



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

FDP (Cyclone) NOC Report Dated 17th November, 2021

Time of Issue: 1200 UTC

Synoptic features (based on 0900 UTC analysis):

- ❖ Yesterday's Low Pressure Area (LPA) over southeast BoB lay over southeast and adjoining southwest Bay of Bengal (BoB) at 0000 UTC of today the 17th November, 2021 and persisted over the same region at 0900 UTC of today. Associated cyclonic circulation extended upto 5.8 km above mean sea level. It is likely to move nearly westwards and reach westcentral & adjoining southwest BoB off south Andhra Pradesh and adjoining north Tamil Nadu coasts by tomorrow, the 18th November, 2021.
- ❖ Yesterday's LPA formed over eastcentral AS lay over eastcentral Arabian Sea off Goa & adjoining south Maharashtra coasts at 0300 UTC of today, the 17th November, 2021. It persisted over the same region at 0900 UTC. Associated cyclonic circulation extended upto 5.8 km above mean sea level. It is likely to move west-northwestwards and become more marked during next 48 hours.
- ❖ The trough now ran from the cyclonic circulation associated with low pressure area over eastcentral AS off Goa-south Maharashtra coasts to south Gujarat coast across north Maharashtra coast and extended upto 0.9 km above mean sea level.
- ❖ The other trough ran from the cyclonic circulation associated with the low pressure area over southeast & adjoining southwest BoB to south Tamil Nadu and extended upto 4.5 km above mean sea level.

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. 26-28°C over western parts of AS off Somalia, Yemen & Oman coasts.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	(a) 70-90 over most parts of BoB, (b) 100-120 over eastern equatorial Indian Ocean and adjoining south Andaman Sea & southeast BoB.	(a) 60-80 over eastcentral & adjoining southeast AS and also over adjoining southwest AS. (b) It is less than 50 over western parts of AS.
Cyclonic Relative vorticity (X10⁻⁶s⁻¹)	(a) Positive vorticity is about 40-50 over central parts of south BoB with vertical extension upto 500 hPa level.	60-80 (increased compared to yesterday) over eastcentral AS with vertical extension upto 500 hPa level.
Low Level convergence (X10⁻⁵ s⁻¹)	An elongated zone of positive convergence 05 -20 extending from eastcentral to southwest	An elongated belt of 05-10 over eastcentral AS off Karnataka-Goa- Maharashtra coasts upto

	BoB.	southwest BoB.
Upper Level divergence (X10⁻⁵ s⁻¹)	(a) 05-10 over the system area. (b) A large extended zone 05-20 over south BoB and adjoining central BoB & equatorial Indian Ocean on either side.	North-south oriented large extended zone 05-20 over southeast and adjoining eastcentral AS.
Vertical Wind Shear (VWS knots)	Moderate (15-10) over the system area. Moderate (15-10) also over eastern parts of BoB & Andaman Sea. High (>25) over southwest, westcentral and areas to the south of 8°N.	Low to moderate (10-20) over over central parts of AS. High over major parts of AS including north and south AS.
Wind Shear Tendency (knots)	Increasing over central BoB & upto Andhra Pradesh and adjoining TamilNadu coasts.	Decreasing over eastcentral AS near the system area. Increasing over central parts of AS.
Upper tropospheric Ridge	Along 19.0°N in association with anti-cyclonic circulation over northern parts of Myanmar.	Along 17°N

Satellite observations based on INSAT imagery (0900 UTC):

(a) Associated with low pressure area over eastcentral Arabian Sea

At 0900 UTC, scattered to broken low & medium clouds with embedded intense to very intense convection lay over eastcentral AS and neighbourhood. Minimum cloud top temperature is minus 89°C. The associated cloud mass has moved north-northwestwards along Maharashtra coast in past 3 hours. The microwave pass of 0851 UTC depicts that the intense convective cloud mass is sheared to the north of system centre.

(b) Associated with low pressure area over central parts of Bay of Bengal

At 0900 UTC, scattered to broken low & medium clouds with embedded intense to very intense convection lay over southwest & adjoining westcentral BoB. Minimum cloud top temperature is minus 93°C. Intense convection is sheared to the west of system centre.

(c) Over the BoB

At 0900 UTC, scattered to broken low & medium clouds with embedded intense to very intense convection lay over westcentral & southwest BoB, Palk Strait, Gulf of Mannar and south Andaman Sea. Minimum Cloud Top Temperature (CTT) is minus 93°C. Scattered to broken low and medium clouds with embedded intense to intense very intense convection also lay over eastcentral & southeast BoB and over north Andaman Sea.

(b) Over the Arabian Sea:-

At 0900 UTC, scattered to broken low and medium clouds with embedded intense to very intense convection lay over eastcentral AS. Minimum CTT was minus 90°C. Scattered low and medium clouds with embedded moderate to intense convection lay over northeast As off Gujarat coast, Gulf of Kutch, Gulf of Cambay and Comorin.

M.J.O. Index:

MJO index is currently in Phase 4 with amplitude close to 1. It will continue in same phase for next 7 days with amplitude close to 1.

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
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IMD-GFS	Indicates a Low Pressure Area (LPA) over southeast and adjoining southwest BoB on 17 th , over southwest & adjoining west-central BoB off Sri Lanka – north Tamil Nadu coasts on 18 th , over southwest & adjoining west-central BoB and coastal Tamil Nadu and south coastal Andhra Pradesh on 19 th , again shifting over the Sea and located over southwest & adjoining west-central BoB off north Tamil Nadu – south Andhra Pradesh coasts on 20 th and weakening on 21 st .	Indicates an LPA over east-central AS off Karnataka- Goa – south Maharashtra coasts on 17 th , northwestward movement and located over east-central AS off (away from) Maharashtra coast on 18 th , westward movement over to east-central AS on 19 th , west-southwestward movement over to east-central & adjoining southeast AS off Karnataka coast on 20 th , as an extended Low over east-central & adjoining southeast AS and Maharashtra- Goa – Karnataka coasts on 21 st and further weakening on 22 nd .
IMD-GEFS	Same as above	Same as above
IMD-WRF	Indicates an LPA over southeast BoB on 17 th , over central parts of south & adjoining west-central BoB on 18 th , over southwest & adjoining west-central BoB close to north Tamil Nadu – south Andhra Pradesh coasts on 19 th and over north coastal Tamil Nadu & adjoining south coastal Andhra Pradesh on 20 th .	Indicates an LPA over east-central AS on 18 th , over east-central & adjoining southeast AS on 19 th and as an extended Low over east-central & adjoining southeast AS off Maharashtra – Goa coasts on 20 th .
NCMRWF-NCUM	Indicates an LPA over central parts of south BoB on 17 th , over southwest & adjoining west-central BoB off north Tamil Nadu – south Andhra Pradesh coasts on 18 th , over north coastal Tamil Nadu & adjoining south coastal Andhra Pradesh on 19 th , over south coastal Andhra Pradesh and adjoining Rayalaseema on 20 th and weakening on 21 st .	Indicates a trough of Low over east-central AS off Goa – Maharashtra coasts on 17 th , a Well Marked Low over east-central AS off south Maharashtra coast on 18 th , as a Depression over east-central AS on 19 th , as a Deep Depression over the same region on 20 th , a temporary weakening into a Depression following a westward movement on 21 st , rapid intensification into a Cyclonic Storm (CS) over west-central & adjoining southwest AS on 22 nd and CS over southwest & adjoining west-central AS off north Sumatra coast on 23 rd .
NCMRWF-NEPS	-Do-	-Do-
NCMRWF-UM (Regional)	Nearly same as above, but indicates a brief intensification of the system to a Depression, close to north Tamil Nadu coast on 18 th .	-Do-
ECMWF	Indicates a feeble LPA over central	Indicates an LPA over east-

