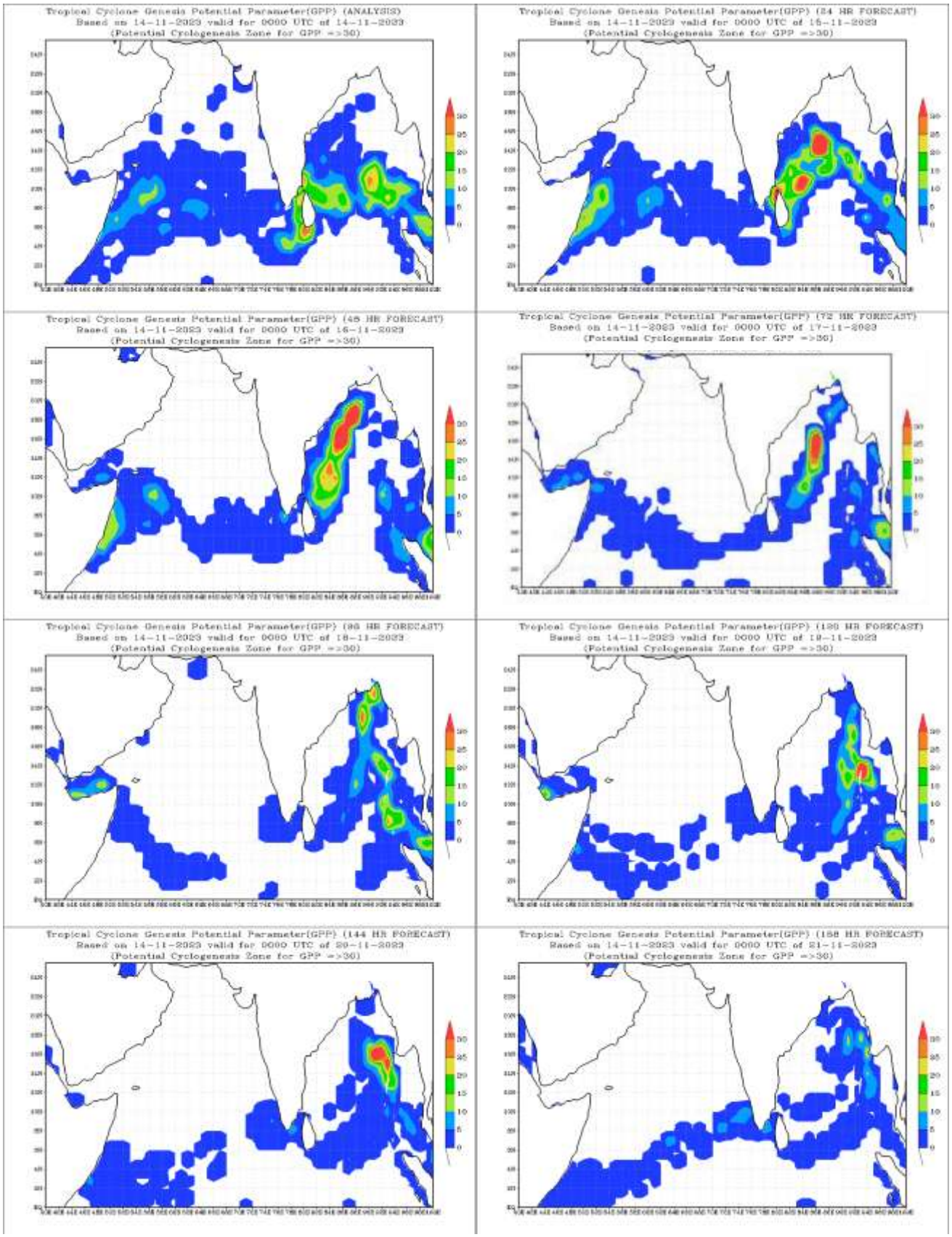
Most of the models are indicating that there will be no significant system for the next seven days.

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: North Andhra Pradesh coast during 15th & 16th Nov, Odisha coast during 15th-17th Nov, West Bengal coast during 16th-18th Nov.

