



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

**Tropical Cyclone Forecast Programme
Report Dated 22nd October, 2023**

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

- Extremely Severe Cyclonic Storm “Tej” (pronounced as Tej) over westcentral & adjoining southwest Arabian Sea

The Extremely Severe Cyclonic Storm “Tej” (pronounced as Tej) over westcentral & adjoining southwest Arabian moved northwestwards with a speed of 16 kmph during past 6 hours, and lay centered at 1430 hours IST of today, the 22nd October over the same region, near latitude 12.9°N and longitude 54.7°E about 90 km east-northeast of Socotra (Yemen), 460 km south-southeast of Salalah (Oman) and 450 km southeast of Al Ghaidah (Yemen).

It is very likely to move northwestwards and cross Yemen coast close to Al Ghaidah (Yemen) around early hours of 24th October as a very severe cyclonic storm with wind speed of 125-135 kmph gusting to 150 kmph.

- Depression over westcentral Bay of Bengal

The Depression over westcentral Bay of Bengal moved nearly northwards with a speed of 11 kmph during past 6 hours and lay centered at 1430 hours IST of today, the 22nd October over the same region, near latitude 15.6°N and longitude 86.2°E about 520 km south-southeast of Paradip (Odisha), 680 km south-southwest of Digha (West Bengal), and 820 km south-southwest of Khepupara (Bangladesh).

It is likely to move nearly northwards and intensify into a deep depression during next 6 hours. Thereafter, it is likely to continue to move northwards till 23rd morning and then north-northeastwards during subsequent 2 days towards Bangladesh coast.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	28-30°C almost over entire BoB, 26-28 over southwest BoB adjoining to Sri Lanka coast, Gulf of Mannar, Comorin area.	29-30°C over southeast and adjoining southwest Arabian Sea, north AS. 26-28 over the system, central parts of AS, and less than 24 along and off Somalia, Yemen, Oman coasts.
Tropical Cyclone Heat	100-110 over eastcentral BoB.	50-60 over southeast & adjoining

Potential kJ/cm² (TCHP)	50-60 over most parts of BOB. Less than 40 along Andhra Pradesh and Tamil Nadu coasts, adjoining sea areas, over Gulf of Mannar and Comorin area.	southwest Arabian Sea. 20-30 over eastcentral and adjoining northeast AS, along and off west coast of India, less than 10 over westcentral and southwest AS, west coast of India.
Cyclonic Relative vorticity (X10⁻⁶s⁻¹)	70-80 over the system.	160-170 over the system centre and vertical extension upto 500 hpa level, 100 surrounding the system and vertical extension upto 500 hpa level.
Low Level convergence (X10⁻⁵ s⁻¹)	10-15 over the system and also over north to the system.	30 over the system centre, 10-20 to the northeast of it.
Upper Level divergence (X10⁻⁵ s⁻¹)	10-20 over the system and its surrounding areas.	40-50 over the system centre, 10-30 over its surrounding areas.
Vertical Wind Shear (VWS knots)	10 around the system, 20-25 its south and north.	10 over the system centre, 20-30 over the southwest AS, 20-25 over the central AS, 30-40 over the north and adjoining central AS.
Wind Shear Tendency (knots)	Decreasing tendency over the central BoB, increasing tendency over the north and adjoining central BoB.	Decreasing tendency towards the southeast of the system, increasing tendency in its forecasted path.
Upper tropospheric Ridge	Along 15°N over BoB	Along 17°N over AS

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the BoB & Andaman Sea:-

Scattered to broken low/mod clouds with embedded intense to very intense convection over central and adjoining north BoB, Andaman Sea. Scattered low/mod clouds with embedded mod to intense convection over rest of BoB.

(b) Over the Arabian Sea:-

Scattered to broken low/med clouds with embedded intense to very intense convection over southwest & westcentral AS. Scattered low/med clouds with embedded isol mod to intense convection over southeast & eastcentral AS.

(c) Convection outside India:

Scattered low/med clouds with embedded mod to intense convection over Sri Lanka Palk Strait, Gulf of Mannar, Maldives, Myanmar, Thailand, Gulf of Thailand, Cambodia, Hainan, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Celebes, IIs & Sea, Philippines, North Madagascar and over Indian Ocean between lat 5.0N to 10.0S long 45.0E to 100.0E.

M.J.O. Index:

MJO index is in Phase 2 with amplitude less than 1. It remain in phase 8 for next seven days with amplitude less than 1.

