



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

**Tropical Cyclone Forecast Programme  
Report Dated 26<sup>th</sup> November, 2023**

**Time of Issue: 0730 UTC**

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

1. A cyclonic circulation lay over south Thailand and adjoining south Andaman Sea in the early morning (0000 UTC) of today, the 26th November, 2023. It lay over south Andaman Sea and adjoining south Thailand at 0300 UTC extending upto 5.8 km above mean sea level. Under its influence, a Low Pressure Area is likely to form over South Andaman Sea & adjoining Southeast Bay of Bengal around 27th November. It is likely to move west-northwestwards and intensify into a Depression over Southeast Bay of Bengal around 29th November, 2023.
2. The Cyclonic Circulation over Southeast & adjoining Southwest 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>	27-29 over major parts of BoB. 26-27°C over parts of north and adjoining westcentral BoB.	29-30 over southeast, adjoining southwest and eastcentral AS. 26-28 over most parts of central adjoining southwest AS. 26-27 over north and adjoining central AS.
<b>Tropical Cyclone Heat Potential (TCHP) kJ/cm<sup>2</sup></b>	70-90 over Andaman Sea and parts of eastcentral BoB. 90-100 over southwest BoB.	100-110 over parts of southeast and southwest AS and eastcentral AS.
<b>Cyclonic Relative vorticity (X10<sup>-6</sup>s<sup>-1</sup>)</b>	60-80 over Malay Peninsula and adjoining South Andaman Sea. Another zone of 50-60 over southeast & adjoining southwest BoB.	30-40 over northeast AS and another zone of 30-40 over southwest & adjoining west Equatorial Indian Ocean (WEIO)
<b>Low Level convergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	10-20 over South Andaman Sea, 05-10 over southwest BoB and 05-10 over southwest BoB off south Sri Lanka coast	15-20 over eastcentral & adjoining northeast AS off Maharashtra coast
<b>Upper Level divergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	20 over South Andaman Sea with extension upto southeast BoB & adjoining East Equatorial Indian Ocean (EEIO).	40 over eastcentral & adjoining northeast AS off Maharashtra coast
<b>Vertical Wind Shear (VWS knots)</b>	10-20 over south BoB, and Andaman Sea.	10-20 over WEIO and adjoining South AS. High over remaining parts of AS.

<b>Low: 05-10 knots Moderate:10-20 knots High: &gt;20 knots</b>	High (>20knots) over central & north BoB.	
<b>Wind Shear Tendency (knots)</b>	Increasing (05 knots) over parts of South Andaman Sea, southwest & westcentral BoB.	Decreasing over WEIO and adjoining southeast AS. Decreasing over eastcentral & adjoining northeast AS off Gujarat coast and over westcentral AS off Oman-Yemen coasts
<b>Upper Tropospheric Ridge</b>	Along 10°N over BoB.	Along 8°N over AS.

### **Satellite observations based on INSAT imagery (0600 UTC):**

#### **(a) Over the Bay of Bengal & Andaman Sea:-**

Scattered to broken low and medium clouds with embedded intense to very intense convection lay over south Andaman Sea (minimum cloud top temperature minus 80<sup>0</sup>c. Scattered low and medium clouds with embedded moderate to intense convection lay over south Bay of Bengal and isolated weak to moderate convection lay over north Andaman Sea.

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

Scattered to broken low and medium clouds with embedded intense to very intense convection lay over gulf of cambay (minimum cloud top temperature minus 80<sup>0</sup>c. Scattered low and medium clouds with embedded moderate to intense convection lay over eastcentral Arabian Sea off karnataka coast & south arabian sea.

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

Scattered low and medium clouds with embedded moderate to intense convection lay over south Maldives, Pakistan, south Thailand, Gulf of Thailand, Cambodia, South Vietnam, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea and over Indian ocean between latitude 5.0N to 10.0S longitude 60.0E to 100.0E and between latitude 3.0S to 14.0S longitude 40.0E to 65.0E.

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

MJO index is currently in Phase 3 with amplitude greater than 1. It would move across phases 3 and 4 with amplitude greater than 1 during 26<sup>th</sup> November to 6<sup>th</sup> December. Thus, MJO would support cyclogenesis over the BoB region till 6<sup>th</sup> December.

### **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>	Low pressure area (LPA) over South Andaman Sea (6°N/98°E) on 27 <sup>th</sup> Nov., deep depression/cyclonic storm (DD/CS) over Southeast BoB (7°N/93°E) on 28 <sup>th</sup> Nov. CS/SCS over Southeast BoB (8.5°N/90°E) on 29 <sup>th</sup> . SCS over southeast BoB (11.5°N/89°E) on 30 <sup>th</sup> Nov. SCS/VSCS over westcentral BoB (13.5°N/88°E) on 1 <sup>st</sup> Dec. VSCS over westcentral and adjoining eastcentral BoB	No significant system during next 7 days.

	(15.5°N/87.5°E) on 2 <sup>nd</sup> Dec. VCSC over eastcentral and adjoining northeast BoB (19°N/88°E) on 3 <sup>rd</sup> Dec. SCS over northeast BoB (21°N/91°E) on 4 <sup>th</sup> Dec. Dissipated on 5 <sup>th</sup> Dec. System to move north-northwestwards till 3 <sup>rd</sup> December and then northeastwards towards South Bangladesh coast.	
<b>IMD-GEFS</b>	Depression on 29 <sup>th</sup> & 30 <sup>th</sup> Nov. DD/CS on 01 <sup>st</sup> Dec. CS on 2 <sup>nd</sup> Dec. CS/DD on 3 <sup>rd</sup> Dec.	No significant system during next 7 days.
<b>IMD-WRF</b>	LPA on 27 <sup>th</sup> over South Andaman Sea, WML over South Andaman Sea and adjoining southeast BoB on 28 <sup>th</sup> , Depression over southeast BoB on 29 <sup>th</sup> (7.5N/90.5E)	No significant system during next 3 days.
<b>NCMRWF-NCUM</b>	A over southeast BoB (9°N/87.5°E) on 1 <sup>st</sup> Dec, WML/D over southeast BoB (10°N/86°E) as on 2 <sup>nd</sup> Dec. Depression over southwest BoB (11°N/84.5°E) on 3 <sup>rd</sup> Dec. It is indicated to move initially northwestwards till 4 <sup>th</sup> Dec and then north-northeastwards thereafter. DD over the westcentral BoB (12.5°N/84.5°E) on 4 <sup>th</sup> Dec, intensify further into CS on 5 <sup>th</sup> Dec over westcentral BoB (13.5°N/82.5°E), and SCS on 6 <sup>th</sup> Dec over westcentral BoB (16°N/85°E).	Cycir over southwest AS on 28 <sup>th</sup> Nov having westward movement with no significant intensification.
<b>NCMRWF-NEPS</b>	Not available	No significant system during next 7 days.
<b>NCMRWF-UM (Regional)</b>	No significant system during next 3 days.	No significant system during next 3 days.
<b>ECMWF</b>	LPA over South Andaman Sea (6°N/98°E) on 27 <sup>th</sup> Nov, Depression over southeast BoB (8.3°N/92°E) on 29 <sup>th</sup> Nov, Deep Depression over southeast BoB (10.4°N/90°E) on 30 <sup>th</sup> Nov, CS over the same region (11°N/88.5°E) on 1 <sup>st</sup> Dec, CS/SCS over southeast adjoining southwest BoB (11.8°N/86°E) on 2 <sup>nd</sup> Dec, SCS over westcentral BoB (13.2°N/85°E) on 3 <sup>rd</sup> DEC, SCS over southwest adjoining westcentral BoB (13°N/83.7°E) on 4 <sup>th</sup> Dec, VSCS over westcentral BoB (13.5°N/83.2°E) on 5 <sup>th</sup> Dec, VSCS over westcentral BoB (14.5°N/84°E) on 5 <sup>th</sup> Dec.	No significant system during next 7 days.
<b>NCEP-GFS</b>	WML over South Andaman Sea (7.0°N/95°E) on 28 <sup>th</sup> Nov, WML over Southeast BoB (9.4°N/91°E) on 29 <sup>th</sup> Nov. CS over the southeast BoB (11.4°N/88.4°E) on 30 <sup>th</sup> Nov. CS over eastcentral BoB (13.3°N/89.2°E) on 01 <sup>st</sup> Dec. SCS over westcentral BoB (15°N/89°E) on 02 <sup>nd</sup> Dec. CS over westcentral BoB (15.9°N/89°E) on 3 <sup>rd</sup> Dec. SCS/VSCS over eastcentral BoB (18.9°N/90.5°E) on 04 <sup>th</sup> Dec. DD over northeast BoB (20.6°N/92.5°E) on 5 <sup>th</sup> Dec.	No significant system.
<b>IMD-Genesis Potential Parameter</b>	Potential zone over South Andaman Sea and southeast BoB on 27 <sup>th</sup> and over South Andaman Sea and adjoining southeast BoB on 28 <sup>th</sup> Nov, over southeast BoB on 29 <sup>th</sup> , eastcentral BoB on 30 <sup>th</sup> Nov, over eastcentral and adjoining westcentral BoB on 1 <sup>st</sup> Dec, over westcentral BoB on 2 <sup>nd</sup> Dec.	No potential zone of cyclogenesis over AS.