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 14-11-2023 valid for 0000 UTC of 14-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 14-11-2023 valid for 0000 UTC of 15-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 14-11-2023 valid for 0000 UTC of 16-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 14-11-2023 valid for 0000 UTC of 17-11-2023
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Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
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Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 14-11-2023 valid for 0000 UTC of 19-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 14-11-2023 valid for 0000 UTC of 20-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
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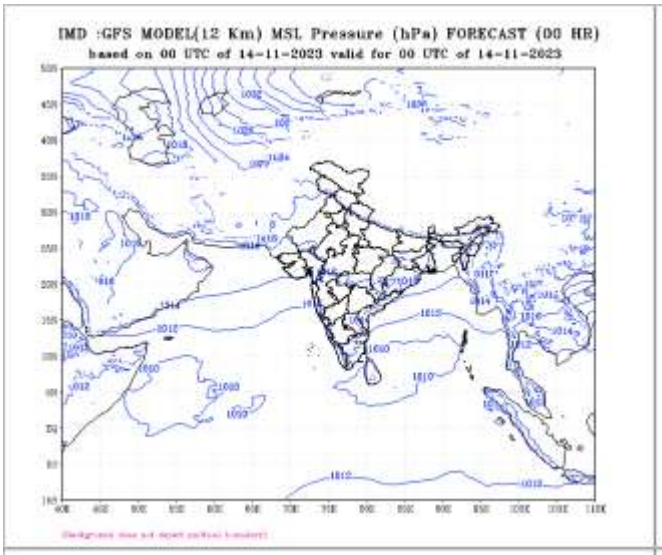
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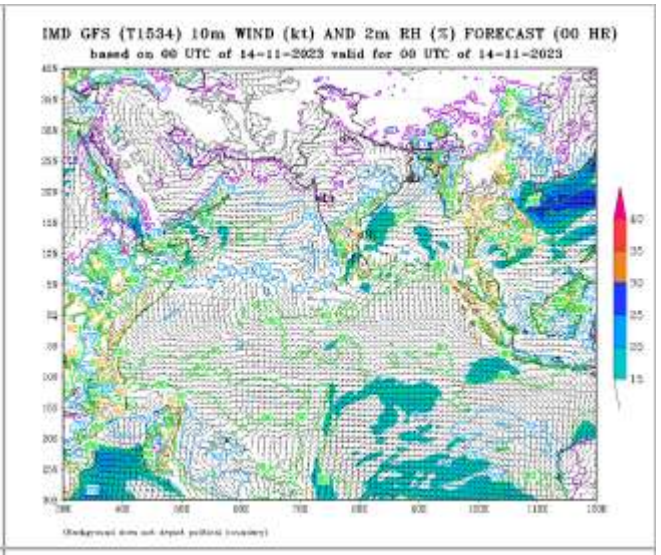
based on 00 UTC of 14-11-2023 valid for 00 UTC of 14-11-2023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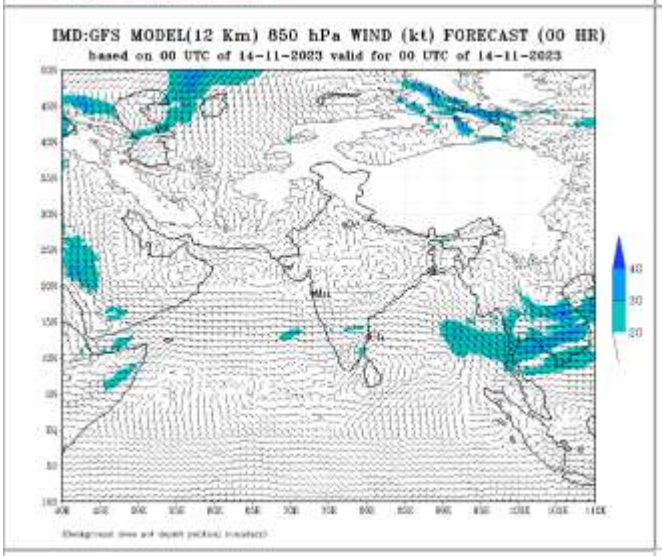
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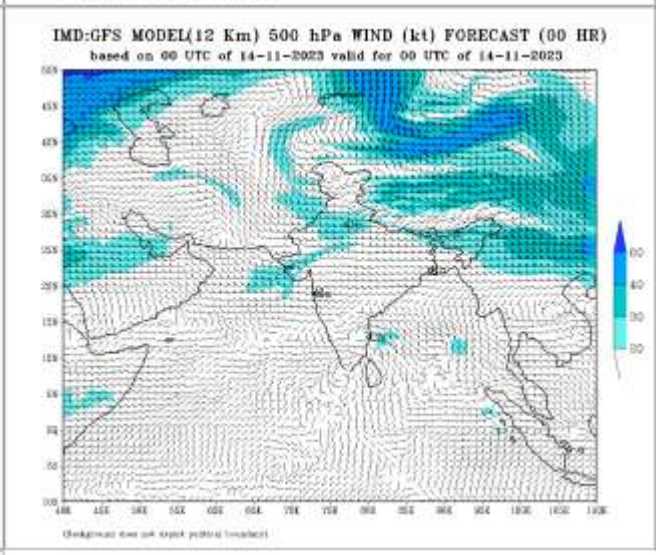
