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

FDP (Cyclone) NOC Report Dated 4th November, 2021

Time of Issue: 1200 UTC

Synoptic features (based on 0900 UTC analysis):

- Yesterday's Low Pressure Area (LPA) over Lakshadweep area and adjoining southeast Arabian Sea (AS) moved slightly north-northwestwards and lay over southeast AS and adjoining Lakshadweep area at 0000 UTC of today, the 4th November, 2021. The associated cyclonic circulation extended upto 4.5 km above mean sea level. It persisted over the same region at 0900 UTC. It is likely to move north-northwestwards and become more marked over east-central AS during next 48 hours.
- Yesterday's trough at mean sea level from Comorin area to West-central Bay of Bengal off South Andhra Pradesh coast across Gulf of Mannar and Tamil Nadu coast became less marked by 0000 UTC of today.
- However, a cyclonic circulation lay over southwest & adjoining west-central Bay of Bengal, extending upto 3.1 km above mean sea level at 0300 UTC of today and it persisted there at 0900 UTC.
- Yesterday's trough in easterlies from Lakshadweep area to East-central Arabian Sea off Karnataka coast extending upto 0.9 km above mean sea level ran from the cyclonic circulation associated with the LPA over southeast AS and adjoining Lakshadweep area to east-central AS off south Maharashtra coast at 0300 UTC of today. It persisted there at 0900 UTC.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	29-30°C over entire BoB region.	29-30°C over eastern parts of AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	70-80 over most parts of BoB and 120-140 over some parts of eastern equatorial Indian Ocean adjoining to Sumatra coast,110-120 over coastal belt of north Tamil Nadu, south Andhra Pradesh, south Odisha and north Myanmar, 50-60 over Comorin area off Sri Lanka coast.	70-80 over east-central & adjoining southeast AS, 80-90 southeast AS & adjoining equatorial Indian Ocean. <50 over western parts of AS.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	20 - 30 over southwest BoB off Sri Lanka coast & also over west-central BoB off south Andhra Pradesh coast, both with vertical	50 - 60 over southeast AS with vertical extension upto 500 hPa.

	extension upto 500 hPa.	
Low Level convergence ($X10^{-5}$ s^{-1})	5 - 10 over west-central BoB.	10-15 over southeast AS, to the west of the LPA over southeast AS & adjoining Lakshadweep - area
Upper Level divergence ($X10^{-5}$ s^{-1})	An Extended zone of 10-20 over west-central BoB.	10-20 over south & adjoining central AS.
Vertical Wind Shear (VWS Knots)	Low to moderate (05-20) over south & east-central BoB and Andaman Sea and High (30-40) elsewhere	Low to Moderate (05-20) over southeast & adjoining east-central AS and High (30-40) elsewhere.
Wind Shear Tendency (knots)	Decreasing over west-central & northwest BoB.	Decreasing over southeast & adjoining east-central AS.
Upper tropospheric Ridge	Along 14.0°N over the central BoB in association with anti-cyclonic circulation off Myanmar coast.	Along 14.0ºN over the Arabian Sea.

Satellite observations based on INSAT imagery (0900 UTC):

(a) Convection associated with the Low Pressure area

At 0900 UTC, scattered to broken low & medium clouds with embedded intense to very intense convection lay over east-central and adjoining southeast AS and moderate to intense convection over Lakshadweep area in association with the low pressure area. Minimum cloud top temperature is minus 80°C.

(b) Over the BoB

At 0900 UTC, scattered low & medium clouds with embedded intense to very intense convection lay over central & southwest BoB and south Andaman Sea, scattered low and medium clouds with embedded moderate to intense convection over the rest of the BoB and Gulf of Martaban.

(c) Over the Arabian Sea:-

At 0900 UTC, scattered low & medium clouds with embedded intense to very intense convection lay over east-central & adjoining southeast AS and moderate to intense convection over southwest AS.

M.J.O. Index:

MJO index is in Phase 3 with amplitude less than 1. It is likely to continue to propagate further eastwards & move into phase 4 by tomorrow, the 5th November, remain there with gradual eastward propagation during the subsequent 4 days and enter into Phase 5 towards the ends of the forecast period with amplitude remaining less than 1. Hence MJO will support enhancement of convective activity over the north Indian Ocean during the entire forecast period.

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

No storm / depression prevails over these Sea areas as on today.

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

Model	BoB	AS
IMD-GFS	**No fresh genesis predicted**.	**No fresh genesis predicted.** Indicates an LPA over southeast AS & adjoining Lakshadweep area on 4th & 5th, a well marked Low over southeast AS on 6th, weakening into

		an LPA over southeast and adjoining east-central AS on 7th, again as an extended Low over central AS on 8th and its weakening on 9th.Again a fresh LPA is shown over west-central AS on 10th.
IMD-GEFS	-Do-	-Do- as GFS till 6th, then it indicates the west-southwestward movement of the well marked Low and its weakening into an LPA and complete dissipation on 9th.
IMD-WRF	**No fresh genesis predicted** till 7th November. Indicates a feeble LPA over southwest BoB on 6th and over southwest BoB off north Tamil Nadu coast on 7th.	**No fresh genesis predicted** till 7th November. Indicates an extended low over southeast & adjoining east-central AS on 4th, over southeast AS on 5th, as an LPA over southeast AS on 6th and as a well marked Low over southeast & adjoining southwest AS on 7th.
NCMRWF-NCUM	**No fresh genesis predicted.**	**Forecasts cyclogenesis (formation of a Depression) over east-central AS on 7th November (for the fifth day in successive 00 UTC runs, though it was indicated to happen on 6th until 2nd Nov. 00 UTC ICs) and its further intensification into Cyclonic Storm during the subsequent 48 hours.** Indicates an extended Low over southeast AS & adjoining Lakshadweep area 4th & 5th, as a Well Marked low over southeast and adjoining east-central AS on 6th, as a **Depression** over east-central & adjoining southeast AS on 7th, as Cyclonic Storm over east-central AS on 8th and 9th and over central parts of AS on 10th.
NCMRWF-NEPS	-Do-	-Do-
NCMRWF-UM (Regional)	No fresh genesis predicted till 7th November.	Indicates an extended Low over southeast AS & adjoining Lakshadweep area 4th & 5th, as a Well Marked low over southeast and adjoining east-central AS on 6th, as a **Depression** over east-central & adjoining southeast AS on 7th.
ECMWF	**No fresh genesis predicted**.	**No fresh genesis predicted**. Indicates an LPA over southeast AS on 4th, over southeast & adjoining east-central AS on 5th, east-central & adjoining southeast AS on 6th, over east-central AS on 7th & 8th, over central parts of AS on 9th, followed by dissipation on 10th.
ECMWF-EPS	No strike probability predicted during forecast period.	No strike probability predicted during forecast period.
NCEP-GFS	**No fresh genesis predicted**.	**No fresh genesis predicted**.

