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

Tropical Cyclone Forecast Programme
Report Dated 25th November, 2023

Time of Issue: 1330 UTC

Synoptic features (based on 0300 UTC analysis):

1. A cyclonic circulation is likely to emerge into south Andaman Sea and neighbourhood by 26th November. Under its influence, a low pressure area is likely to form over south Andaman sea and adjoining southeast Bay of Bengal around 27th November. It is likely to move west-northwestwards and intensify into a depression over southeast Bay of Bengal around 29th November, 2023.
2. Yesterday's Cyclonic Circulation over Southeast and Adjoining Southwest Arabian Sea extending upto 1.5 Km above Mean Sea Level persists over the same region.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	27-29 over major parts of BoB. 26-27^{0}C over parts of north and adjoining westcentral BoB.	29-30 over southeast, adjoining southwest and eastcentral AS. 26-28 over most parts of central adjoining southwest AS. 26-27 over north and adjoining central AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	70-90 over Andaman Sea and parts of eastcentral BoB. 90-100 over southwest BoB.	100-110 over parts of southeast and southwest AS and eastcentral AS.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	30-40 over Gulf of Thailand adjoining Strait of Malacca, over southeast BoB adjoining east EIO, over northeast BoB off Bangladesh coast. 10-20 over most parts of south BoB.	10-20 over major areas of AS. 20-30 over southeast and adjoining southwest AS.
Low Level convergence (X10^{-5} s^{-1})	5-10 over southeast BoB adjoining to EIO, Gulf of Thailand, -5 over parts of central BoB, northwest BoB.	-5 over most parts of AS, 10 over parts of north AS.
Upper Level divergence (X10^{-5} s^{-1})	20-30 over Gulf of Thailand adjoining Strait of Malacca. 5-10 over South Andaman Sea and adjoining southeast BoB. -10 over North Andaman Sea.	5-10 over southeast adjoining southwest AS. -5 over central parts of AS. 10-20 over north AS.
Vertical Wind Shear (VWS knots) **Low: 05-10 knots** **Moderate:10-20**	5-10 over south BoB, and adjoining South Andaman Sea. 20 knots over parts of central BoB and north Andaman Sea. High (>20knots) over	5-10 over the south AS, 20 over northern parts of south AS, High (>20 knots) over the central and North AS.

knots **High: >20 knots**	central & north BoB, Gulf of Thailand.	
Wind Shear Tendency (knots)	Decreasing over parts of central BoB, increasing over south BoB and South Andaman Sea.	Decreasing over south and adjoining westcentral AS. Increasing over parts of south AS, northwest AS.
Upper Tropospheric Ridge	Along 9^{o}N over BoB.	Along 9^{0}N over AS.

Satellite observations based on INSAT imagery (0600 UTC):

(a) Over the Bay of Bengal & Andaman Sea:-

Scattered low and medium clouds with embedded intense to very intense convection lay over south Andaman Sea. Scattered low and medium clouds with embedded moderate to intense convection over southeast Bay of Bengal and weak to moderate convection lay over central & southwest Bay of Bengal.

(b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded intense to very intense convection lay over southeast Arabian Sea. Scattered low and medium clouds with embedded moderate to intense convection lay over eastcentral & rest of south Arabian Sea and comorin area.

(c) Convection outside India:-

Scattered low and medium clouds with embedded moderate to intense convection lay over Gulf of Mannar, Maldives, Tibet, adjoining china, Gulf of Thailand, South Thailand, Cambodia, South Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea, Philippines, Sulu Sea and over Indian ocean between latitude 5.0N to 10.0S longitude 40.0E to 110.0E and between latitude 10.0S to 20.0S longitude 58.0E to 80.0E.

M.J.O. Index:

MJO index is currently in Phase 2 with amplitude greater than 1. It will remain in same phase till 27th Nov with amplitude greater than 1. It will enter phase 3 on 28th Nov with amplitude greater than 1, further it will remain in phase 3 till 30th but with amplitude less than 1. It will enter phase 4 with amplitude less than 1 on 1st December with amplitude less than 1 and will remain in the same phase till 8th December.

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

A low pressure area is centered near latitude 4.1N and longitude 107.8E at 0600 UTC of 14th November. Associated maximum sustained wind speed is 10-15 knots.

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

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	Emergence of Depression over South Andaman Sea near Nicobar island on 27th Nov. It moves west-Northwestward and lay over Southeast BoB (7^{o}N/92^{o}E) on 28th Nov as D. It intensifies into CS over Southeast BoB (10^{o}N/89^{o}E) on 29th. It move northwestward with further intensification into SCS over southeast adjoining southwest BoB (12^{o}N/88^{o}E) on 30th Nov. System moves in same direction and intensify further into VSCS over westcentral BoB (13.5^{o}N/86^{o}E) on 1st Dec, system moves in same direction and lay over westcentral BoB (14.5^{o}N/85^{o}E) as SCS on 2nd Dec. It moves then northeastward and lay over westcentral and	No significant system during next 7 days.

	adjoining northwest BoB (17.5°N/86°E) on 3rd Dec, further it moves in same direction towards West Bengal-Bangladesh coast.	
IMD-GEFS	LPA over southeast BoB (9°N/90°E) on 28th Nov, moving northwestward and lay over southeast BoB (11°N/88°E) as WML/D on 29th Nov, moving in the same direction and lay as WML over westcentral and adjoining eastcentral BoB (13.5°N/87°E) on 30th Nov, lay over westcentral BoB (14°N/85°E) on 1st Dec as DD/CS, moving further in the same direction and lay over the same region on 2nd Dec, moving then northeastward towards West Bengal – Bangladesh coast with weakening.	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	LPA over southeast BoB and adjoining Andaman Sea (9°N/90°E) on 30th Nov. It intensifies into WML over southeast BoB (10°N/89°E) on 2nd Dec. Moving northwestward and lay over eastcentral and adjoining westcentral BoB (14°N/87°E) on 3rd Dec as Depression, moving then northeastward and lay over westcentral BoB (15°N/88°E) as CS on 4th Dec, it lay over the same region (18°N/89°E) as SCS/VSCS on 5th Dec.	Cycir over southwest AS on 28th Nov having westward movement with no significant intensification.
NCMRWF-NEPS	LPA over southeast BoB (9°N/90°E) on 1st Dec, moving northwestward and lay over southeast BoB (10°N/89°E) as LPA/WML on 2nd Dec, moving in same direction and lay over westcentral BoB (13.5°N/87°E) as Depression on 3rd Dec, moving then northward and lay over same region (15°N/88°E) as CS on 4th Dec, intensify further into SCS/VSCS on 5th Dec over westcentral and adjoining northwest BoB (18°N/88.5°E).	No significant system during next 7 days.
NCMRWF-UM (Regional)	No significant system during next 3 days.	No significant system during next 3 days.
ECMWF	LPA over South Andaman Sea (8°N/94°E) on 27th Nov, moving westnorthwestward and lay over southeast BoB (9°N/90°E) as D on 30th Nov, moving in the same direction and lay over southeast BoB (11°N/88°E) as DD/CS on 30th Nov, moving in the same direction and lay over southwest BoB (11.1°N/87°E) as CS on 1st Dec, lay over southwest BoB (11.5°N/85°E) on 2nd Dec as CS, further moving in the same direction towards Tamil Nadu coast with intensification and lay over southwest and adjoining westcentral BoB (12.1°N/80.5°E) as SCS by 00 UTC of 5th Dec.	No significant system during next 7 days.
NCEP-GFS	LPA over South Andaman Sea adjoining on 26th Nov, WML over Southeast BoB (8.6°N/91°E) on 29th Nov. Depression over the southeast BoB (10.5°N/90°E) on the same day. It move northward and become CS/SCS on 30th Nov over southeast and adjoining eastcentral BoB (12.6°N/89.6°E). It moves in the same direction and lay over eastcentral and adjoining westcentral BoB as SCS on 1st Dec. It moves in the same direction and lay	No significant system.

