



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

**Tropical Cyclone Forecast Programme  
Report Dated 12<sup>TH</sup> November, 2023**

**Time of Issue: 1030 UTC**

**Synoptic features (based on 0300 UTC analysis):**

- A cyclonic circulation lies over Gulf of Thailand and extends upto mid-tropospheric levels tilting southwestwards with height. It is likely to emerge into Andaman Sea on 13th November. Under its influence, a Low Pressure Area is likely to form over Southeast Bay of Bengal around 14th November. It is likely to move westnorthwestwards and intensify into a depression over Central & adjoining South Bay of Bengal around 16th November, 2023.
- The cyclonic circulation over Southwest & adjoining Westcentral Arabian sea extending upto 1.5 km above mean sea level persists.

**Dynamical and thermo-dynamical features**

<b>Parameter</b>	<b>Bay of Bengal (BoB)</b>	<b>Arabian Sea (AS)</b>
<b>Sea Surface Temperature (SST) °C</b>	29-31°C over major parts of BoB, South Andaman Sea, Gulf of Mannar, 26-28°C over parts of southwest BoB.	29-31°C over southeast, adjoining southwest and adjoining eastcentral AS, north AS, along and off south Gujarat, Maharashtra coasts, 26-28°C over central, adjoining north AS, southwest AS, along and off Kerala and Karnataka coasts. Less than 24 along and off Yemen-Oman & Somalia coasts and adjoining sea areas.
<b>Tropical Cyclone Heat Potential (TCHP) kJ/cm<sup>2</sup></b>	100-120 over eastcentral BoB adjoining southeast BoB and adjoining southwest BoB. 100 over Gulf of Mannar and Comorin area, 80-100 over parts of westcentral BoB and Andaman Sea.	100-110 over southeast and adjoining eastcentral AS, adjoining westcentral AS, less than 50 over westcentral, southwest and north AS, north parts of eastcentral AS, less than 40 over along and off Yemen-Oman coast.
<b>Cyclonic Relative vorticity (X10<sup>-6</sup>s<sup>-1</sup>)</b>	20- 30 over northeast BoB along off southeast Bangladesh and adjoining Myanmar coast. 10-20 over parts of south and central BoB, parts of Andaman Sea.	20 over south and adjoining central AS, Lakshadweep area, parts of north AS, 30 over parts of southwest AS.
<b>Low Level convergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	5-10 over south BoB and adjoining south Andaman Sea.	10-20 over southeast AS adjoining to Comorin area, -5 over parts of central

		AS.
<b>Upper Level divergence (<math>\times 10^{-5} \text{ s}^{-1}</math>)</b>	5-10 over southwest and adjoining southeast BoB, -5 to -10 over parts of westcentral BoB,	10-20 over southeast AS, adjoining Comorin area, Lakshadweep area, 5 over central AS, adjoining southwest AS, 10 over parts of central and southwest AS.
<b>Vertical Wind Shear (VWS knots)</b> <b>Low: 05-10 knots</b> <b>Moderate: 10-20 knots</b> <b>High: &gt;20 knots</b>	5 over southeast and adjoining eastcentral and southwest BoB, Andaman Sea, 20 over central and adjoining south BoB, High (> 20 knots) over remaining parts of BoB.	5-10 over south AS, 20 over south part of central AS and adjoining southwest AS, High (>20 knots) over remaining parts of AS.
<b>Wind Shear Tendency (knots)</b>	Decreasing over south BoB and Andaman Sea. Increasing over central and north BoB.	Decreasing over central and north AS, increasing over south AS.
<b>Upper Tropospheric Ridge</b>	Along 15°N over BoB.	Along 13°N over AS.

### **Satellite observations based on INSAT imagery (0300 UTC):**

#### **(a) Over the BoB & Andaman Sea:-**

Scattered low/med clouds with embedded intense to v intense convection over south Bay of Bengal. Scattered low/med clouds with embedded moderate to intense convection over eastcentral Bay of Bengal, Andaman Sea, Tenasserim coast and South Arakan coast.

#### **(b) Over the Arabian Sea:-**

Scattered low/med clouds with embedded intense to very intense convection over south AS Lakshadweep islands area and Comorin area. Scattered low/med clouds with embedded isolated weak to moderate convection over central adjoining north AS.

#### **(c) Convection outside India:-**

Scattered low/med clouds with embedded moderate to intense convection over Sri Lanka, Gulf of Mannar, Maldives, Tibet, China, South Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, South Vietnam, Hainan, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea, Philippines, Sulu Sea and over Indian Ocean between lat 5.0N to 10.0S long 40.0E to 110.0E and between lat 10.0S to 30.0S long 50.0E to 72.0E.