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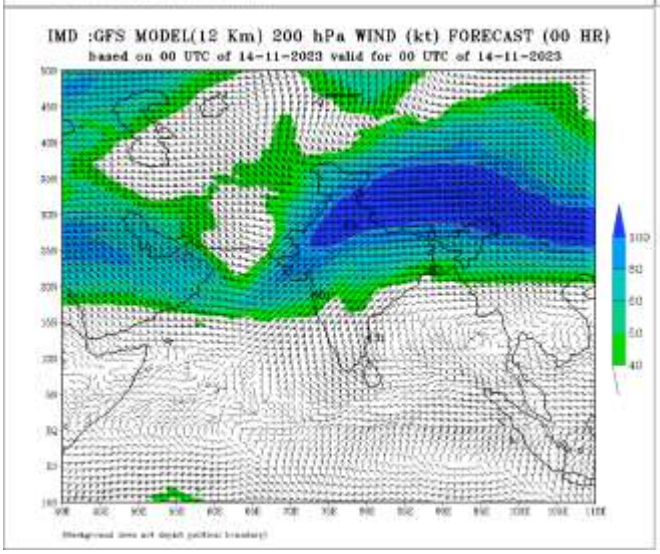
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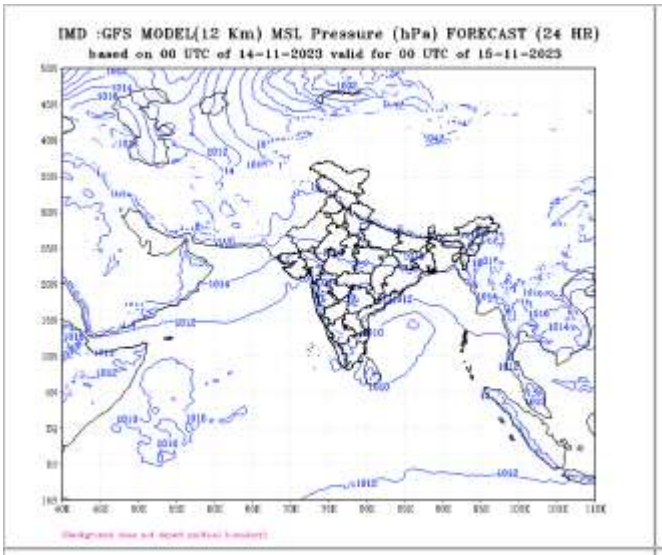
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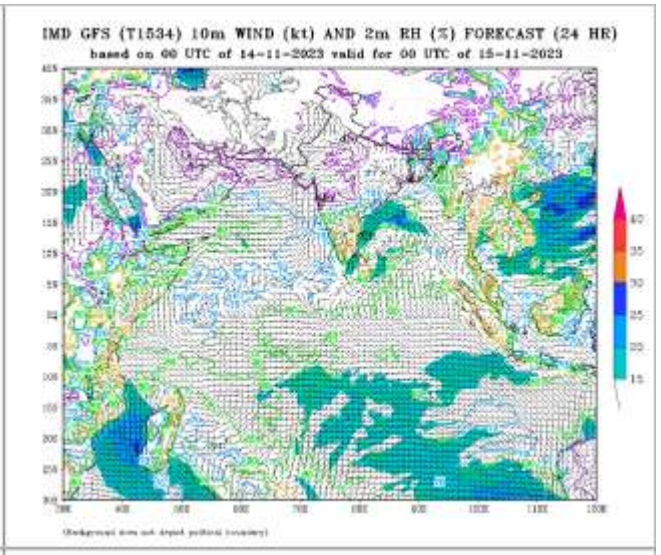
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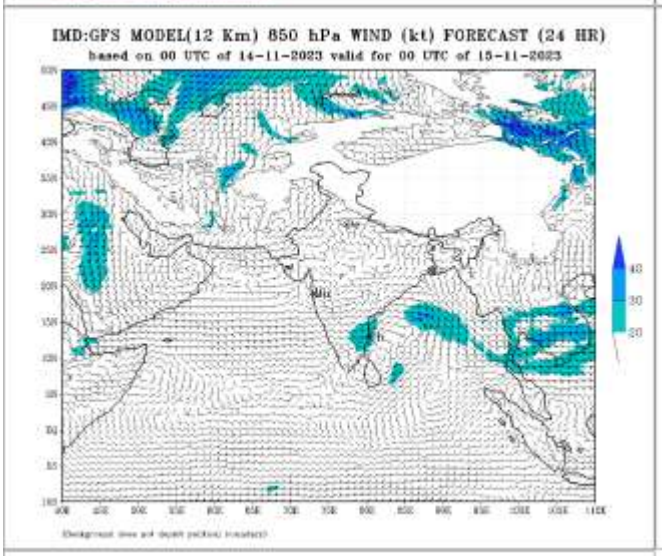
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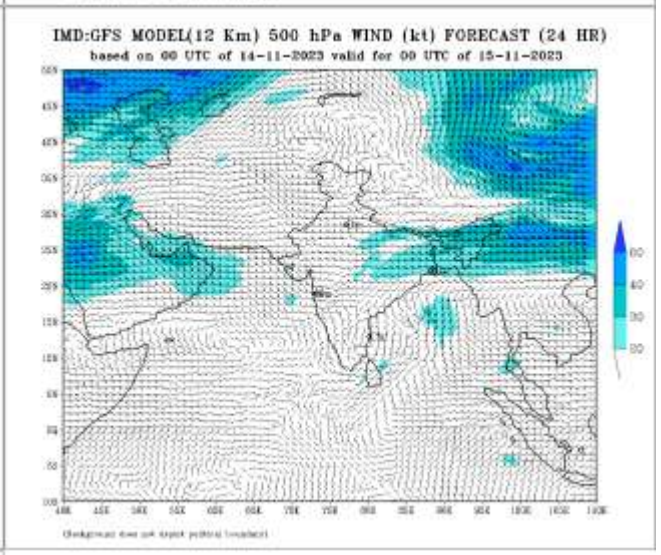
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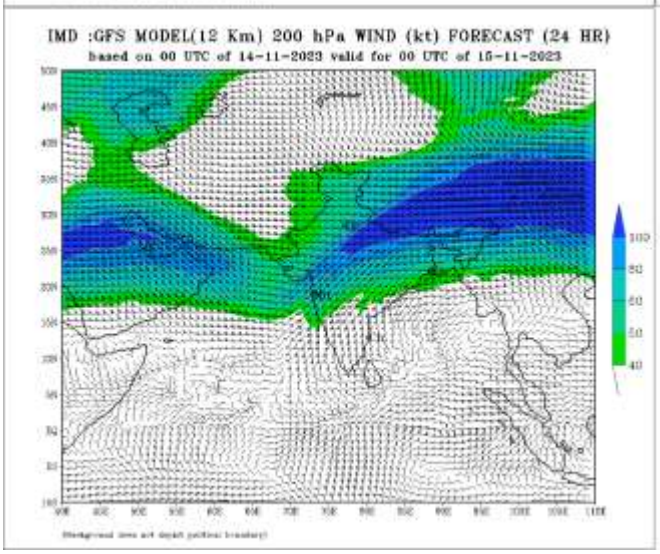
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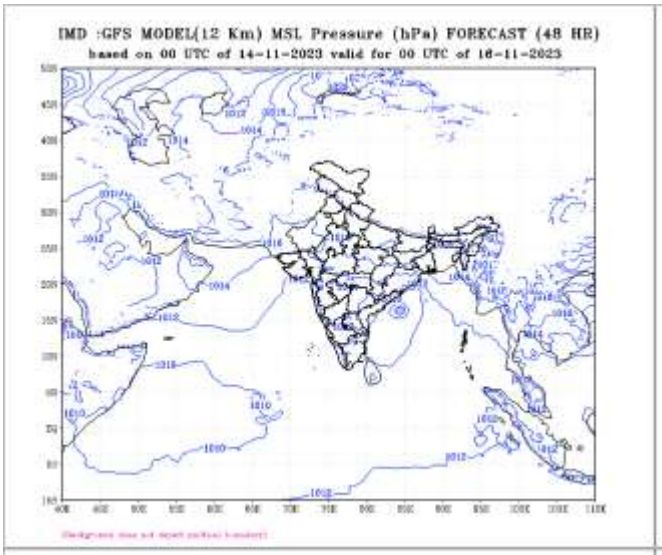
