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

Tropical Cyclone Forecast Programme
Report Dated 18th October, 2023

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

- Under the influence of cyclonic circulation over southeast Arabian Sea & adjoining Lakshadweep area, a low-pressure area formed over southeast & adjoining eastcentral Arabian Sea at 0000 UTC and lay over the same region at 0300 UTC of today, the 18th October, 2023. It is likely to move west-northwestwards and become well marked low pressure area over eastcentral & adjoining southeast Arabian sea during next 24-hours and intensify into a depression over central Arabian sea around 21st October.
- A cyclonic circulation in lower tropospheric levels lay over southeast Bay of Bengal at 0300 UTC of today, the 18th October, 2023. It is likely to move northwestwards and under its influence a low pressure area is likely to form over central parts of bay of Bengal around 20th October

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	29-30°C over entire BOB. 30-31°C over some parts of North Andaman Sea.	29-30°C over south and eastcentral Arabian sea. Becoming 27-29°C over western parts of AS and North AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	100-120 over eastcentral BoB. 20-30 over southwest & parts of westcentral BOB. 60-80 over remaining parts of BOB.	60-80 over eastcentral & south Arabian Sea. 20-30 over the western parts of AS and North AS.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	Positive vorticity of 50-60 over southeast BOB with vertical extension upto 500 hpa levels. Positive vorticity of 30-40 over southwest BOB with vertical extension upto 700 hpa levels.	Positive vorticity of 50 over Southeast AS with vertical extension upto 200 hPa level to the south of system centre.
Low Level convergence (X10^{-5} s^{-1})	10 over southeast BOB and south Andaman sea. 5 over westcentral BOB. 10-20 over southwest BOB.	10 over eastcentral & adjoining southeast Arabian sea. 5-10 over southeast Arabian Sea off Kerala coast.
Upper Level divergence (X10^{-5} s^{-1})	5 over southeast BOB. 10-20 over southwest BOB.	10 over south Arabian sea.

Vertical Wind Shear (VWS knots)	Low (5-10) over central BoB. High (30-40) over southeast and south BOB.	Low (5-10) over south & central AS.
Wind Shear Tendency (knots)	Increasing over the coast of Tamil Nadu & Andhra Pradesh. Decreasing tendency over major parts of BoB.	Increasing over major parts of Arabian Sea.
Upper tropospheric Ridge	Along 16.0ºN over BoB.	Along 12.0ºN over AS

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the BoB & Andaman Sea:-

At 0300 UTC, Scattered to broken low & medium clouds with embedded intense to very intense convection lay over southwest Bay of Bengal of Bengal and moderate to intense convection lay over southeast & eastcentral Bay of Bengal of Bengal, Andaman sea.

(b) Over the Arabian Sea:-

At 0300 UTC, Scattered to broken low & medium clouds with embedded intense to very intense convection lay over southeast Arabian sea and moderate to intense convection lay over eastcentral Arabian sea, Lakshadweep islands area, comorin area

(c) Convection outside India:

Scattered low and medium clouds with embedded moderate to intense convection over Sri Lanka, Palk strait, Gulf of Mannar, north Maldives, Tibet, South Myanmar, Thailand, gulf of Thailand, Cambodia, Laos, Vietnam, gulf of Tonkin, Hainan, Sumatra, strait of Malacca, Malaysia, Borneo, south China Sea, Java Islands & Sea Celebes Islands & Sea Philippines, Sulu Sea, Madagascar, Mozambique channel and over Indian ocean between latitude 5.0N to 9.0S longitude 45.0E to 100.0E.

M.J.O. Index:

MJO index is in Phase 1 with amplitude greater than 1. It will continue in same phase during next 7 days with amplitude becoming less than 1 from 20th with gradually decreasing trend.

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

Nil

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

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	Low Pressure Area (LPA) over southeast & adjoining southwest BoB (10N/86E) on 18th, well marked low pressure area (WML) over southwest & adjoining westcentral BoB (12N/87E) on 19th, WML over same region (12N/86E) on 20th, WML over same region (12.5N/87E) on 21st, WML over same region (12.5N/85E) on 22nd, becomes Depression (D) over westcentral & adjoining southwest BoB (13N/84E), intensify into a Deep Depression (DD) over westcentral BoB (15N/84E) on 24th, further intensify as CS crossing north Andhra-Pradesh coast (16N/82E).	LPA over the eastcentral AS (14N/66E) on 18th, LPA ocer southwest AS (9N/57E) on 21st, LPA over same region on 22nd, LPA over southwest AS (8N/54E) and LPA over southwest AS off Somalia coast (8N/52E).

IMD-GEFS	LPA over southwest & adjoining westcentral BoB (10N/85E) on 19th, LPA over same region on 20th, LPA over westcentral BoB (12N/85E) on 21st, LPA over same region (12N/84E) on 22nd, becomes WML/D over same region (14N/82E) on 23rd, becomes D over same region (14N/81E) on 24th, crosses north Andhra-Pradesh coast on 25th as LPA.	LPA over southwest & adjoining southeast AS (10N/65E) on 19th only.
IMD-WRF	LPA over westcentral AS (13N/86E) on 19th, LPA over same region (14N/88E) on 20th October, intensifies as D over same region (14N/88E) on 21st.	LPA over southwest AS (11N/57E) on 21st October.
NCMRWF-NCUM	Cycir over southeast BOB adjoining southwest BOB (10N/86.5E) on 18th October. WML over westcentral and adjoining eastcentral BOB (14N/57.5E) on 22nd October. Depression over eastcentral BOB (18N/89E) on 24th October. Weakens over northeast BOB (20N/91E) on 26th October	Cycir over central and southeast AS (12N/64.8E) on 18th October. LPA over westcentral and southwest AS (12N/61.7E) on 20th October. System moves westwards and intensifies into depression (14N/50E) on 23rd October. Gradually weakens into LPA on 24th October (12.5N/49E).
NCMRWF-NEPS	LPA over westcentral and adjoining south BOB (13.5N/87E) on 21st October. System intensifies into WML on 22nd October. Depression over eastcentral BOB (16N/89E) on 23rd October. Further intensifies into deep depression on eastcentral BOB (18.55N/89E) on 24th October. Gradually weakens into Depression over northeast BOB (19.5N/90E) on 25th October. LPA over northeast BOB (20N/91E) on 27th October.	LPA over Southwest AS adjoining Southeast AS (11N/63.5E) on 19th October. WML over westcentral AS adjoining southwest AS (12.5N/59E) on 21st October. System further intensifies into Depression over westcentral AS (14.8N/55E) on 22nd October. System gradually weakens over westcentral AS.
NCMRWF-UM (Regional)	Cycir over southwest BOB on 19th October (10N/86E), intensify into LPA over central and southeast BOB (13N/88.5E) on 21st October.	Cycir over eastcentral and adjoining southeast AS (12.5N/67E) on 18th October. LPA over central AS (11N/65E) on 19th October further intensifies into depression on 20th October over southwest and adjoining southeast AS. DD over central AS and adjoining southwest AS on 21st October (12N/62.5E).
ECMWF	Extended LPA over central BOB (12.9N/88E) on 21st October. System intensifies into depression over westcentral BOB (13.5N/87E) on 22nd/1200 UTC. To move northwestwards till 25th and gradually recurve northeastwards and cross Bangladesh coast as DD.	LPA over southwest and adjoining southeast AS (11.4N/64.4E) on 19th October. Depression over southwest AS (10.4N/62E) on 21st October. To intensify further into severe Cyclonic storm and cross Oman-Yemen coasts on 23rd.

