



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

**Tropical Cyclone Forecast Programme
Report Dated 18th October, 2022**

Time of Issue: 1200 UTC

Synoptic features (based on 0900 UTC analysis):

- ❖ A cyclonic circulation lies over north Andaman Sea & neighbourhood and extends upto 3.1 km above mean sea level. Under its influence, a Low Pressure Area is likely to form over Southeast and adjoining Eastcentral Bay of Bengal during next 48 hours. It is likely to move west-northwestwards and concentrate into a Depression by 22nd morning over Central Bay of Bengal. It is very likely to intensify further into a Cyclonic Storm over Westcentral Bay of Bengal subsequently.
- ❖ A trough runs from cyclonic circulation over north Andaman Sea & neighbourhood to Tamil Nadu coast across South Bay of Bengal in lower tropospheric levels.
- ❖ A cyclonic circulation lies over Eastcentral Arabian Sea off Maharashtra coast in lower tropospheric levels.
- ❖ A north-south trough runs from Southeast Arabian Sea off Kerala coast to cyclonic circulation over Eastcentral Arabian Sea off Maharashtra coast in lower tropospheric levels.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	About 29-31°C over entire BoB and Andaman Sea except over some parts of southwest BoB and over Comorin Area.	28-30°C over extreme north AS, southeast & adjoining eastcentral AS and off Maharashtra-South Gujarat coasts. 26-28°C over eastcentral, westcentral and southwest BoB. Less than 26°C off Oman & Somalia coast.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	(a) 110-120 over eastcentral BoB and Andaman Sea off Myanmar-Thailand coasts & Sumatra Islands. (b) 60-80 over western parts of BoB and parts of southeast BoB. (c) 30-40 over some parts of westcentral & southwest BoB off TamilNadu & Andhra Pradesh coasts and Comorin Area.	(a) 60-80 over eastcentral & also along & off west coast of India. (b) 30-40 over remaining AS.

Cyclonic Relative vorticity ($\times 10^{-6} \text{s}^{-1}$)	(a) Positive vorticity of 30-40 south Andaman Sea and adjoining southeast BoB with vertical extension upto 500 hPa level.	(a) Positive vorticity of 30-40 over central AS with vertical extension upto 500 hPa level. (b) 30-40 over southwest AS off Yemen coasts. (c) 20-30 over Comorin area, Lakshadweep area and adjoining southeast AS.
Low Level convergence ($\times 10^{-5} \text{s}^{-1}$)	5-20 over south Andaman Sea and adjoining Gulf of Thailand and off Sumatra Islands. Small zone of value 05 over southwest BoB and another zone of 05 over Comorin Area.	5-15 over southeast AS. 5-10 over southwest AS. Small zones of value 05-10 over Lakshadweep & Maldives area and adjoining southeast AS.
Upper Level divergence ($\times 10^{-5} \text{s}^{-1}$)	05-10 over Andaman Sea and Gulf of Thailand. 05-10 over central parts of south BoB.	10-30 over southeast AS off Kerala-Karnataka coasts, Lakshadweep area.
Vertical Wind Shear (VWS knots)	10-15 (favourable) over major parts of central BoB and north BoB. 25-30 (unfavourable) over extreme south BoB & adjoining equatorial Indian Ocean (EIO).	10-15 (favourable) over central & adjoining south AS. 20-30 (unfavourable) over Comorin.
Wind Shear Tendency (knots)	Decreasing over north Andaman Sea.	Decreasing over westcentral & adjoining southwest AS off Oman coast.
Upper tropospheric Ridge	Along 15.0°N over the BoB.	Along 21.0°N over the AS.

Satellite observations based on INSAT imagery (0900 UTC):

(a) Over the BoB & Andaman Sea:-

At 0900 UTC, Scattered to broken low and medium clouds with embedded intense to very intense convection lay over central & south Bay of Bengal and Andaman Sea. Scattered low and medium clouds with embedded moderate to intense convection lay over north Bay of Bengal.

(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 & southeast Arabian Sea, Lakshadweep islands area and Comorin area. Scattered low and medium clouds with embedded moderate to intense convection lay over westcentral and adjoining southwest Arabian Sea.

M.J.O. Index:

MJO index is currently in Phase 6 with amplitude greater than 1. It will continue in same phase for next 7 days with amplitude remaining greater than 1.

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

Vortex (NESAT) over South China Sea and neighbourhood moved nearly west-southwestwards and lay near $18.1\text{N} / 113.1\text{E}$ with intensity T.No./C.I. No. 4.5/4.5 at 0600 UTC. Associated broken low and medium clouds with embedded intense to very intense convection lay over area between latitude 16.5N & 22.5N and longitude 109.0E & 114.0E and Hainan.

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

MODEL GUIDANCE	BoB	AS
IMD-GFS	GFS is indicating a low pressure area (LPA) over North Andaman Sea on 18 th , with nearly westwards movement till 20 th . It would lie as a depression over southeast BoB on 21 st , a deep depression (DD) over southeast BoB on 22 nd , very severe cyclonic storm (VSCS) over westcentral BoB on 23 rd , further intensification of the system on 24 th over westcentral BoB near central Andhra Pradesh coast. Moving north-northwestwards, the system would cross Andhra Pradesh coast near 16.8N/82.0E in the evening of 24 th (09-12 UTC). Yesterday, it was indicating that the system would cross North Andhra Pradesh coast. Model is also indicating rapid intensification of the system during 0000 UTC of 22 nd to 0000 UTC of 23 rd .	A cycir over eastcentral AS and another over southwest AS on 18 th . Cycir over eastcentral moving slightly westwards and becoming less marked on 20 th . The cycir over southwest AS becoming less marked on 19 th .
IMD-GEFS	Extended low over Andaman & Nicobar Islands and central BoB on 19 th , LPA over eastcentral BoB on 20 th , WML over southeast & adjoining eastcentral on 21 st , depression over westcentral & adjoining southwest BoB on 22 nd , deep depression/CS over the westcentral & adjoining southwest BoB on 23 rd , further intensification on 24 th and west-northwestwards movement towards Andhra Pradesh coast on 24 th , crossing North Andhra Pradesh coast on 25 th around 0000 UTC as a CS and weakening over the same region on 26 th .	A cycir over eastcentral & adjoining southwest AS during 19 th -21 st . Extended low over southeast AS on 22 nd & 23 rd , becoming less marked on 26 th .
GEFS Probabilistic guidance	About 70-80% ensemble members are indicating initial westwards movement towards southwest & adjoining westcentral BoB. 20-50 % members are thereafter indicating nearly northwestwards movement and crossing over Andhra Pradesh coast (from southern tip to northern tip).	Not available
IMD-WRF	A cycir over central parts of Andaman Islands and adjoining eastcentral BoB on 18 th & 19 th with gradual west-northwestwards movement and LPA over southeast BoB on 20 th , depression over eastcentral & adjoining southeast BoB on 21 st ,	An LPA over south AS on 17 th , southeast AS on 18 th , becoming less marked thereafter. An extended low over westcentral & adjoining southwest AS on 18 th becoming less marked thereafter.
NCMRWF-NCUM	An LPA over North Andaman Sea on 18 th with westwards movement till 21 st as an LPA, depression over eastcentral BoB on 22 nd , CS over eastcentral BoB on 23 rd . Thereafter, the system is predicted to move nearly north-northeastwards and cross Bangladesh coast near 24.8N/90.0E around 0000 UTC of 24 th .	A cycir lies over eastcentral AS off Maharashtra coast on 18 th – 20 th moving gradually westwards towards southwest AS till 24 th and becoming less marked thereafter. Development of fresh cycir