	as VSCS over eastcentral and adjoining westcentral BoB ($16^oN/90^oE$) on 2nd Dec. It moves then northeastward towards southeast Bangladesh coast with slight weakening.	
IMD-Genesis Potential Parameter	Potential zone over South Andaman Sea and southeast BoB on 27th and over South Andaman Sea and adjoining southeast BoB on 28th Nov, over southeast BoB on 29th & 30th Nov, its over eastcentral and adjoining westcentral BoB on 1st Dec, over westcentral BoB on 2nd Dec.	No potential zone of cyclogenesis over AS.

Summary and conclusion:

1. For Bay of Bengal:

Most of the models are indicating formation of depression over Bay of Bengal during 28th-29th November. However, there is large variation among various models wrt area of formation. GFS group of models (IMD & NCEP) are indicating likely emergence of a cyclonic circulation/low pressure area into south Andaman Sea around 26th with formation of depression over south Andaman Sea around 28th/29th November. These models are indicating initial northwestwards movement till 2nd December, followed by northeastwards movement thereafter. NCUM is indicating a Low pressure area over southeast Bay of Bengal and adjoining Andaman Sea on 30th November, with west-northwestwards and intensification into a depression over eastcentral and adjoining westcentral Bay of Bengal on 3rd December. ECMWF is indicating a low pressure area on 27th over South Andaman Sea, depression over southeast Bay of Bengal on 28th. It is also indicating further intensification and reaching southwest Bay of Bengal off Tamil Nadu and south Andhra Pradesh coast as a severe cyclonic storm by 00 UTC of 5th Dec.

In view of above, it is inferred that a cyclonic circulation is likely to emerge into South Andaman Sea and neighbourhood by 26th November. Under its influence, a low pressure area is likely to form over South Andaman Sea and adjoining southeast Bay of Bengal around 27th November. It is likely to move west-northwestwards and intensify into a depression over southeast Bay of Bengal around 29th November, 2023.

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**	**LOW**	**MOD**	**HIGH**	**HIGH**	**HIGH**

Every 24 hour forecast is valid upto 0300 of next day.

2. For the Arabian Sea:

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

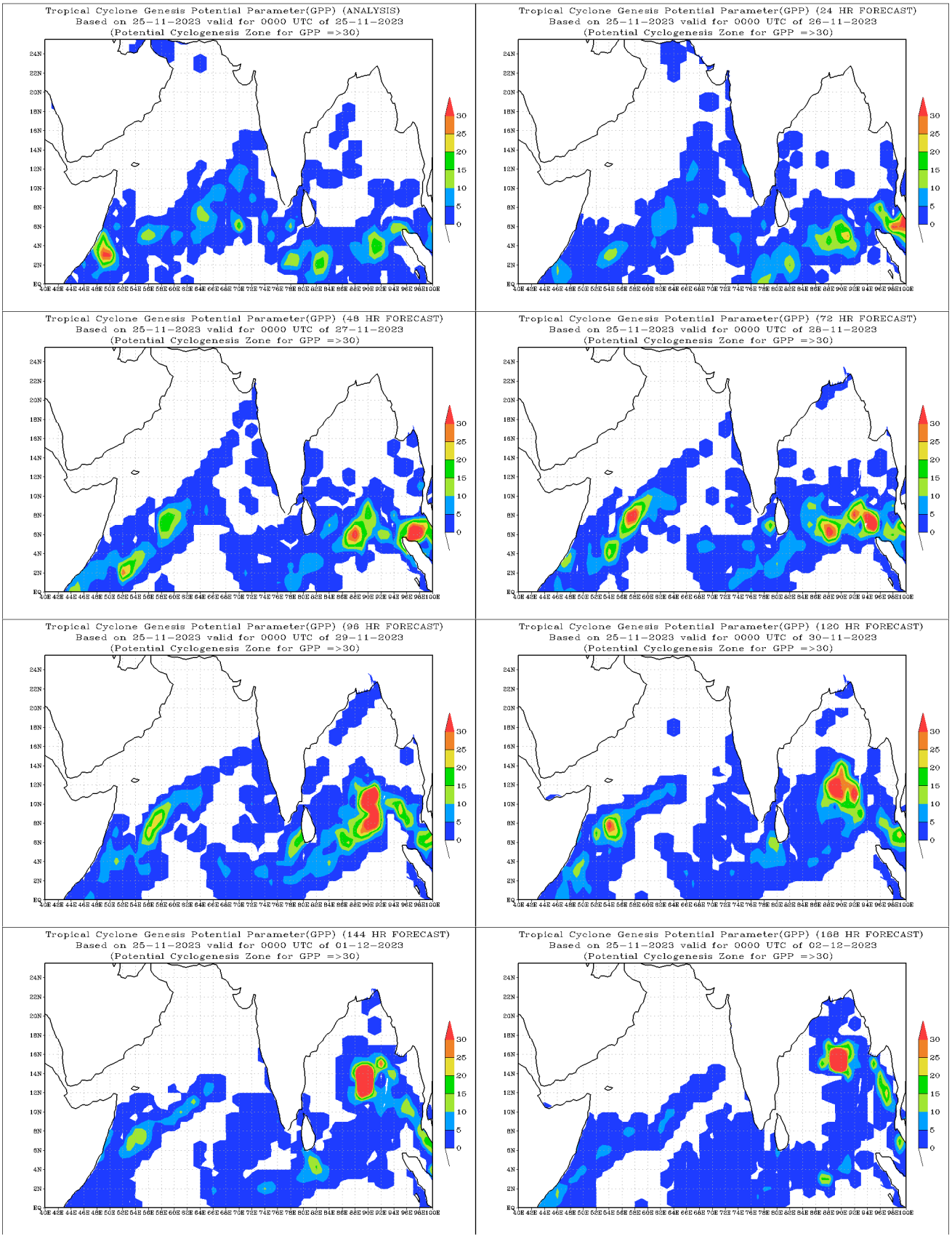
Probability of Cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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**

Every 24 hour forecast is valid upto 0300 of next day.

