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

Tropical Cyclone Forecast Programme
Report Dated 24th November, 2022

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

- Yesterday's low pressure area over south coastal Andhra Pradesh & neighbourhood weakened and lay as a cyclonic circulation over North Tamil Nadu and neighbourhood at 0530 hours IST of today, the 24th November, 2022.
- A fresh cyclonic circulation is likely to emerge into North Andaman Sea during next 24 hours.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	About 28-29°C over the system and major parts of BoB, 29-30°C over eastcentral & adjoining southeast BoB and along south Sri Lanka coast.	About 29-30°C over the southeast AS and adjoining southwest, eastcentral AS, off south Gujarat and Maharashtra coasts, 26-28°C over eastcentral and adjoining north AS, adjoining southwest AS, less than 24°C over southwest AS off Oman and Yemen coasts and adjoining sea areas.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	>110 over south Andaman sea & eastcentral BoB, 70-80 over north Andaman Sea, north parts of southwest BoB and adjoining westcentral BoB, off Sri Lanka, north BoB, and less than 40 over westcentral BoB, along and off east coast of India, west coast of SriLanka, Gulf of Mannar, some parts of southwest BoB.	70-90 over southeast and adjoining eastcentral and adjoining southwest AS, Maldives & adjoining EIO, Comorin area and less than 40 over remaining AS and also off west coast of India, Comorin area.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	40-50 over southwest BoB along & off North Sri Lanka coast and another zone over South Andaman Sea	40-50 over southeast AS off south Kerala coast.
Low Level convergence (X10^{-5} s^{-1})	Small zone of 5 over South Andaman Sea.	

Upper Level divergence ($X10^{-5}$ s^{-1})	20 over South Andaman Sea.	05-10 over southeast AS, Lakshadweep area.
Vertical Wind Shear (VWS knots)	10-20 over Andaman Sea and central BoB.	10-20 over southeast AS.
Wind Shear Tendency (knots)	Decreasing over Andaman Sea and central BoB..	Decreasing over southeast AS.
Upper tropospheric Ridge	Along 15.0°N over the BoB.	Along 17.0°N over the AS.
Trough in westerlies	No significant trough	

Satellite observations based on INSAT imagery (0900 UTC):

a) Over the BoB & Andaman Sea:-

Intense convection over Andaman Sea and adjoining Thailand and neighbourhood areas. Minimum cloud top temperature is -93 degree Celsius. Scattered to broken low and medium clouds with embedded intense to very intense convection lay over Andaman Sea, Gulf of Marataban, Tenasserim coast and Thailand. Scattered low and medium clouds with embedded moderate to intense convection lay over central and south Bay of Bengal.

b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded isolated weak to moderate convection lay over north and central parts of Arabian Sea, Lakshadweep and Comorin Area.

M.J.O. Index:

The Madden Julian Oscillation (MJO) Index is currently in Phase 6 with amplitude more than 1. It will continue in same phase for next 3 days. Thereafter, it would move to phase 7 and continue there with gradually decreasing amplitude during subsequent 4 days.

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

At 0600 UTC of 23rd November, there is a cyclonic disturbance over 14.1S/117.4E. The associated maximum wind speed is 20 kt gusting to 30 kt.

Model guidance based on 0000 UTC for the next 7 days

MODEL GUIDANCE	BoB	AS
IMD-GFS	Cycir over South Kerala on 24th, to move southwestwards and become less marked on 26th Nov. A cyclonic circulation (cycir) over Gulf of Thailand on 24th, to emerge into North Andaman Sea on 25th, to move west-northwestwards till 27th & less marked thereafter.	No significant system
IMD-GEFS	Cycir over South Kerala on 24th, to move southwestwards and become less marked on 26th Nov.	No significant system

	Low pressure area (LPA) over Gulf of Thailand on 24th, 25th to emerge into North Andaman Sea on 26th, as a cycir, to move west-northwestwards till 27th, LPA over central BoB on 28th & less marked thereafter.	
GEFS Probablistic guidance	No significant system	Not available
IMD WRF	Cycir over South Kerala on 24th, to move southwestwards and become less marked on 26th Nov. A cyclonic circulation (cycir) over Gulf of Thailand on 24th, to emerge into North Andaman Sea on 25th, to move west-northwestwards till 27th.	No significant system
NCMRWF-NCUM	Cycir over North Tamil Nadu on 24th, to move southwestwards as a cycir over south Tamil Nadu on 25th, emerge into Arabian Sea on 26th. Fresh cycir to emerge into Andaman Sea on 25th, to move north-northwestwards till 27th towards eastcentral BoB, becoming less marked thereafter. A fresh cycir to emerge into South Andaman Sea on 4th Dec..	Cycir over southeast Arabian Sea on 26th to move nearly west-southwestwards towards Somalia coast till 30th as a cycir. No further intensification is predicted.
NCMRWF-NEPS	Cycir over North Tamil Nadu on 24th, to move southwestwards as a cycir over south Tamil Nadu on 25th, emerge into Arabian Sea on 26th. Fresh cycir to emerge into Andaman Sea on 25th, to move north-northwestwards till 27th towards eastcentral BoB, becoming less marked thereafter. A fresh cycir to emerge into South Andaman Sea on 4th Dec.	Cycir over southeast Arabian Sea on 26th to move nearly west-southwestwards towards Somalia coast till 30th as a cycir. No further intensification is predicted.
NCMRWF-UM (Regional)	Cycir over North Tamil Nadu on 24th, to move southwestwards as a cycir over south Tamil Nadu on 25th, emerge into Arabian Sea on 26th. Fresh cycir to emerge into Andaman Sea on 25th, to move north-northwestwards till 27th towards eastcentral BoB, becoming less marked thereafter.	Cycir over southeast Arabian Sea on 26th to move nearly west-southwestwards thereafter. No further intensification is predicted.
ECMWF	Cycir over South Tamil Nadu on 24th to move southwestwards and emerge into Arabian Sea on 25th. Fresh low pressure area over North Andaman Sea on 24th, to move initially westwards and then northwards without any intensification, till 29th. Fresh cyclonic circulation/low pressure area (remnant from South China Sea) is likely to emerge into Andaman Sea on 4th Dec.	No significant intensification of system.
ECMWF ensemble	Likely cyclogenesis (30-40% probability) over South BoB during next 3-4 days with intensification upto depression only. Another cyclogenesis expected over South BoB during 4th-8th Dec. with intensification upto Cyclonic Storm (50-60% probability). 20-30% Enesmle members indicate likely northwestwards movement towards Andhra Pradesh coast.	No significant system

NCEP-GFS	Cycir over South Kerala on 24th, to move southwestwards and become less marked on 26th Nov. A cyclonic circulation (cycir) over Gulf of Thailand on 24th, to emerge into North Andaman Sea on 25th, to move west-northwestwards till 27th & less marked thereafter. A fresh cycir/low pressure area to emerge into Andaman Sea around 4th December from South China Sea. To move northwestwards towards westcentral & adjoining northwest BoB with significant intensification into a cyclonic storm.	No significant system
IMD MME		No significant system
IMD HWRF	Available during cyclonic disturbance period only	No significant system
IMD-Genesis Potential Parameter	No potential zone over Bay of Bengal	No potential zone over Arabian Sea

Summary and conclusion:

- Most of the models are indicating that the cyclonic circulation over North interior Tamil Nadu on today, the 24th November would move southwestwards and emerge into southeast Arabian Sea. Thereafter, it would move westwards with no significant intensification for subsequent 2-3 days.