#### **M.J.O. Index:**

MJO index is currently in Phase 7 with amplitude close to 1. It will be in phase 7 with amplitude close to 1 till 13<sup>th</sup> November, and remain in same phase with amplitude greater than 1 during 14<sup>th</sup> November. It will be in phase 8 on 15<sup>th</sup> November with amplitude greater than 1 and will remain there for next few days.

#### **Storms and Depression over South China Sea/ South Indian Ocean: Nil.**

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

<b>MODEL GUIDANCE</b>	<b>Bay of Bengal (BoB)</b>	<b>Arabian Sea (AS)</b>
<b>IMD-GFS</b>	Cycir over Gulf of Thailand to emerge into South Andaman Sea on 13 <sup>th</sup> . To move west-northwestwards as an extended circulation till 14 <sup>th</sup> . Seen as a trough of low over southwest & adjoining westcentral BoB on 15 <sup>th</sup> . Thereafter, model indicates very fast movement	No significant system during next 7 days

	and rapid intensification into severe cyclonic storm. System is seen as a severe cyclonic storm on 16 <sup>th</sup> over northwest & adjoining westcentral BoB. Thereafter, the system is indicated to weaken gradually and move northeastwards skirting the east coastal states, reaching southeast Bangladesh coast as a low pressure area on 19 <sup>th</sup> Nov.	
<b>IMD-GEFS</b>	A cycir over central parts of south BoB on 13 <sup>th</sup> . To move initially west-northwestwards and then north-northeastwards. Low pressure area (LPA) over southwest BoB on 14 <sup>th</sup> , depression on 15 <sup>th</sup> over westcentral BoB, deep depression on 16 <sup>th</sup> , low pressure area on 17 <sup>th</sup> over northwest & adjoining westcentral BoB, becoming less marked on 19 <sup>th</sup> .	No significant system during next 7 days
<b>IMD-WRF</b>	An LPA over southwest BoB on 14 <sup>th</sup> Nov	No significant system during next 3 days
<b>NCMRWF-NCUM</b>	Cyclonic circulation over Gulf of Thailand on 12 <sup>th</sup> , over south Andaman Sea on 13 <sup>th</sup> and over southwest & adjoining southeast BoB on 14 <sup>th</sup> , low pressure area over southwest BoB off Tamil Nadu - Sri Lanka coasts on 15 <sup>th</sup> , well marked low pressure area over westcentral & adjoining southwest BoB on 16 <sup>th</sup> . Depression over westcentral BoB off South Odisha & North Andhra Pradesh coasts on 17 <sup>th</sup> , westcentral BoB on 19 <sup>th</sup> . Thereafter, it would gradually recurve northeastwards and also intensify further into a cyclonic storm. However very slow movement is indicated during 20 <sup>th</sup> -22 <sup>nd</sup> over westcentral BoB.	No significant system during next 7 days
<b>NCMRWF-NEPS</b>	No significant system is indicated. Model is indicating an extended low pressure area/ low pressure area over southwest & westcentral BoB during 16 <sup>th</sup> -21 <sup>st</sup> November	No significant system during next 7 days
<b>NCMRWF-UM (Regional)</b>	Cyclonic circulation over southeast BoB on 14 <sup>th</sup> .	No significant system during next 7 days
<b>ECMWF</b>	Cycir over south Andaman Sea on 13 <sup>th</sup> . LPA over southeast BoB on 14 <sup>th</sup> . To move northwestwards and intensify into a depression over westcentral BoB on 16 <sup>th</sup> . Thereafter weakening is indicated. The system is predicted to reach Odisha coast as a low pressure area on 18 <sup>th</sup> .	No significant system during next 7 days.
<b>NCEP-GFS</b>	Cycir over South Andaman Sea on 13 <sup>th</sup> . Low pressure area over southeast BoB on 14 <sup>th</sup> . Depression over westcentral BoB on 15 <sup>th</sup> . To intensify into a cyclonic storm over westcentral BoB on 16 <sup>th</sup> . To move northwestwards till 16 <sup>th</sup> and recurve northeastwards thereafter as a severe cyclonic storm, reaching southeast Bangladesh coast on 17 <sup>th</sup> as an intense storm. Thereafter, weakening rapidly and crossing Bangladesh coast as a low pressure area.	No significant system.
<b>IMD-Genesis Potential Parameter</b>	GPP is indicating a potential zone over South Andaman Sea as on today, the 12 <sup>th</sup> November, it moves northwestward and lay over westcentral BoB by 15 <sup>th</sup> November, over northwest BoB on 16 <sup>th</sup> November.	No potential zone over AS for next 7 days.

