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

Tropical Cyclone Forecast Programme
Report Dated 19th November, 2022

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

Yesterday's low pressure area over Southeast Bay of Bengal & neighbourhood moved west-northwestwards, concentrated into a wellmarked low pressure area over central parts of south Bay of Bengal in the morning of today, the 19th November, 2022. It is likely to move west-northwestwards and gradually concentrate into a Depression over southwest Bay of Bengal and adjoining westcentral Bay of Bengal during next 24 hours. Thereafter, it is very likely to move west-northwestwards towards Tamilnadu-Puducherry and south Andhra Pradesh coasts during subsequent 2 days.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	About 28-29°C over the system and major parts of BoB, 26-28°C over south of southwest BoB and Gulf of Mannar, Sri Lanka coast.	About 28-29°C over southeast and adjoining southwest AS, along and off south Gujarat and Maharashtra coasts, north of north AS, 26-28°C over eastcentral and adjoining westcentral, adjoining north AS, along and off Kerala and Karnataka coasts, less than 24°C over southwest AS off Oman and Yemen coasts and adjoining sea areas, Comorin area.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	>110 over south Andaman sea & eastcentral BoB, 70-80 over north Andaman Sea, southwest BoB off Sri Lanka, north BoB, and less than 40 over westcentral BoB, along and off TN and AP coasts, Gulf of Mannar, some parts of southwest BoB.	70-90 over southeast and adjoining eastcentral and southwest AS, Maldives & adjoining EIO, and less than 40 over remaining AS and also off west coast of India, Comorin area.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	80-100 x10-6 s^{-1} over the system, 50-60 x10-6 s^{-1} over eastern parts of westcentral BoB and adjoining southwest BoB, 10-20 x10-6 s^{-1} over off Sri Lanka coast.	50-60x10-6s^{-1} over south parts of southwest AS and adjoining EIO & some parts of eastcentral and southeast AS.

Low Level convergence ($X10^{-5}$ s^{-1})	05-10x10^{-5} s^{-1} over the current system over the BoB, 05 x10^{-5} s^{-1} over the central parts of central BoB.	05-10x10^{-5} s^{-1} over the south parts of south AS.
Upper Level divergence ($X10^{-5}$ s^{-1})	10x10^{-5} s^{-1} to 20x10^{-5} s^{-1} over the system, 30x10^{-5} s^{-1} to the southwest of the system, along and off NE Sri Lanka, 20 x10^{-5} s^{-1} over western parts of eastcentral BoB, 5 x10^{-5} s^{-1} over southwest and adjoining westcentral BoB.	10x10^{-5} s^{-1} to 20x10^{-5} s^{-1} over the southwest AS.
Vertical Wind Shear (VWS knots)	15-25 kt over the low pressure area	5-15 over southwest and adjoining west central AS, 20-30 over southeast and adjoining eastcentral AS, 30-50 over north parts of central AS and north AS.
Wind Shear Tendency (knots)	Decreasing over south west BoB. Increasing over central, north BoB and Andaman sea & adjoining southeast BoB.	Decreasing over southwest AS & adjoining EIO region, westcentral and northwest AS. Increasing over southeast AS and adjoining EIO, eastcentral and northeast AS.
Upper tropospheric Ridge	Along 17.0°N over the BoB.	Along 13.0°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 Bay of Bengal and scattered low to medium clouds with moderate to intense convection over Andaman Sea.

b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded intense to very intense convection lay over southwest Arabian Sea. Scattered low and medium clouds with embedded isol moderate to very intense convection lay over 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 phase 6 for next 7 days with amplitude greater than 1. Thereafter, it would move to phase 7 with amplitude remaining more than 1.

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

At 0900 UTC of 19th November, a Depression lies near 11.1S/108.0E. The wind speed associated with the system is 25 kt.

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

MODEL GUIDANCE	BoB	AS
IMD-GFS	WML over southeast & adjoining southwest BoB on 19th, WML over southwest and adjoining westcentral BoB on 20th, LPA over southwest BoB on21st, less marked on 22nd. A fresh low pressure area is expected over south Andaman Sea on 24th.	No significant system
IMD-GEFS	WML over southeast BoB on 20th, LPA over southwest Bob on 21st, less marked on 22nd . A fresh low pressure area is expected over north Andaman Sea on 24th.	No significant system
GEFS Probablistic guidance	Not available	Not available
IMD WRF	WML over southeast & adjoining southwest BoB on 19th, WML over southwest and adjoining westcentral BoB on 20th, LPA over southwest BoB on21st, less marked on 22nd.	No significant system
NCMRWF-NCUM	LPA over southwest BoB on 19th, WML over southwest BoB on 20th, depression over southwest & adjoining westcentral BoB on 21st , depression over westcentral BoB on 22nd, depression over westcentral BoB off Chennai coast on 23rd, LPA off north Tamil Nadu coast on 24th. A fresh low pressure area is expected over south Andaman Sea on 24th.	No significant system
NCMRWF-NEPS	LPA over southwest BoB on 19th, WML over southwest & adjoining westcentral BoB on 20th, depression over westcentral BoB on 21st, deep depression over westcentral BoB on 22nd, depression over westcentral BoB on 23rd, LPA over southwest BoB on 24th, less marked thereafter. Fresh LPA over North Andaman Sea and adjoining eastcentral BoB on 24th Nov.	No significant system
NCMRWF-UM (Regional)	WML over southwest BoB on 19th, depression over southwest BoB on 20th, depression over westcentral BoB on 21st, deep depression over westcentral BoB on 22nd, depression over westcentral boB on 23rd	No significant system
ECMWF	LPA over southwest BoB on 19th, depression over southwest BoB on 20th, depression over southwest BoB on 21st , WML over westcentral BoB on 22nd, LPA over southwest BoB on23rd.	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 southwest BoB on 19th, WML over southwest & adjoining westcentral BoB on 20th, to move west-northwestwards toward north TN and south AP coasts without significant intensification thereafter.	No significant system

IMD MME	IMD MME is indicating formation of depression over southwest BoB on 20th, move north-northwestwards till 23rd and move south-southwestward there after till 24th and reach nearTN coast as less marked.	No significant system
IMD HWRF	Available during cyclonic disturbance period only	No significant system
IMD-Genesis Potential Parameter	A potential zone over over southwest and adjoining westcentral BoB and adjoining southwest BoB on 20th, westcentral BoB on 20th/21st, westcentral BoB off AP coast on 22st-24th.	No potential zone over Arabian Sea

Summary and conclusion:

- Most of models are indicating that development of depression over southwest & adjoining westcentral BoB around 20th. Models are also indicating slow west-northwestwards movement of the system towards North Tamil Nadu-South Andhra Pradesh coasts during 20th-21st with weakening before reaching coast.