- Most of the models are indicating emergence of a fresh cyclonic circulation (remnant from South China Sea) into North Andaman Sea around 25th with initial northwestwards movement followed by northwards movement towards North Bay of Bengal with no significant intensification.

- Models like NCEP GFS, NCUM group and ECMWF are also indicating likely emergence of another cyclonic circulation/low pressure area (remnant from South China Sea) into Andaman Sea around 4th December.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

A Fresh cycir/low pressure (remnant from South China Sea) is likely to emerge into North Andaman Sea around 24th/25th and move west-northwestwards initially followed by nearly northwards movement with no significant intensification. Nil probability is assigned to it's intensification into a depression.

Another cyclonic circulation (remnant from South China Sea) is likely to emerge into Andaman Sea around 4th December. The movement and intensification of this system need to be critically monitored during 4th-10th December.

2. For the Arabian Sea:

No significant system.

Probability of cyclogenesis (formation of depression and above intensity systems) over the BAY OF BENGAL 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

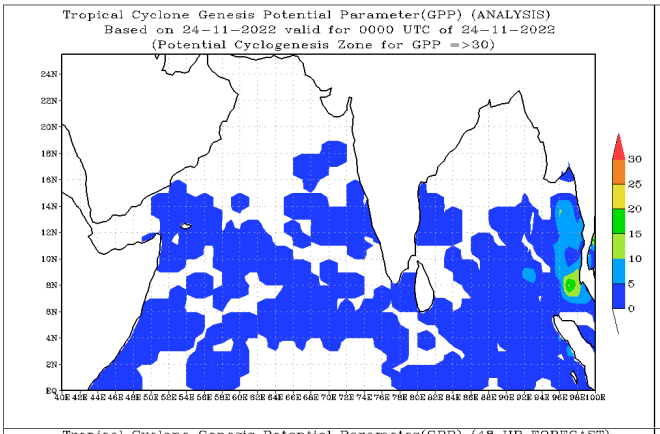
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

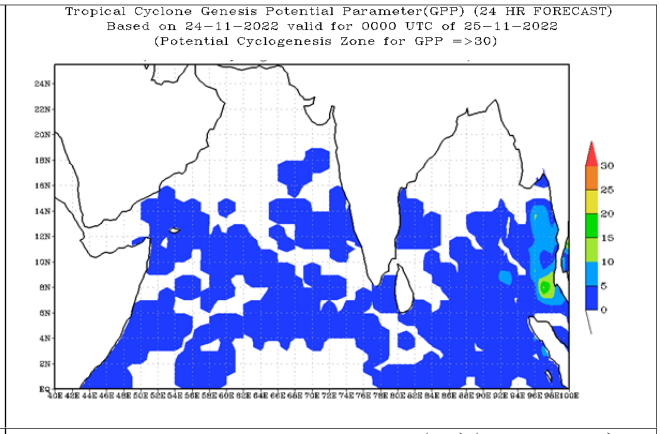
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

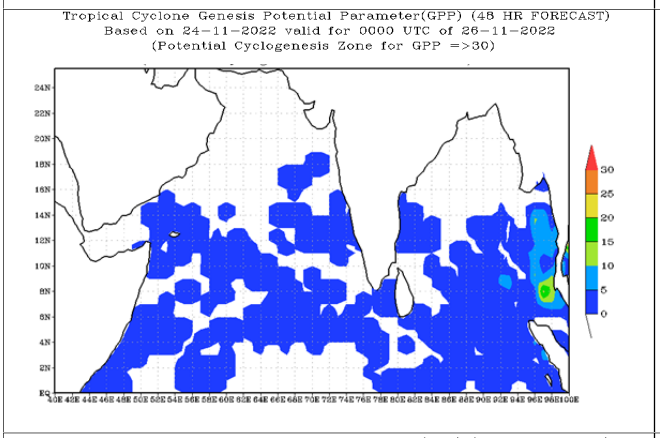
Advisory:
The movement and intensification of the cyclonic circulation/low pressure area likely to emerge into Andaman Sea around 25th need to be monitored.

