



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

**Tropical Cyclone Forecast Programme
Report Dated 15TH November, 2023**

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

Yesterday's low pressure area over southeast Bay of Bengal (BoB) and adjoining Andaman & Nicobar Islands lay as a well marked low pressure area over southeast & adjoining central BoB in the same evening (1730 hours IST). It concentrated into a depression over westcentral BoB in the forenoon (0830 hours IST) of today, the 15th November, 2023. It moved northwestwards with a speed of 13 kmph during past 3 hours and lay centred at 1130 hours IST of today, the 15th November over the same region near latitude 14.7°N and longitude 86.5°E, about 470 km southeast of Visakhapatnam (Andhra Pradesh), 620 km south-southeast of Paradip (Odisha) and 770 km south of Digha (West Bengal).

It is likely to move initially northwestwards, then north-northwestwards and intensify into a deep depression over Westcentral Bay of Bengal off Andhra Pradesh coast in the morning of 16th November. Thereafter, it would recurve north-northeastwards and reach over Northwest Bay of Bengal off Odisha coast on 17th morning & off North Odisha-West Bengal coasts on 18th November morning.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	29-30 over the system, north Andaman Sea, 28 over the westcentral and adjoining northwest BoB, along and off Andhra Pradesh and Odisha coasts, around 27 over northern part of north BoB, along and off West Bengal and north Odisha coasts.	Around 30-31 over southeast adjoining eastcentral AS, along and off the coast of south Maharashtra, Karnataka, Kerala coasts, 29-30 over Southwest adjoining eastcentral AS and along the coast of Northern Maharashtra, 26-28 over westcentral and entire North AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	100-110 over eastcentral and adjoining southeast BoB and along the North Andaman Sea, 80-90 over south Andaman Sea, 50-60 over most parts of BoB.	70-80 over few parts of southeast adjoining Southwest AS, 60-70 over eastcentral AS, less than 10 over westcentral, southwest AS, 30-40 around the Extreme North of AS and 20-30 over rest part of North adjoining Westcentral AS.

Cyclonic Relative vorticity ($\times 10^{-6} \text{s}^{-1}$)	100-130 around the system, 50-60 over southwest BoB along and off Tamil Nadu, Sri Lanka coasts, Gulf of Mannar.	20-30 over parts of north AS, 30-40 over parts of Comorin area, 50-60 over southwest AS along and off Somalia coast.
Low Level convergence ($\times 10^{-5} \text{s}^{-1}$)	10-20 to the northeast of the system, 5 to 10 over south and adjoining westcentral BoB.	5 over the parts of southwest AS, -5 over few parts of eastcentral and westcentral AS.
Upper Level divergence ($\times 10^{-5} \text{s}^{-1}$)	20-30 to the north of the system, 5-10 over parts of south and central BoB.	5-10 over parts of southeast and southwest AS, -5 to -10 over eastcentral AS and Comorin area.
Vertical Wind Shear (VWS knots) Low: 05-10 knots Moderate: 10-20 knots High: >20 knots	5-10 over Andamanm Sea, southeast and adjoining southwest BoB, adjoining eastcentral BoB, 20 over central and adjoining southwest BoB, and southern parts of south BoB, High (> 20 knots) over remaining parts of BoB.	5-10 over southwest and adjoining southeast AS, 20 over south part of central AS, adjoining southeast AS, High (>20 knots) over remaining parts of AS.
Wind Shear Tendency (knots)	Decreasing over southwest BoB along and off Tamil Nadu coast, Gulf of Mannar, Comorin area, north Andaman Sea. Increasing over southeast BoB.	Decreasing over central and adjoining parts of AS. Increasing over north and southeast AS.
Upper Tropospheric Ridge	Along 16°N over BoB.	Along 12°N over AS.

Satellite observations based on INSAT imagery (0300 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 South Andaman Sea. Scattered Low to Medium clouds with embedded moderate to intense convection over North Andaman Sea.

(b) Over the Arabian Sea:-

Scattered low and medium clouds with embedded moderate to intense convection over South Arabian Sea.

(c) Convection outside India:-

Scattered low and medium clouds with embedded moderate to intense convection lay over Sri Lanka, Palk strait, Gulf of Mannar, Maldives, Tibet, china, South Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, South Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & sea, Celebes islands & sea, Philippines, North Madagascar, North Mozambique channel and over Indian ocean between latitude 5.0N to 5.0S Longitude 40.0E TO 100.0E. and between latitude 17.0S to 35.0S longitude 50.0E to 70.0E.

M.J.O. Index:

MJO index is currently in Phase 8 with amplitude greater than 1. It will continue to be in phase 8 with amplitude greater than 1 on 16th November, and on 17th November, it will be in phase 1

amplitude greater than 1 till 19th November. It will remain in the same phase with amplitude greater than 1 there for next few days.