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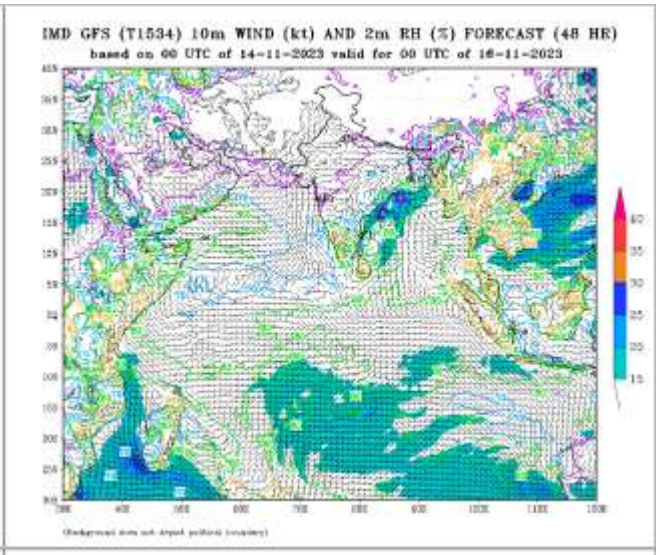
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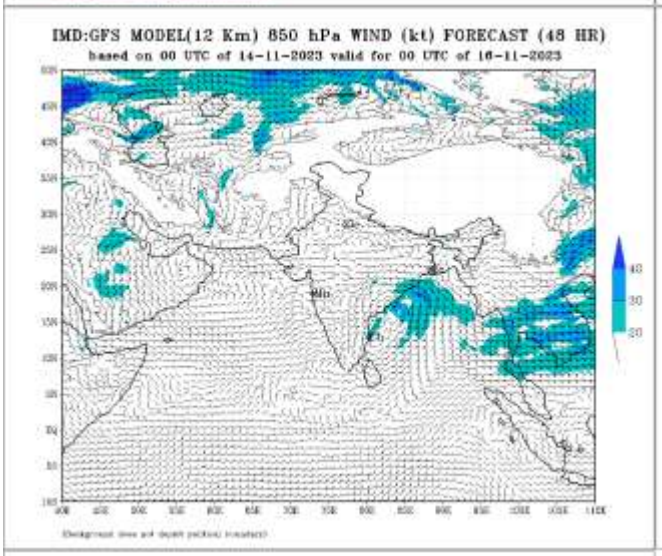
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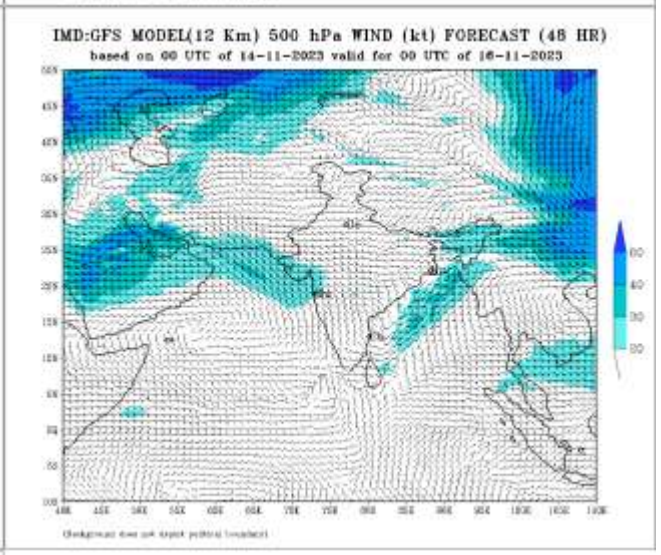
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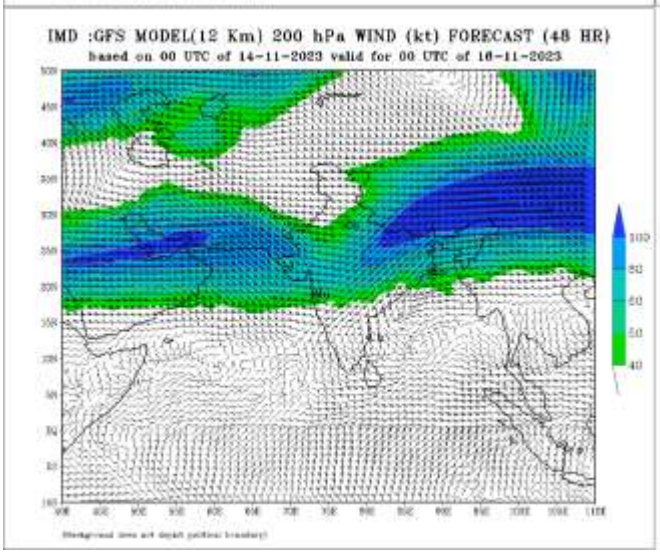
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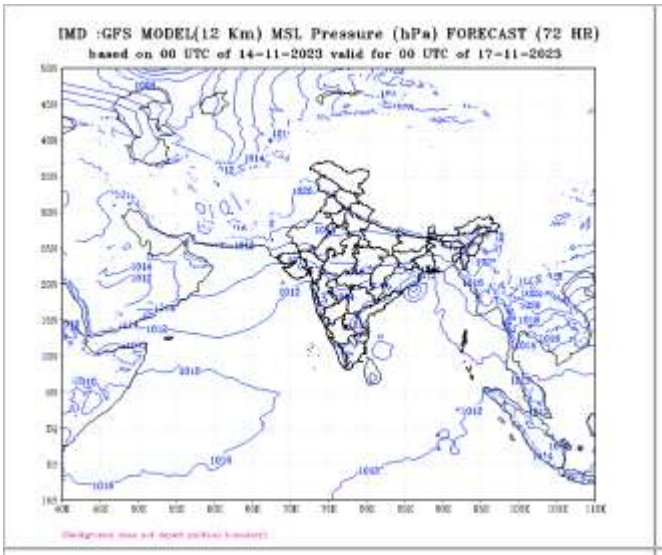
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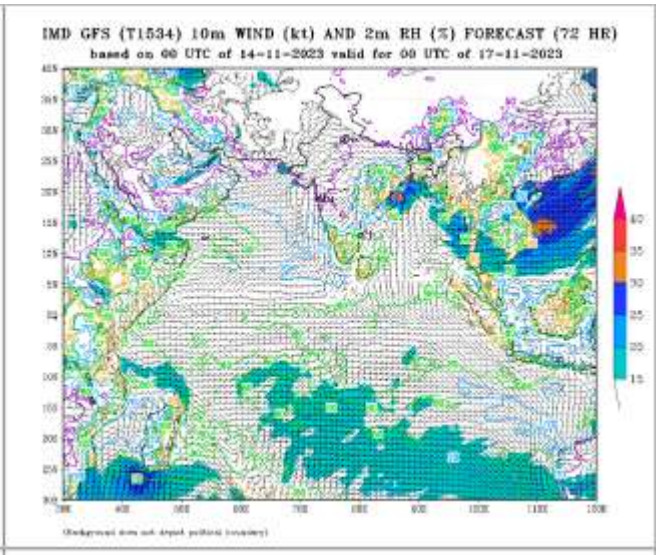