IOP: NIL

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 24-11-2022 valid for 0000 UTC of 24-11-2022
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 24-11-2022 valid for 0000 UTC of 25-11-2022
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
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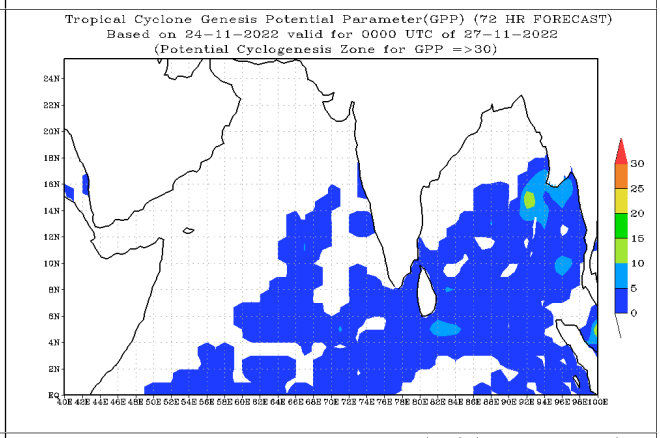
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
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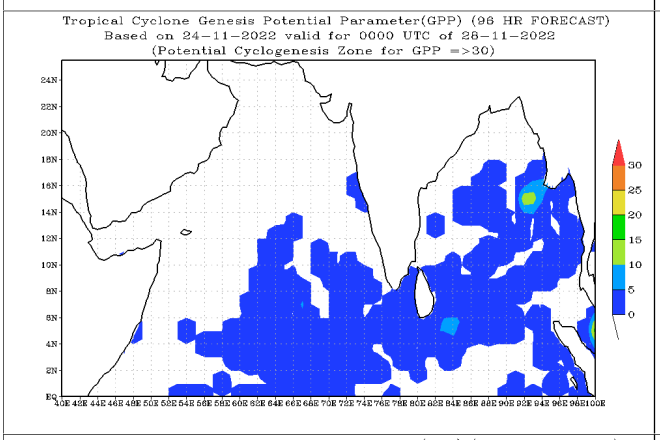
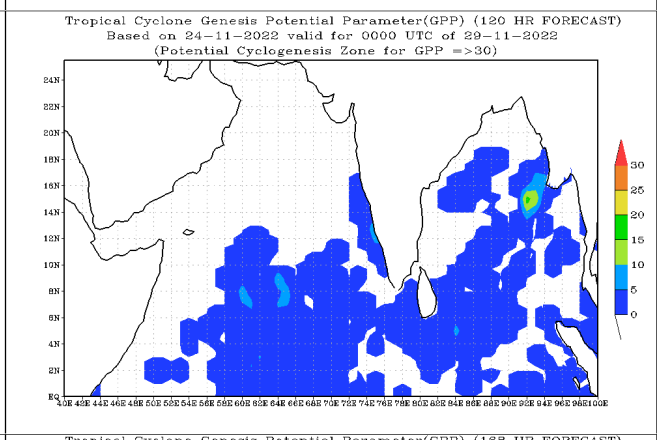
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 24-11-2022 valid for 0000 UTC of 28-11-2022
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
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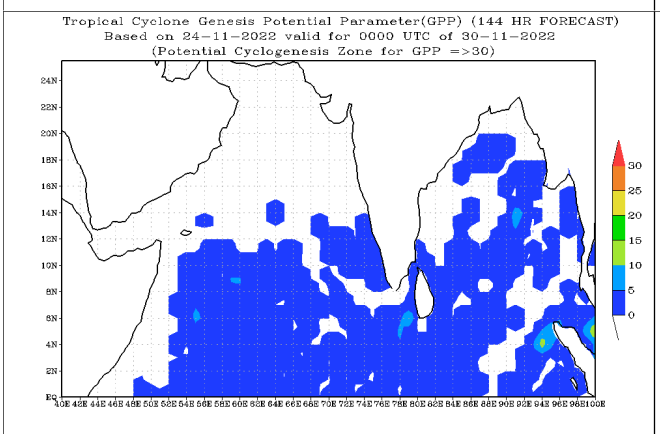
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
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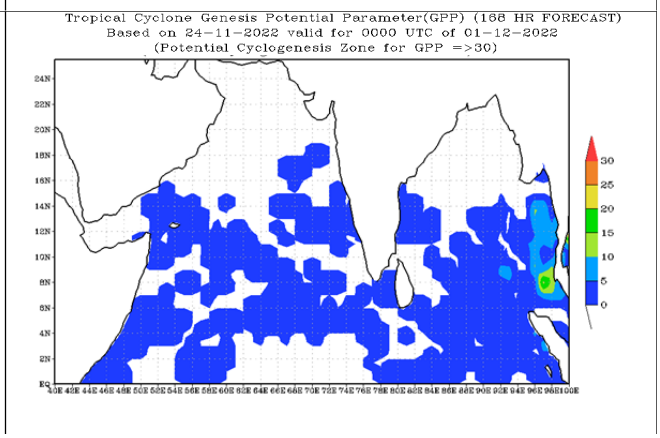
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 24-11-2022 valid for 0000 UTC of 01-12-2022
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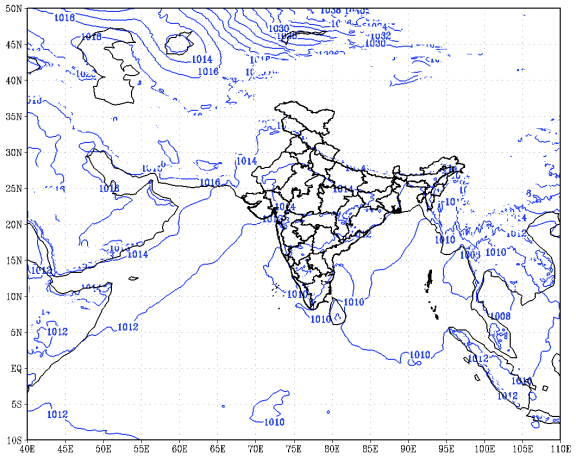
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 24-11-2022



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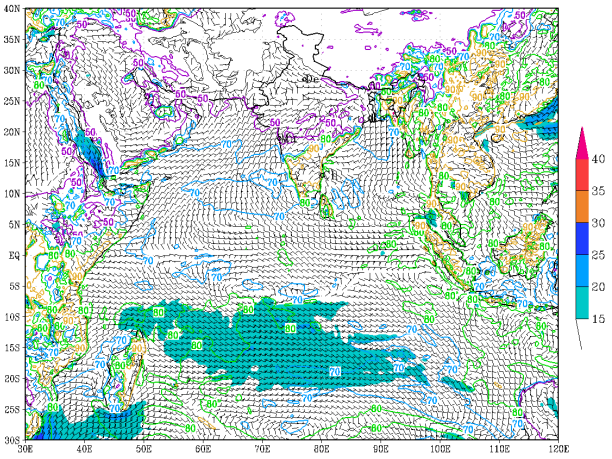
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 24-11-2022



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

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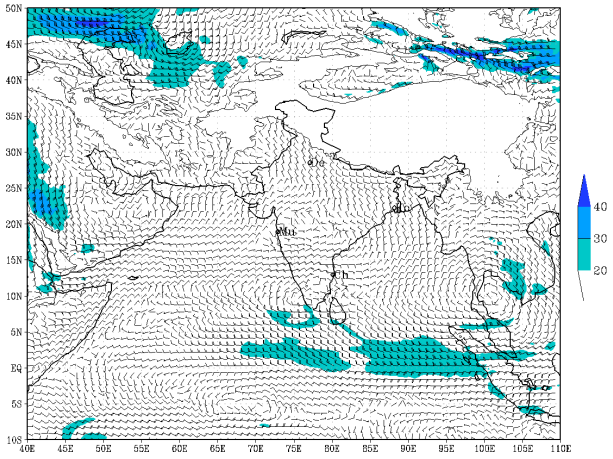

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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)

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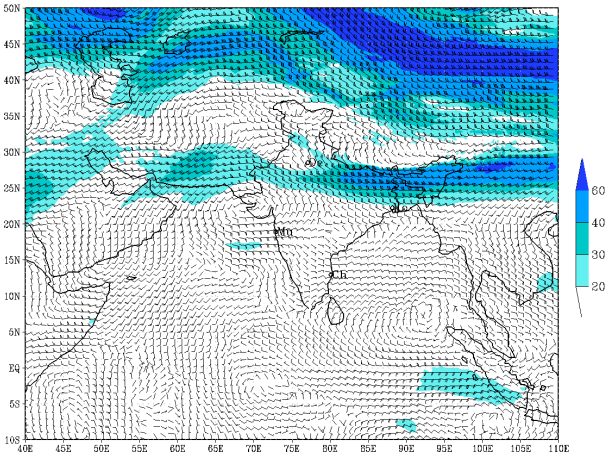

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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)

