



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

**Tropical Cyclone Forecast Programme
Report Dated 17th October, 2023**

Time of Issue: 1230 UTC

Synoptic features (based on 0300 UTC analysis):

- Yesterday's cyclonic circulation over southeast Arabian Sea and adjoining Lakshadweep area in lower tropospheric levels with vertical extension up to 3.1 km above mean sea level persists over the same region. Under its influence, a low pressure area is likely to develop over southeast & adjoining eastcentral Arabian Sea during next 36 hours. It is likely to move further west-northwestwards and intensify into a depression over central Arabian Sea around 21st October.
- A cyclonic circulation lay over southeast Bay of Bengal and adjoining Andaman Sea extending up to 3.1 km above mean sea level, at 0300 UTC of 17th October, 2023. It is likely to move west-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) °C	29-30°C over entire BOB. 30-31°C over some parts of westcentral BOB.	29-30°C over south and eastcentral Arabian sea.
Tropical Cyclone Heat Potential (TCHP) kJ/cm ²	100-120 over eastcentral BoB. 60-80 over remaining parts of BOB. 20-30 over southwest BOB.	60-80 over eastcentral & south Arabian Sea. 20-30 over the west coast.
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 westcentral & adjoining southeast BOB with vertical extension upto 700 hpa levels.	Positive vorticity of 40-500 over Southeast AS with vertical extension upto 700 hPa level. Positive vorticity of 30-40 over Comorin Area with vertical extension upto 700 hPa level.
Low Level convergence (X10 ⁻⁵ s ⁻¹)	20-30 over southeast BOB and south Andaman sea.	15 over southeast & adjoining east central Arabian sea.
Upper Level divergence (X10 ⁻⁵ s ⁻¹)	20-30 over south BOB & south Andaman Sea.	10-20 over south Arabian sea & adjoining eastcentral Arabian Sea.

Vertical Wind Shear (VWS knots)	Moderate (10-15) over south & central BoB.	Low (5-10) over south & central AS.
Wind Shear Tendency (knots)	Decreasing tendency over major parts of BoB.	Increasing over central AS & decreasing over southeast AS.
Upper tropospheric Ridge	Along 10.0°N over BoB.	Along 12.0°N over AS

Satellite observations based on INSAT imagery (0300 UTC):

(a) Over the BoB & Andaman Sea:-

At 0300 UTC, scattered to broken low and medium clouds with embedded intense to very intense convection lay over south Bay of Bengal and south Andaman sea. Scattered low and medium clouds with embedded isolated moderate to intense convection lay over eastcentral Bay of Bengal and north Andaman Sea.

(b) Over the Arabian Sea:-

At 0300 UTC, scattered low and medium clouds with embedded moderate to intense convection lay over central & south Arabian Sea, south Lakshadweep islands area and Comorin area.

(c) Convection outside India:

Scattered low and medium clouds with embedded moderate to intense convection lay over Sri Lanka, Palk strait, Gulf of Mannar, North Maldives, north Pakistan, Nepal, Bhutan, Tibet, China, East China sea, Taiwan, South Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, Vietnam, Gulf of Tonkin, Hainan, Sumatra, strait of Malacca, Malaysia Borneo, south china sea, java sea, Celebes islands & sea Philippines, sulu sea, Madagascar, Mozambique channel and over Indian ocean between latitude 5.0N to 10.0S 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	The extended cycir over southcentral BoB on 18 th , a cycir over the same region on 19 th (10N,88E), an extended low pressure area (LPA) over the southeast BoB on 20 th , becomes LPA/depression (D) over eastcentral BoB on 21 st (15N/91E), deep depression (DD)/cyclonic storm (CS) over eastcentral BoB (17N/91E) on 22 nd , moving northeastward and become severe cyclonic storm (SCS)/very severe cyclonic storm (VSCS) over eastcentral and adjoining northeast BoB (19N/92E) on 23 rd , crosses the north Myanmar and adjoining Bangladesh	Extended Cycir over southeast AS and adjoining Lakshadweep area on 17 th , LPA over the same region around 18 th evening/ 19 th morning, moves westnorthwest ward and becomes D over southwest and adjoining westcentral AS (12N/57E) on 23 rd , SCS/VSCS over westcentral AS (14N/56E) on 24 th , moves northwesterly and lay over westcentral AS off Yemen coast (16N/55.5E) as VSCS on 26 th , cross the Yemen coast on the same day and lay over coastal Yemen (18N/54.5E) as DD on 27 th .