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	Depression (D) over westcentral BoB (16N/86E) on 22 nd , moves northeastward and lay over westcentral and adjoining northwest BoB (18N/87E) on 23 rd as SCS, moves northeastward and becomes CS over northwest and adjoining northeast BoB on 24 th , move further northeastward and lay over northeast BoB close to Bangladesh coast (22.5N/91E) as D on 25 th , less marked thereafter and cross the coast.	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS as on today 22 nd , system moves northwestwards and its centre lay over Yemen coast (16.1N/52E) on 23 rd night or early hours of 24 th , system will cross the Yeman coast on 24 th and weakens thereafter.
IMD-GEFS	Deep Depression (DD) over westcentral BoB (16N/86E) on 22 nd , moves northeastward and lay over westcentral and adjoining northwest BoB (18N/87E) on 23 rd as CS, moves further northeastward and becomes DD over northwest and adjoining northeast BoB on 24 th , move further northeastward and lay over northeast BoB close to Bangladesh coast (22.5N/91E) as LPA on 25 th , less marked thereafter and cross the coast.	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS on 22 nd , system moves northwestwards and its centre lay over Yemen coast near (16.1N/52.5E) around night of 23 rd or early hours of 24 th as CS, will cross the coast on 24 th as CS and weaken thereafter.
IMD-WRF	Deep Depression (D) over westcentral BoB (16N/86E) as on night of today 22 nd , moves northeastward and lay over westcentral and adjoining northwest BoB (18N/87E) on 23 rd as CS, moves northward and becomes SCS over northwest and adjoining westcentral BoB off Odisha coast (20N/87E) on 24 th ,	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS as on today 22 nd , system moves northwestwards and its centre lay close to Yemen coast (15.5N/53E) on 23 rd night or early hours of 24 th as VSCS, system will cross the Yeman coast on 24 th night or early hours of 25 th , weakens thereafter.
NCMRWF-NCUM	DD over westcentral BoB (16N/85E) as on today 22 nd night, moves northeastward and lay over westcentral and adjoining northwest BoB (18N/89E) as CS on 23 rd , moves further northeastward and lay over northeast BoB close to Bangladesh coast (21.5N/91.5E) as D on 24 th , weaken thereafter and cross the coast.	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS on today 22 nd , system moves northwestwards and its centre lay close to Yemen coast near (16.0N/52.0E) around night of 23 rd or early hours of 24 th as SCS, will cross the coast on 24 th as SCS and weaken thereafter.
NCMRWF-NEPS	DD over westcentral BoB (16N/85E) as on today 22 nd night, moves northeastward and lay over westcentral and adjoining northwest BoB (18N/89E) as CS on 23 rd , moves further northeastward and lay over northeast BoB close to Bangladesh coast (21.5N/91.5E) as D on 24 th , weaken thereafter and cross the coast.	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS on today 22 nd , system moves northwestwards and its centre lay close to Yemen coast near (16.0N/52.0E) around night of 23 rd or early hours of 24 th as SCS, will cross the coast on 24 th as SCS and weaken thereafter.

NCMRWF-UM (Regional)	SCS/VSCS over westcentral BoB (16.5N/85.5E) on 22 nd , moves northeastward and becomes ESCS over westcentral, adjoining eastcentral BoB and adjoining north BoB (20N/88E) on 23 rd , will become less marked on 24 th .	
ECMWF	DD over westcentral BoB (15.7N/86.7E) on 22 nd , moves then northeastward and becomes SCS over westcentral and adjoining north BoB (18.0N/87.1E) on 23 rd , will moves further northeastward and lay over northeast and adjoining northwest BoB (20.0N/89.9E) as DD/CS on 24 th , lay over northeast BoB close to Bangladesh coast (21.7N/90.4E) as CS on 25 th , moves further northeastward and cross the Bangladesh coast near 22.46N/91.5E as D on 25 th .	Yesterday's SCS intensified lay over westcentral AS (13.6N/53.8E) as ESCS as on today 22 nd , moves northwestwards and lay close to Yemen coast (15.4N/52.4E) as VSCS on 23 rd , System moves northwestward and cross the coast close to Yemen (15.4N/51.6E) as SCS on early hours of 24 th , and weaken thereafter over land.
NCEP-GFS	D over westcentral BoB (16N/85E) as on today 22 nd night, moves northeastward and lay over westcentral and adjoining northwest BoB (18N/89E) as DD on 23 rd , moves further northeastward and lay over northeast and adjoining northwest BoB (19N/90E) as D on 24 th , weaken thereafter and cross the coast, moves further northeastward and lay over northeast BoB close to Bangladesh coast ad LPA on 25 th , weakens further and cross the coast.	Yesterday's SCS moved northwestward and lay over westcentral AS (14.8N/53.5E) as ESCS on today 22 nd , system moves northwestwards and its centre lay close to Yemen coast near (16.0N/52.0E) around night of 23 rd or early hours of 24 th as VSCS, will cross the coast on 24 th as SCS and weaken thereafter.
IMD-Genesis Potential Parameter	Potential zone of Cyclogenesis over westcentral BoB on today 22 nd , westcentral and adjoining north BoB on 23 rd , over northeast BoB on 24 th .	Potential zone of Cyclogenesis over westcentral AS on today 22 nd , close to the Yemen-Oman coast on 23 rd .