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	Cyclonic storm over westcentral BoB as on today i.e., 15 th Nov, moves northeastward and cross the Bangladesh coast as cyclonic storm during 16 th Nov.	No significant system during next 7 days.
IMD-GEFS	Deep depression over westcentral BoB as on today i.e., 15 th Nov, moves northeastward and cross the Bangladesh coast as deep depression during 16 th Nov.	No significant system during next 7 days.
IMD-WRF	Depression over westcentral BoB as on today i.e., 15 th Nov, moves northwestward and lay over westcentral BoB as deep depression on 16 th Nov, weaken thereafter.	No significant system during next 3 days.
NCMRWF-NCUM	An extended cycir over southwest BoB as on today i.e., 15 th Nov, to move westnorthwestward and lay as LPA over westcentral and adjoining southwest BoB on 16 th Nov, no further intensificatibecomes LPA over the same region by 16 th Nov, no further intensification thereafter.	No significant system during next 7 days.
NCMRWF-NEPS	An extended cycir over southwest BoB as on today i.e., 15 th Nov, to move westnorthwestward and lay as LPA over westcentral and adjoining southwest BoB on 16 th Nov, no further intensificatibecomes LPA over the same region by 16 th Nov, no further intensification thereafter.	No significant system during next 7 days.
NCMRWF-UM (Regional)	Depression over westcentral BoB as on today i.e., 15 th Nov, moves northwestward and lay over westcentral and adjoining northwest BoB as deep depression on 16 th Nov, weaken thereafter.	No significant system during next 7 days.
ECMWF	Depression over westcentral BoB as on today i.e., 15 th Nov, moves northewestward and lay over westcentral and adjoining northwest BoB as depression on 16 th Nov, moves then northeastward and lay over northwest and adjoining northeast BoB as a depression on 17 th Nov, moves further in the same direction and cross West Bengal - Bangladesh coast as a depression on night of 18 th Nov/ morning of 19 th Nov.	No significant system during next 7 days.
NCEP-GFS	Deep depression over westcentral BoB as on today i.e., 15 th Nov, moves northewestward and lay over westcentral and adjoining northwest BoB as cyclonic storm on 16 th Nov, moves then northeastward and lay over northwest and adjoining northeast BoB as deep depression on 17 th Nov, moves further in the same direction and cross the Bangladesh coast as an LPA on 18 th Nov. Another LPA is likely over eastcentral Bay on 19 th , depression on 20 th over eastcentral and adjoining westcentral Bay, severe cyclonic storm on 21 st over westcentral Bay, gradually recurving northeastwards with slight weakening from 22 nd onwards. It is indicated to reach Myanmar coast on 24 th as an LPA.	No significant system.

IMD-Genesis Potential Parameter	GPP is indicating a potential zone over westcentral BoB and adjoining northwest BoB as on today i.e., 15 th Nov, over westcentral and adjoining northnortheast BoB on 16 th Nov. Another potential zone over eastcentral and adjoining southeast BoB on 18 th , over eastcentral and adjoining westcentral BoB on 19 th Nov, over westcentral BoB on 20 th Nov, over westcentral and adjoining eastcentral BoB on 21 st Nov.	No potential zone over AS for next 7 days.
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Summary and conclusion:

1. For Bay of Bengal:

- a) The guidance from various numerical models (IMD-GFS, NCEP-GFS, ECMWF AND IMD-MME) are indicating initial northwestwards movement followed by gradual north-northeastwards recurvature towards West Bengal Bangladesh coasts. Peak intensification is suggested upto marginal cyclone/deep depression stage.

Considering all these, it is inferred that the depression over westcentral Bay of Bengal is likely to move initially northwestwards, then north-northwestwards and intensify into a deep depression over westcentral Bay of Bengal off Andhra Pradesh coast around 0000 UTC of 16th November. Thereafter, it would recurve north-northeastwards and reach over northwest Bay of Bengal off Odisha coast around 0000 UTC of 17th & off north Odisha-West Bengal coasts around 0000 UTC of 18th November.

Probability of Cyclogenesis (formation of depression and above intensity systems) over 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

“-“ INDICATE THAT CYCLOGENESIS HAS ALREADY OCCURRED. THE ABOVE TABLE INDICATES PROBABILITY OF CYCLOGENESIS ONLY (FORMATION OF DEPRESSION).

- b) NCEP-GFS is also indicating a fresh low pressure area over eastcentral Bay on 19th, depression on 20th over eastcentral and adjoining westcentral Bay, severe cyclonic storm on 21st over westcentral Bay, gradually recurving northeastwards with slight weakening from 22nd onwards. It is indicated to reach Myanmar coast on 24th as a low pressure area. The likely development of this system needs to be watched.

2. For the Arabian Sea:

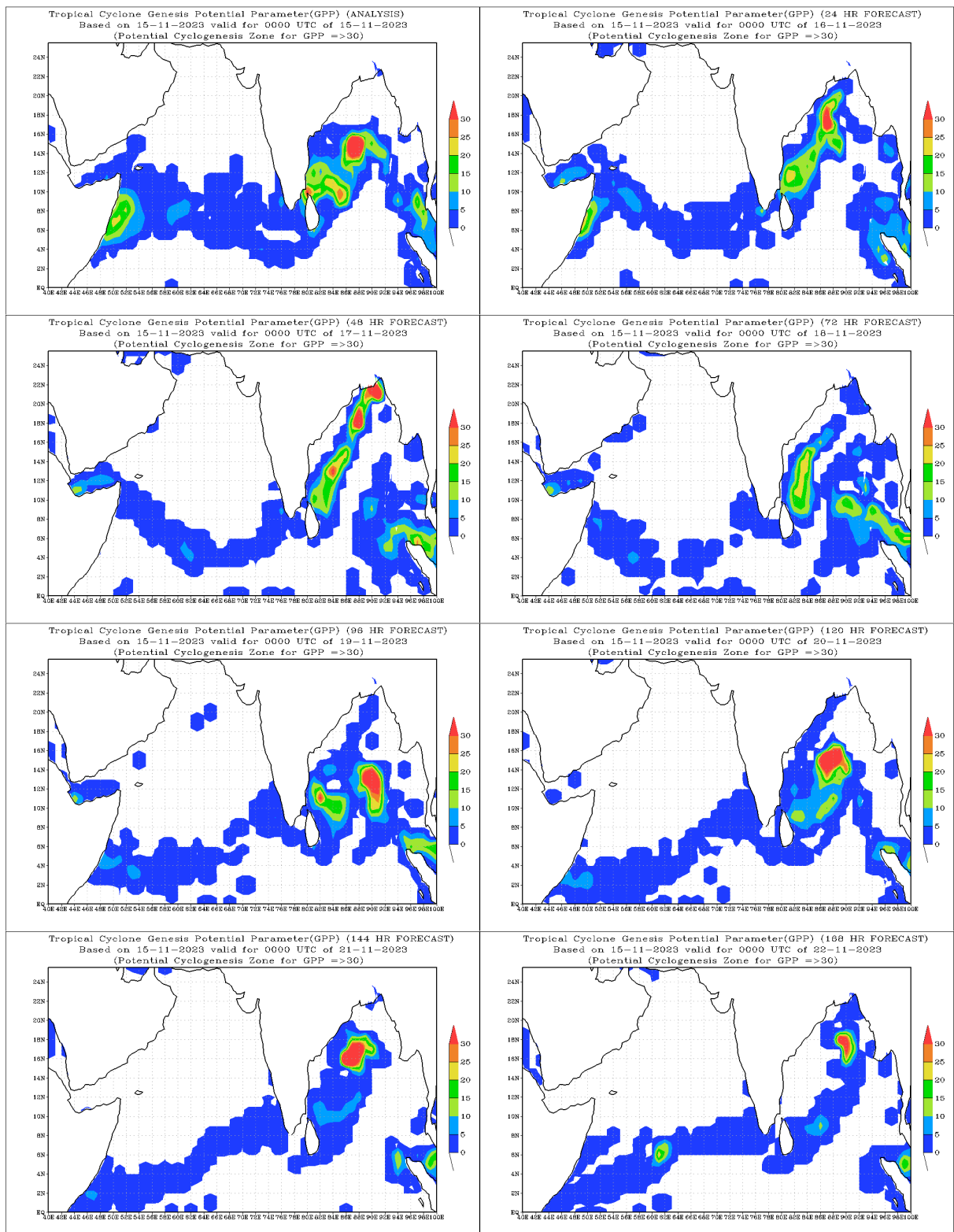
Most of the models are indicating that there will be no significant system for the next seven days.