NCEP-GFS	LPA on 21st over eastcentral & adjoining southeast BoB (13.3N/88.7E), D over central parts of BoB (13.9N/87.2E) on 22nd/1200 UTC, DD over eastcentral BoB (15.0N/87.5E) on 23rd/0000 UTC. To intensify further becoming CS on 23rd/1200 UTC over westcentral BoB (16.1N/85.6E). To move northwestwards till 23rd/1200 UTC and then recurve northeastwards. To reach near south Bangladesh-Myanmar coast on 25th/0000 UTC.	LPA over southeast & adjoining eastcentral AS (11.0N/65.6E) on 18th, LPA over southwest AS (11.3N/65.0E) on 19th, D over southwest AS (10.1N/63E) on 20th/1200 UTC. To intensify further becoming CS over same region (10.1N/65.1E). Indicating further intensification and movement towards Oman-Yemen coasts. Crossing on 24th over Oman near 17.6N/56.0E.
IMD-Genesis Potential Parameter	A Potential zone for cyclogenesis over southwest BoB on 18th, 19th, eastcentral BoB on 20th, 21st, 22nd & 23rd, northeast BoB on 24th and northeast BoB off Myanmar coast on 25th.	A potential zone for cyclogenesis over southwest AS on 20th, 21st and westcentral on 22nd, 23rd, 24th & 25th.

Summary and conclusion:

1. For the Bay of Bengal:

Model guidance indicates that low pressure area is likely to form over southeast and adjoining central BoB around 20th October. Most of the models are indicating further intensification of the system into a depression during 22nd to 24th (NCEP GFS around 22nd, ECMWF around 23rd and IMD GFS & NCUM around 24th). There is variation among various models wrt further intensification and movement of the system. IMD GFS is indicating intensification of this system into a cyclonic storm and crossing over North Andhra Pradesh coast. ECMWF, NCUM & NCEP GFS are indicating crossing over Bangladesh coast with ECMWF & NCUM as low pressure area/depression and NCEP GFS as a deep depression.

In view of all the above, it is inferred that the cyclonic circulation over southeast Bay of Bengal is likely to move northwestwards and under its influence a low pressure area is likely to form over central parts of Bay of Bengal around 20th October. However, low to moderate probability is assigned to its further intensification into depression during 23rd to 24th.

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	Low	Moderate

2. For the Arabian Sea:

Models like NCEP-GFS, ECMWF, NCUM-R, NEPS, IMD GPP are indicating further intensification into depression over central parts of Arabian Sea around 21st, with NEPS indicating 22nd and ECMWF indicating depression around 21st and NCUM-R & NCEP around 20th. ECMWF and NCEP GFS are also indicating further intensification into cyclonic storm. However, IMD GFS is not indicating any significant system over Arabian Sea. Also there is variation among various models with respect to movement of the system. Most of the models are indicating movement towards Oman-Yemen coasts and NCEP-GFS is indicating movement towards Pakistan coast.

Hence, it is inferred that the low-pressure area over southeast & adjoining eastcentral Arabian Sea is likely to move west-northwestwards and become well marked low pressure area over eastcentral & adjoining southeast Arabian sea during next 24-hours and intensify into a depression over central Arabian sea around 21st October.

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	Low	Moderate	High	-	-

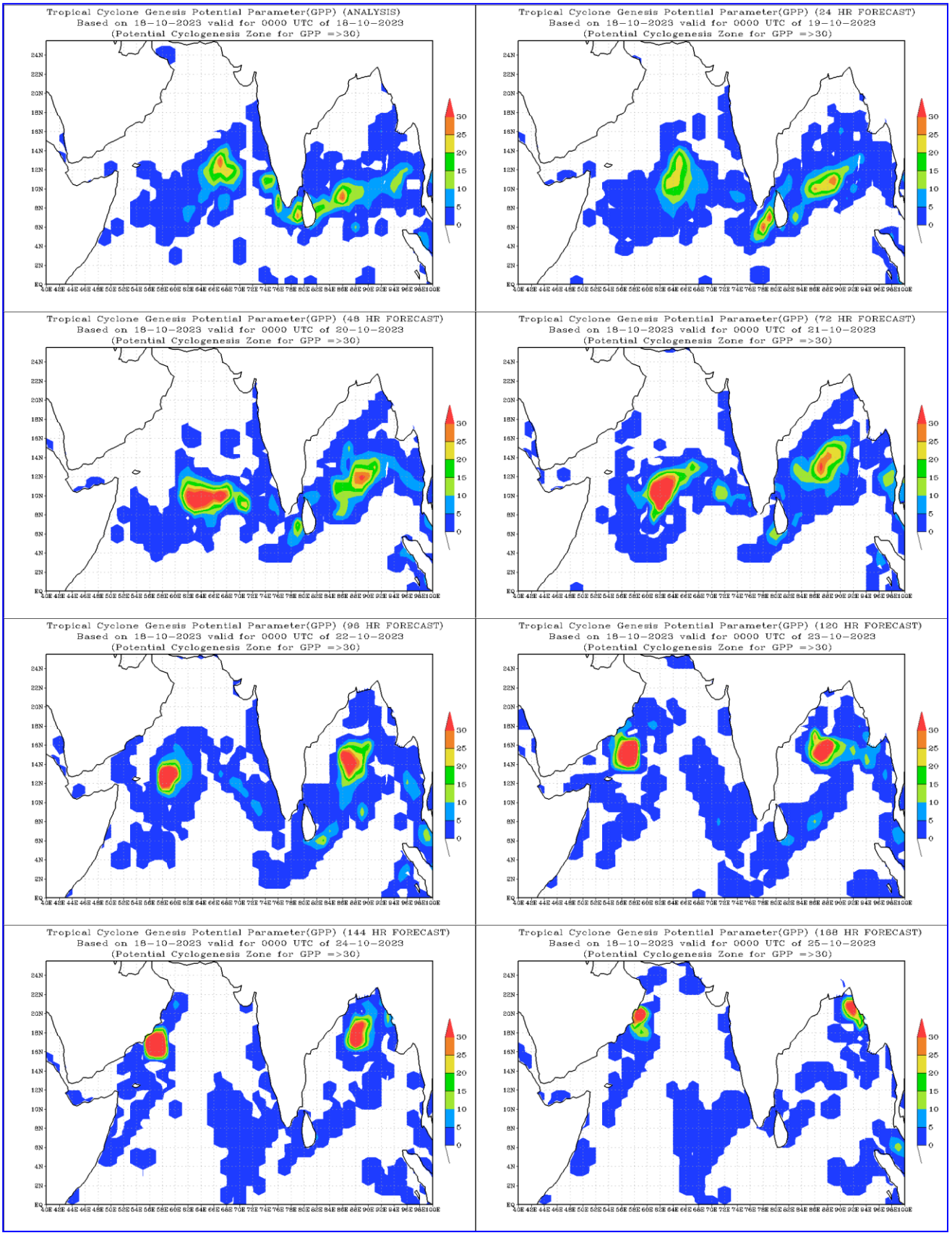
"-" indicate that cyclogenesis has already occurred. The above table indicates probability of cyclogenesis (formation of depression).