	part of south BoB on 17 th , as an LPA over southwest & adjoining west-central BoB off north Tamil Nadu – south Andhra Pradesh coasts on 18 th and weakening on 19 th .	central AS off south Maharashtra - Goa coasts on 17 th , moving northwestwards and over east-central AS on 18 th & 19 th , further westward movement over to east-central AS on 20 th and its persistence on 21 st , weakening with gradual west-southwestward movement from 22 nd .
ECMWF-EPS	Genesis & strike probability NIL.	Shows genesis & strike probability 10-20 % over east-central AS on 22 nd & 23 rd .
NCEP-GFS	Indicates an LPA over southwest BoB & adjoining north Tamil Nadu coast on 18 th , over north coastal Tamil Nadu & adjoining south coastal Andhra Pradesh on 19 th , over west-central and adjoining southwest BoB off south Andhra Pradesh – north Tamil Nadu coasts on 20 th and weakening on 21 st .	Indicates an LPA over east-central AS during 18 th – 20 th , over east-central and adjoining southeast AS on 21 st , as an extended Low over the same region on 22 nd and over central parts of south AS on 23 rd .
IMD-GPP	A Potential zone over southwest BoB off north Tamil Nadu coast on 18 th and NIL during the rest of the days.	Potential zone over east-central AS off south Maharashtra coast on 17 th , over east-central AS off Maharashtra coast on 18 th & 19 th , again a circular zone over east-central AS off south Maharashtra coast on 20 th , over east-central & adjoining southeast AS on 21 st and over central parts of south AS on 22 nd .

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

Summary and Conclusion:

- 1. For the Bay of Bengal:** None of the models analysed above are indicating intensification to Depression stage of the present Low Pressure Area lying over southeast Bay of Bengal during the forecast period, except NCUM(R). NCUM (R) indicates the marginal intensity of a Depression close to north Tamil Nadu coast on 18th, followed by rapid weakening over the coast on 19th. All of them predict it's near westward movement, reaching either southwest or southwest & adjoining west-central BoB off north Tamil Nadu – south Andhra Pradesh coasts during on 18th November morning.
- 2. For the Arabian Sea:** Most of the models indicate the presence of a Low Pressure Area over east-central Arabian Sea off Maharashtra - Goa coasts on 17th, except a few like NCUM, NEPS & WRF which simulate the system as a trough of Low along the west coast in their 00 UTC analysis of 17th. Majority of them indicate gradual northwest / west-northwestward movement with no significant intensification. Only the NCUM group (NCUM, NEPS & NCUM (R)) indicate intensification into a Depression over the same region on 19th November followed by west-southwestward (un-usually rapid) movement and intensification into a Cyclonic Storm directed towards north Somalia coast during 22nd & 23rd.

It may thus be concluded that,

1. The Low Pressure Area over southeast & adjoining southwest Bay of Bengal is likely to move nearly westwards and reach west-central & adjoining southwest BoB off south Andhra Pradesh and adjoining north Tamil Nadu coasts by tomorrow, the 18th November, 2021.
2. The other Low Pressure Area over east-central Arabian Sea off Goa- south Maharashtra coasts is likely to move west-northwestwards and become more marked during next 48 hours. A 'Low' probability for its intensification into a Depression can be assigned to this system, on 19th & 20th November over east-central Arabian Sea, owing to the fact that the NCUM group of models consistently indicating this intensification. However, further intensification as shown by these models are negated by the adverse environmental conditions and hence considered as un-likely.

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

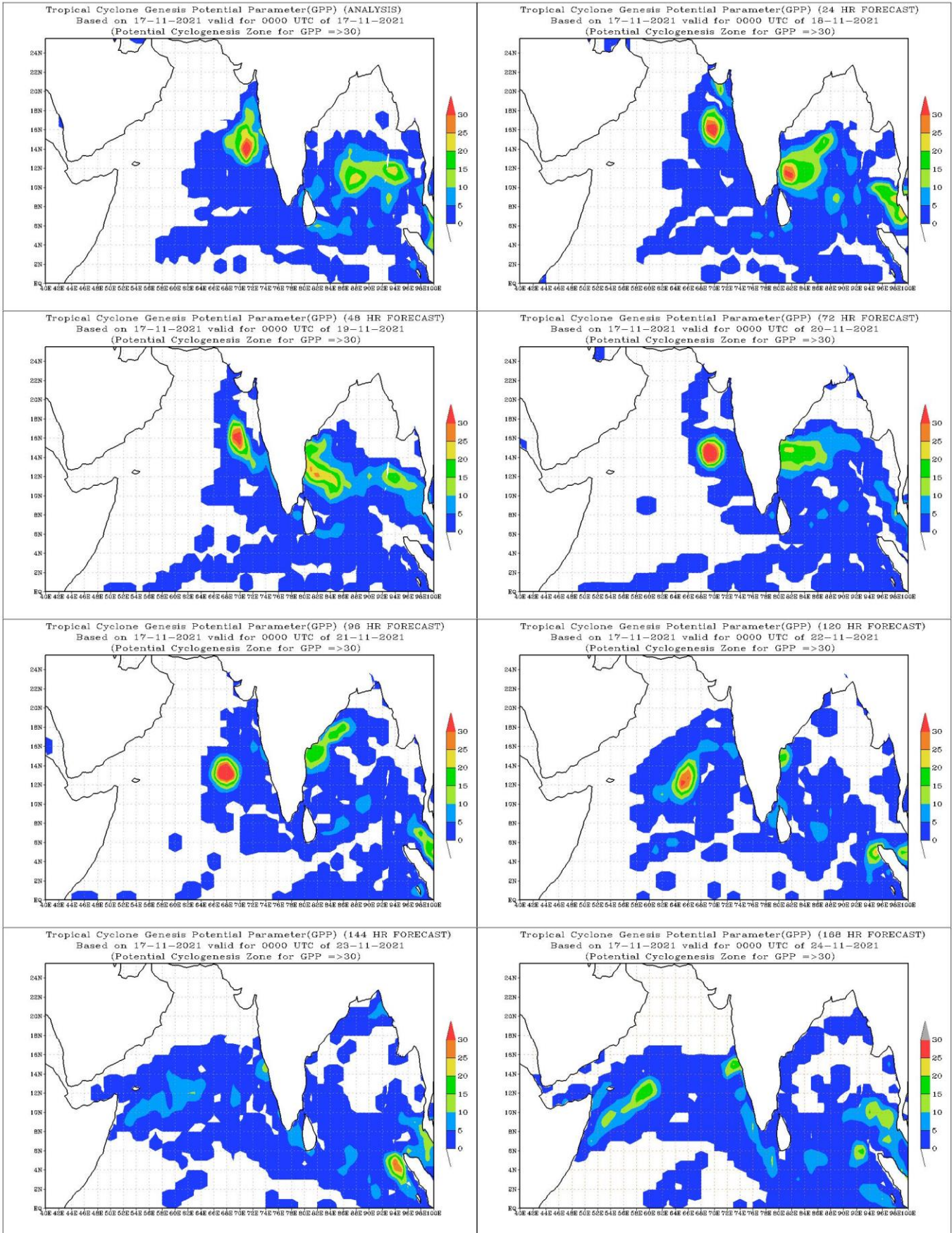
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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