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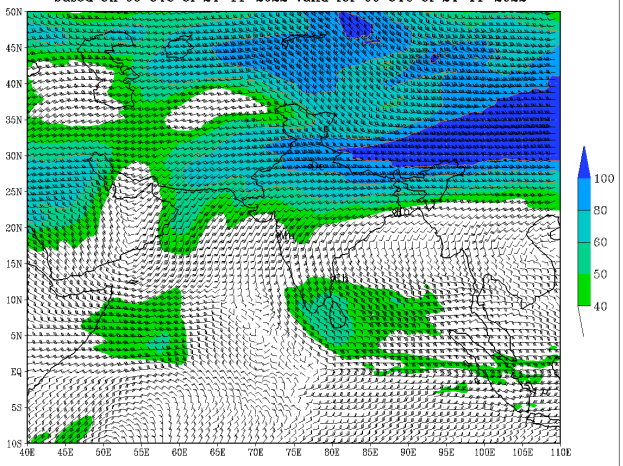

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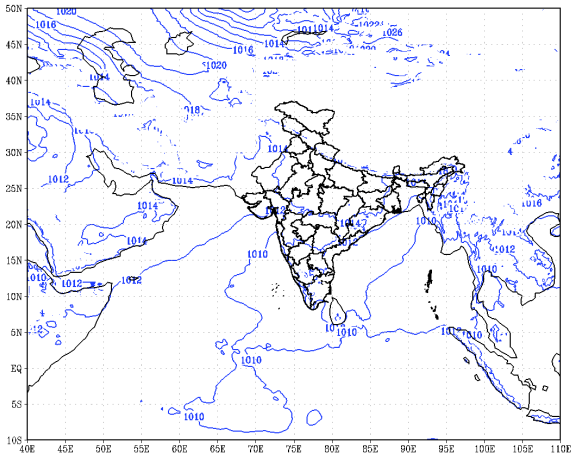
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 25-11-2022



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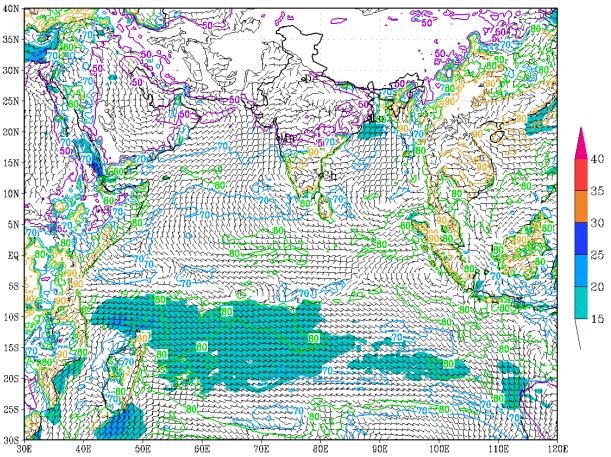
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 25-11-2022



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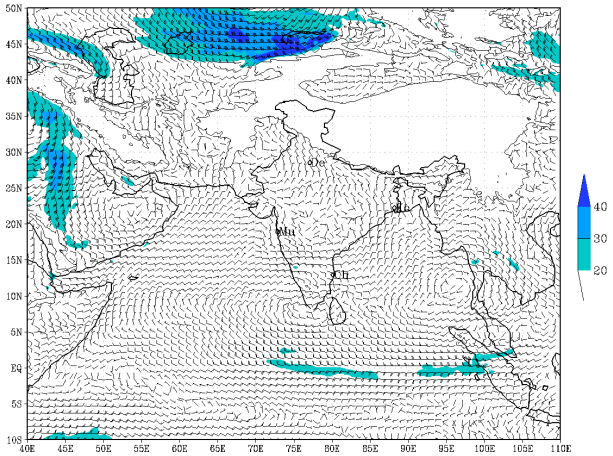

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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)

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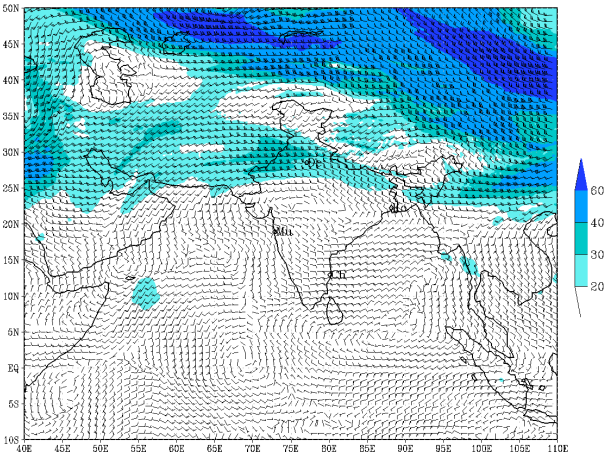

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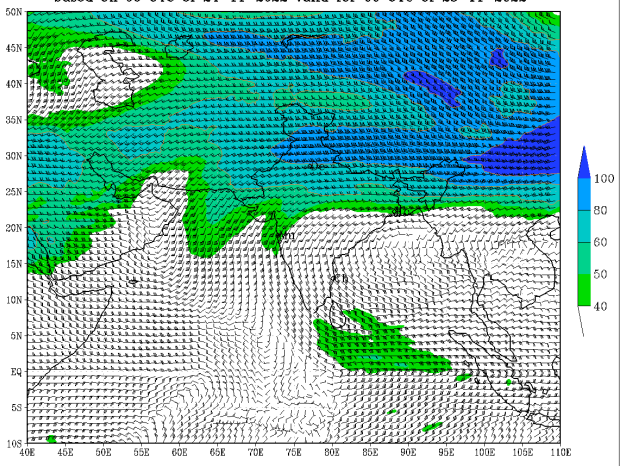

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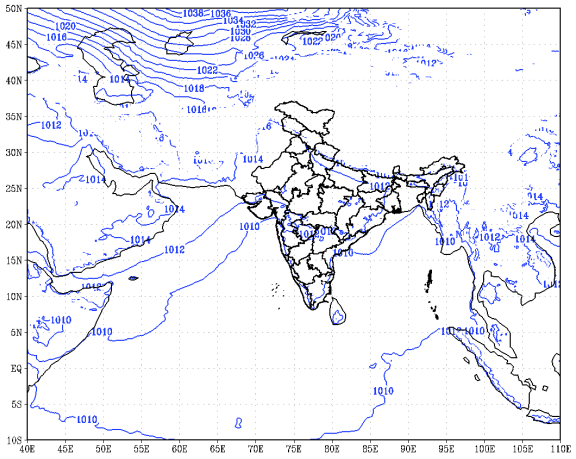
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 26-11-2022