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

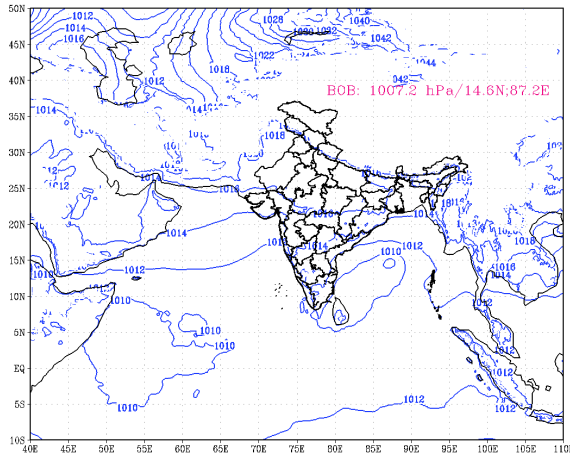
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

IOP: North Andhra Pradesh coast during 15th & 16th Nov, Odisha coast during 15th-17th Nov, West Bengal coast during 16th-18th Nov.

Annexure

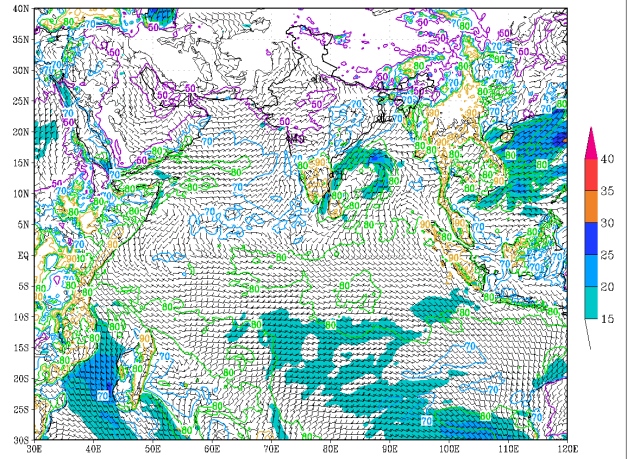


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
 based on 00 UTC of 15-11-2023 valid for 00 UTC of 15-11-2023



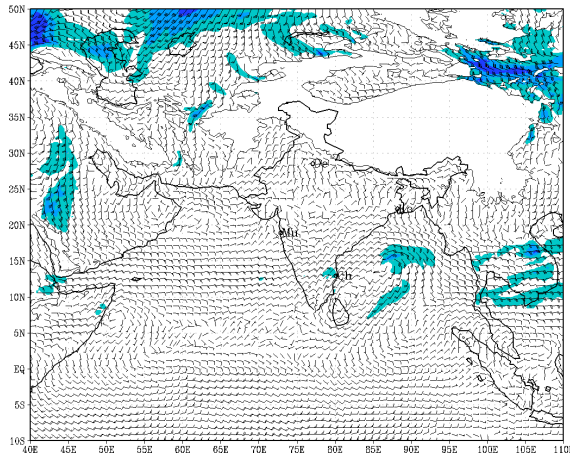
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
 based on 00 UTC of 15-11-2023 valid for 00 UTC of 15-11-2023