	Indicates a fresh LPA over east equatorial Indian Ocean and adjoining southeast BoB on 8th,over central parts of south BoB on 9th and as a Well marked Low over southwest BoB to the east of Sri Lanka on 10th.	Indicates an extended low over southeast AS and adjoining areas of east-central AS on 5th, an LPA over east-central & adjoining southeast AS on 6th, a well marked Low over east-central AS on 7th & 8th and as an LPA over central AS on 9th & 10th.
IMD-GPP	A very small Potential zone over west-central BoB off Andhra Pradesh coast on 6th, Nil on 7th, fresh elongated zone over southeast BoB and adjoining equatorial Indian Ocean on 8th, over southeast BoB on 8th and over southwest & adjoining southeast BoB on 9th.	A small near circular zone over southeast AS on 4th, nil on 5th, a significant, but elongated zone over east-central AS on 6th & 7th, nil on 8th, again a fresh zone over east-central &n adjoining southeast AS on 9th & 10th.

GPP- Genesis Potential Parameter based on Dynamical Statistical model developed by IMD.

Summary and Conclusion:

The 4 Numerical models (viz., NCUM, its ensemble NEPS, its regional NCUM (R) and IMD GPP) which indicated cyclogenesis over the Arabian Sea yesterday continue to indicate so today as well, over east-central Arabian Sea around 7th. NCUM & its ensemble are showing its further intensification into cyclone on 8th, 9th & 10th with a west-northwestward movement towards west-central Arabian Sea. NCEP GFS now shows that a fresh Low pressure area could form in the near equatorial belt & adjoining southeast BoB and move west-northwestwards during 8th – 10th November.

It may thus be concluded that,

The Low pressure area over southeast AS and adjoining Lakshadweep area is likely to move north-northwestwards and become more marked over east-central Arabian Sea during next 48 hours.

Likely cyclogenesis over east-central AS during 7th - 10th November as indicated by some of the numerical models needs to be further monitored.

Probability of cyclogenesis (formation of depression and above intensity systems) over the 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	NIL	NIL	NIL	NIL	NIL

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

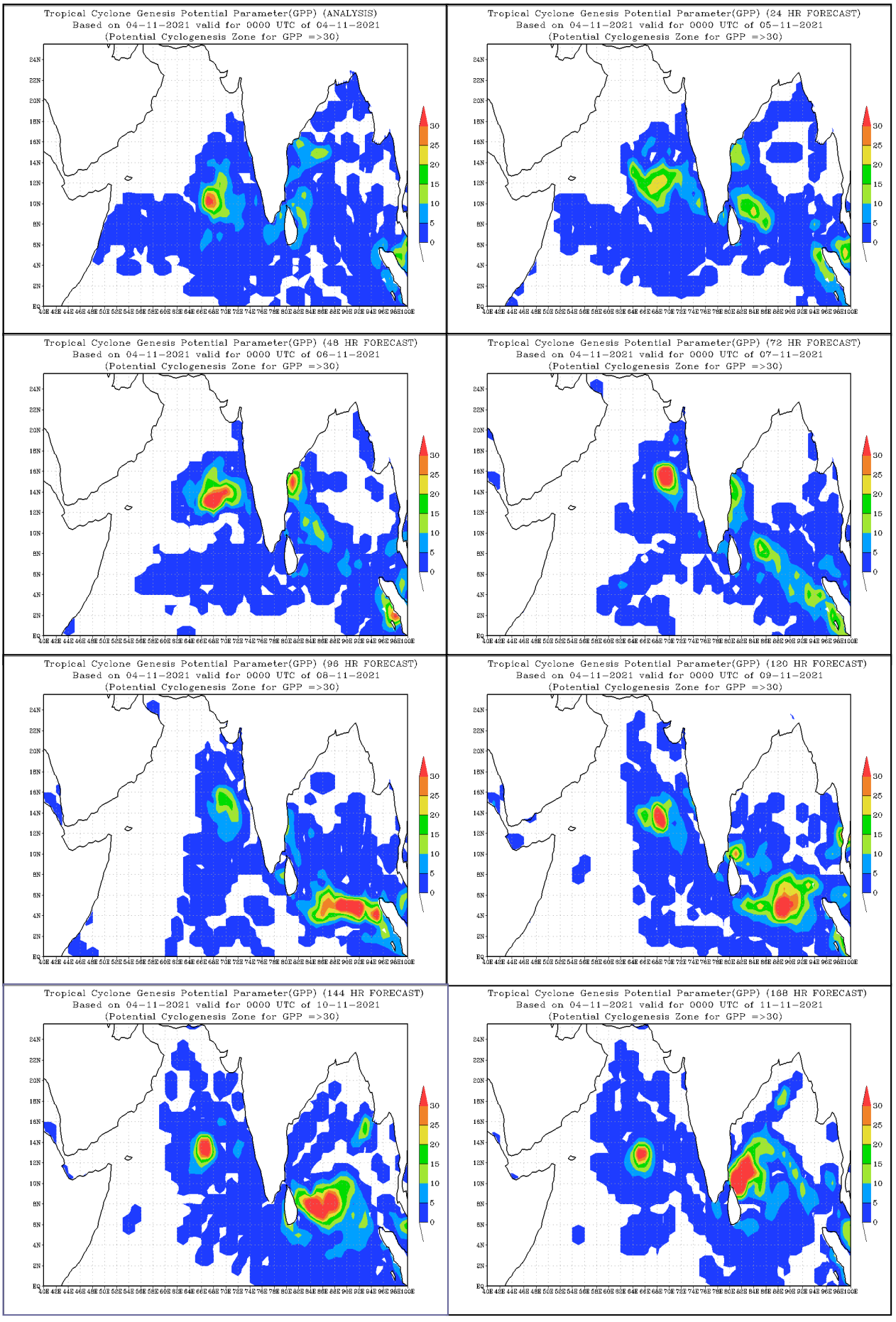
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	LOW	LOW	LOW	LOW

Advisory:

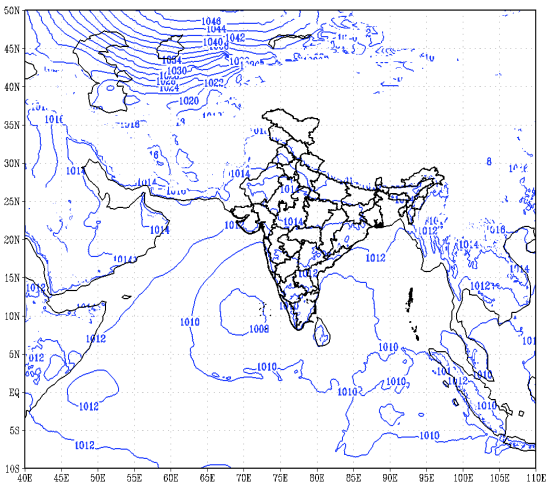
The intensity & movement of the Low Pressure Area over southeast AS and adjoining Lakshadweep area need to be monitored.