Advisory:

Both the cyclonic disturbances over the Arabian Sea and the Bay of Bengal are under continuous watch and being monitored regularly.

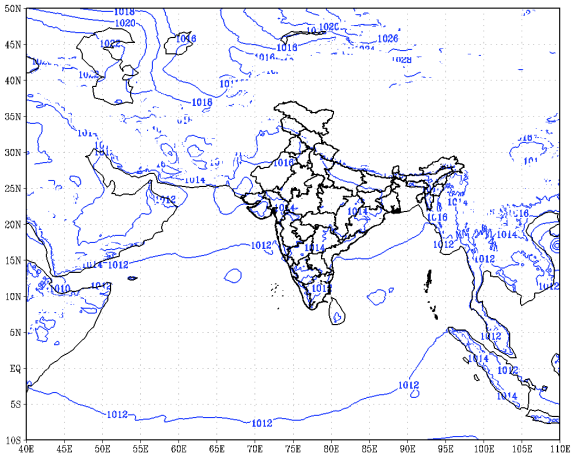
Intense Observation Period (IOP) is suggested for Lakshadweep Islands on 18th.

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 18-10-2023 valid for 0000 UTC of 18-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 19-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 20-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 21-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 22-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 23-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 24-10-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 18-10-2023 valid for 0000 UTC of 25-10-2023
(Potential Cyclogenesis Zone for GPP =>30)

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

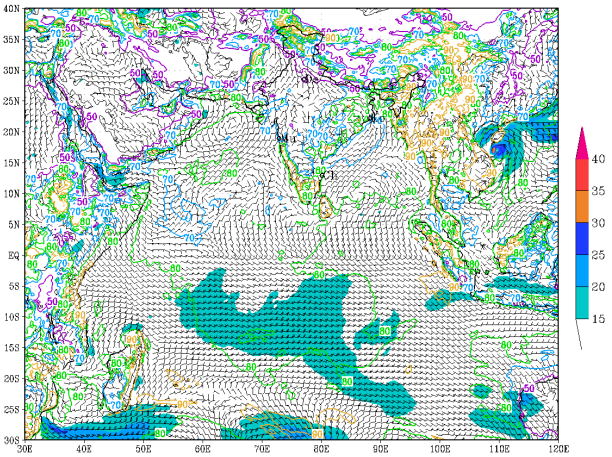
based on 00 UTC of 18-10-2023 valid for 00 UTC of 18-10-2023



(Background does not depict political boundary)

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

based on 00 UTC of 18-10-2023 valid for 00 UTC of 18-10-2023



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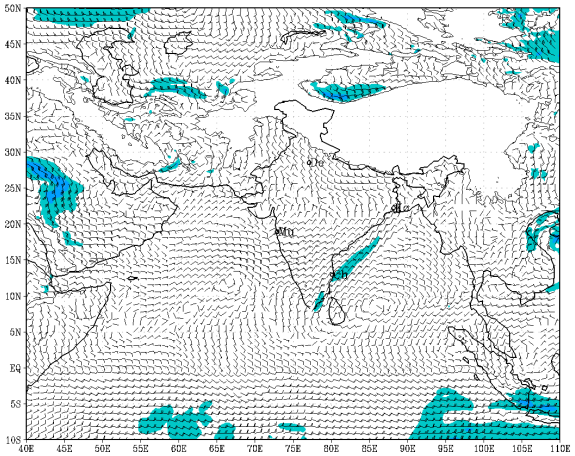

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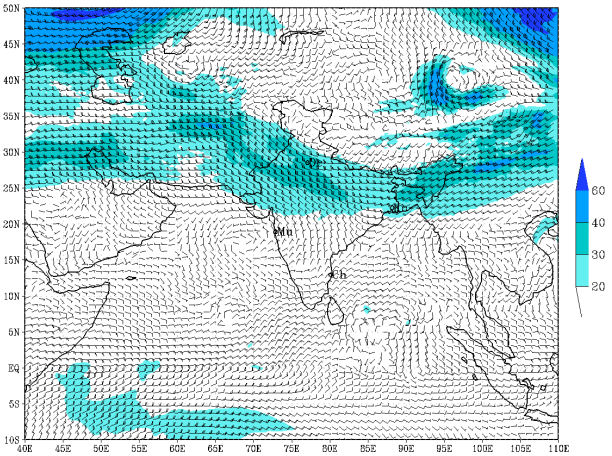

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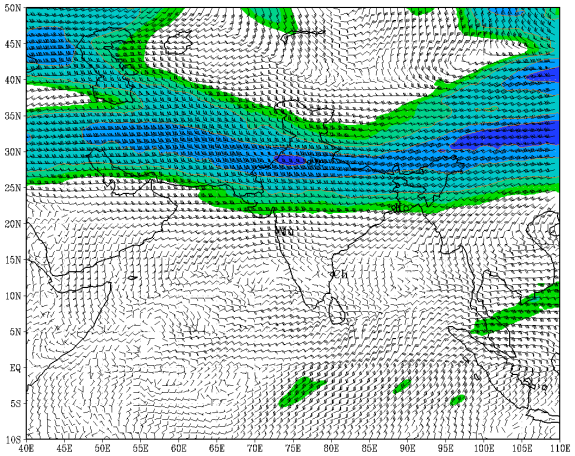