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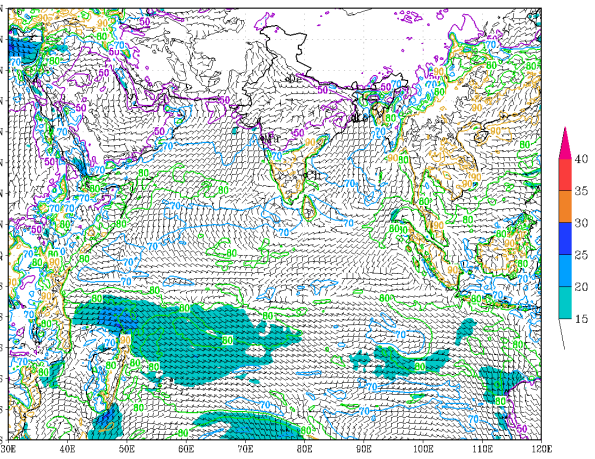
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)

based on 00 UTC of 24-11-2022 valid for 00 UTC of 26-11-2022



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

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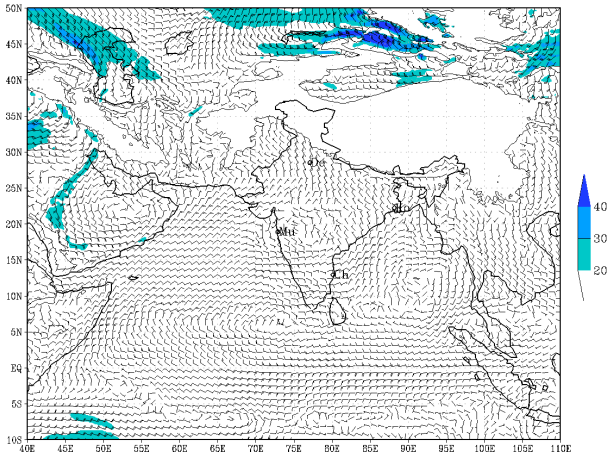

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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)

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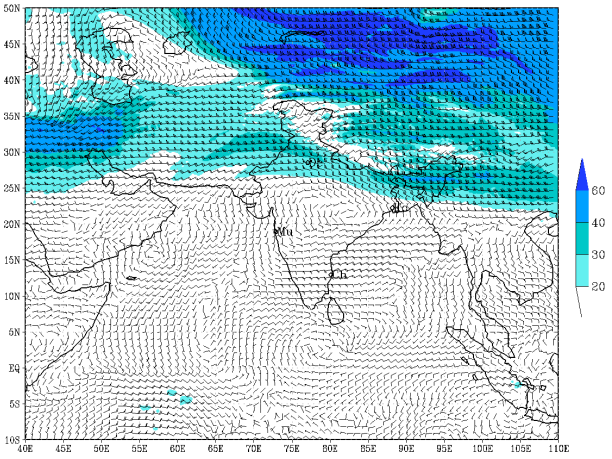

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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)

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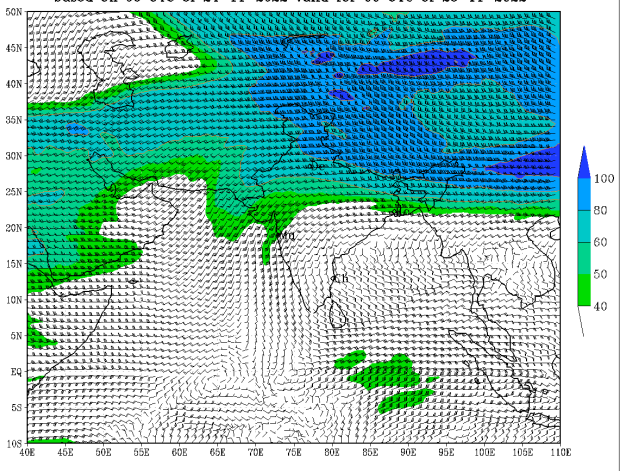

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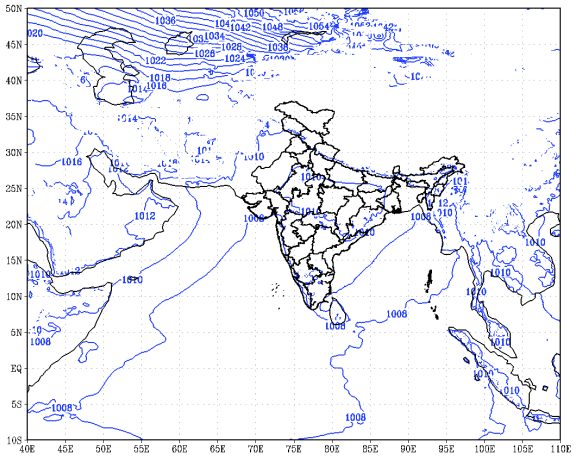
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 27-11-2022



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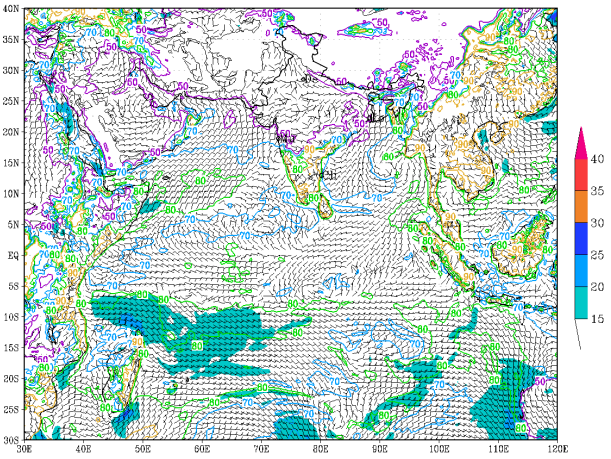
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 27-11-2022



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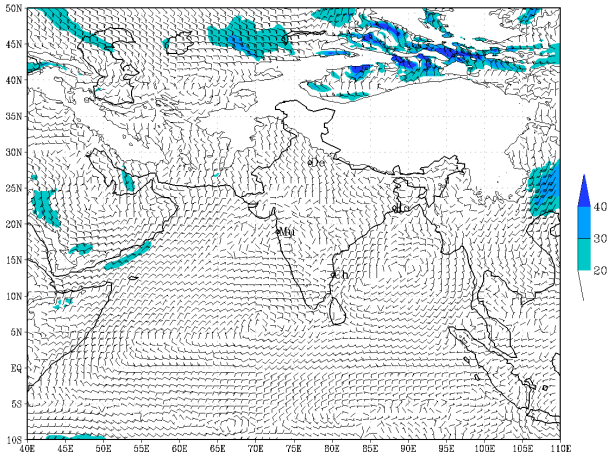
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 27-11-2022



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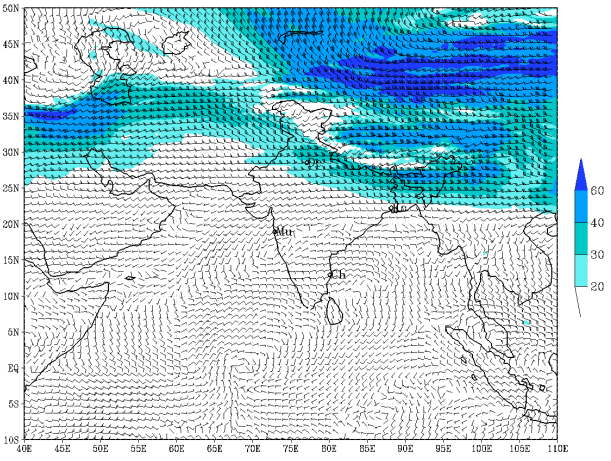