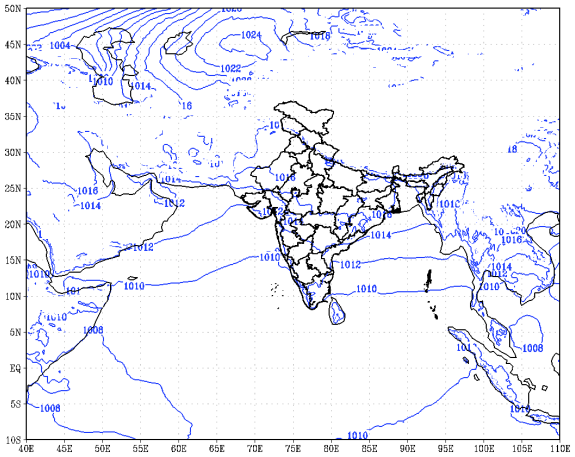
IOP: IOP for Andaman & Nicobar Islands for 26th - 28th November.

ANNEXURE


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 25-11-2023 valid for 0000 UTC of 25-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 26-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 27-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 28-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 29-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 30-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 01-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 25-11-2023 valid for 0000 UTC of 02-12-2023
(Potential Cyclogenesis Zone for GPP =>30)

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

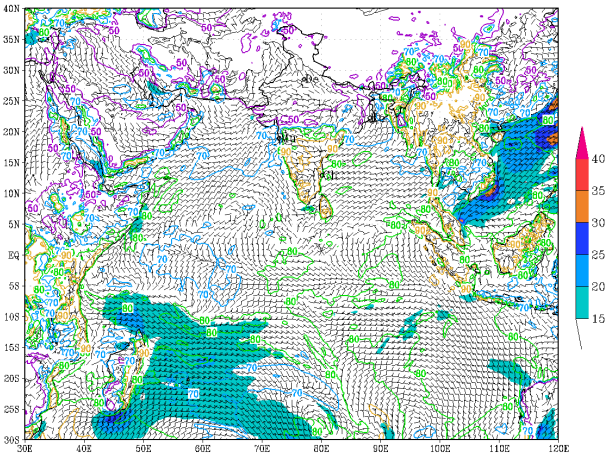
based on 00 UTC of 25-11-2023 valid for 00 UTC of 25-11-2023



(Background does not depict political boundary)

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

based on 00 UTC of 25-11-2023 valid for 00 UTC of 25-11-2023



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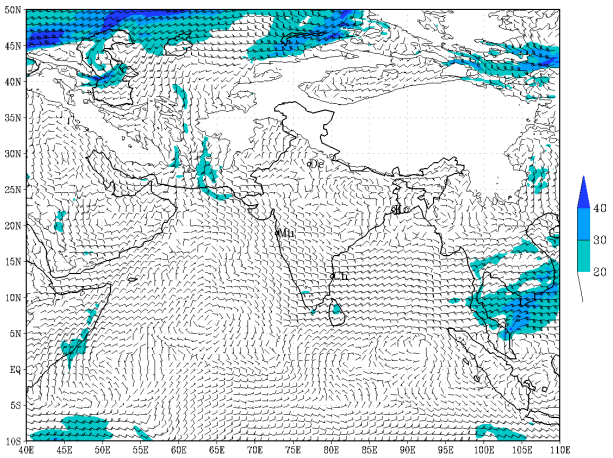
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)

based on 00 UTC of 25-11-2023 valid for 00 UTC of 25-11-2023



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

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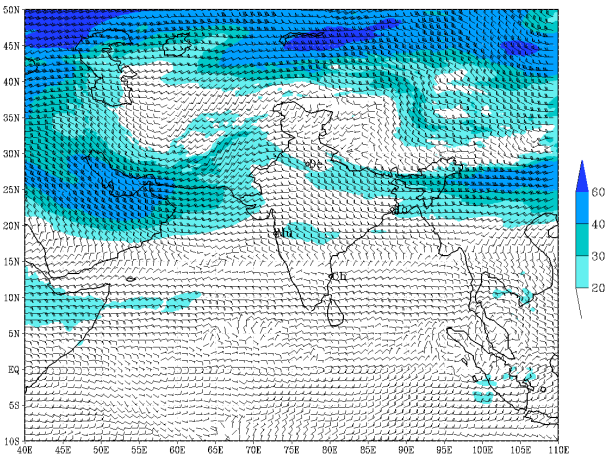

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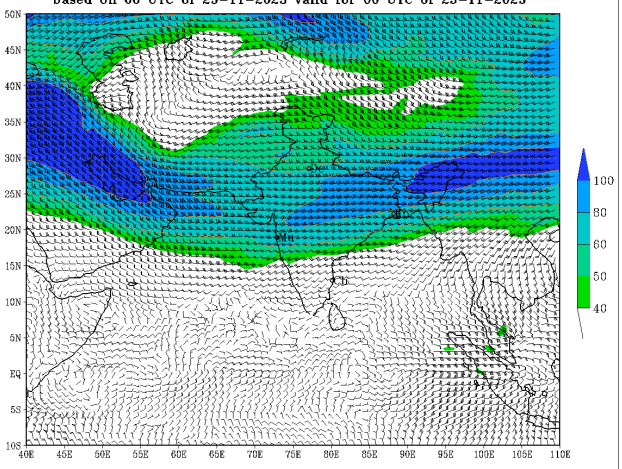

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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

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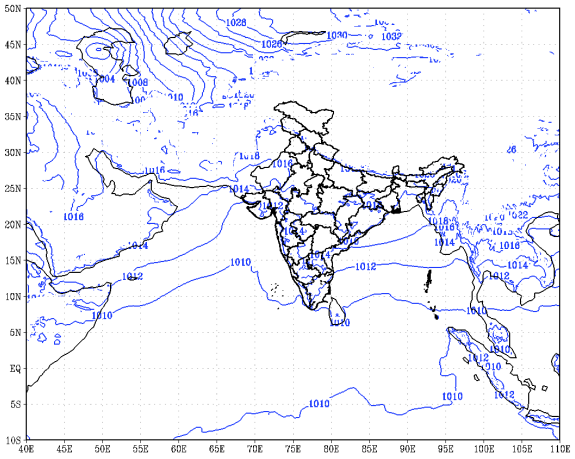

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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