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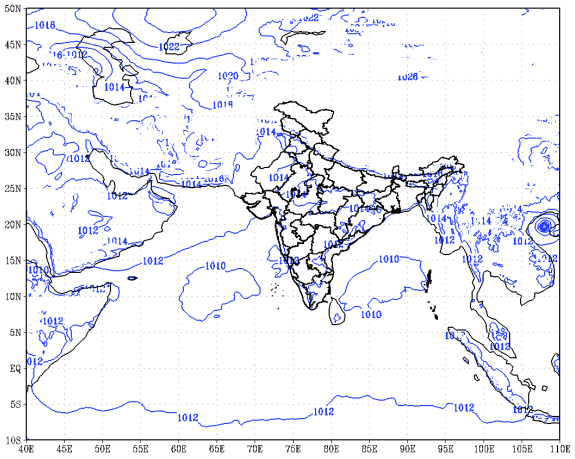
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 19-10-2023



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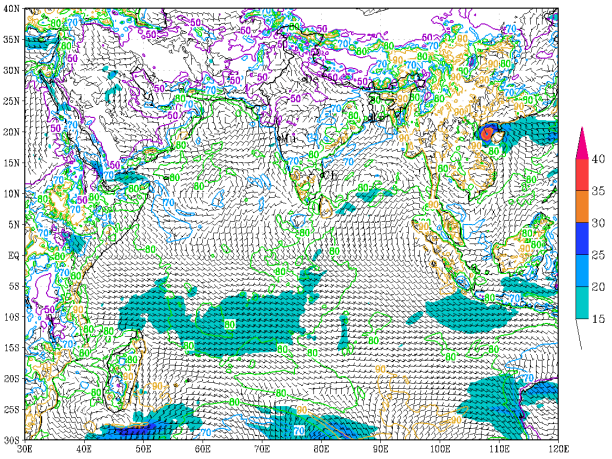
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 19-10-2023



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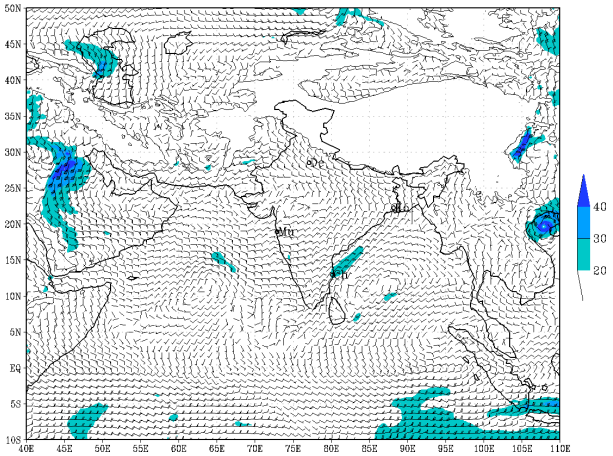

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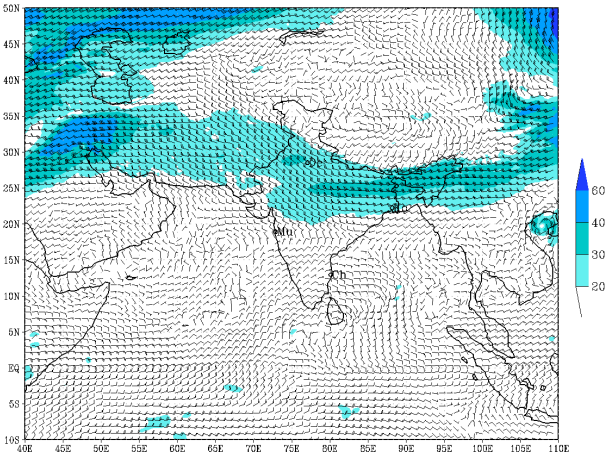

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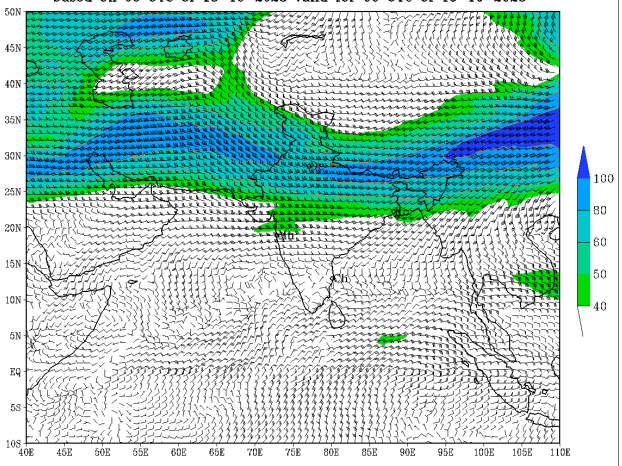

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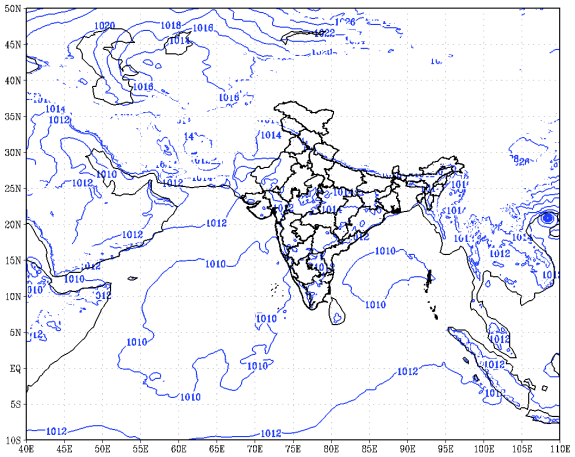
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 20-10-2023



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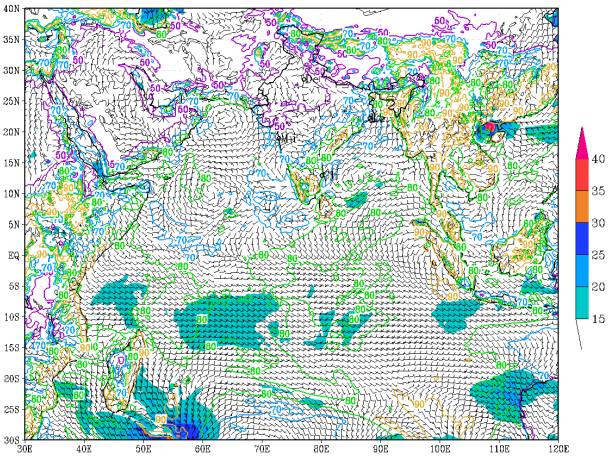
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 20-10-2023