IOP is suggested for Lakshadweep & Kerala coast on 5th November and Karnataka – Goa – south Maharashtra coasts during 5th - 9th November.

Annexure-I

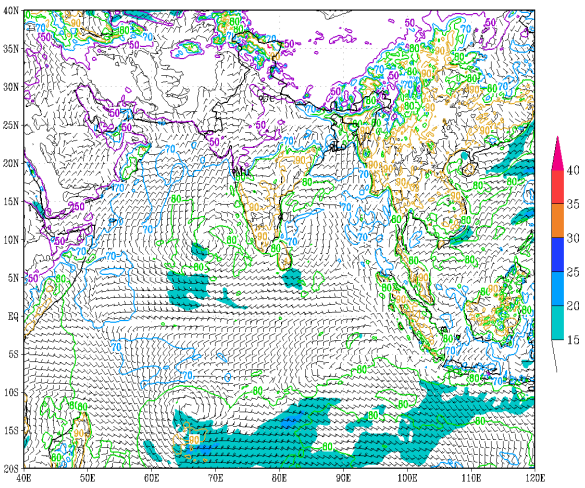

Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 04-11-2021 valid for 0000 UTC of 04-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 05-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 06-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 07-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 08-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 09-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 10-11-2021
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 04-11-2021 valid for 0000 UTC of 11-11-2021
(Potential Cyclogenesis Zone for GPP =>30)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 04-11-2021



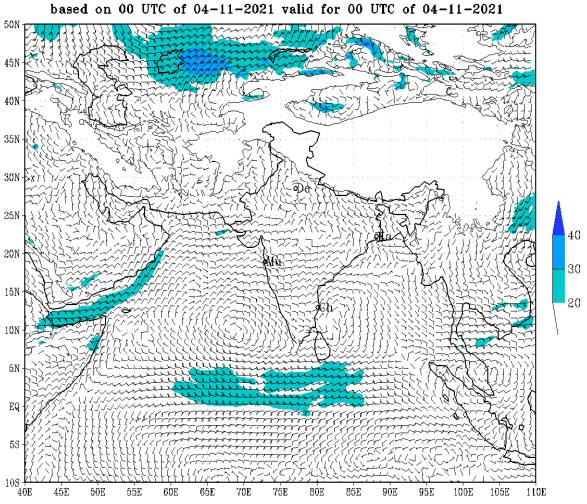
(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 04-11-2021



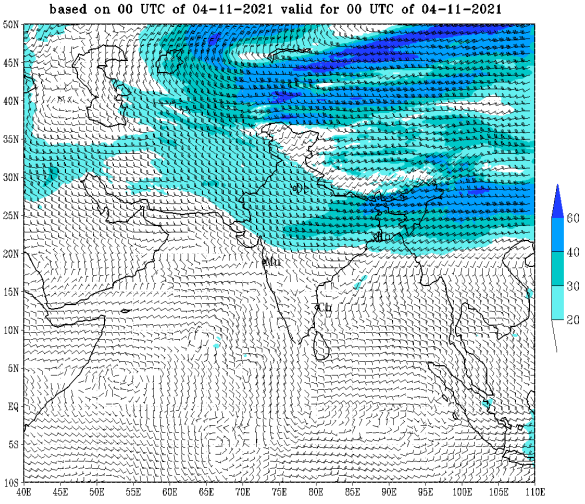
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 04-11-2021



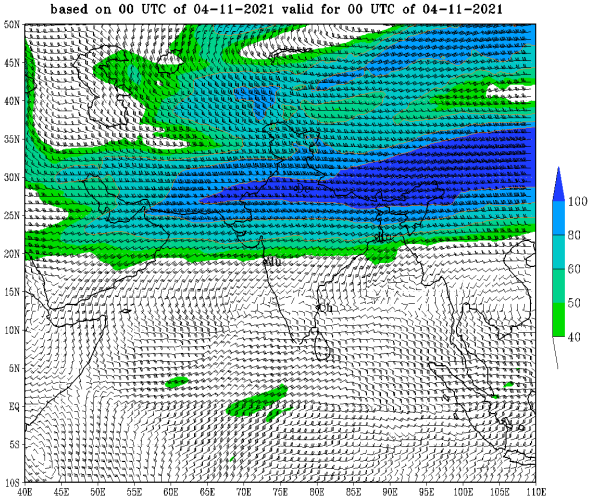
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 04-11-2021



(Background does not depict political boundary)

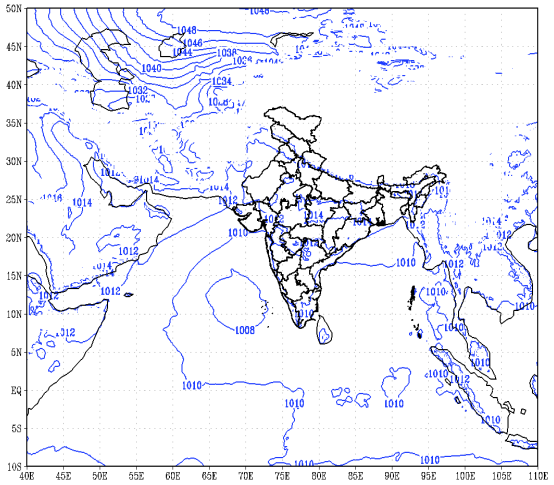
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 04-11-2021



(Background does not depict political boundary)

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

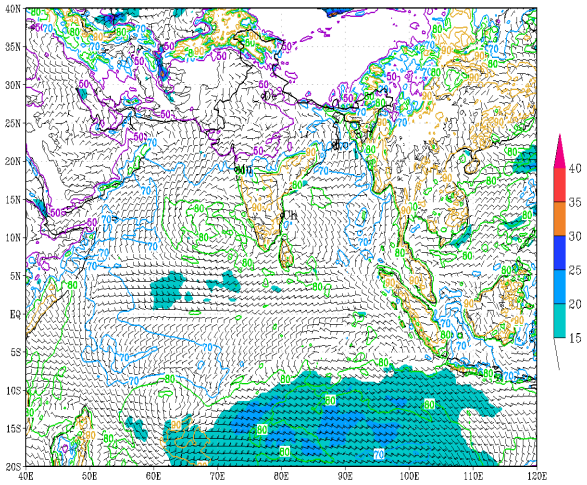
based on 00 UTC of 04-11-2021 valid for 00 UTC of 05-11-2021