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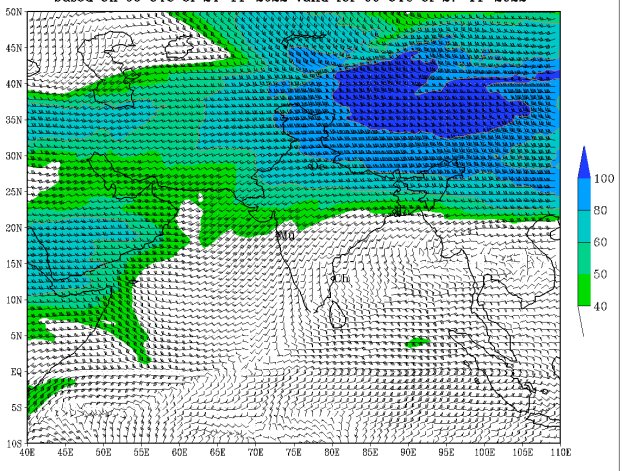

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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
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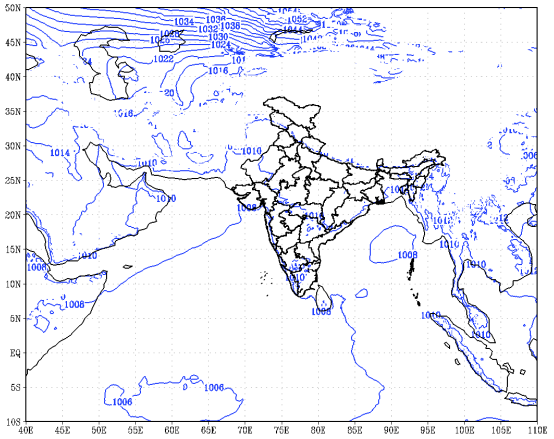

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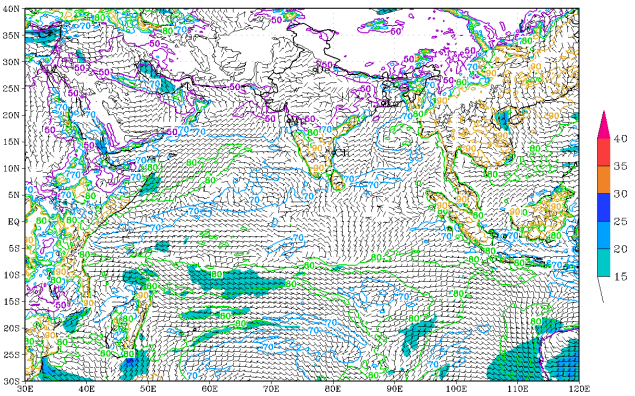
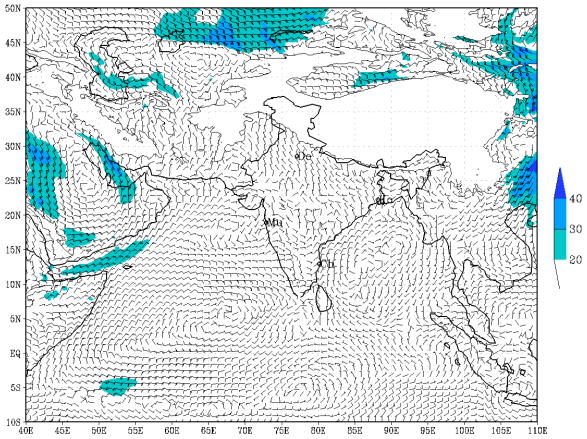
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 28-11-2022



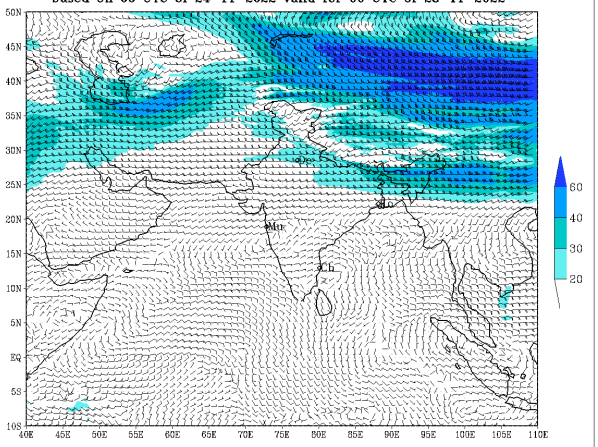
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 28-11-2022



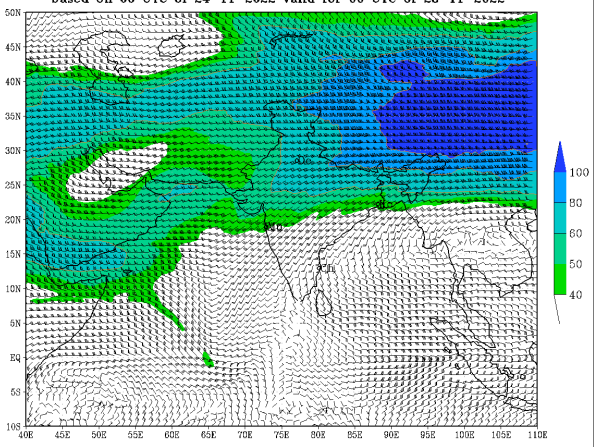
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 28-11-2022