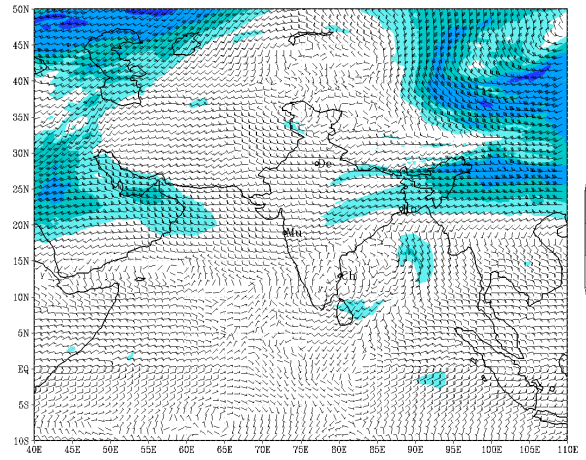
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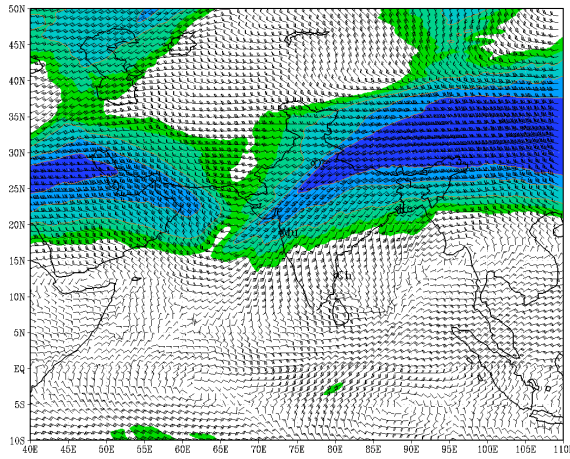
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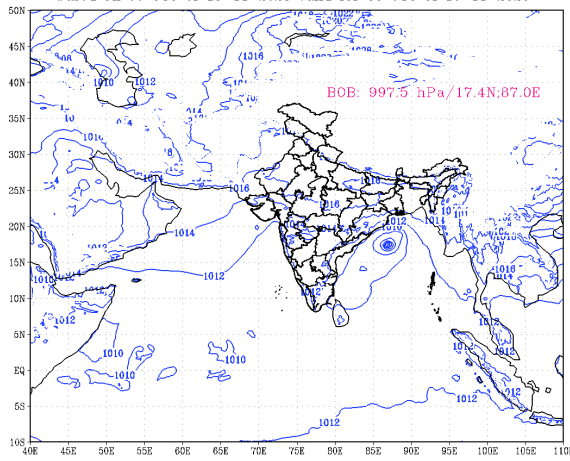
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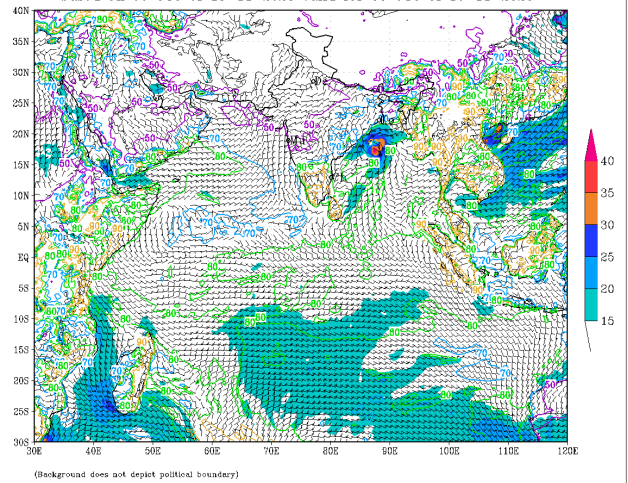


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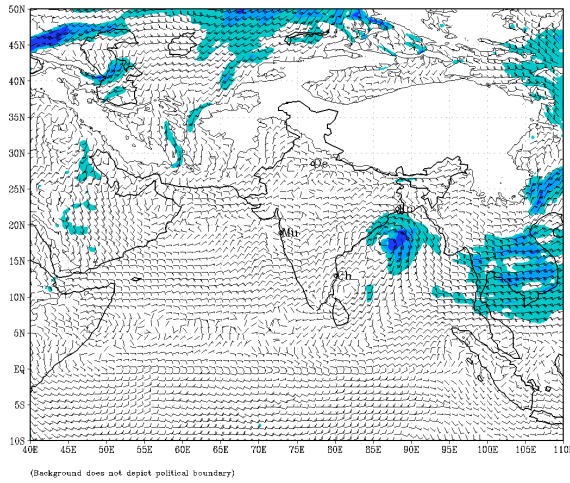
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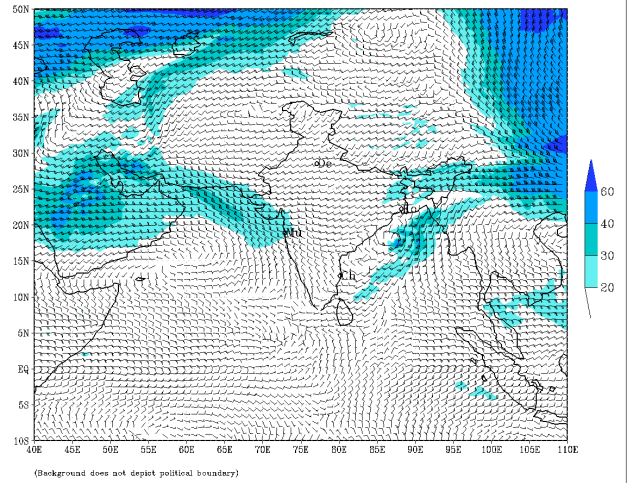
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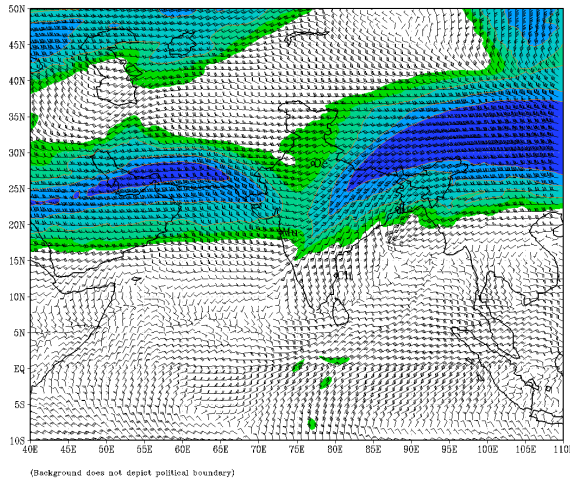
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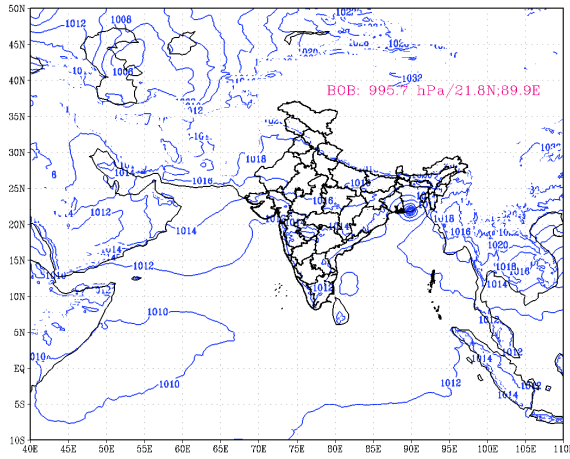
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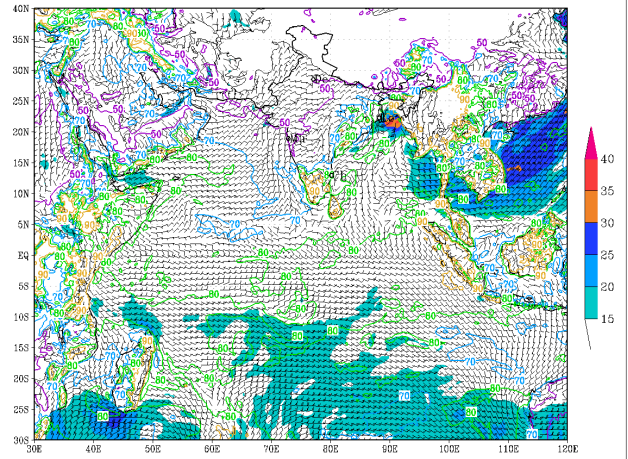