	coast on the same day.	
IMD-GEFS	Extended cycir over southwest BoB on 17 th , LPA over eastcentral and adjoining westcentral BoB (15N/88E) by 20 th , D over eastcentral BoB (15.5N/90E) by 21 st , moving northnorthwestward and lay over eastcentral BoB (16N/89E) as D on 22 nd , lay over southern part of north BoB and adjoining central BoB (21N/86.5E) with same intensity on 23 rd , cross around West Bengal and Bangladesh border (22N/89E) with same intensity on 24 th , less marked thereafter.	LPA over Lakshadweep and adjoining southeast AS (10N/65E), will moves westnorthwest ward and becomes D by the evening of 21 st over southwest AS (10N/60E), moves northwest ward and becomes DD over westcentral and adjoining southwest AS (13N/57E) on 24 th , continue to move in the same direction and becomes DD/CS over westcentral AS (16N/56E) on 25 th .
IMD-WRF	An extended low over southeast and adjoining southwest BoB (11.5N/87E) by 18 th , becomes LPA over the same region by 19 th , moves northeast ward and becomes D over eastcentral BoB (15N/90E) by 20 th .	An extended cycir over southeast and adjoining southwest AS on 17 th , cycir over southwest AS (11N/64E) on 18 th , becomes D over southwest AS (11.5N/60.5E) by 20 th .
NCMRWF-NCUM	A cycir over southwest BoB (10N/85E) on 17 th , LPA over westcentral BoB (14.8N/85E) on 20 th , Depression over westcentral BoB (15N/85E) on 22 nd , Cyclonic Storm (CS) over westcentral BoB(17.5N/84E) on 23 rd , crossing south Odisha/north AP coasts (19.8N/85E) as VSCS on 24 th .	Cycir over southeast AS (10N/65E) on 17 th , LPA over southwest AS (10.5N/62E) on 20 th , to move towards Gulf of Aden as LPA till 22 nd , Depression over westcentral AS close to Gulf of Aden (12N/52E) on 23 rd & 24 th , LPA over north Somalia.
NCMRWF-NEPS	Not Available	Not Available
NCMRWF-UM (Regional)	LPA over southeast BoB (12N/86E) on 19 th , Depression over eastcentral and adjoining westcentral BoB (15N/86E) on 21 st , DD over the same region (15N/86E) on 22 nd .	LPA over southwest AS (10N/64E) on 19 th , Depression over westcentral AS (14.5N/55.5E) 22 nd .
ECMWF	LPA southeast and adjoining westcentral BoB (13N/86E) on 21 st , Depression over westcentral BoB (14.0N/84.8E) on 23 rd , To move northwestwards and cross south Odisha-north AP coasts as depression on 25 th midnight 1800 UTC near (18.0N/83.5E).	LPA over southeast and adjoining southwest AS (11.8N/64.5E) on 19 th , Depression over southwest AS (11.3N/61E) on 21 st , Deep Depression (DD) over westcentral AS (13N/59E) on 22 nd and Cyclonic storm over westcentral AS (13.3N/58E) on 22 nd . To intensify further into VSCS, move northwestwards and cross Oman coasts as CS (18.2N/56.1E) on 0300 UTC of 25 th .
NCEP-GFS	LPA over eastcentral BoB on (14.3N/91.4E) on 1800UTC of 20 th , To move nearly north-northeastwards and cross south Bangladesh as a cycir on 26 th /0600 UTC.	LPA over southwest AS (12.5N/62.0E) on 18 th , WML over southeast AS (10.5N/65.0E) on 1200 UTC of 19 th . Depression over southeast AS (10.7N/65.2E) on 20 th /0600 UTC, CS over southeast AS (11.3N/64.0E) on 21 st , VSCS over westcentral AS (13.2N/62.2E) on 22 nd , to move nearly northwards till 24 th recurve northeastwards thereafter crossing Pakistan-Gujarat coasts on

		25 th evening (0900 UTC) near 24.2N/64.1E.
IMD-Genesis Potential Parameter	A Potential zone for cyclogenesis over southwest BoB on 18 th , eastcentral BoB on 20 th & 21 st and eastcentral and adjoining northeast off Myanmar coast on 22 nd .	A potential zone for cyclogenesis over southeast AS on 18 th , 19 th & 20 th , over westcentral AS on 20 st , 22 nd & 23 rd .

Summary and conclusion:

1. For the Bay of Bengal:

There is large variation among various models with respect to area of formation of low pressure area. Considering consensus, a low pressure area may form over southeast and adjoining central Bay of Bengal. The date of formation of low pressure area is varying from 19th to 21st. Most of the models are indicating unanimously the formation of depression over the central Bay of Bengal. Models like GFS and NCUM are indicating the system to intensify into a cyclonic storm. However, other models are not indicating the further intensification. With respect to crossing, NCUM and ECMWF are crossing over south Odisha coast, IMD GFS & NCEP GFS are indicating crossing over south Bangladesh.

Hence, it is inferred that the cyclonic circulation over southeast Bay of Bengal and adjoining Andaman Sea is likely to move west-northwestwards and under its influence a low-pressure area is likely to form over central parts of Bay of Bengal around 20th October.

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	Low

2. For the Arabian Sea:

Most of the models are indicating formation of low pressure area over southwest Arabian Sea. However, IMD GFS is indicating low pressure area over southeast Arabian Sea. However, there is variation among various models with respect to date of formation with GFS group indicating low pressure area on 18th and ECMWF and NCUM group on 19th. Most of the models are indicating formation of depression over southwest and adjoining westcentral Arabian Sea. However, there is variation again with respect to date of formation. Considering the consensus depression is likely during 21st & 22nd. Most of the models except NCUM group are indicating the system to intensify to a severe cyclonic storm. There is also variation among various models with respect to crossing point and crossing intensity. Most of the models are (except NCEP-GFS) are indicating the crossing point Oman-Yemen coasts. However, NCEP-GFS is indicating the crossing over Pakistan-Saurashtra (India) coast. NCUM group of models is indicating the system to cross Oman-Yemen coasts as low pressure area.

Hence, it is inferred that under the influence of cyclonic circulation over southeast Arabian Sea and adjoining Lakshadweep area, a low pressure area is likely to develop over southeast & adjoining eastcentral Arabian Sea during next 24 hours. It is likely to move further west-northwestwards and intensify into a depression over central Arabian Sea around 21st October.