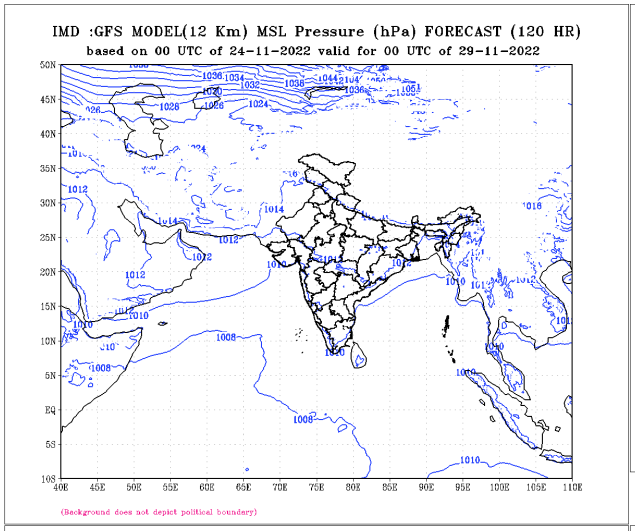


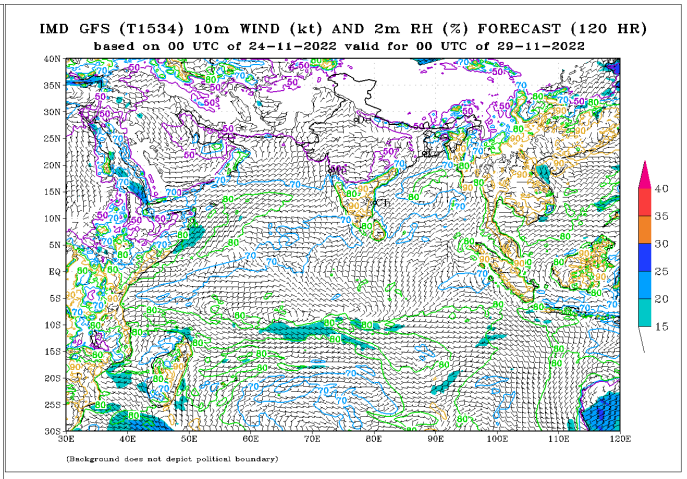
(Background does not depict political boundary)

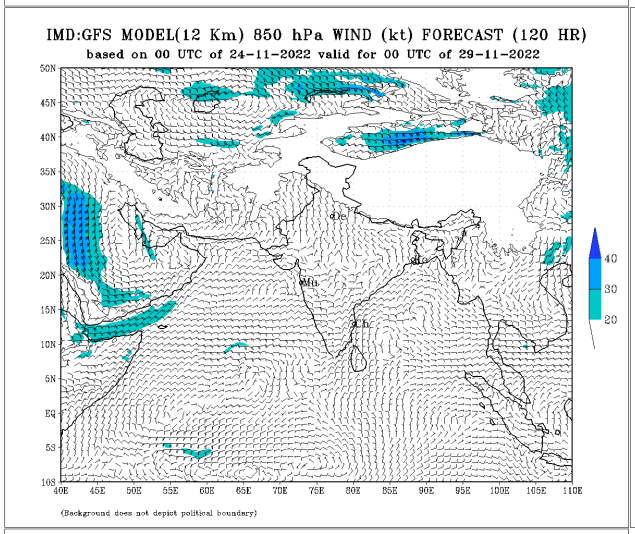
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 28-11-2022

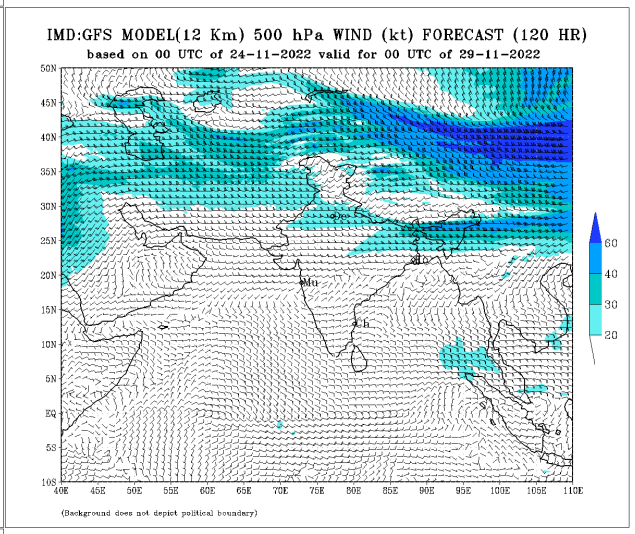


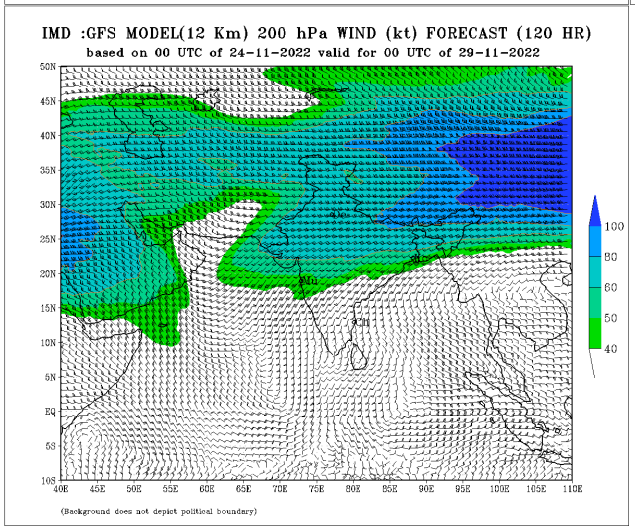
(Background does not depict political boundary)

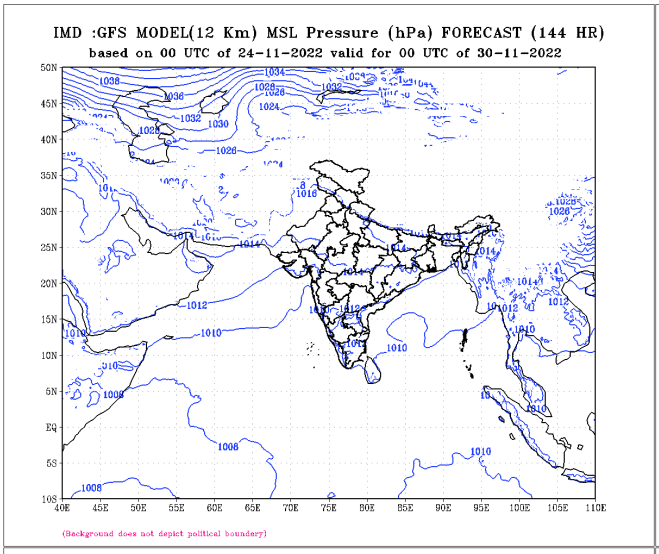

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 29-11-2022
(Background does not depict political boundary)

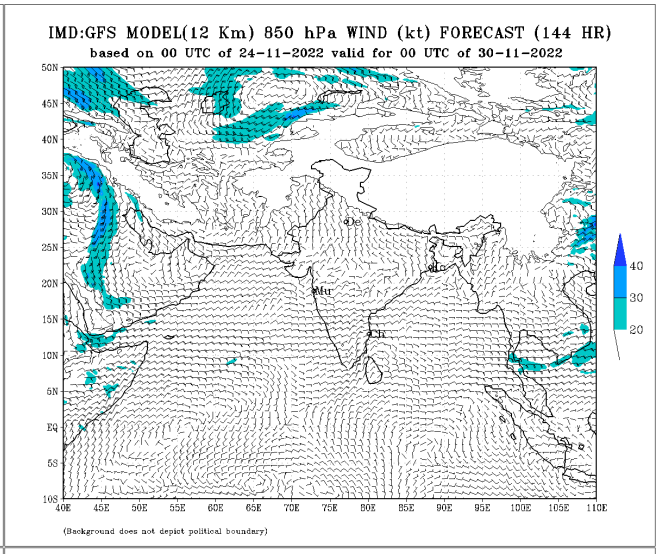

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 29-11-2022
(Background does not depict political boundary)