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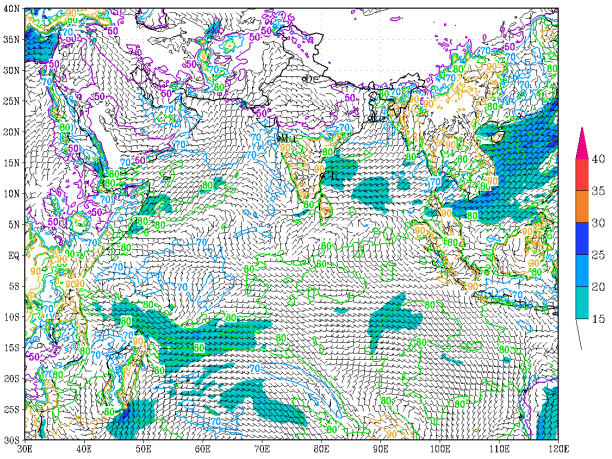

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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (24 HR)

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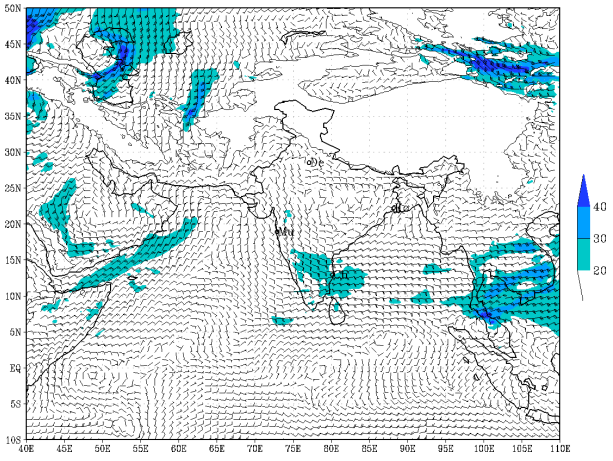

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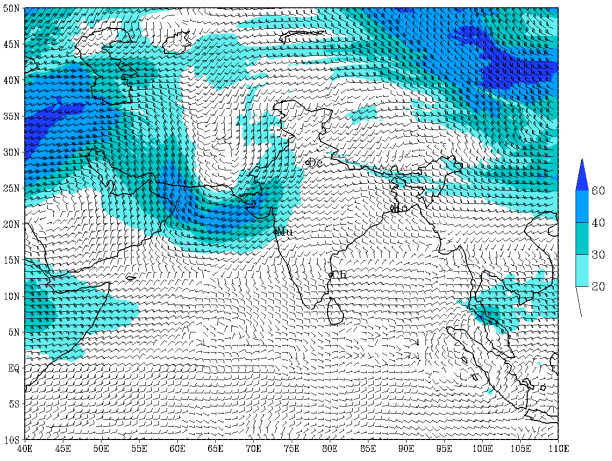
based on 00 UTC of 25-11-2023 valid for 00 UTC of 26-11-2023



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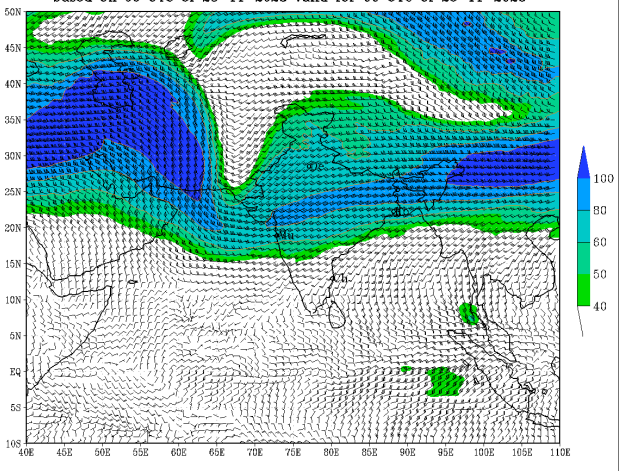
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 25-11-2023 valid for 00 UTC of 26-11-2023



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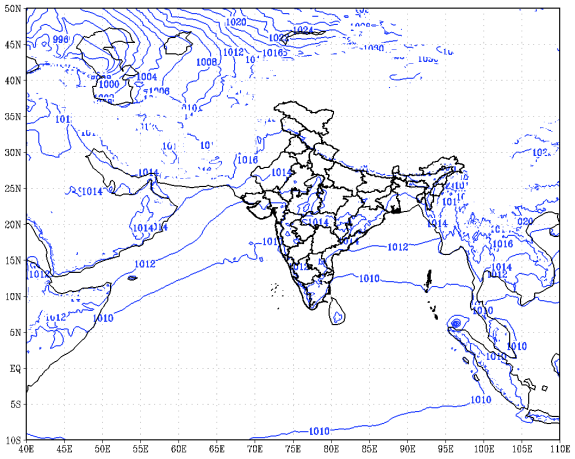
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)

based on 00 UTC of 25-11-2023 valid for 00 UTC of 27-11-2023



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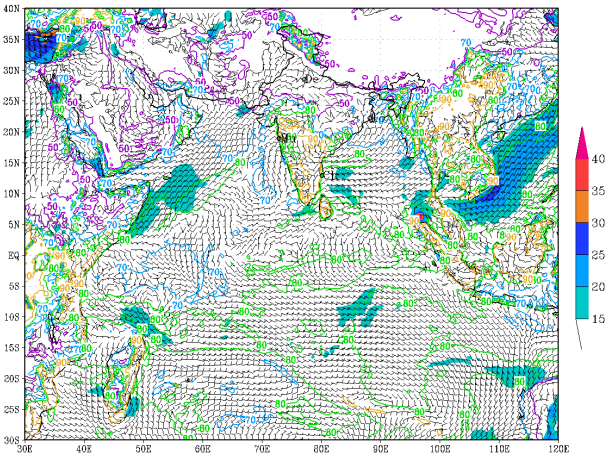
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)

based on 00 UTC of 25-11-2023 valid for 00 UTC of 27-11-2023



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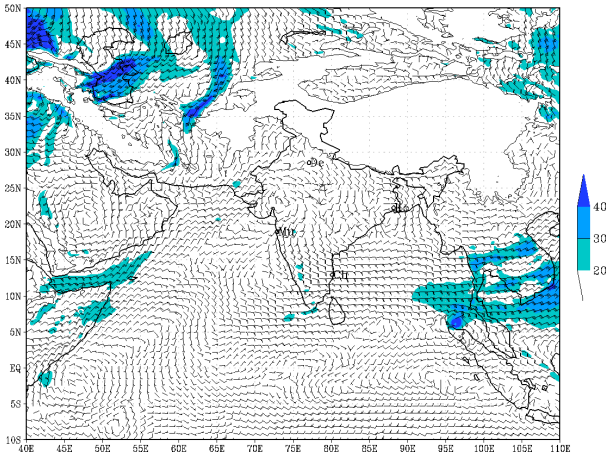
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (48 HR)