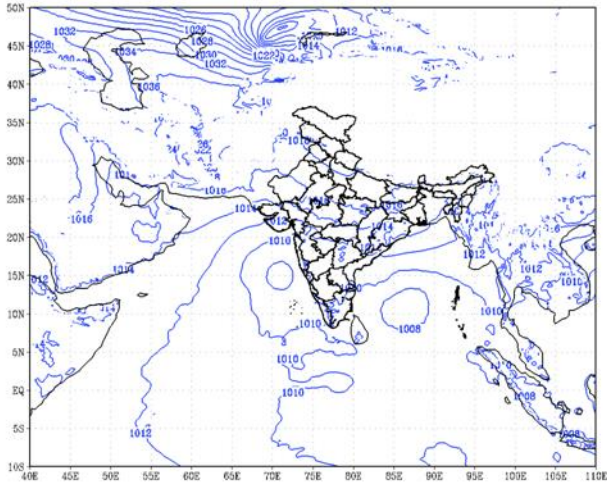
Advisory:

(1) Likely intensification & movement of Low pressure Area over southeast & adjoining southwest Bay of Bengal needs to be monitored. (2) Likely intensification & movement of Low pressure Area over east-central Arabian Sea off Goa- south Maharashtra coasts also needs to be monitored.

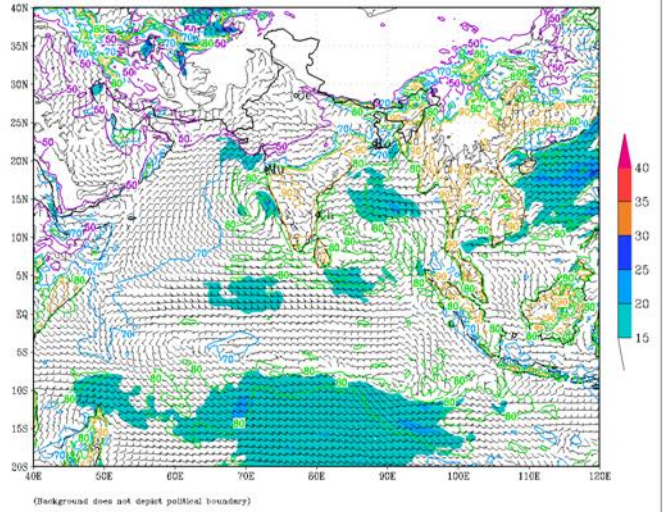
IOP is suggested for south Andhra Pradesh – north Tamil Nadu coasts on 18th November.



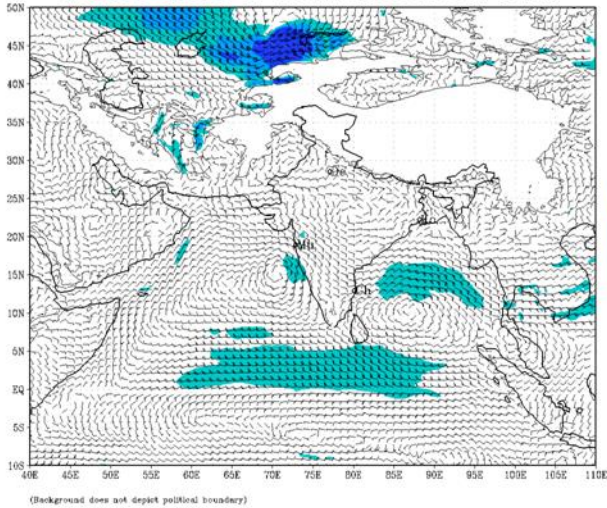
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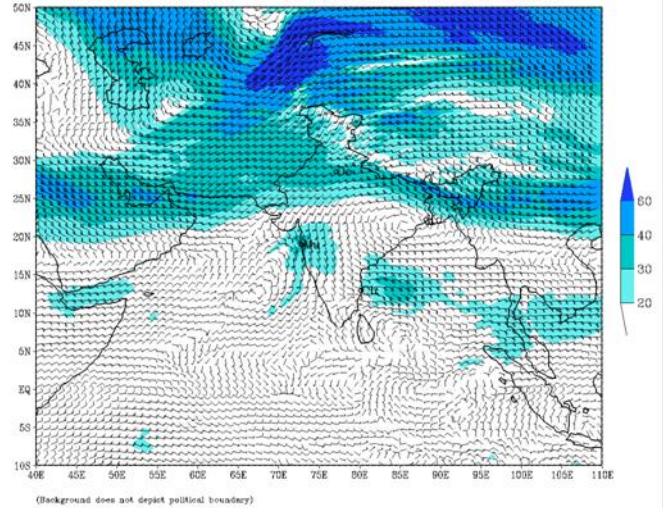
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 17-11-2021 valid for 00 UTC of 17-11-2021