	Yesterday, it was indicating the system to cross North Andhra Pradesh coast near 18.0N/82.0E around 23 rd night as an SCS.	over Comorin area on 26 th & 27 th .
NCMRWF-NEPS	An extended circulation over central & south BoB on 18 th . LPA over eastcentral & adjoining southeast BoB on 19 th , extended low over southwest & westcentral BoB on 20 th , WML over southeast & adjoining eastcentral BoB on 21 st , depression over eastcentral BoB on 22 nd , CS over eastcentral BoB on 23 rd , further intensification and crossing Bangladesh coast around 2100 UTC of 23 rd near 22.5N/90.1E against yesterday's guidance of crossing North Andhra Pradesh in the night of 23 rd .	An LPA over westcentral AS on 18 th becoming less marked on 19 th . A cycir lies over eastcentral & adjoining southeast AS during 19 th –21 st becoming an LPA over southeast AS on 22 nd & 23 rd and less marked thereafter. A fresh cycir over Comorin area and adjoining Lakshadweep on 25 th becoming less marked on 27 th .
NCMRWF-UM (Regional)	LPA over eastcentral BoB on 18 th becoming WML on 19 th over the same region and depression over southeast BoB on 20 th .	A cycir lies over southeast & adjoining eastcentral AS on 18 th , becoming less marked on 19 th
ECMWF	A cycir over North Andaman Sea & adjoining southeast & eastcentral BoB during 18 th -19 th , LPA over southeast BoB on 20 th , WML/depression over southeast BoB on 21 st , DD over southeast BoB 22 nd , CS over westcentral & adjoining southwest BoB on 23 rd , thereafter moving further north-northwestwards crossing over North Odisha around 2100 UTC of 25 th near 21.6N/87.3E against yesterday's guidance that indicated crossing near Sunderbans as CS/SCS in the midnight of 25 th near 21.8N/88.8E.	A extended cycir over central AS on 19 th becoming less marked thereafter.
ECMWF-EPS	40-50% cyclogenesis probability over central BoB during next 5-7 days. Large variation in track with some members indicating nearly west-northwestwards movent towards westcentral & adjoining southwest BoB and some members indicating initial west-northwestwards movement, followed by nearly northwards movement towards north BoB.	Model is indicating 40-50% probability of cyclogenesis over central parts of south AS during next 3-5 days and 40-50% cyclogenesis probability over eastcentral AS during next 3-5 days.
NCEP-GFS	Model is indicating an LPA over southeast BoB during 19 th – 22 nd , depression over central parts of south BoB on 23 rd , deep depression over westcentral BoB on 25 th , thereafter nearly north-northeastwards movement and crossing as a depression over North odisha coast on 26 th /0000 UTC, becoming less marked thereafter.	A cycir over eastcentral AS and another over southwest AS on 18 th . Cycir over eastcentral moving slightly westwards and becoming less marked on 20 th . The cycir over southwest AS becoming less marked on 19 th .
IMD-Genesis Potential Parameter	A Potential zone over South Andaman Sea on 18 th & 19 th , over eastcentral BoB on 20 th & 21 st , over westcentral BoB on 22 nd . The guidance product is indicating northeastwards movement of potential zone till 25 th reaching close to North Odisha.	Potential zone over southeast AS on 20 th to 24 th . Development of a significant zone over eastcentral AS off Karnataka coast on 25 th .

Summary and conclusion:

1. For the Bay of Bengal:

Most of the models are indicating development of low pressure area over southeast & adjoining eastcentral BoB during next 48 hours. Models are also indicating further intensification of this system into a depression by 22nd/0000 UTC and into a cyclonic storm thereafter. However, there is large variation among various models wrt. track & peak intensification of this system. The landfall point is varying from north Andhra Pradesh (GFS group), to North Odisha (ECMWF) to Bangladesh coast (NCUM group) and peak intensification is varying from deep depression (NCEP GFS) to cyclonic storm (ECMWF) to severe cyclonic storm (NCUM) to very severe cyclonic storm (IMD GFS). Landfall time is varying from 24/0000 UTC (NCUM group) to 24/1200 UTC (IMD GFS) to 25/2100 UTC (ECMWF).

In view of all the above, it is inferred that a low pressure area is likely to form over southeast & adjoining eastcentral Bay of Bengal during next 48 hours. It is likely to move west-northwestwards and concentrate into a depression by 22nd morning over central Bay of Bengal. It is very likely to intensify further into a cyclonic storm over westcentral Bay of Bengal subsequently. Thereafter, there is large variation wrt movement, intensification & landfall of the system and hence a continuous watch is being maintained.

The environmental conditions like SST and ocean thermal energy are favourable over south & central BoB for formation of low/depression. The La Nina conditions supported with negative IOD conditions will support the movement of remnant circulations from South China Sea to Andaman Sea with possible further intensification. However, MJO being in phase 6 with amplitude more than 1, will not be supportive for amplification of convection and hence the system.