based on 00 UTC of 25-11-2023 valid for 00 UTC of 27-11-2023



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

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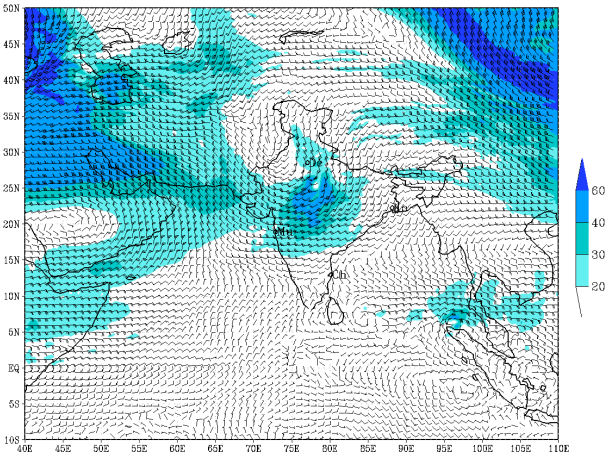

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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)

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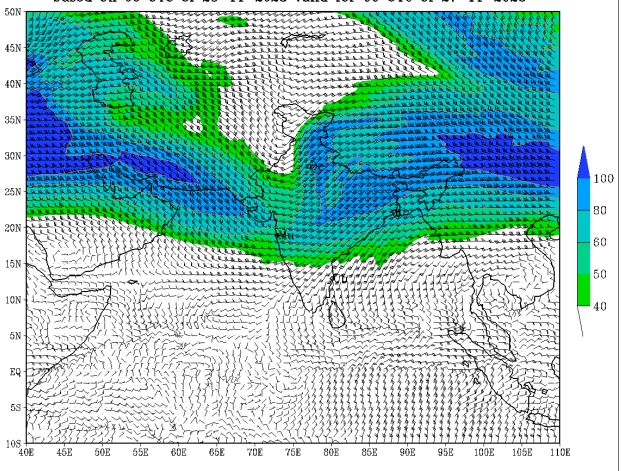

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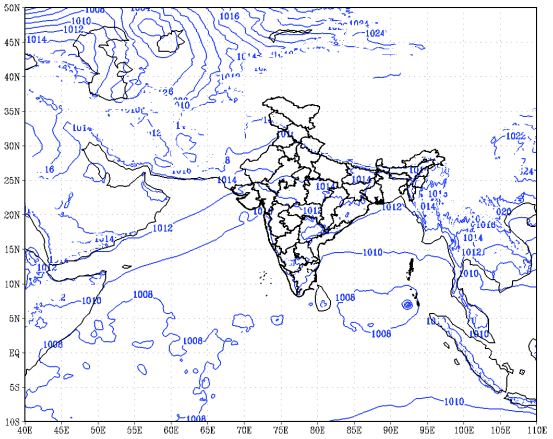
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 28-11-2023



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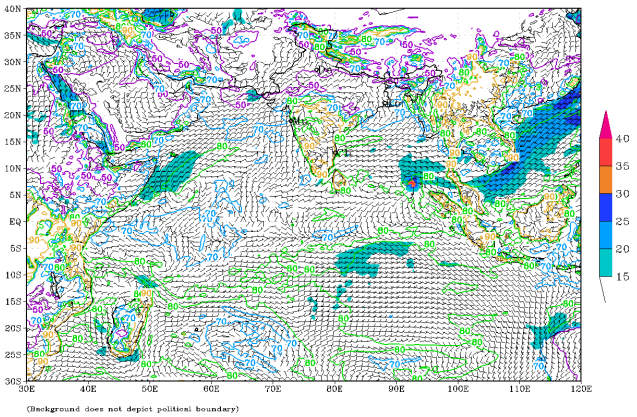
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 28-11-2023



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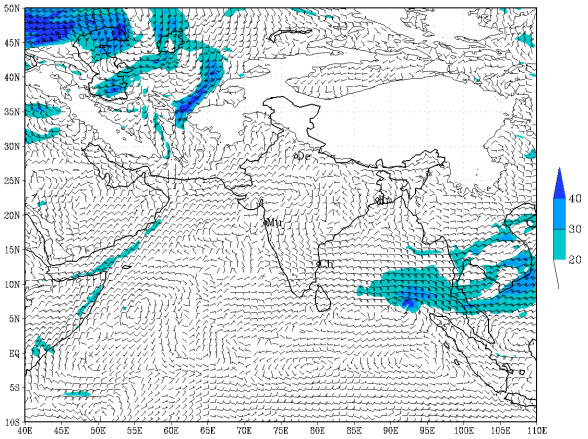

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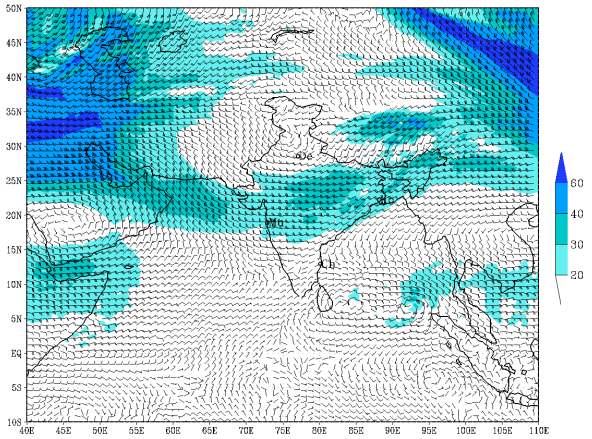

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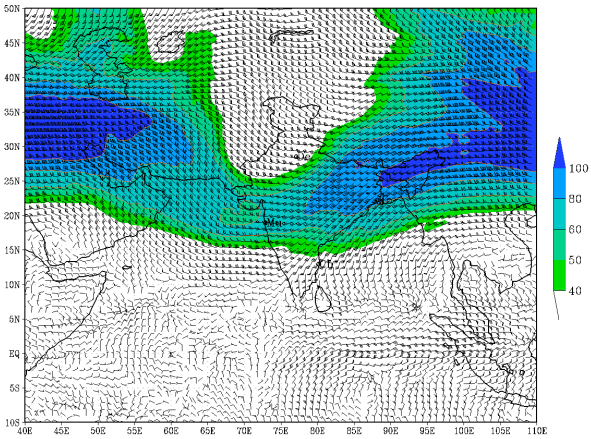