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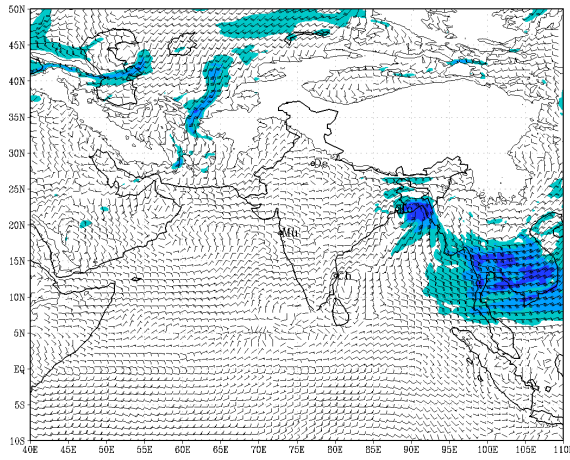
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
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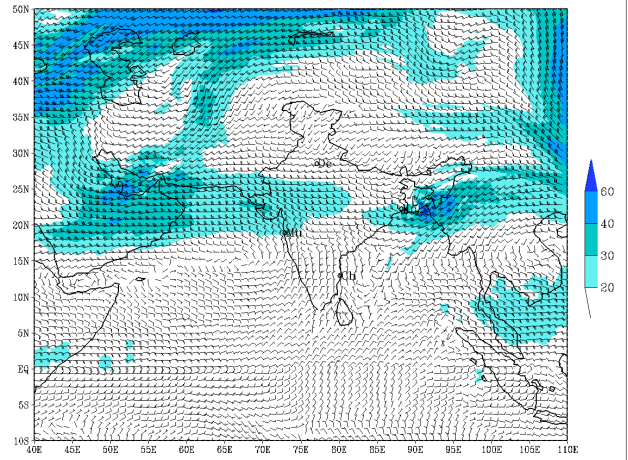
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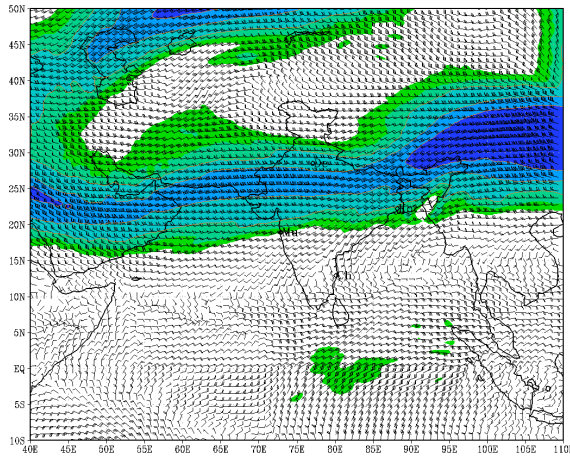
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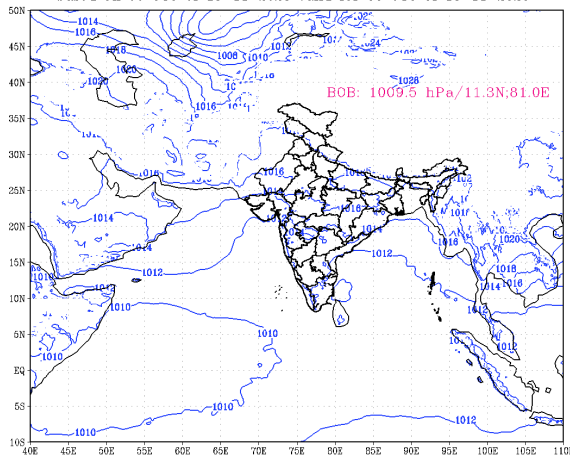
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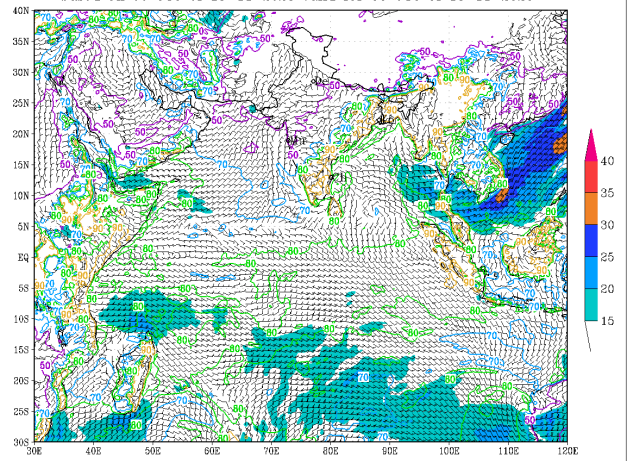
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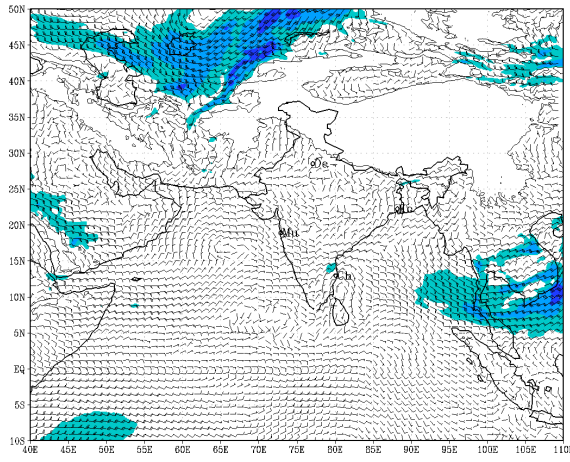
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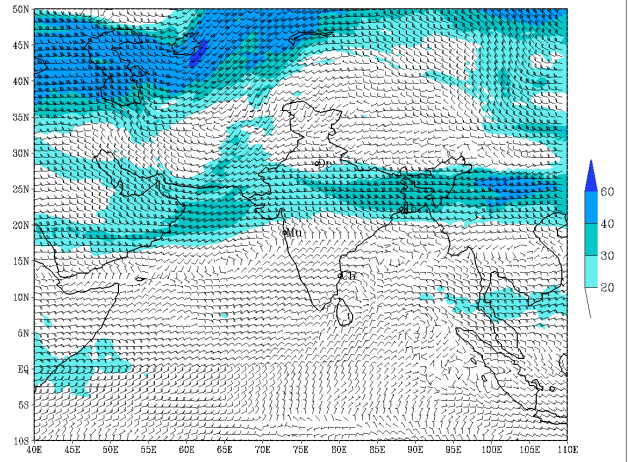
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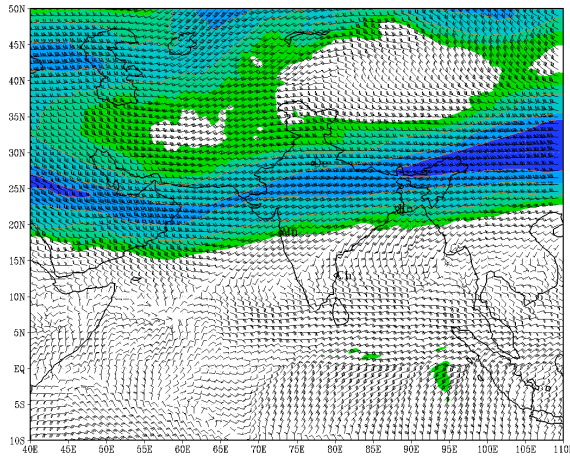
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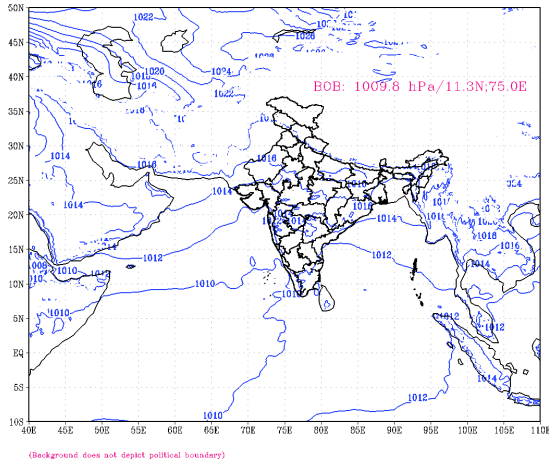
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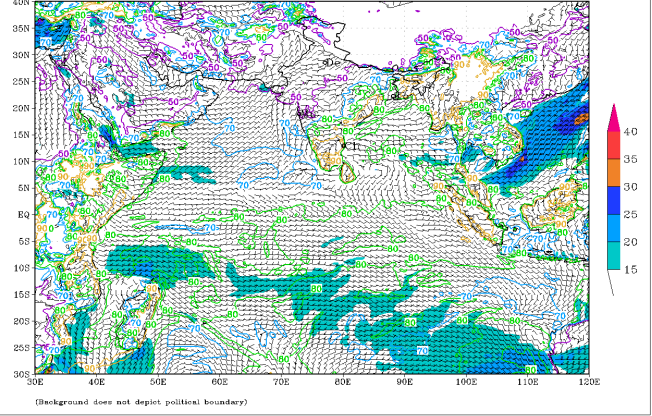