## Summary and conclusion:

### 1. For Bay of Bengal:

Most of the models are indicating formation of depression over south BoB during 28<sup>th</sup> -30<sup>th</sup> November, it's intensification into a cyclonic storm and it's northeastwards recurvature. However, there is large variation among various models wrt area of formation of depression, time of formation of depression, movement, point of recurvature and intensity. IMD GFS is indicating low pressure area over south Andaman Sea on 27<sup>th</sup>, severe cyclonic storm over southeast BoB on 28<sup>th</sup>, west-northwestwards movement till 2<sup>nd</sup> November, followed by north-northeastwards movement towards Bangladesh coast and rapid weakening near Bangladesh coast. NCEP GFS is indicating a low pressure area over south Andaman Sea on 27<sup>th</sup>, depression over southeast bob on 29<sup>th</sup>, west-northwestwards movement till 30<sup>th</sup> over southeast BoB, followed by nearly northeastwards movement towards Bangladesh-Myanmar coasts. Regarding intensification, NCEP GFS is also indicating intensification upto severe cyclonic storm till 3<sup>rd</sup> December and weakening from 4<sup>th</sup> December onwards with system reaching coast as a depression. Thus, both GFS models are indicating movement towards Bangladesh coast with weakening. ECMWF is indicating depression over southeast BoB on 29<sup>th</sup>, with intensification into a severe cyclonic storm and initial west-northwestwards movement towards westcentral BoB till 4<sup>th</sup>/1800 UTC, followed by northeastwards recurvature over westcentral BoB on 5<sup>th</sup> December/0000 UTC. NCUM is indicating a low pressure area over southeast BoB on 1<sup>st</sup> December, depression over southwest BoB on 3<sup>rd</sup> December and intensification into a cyclonic storm over westcentral BoB on 5<sup>th</sup> December with initial north-northwestwards movement till 4<sup>th</sup> December followed by north-northeastwards movement till 6<sup>th</sup> December towards eastcentral BoB.

Hence, it is inferred that a low-pressure area is likely to form over south Andaman Sea & adjoining southeast Bay of Bengal around 27<sup>th</sup> November. It is likely to move west-northwestwards and intensify into a depression over southeast Bay of Bengal around 29<sup>th</sup> November 2023. Further movement and intensification of system is being monitored continuously.

### **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	LOW	MOD	HIGH	HIGH	HIGH

Every 24 hour forecast is valid upto 0300 of next day.