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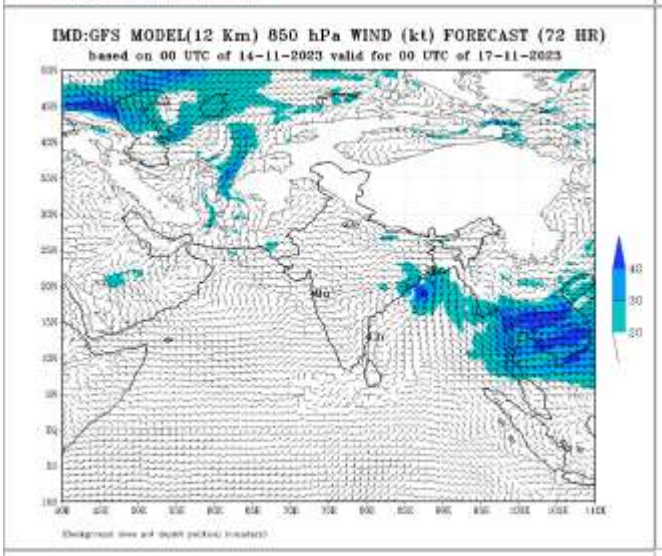
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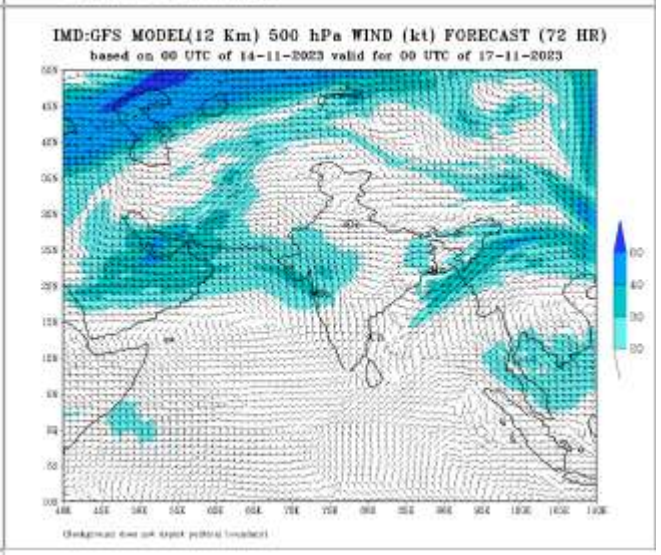
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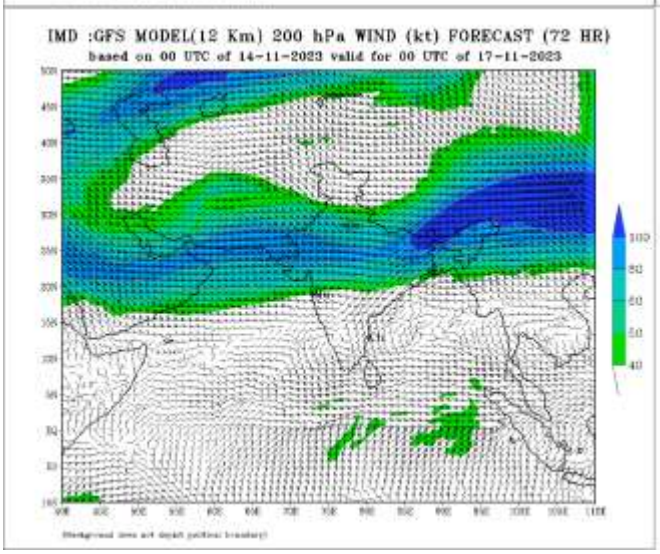
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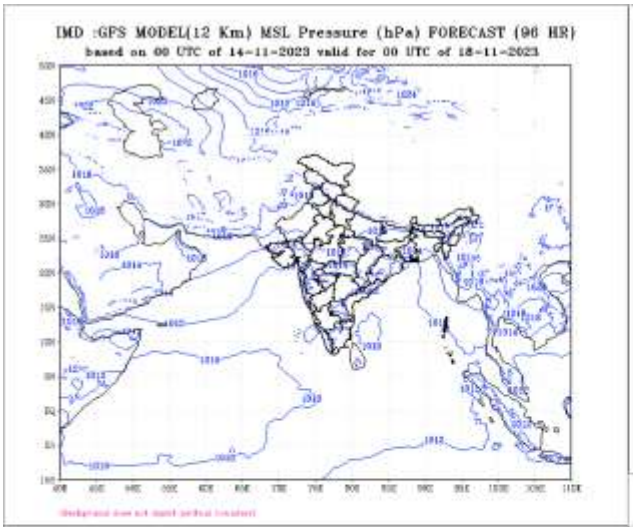
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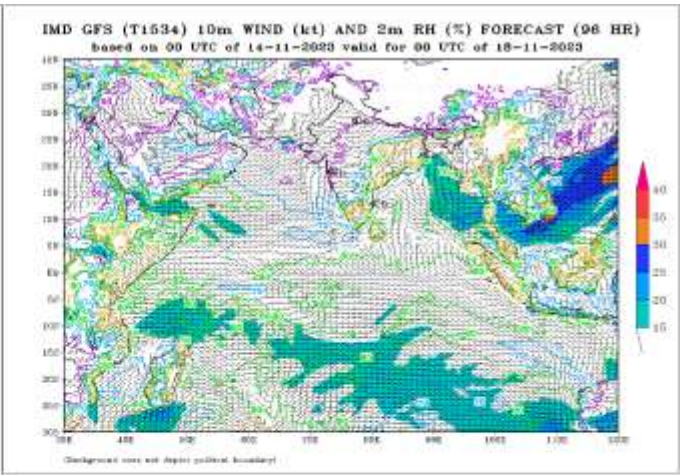
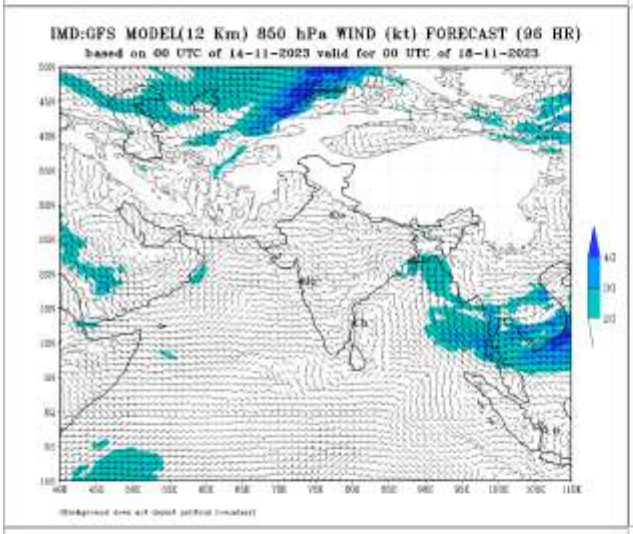

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 18-11-2023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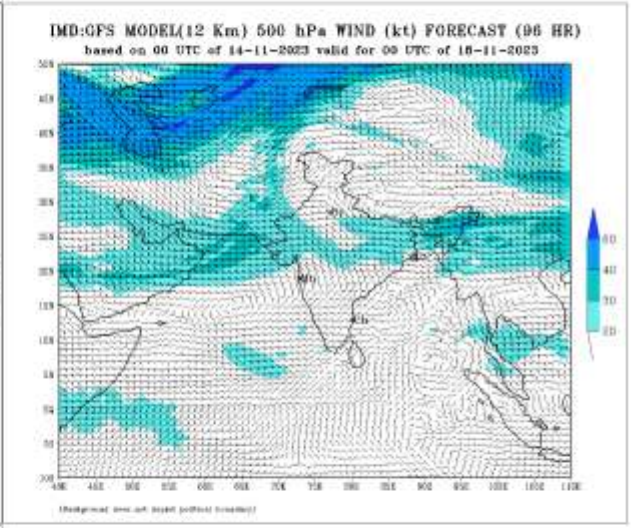