- 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 well marked low pressure area over central parts of south Bay of Bengal is likely to move west-northwestwards and gradually concentrate into a depression over southwest & adjoining westcentral Bay of Bengal during next 24 hours. Thereafter, it is very likely to move west-northwestwards towards Tamil Nadu-Puducherry and south Andhra Pradesh coasts during subsequent 2 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	MOD	LOW	NIL	NIL	NIL	NIL

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

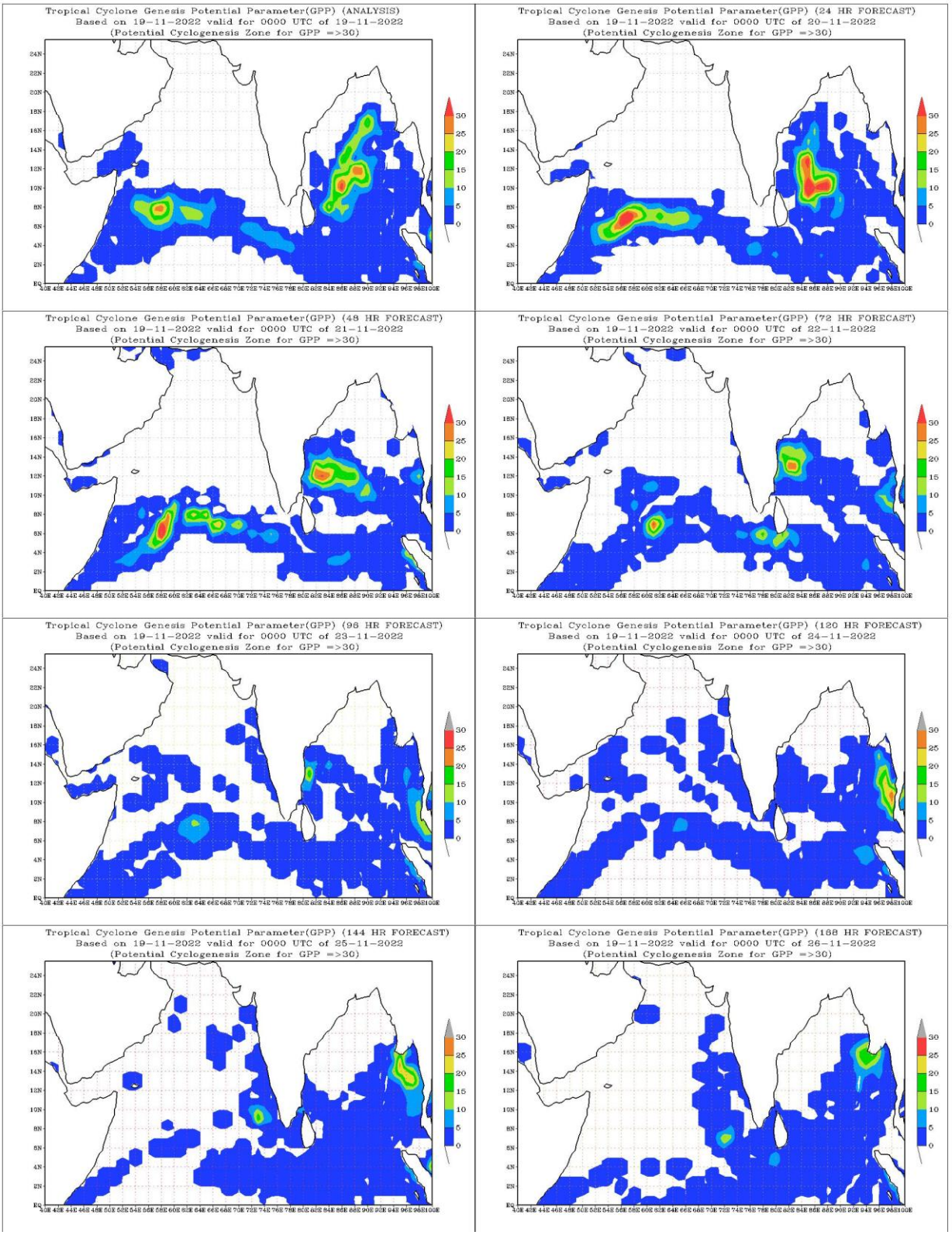
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

Advisory:

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

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

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 19-11-2022 valid for 0000 UTC of 19-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 20-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 21-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 22-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 23-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 24-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 19-11-2022 valid for 0000 UTC of 25-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
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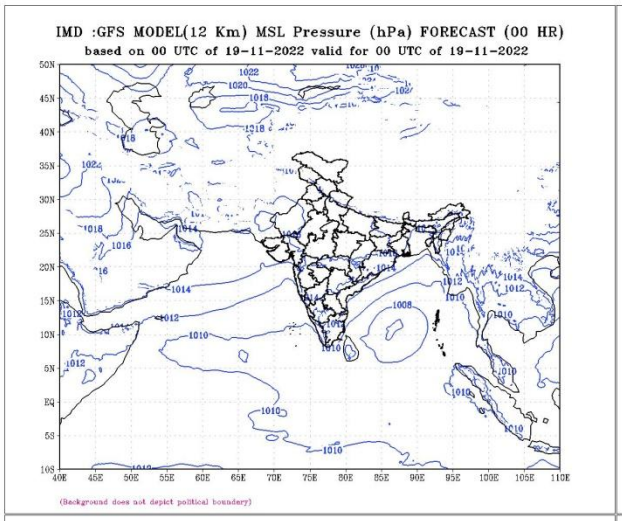
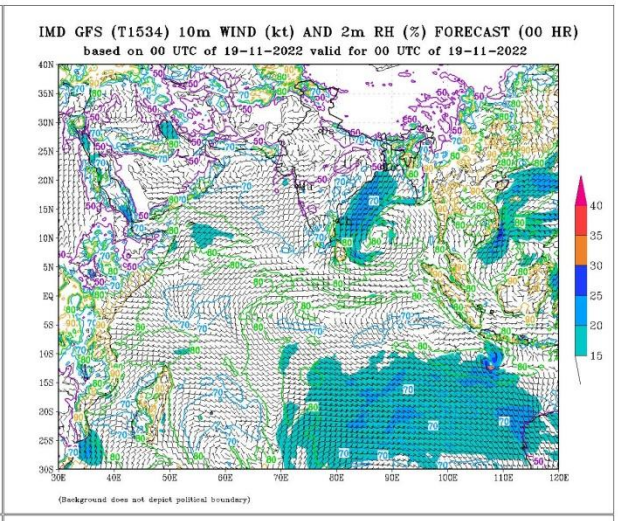
(Potential Cyclogenesis Zone for GPP =>30)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 19-11-2022
(Background does not depict political boundary)