Summary and conclusion:

1. For the Bay of Bengal:

The global models are in agreement that the depression over westcentral BOB is likely to intensify further into a deep depression during next 06 hours and further intensify into a cyclonic storm around 1800 UTC of 23rd October 2023. There is consensus among various models wrt movement towards Bangladesh. Most of the models are indicating intensification upto deep depression stage, however CMC and IMD-GEFS are indicating higher intensity.

Considering all these, the depression over westcentral BOB is very likely to move nearly northwards and intensify into a deep depression during next 6 hours. Thereafter, it is likely to continue to move northwards till 0000 UTC of 23rd and then north-northeastwards during subsequent 2 days towards Bangladesh coast.

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
-	-	-	-	-	-	-

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

2. For the Arabian Sea:

Most of the models are indicating the system to cross Yemen coast. IMD multi model guidance is also indicating landfall over Yemen. Most of the models are indicating weakening prior to landfall. This is supported by decreasing ocean thermal energy and increasing wind shear and cold dry air entrainment when system will approach coast.

In view of above, the Extremely severe cyclonic storm “Tej” (pronounced as Tej) is very likely to move northwestwards and cross Yemen coast close to AL Ghaidah (Yemen, 41398) during 1800-2100 UTC of 23rd October as a very severe cyclonic storm with wind speed of 125-135 kmph gusting to 150 kmph.

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
-	-	-	-	-	-	-

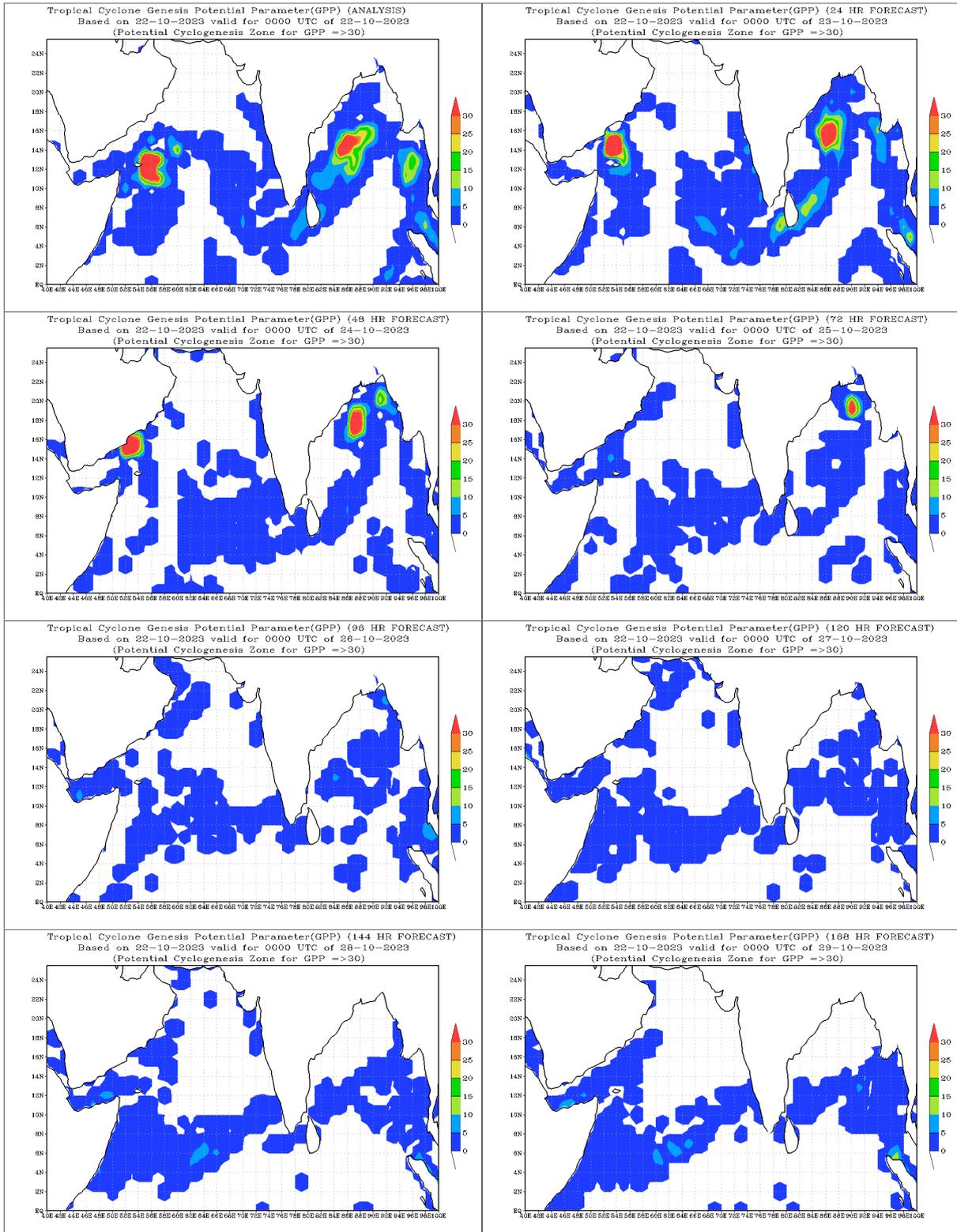
“-“indicate that Cyclogenesis has already occurred. The above table indicates probability of cyclogenesis (formation of depression).