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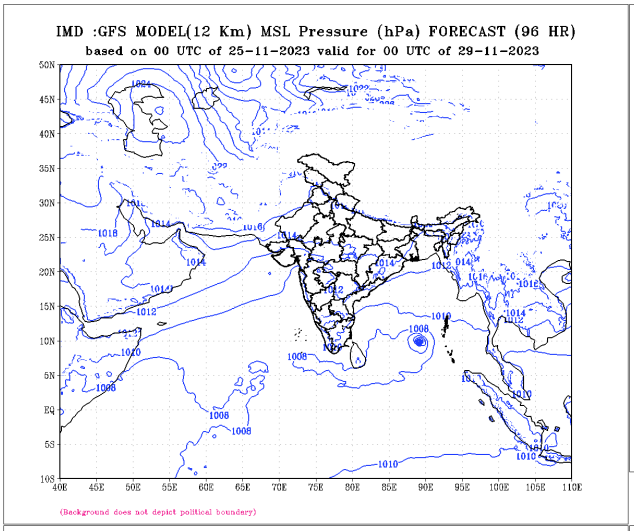
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 29-11-2023
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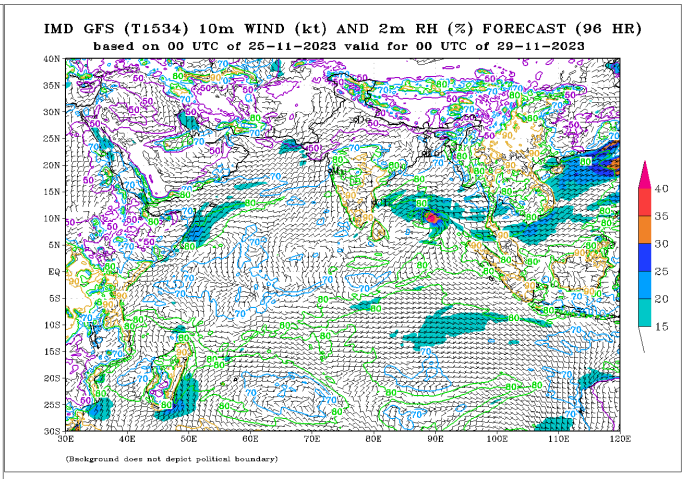
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
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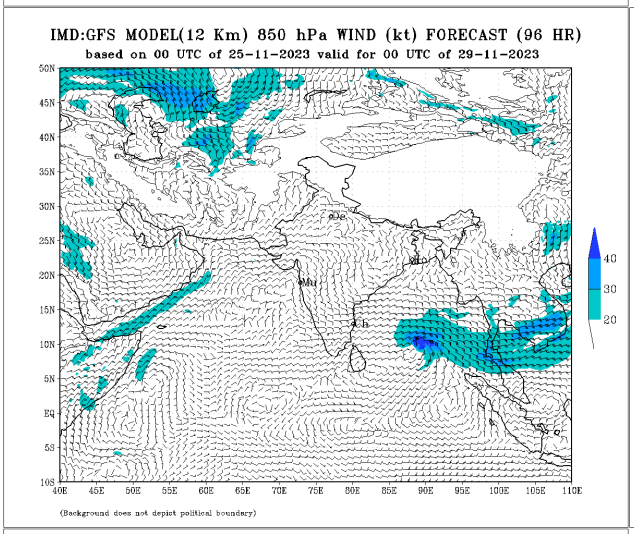
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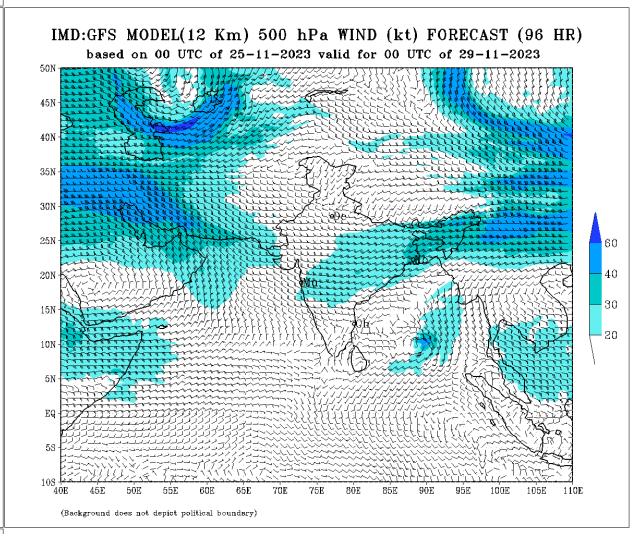
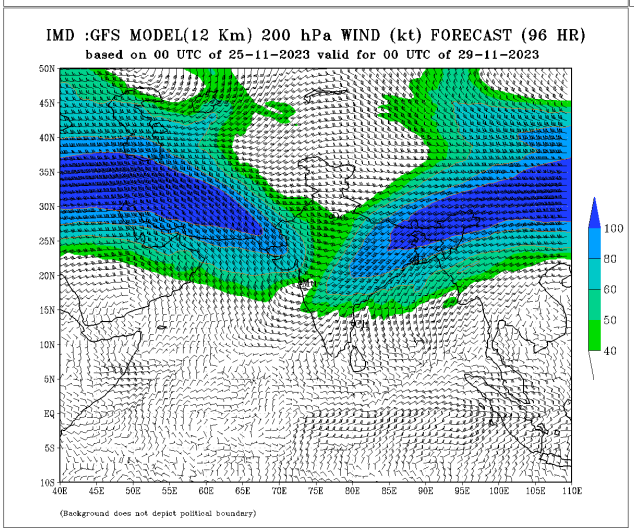
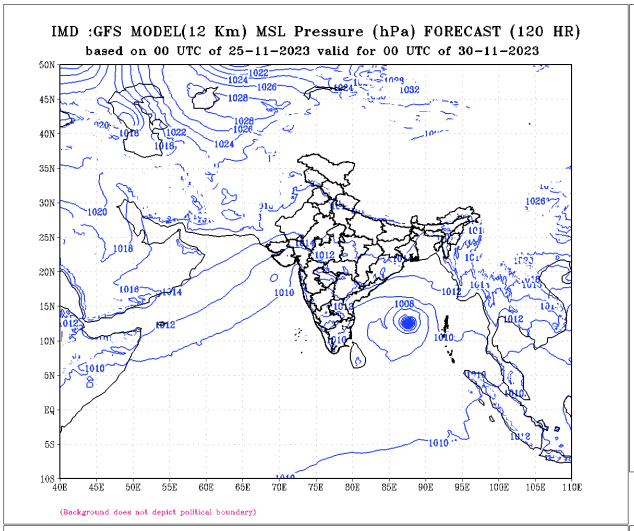
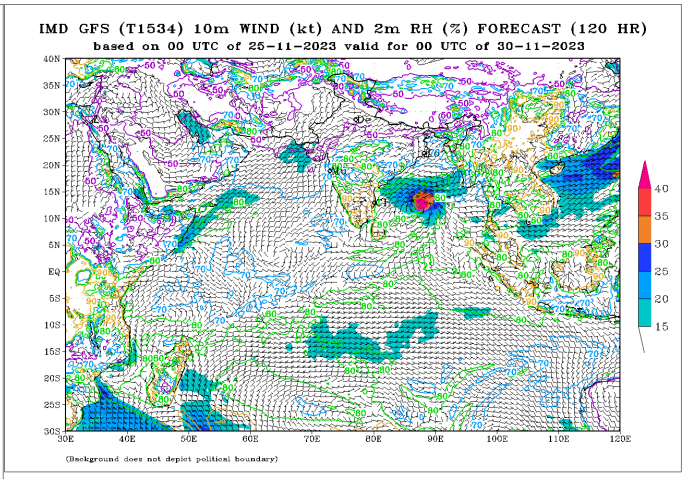
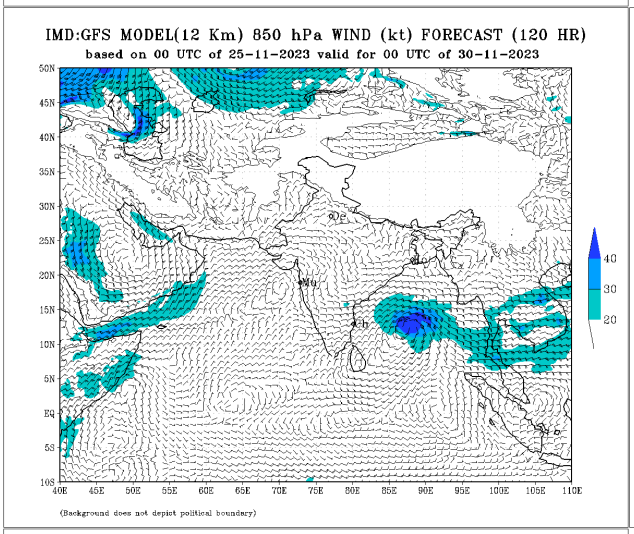
based on 00 UTC of 25-11-2023 valid for 00 UTC of 29-11-2023
(Background does not depict political boundary)

