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

Tropical Cyclone Forecast Programme
Report Dated 17th November, 2022

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

- A Low Pressure Area formed over Southeast Bay of Bengal & adjoining Andaman Sea in the morning (0000 UTC) of today, the 17th November. It is likely to move west-northwestwards and gradually concentrate into a Depression over central parts of South Bay of Bengal around 19th November, 2022. Thereafter, it is likely to move west-northwestwards towards north Tamilnadu-Puducherry and south Andhra Pradesh coasts during subsequent 3 days.
- The cyclonic circulation over Southwest & adjoining Southeast Arabian sea now lies over Southwest Arabian Sea & adjoining Equatorial Indian Ocean and extends upto 4.5 km above mean sea level.
- The Western Disturbance as a trough in mid tropospheric westerlies with its axis at 5.8 km above mean sea level now runs roughly along Long. 75°E to the north of Lat. 32°N.
- The cyclonic circulation over Kerala & neighbourhood extending upto 0.9 km above mean sea level has become less marked.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	About 28-29°C over major parts of BoB and 29-30°C over small pocket of southwest BoB off Tamilnadu and Sri Lanka coast.	About 28-29°C over major parts of AS and 29-30°C over small parts of southeast AS, Karnataka coast and Kerala coast.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	>110 over south Andaman sea and 80-100 over central adjoining south bob and less than 40 over westcentral and southwest bob along east coast of India.	90-100 over parts of Maldives & adjoining EIO, 70-80 over southeast AS & adjoining eastcentral AS, adjoining north AS and less than 30 over remaining AS and also off west coast of India.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	Positive vorticity of 50-60 x10-6 s-1 over south Andaman sea and adjoining southeast BoB, 20-30 over southwest & adjoining westcentral and northwest BoB, off Sri Lanka coast.	Positive vorticity of 40-50 over southeast AS & adjoining southeast AS, 20-30 over central AS.

Low Level convergence ($X10^{-5}$ s^{-1})	10-15 $x10^{-5}$ s^{-1} over south Andaman sea and adjoining southeast BoB and is east-west oriented.	Small zones of 5 over Lakshadweep, Maldives and southwest AS.
Upper Level divergence ($X10^{-5}$ s^{-1})	30 x10-5 s-1 over south Andaman sea, 10-20 over eastcentral BoB.	5-10 over westcentral AS.
Vertical Wind Shear (VWS knots)	10-20 knots over central & adjoining south bob and over Andaman sea, along the expected track.	5-15 over south AS.
Wind Shear Tendency (knots)	Decreasing over south & westcentral BoB. Increasing over Andaman sea & adjoining southeast BoB.	Decreasing over south AS & adjoining EIO region. Increasing over most parts of AS and off Yemen and Oman coast.
Upper tropospheric Ridge	Along 13.0°N over the BoB.	Along 15.0°N over the AS.
Trough in westerlies		

Satellite observations based on INSAT imagery (0900 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 and Andaman sea.

b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded intense to very intense convection lay over westcentral & southwest Arabian sea. Scattered low and medium clouds with embedded moderate to intense convection lay over eastcentral & southeast Arabian sea and Comorin area.

M.J.O. Index:

MJO index is currently in Phase 5 with amplitude more than 1. It will continue in same phase for next 3 days. Thereafter, it would move to phase 6 with amplitude remaining more than 1.

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

At 0900 UTC of 17th November, a deep depression lies near 9.54S/103.43E. The intensity of the system is T 2.0.

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

MODEL GUIDANCE	BoB	AS
IMD-GFS	Extended low over southeast BoB & adjoining Andaman Sea on 17th, well marked low pressure area (MML) over southeast & adjoining southwest BoB on 18th, WML over southwest BoB on 19th, WML over southwest BoB on 20th, depression over westcentral BoB on 21st, depression over westcentral BoB on 22nd, less marked thereafter. A fresh low pressure area is expected over south Andaman Sea on 24th.	No significant system

IMD-GEFS	WML over southeast BoB on 17th, WML over southwest BoB on 18th, depression over southwest BoB on 19th, depression over southwest BoB on 20th, LPA over southwest BoB on 21st, less marked thereafter. A fresh low pressure area is expected over south Andaman Sea on 23rd .	No significant system
GEFS Probablistic guidance	Not available	Not available
IMD WRF	Extended cycir over Andaman Sea & adjoining southeast BoB on 17th, WML over southeast BoB on 18th, WML over southeast & adjoining southwest BoB on 19th, depression over southwest BoB on 20th.	No significant system
NCMRWF-NCUM	Cycir over south Andaman Sea on 17th, LPA over southwest BoB on 18th, WML over southwest BoB on 19th, depession over southwest BoB on 20th, depression over westcentral BoB on 21st, crossing around 22nd /0300 UTC as a depression near 15.5N/80.0E (South Andhra Pradesh coast), cycir over interior Karnataka on 23rd, cycir over southeast AS on 24th. A fresh LPA over North Andaman Sea on 24th to move north-northwestwards towards central parts of north BoB till 26th.	No significant system
NCMRWF-NEPS	Extended low pressure area over southeast BoB & adjoining Andaman Sea on 17th, LPA over southeast BoB on 18th, WML over southwest BoB on 19th, depression over southwest BoB on 20th, depression over westcentral & adjoining southwest BoB on 21st, depression over westcentral BoB off TN coast on 22nd , crossing TN coast around 22nd/0300 UTC as a depression near 15N/80E, LPA over interior Karnataka on 23rd and becoming less marked thereafter. Fresh LPA over North Andaman Sea on 24th Nov.	No significant system
NCMRWF-UM (Regional)	Cycir over south Andaman Sea on 17th, LPA over southwest BoB on 18th, WML over southwest BoB on 19th, depession over southwest BoB on 20th	No significant system
ECMWF	LPA over South Andaman Sea on 17th, 18th, depression over eastcentral & adjoining westcentral BoB on 19th, depression over southwest BoB on 20th, depression over southwest BoB on 21st, LPA over westcentral BoB on 22nd, less marked thereafter.	No significant system
ECMWF ensemble	60-80% probability of formation of depression over south BoB over south BoB during 19th-22nd.	No significant system
NCEP-GFS	LPA over southeast BoB on 17th , LPA over southwest BoB on 18th, extended low over southwest BoB on 19th, WML over southwest & adjoining westcentral BoB on 20th, depression over westcentral BoB on 21st & 22nd, LPA over westcentral BoB off south AP coast on 23rd becoming less marked thereafter.	No significant system

IMD MME	IMD MME is indicating formation of depression over southeast BoB on 20th, move northwestwards and cross South Andhra Pradesh coast as an LPA around 22/1800 UTC.	No significant system
IMD HWRF	Available during cyclonic disturbance period only	No significant system
IMD-Genesis Potential Parameter	A potential zone over Andaman Sea on 16th Nov, over south BoB & another over south Andaman Sea on 17th, over southeast & adjoining eastcentral BoB on 18th, eastcentral BoB on 19th, westcentral BoB on 20th, westcentral BoB off AP coast on 21st	No potential zone over Arabian Sea

Summary and conclusion:

- Most of models are indicating that the low pressure area over southeast BoB and adjoining Andaman Sea would concentrate into a depression during 19th-21st. Models are also indicating west-northwestwards movement of the system towards North Tamil Nadu-South Andhra Pradesh coasts. Most of the models are indicating that the system would weaken slightly before reaching coast. However, NCUM group of models is indicating that the system would cross South Andhra Pradesh coast as a depression.