2. For the Arabian Sea:

The cycir over southeast AS & adjoining Kerala coast is likely to persist over same region during 18th & 19th and become less marked thereafter. No significant system is likely to develop over Arabian Sea during next 7 days.

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	LOW	MODERATE	HIGH	HIGH

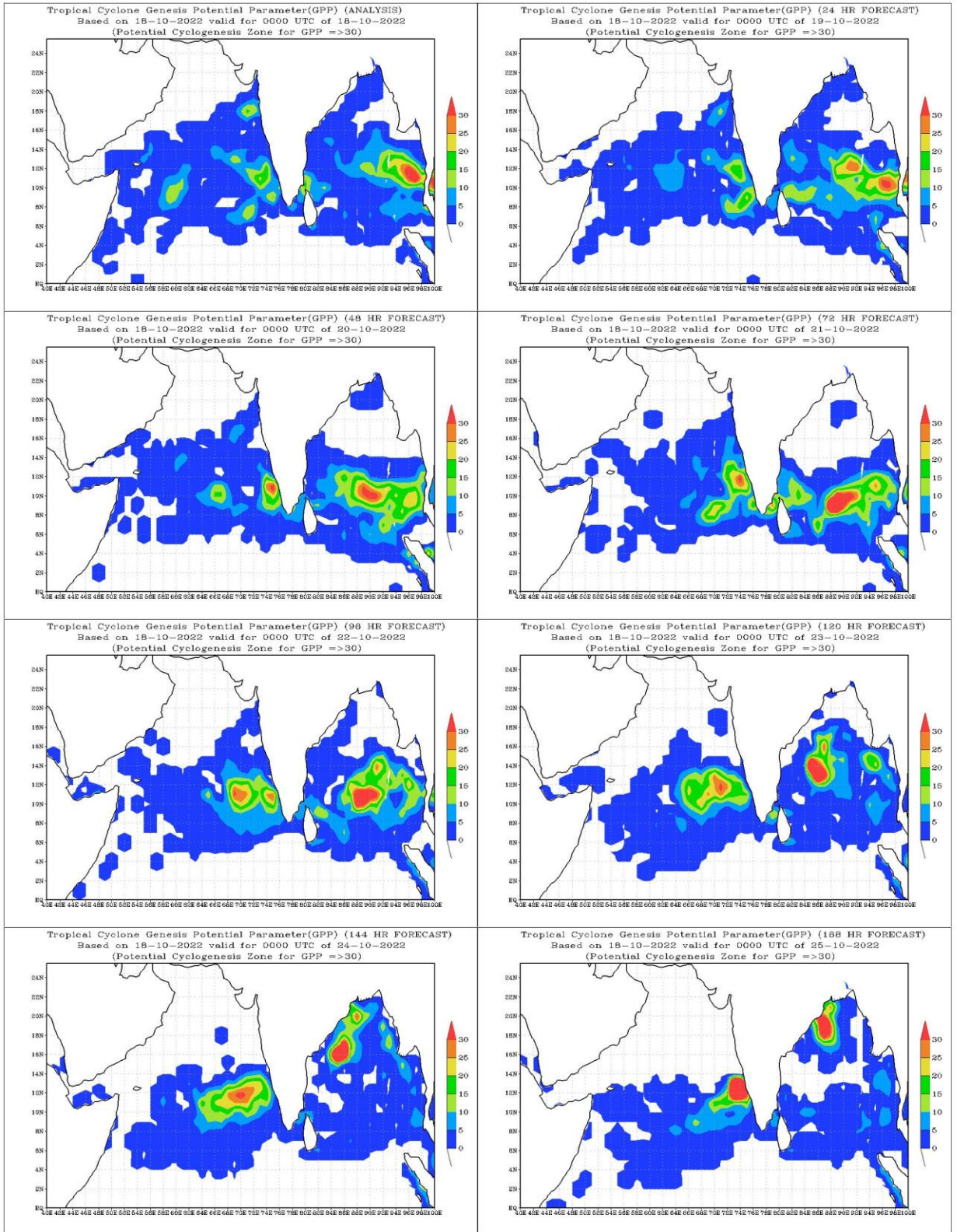
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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

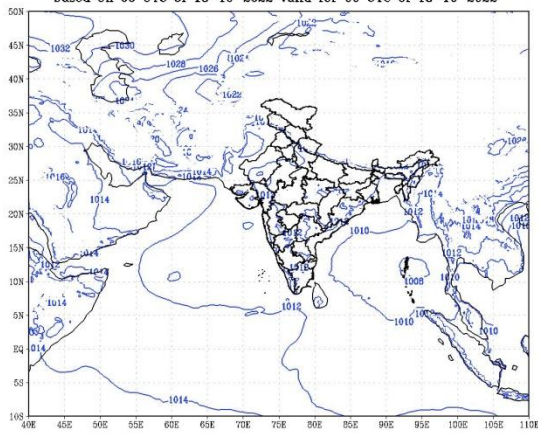
Advisory:

The intensification & movement of depression likely to form over central Bay of Bengal by 22nd October morning need to be monitored closely.

IOP is suggested for Andaman & Nicobar Islands on 19th.

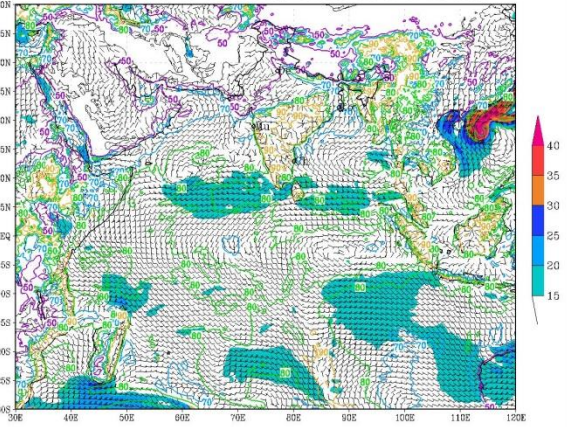


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 18-10-2022



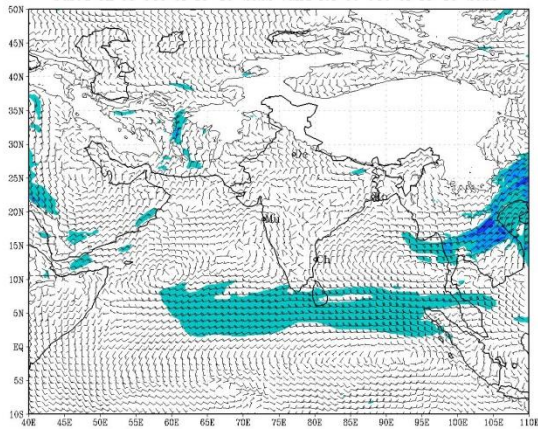
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 18-10-2022