(Background does not depict political boundary)

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

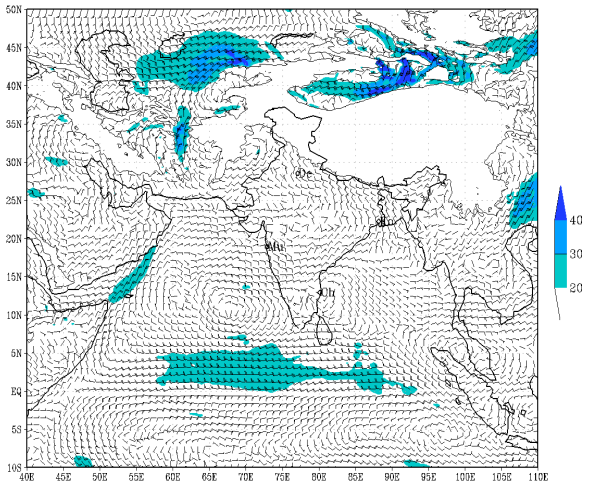
based on 00 UTC of 04-11-2021 valid for 00 UTC of 05-11-2021



(Background does not depict political boundary)

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

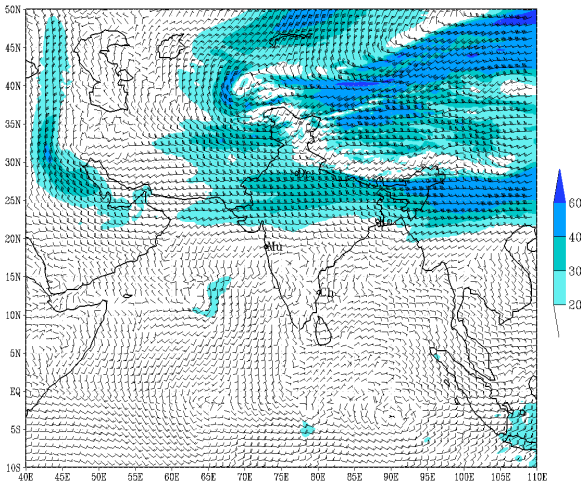
based on 00 UTC of 04-11-2021 valid for 00 UTC of 05-11-2021



(Background does not depict political boundary)

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

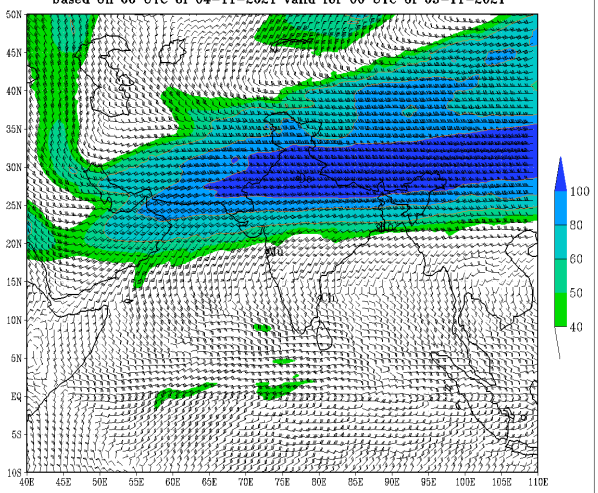
based on 00 UTC of 04-11-2021 valid for 00 UTC of 05-11-2021



(Background does not depict political boundary)

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

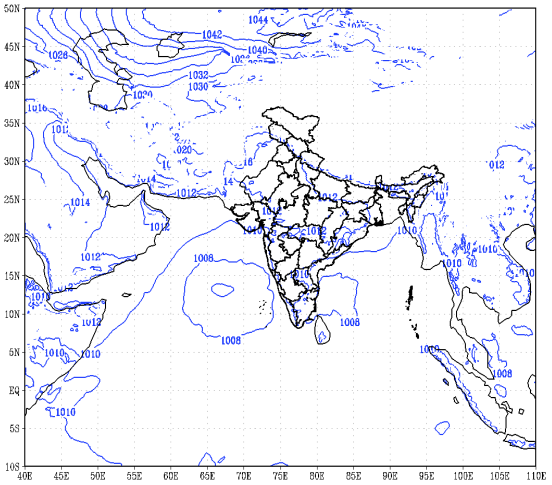
based on 00 UTC of 04-11-2021 valid for 00 UTC of 05-11-2021



(Background does not depict political boundary)

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

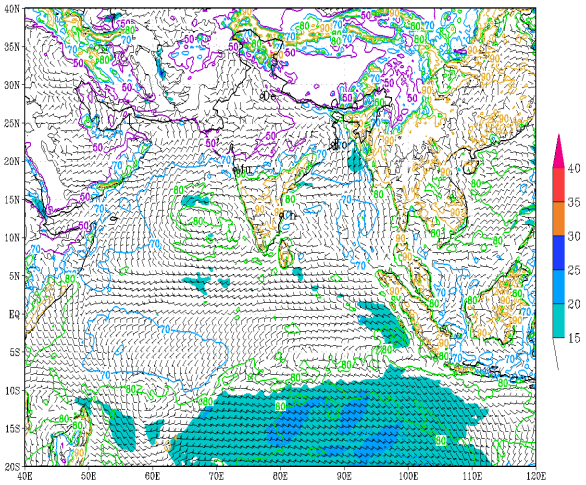
based on 00 UTC of 04-11-2021 valid for 00 UTC of 06-11-2021



(Background does not depict political boundary)

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

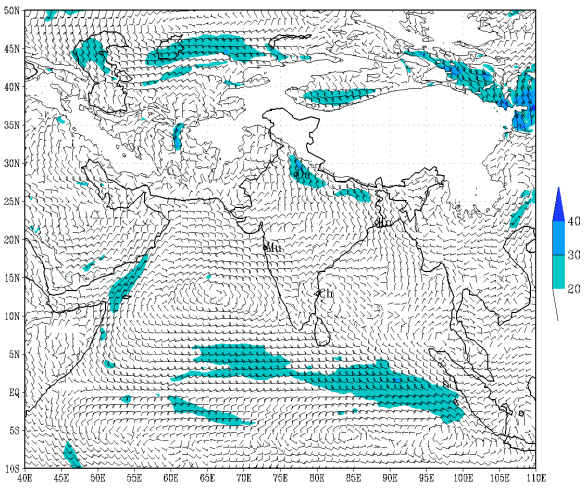
based on 00 UTC of 04-11-2021 valid for 00 UTC of 06-11-2021