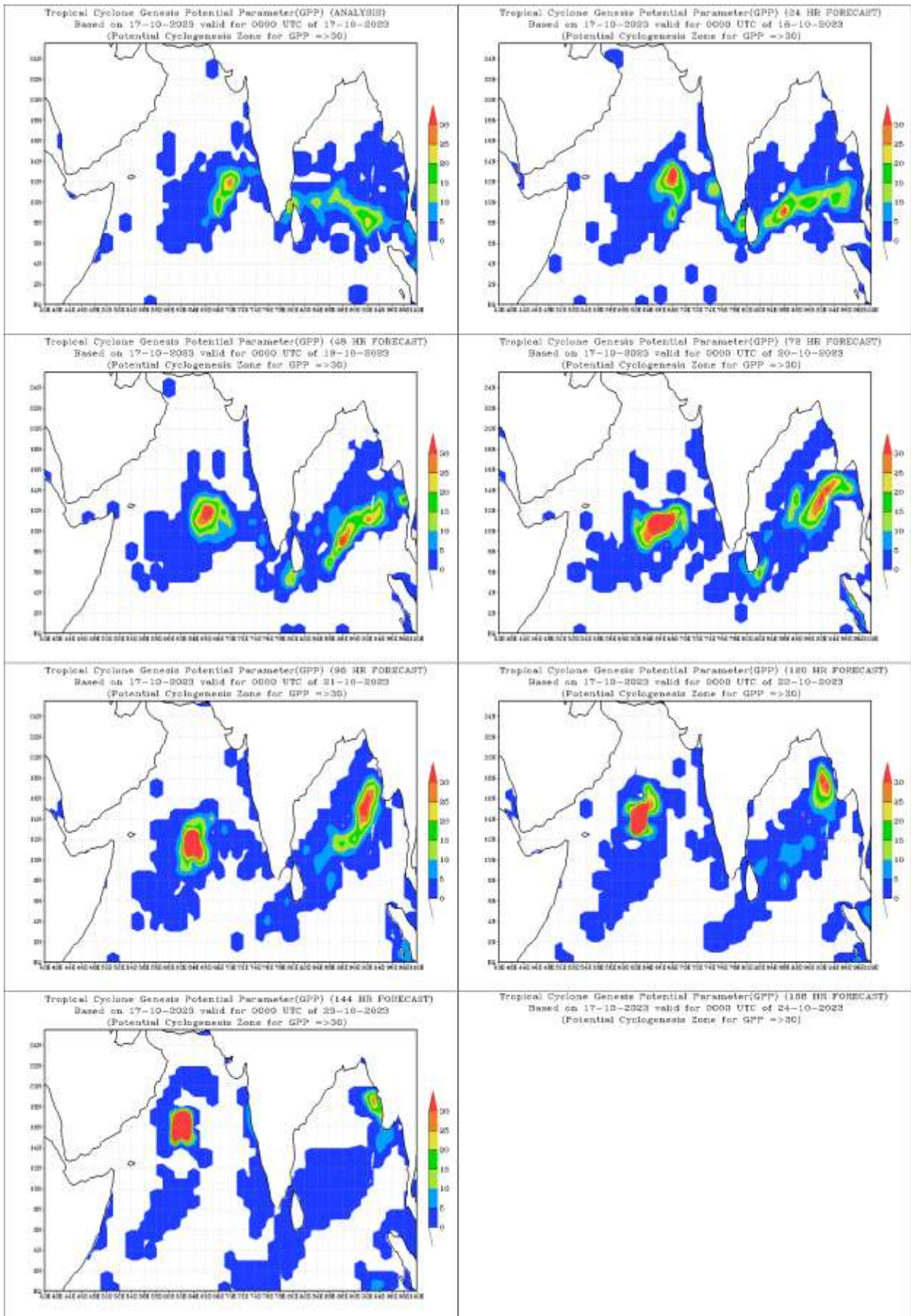
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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

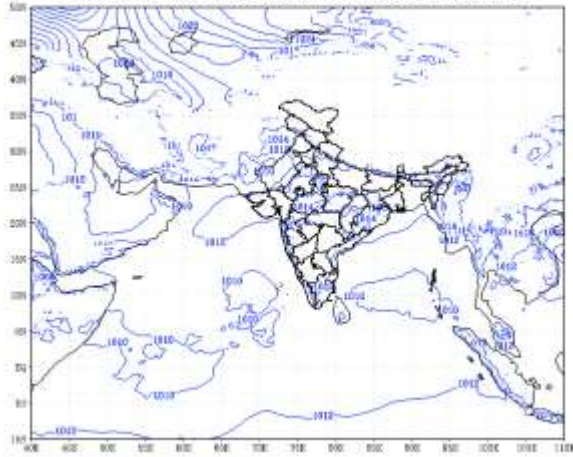
Advisory:

Both the cyclonic disturbances mentioned above are under continuous watch and being monitored regularly.

Intense Observation Period (IOP) is suggested for Lakshadweep Islands on 17th.

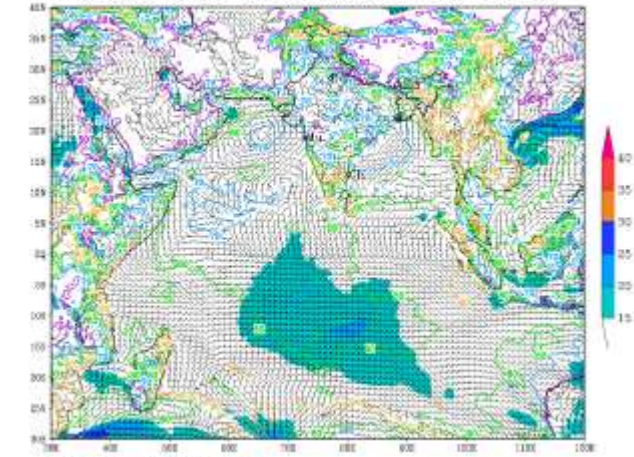


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 17-10-2023



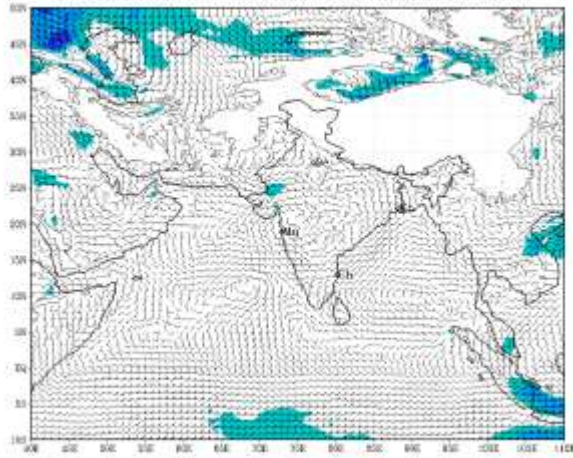
(Background line and depth political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 17-10-2023