### 2. For the Arabian Sea:

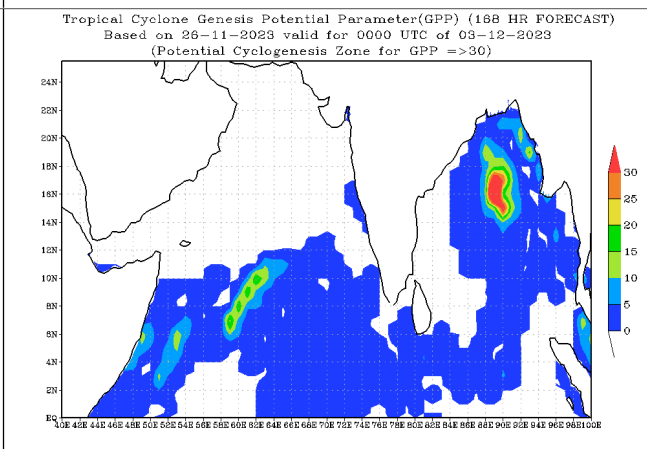
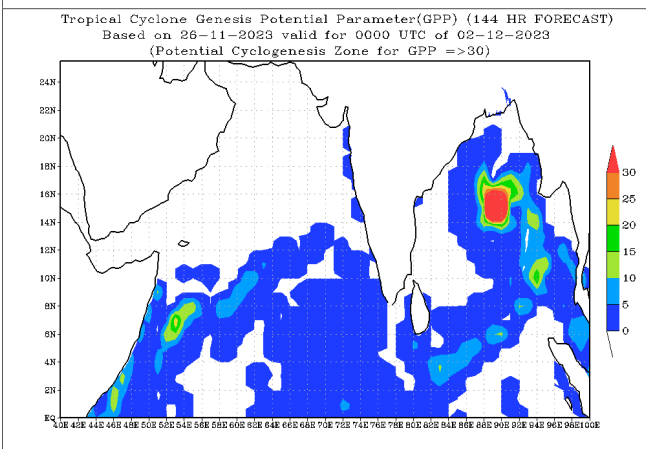
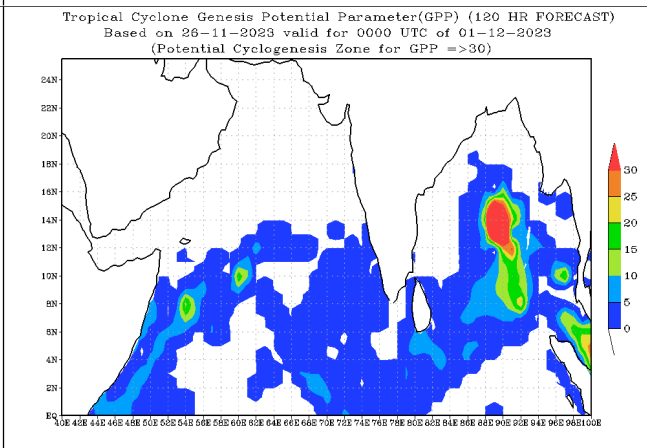
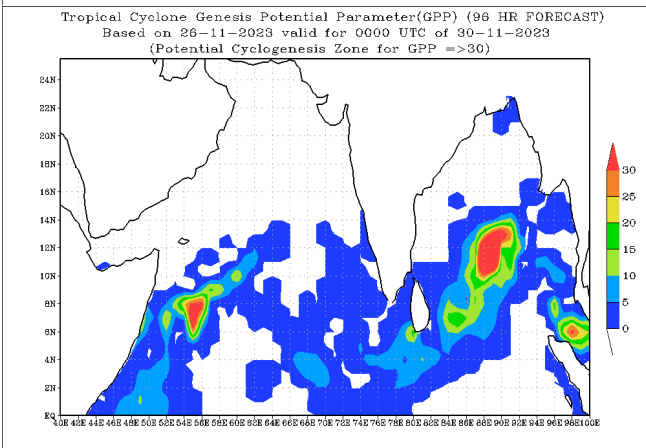
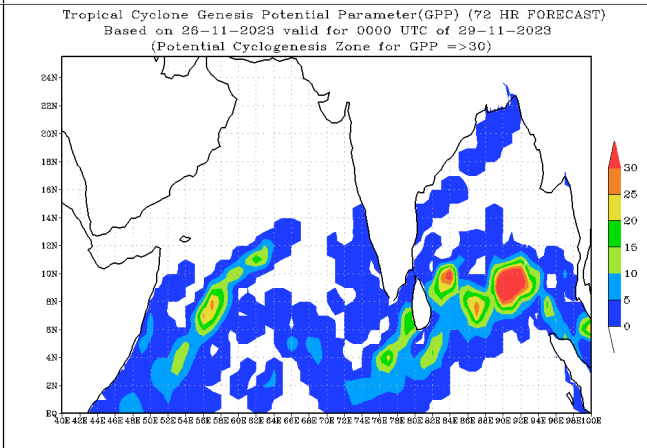
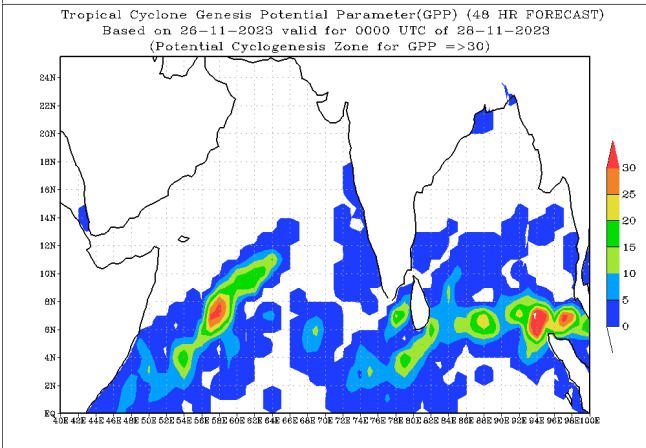
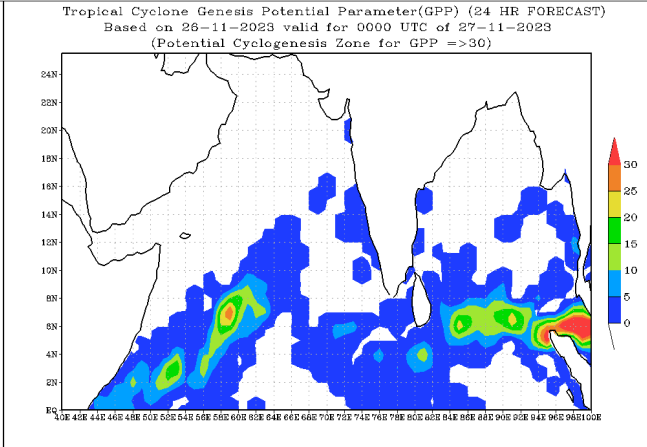
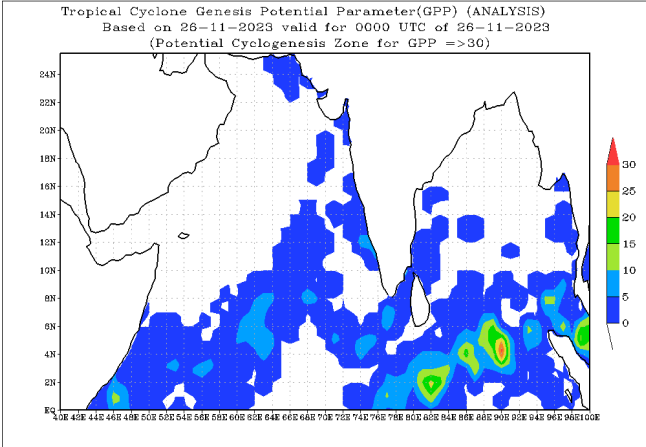
Most of the models are indicating that there will be no significant system for the next seven days.

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

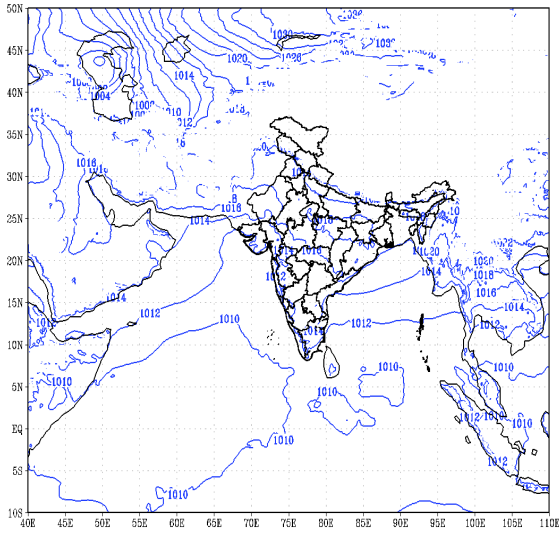
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

Every 24 hour forecast is valid upto 0300 of next day.

**IOP:** IOP for Andaman & Nicobar Islands for 26<sup>th</sup> - 28<sup>th</sup> November.

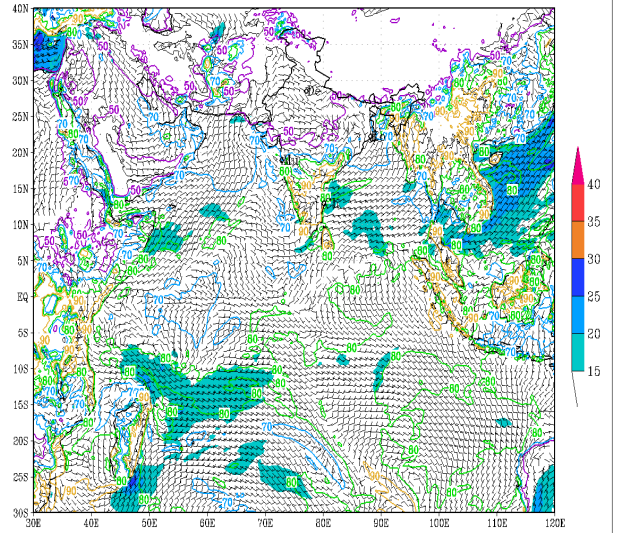


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 28-11-2023



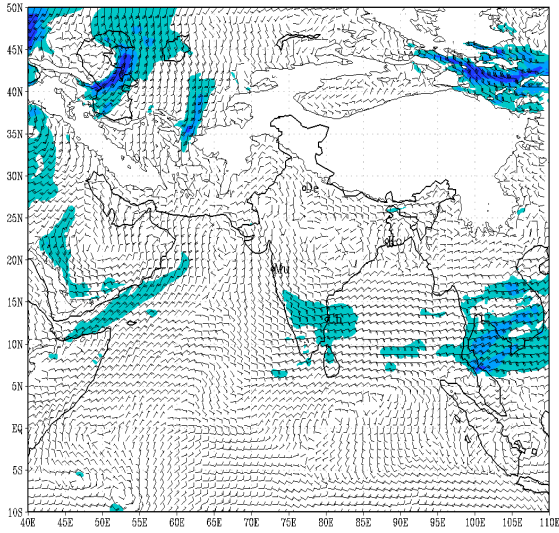
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 28-11-2023