Advisory for fishermen:

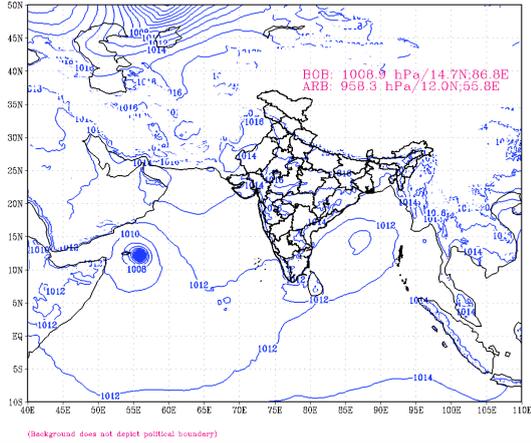
Fishermen are advised not to venture into following areas:

- ❖ **Westcentral Arabian Sea** from 23rd October onwards till 25th evening.
- ❖ Those out at sea are advised to return to coast.
- ❖ **Westcentral and adjoining east and south Bay of Bengal** on 22nd October.
- ❖ **Westcentral Bay of Bengal** on 23rd October onwards.
- ❖ **North Bay of Bengal and along & off Odisha, West Bengal and Bangladesh coasts** from 24th to 26th October.

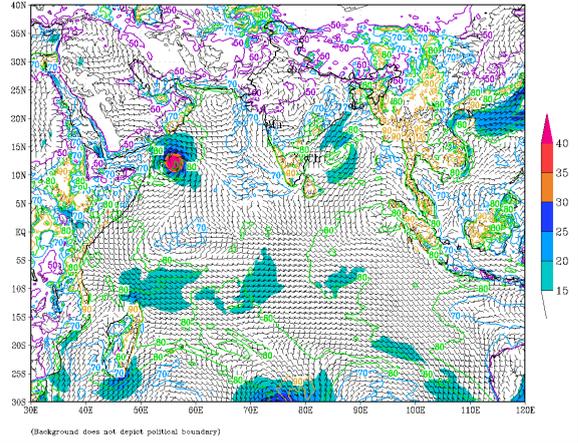
Intense Observation Period (IOP) is suggested for Oman and Yemen coasts on 24th and 25th October, Odisha coast on 24th & 25th and West Bengal and Bangladesh coasts on 25th and 26th October.



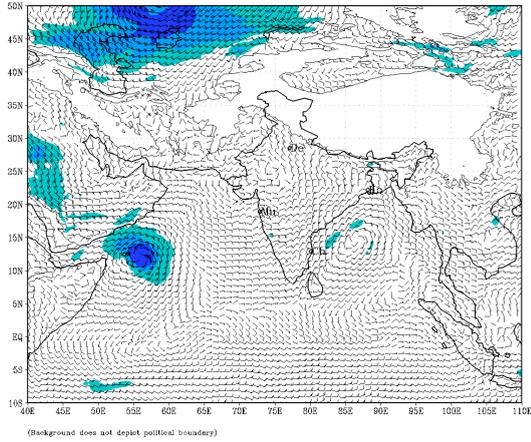
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 22-10-2023



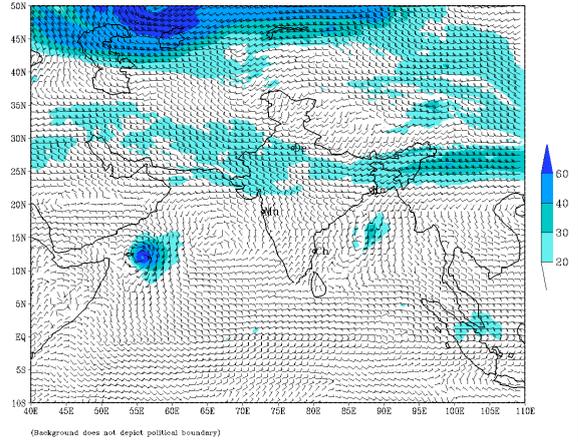
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 22-10-2023



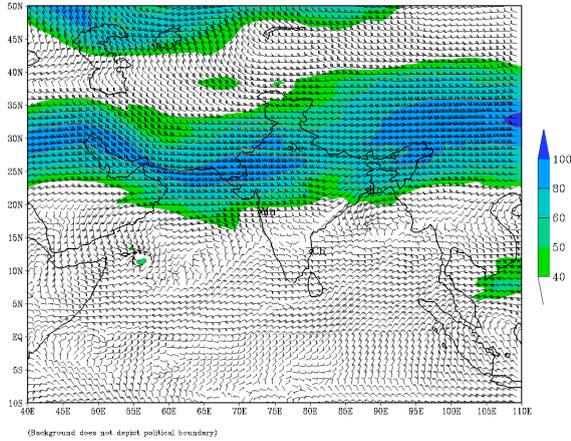
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 22-10-2023