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 19-11-2022
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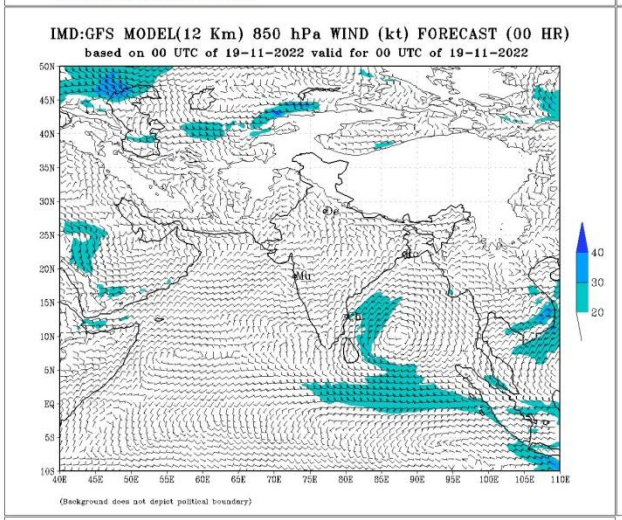
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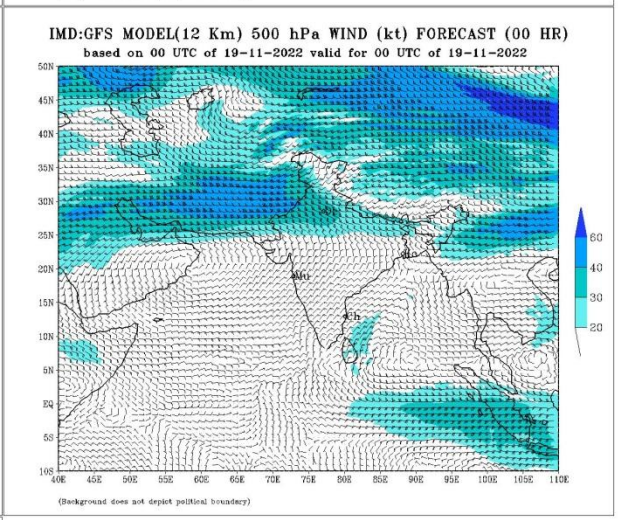
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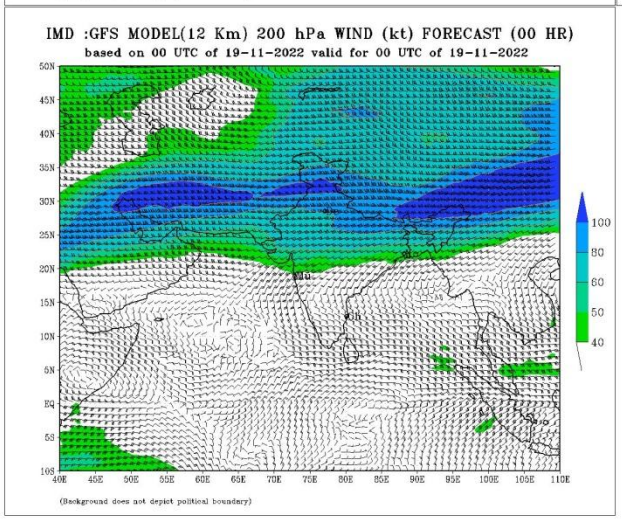
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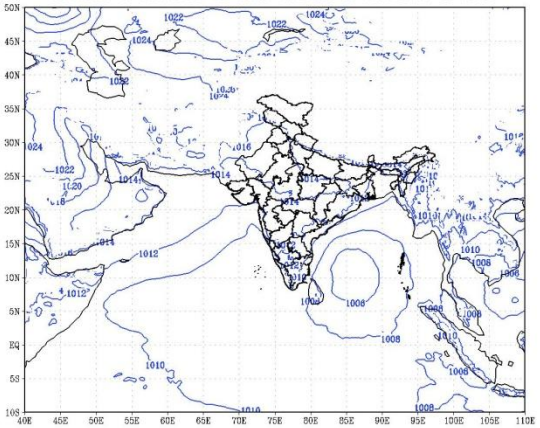

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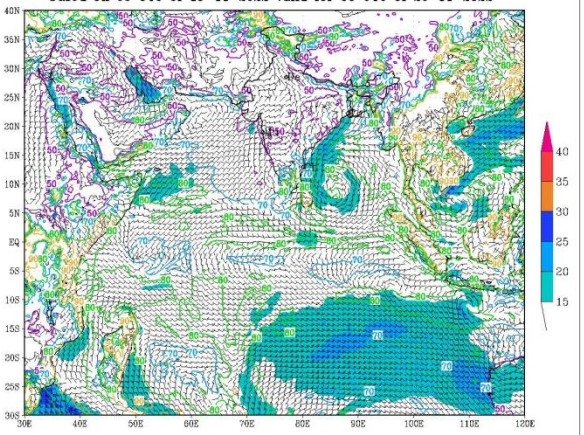

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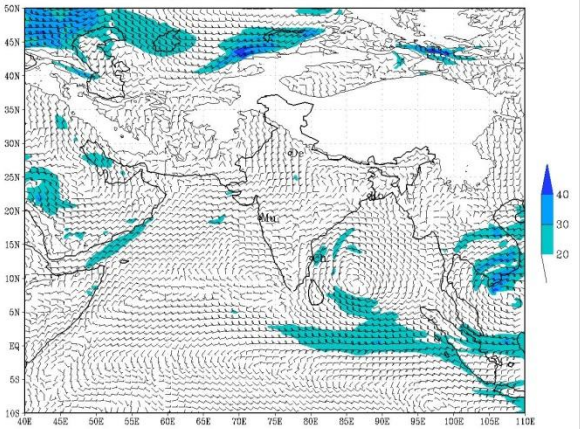