- A Fresh low pressure is also likely over central Andaman Sea on 23rd/24th.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

The Low pressure area over Southeast Bay of Bengal & adjoining Andaman Sea is likely to move west-northwestwards and gradually concentrate into a Depression over central parts of South Bay of Bengal around 19th November, 2022. Thereafter, it is likely to move west-northwestwards towards Tamilnadu-Puducherry and south Andhra Pradesh coasts during subsequent 3 days.

- **A Fresh low pressure is also likely over central Andaman Sea on 23rd/24th.**

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	LOW	MOD	LOW	NIL	NIL

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

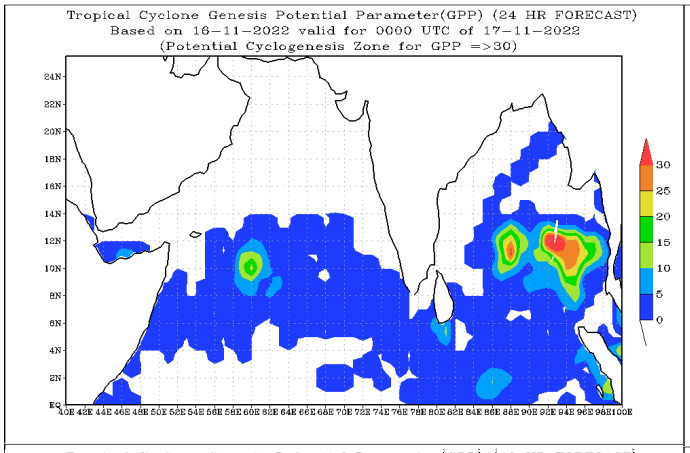
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

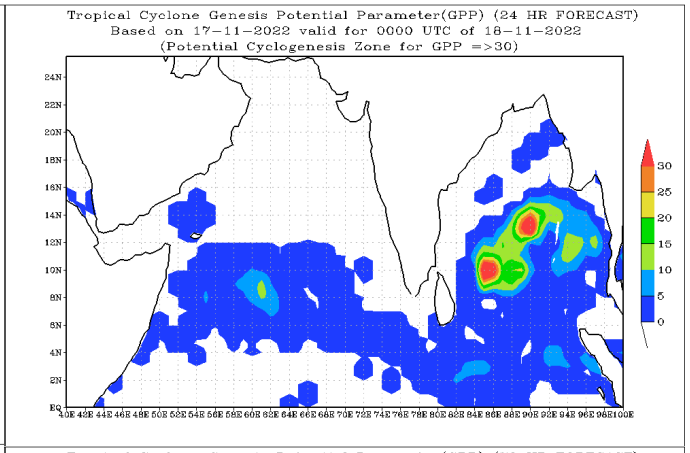
Advisory:

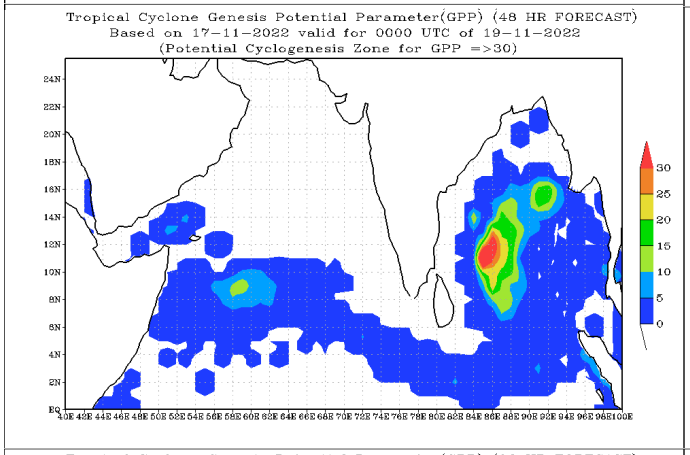
The possible cyclogenesis as indicated above needs to be watched and monitored.

IOP: Andaman Sea for 17th & 18th, Sri Lanka for 18th & 19th, Tamil Nadu-Puducherry and adjoining Andhra Pradesh coasts on 20th , 21st & 22nd .