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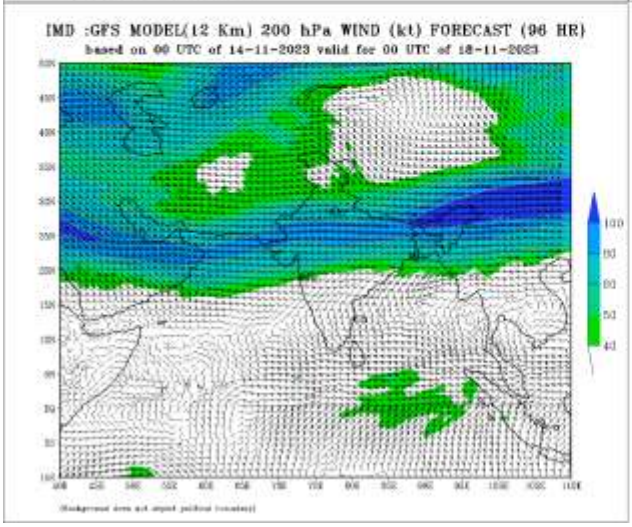
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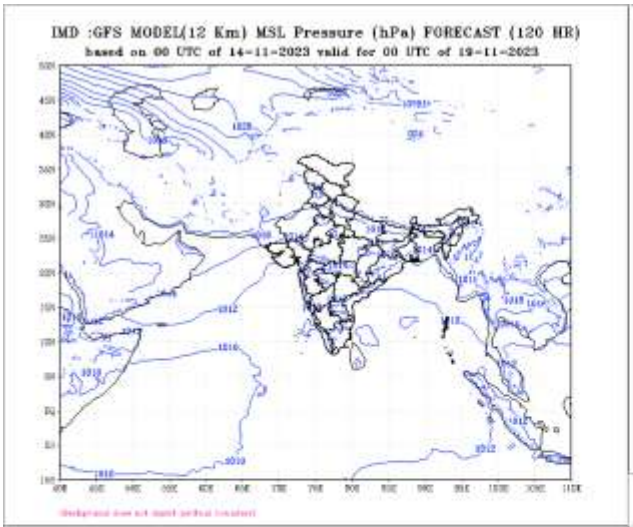
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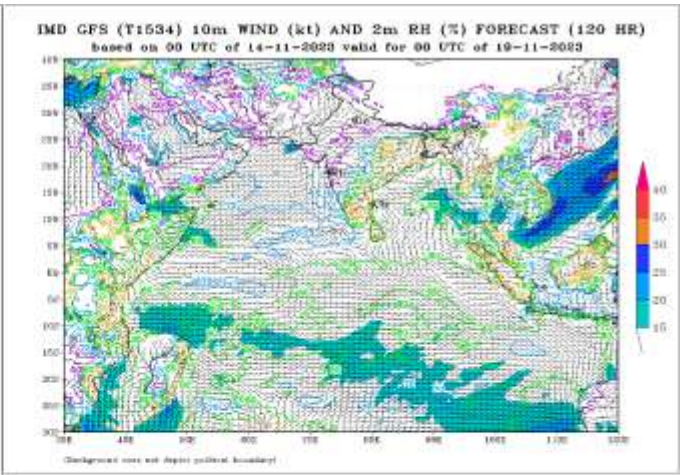
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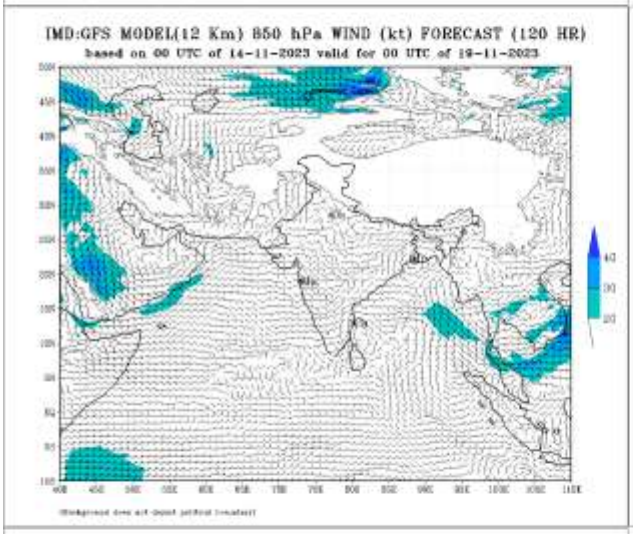
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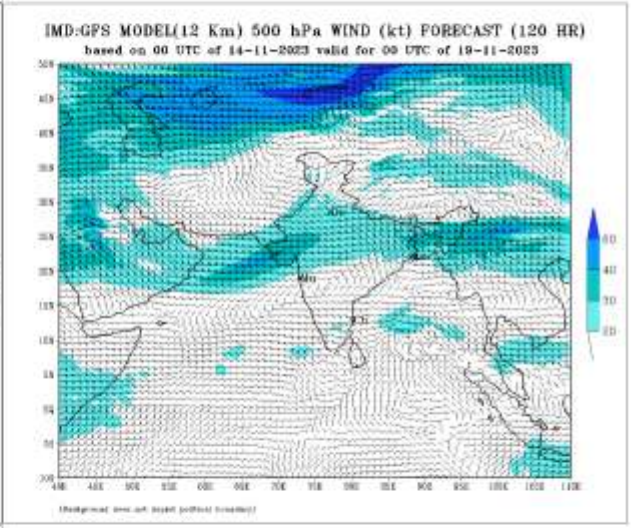
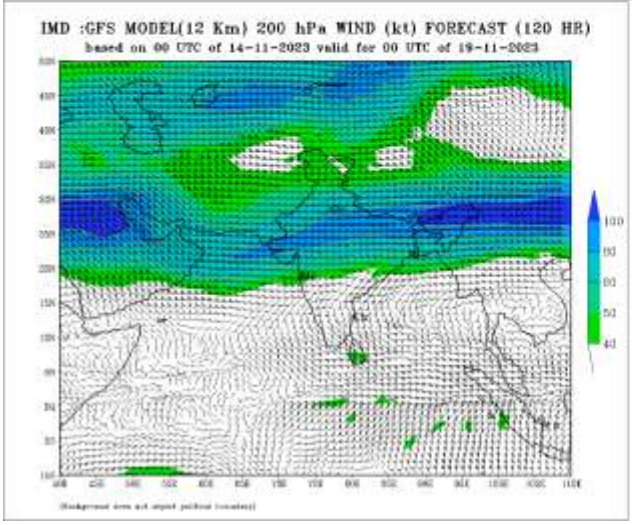
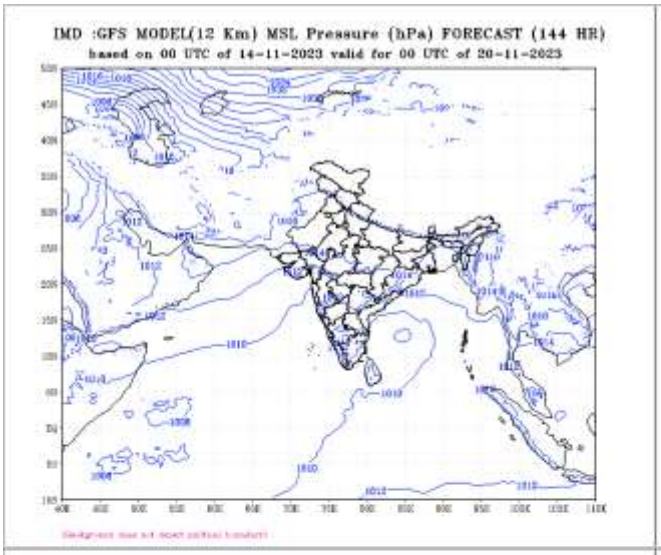