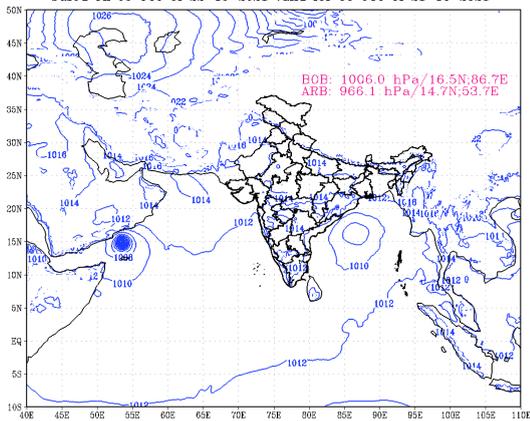
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)
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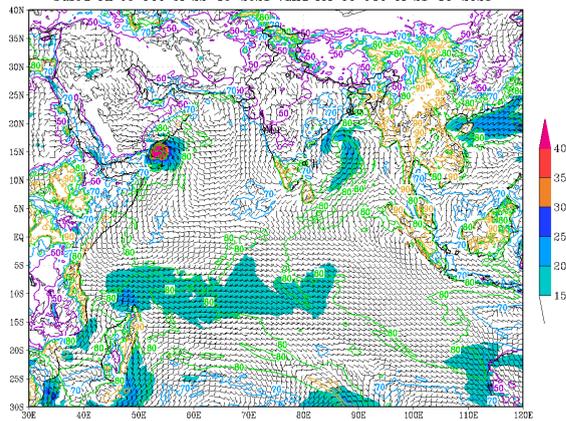


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)
based on 00 UTC of 22-10-2023 valid for 00 UTC of 23-10-2023



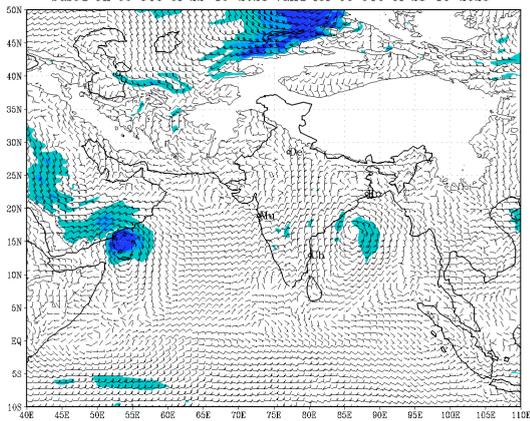
(Background does not depict political boundary)

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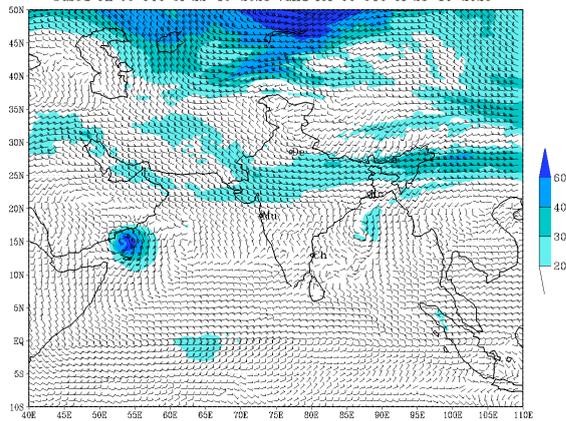
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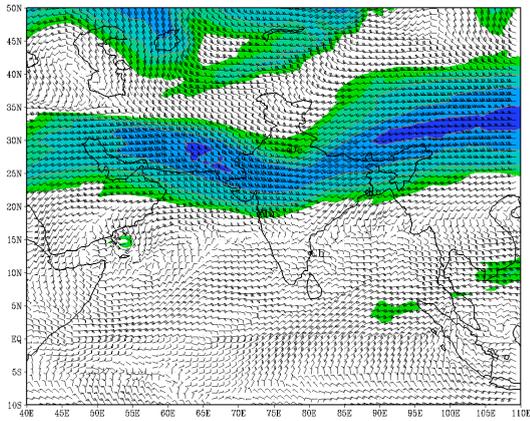
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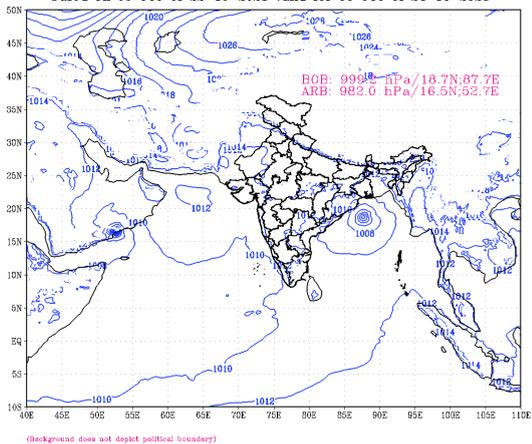
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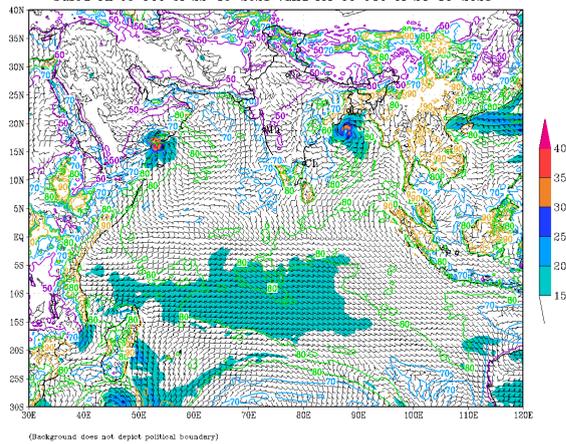