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 16-11-2022 valid for 0000 UTC of 17-11-2022
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 17-11-2022 valid for 0000 UTC of 18-11-2022
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
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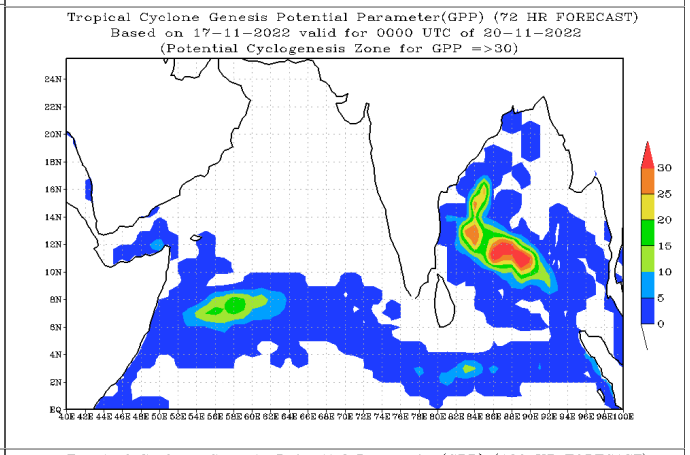
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
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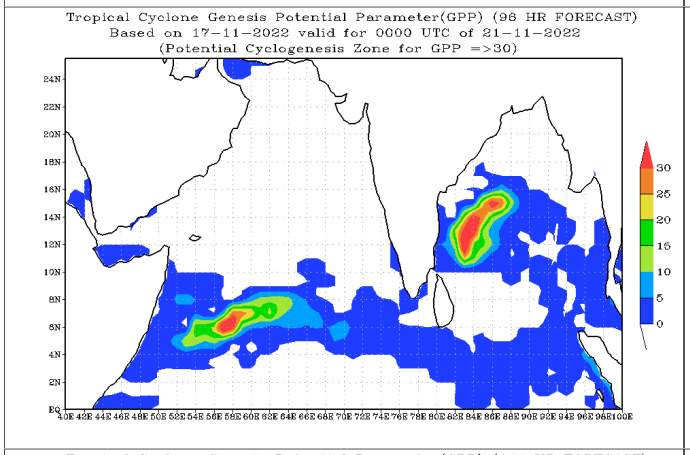
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
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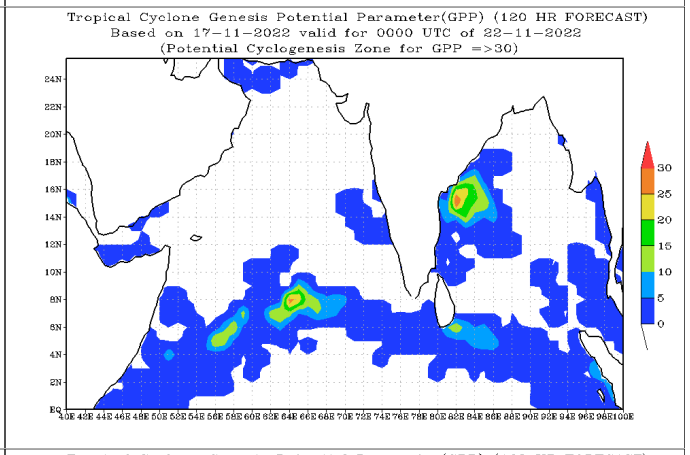
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
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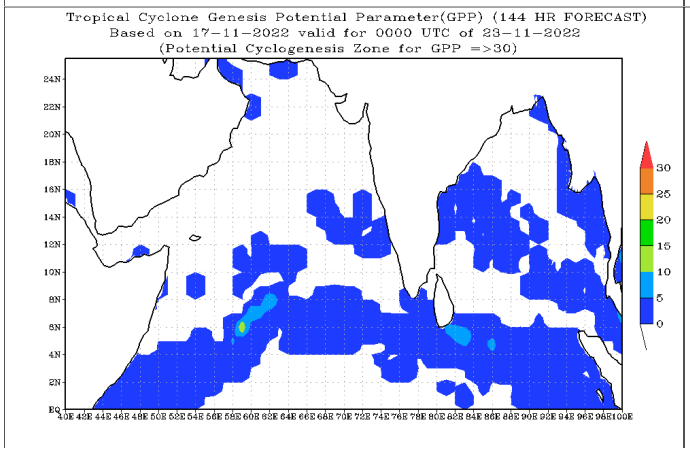
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
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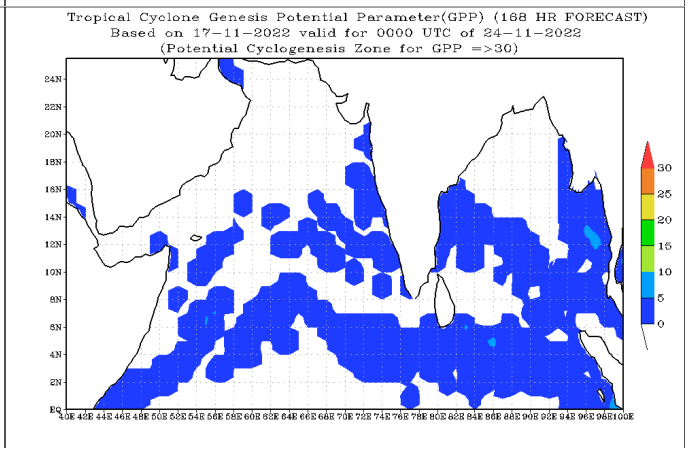
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
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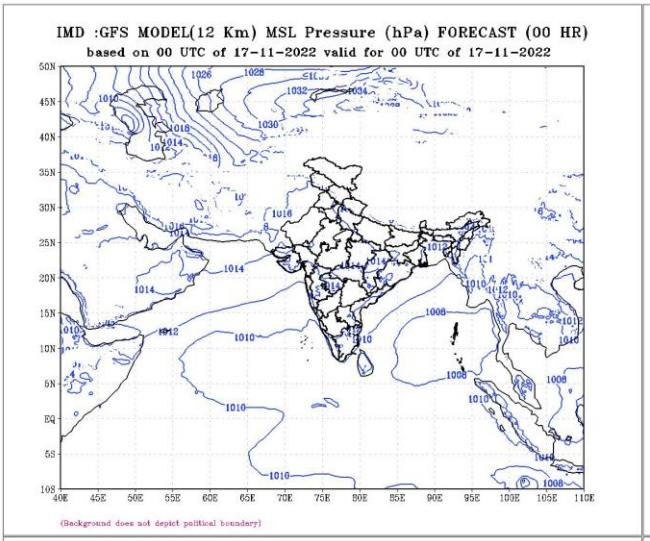
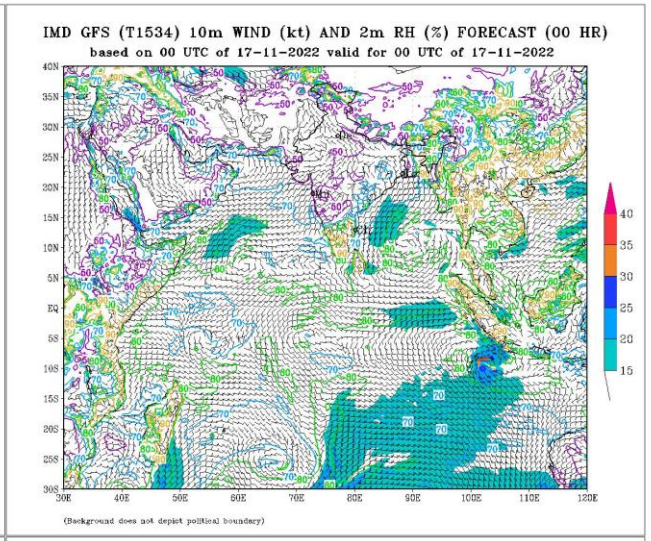

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 17-11-2022
(Background does not depict political boundary)


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 17-11-2022
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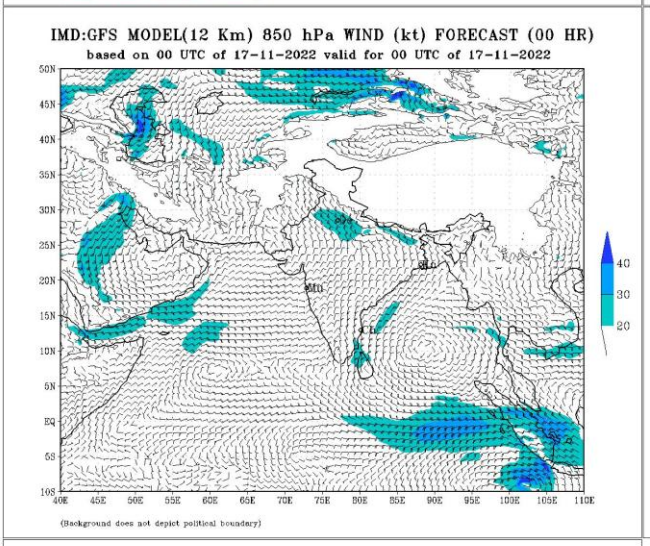
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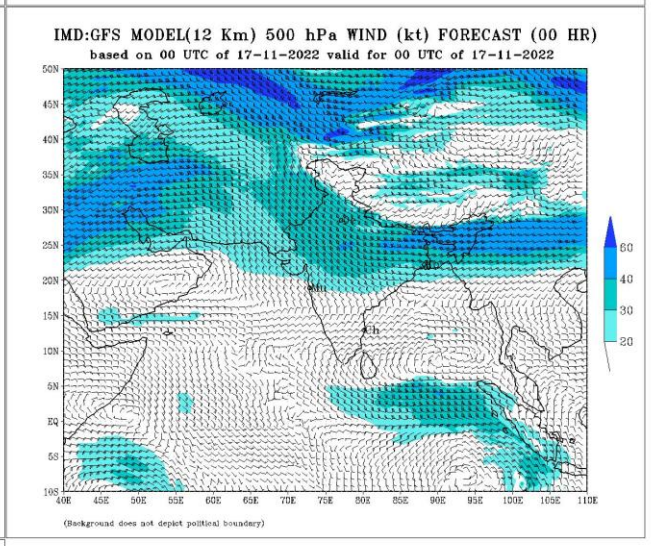
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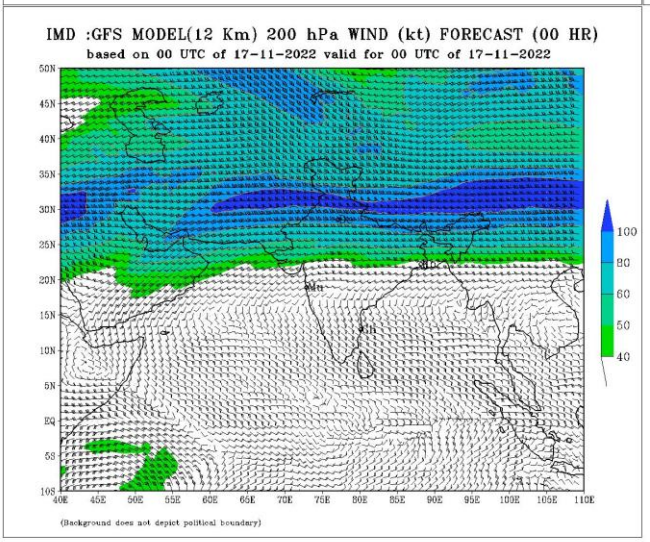
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)
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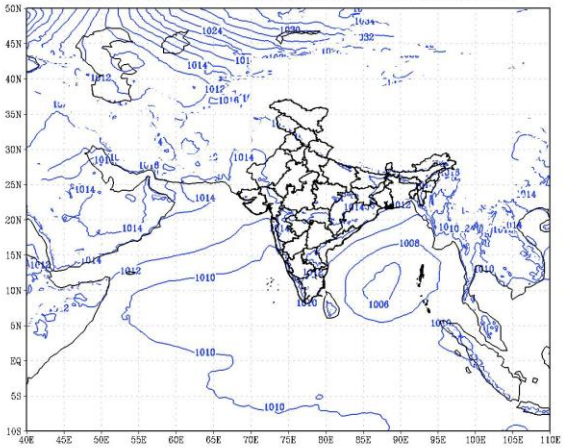
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 18-11-2022