## Summary and conclusion:

### 1. For Bay of Bengal:

There is consensus among various models w.r.t emergence of cyclonic circulation from Gulf of Thailand into South Andaman Sea. The guidance from various models is indicating formation of low pressure area (LPA) around 14<sup>th</sup> (IMD GFS indicating extended low during 14<sup>th</sup> & 15<sup>th</sup> over southwest & westcentral Bay of Bengal (BoB), NCUM on 15<sup>th</sup> over southwest BoB, GEFS on 14<sup>th</sup> over southeast BoB, NCEP GFS on 14<sup>th</sup> over southeast BoB, ECMWF over westcentral BoB on 14<sup>th</sup> over southeast BoB). Further models are indicating intensification of this system into a depression around 16<sup>th</sup> (IMD GFS on 15<sup>th</sup> over westcentral BoB, NCUM on 17<sup>th</sup> over westcentral BoB, GEFS on 15<sup>th</sup> over westcentral & adjoining southwest BoB, NCEP GFS on 15<sup>th</sup> over westcentral BoB, ECMWF over westcentral BoB on 16<sup>th</sup>) with variations in area of formation. Further some of the models are indicating intensification into cyclonic storm (IMD GFS on 16<sup>th</sup> and weakening thereafter, NCUM during 20<sup>th</sup>-22<sup>nd</sup>, NCEP GFS on 16<sup>th</sup> and weakening on 17<sup>th</sup>). There is also variation w.r.t crossing point (IMD GFS crossing over southeast Bangladesh as LPA, NCUM till 22<sup>nd</sup> over sea, GEFS, weakening over north BoB after 18<sup>th</sup>, NCEP GFS crossing over southeast Bangladesh as LPA, ECMWF as low pressure area over Odisha coast).

Considering all the above, it is inferred the upper air cyclonic circulation over Gulf of Thailand is likely to emerge into Andaman Sea on 13th November. Under its influence a LPA is likely to form over southeast Bay of Bengal around 14th November. It is likely to move west-northwestwards and intensify into a depression over central & adjoining south Bay of Bengal around 16th November, 2023.

### **Probability of Cyclogenesis (formation of depression and above intensity systems) over Bay of Bengal and Andaman Sea during next 168 hours:**