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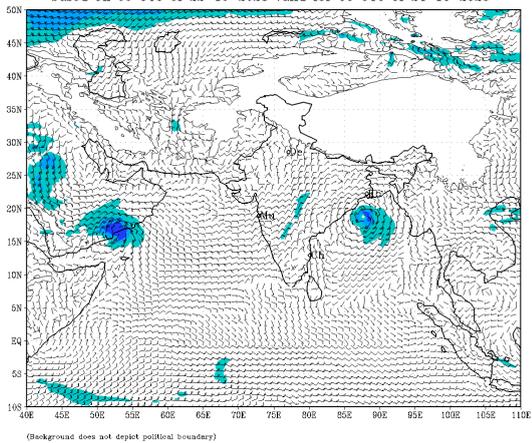
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 22-10-2023 valid for 00 UTC of 24-10-2023



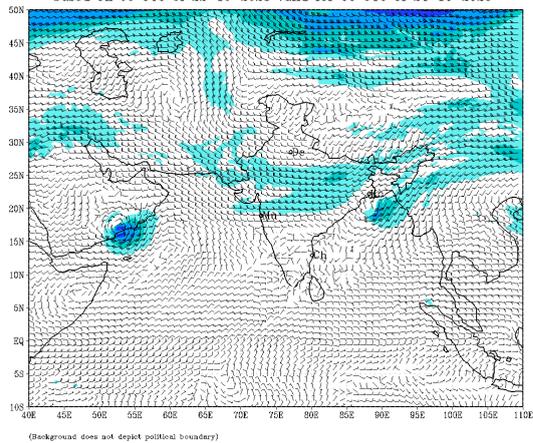
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 22-10-2023 valid for 00 UTC of 24-10-2023



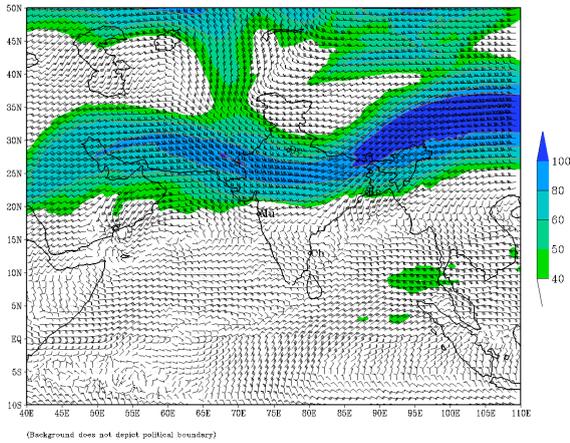
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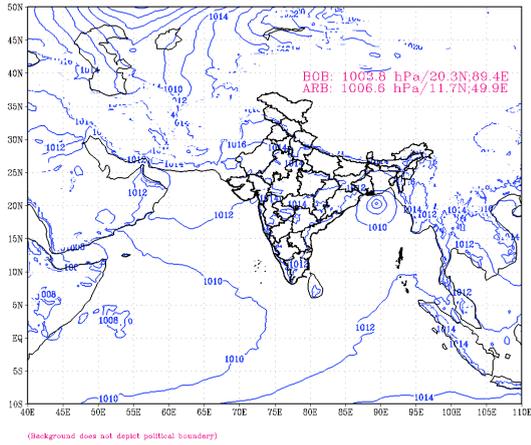
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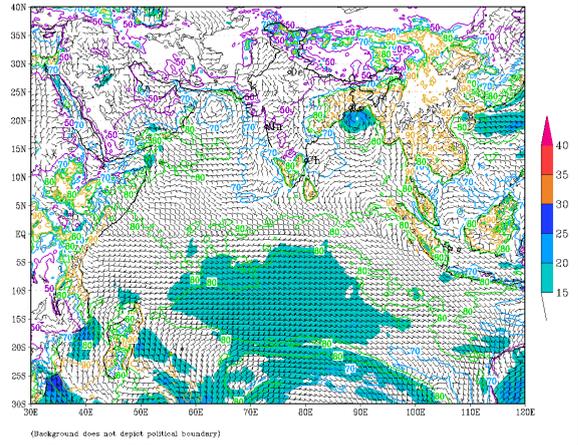
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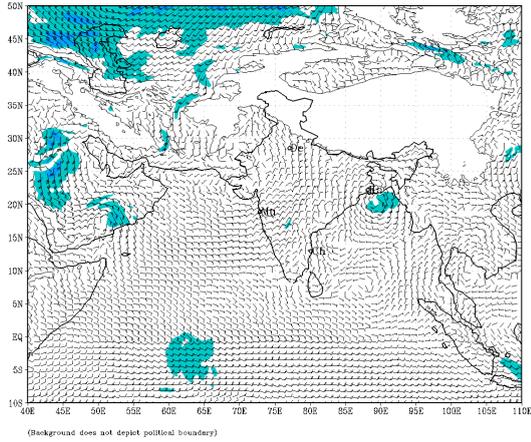
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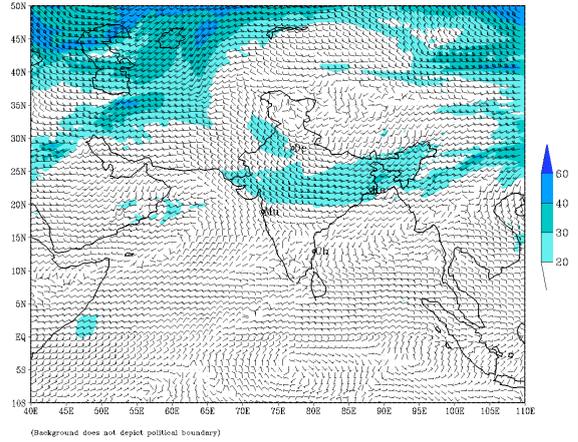
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 25-10-2023