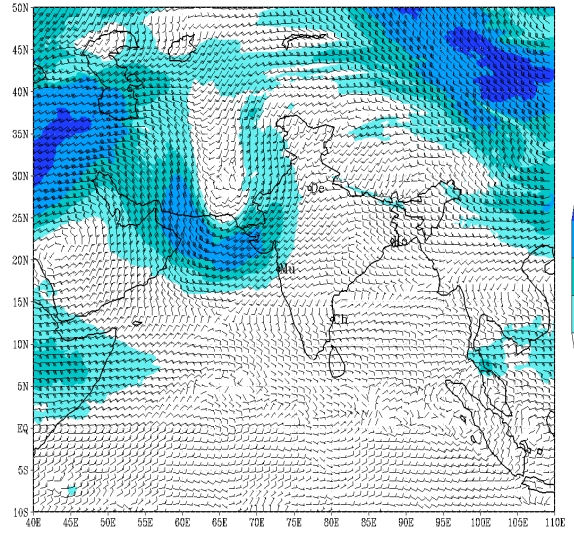
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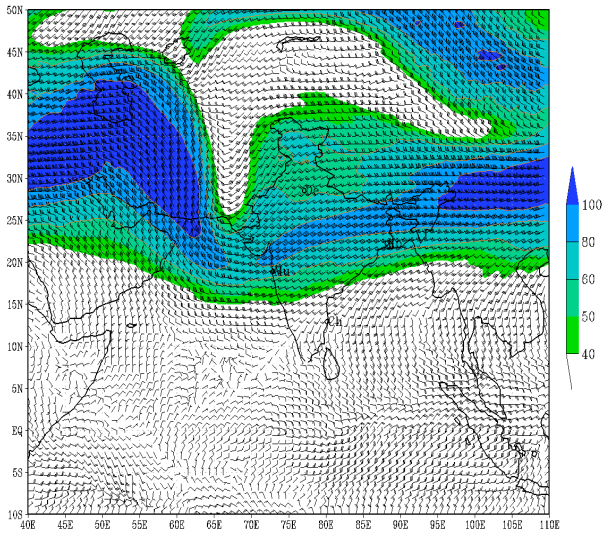
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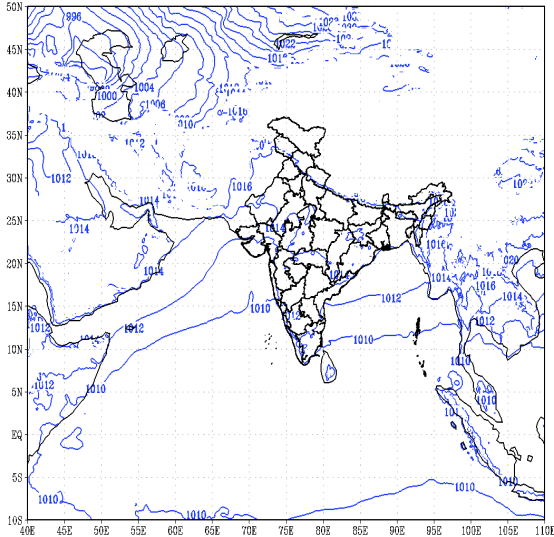
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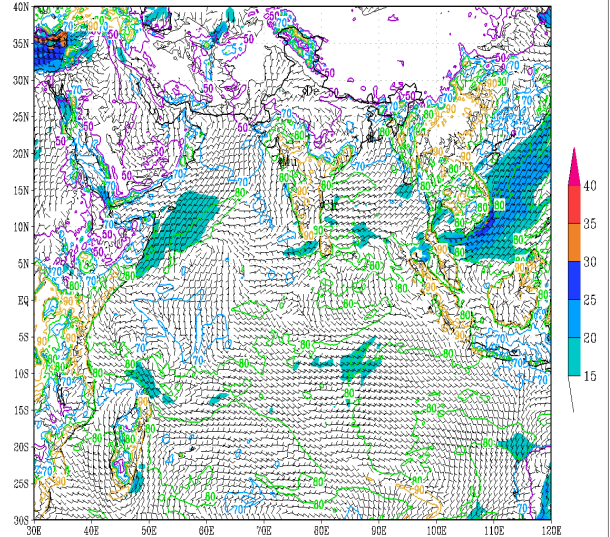
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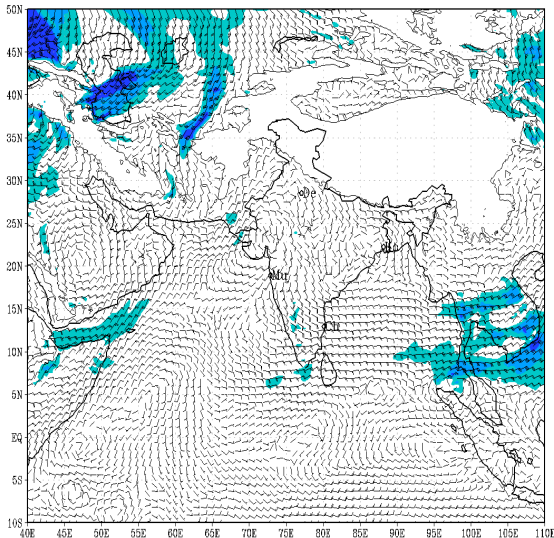
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)  
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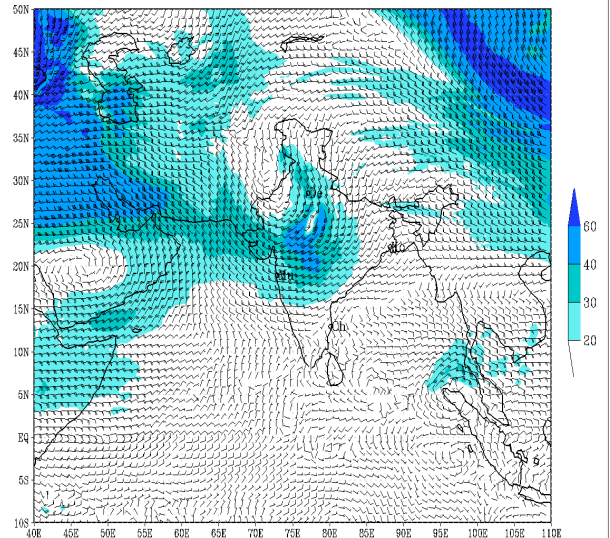
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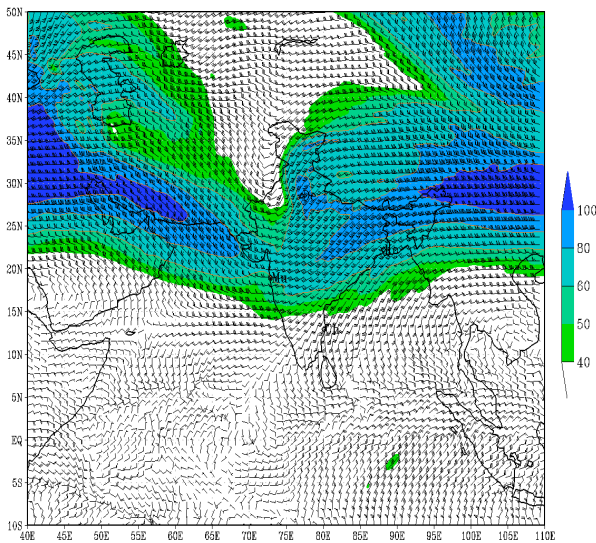
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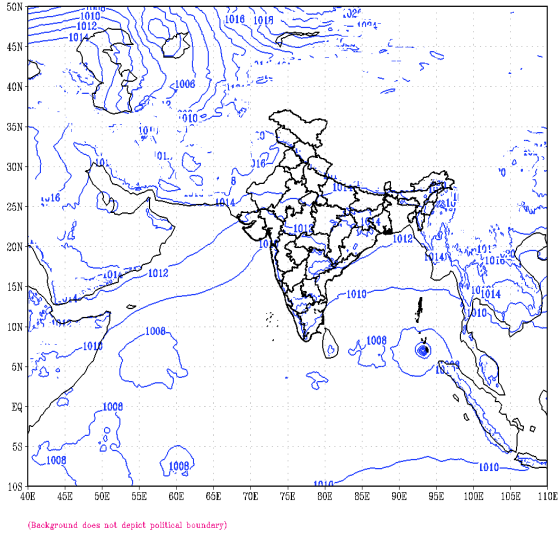
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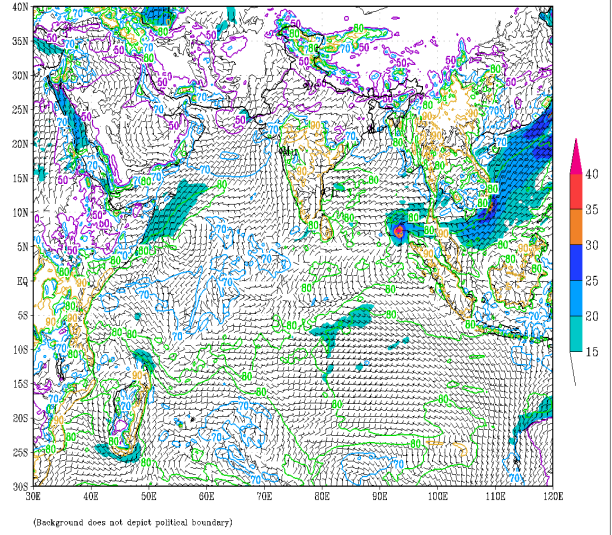