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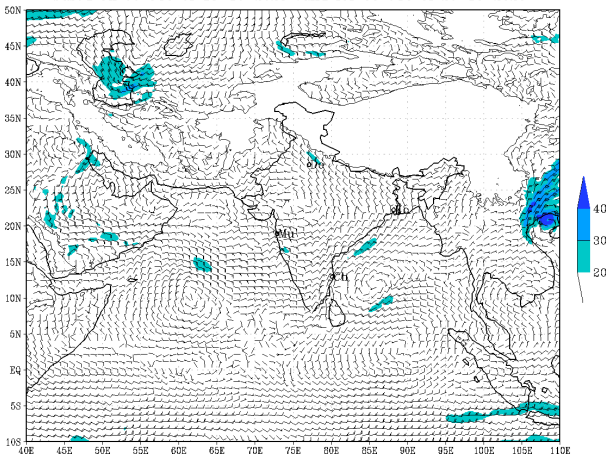

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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)
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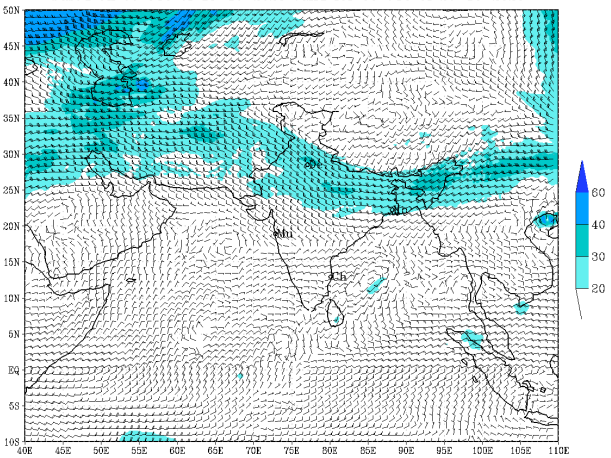

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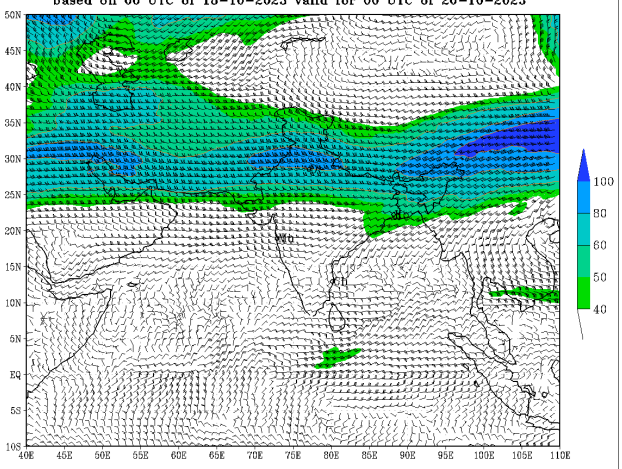

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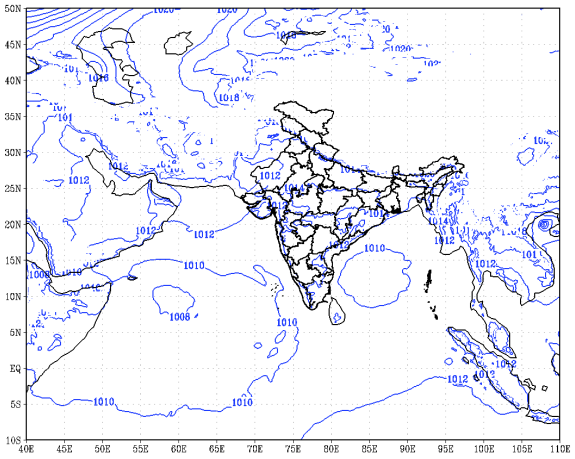
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 21-10-2023



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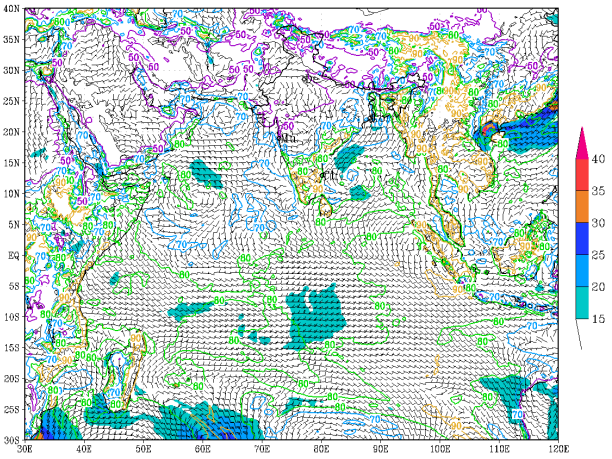
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 21-10-2023



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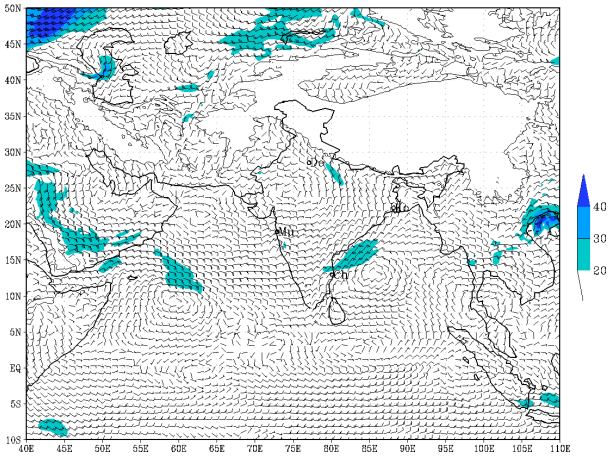
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 21-10-2023



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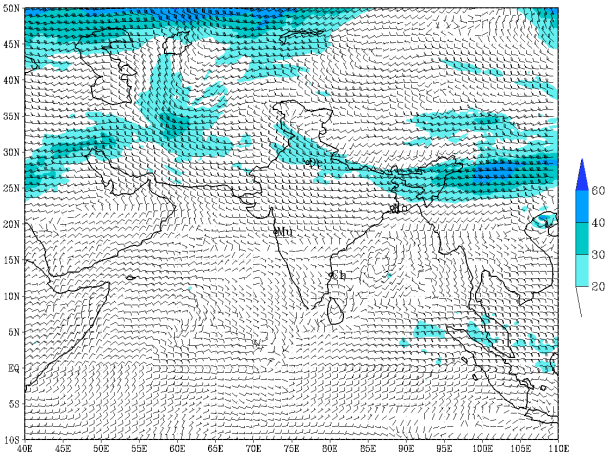
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (72 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 21-10-2023