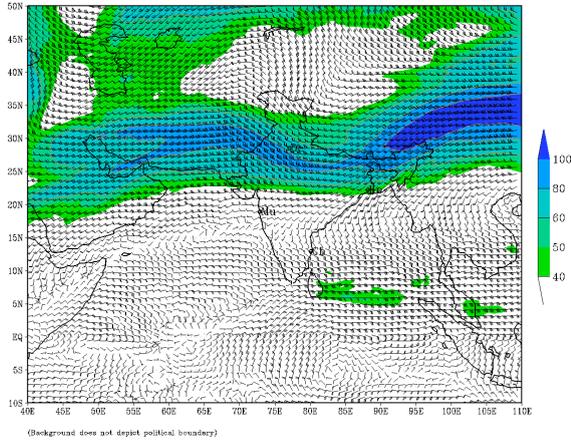
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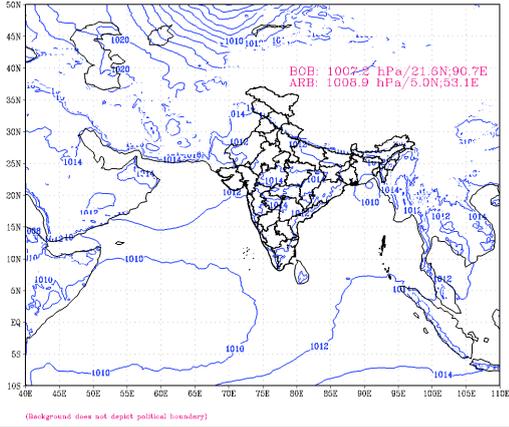
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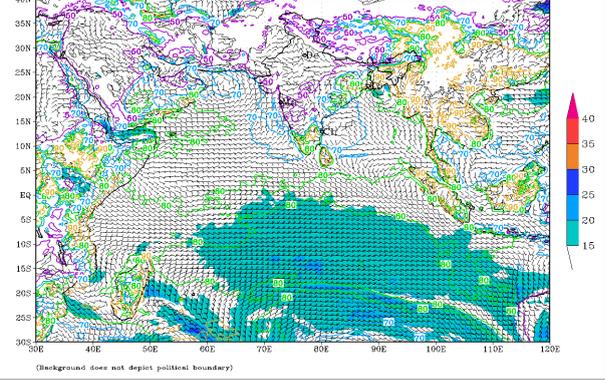
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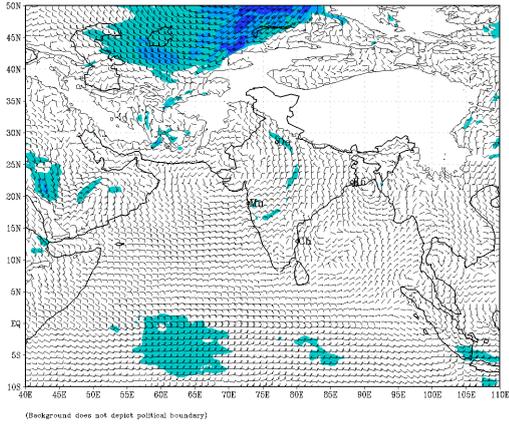
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
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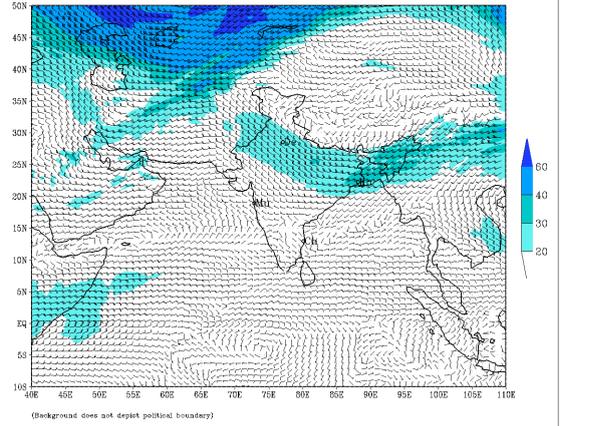
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 22-10-2023 valid for 00 UTC of 26-10-2023