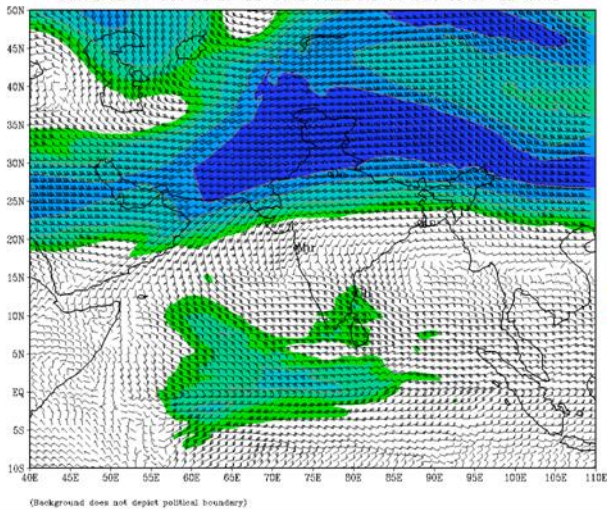
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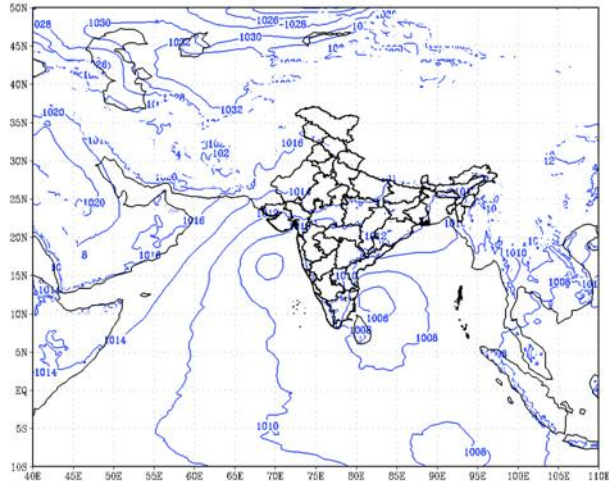
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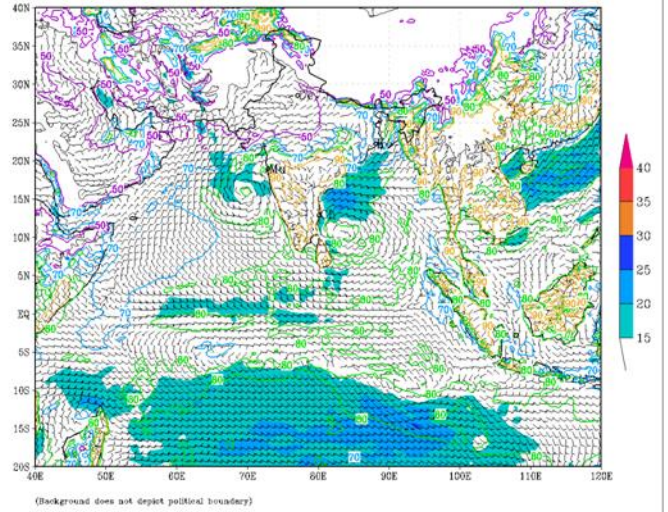
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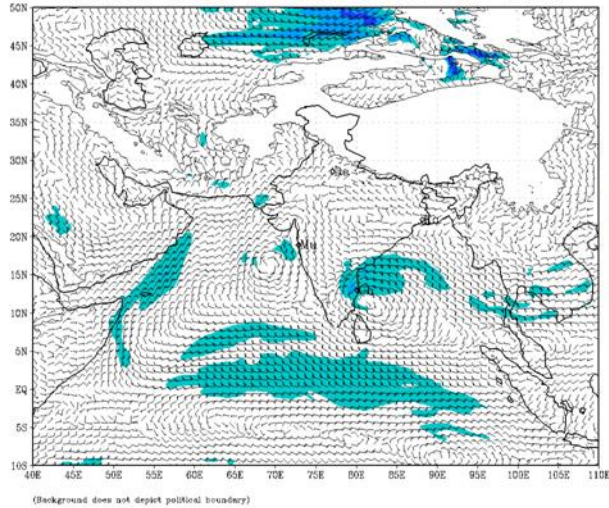
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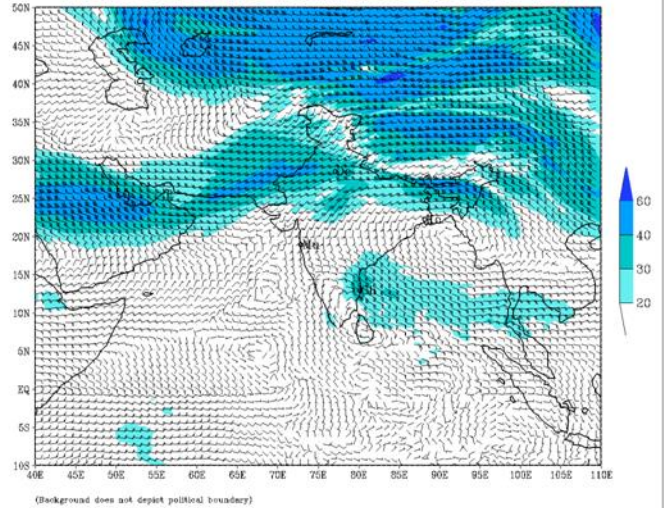
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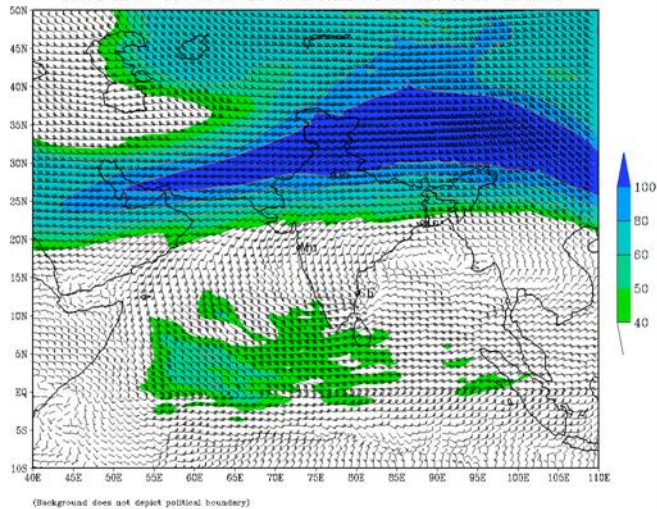
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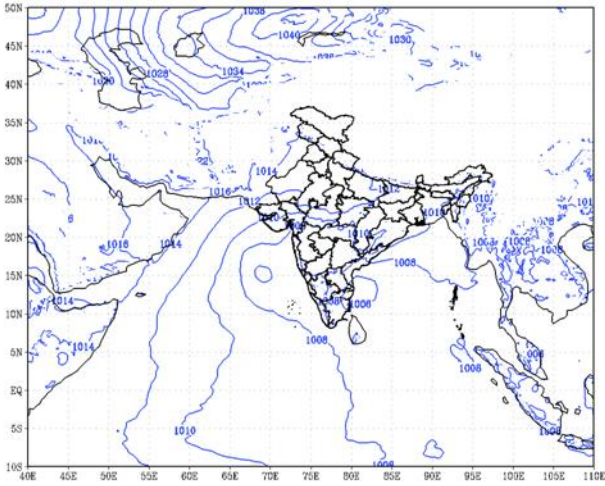
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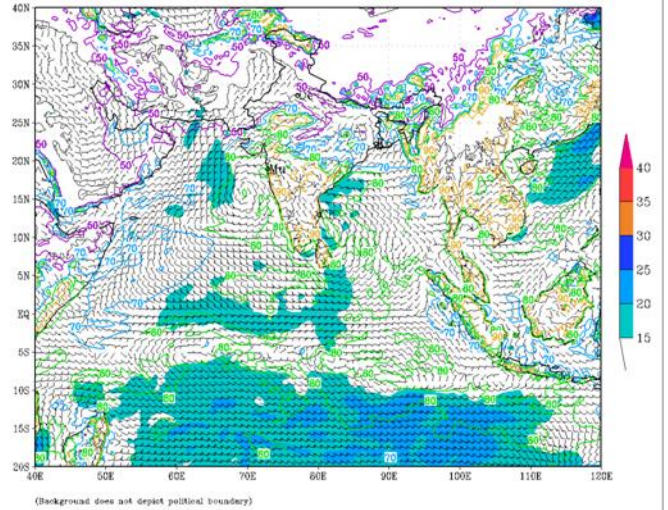
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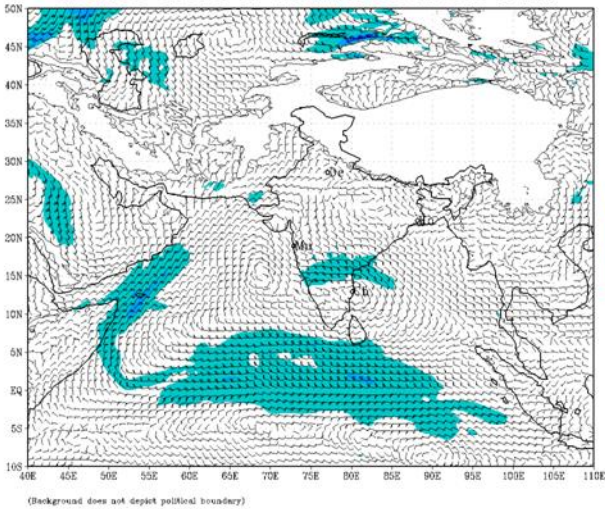
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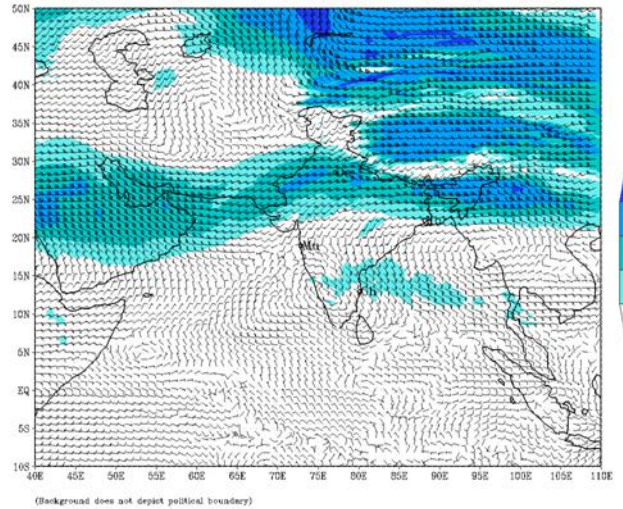
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
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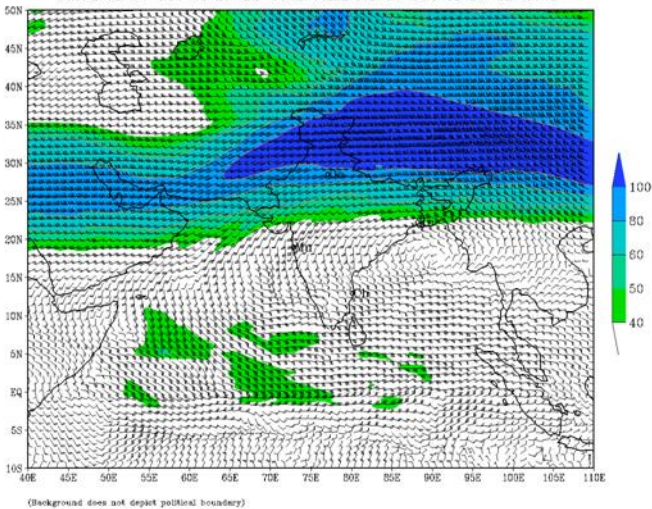
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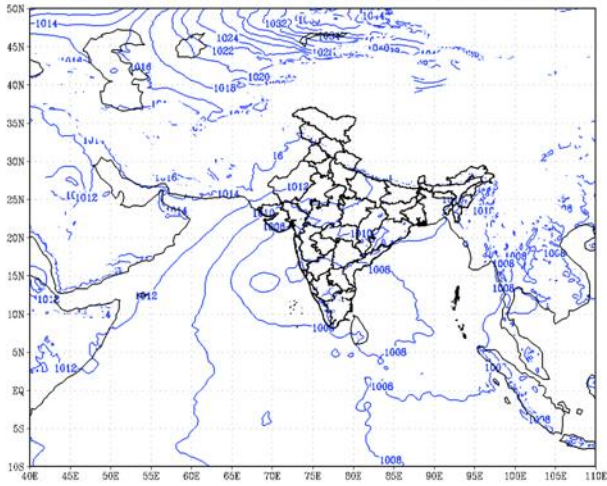
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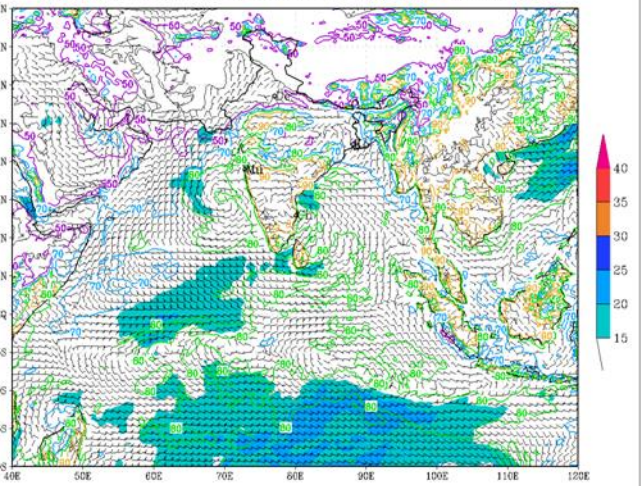