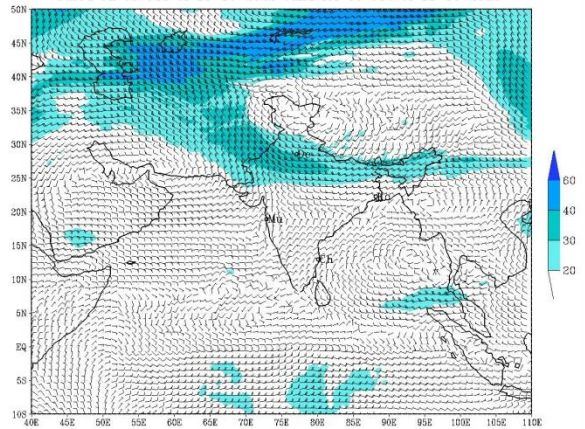
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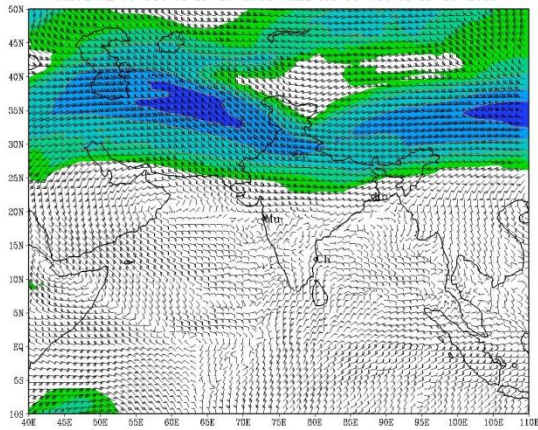
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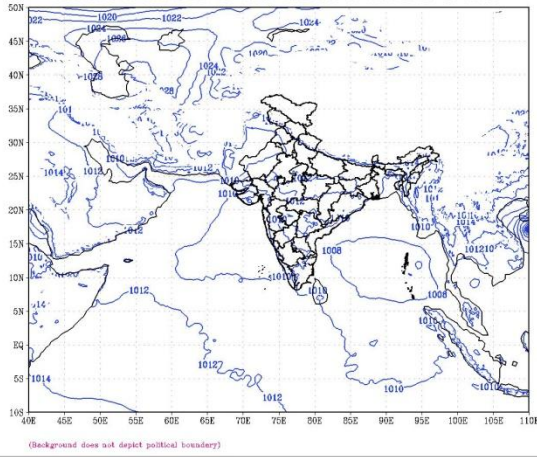
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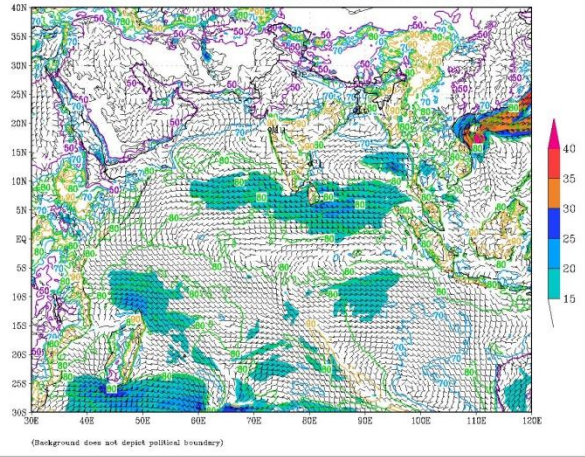