(Background does not depict political boundary)

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

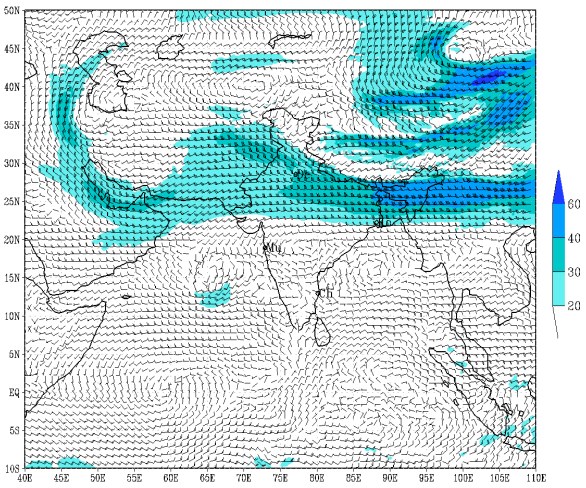
based on 00 UTC of 04-11-2021 valid for 00 UTC of 06-11-2021



(Background does not depict political boundary)

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

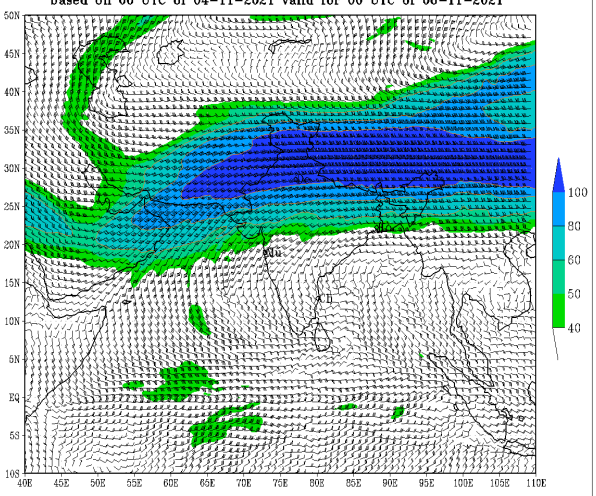
based on 00 UTC of 04-11-2021 valid for 00 UTC of 06-11-2021



(Background does not depict political boundary)

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

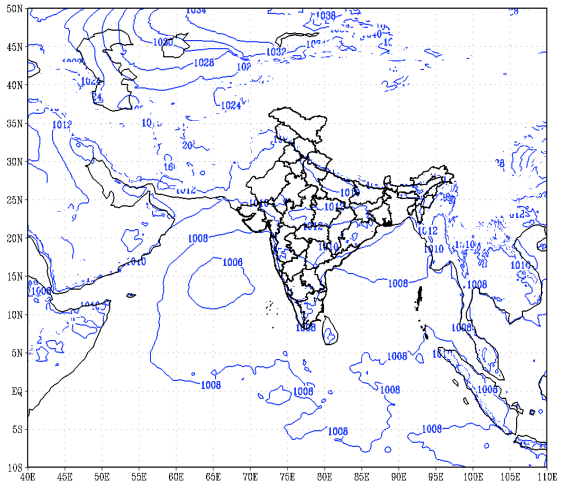
based on 00 UTC of 04-11-2021 valid for 00 UTC of 06-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)

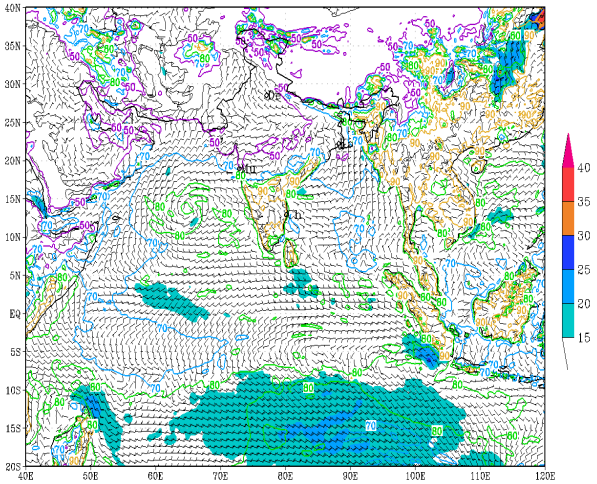
based on 00 UTC of 04-11-2021 valid for 00 UTC of 07-11-2021



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)

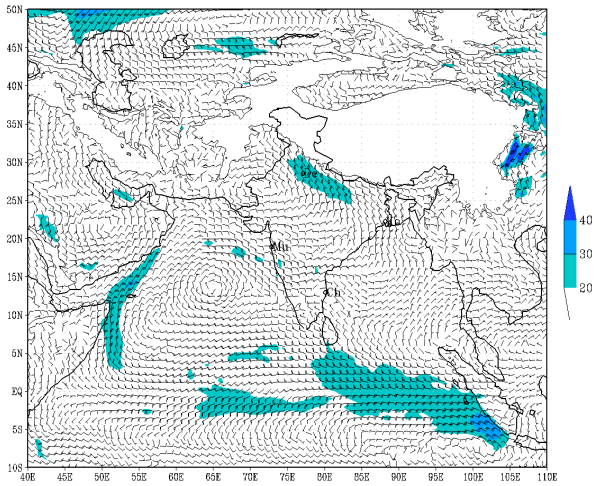
based on 00 UTC of 04-11-2021 valid for 00 UTC of 07-11-2021



(Background does not depict political boundary)

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

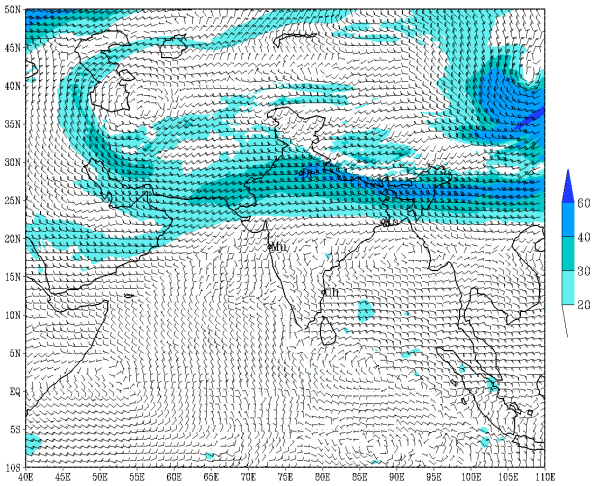
based on 00 UTC of 04-11-2021 valid for 00 UTC of 07-11-2021