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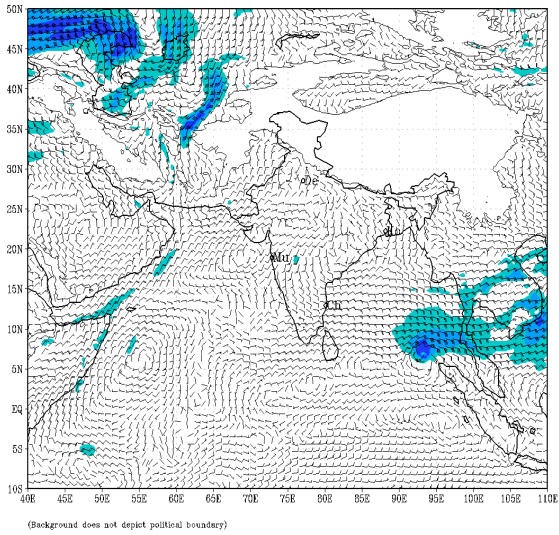
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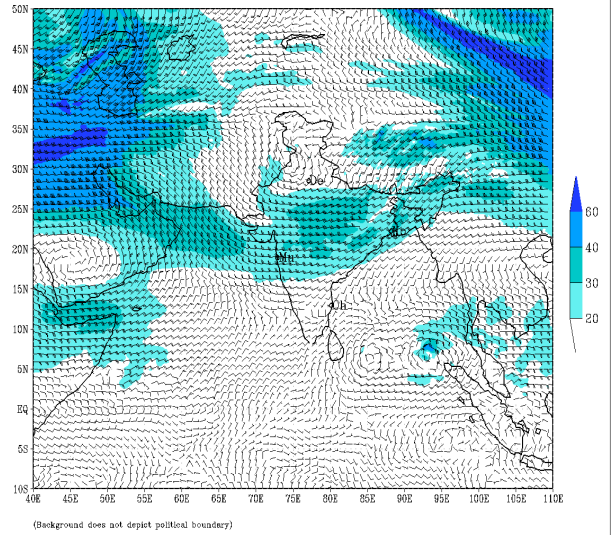
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 28-11-2023



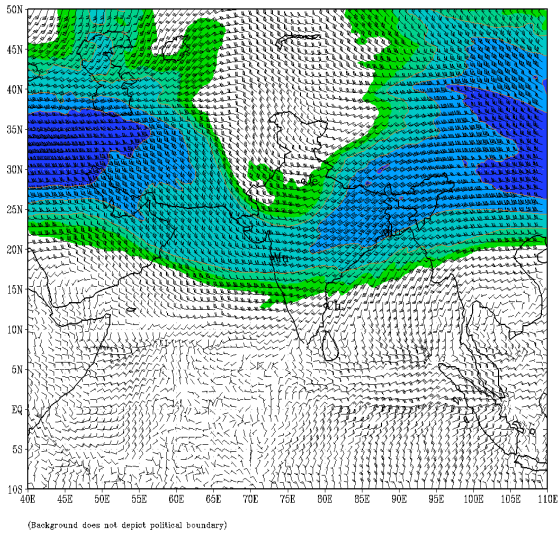
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based on 00 UTC of 28-11-2023 valid for 00 UTC of 28-11-2023



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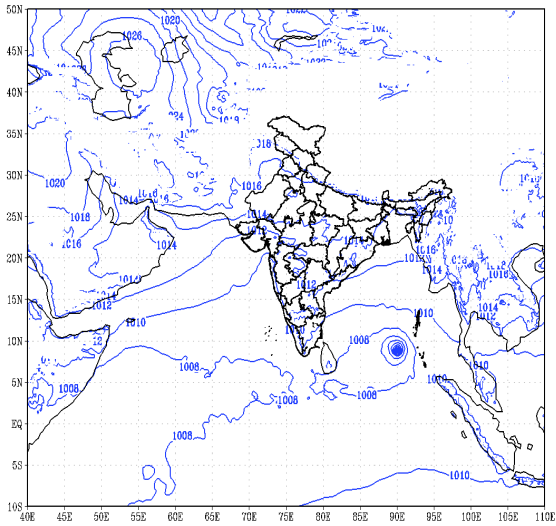


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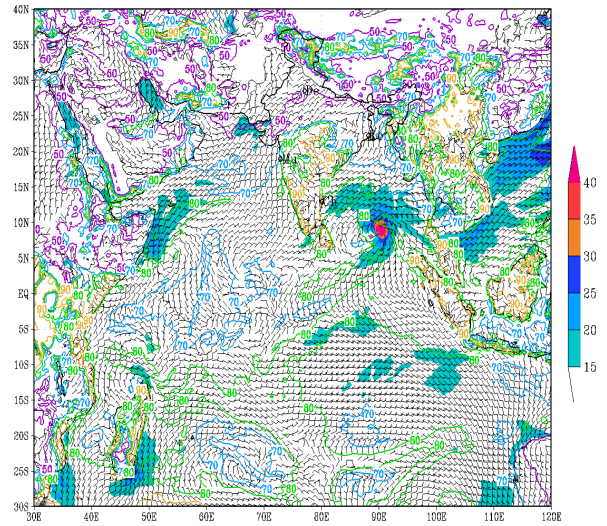