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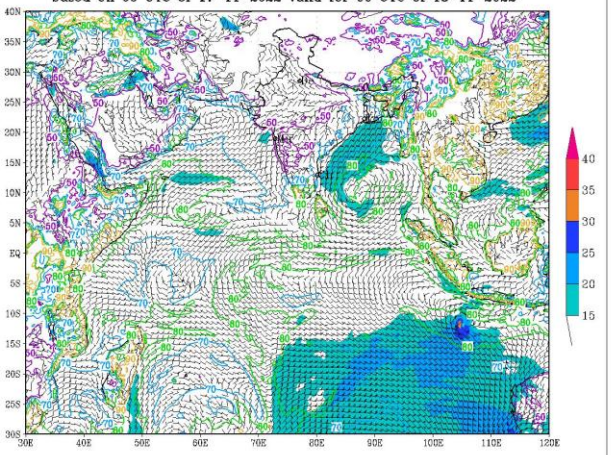

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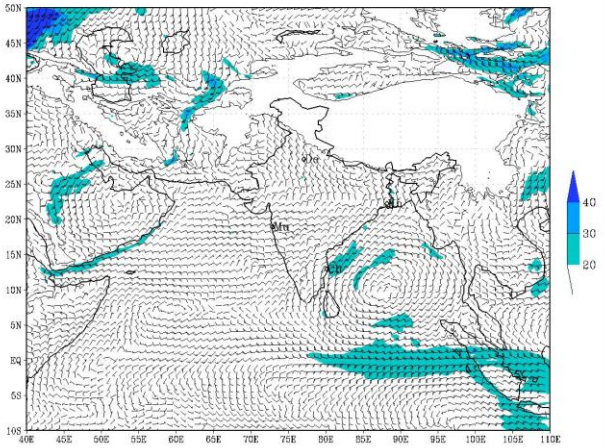

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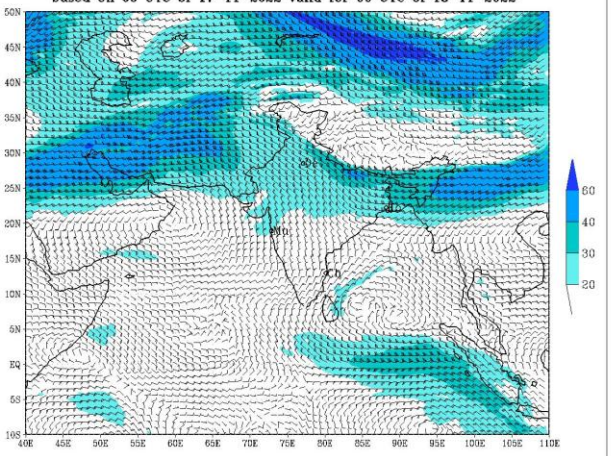

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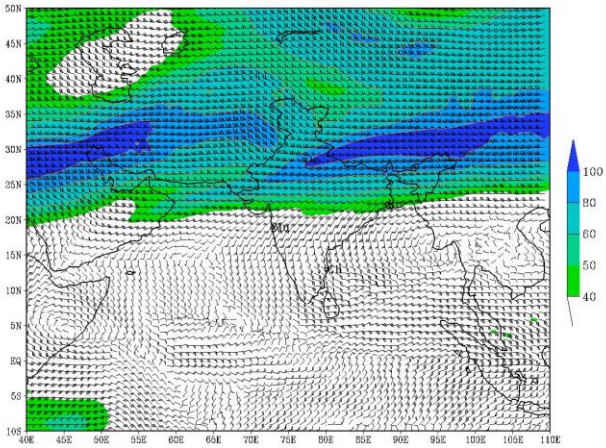