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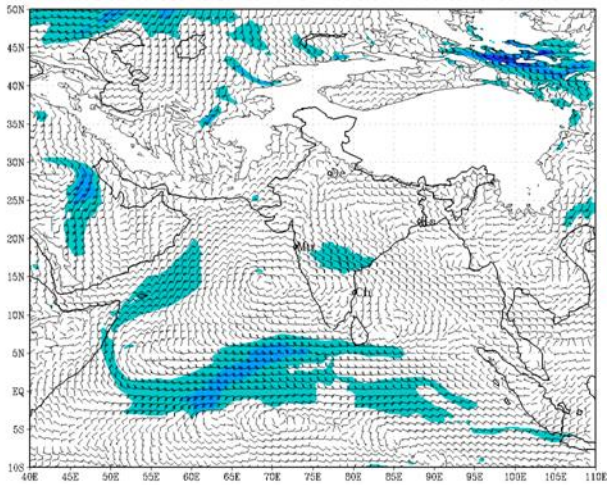
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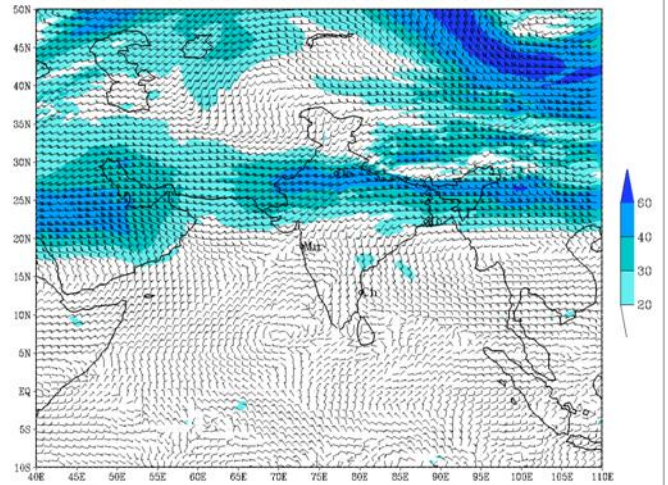
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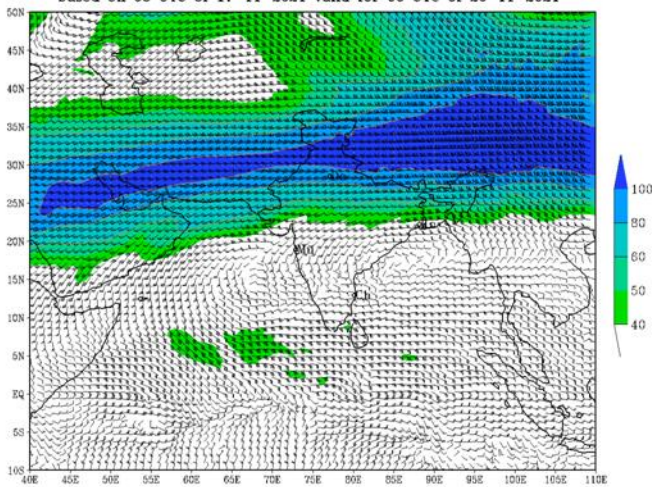
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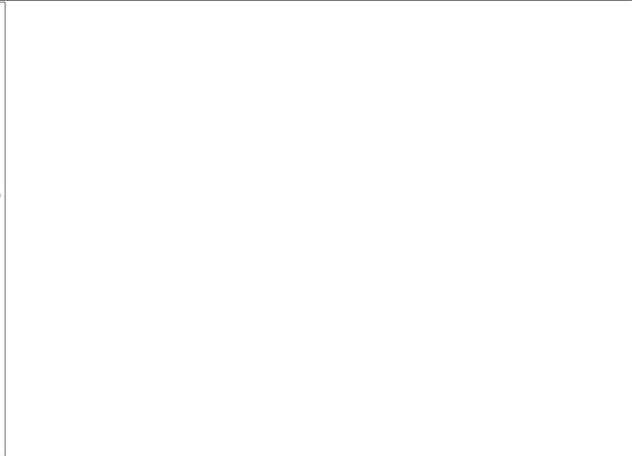
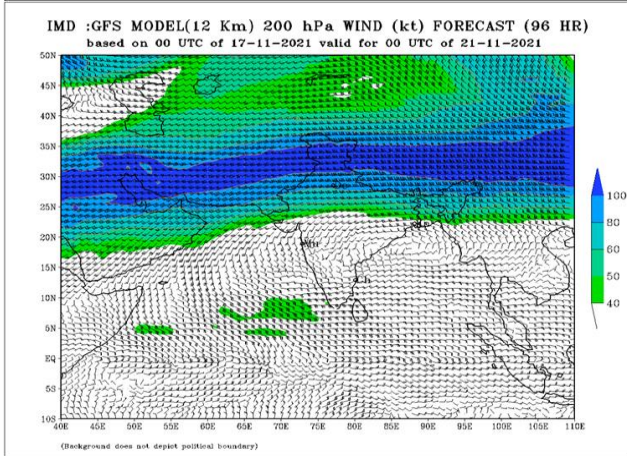
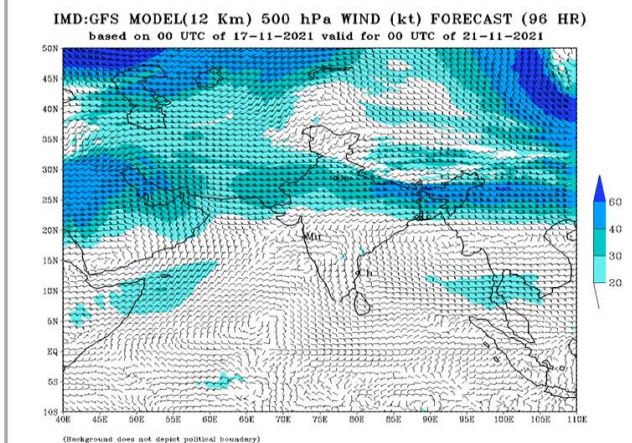
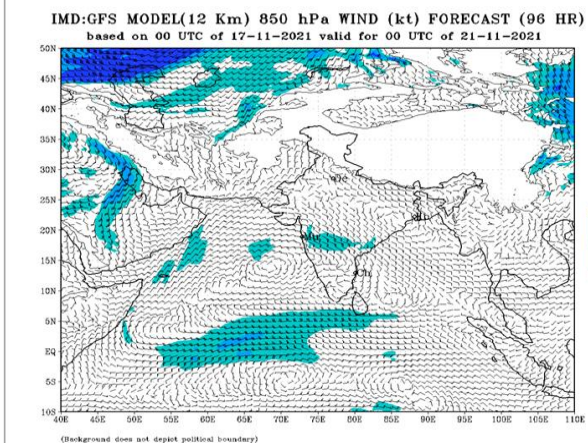
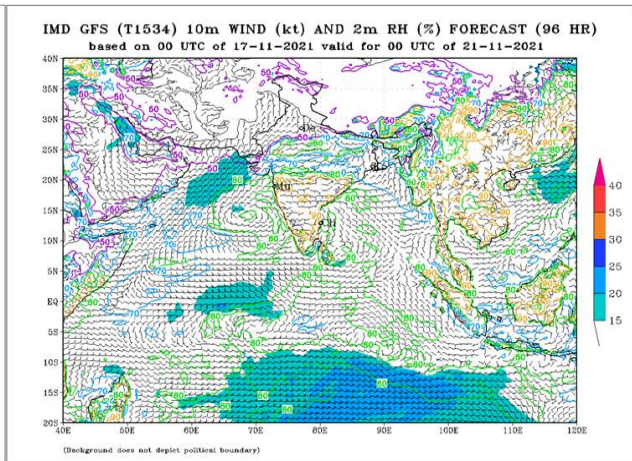
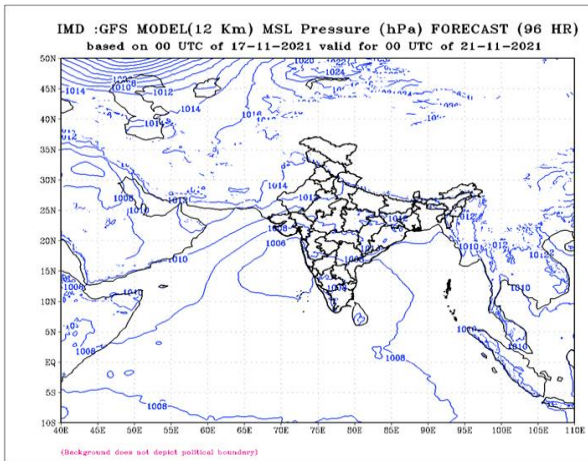