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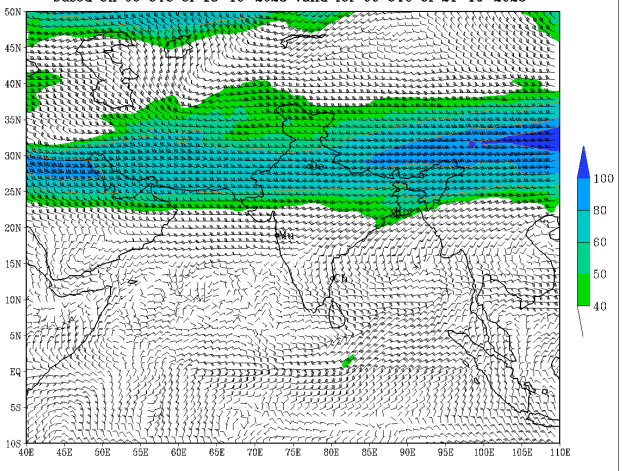
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (72 HR)

based on 00 UTC of 18-10-2023 valid for 00 UTC of 21-10-2023



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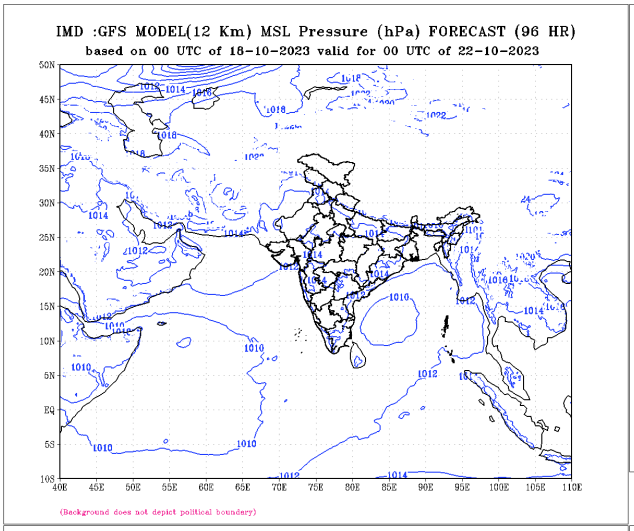
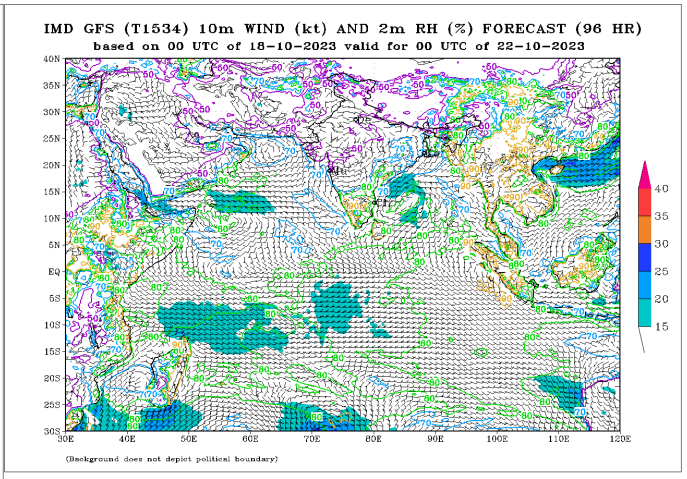
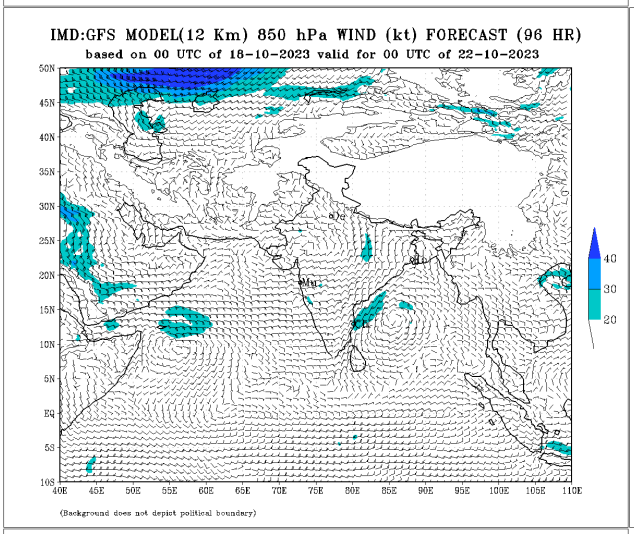
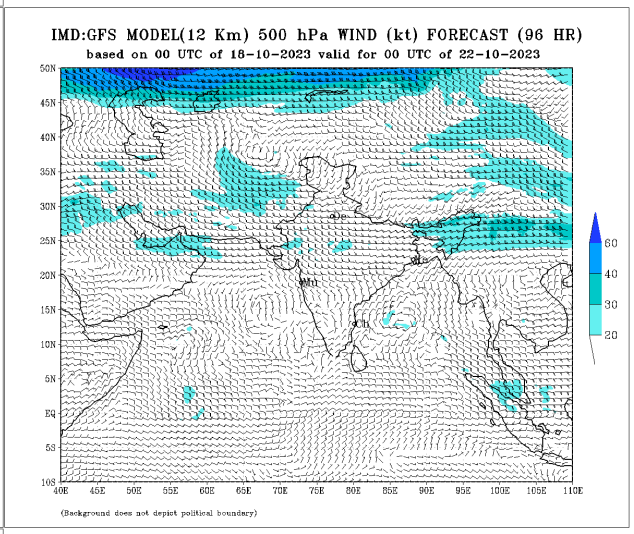
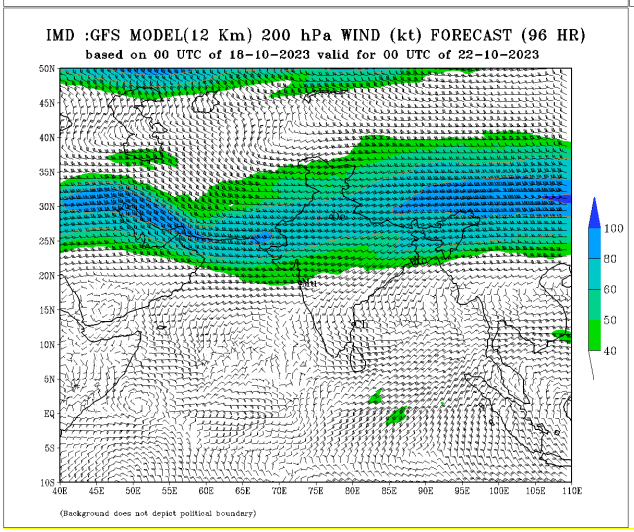
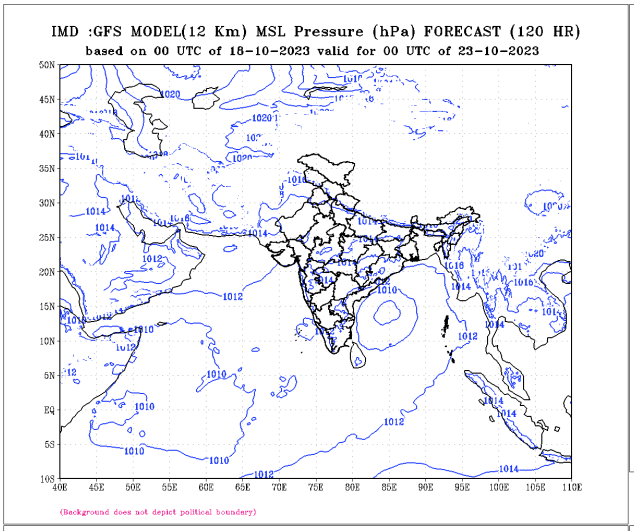