(Background does not depict political boundary)

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

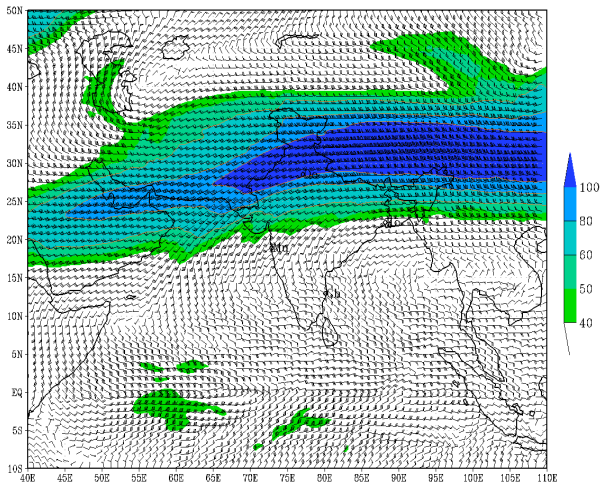
based on 00 UTC of 04-11-2021 valid for 00 UTC of 07-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (72 HR)

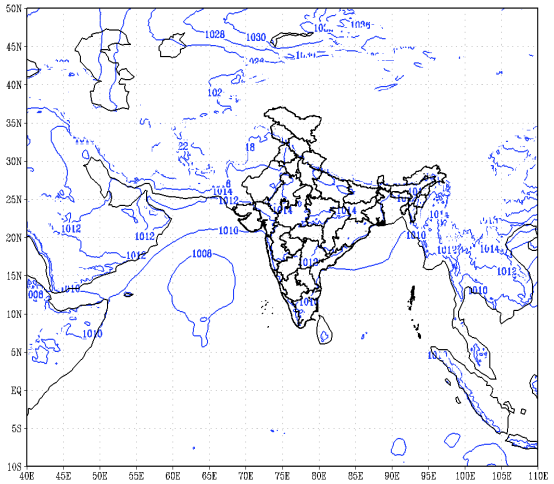
based on 00 UTC of 04-11-2021 valid for 00 UTC of 07-11-2021



(Background does not depict political boundary)

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

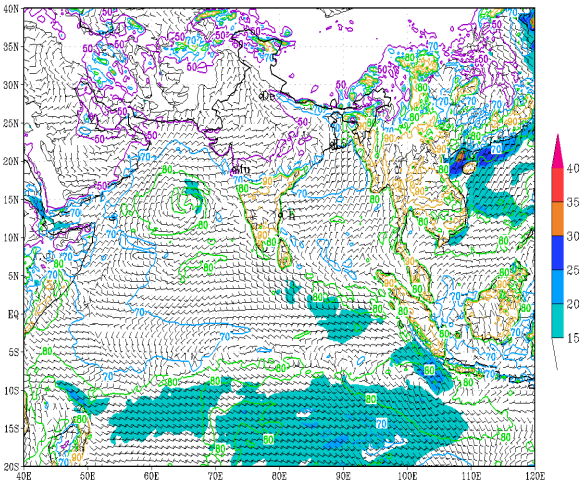
based on 00 UTC of 04-11-2021 valid for 00 UTC of 08-11-2021



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)

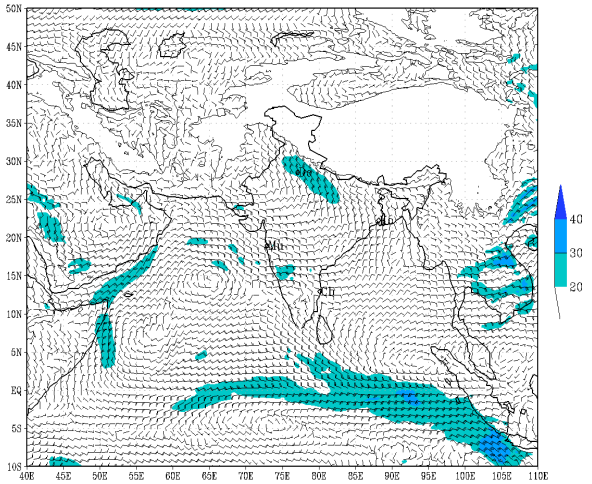
based on 00 UTC of 04-11-2021 valid for 00 UTC of 08-11-2021



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)

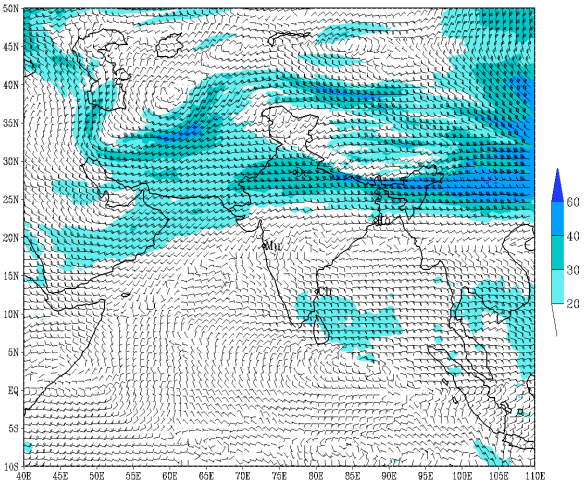
based on 00 UTC of 04-11-2021 valid for 00 UTC of 08-11-2021



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)

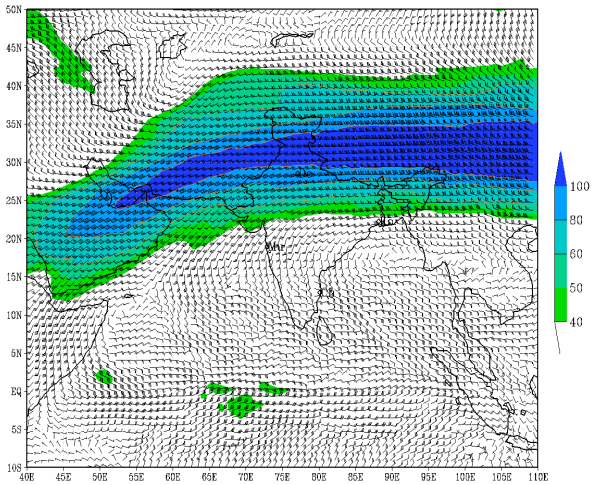
based on 00 UTC of 04-11-2021 valid for 00 UTC of 08-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)