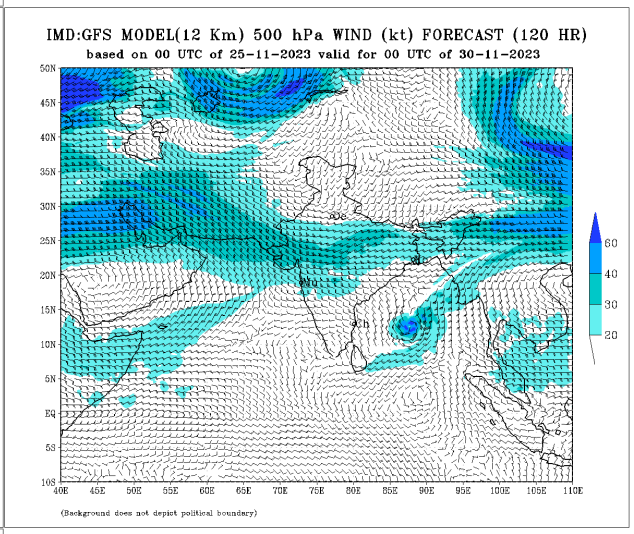

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 29-11-2023
(Background does not depict political boundary)

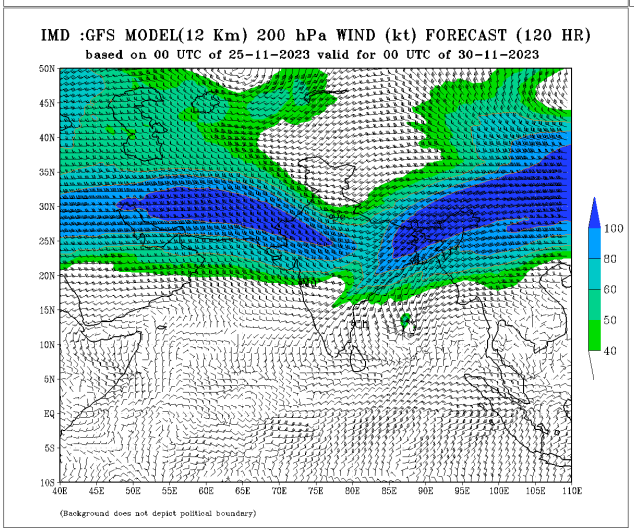

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 29-11-2023
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 30-11-2023
(Background does not depict political boundary)

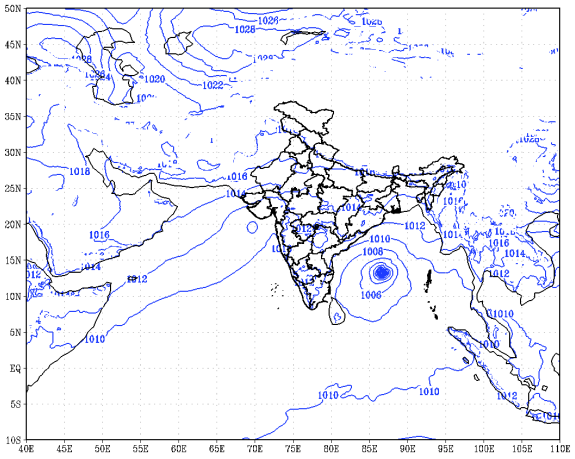

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 30-11-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 30-11-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 30-11-2023
(Background does not depict political boundary)

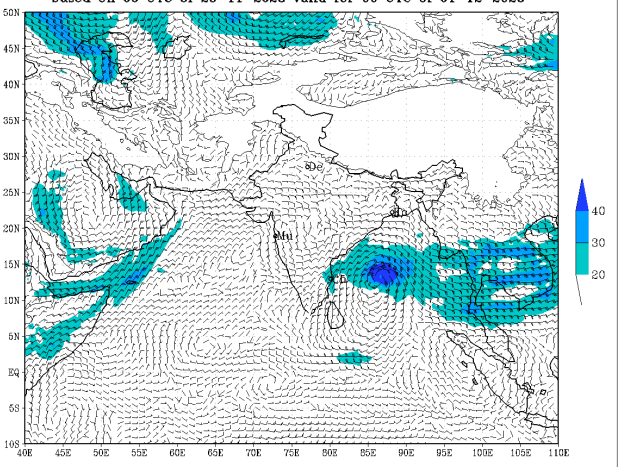

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 30-11-2023
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 01-12-2023