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 22-10-2023
(Background does not depict political boundary)

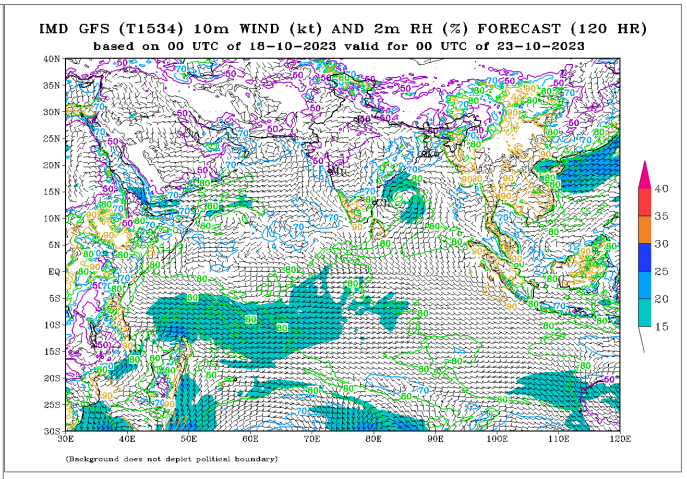

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 22-10-2023
(Background does not depict political boundary)

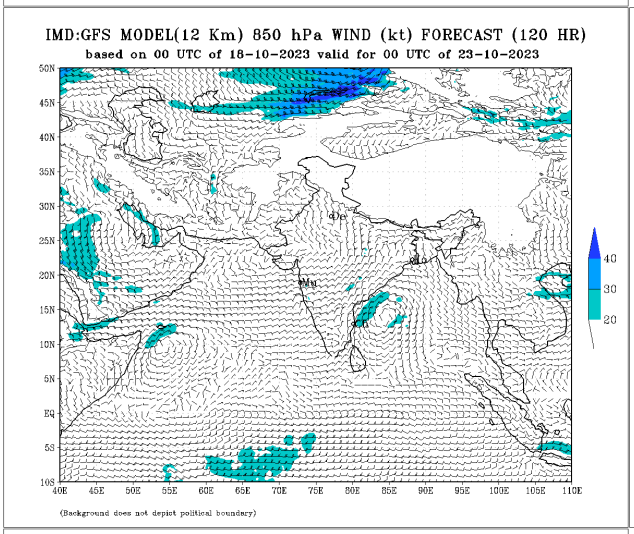

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 22-10-2023
(Background does not depict political boundary)

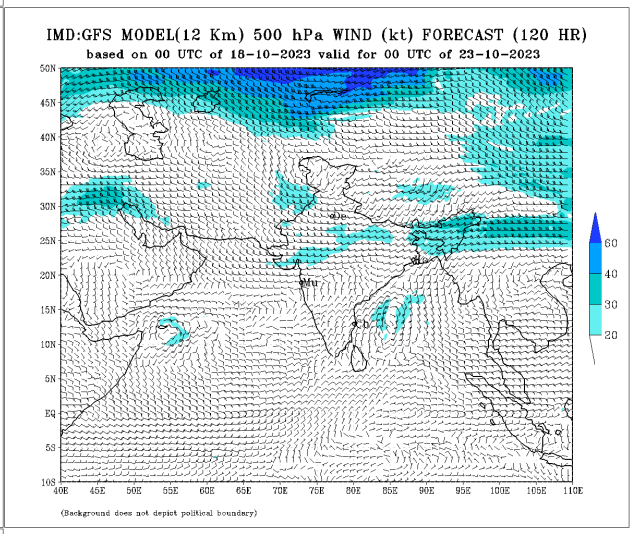

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 22-10-2023
(Background does not depict political boundary)

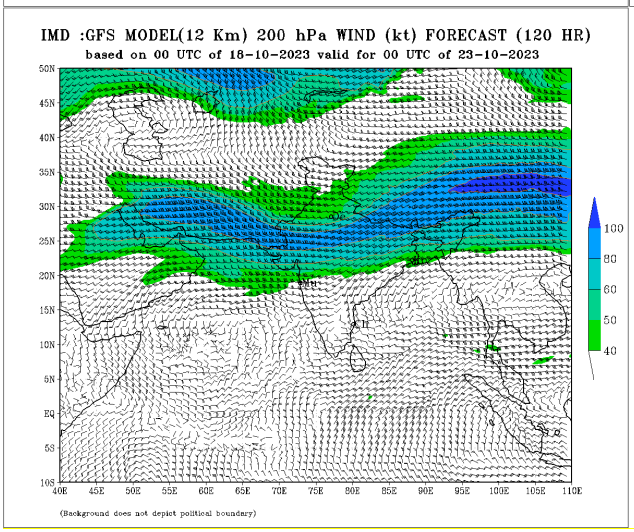

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 22-10-2023
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 23-10-2023
(Background does not depict political boundary)

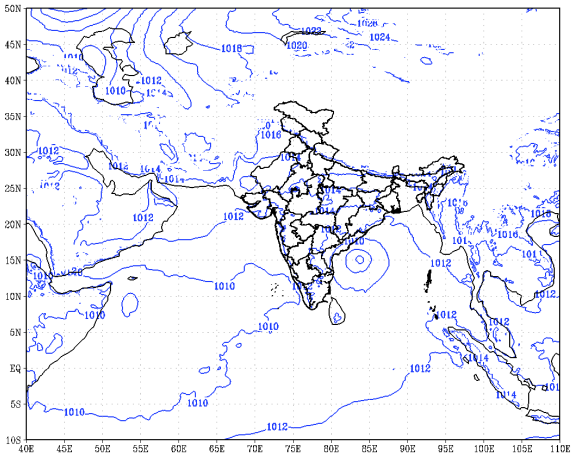

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 23-10-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 23-10-2023
(Background does not depict political boundary)