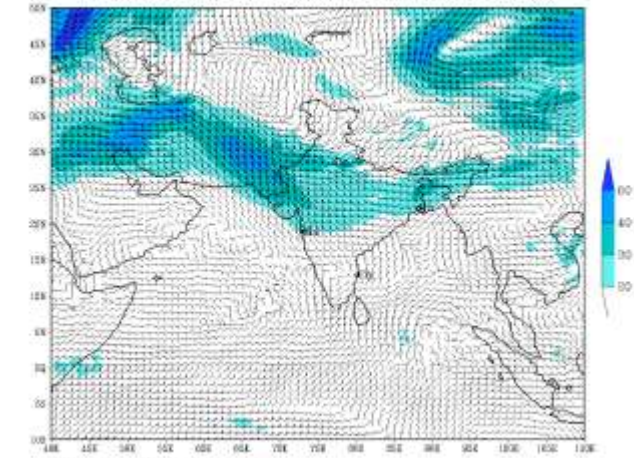
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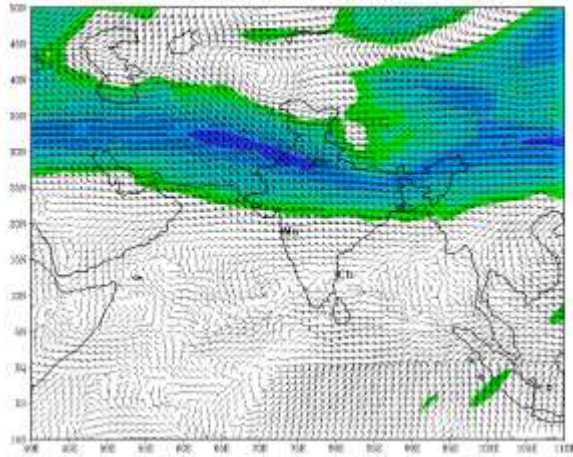
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 17-10-2023



(Background line and depth political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 17-10-2023