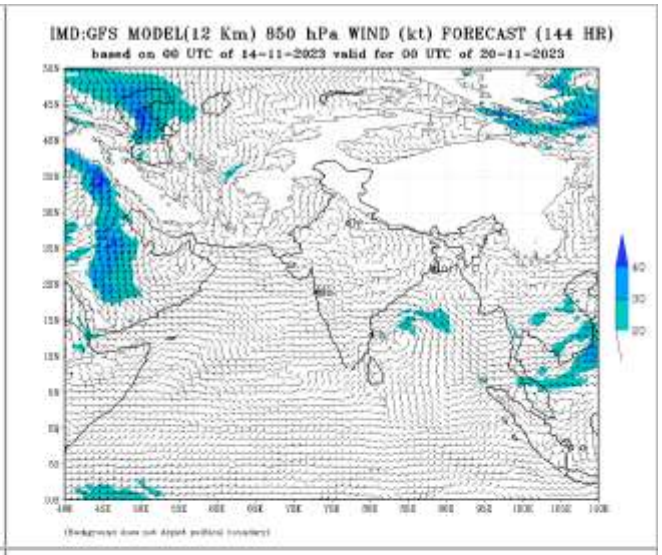
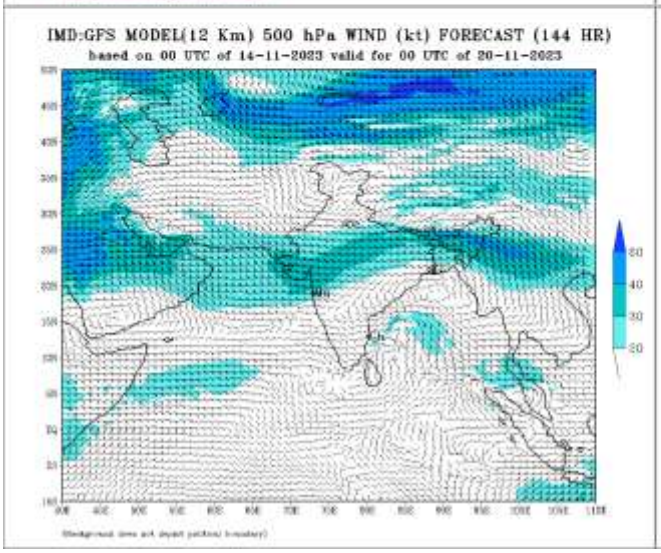
based on 00 UTC of 14-11-2023 valid for 00 UTC of 19-11-2023

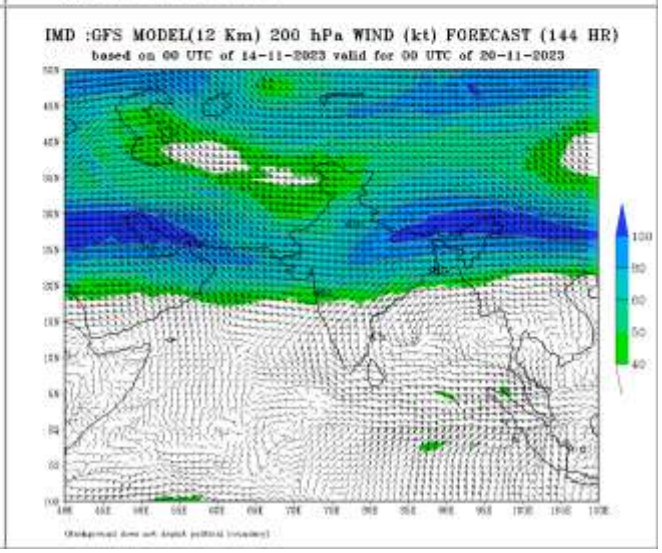

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 19-11-2023


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 19-11-2023


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 20-11-2023


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 20-11-2023


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 20-11-2023


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 14-11-2023 valid for 00 UTC of 20-11-2023