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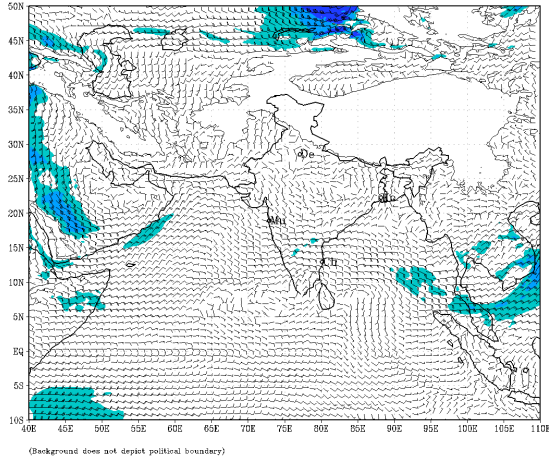
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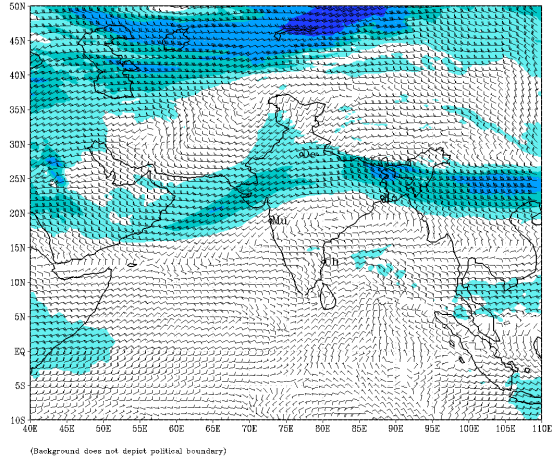
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based on 00 UTC of 15-11-2023 valid for 00 UTC of 19-11-2023