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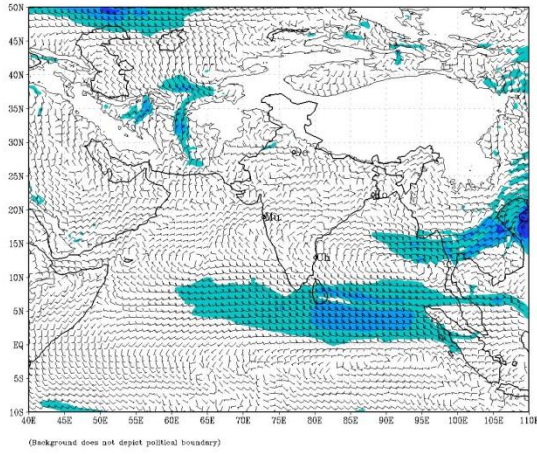
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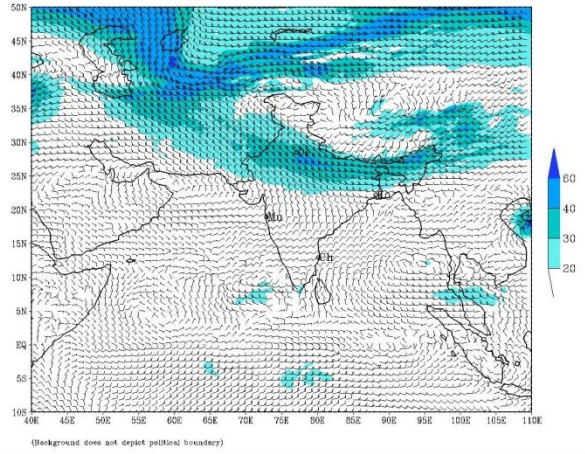
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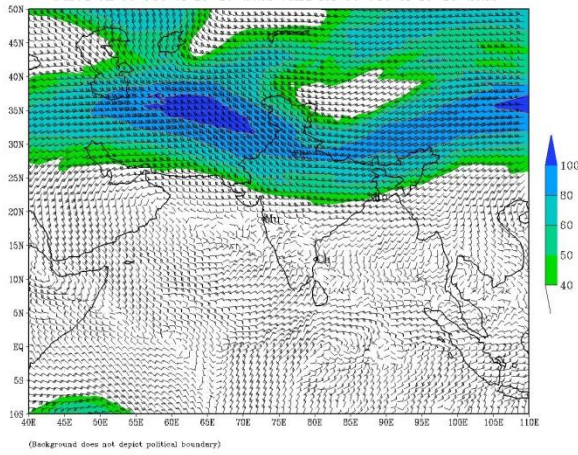
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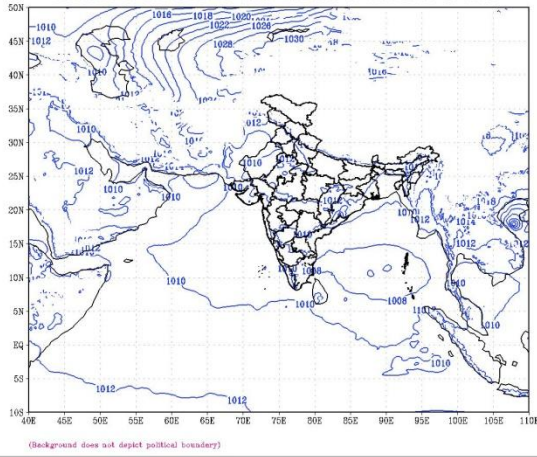
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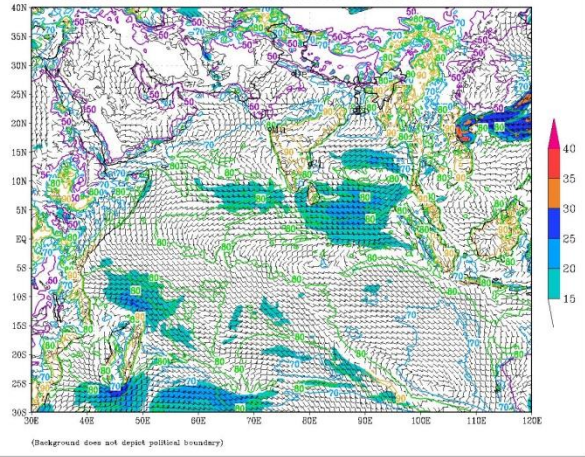
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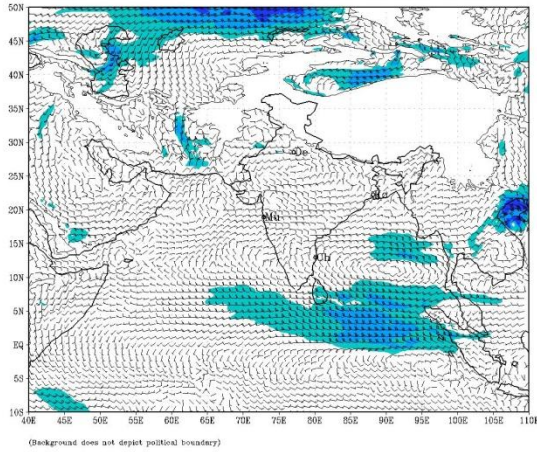
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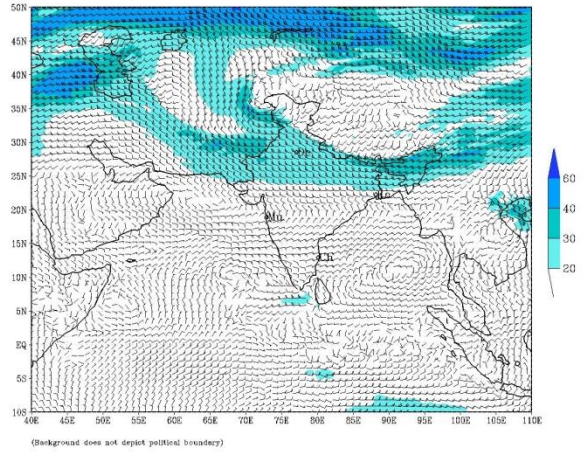
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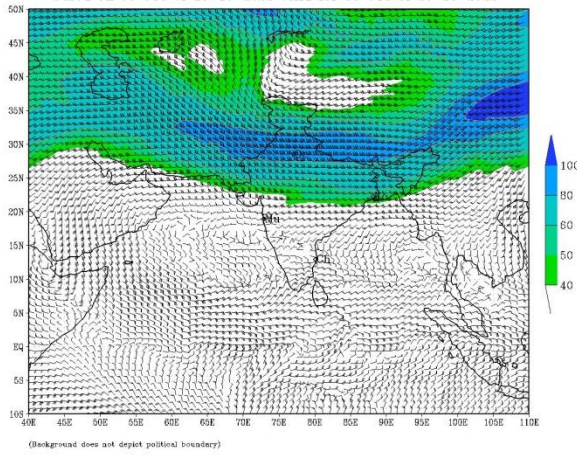
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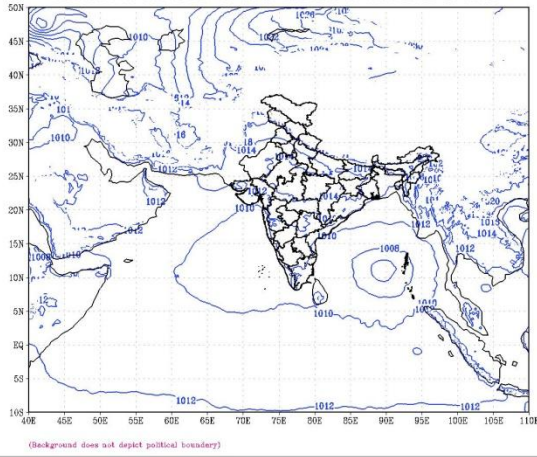
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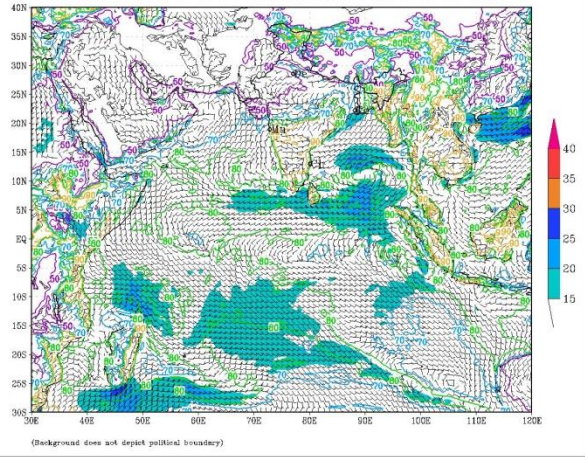
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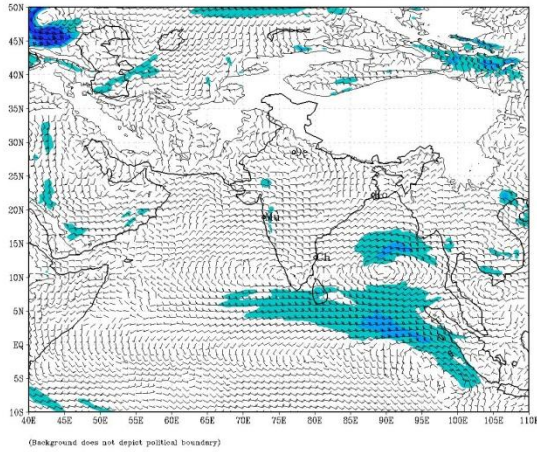
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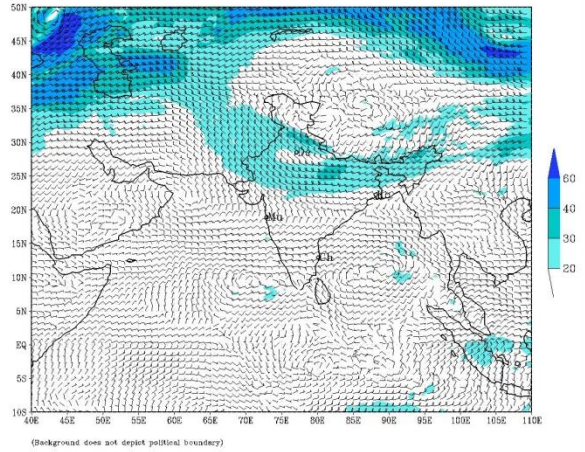
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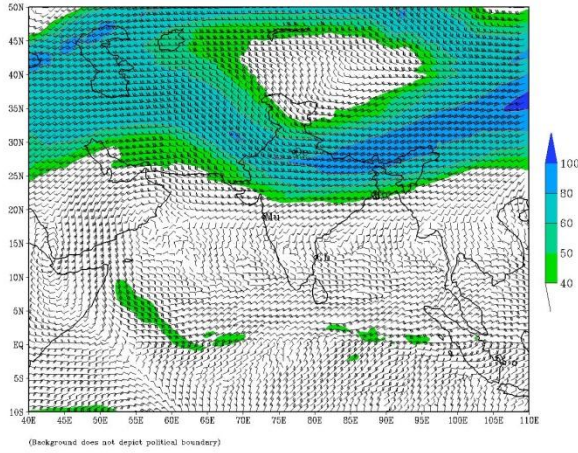
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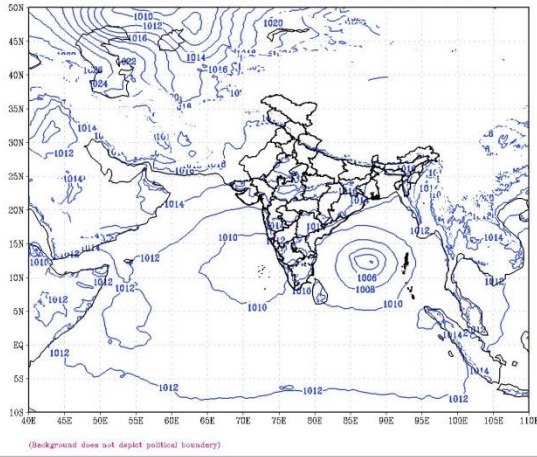