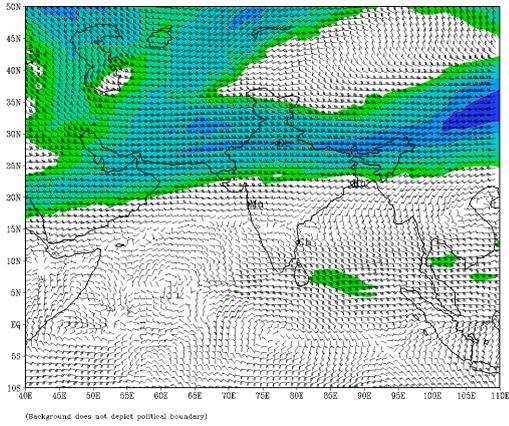
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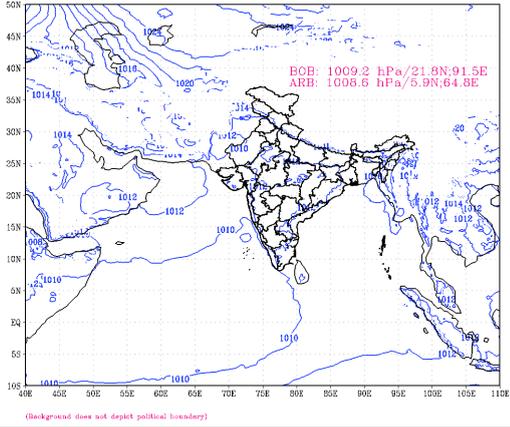
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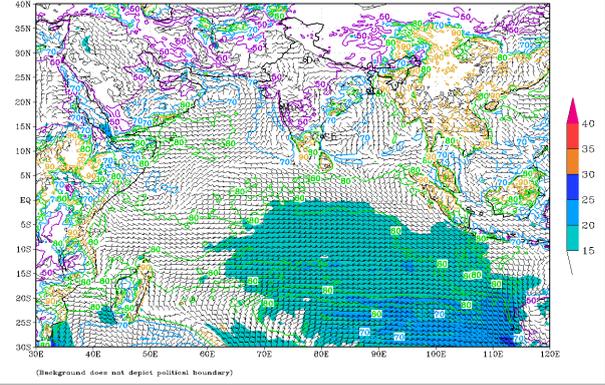
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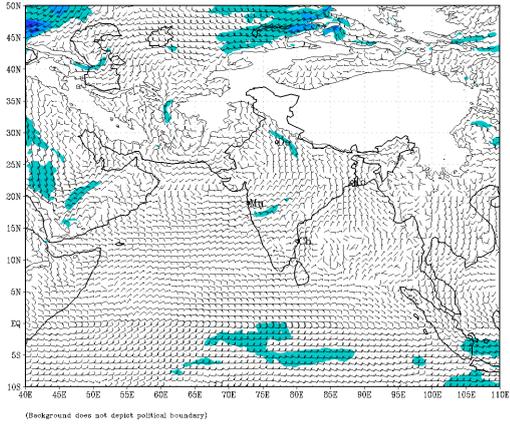
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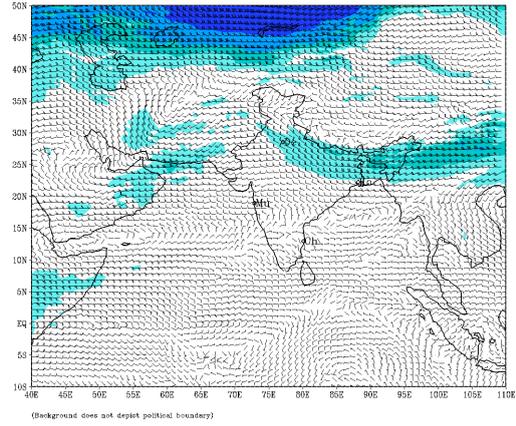
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 27-10-2023



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 27-10-2023



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 27-10-2023



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
 based on 00 UTC of 22-10-2023 valid for 00 UTC of 27-10-2023