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

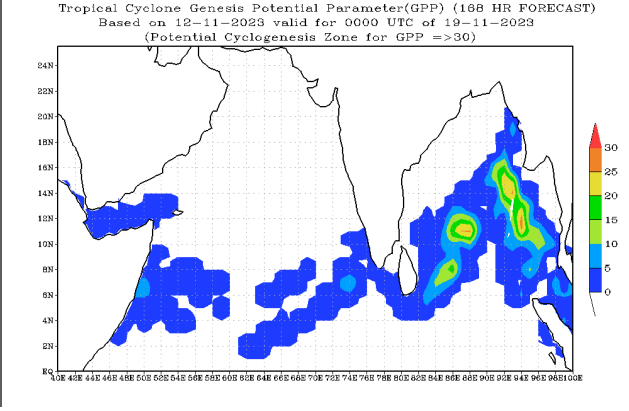
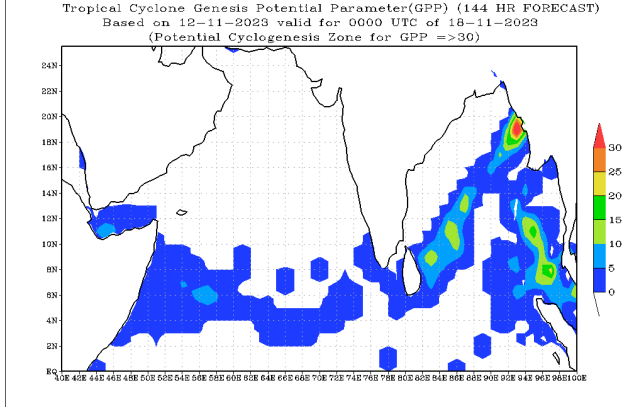
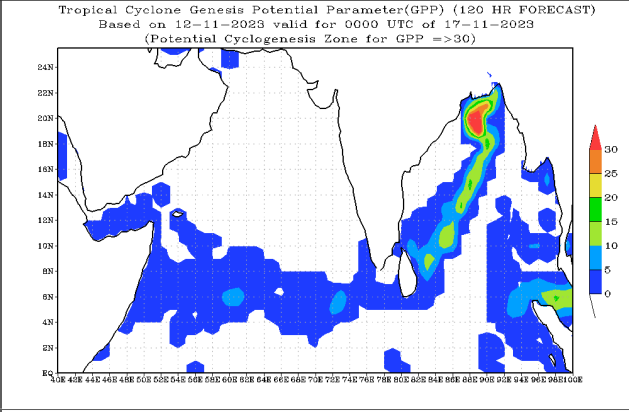
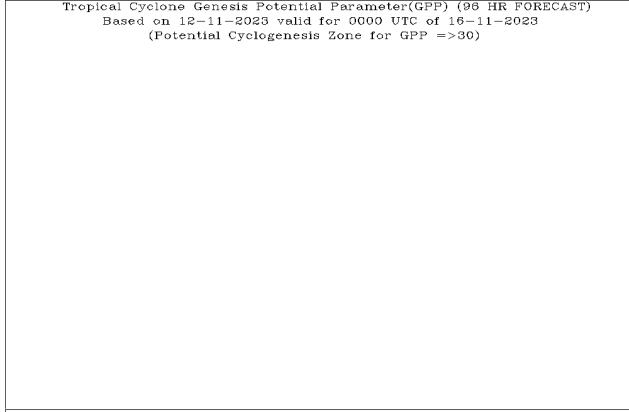
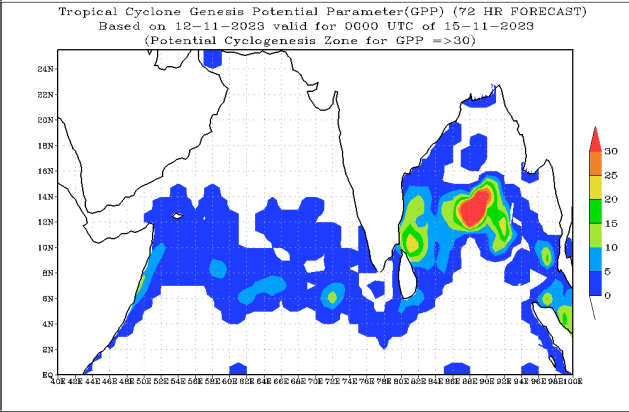
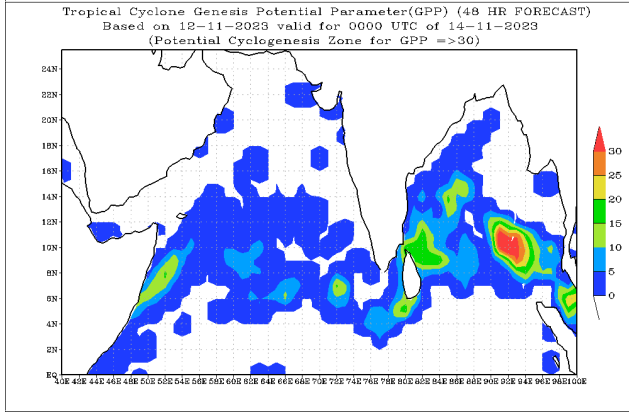
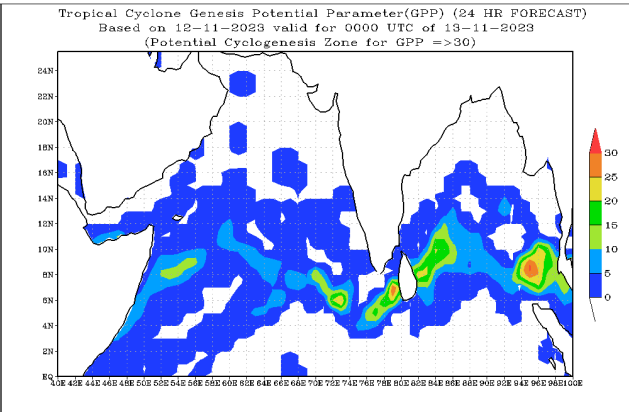
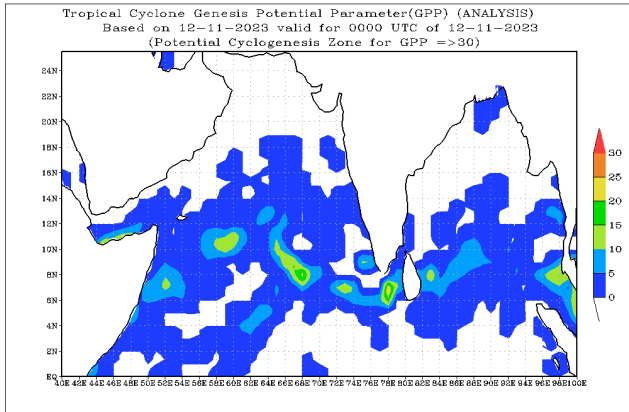
### 2. For the Arabian Sea:

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

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

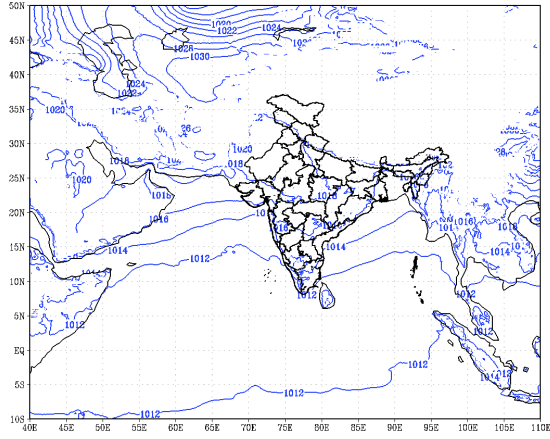
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

**IOP:** Andaman Islands during 13<sup>th</sup> to 15<sup>th</sup> November, 2023.



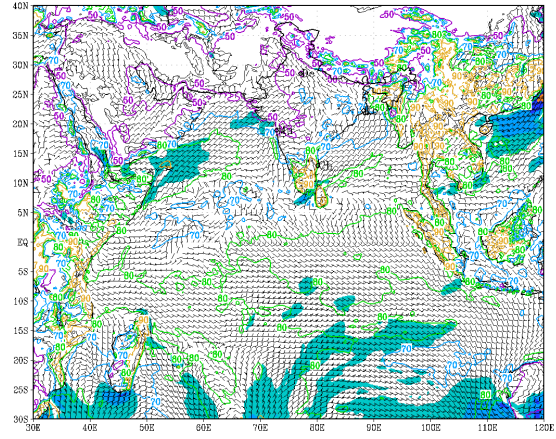


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)  
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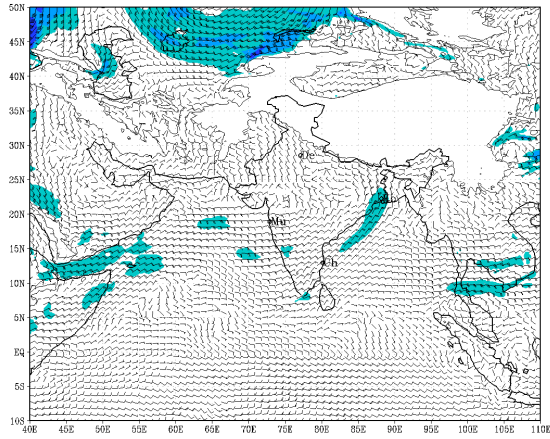
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)  
 based on 00 UTC of 12-11-2023 valid for 00 UTC of 12-11-2023



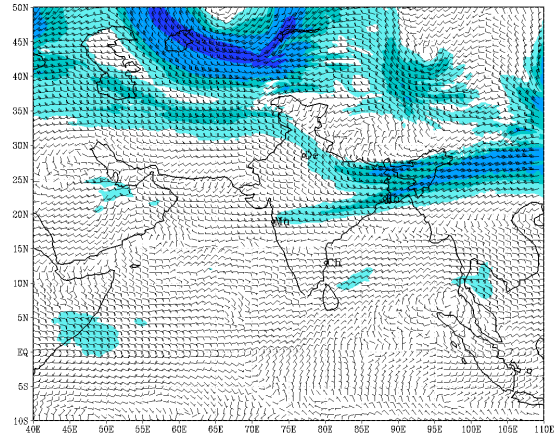
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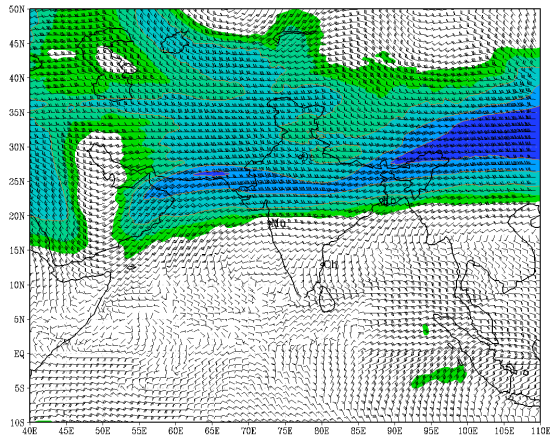
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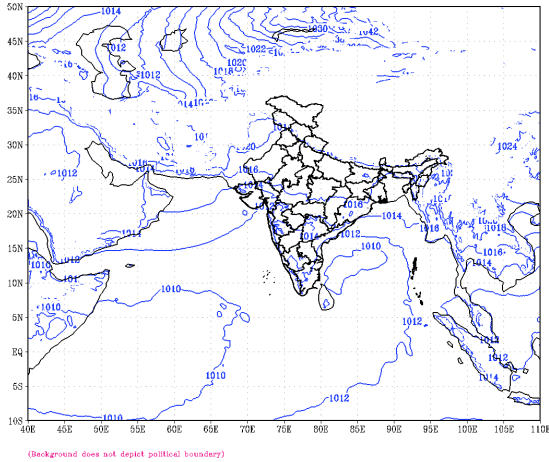
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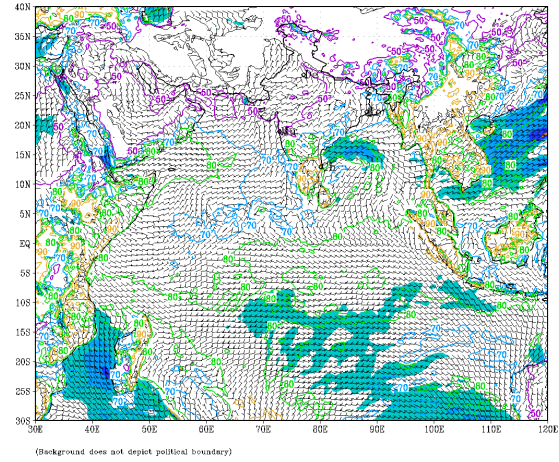