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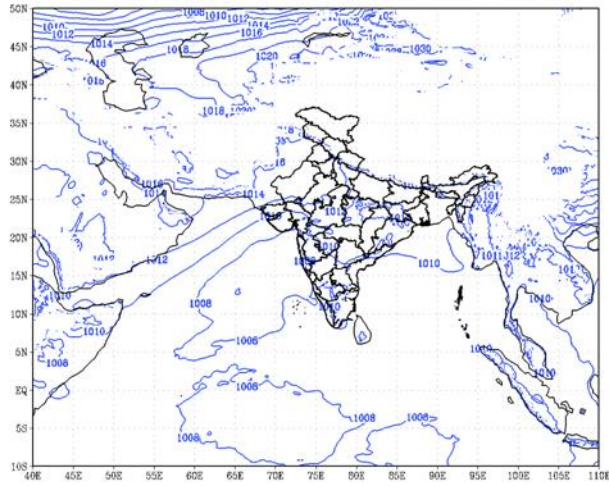
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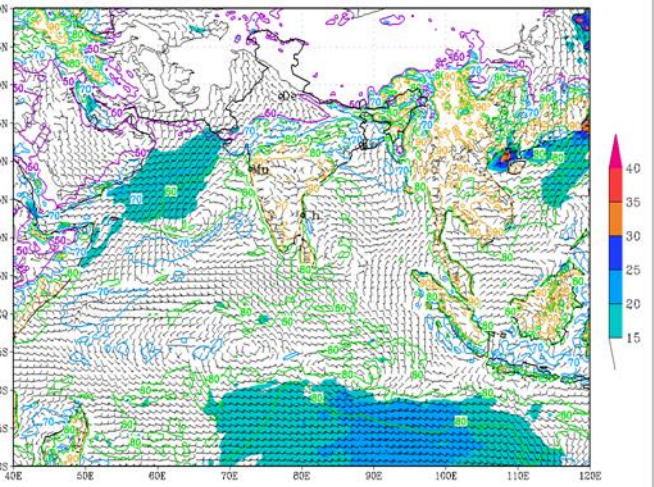