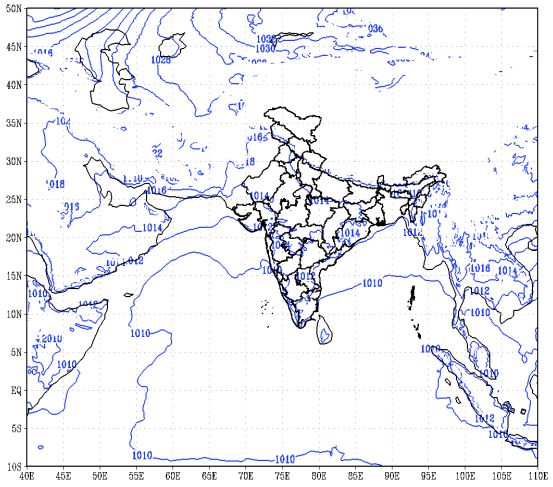
based on 00 UTC of 04-11-2021 valid for 00 UTC of 08-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)

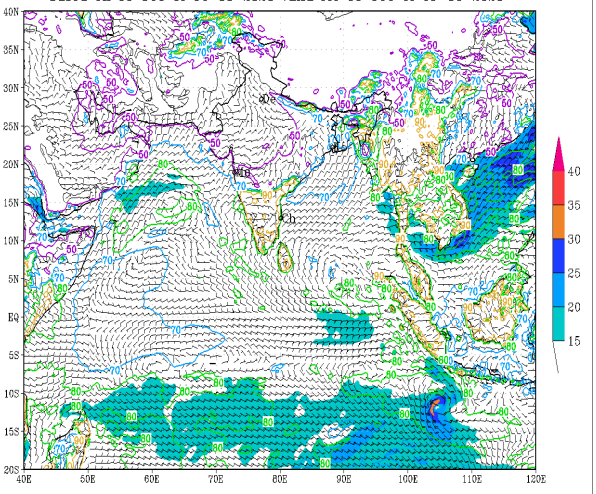
based on 00 UTC of 04-11-2021 valid for 00 UTC of 09-11-2021



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)

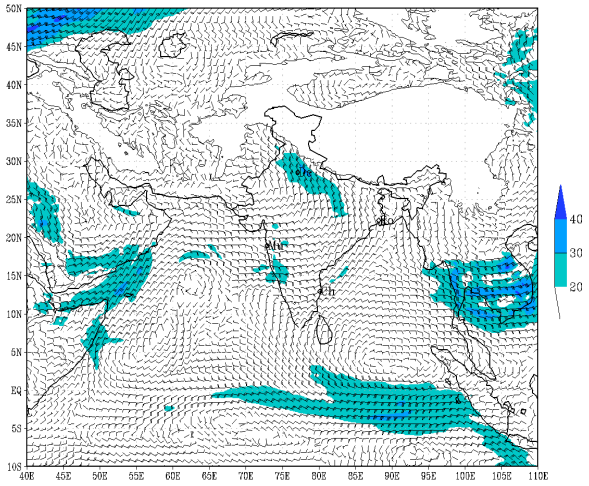
based on 00 UTC of 04-11-2021 valid for 00 UTC of 09-11-2021



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)

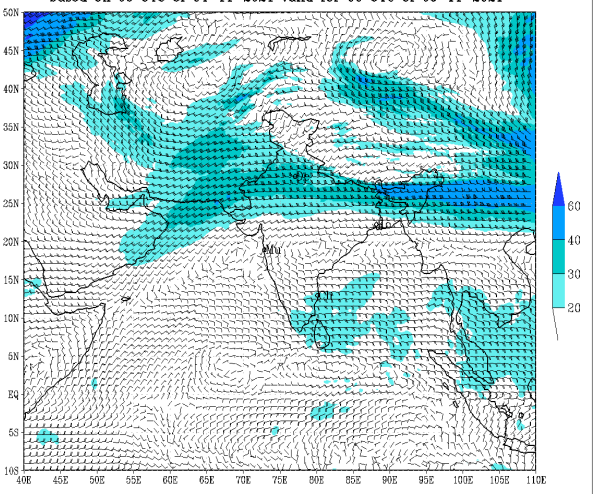
based on 00 UTC of 04-11-2021 valid for 00 UTC of 09-11-2021



(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)

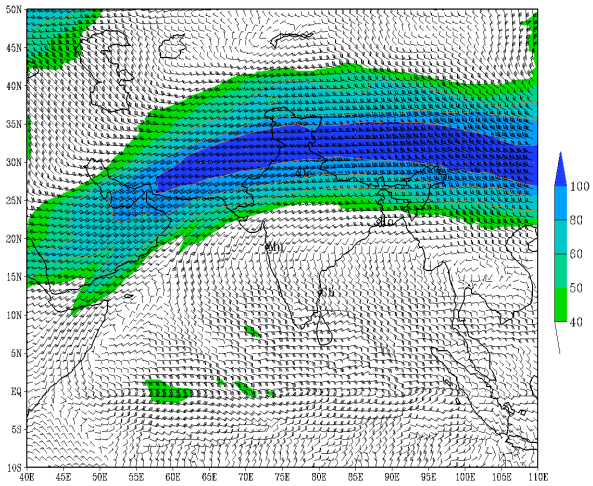
based on 00 UTC of 04-11-2021 valid for 00 UTC of 09-11-2021



(Background does not depict political boundary)

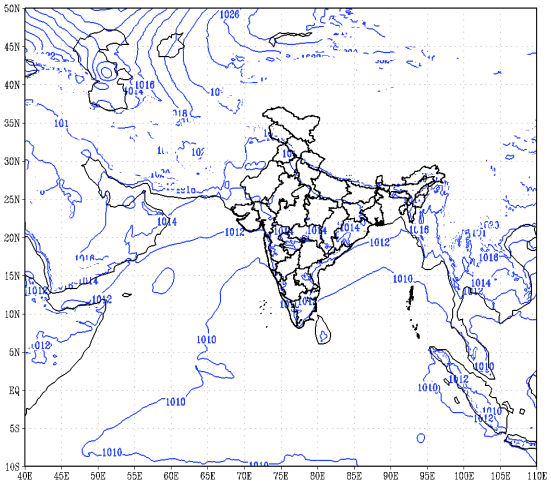
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)

based on 00 UTC of 04-11-2021 valid for 00 UTC of 09-11-2021



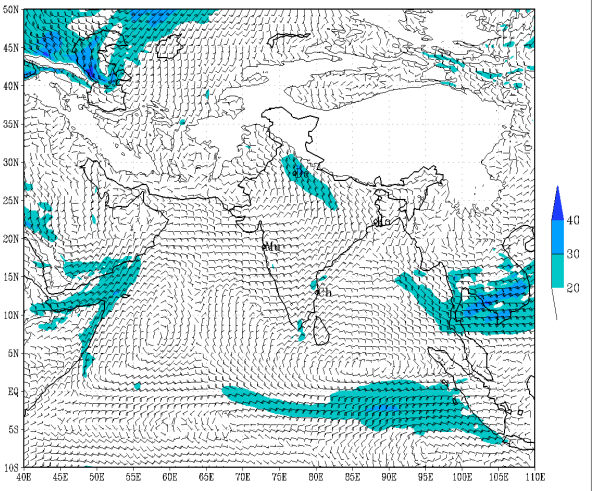
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 10-11-2021