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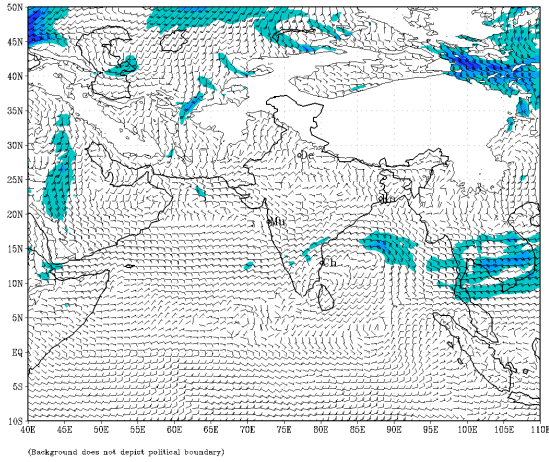
**IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)**  
 based on 00 UTC of 12-11-2023 valid for 00 UTC of 15-11-2023



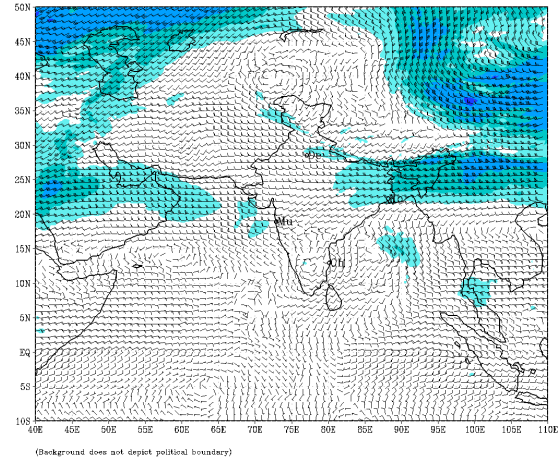
**IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)**  
 based on 00 UTC of 12-11-2023 valid for 00 UTC of 15-11-2023



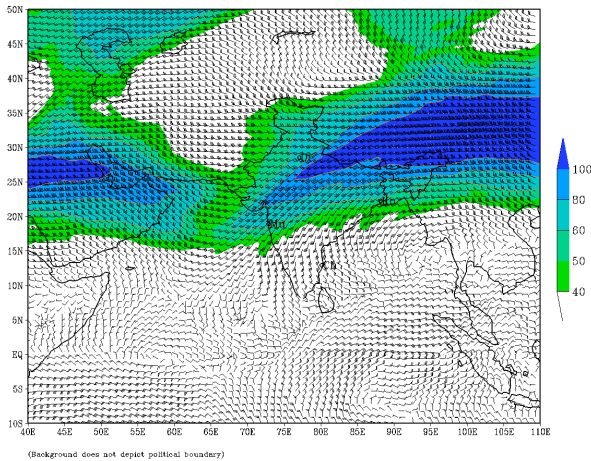
**IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)**  
 based on 00 UTC of 12-11-2023 valid for 00 UTC of 15-11-2023



**IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (72 HR)**  
 based on 00 UTC of 12-11-2023 valid for 00 UTC of 15-11-2023