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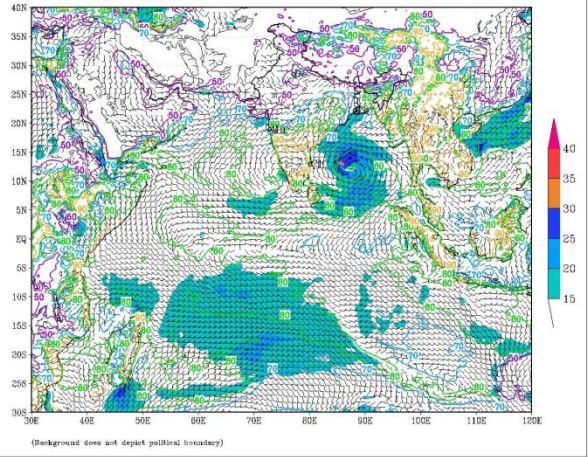
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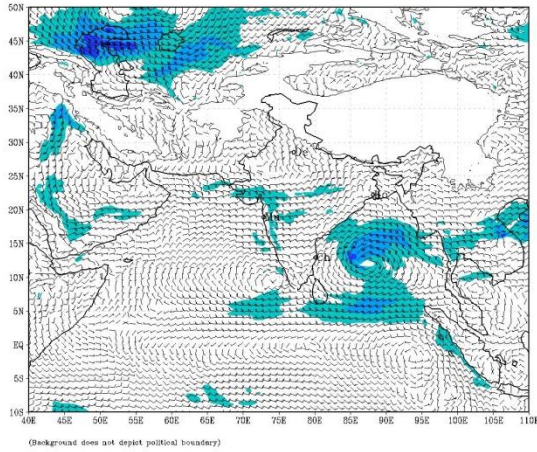
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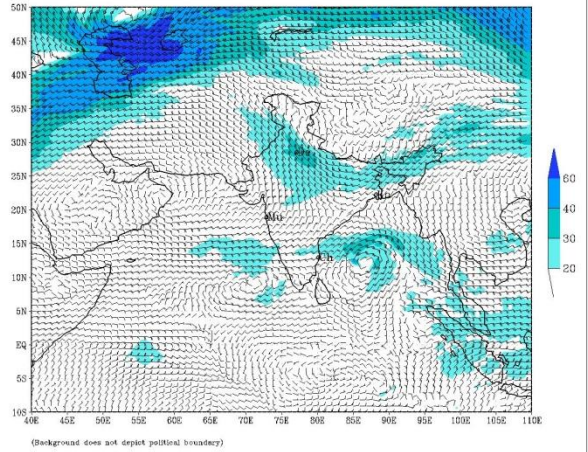
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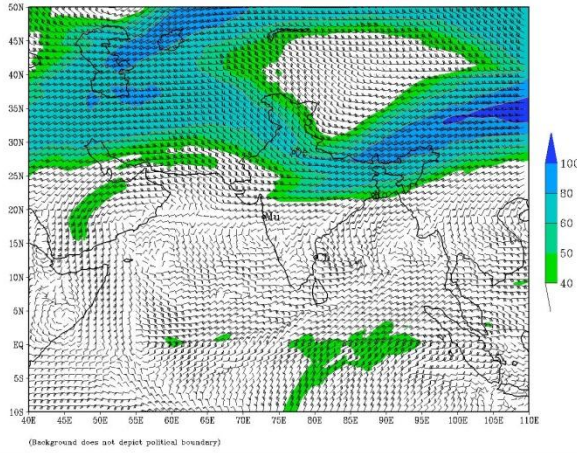
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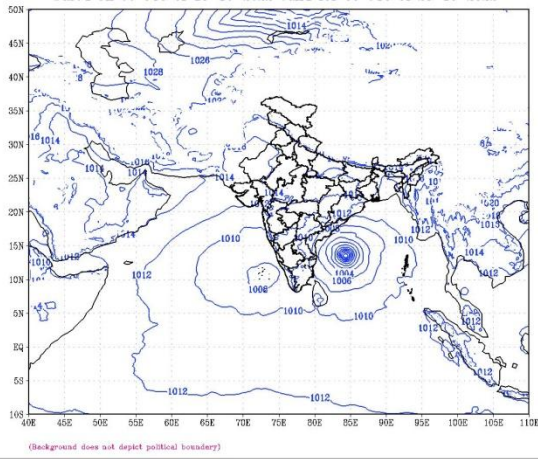
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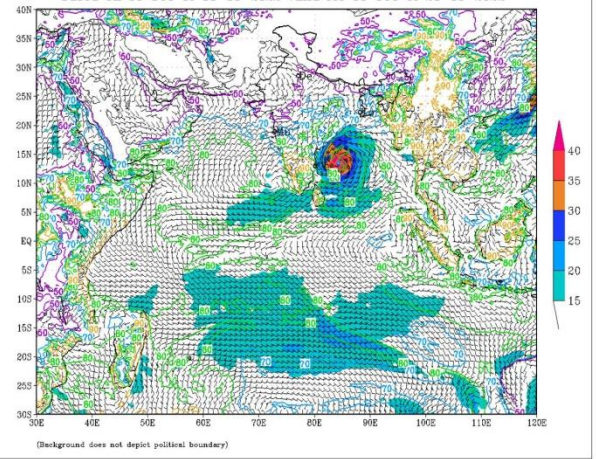
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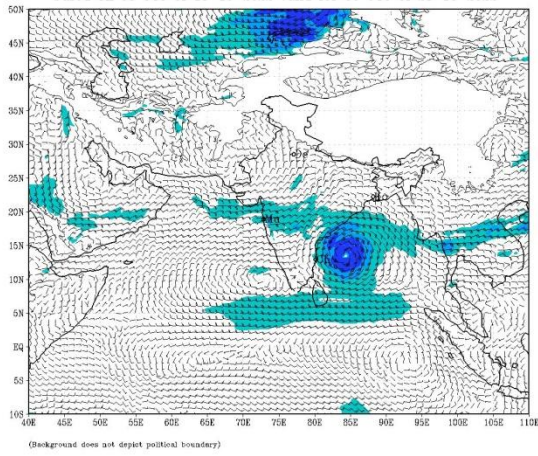
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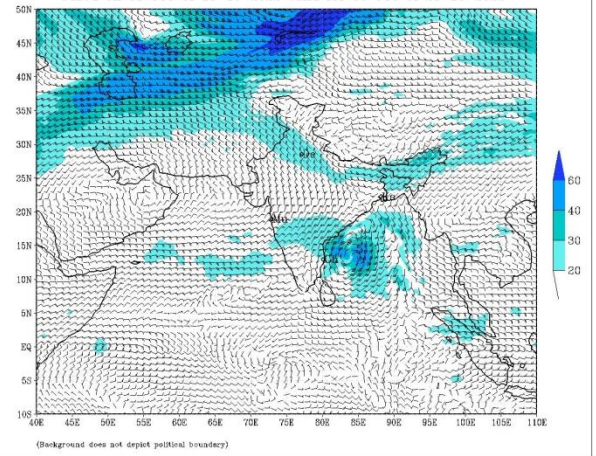
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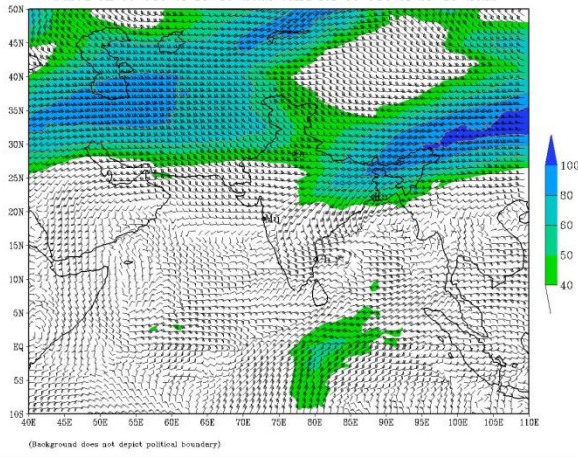
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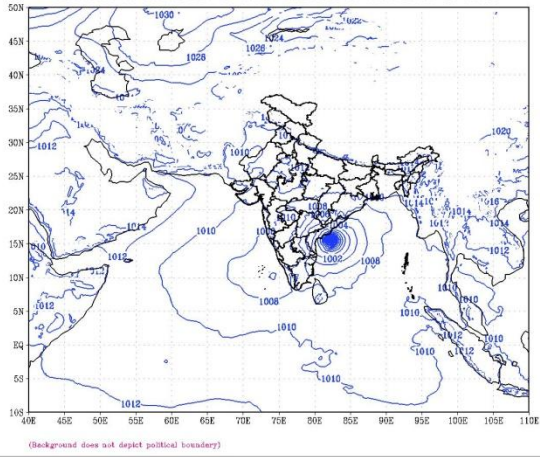
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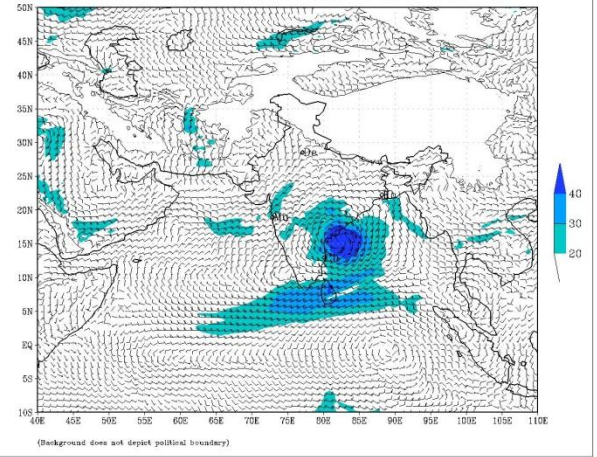
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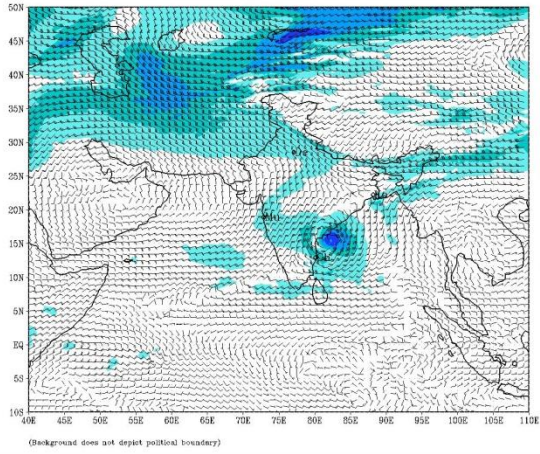
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based on 00 UTC of 18-10-2022 valid for 00 UTC of 24-10-2022