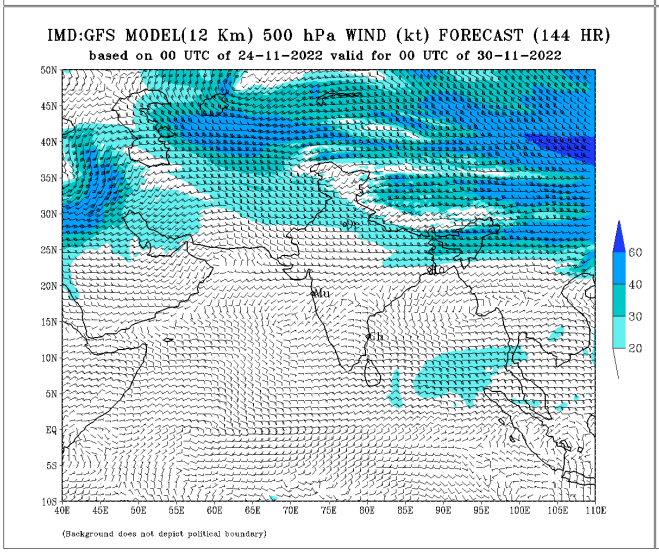

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 29-11-2022
(Background does not depict political boundary)

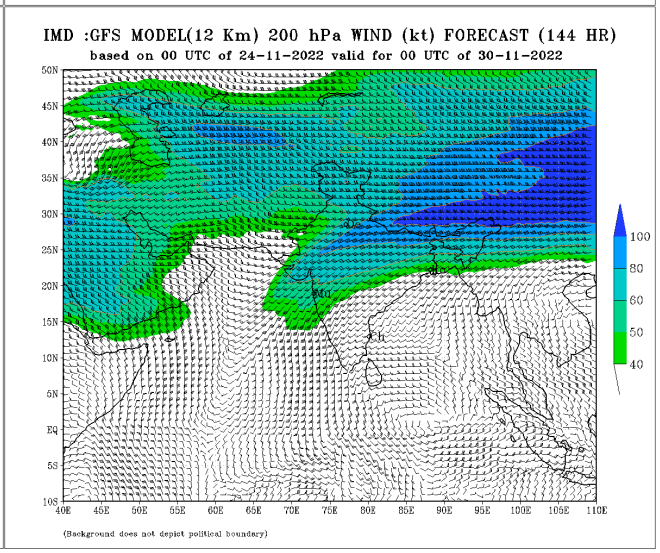

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 29-11-2022
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 29-11-2022
(Background does not depict political boundary)

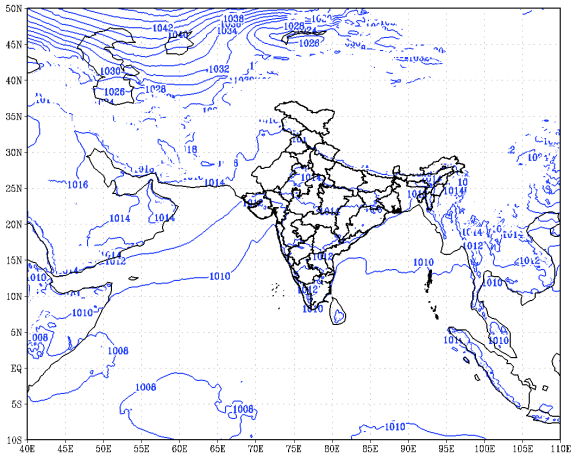

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 30-11-2022
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 30-11-2022
40
30
20
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 30-11-2022
60
40
30
20
(Background does not depict political boundary)

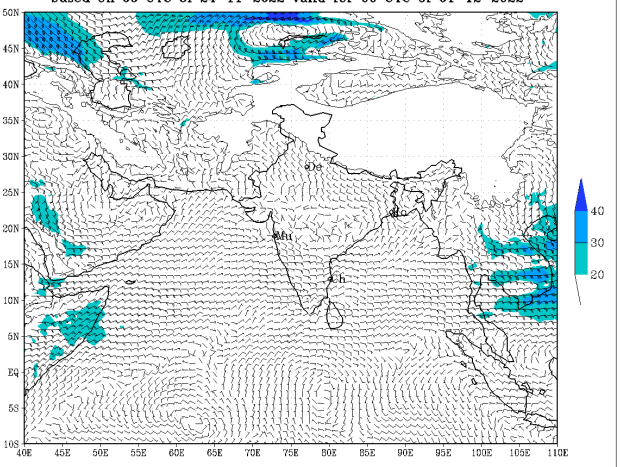

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 30-11-2022
100
80
60
50
40
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 01-12-2022



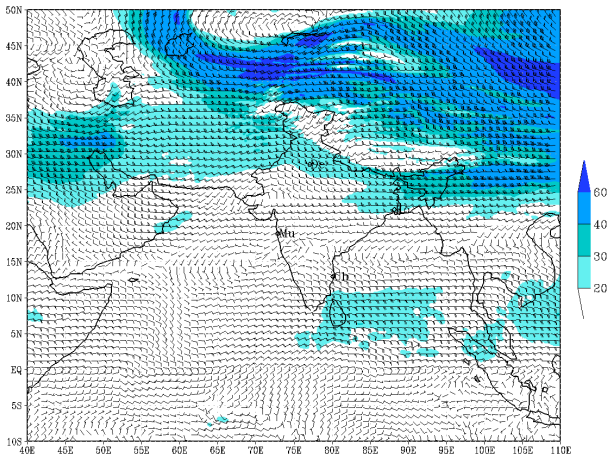
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 01-12-2022



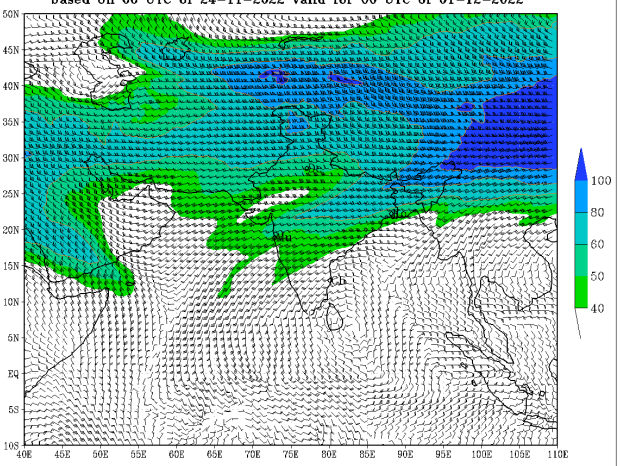
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 01-12-2022



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 24-11-2022 valid for 00 UTC of 01-12-2022



(Background does not depict political boundary)