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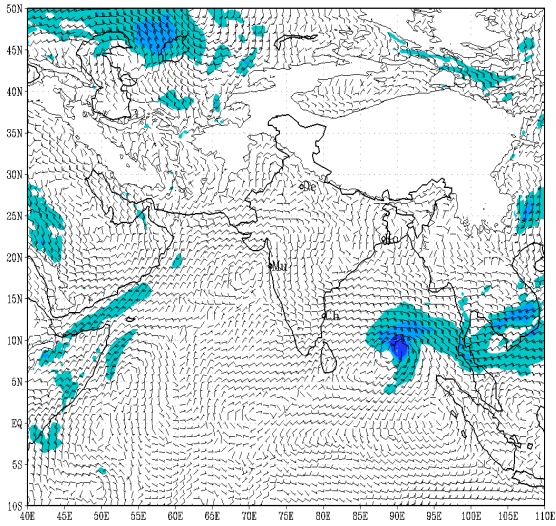
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)  
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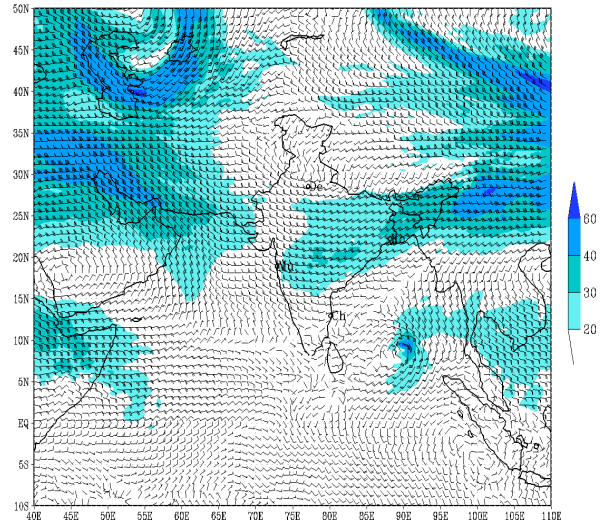
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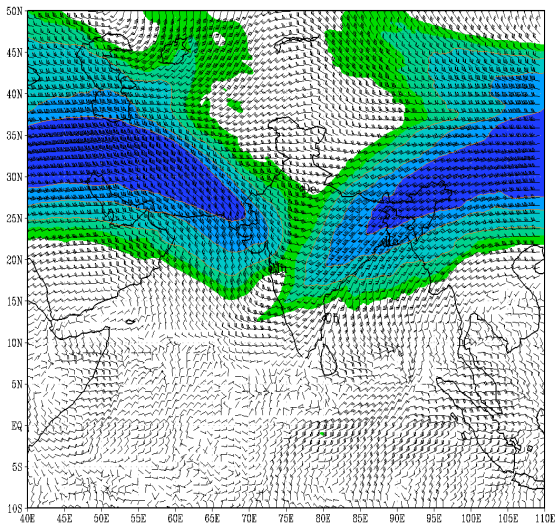
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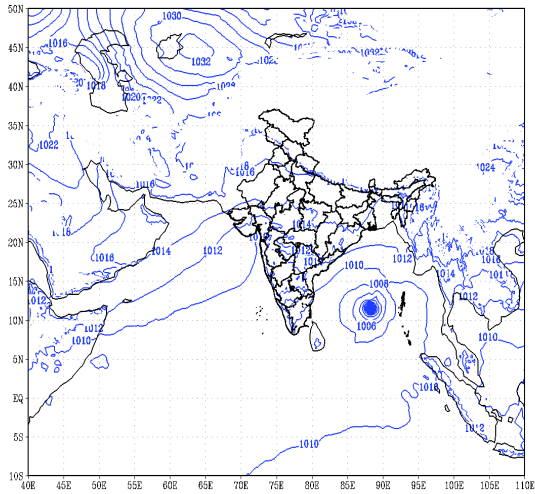
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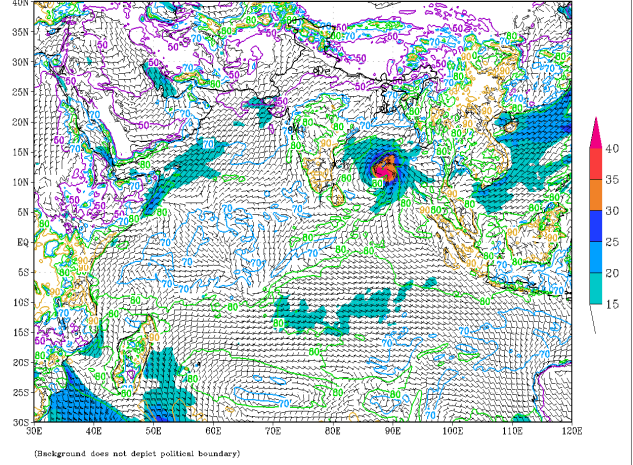


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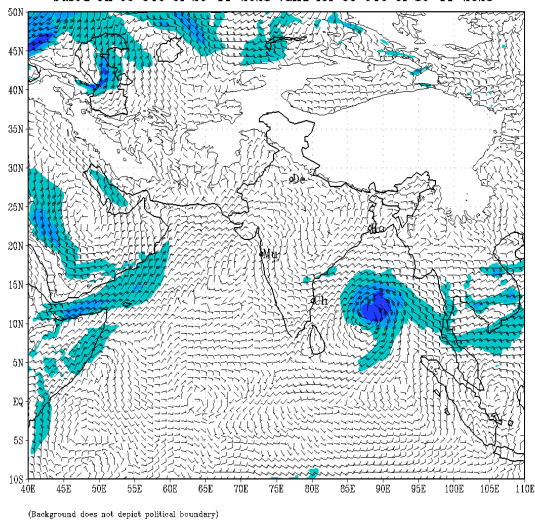
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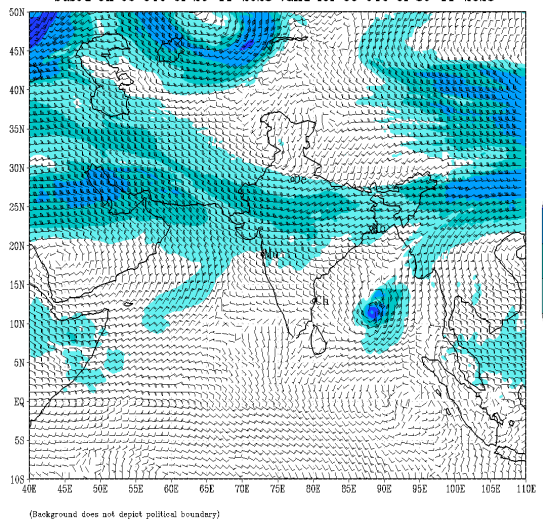
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 30-11-2023