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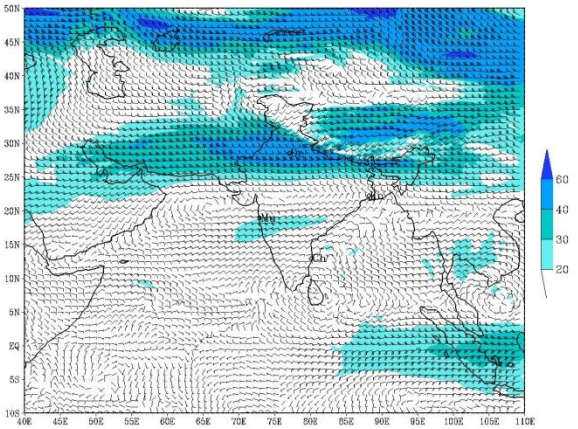

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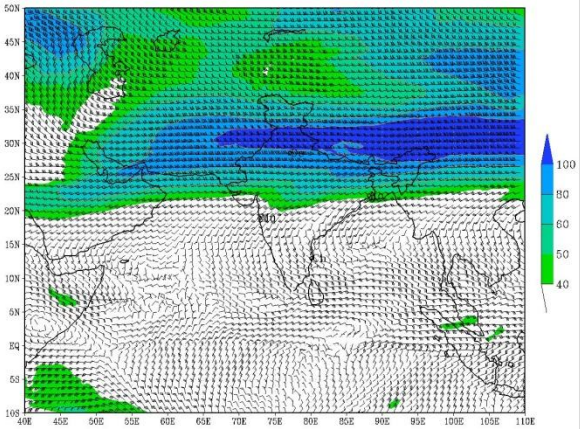

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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
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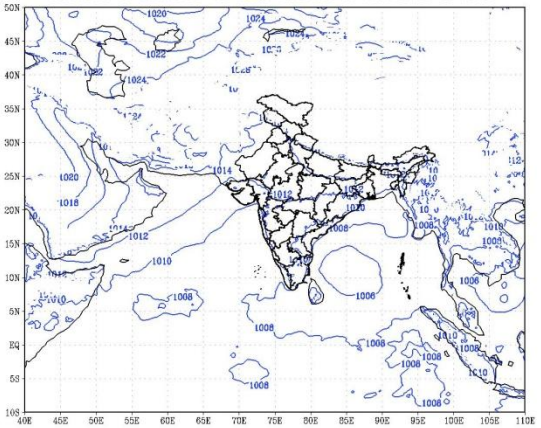

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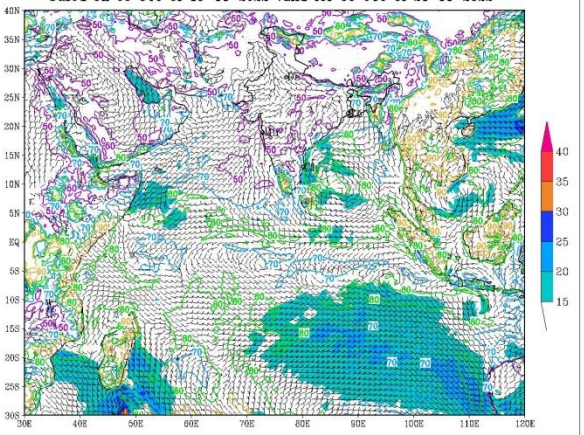
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 21-11-2022



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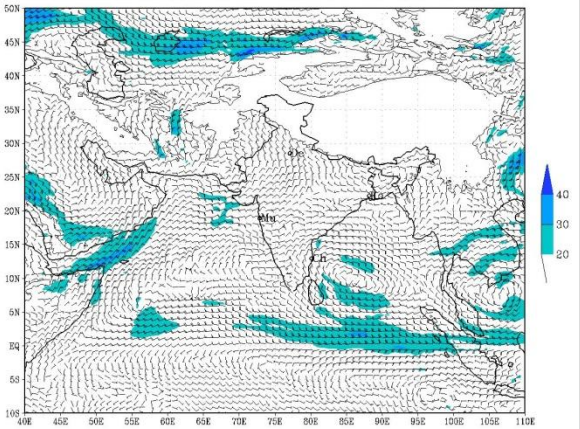

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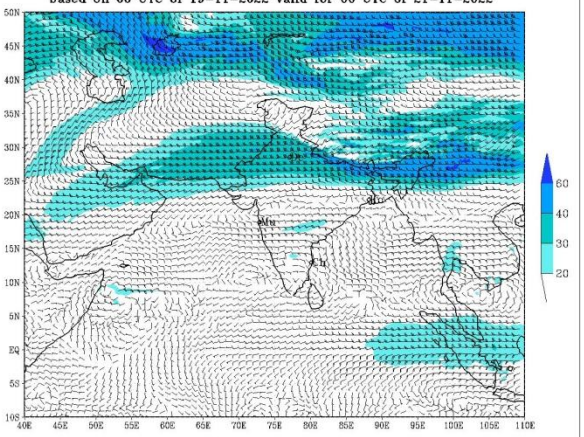

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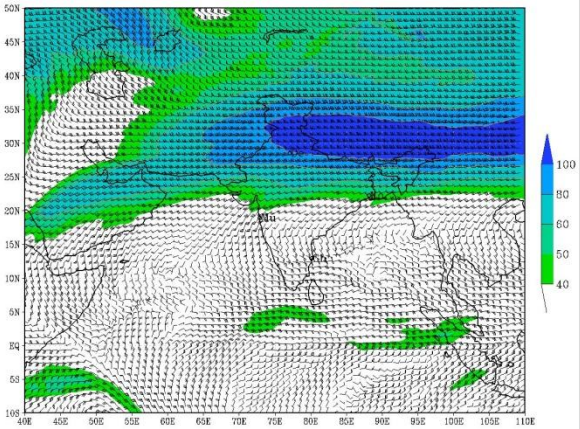