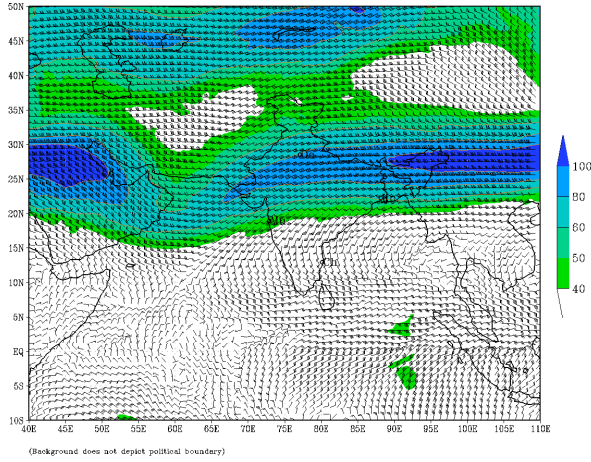
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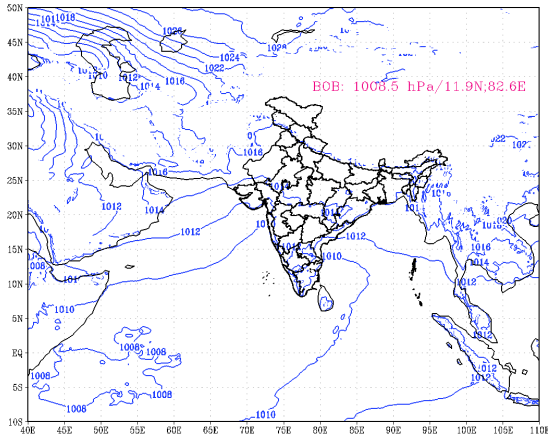
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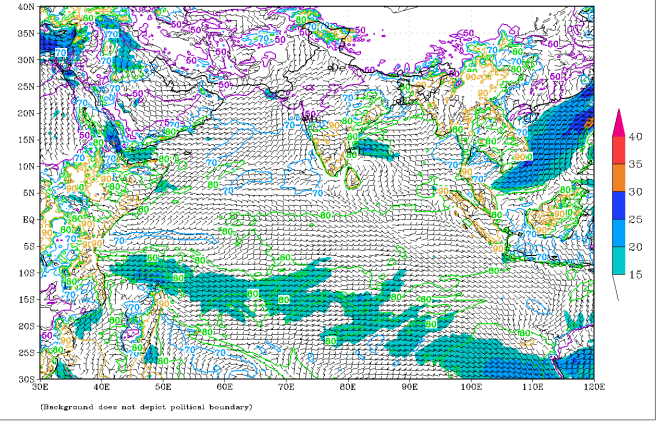
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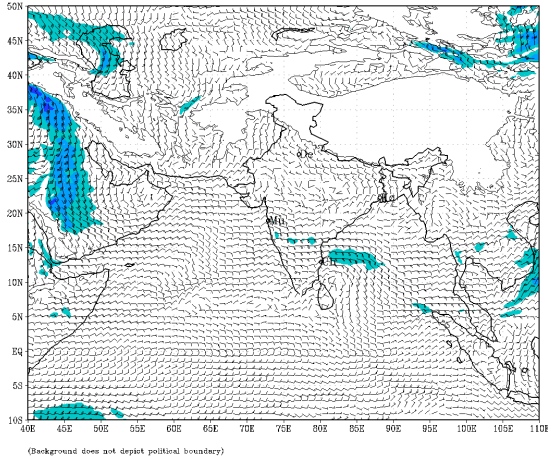
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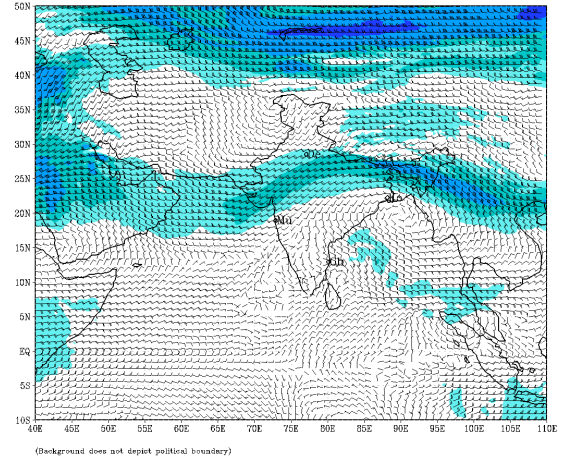
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
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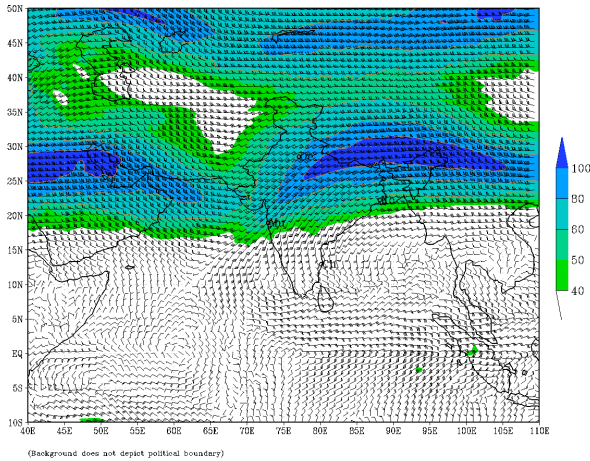
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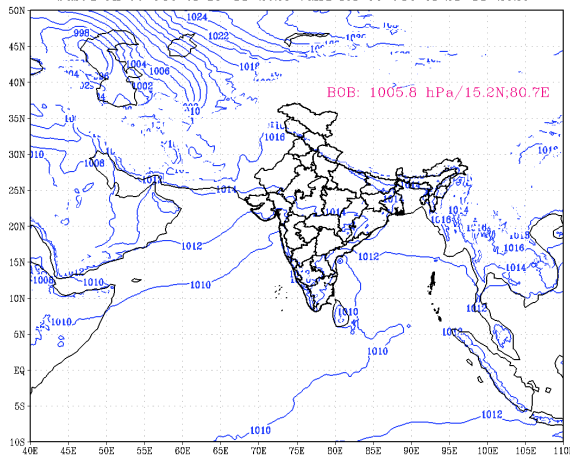
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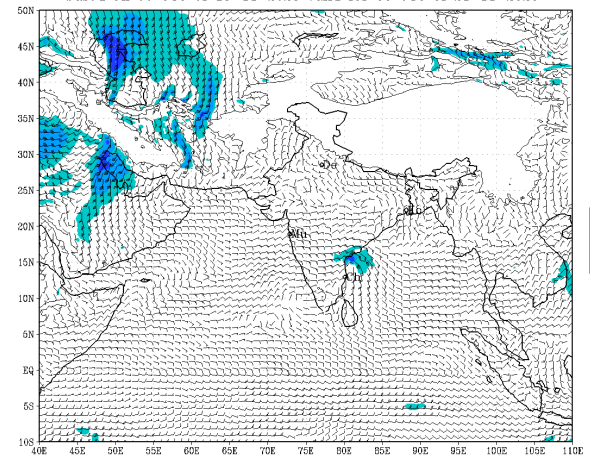