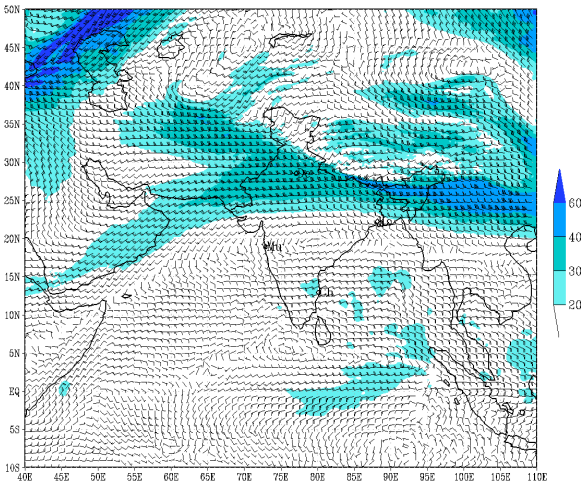
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 10-11-2021



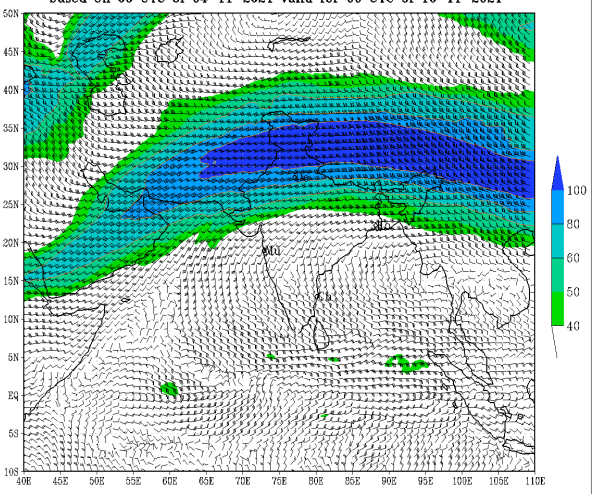
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 10-11-2021



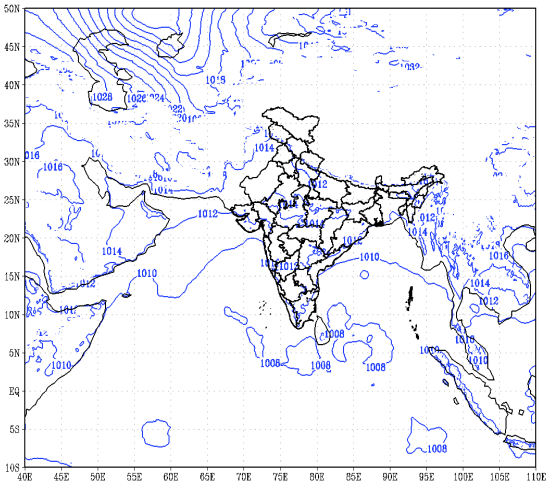
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 10-11-2021



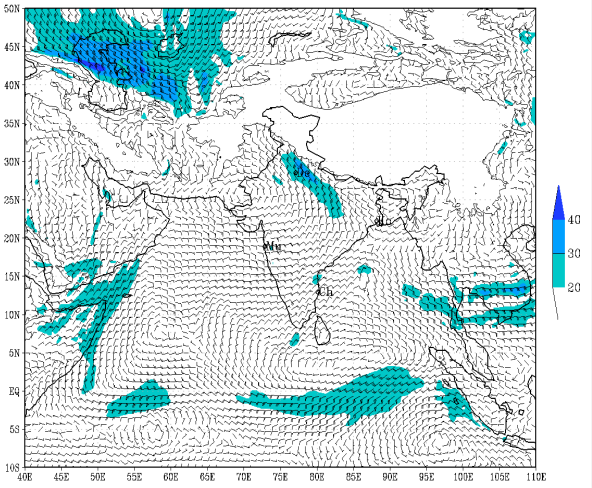
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 11-11-2021



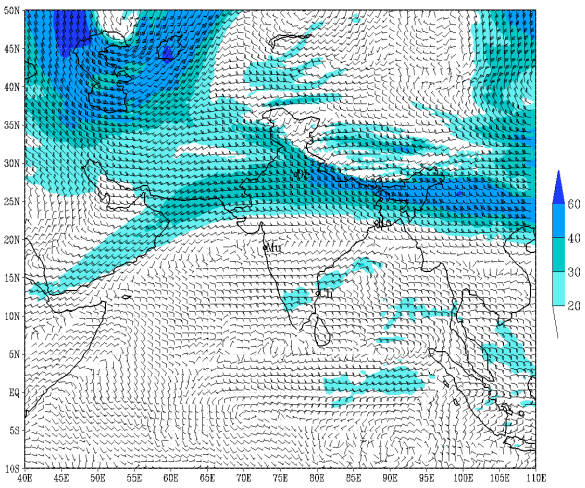
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 11-11-2021



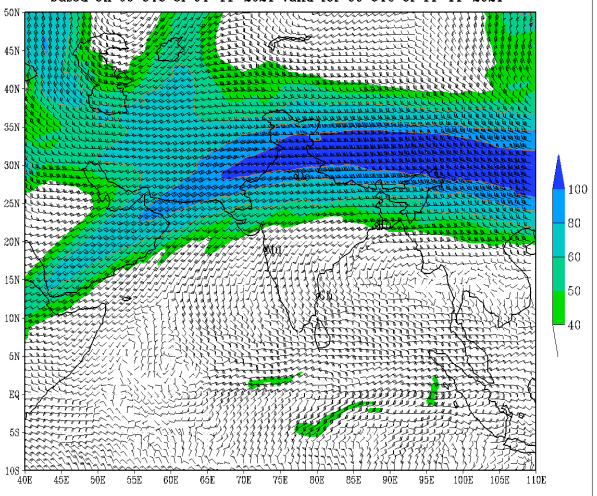
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 11-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 04-11-2021 valid for 00 UTC of 11-11-2021



(Background does not depict political boundary)