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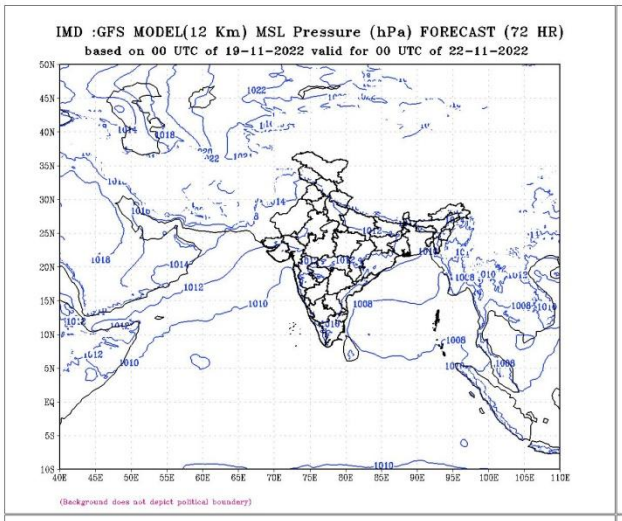
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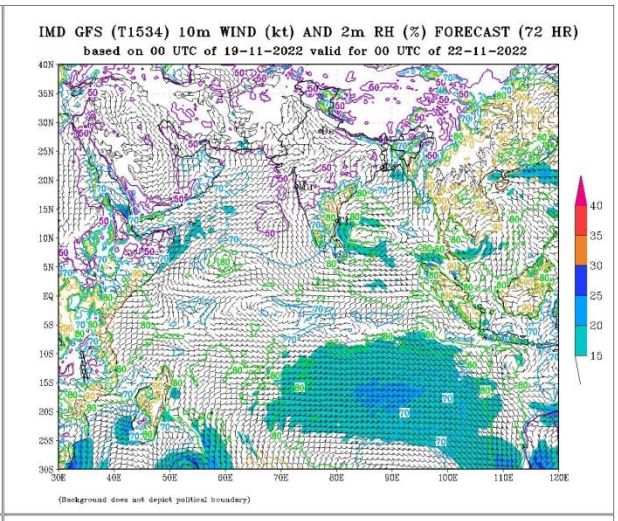
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 22-11-2022
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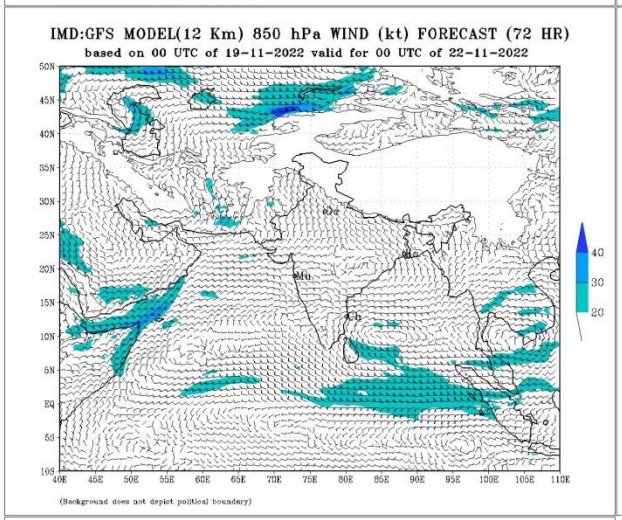
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 22-11-2022
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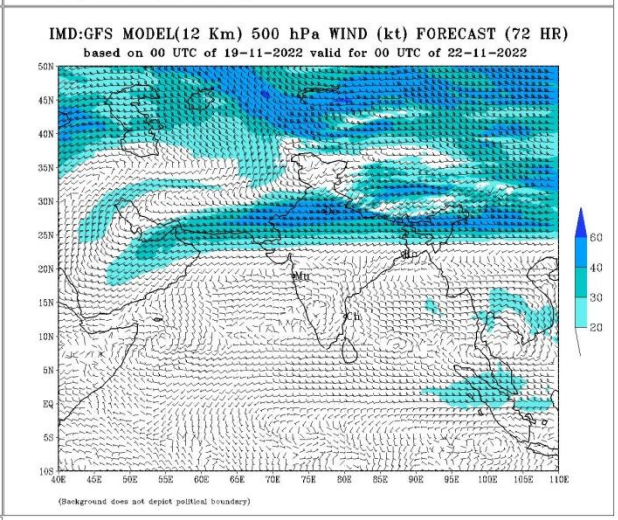
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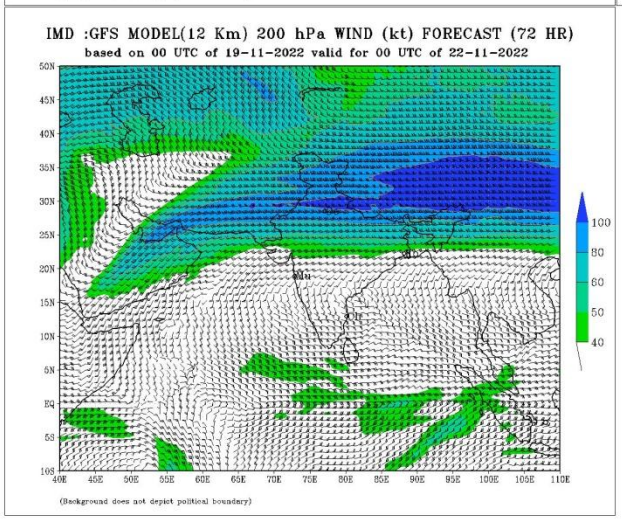