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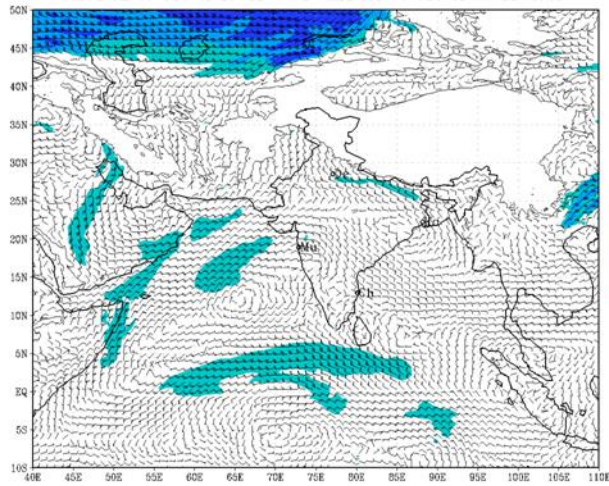
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
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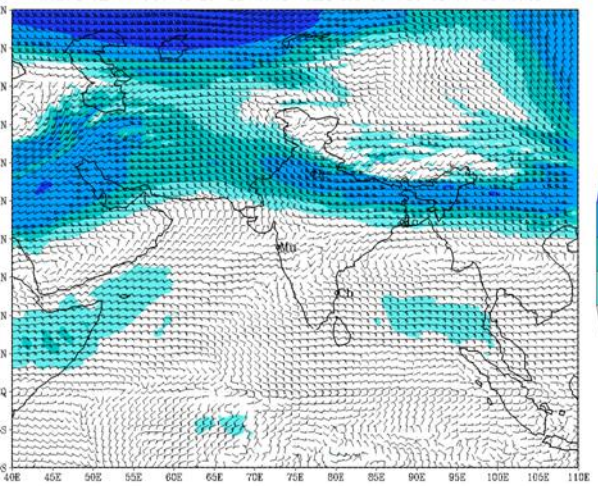
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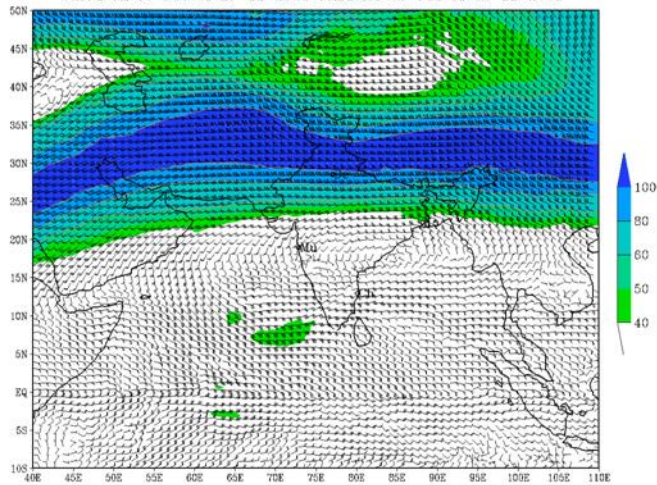
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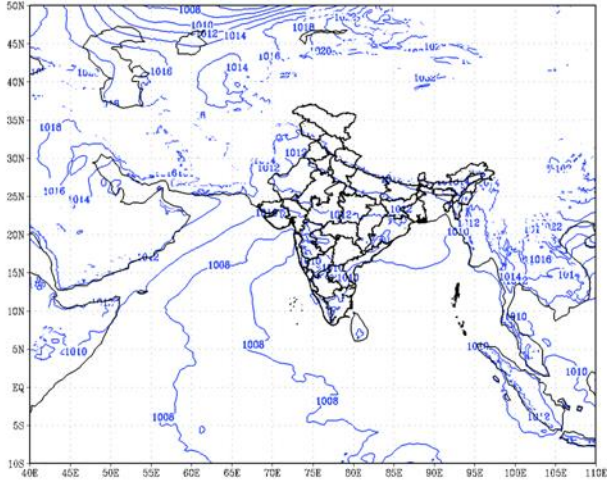
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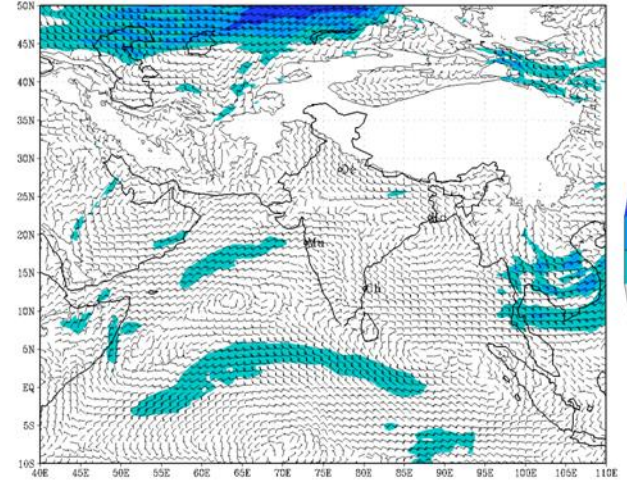
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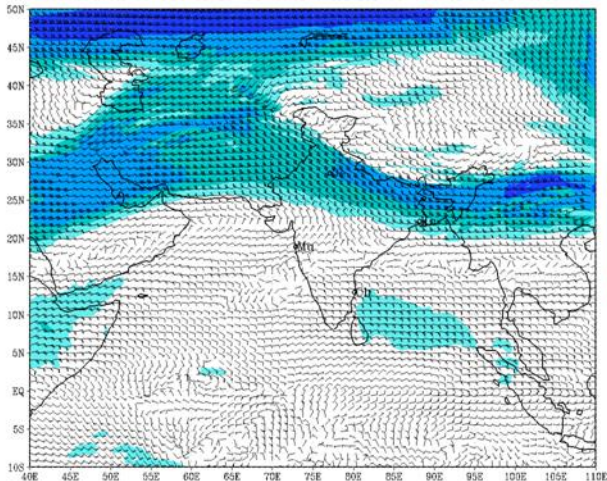
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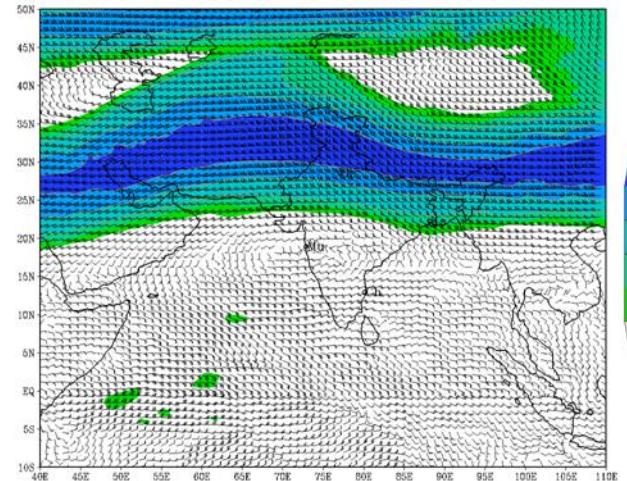
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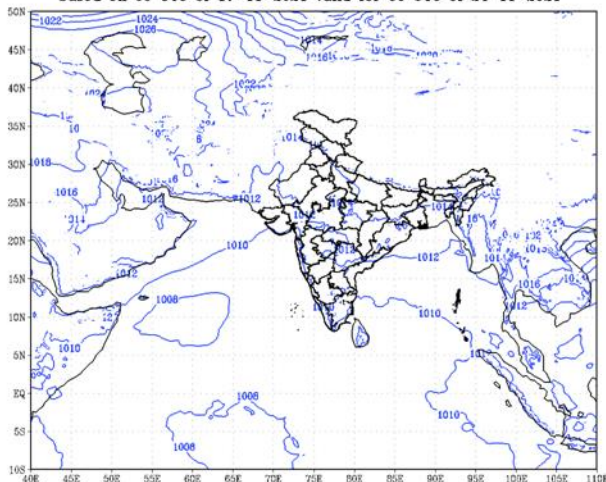
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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
 based on 00 UTC of 17-11-2021 valid for 00 UTC of 23-11-2021