(Background line and depth political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)
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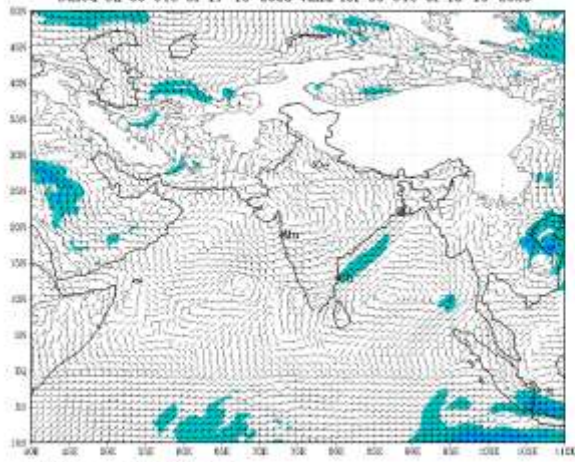
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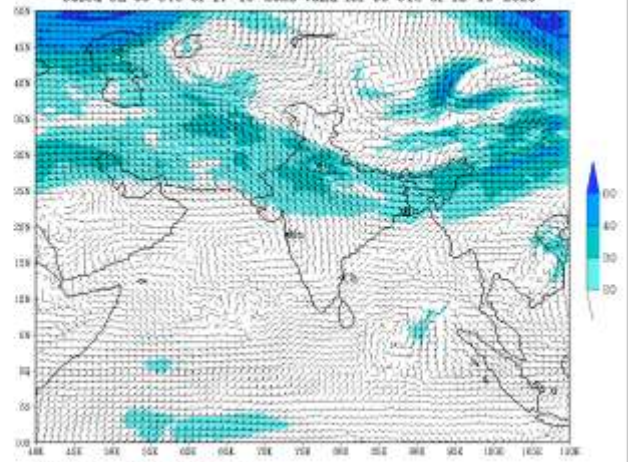
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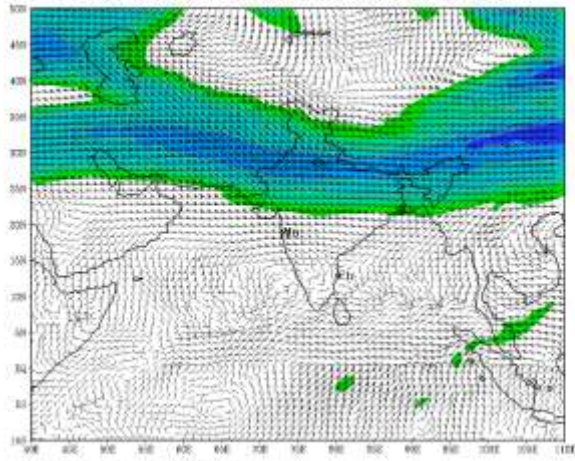
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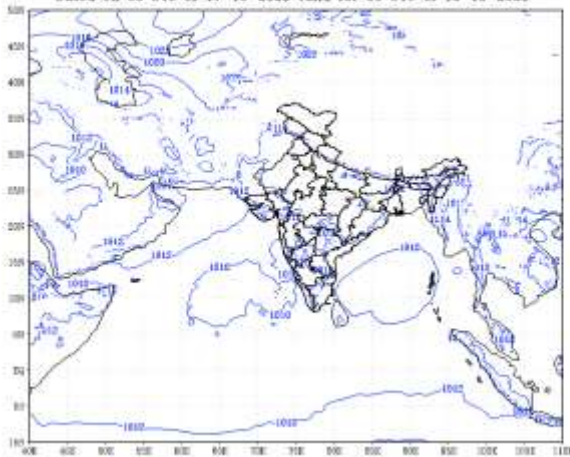
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(Background area not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
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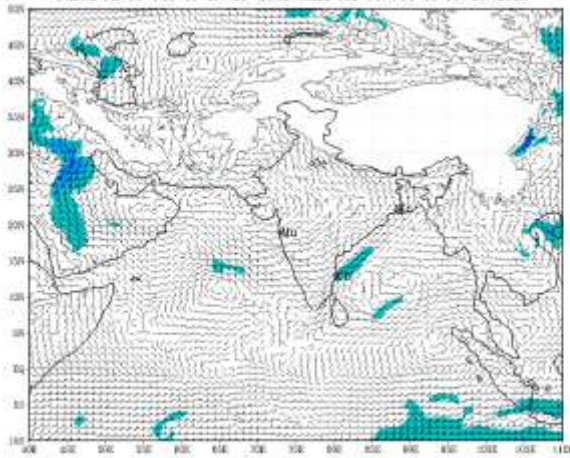
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
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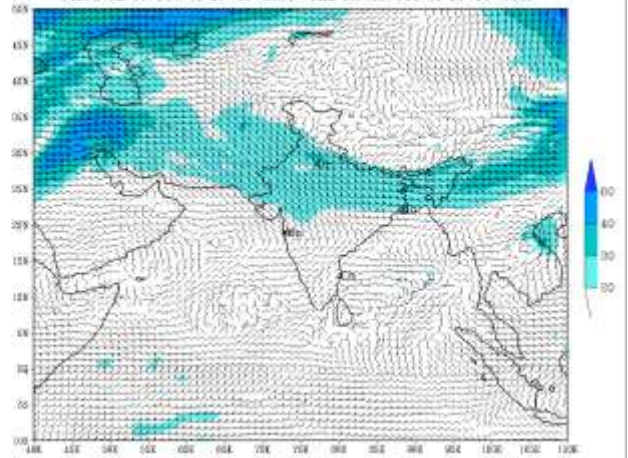
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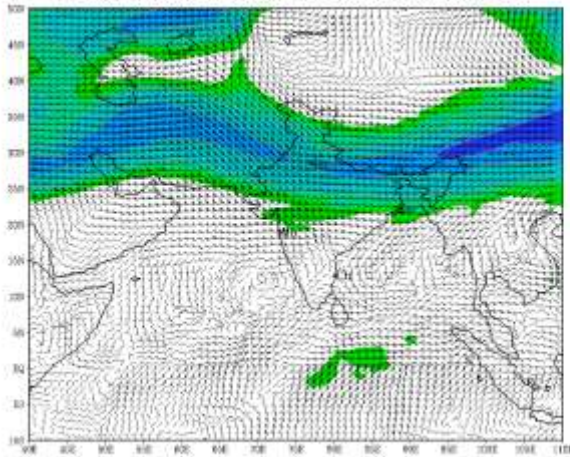
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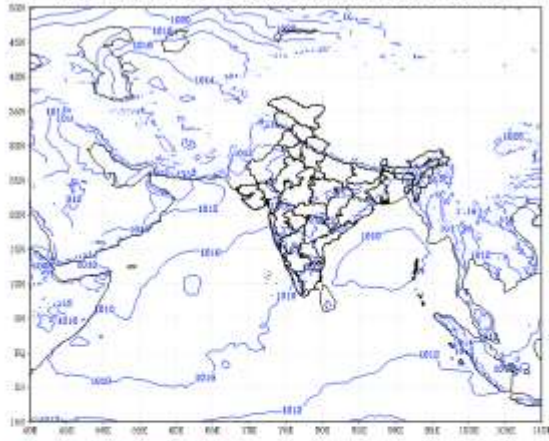
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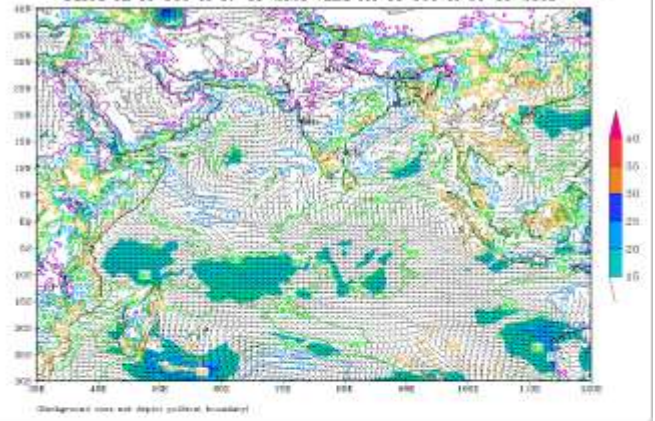