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based on 00 UTC of 19-11-2022 valid for 00 UTC of 22-11-2022
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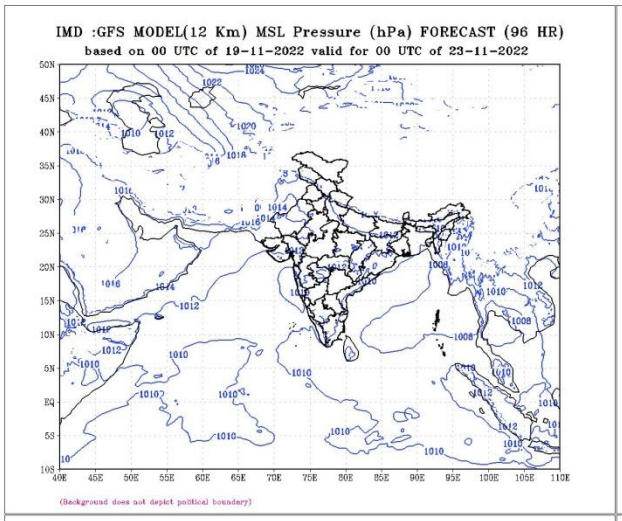
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 23-11-2022
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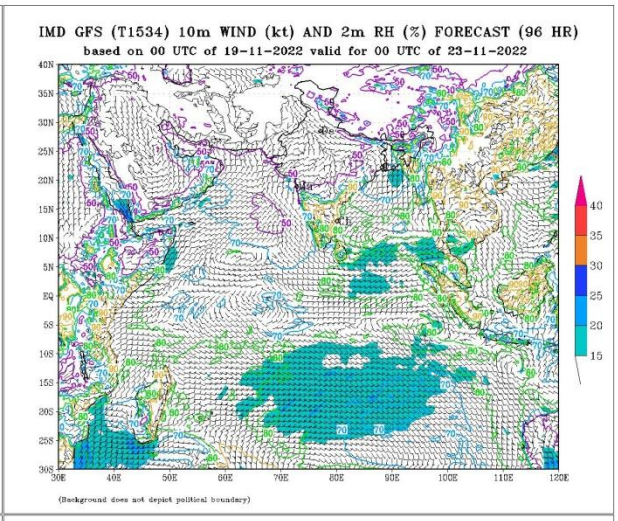
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 23-11-2022
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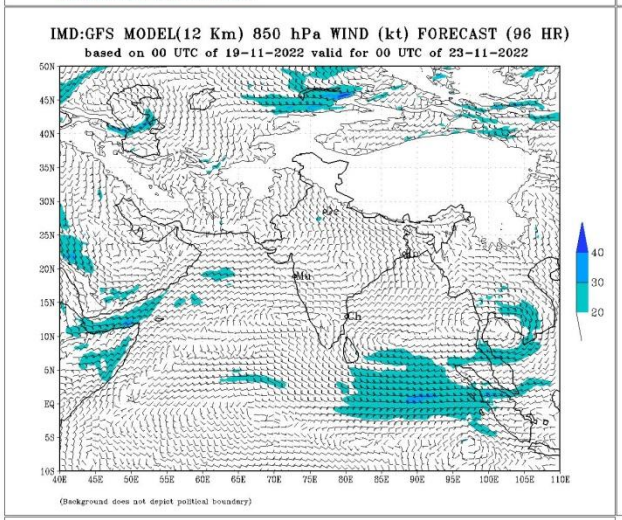