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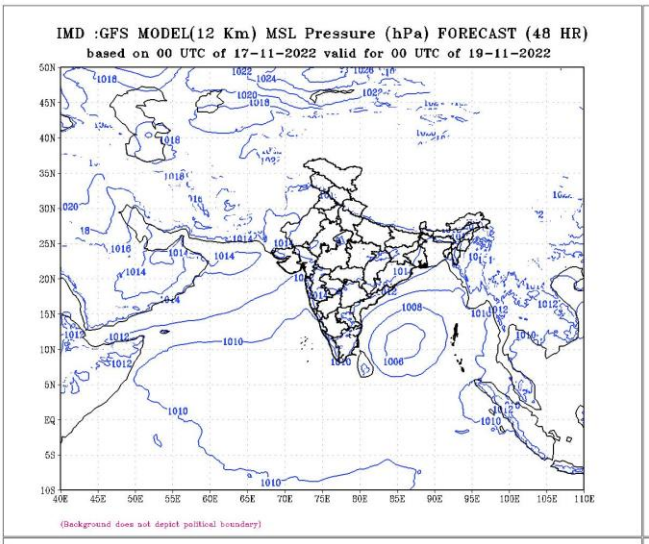
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 19-11-2022
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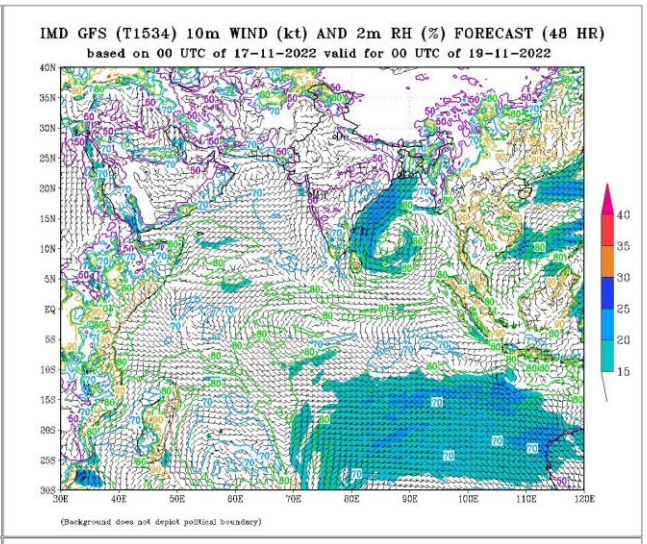
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 19-11-2022
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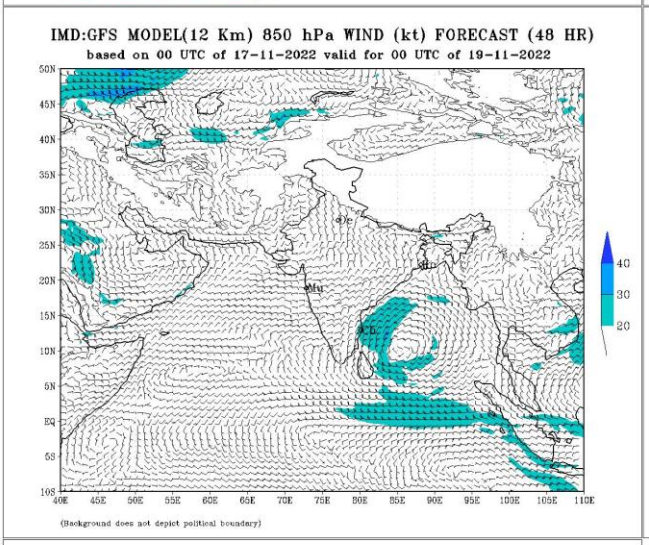
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based on 00 UTC of 17-11-2022 valid for 00 UTC of 19-11-2022
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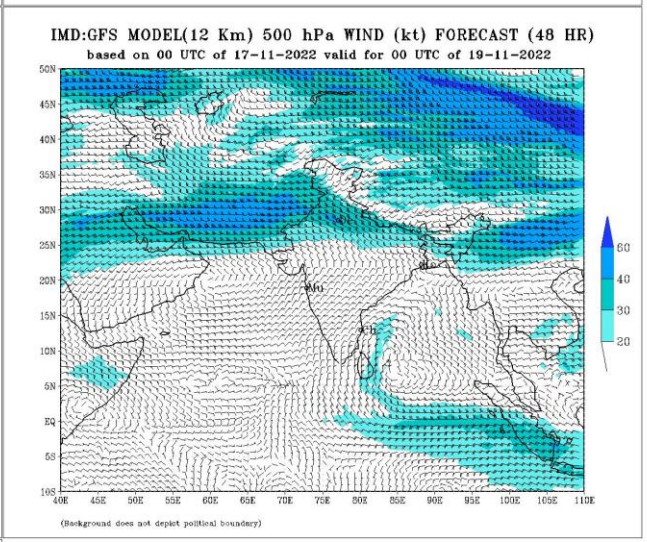
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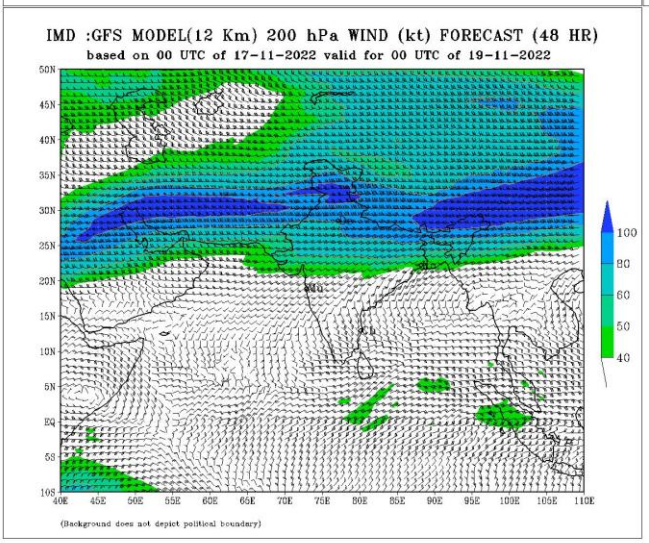
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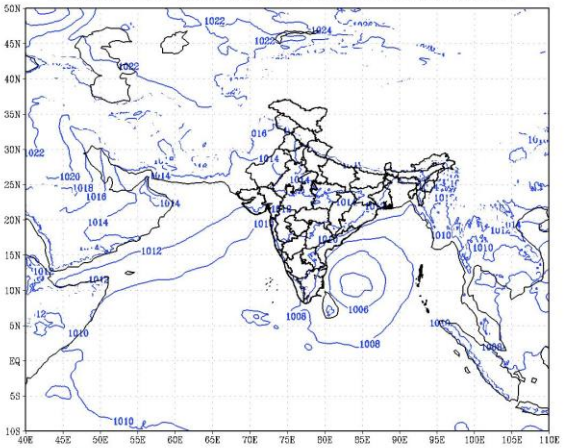
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 20-11-2022



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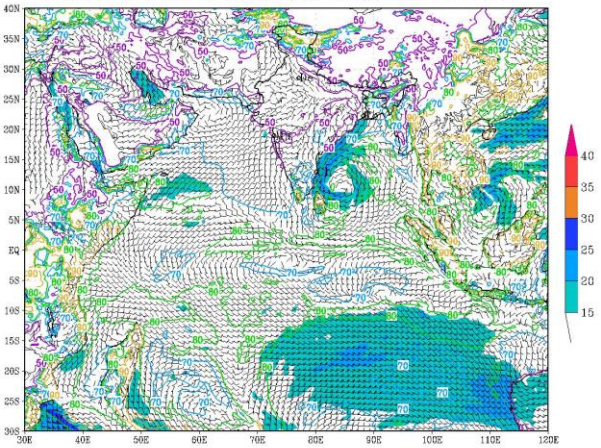
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 20-11-2022



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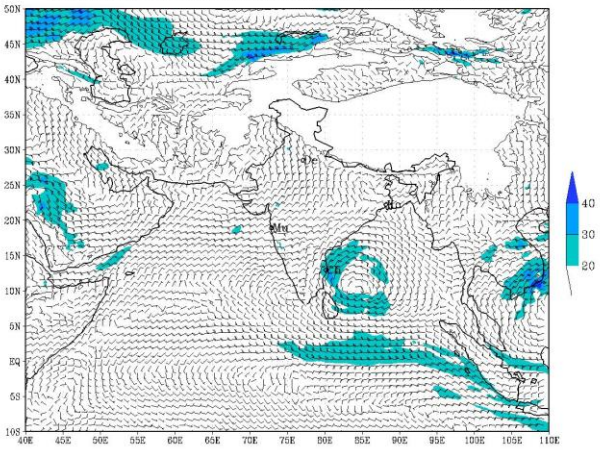
based on 00 UTC of 17-11-2022 valid for 00 UTC of 20-11-2022