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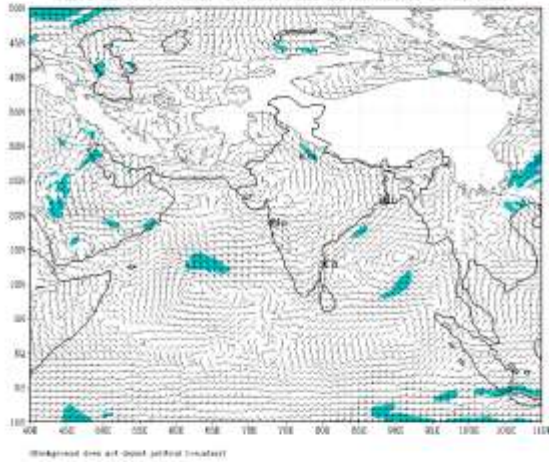
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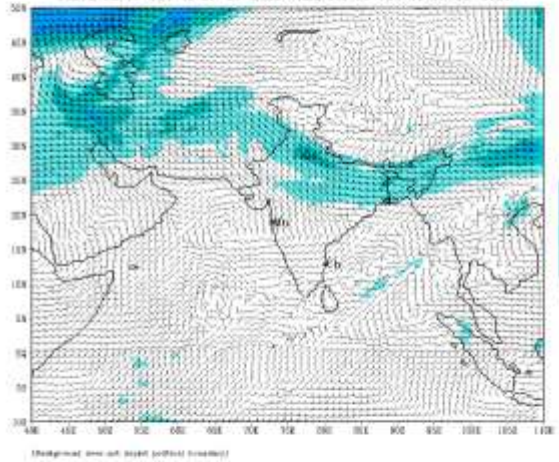
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
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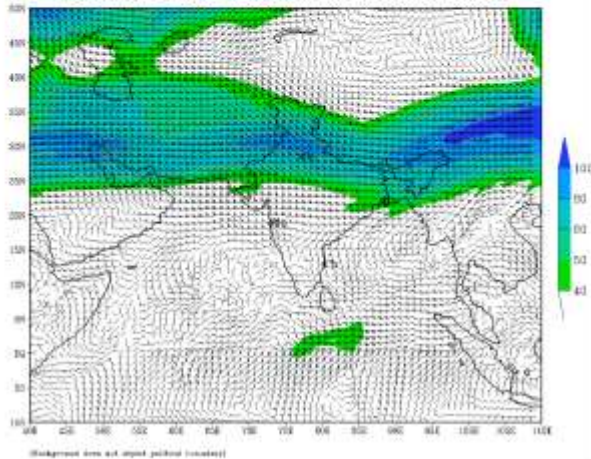
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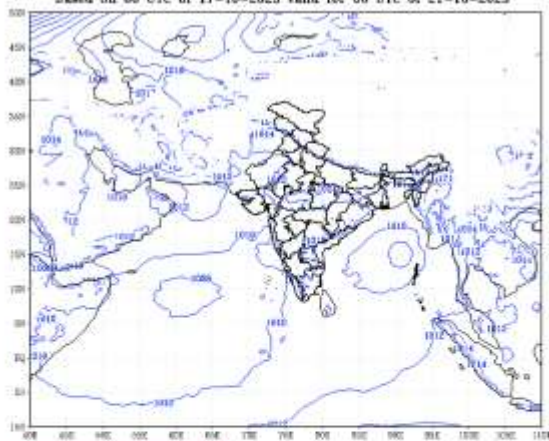
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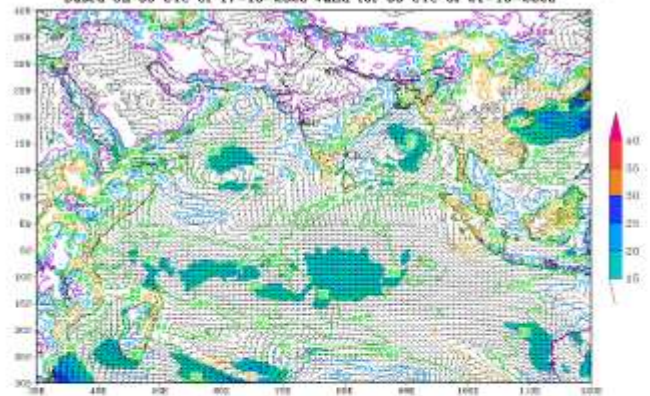
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(Background over sea level political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)

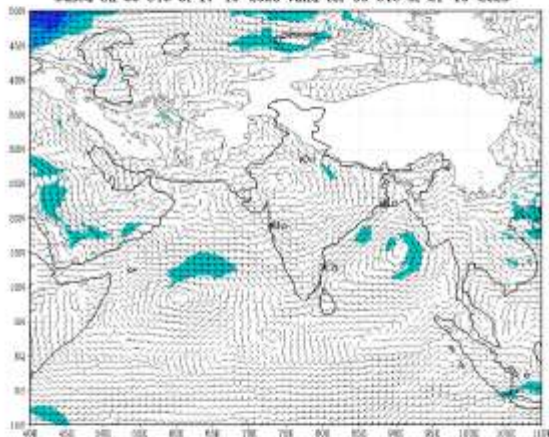
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(Background over sea level political boundary)

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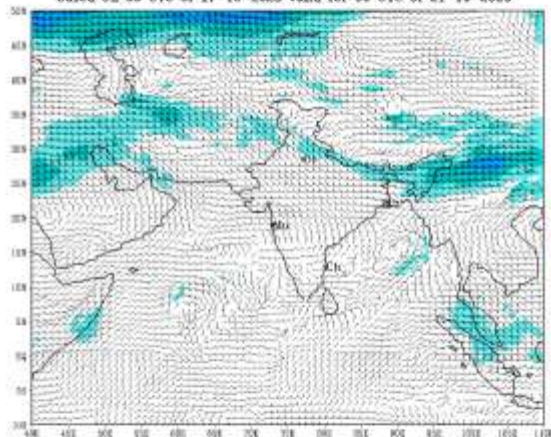
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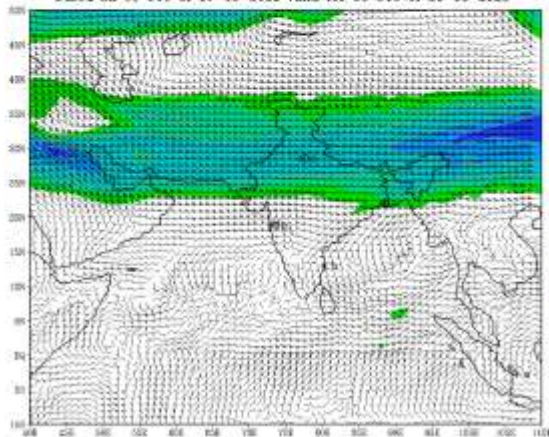
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(Background over sea level political boundary)