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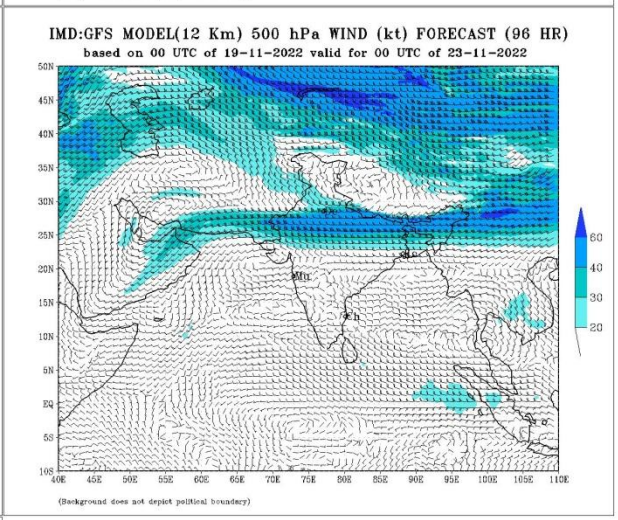
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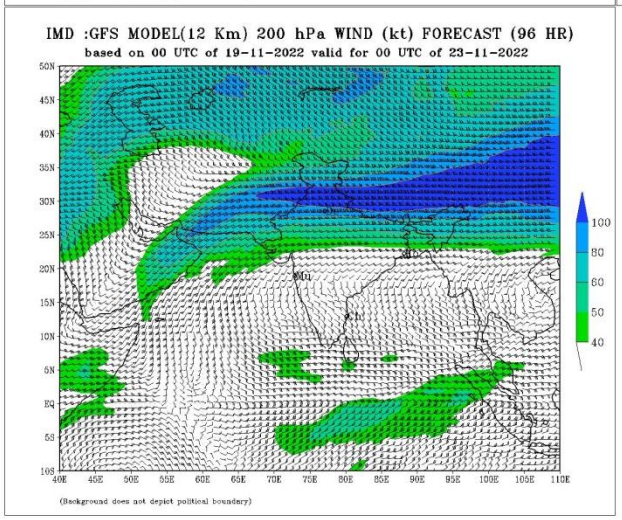
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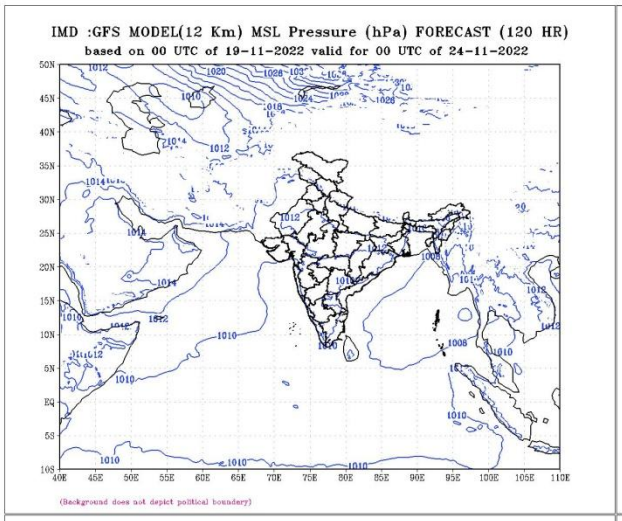
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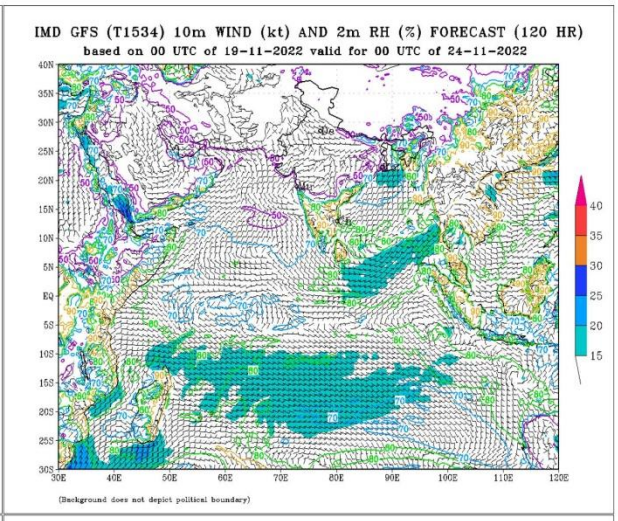
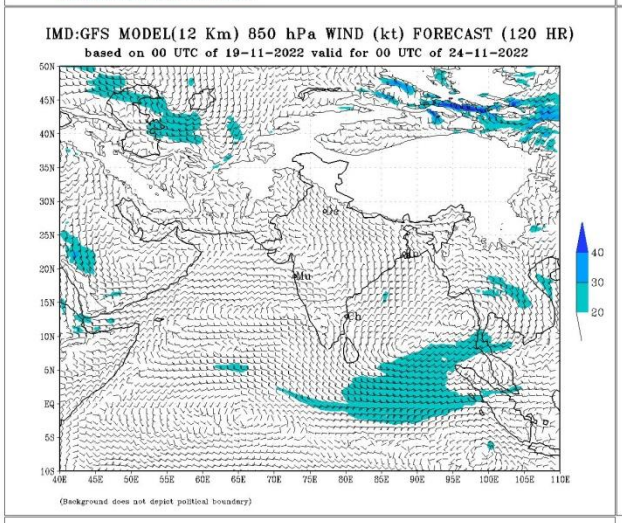
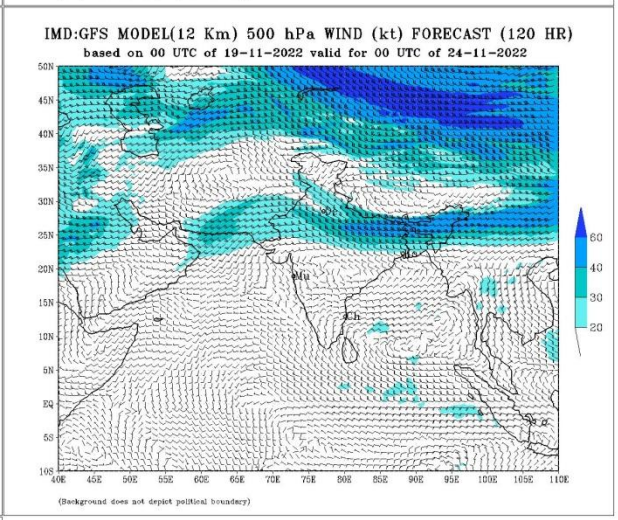
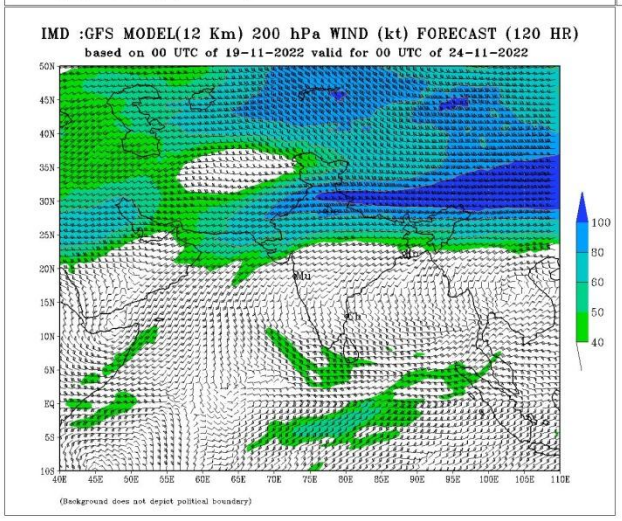
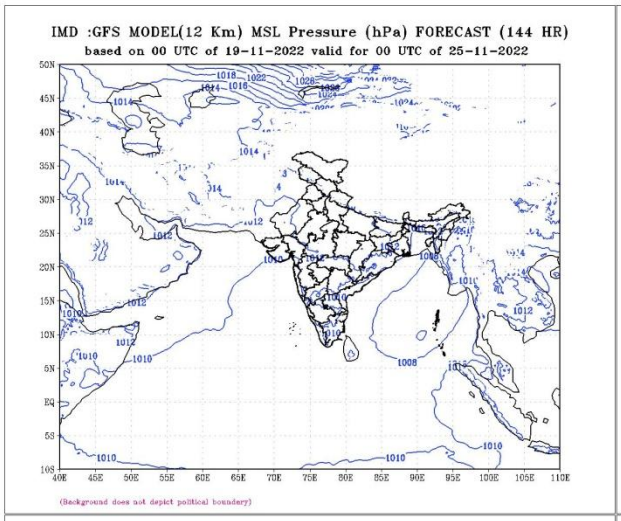
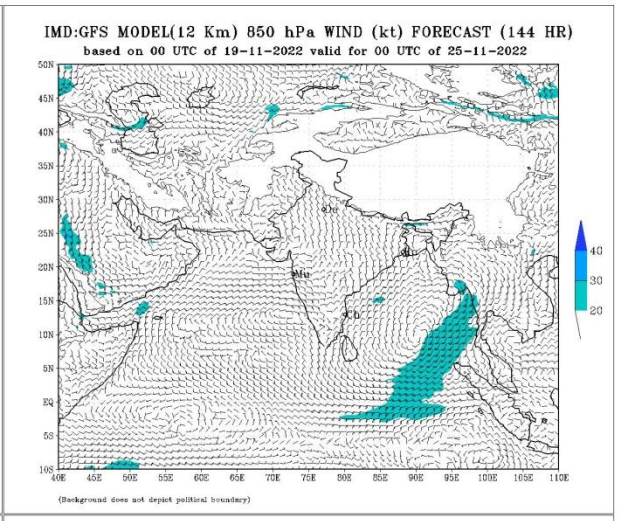