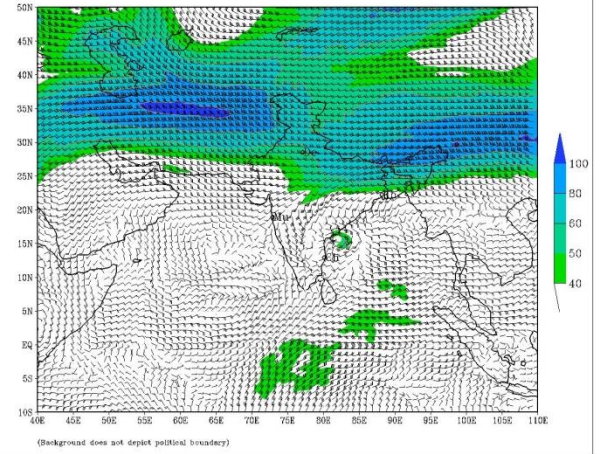
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 24-10-2022



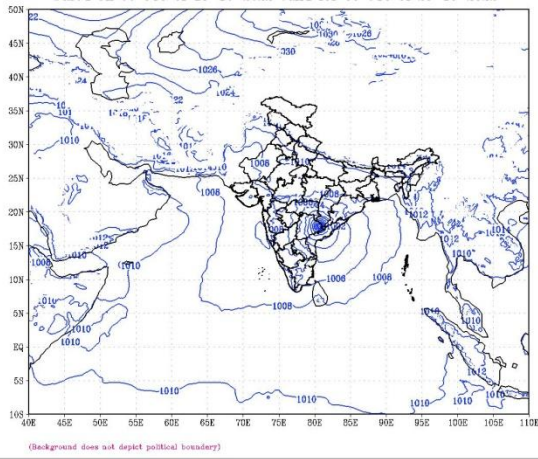
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 24-10-2022