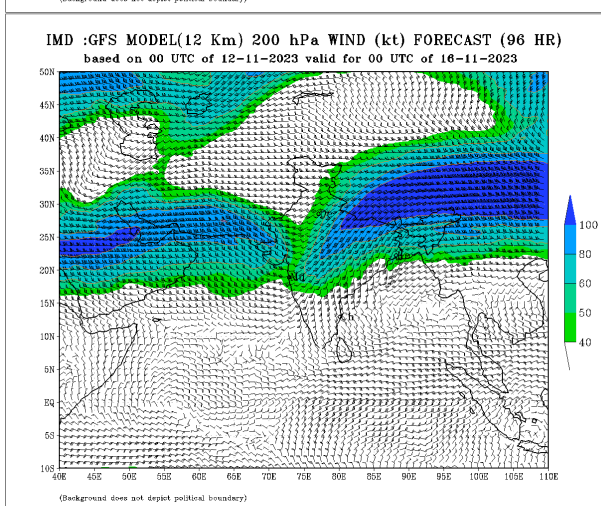
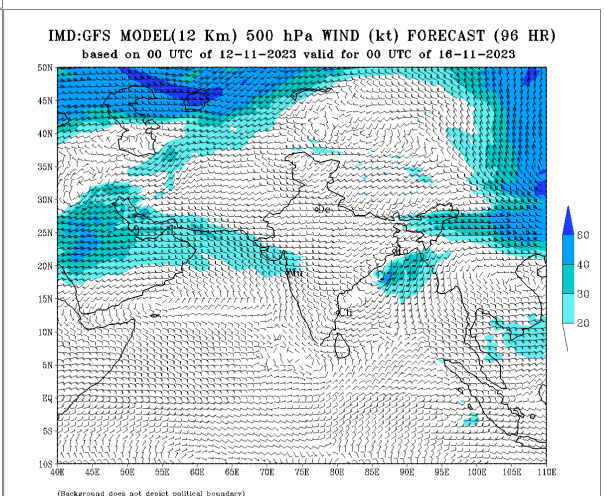
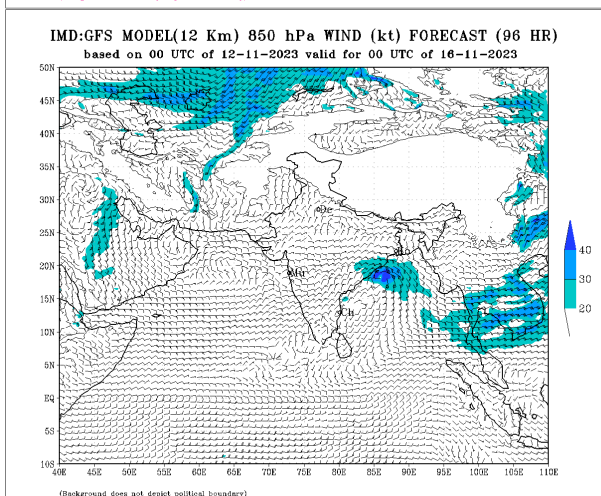
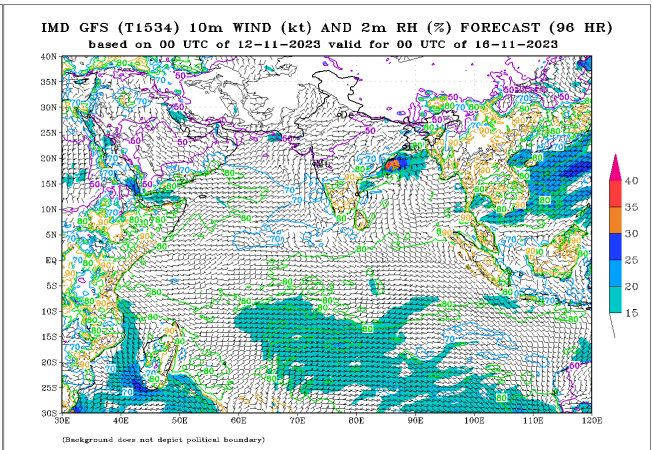
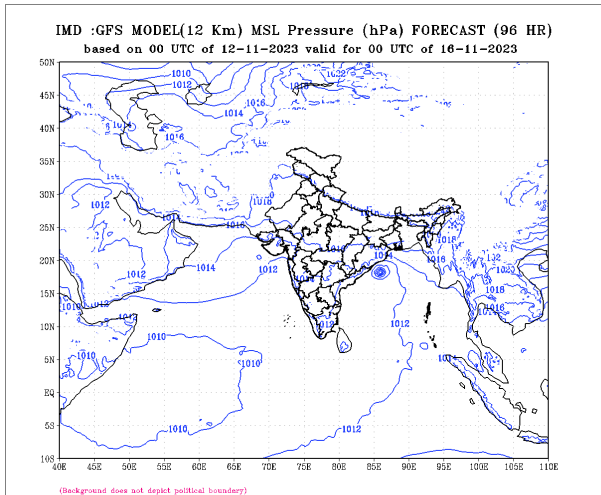


**IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (72 HR)**  
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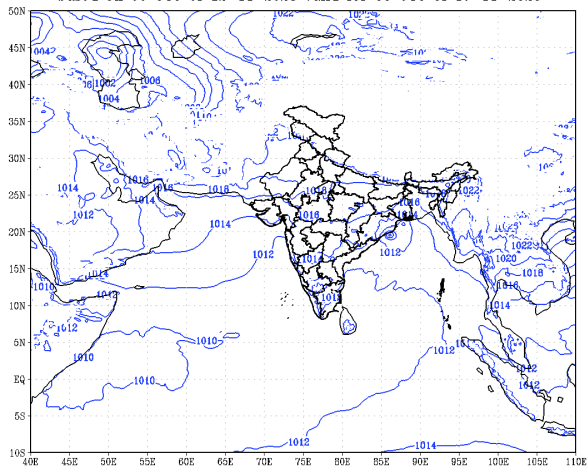
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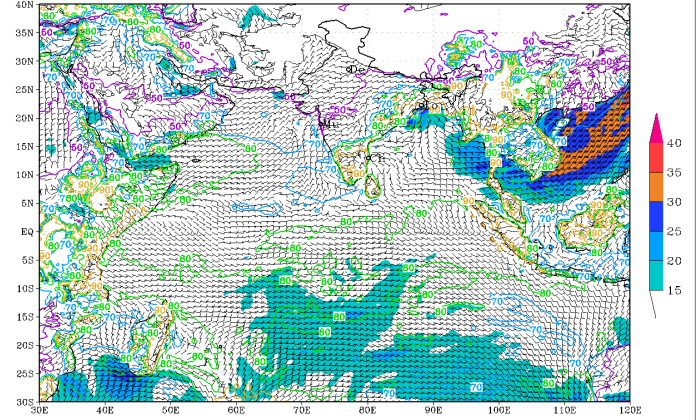


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)  
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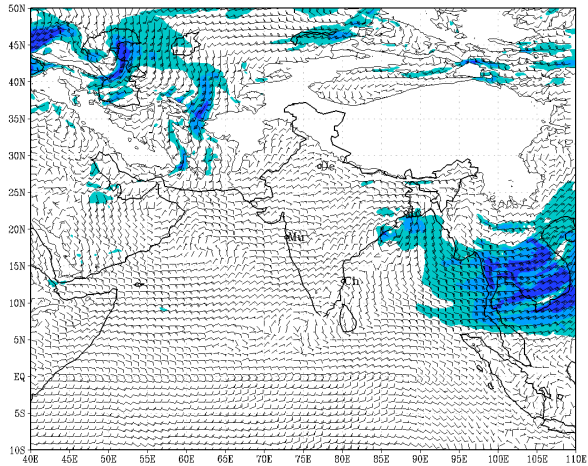
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)  
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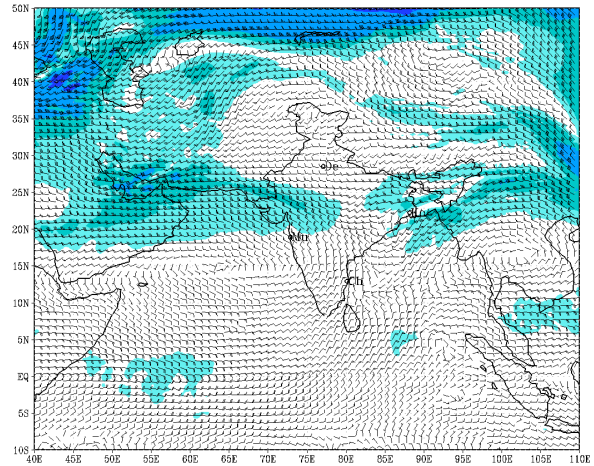
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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)  
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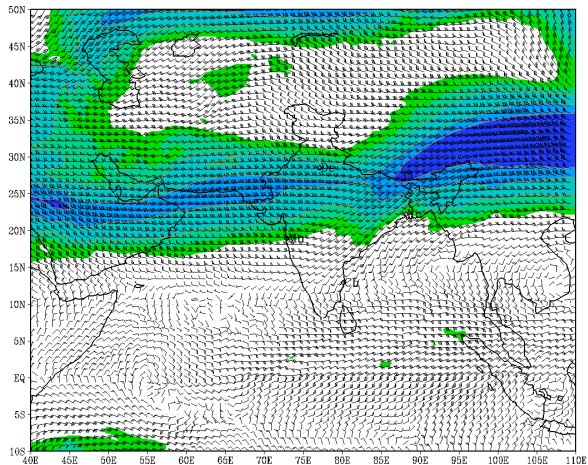
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