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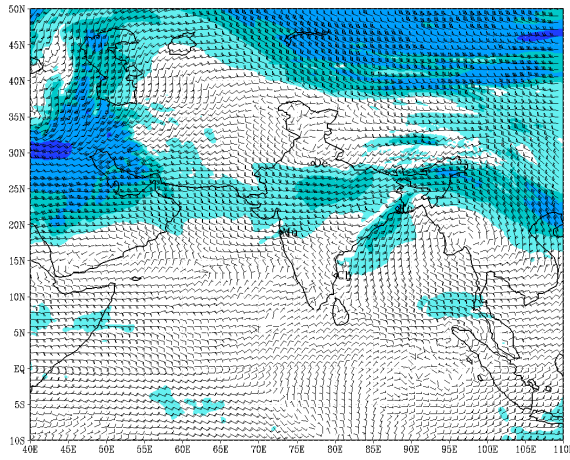
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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
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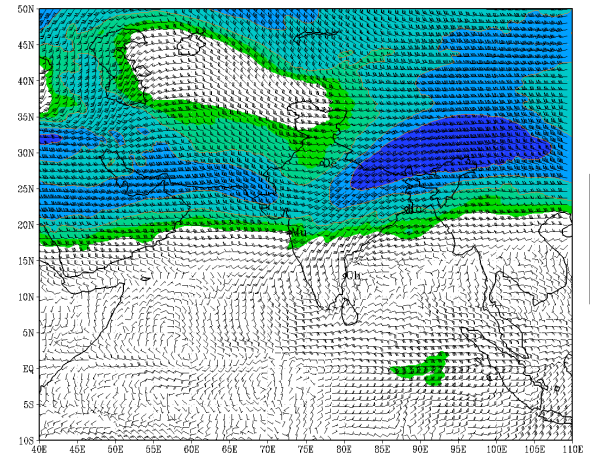
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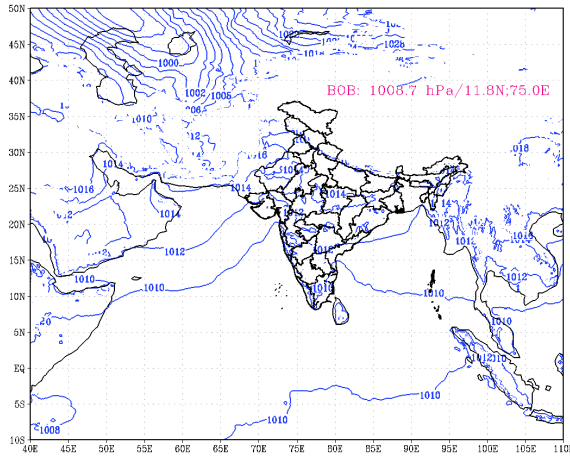
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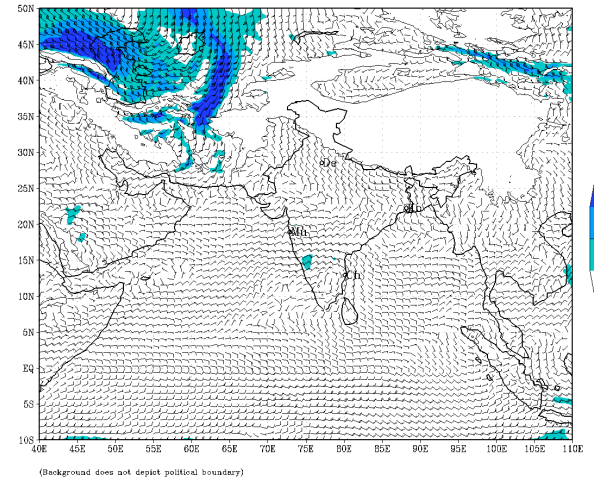


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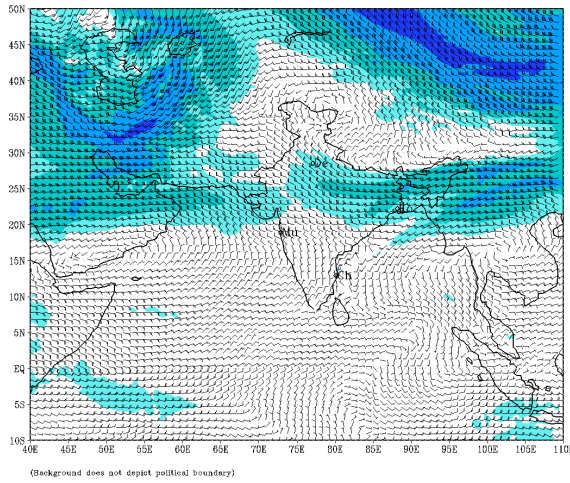
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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 15-11-2023 valid for 00 UTC of 22-11-2023



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 15-11-2023 valid for 00 UTC of 22-11-2023



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 15-11-2023 valid for 00 UTC of 22-11-2023