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 24-11-2022
(Background does not depict political boundary)

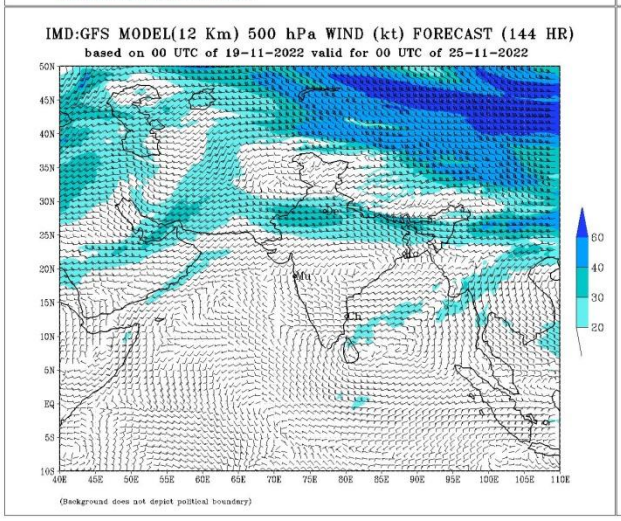

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 24-11-2022
(Background does not depict political boundary)

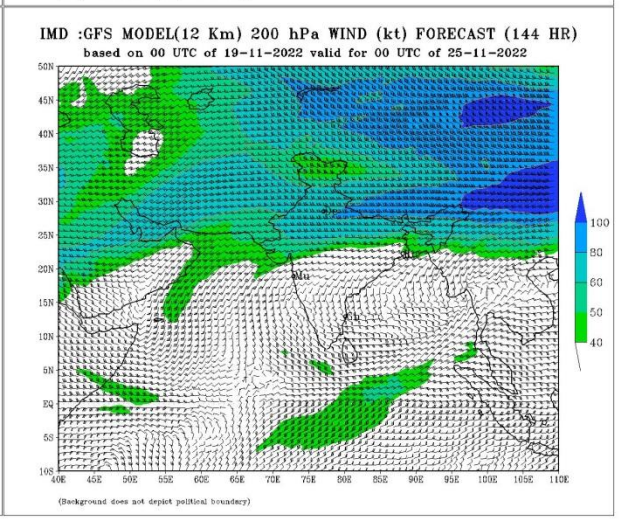

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 24-11-2022
(Background does not depict political boundary)

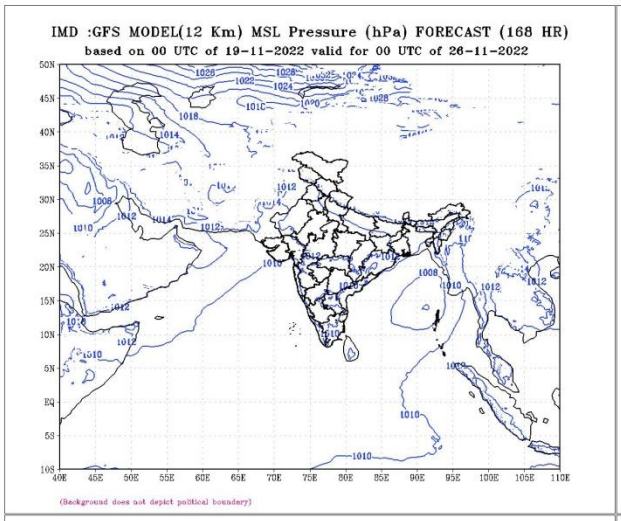

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 24-11-2022
(Background does not depict political boundary)

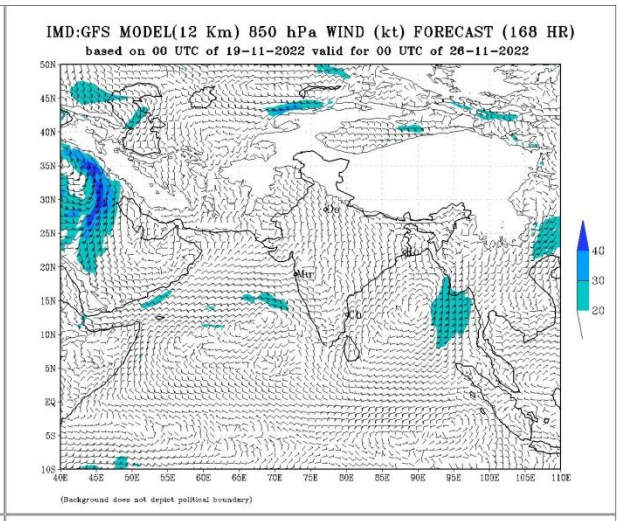

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 25-11-2022
(Background does not depict political boundary)

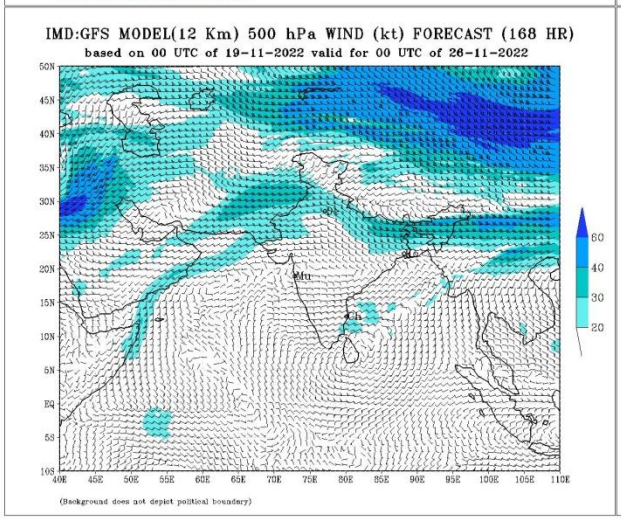

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 25-11-2022
40
30
20
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 25-11-2022
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 19-11-2022 valid for 00 UTC of 25-11-2022
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 19-11-2022 valid for 00 UTC of 26-11-2022
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 26-11-2022
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 19-11-2022 valid for 00 UTC of 26-11-2022
60
40
30
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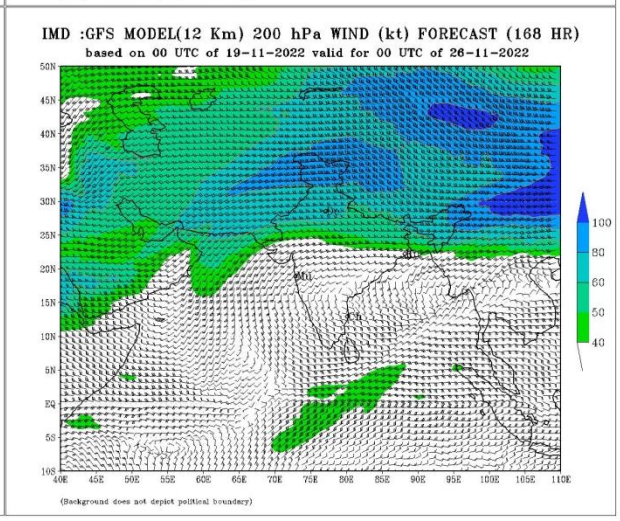
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 19-11-2022 valid for 00 UTC of 26-11-2022
100
80
60
50
40
(Background does not depict political boundary)