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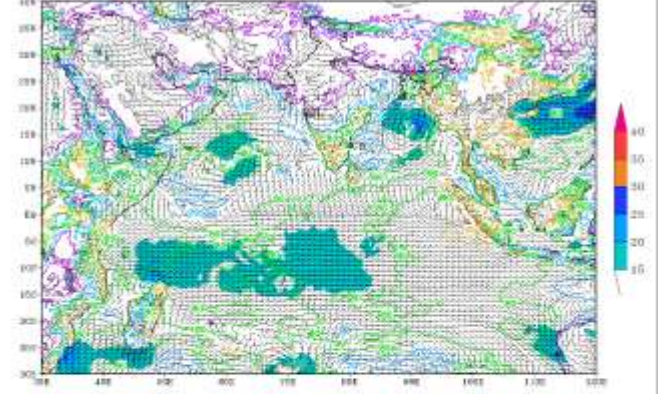
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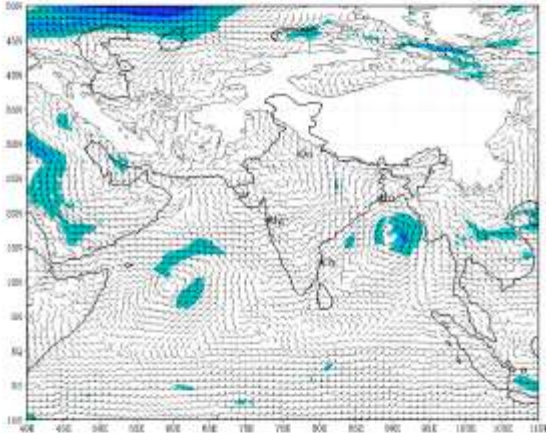
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 22-10-2023



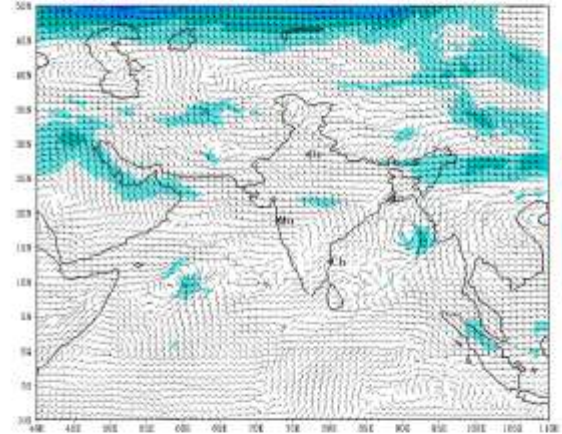
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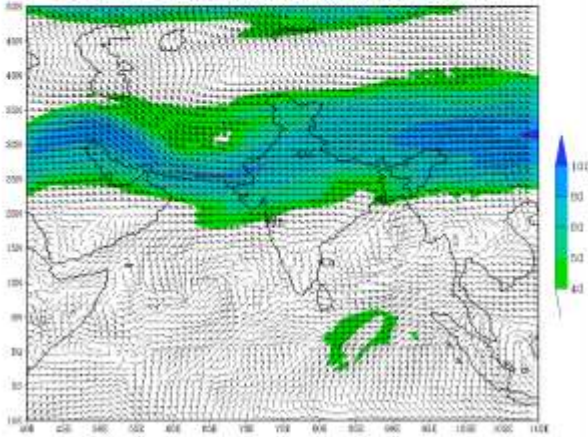
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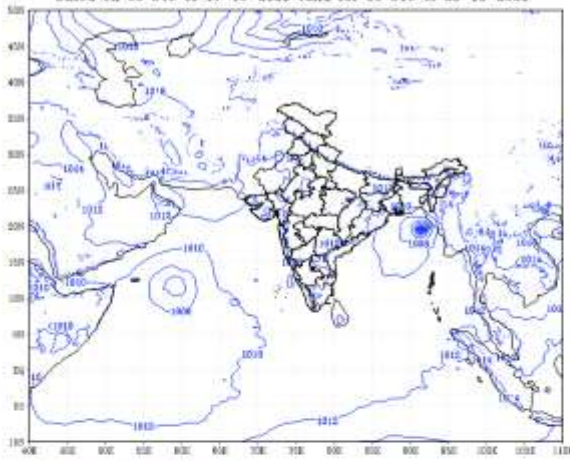
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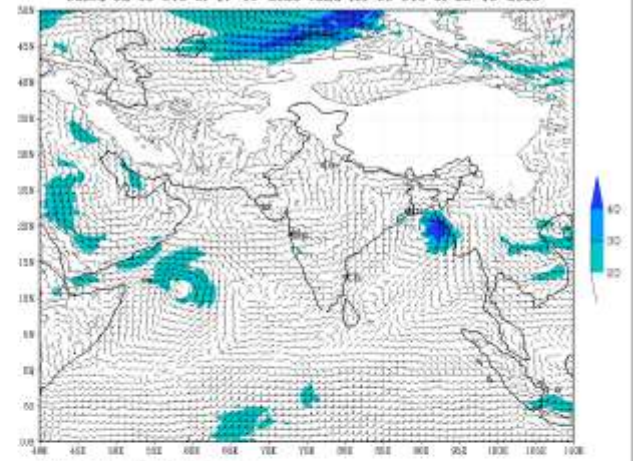
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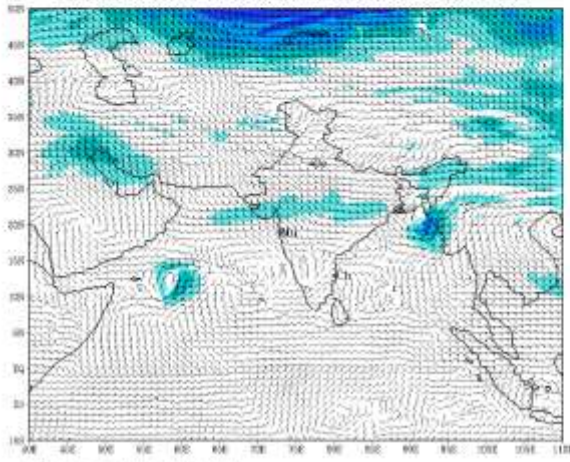
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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 23-10-2023