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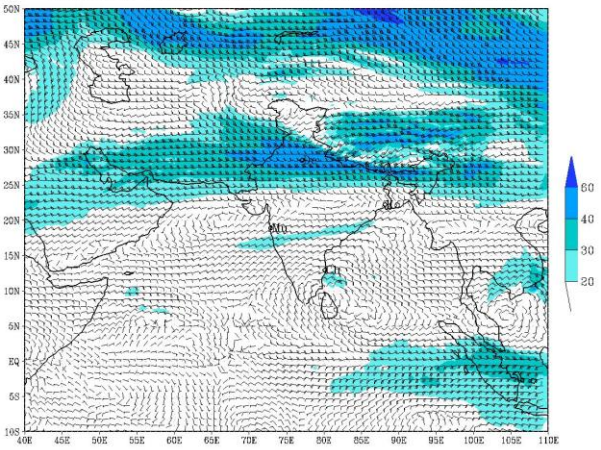

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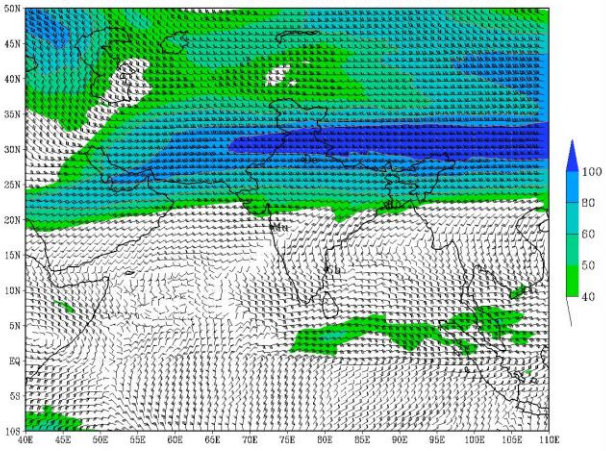

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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
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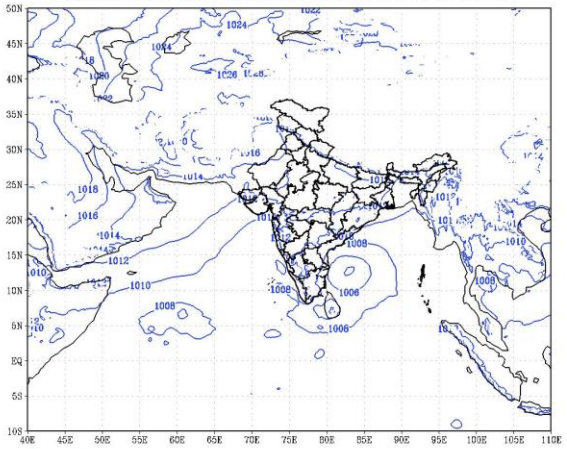

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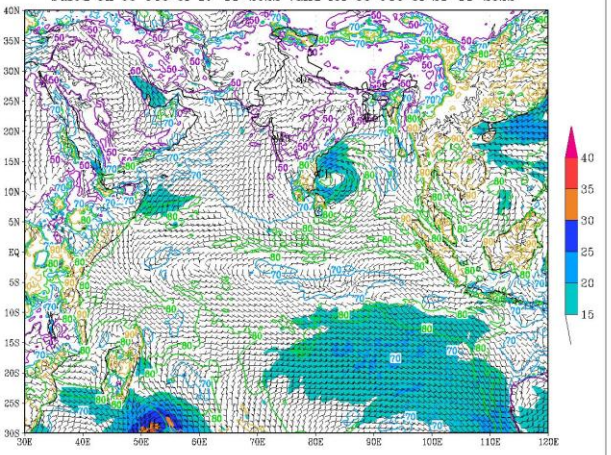
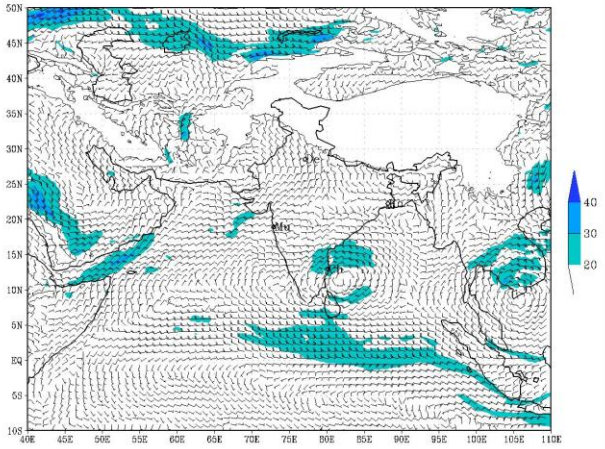
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 21-11-2022



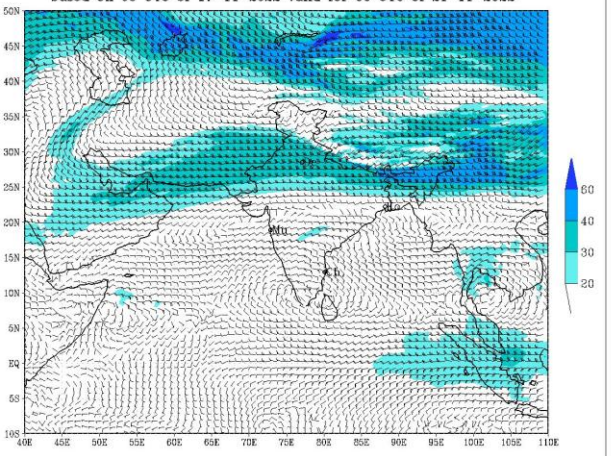
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 21-11-2022



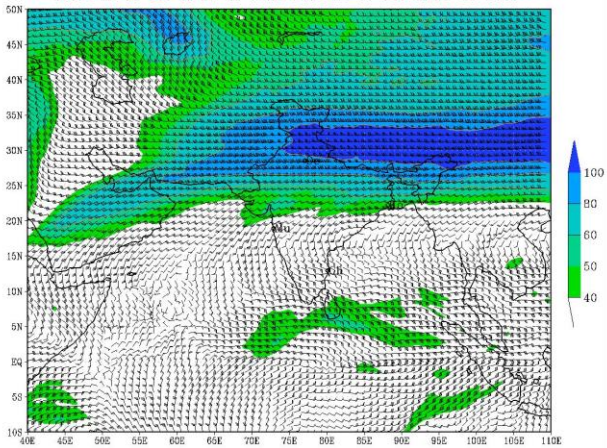
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 21-11-2022