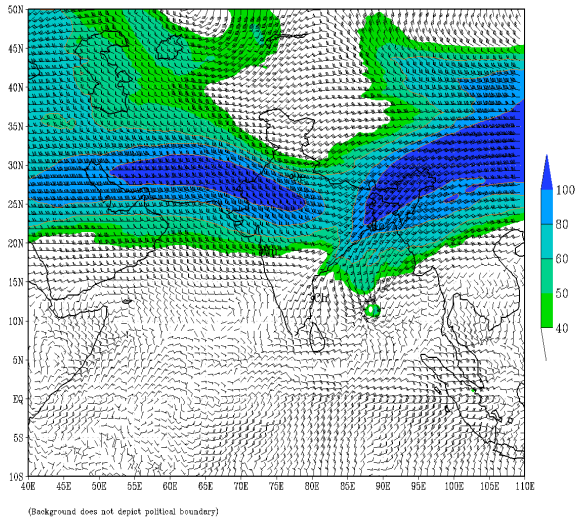
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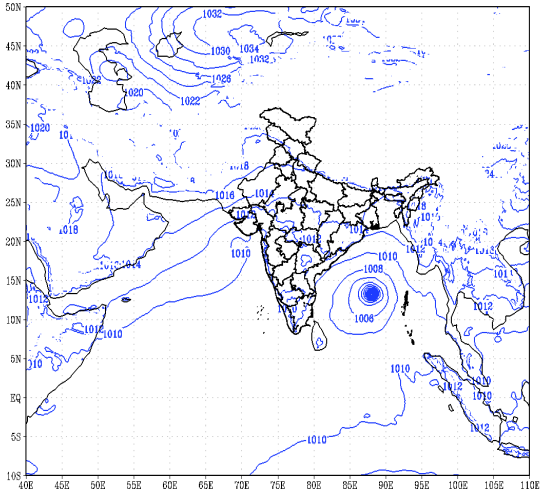
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based on 00 UTC of 28-11-2023 valid for 00 UTC of 30-11-2023



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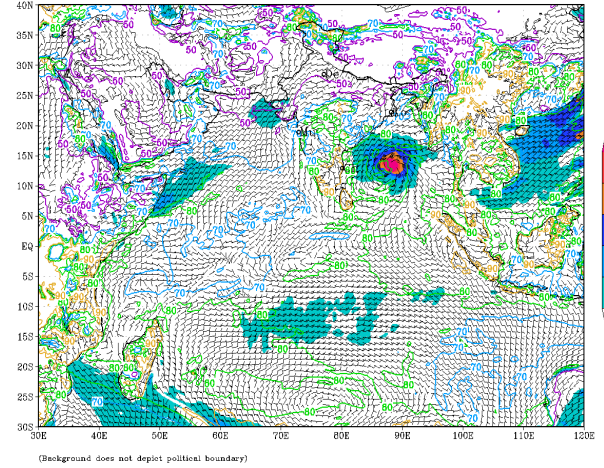


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)  
based on 00 UTC of 26-11-2023 valid for 00 UTC of 01-12-2023



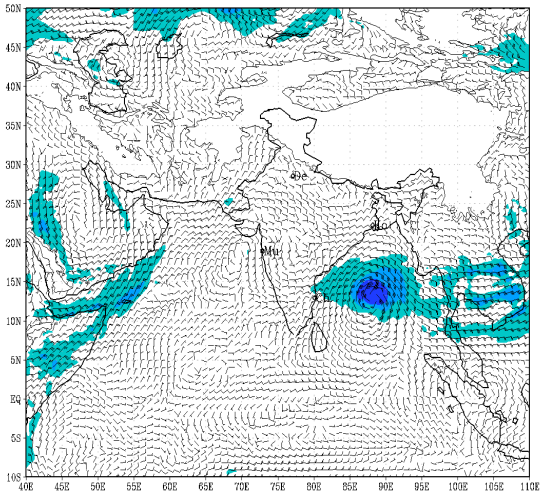
(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)  
based on 00 UTC of 26-11-2023 valid for 00 UTC of 01-12-2023



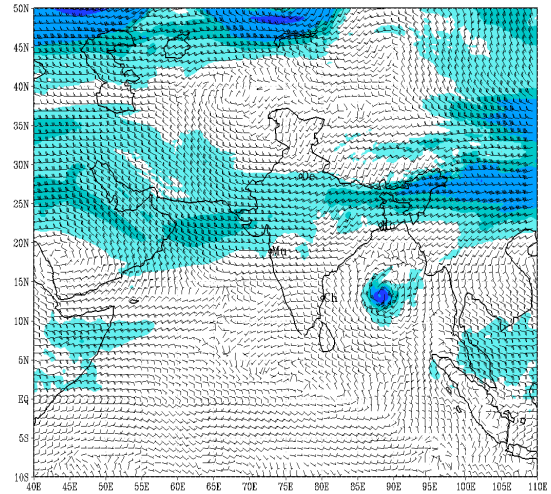
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 26-11-2023 valid for 00 UTC of 01-12-2023



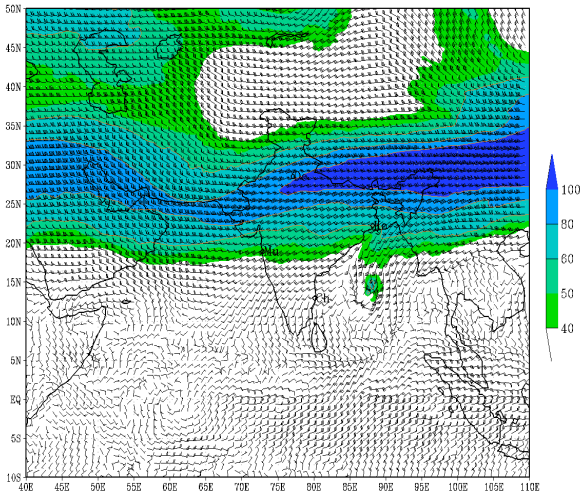
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 26-11-2023 valid for 00 UTC of 01-12-2023



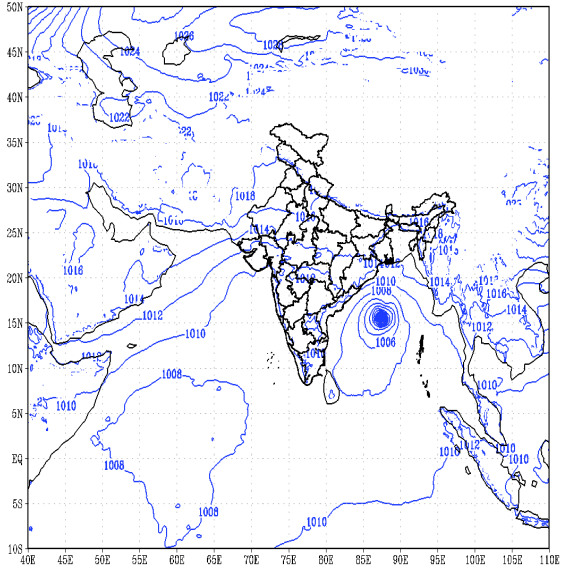
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 26-11-2023 valid for 00 UTC of 01-12-2023



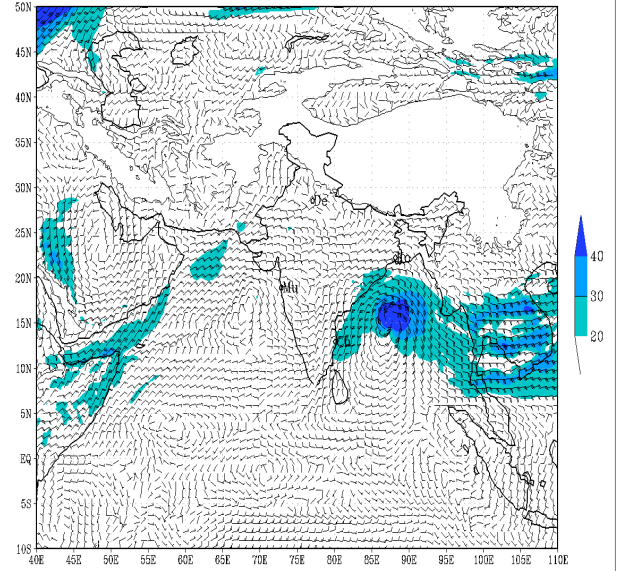
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 02-12-2023