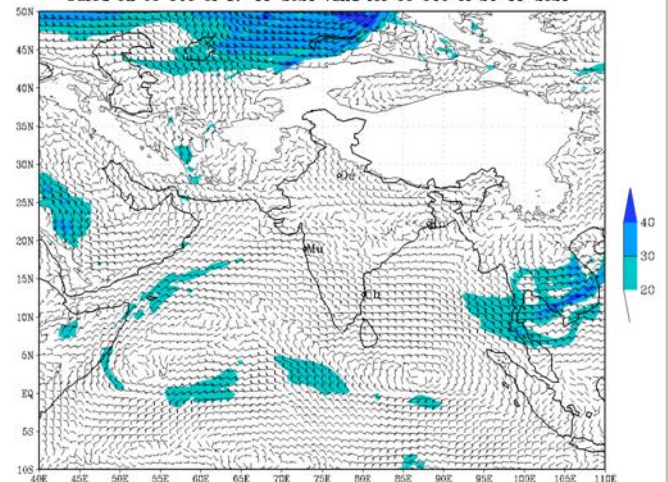
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 17-11-2021 valid for 00 UTC of 24-11-2021



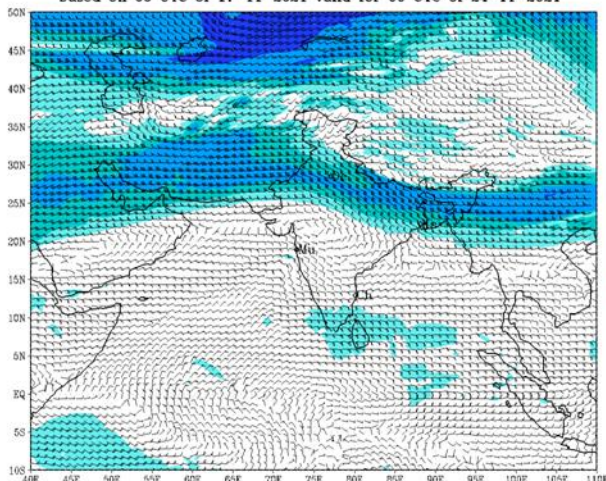
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-11-2021 valid for 00 UTC of 24-11-2021



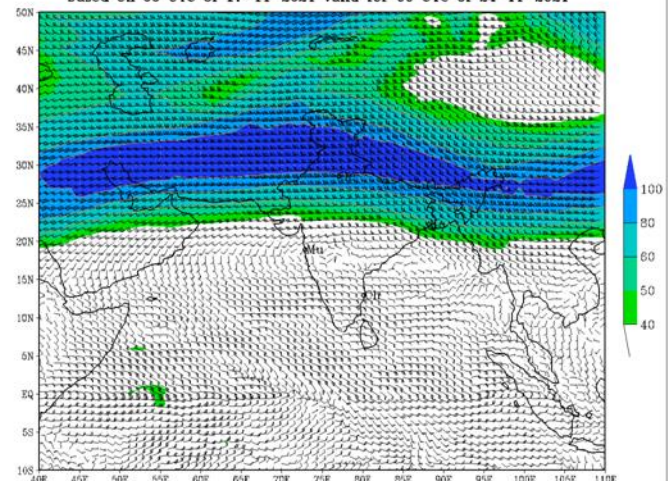
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-11-2021 valid for 00 UTC of 24-11-2021



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-11-2021 valid for 00 UTC of 24-11-2021



(Background does not depict political boundary)