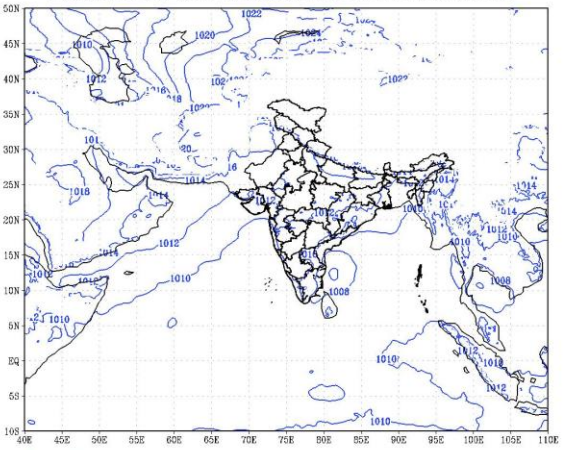
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 21-11-2022



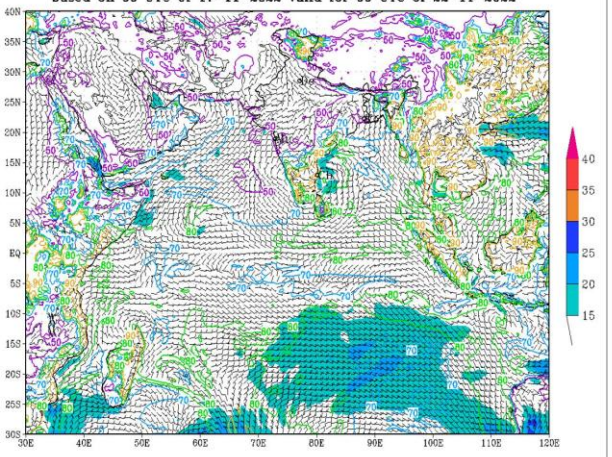
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 22-11-2022



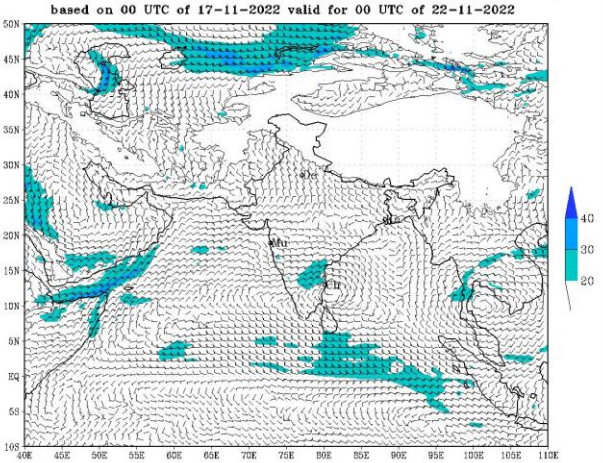
(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 22-11-2022



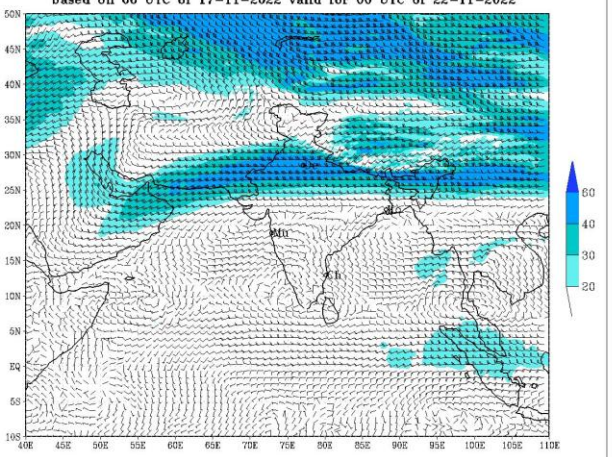
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 22-11-2022



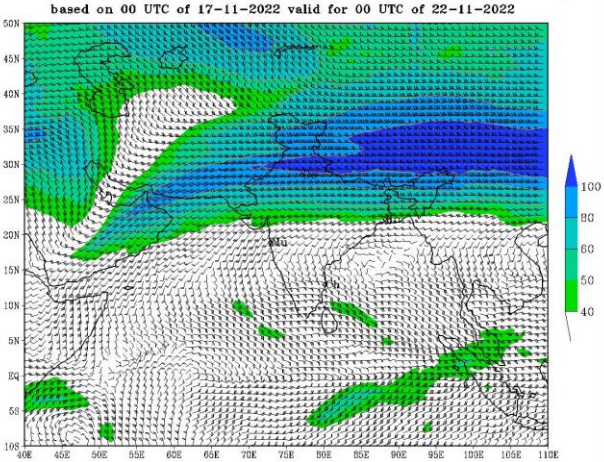
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 22-11-2022

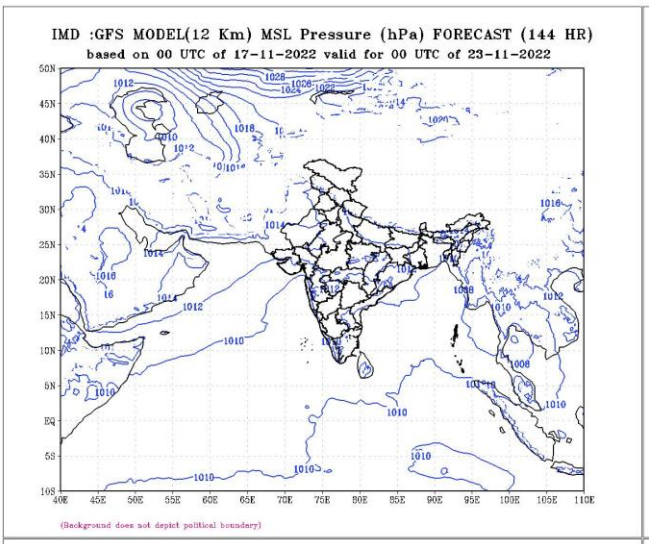


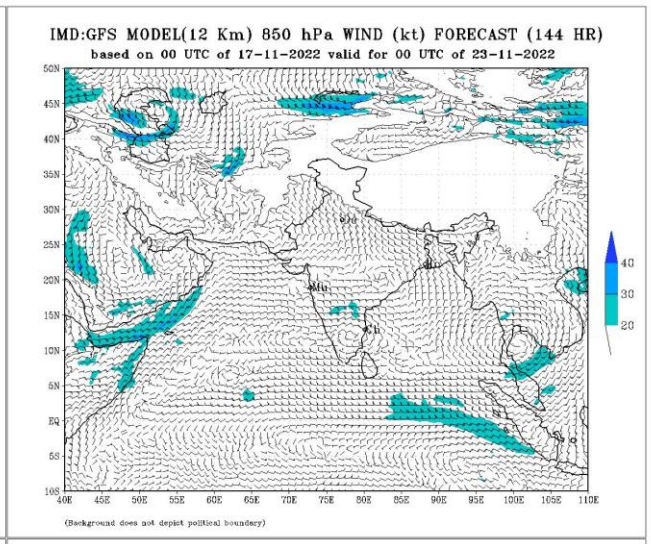
(Background does not depict political boundary)