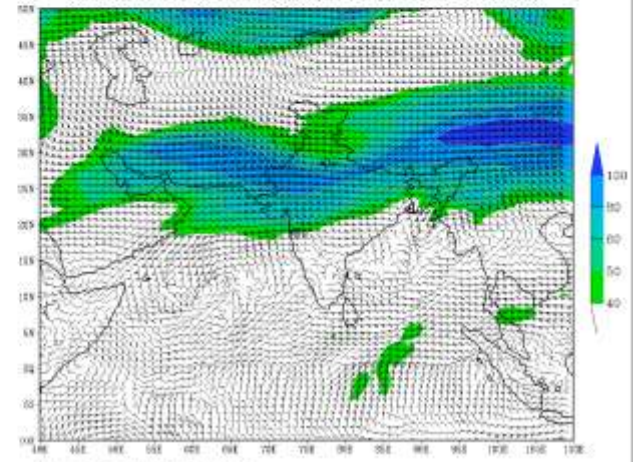
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 23-10-2023



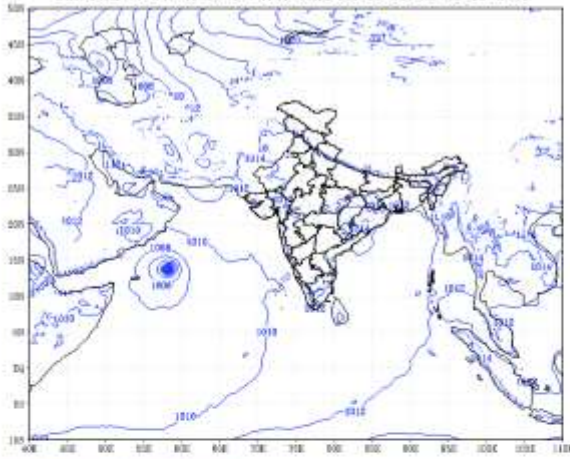
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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 23-10-2023



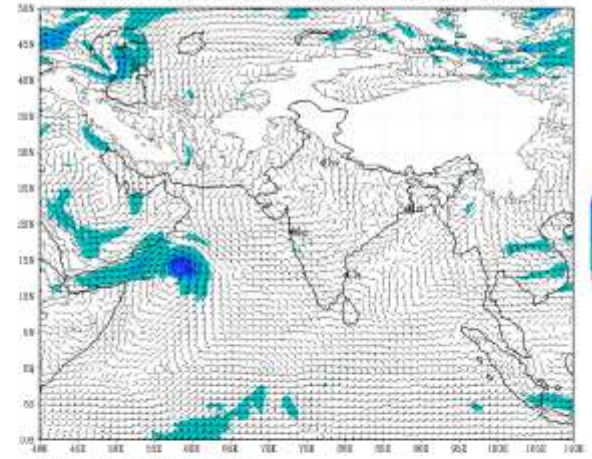
(Background line with dashed contour boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 24-10-2023



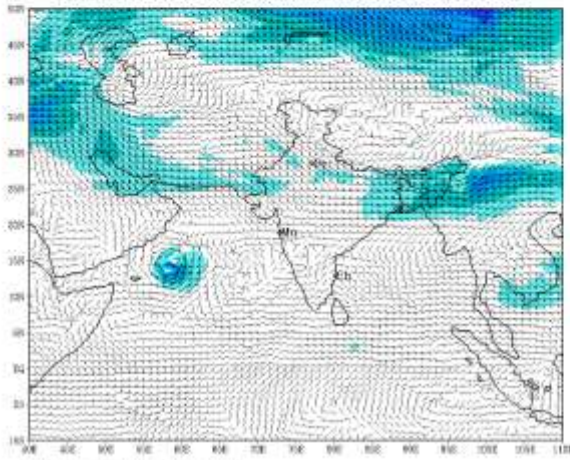
(Background line not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 24-10-2023



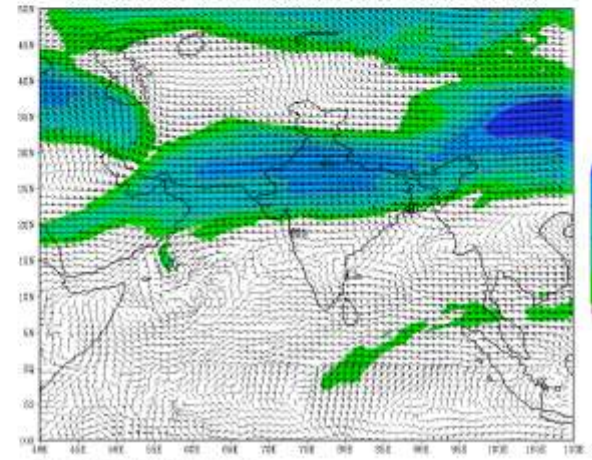
(Background line not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 24-10-2023



(Background line not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 17-10-2023 valid for 00 UTC of 24-10-2023



(Background line not depict political boundary)