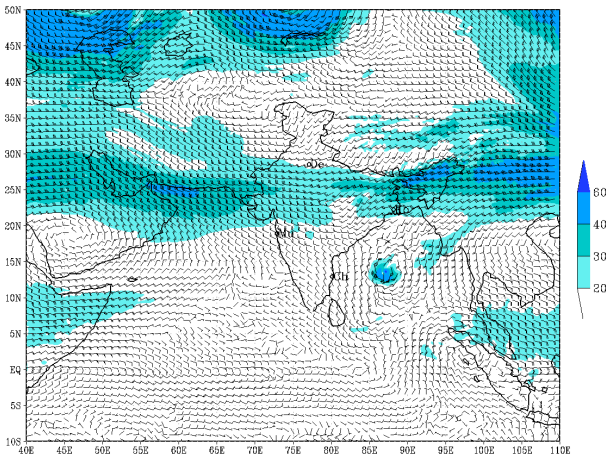
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 01-12-2023



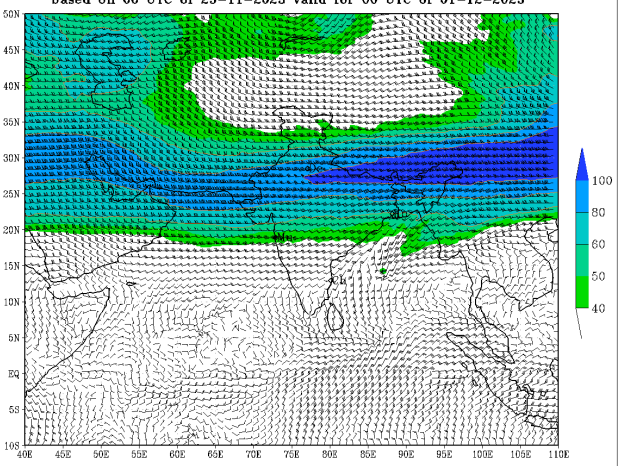
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 01-12-2023

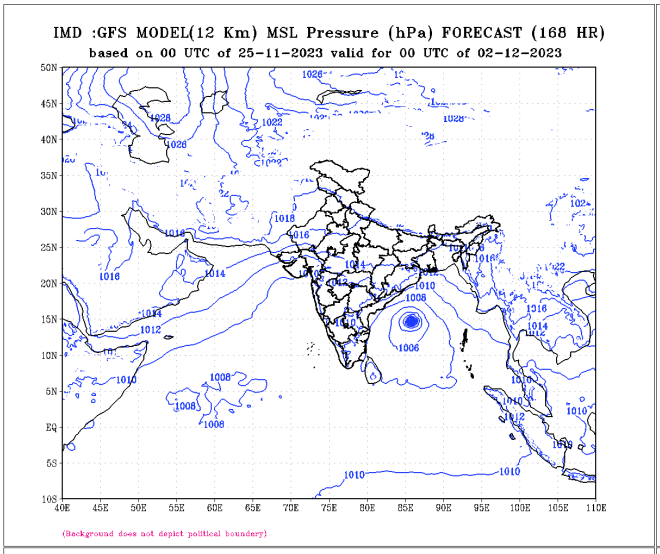


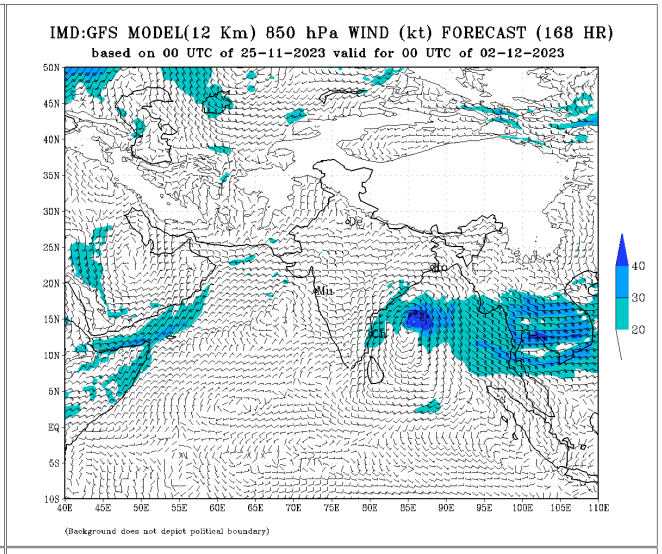
(Background does not depict political boundary)

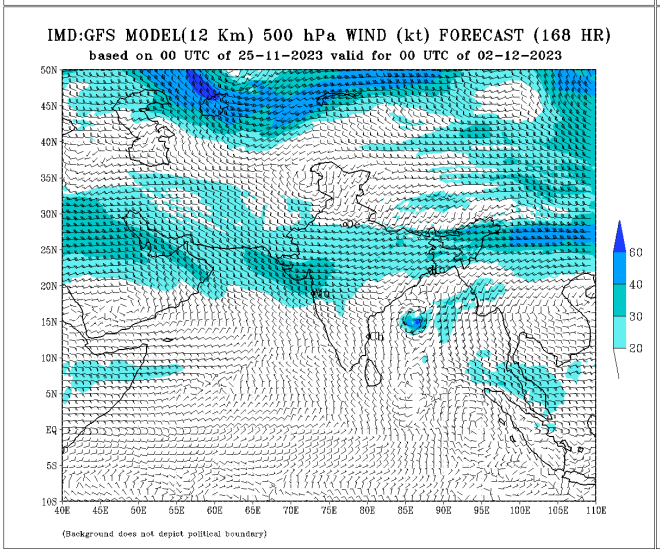
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 01-12-2023

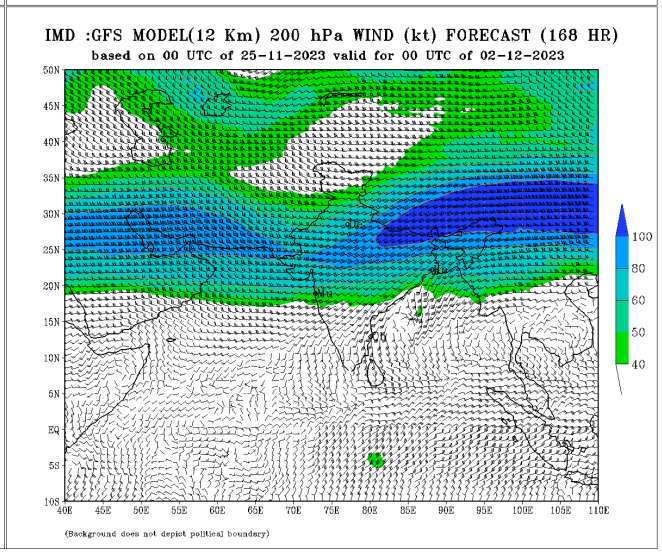


(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 25-11-2023 valid for 00 UTC of 02-12-2023
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 25-11-2023 valid for 00 UTC of 02-12-2023
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 25-11-2023 valid for 00 UTC of 02-12-2023
100
80
60
50
40
(Background does not depict political boundary)