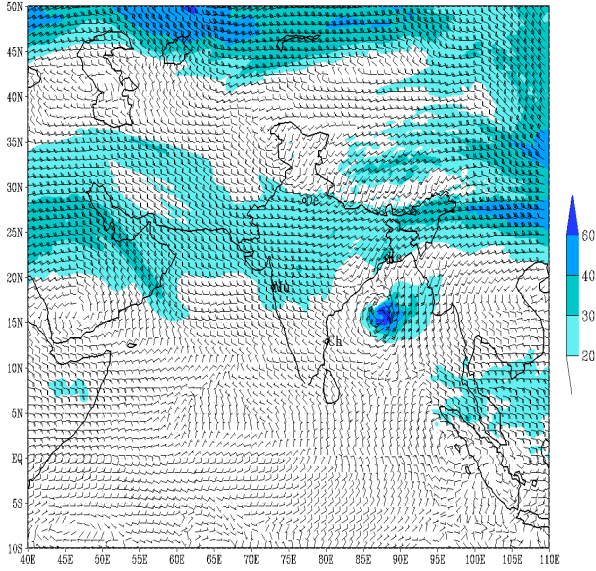
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 02-12-2023



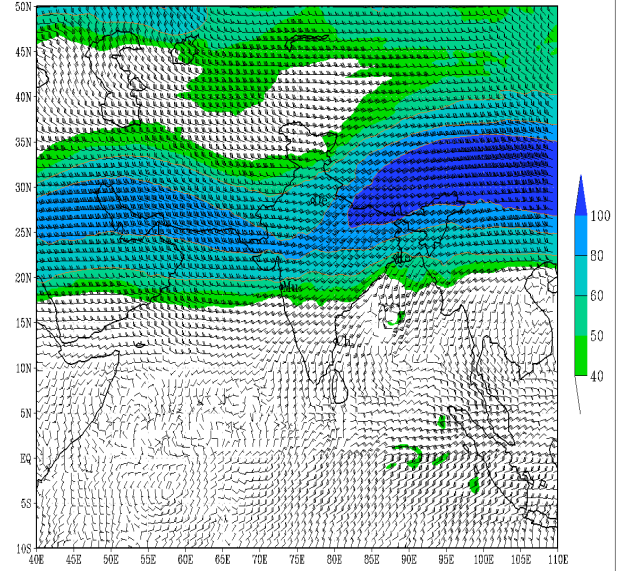
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 02-12-2023



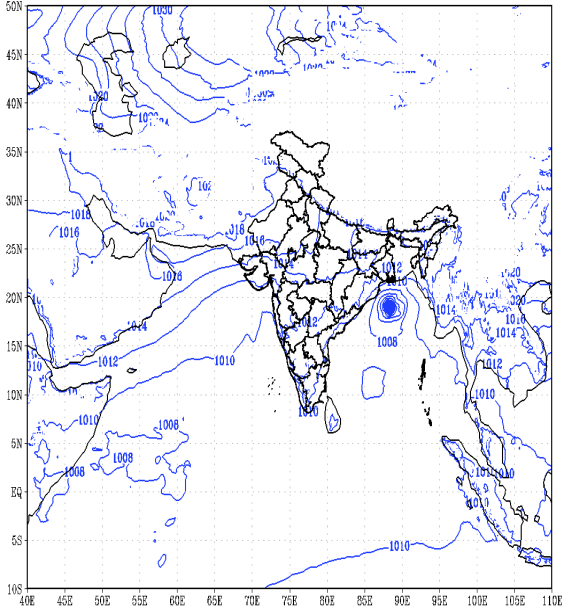
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 02-12-2023



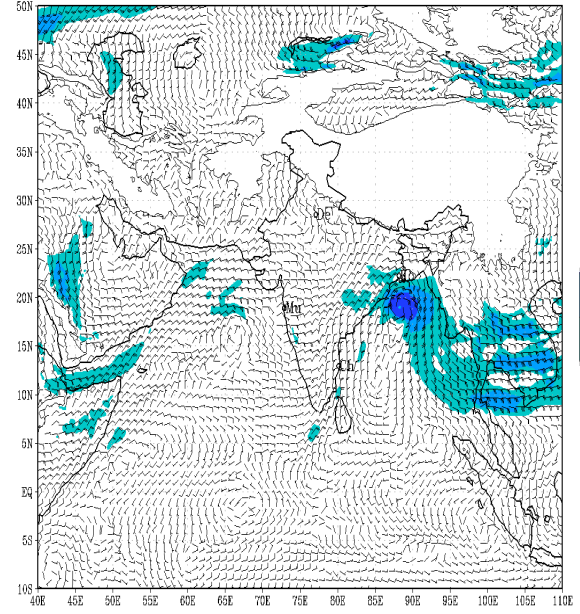
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 03-12-2023



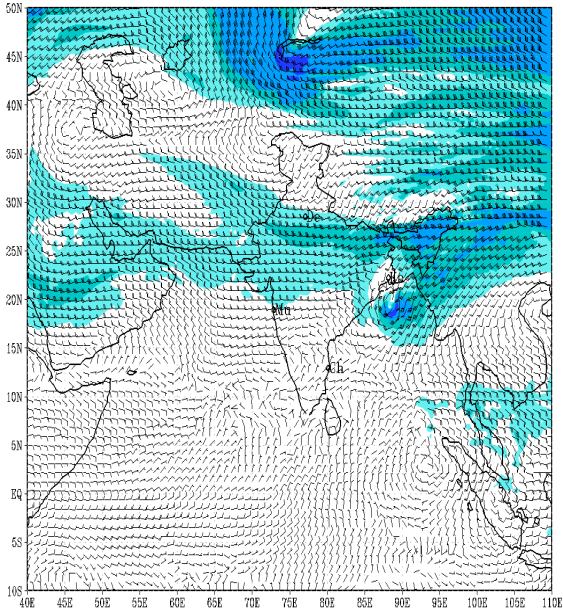
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 03-12-2023



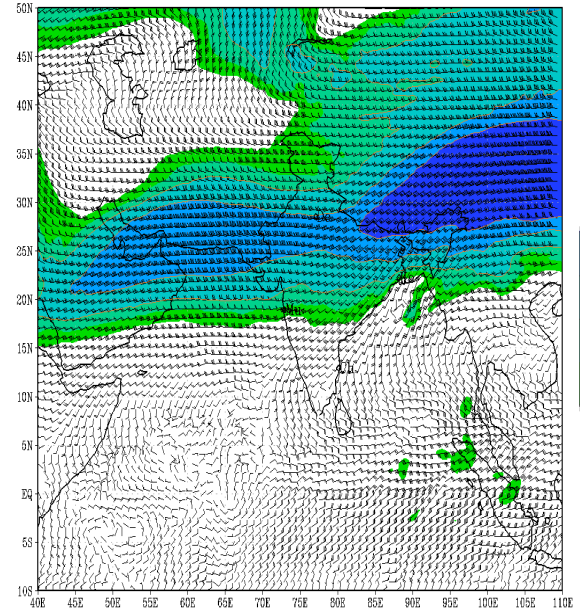
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 03-12-2023



(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 28-11-2023 valid for 00 UTC of 03-12-2023



(Background does not depict political boundary)