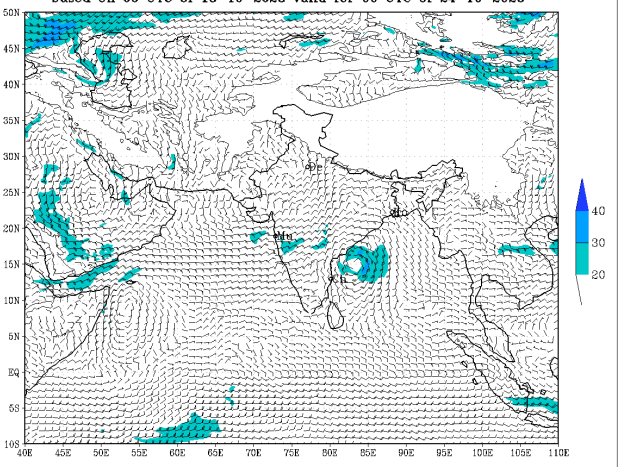

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 23-10-2023
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 23-10-2023
(Background does not depict political boundary)

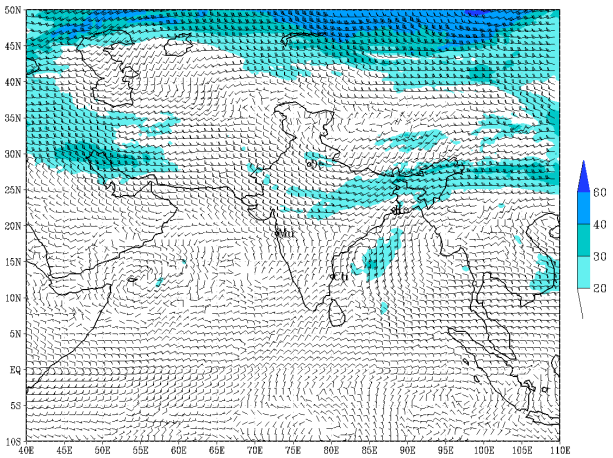
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 24-10-2023



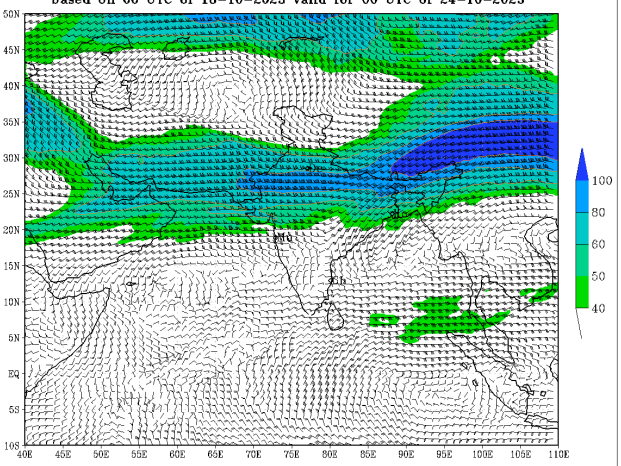
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 24-10-2023



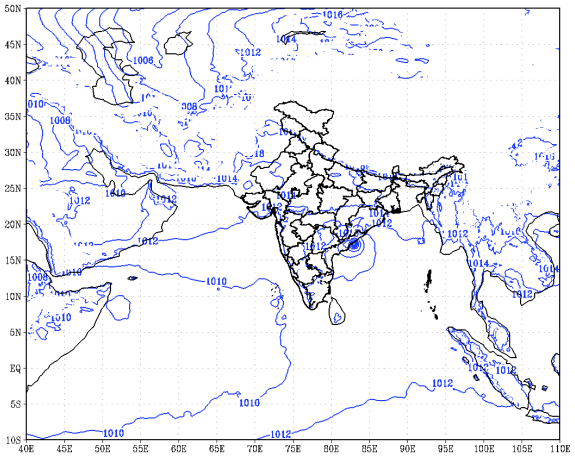
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 24-10-2023



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 24-10-2023

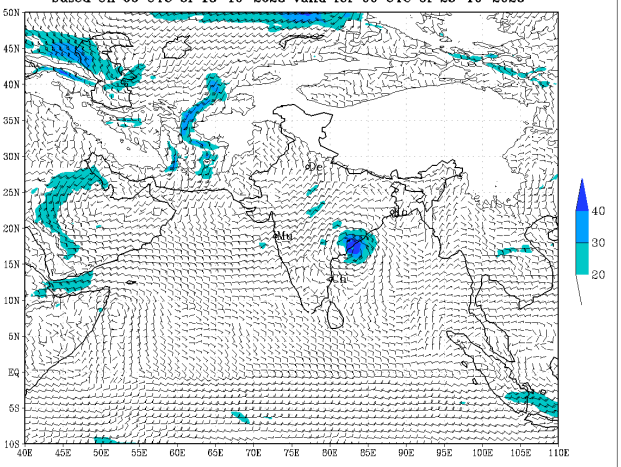


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 25-10-2023



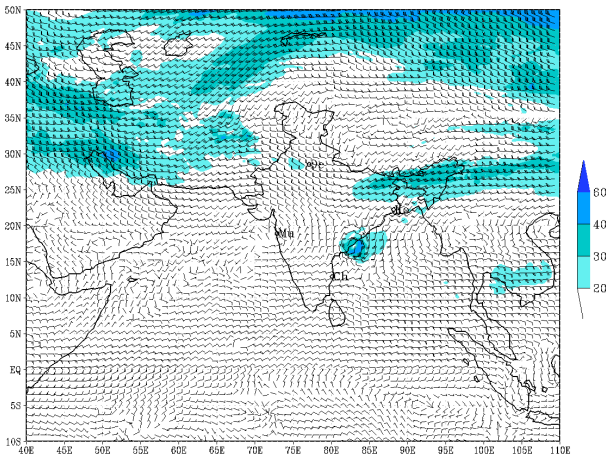
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 25-10-2023



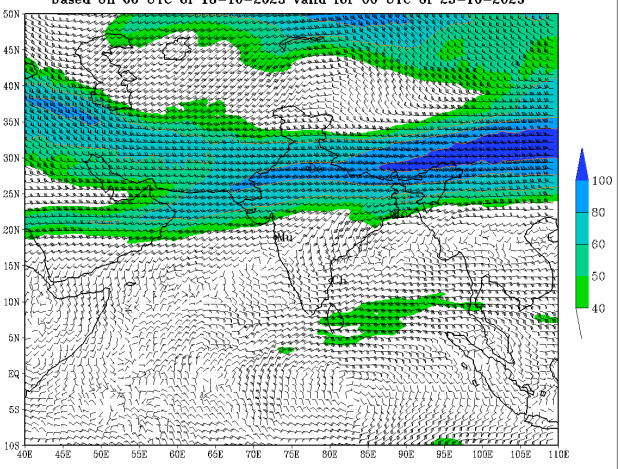
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 25-10-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2023 valid for 00 UTC of 25-10-2023



(Background does not depict political boundary)