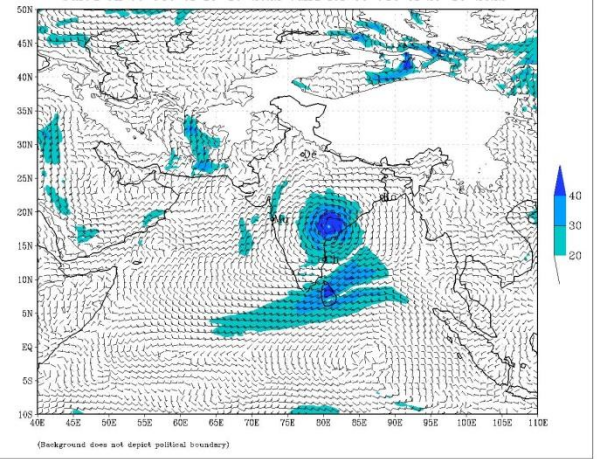
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 24-10-2022



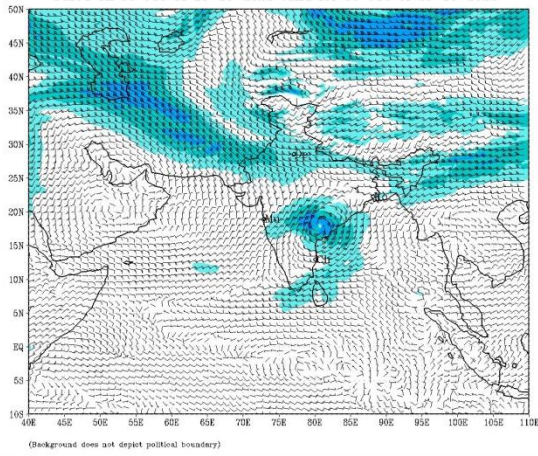
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 25-10-2022



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 25-10-2022



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 25-10-2022



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 18-10-2022 valid for 00 UTC of 25-10-2022