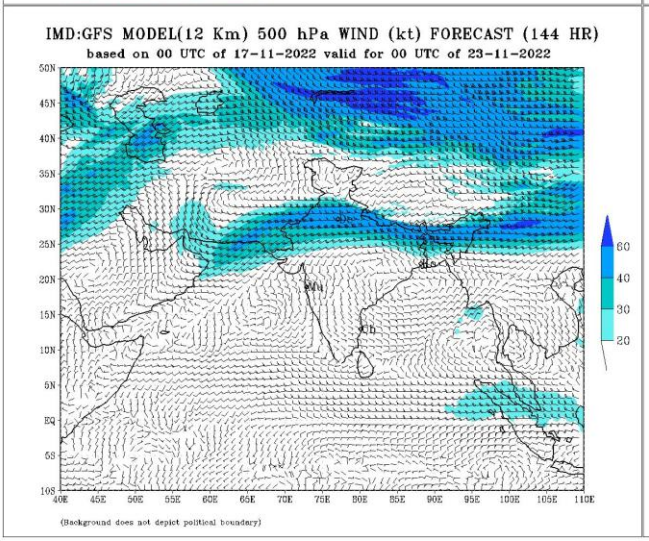
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 22-11-2022

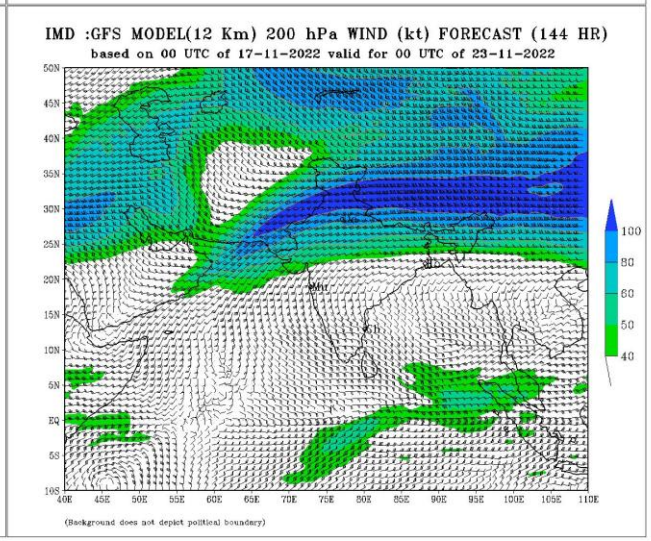


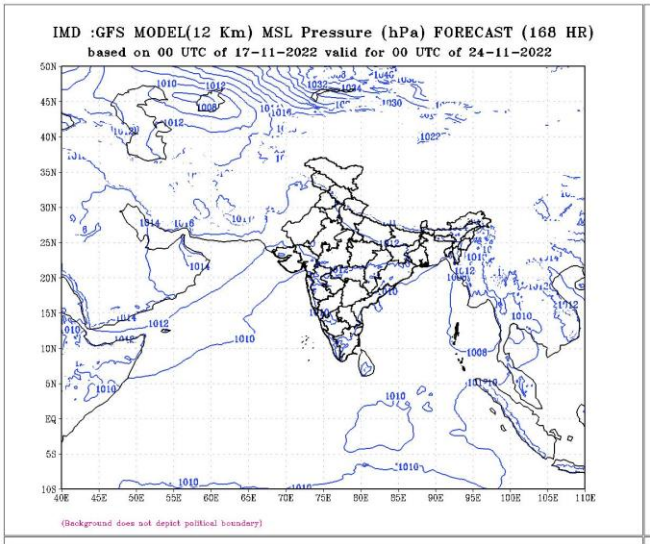
(Background does not depict political boundary)

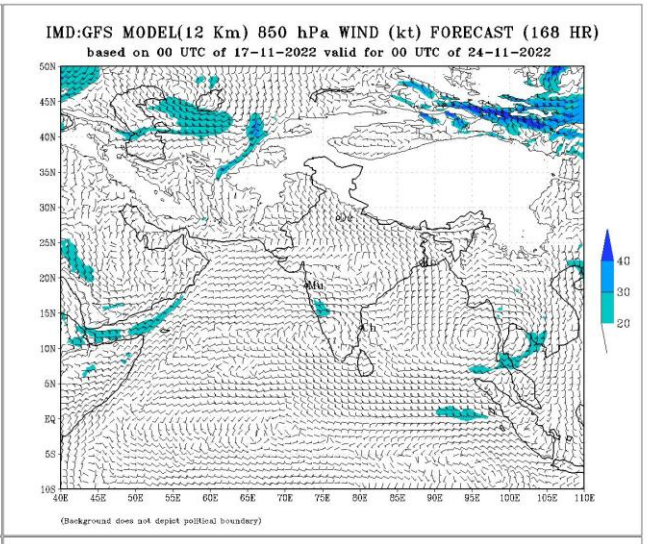

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 23-11-2022
(Background does not depict political boundary)

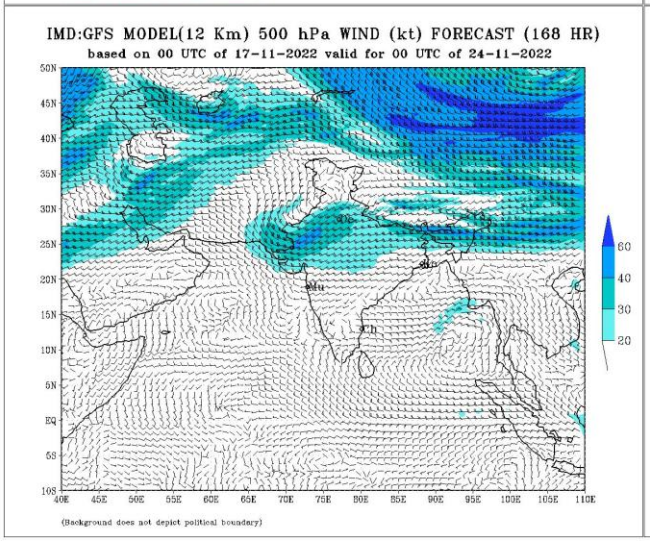

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 23-11-2022
40
30
20
(Background does not depict political boundary)

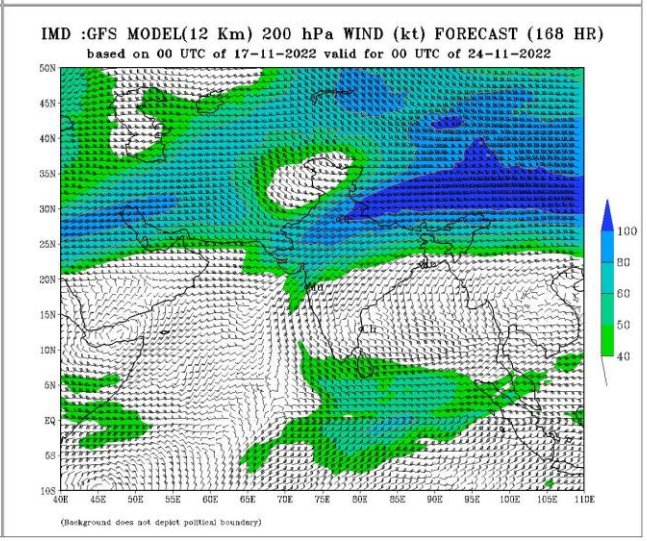

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 23-11-2022
60
40
30
20
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 23-11-2022
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 17-11-2022 valid for 00 UTC of 24-11-2022
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-11-2022 valid for 00 UTC of 24-11-2022
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 17-11-2022 valid for 00 UTC of 24-11-2022
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 17-11-2022 valid for 00 UTC of 24-11-2022
100
80
60
50
40
(Background does not depict political boundary)