



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

**Tropical Cyclone Forecast Programme  
Report Dated 11<sup>TH</sup> November, 2023**

**Time of Issue: 1200 UTC**

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

- A Low Pressure Area 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.
- The upper air cyclonic circulation over Eastcentral & adjoining Southeast Arabian Sea now lies over Southwest & adjoining Westcentral Arabian sea and extends upto 1.5 km above mean sea level.

**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 and off Myanmar coast. 10-20 over parts of south and central BoB, Gulf of Mannar, 20 over South Andaman Sea.	20 over southeast and adjoining eastcentral AS, Lakshadweep area, 30 over parts of southwest AS, northwest AS.
<b>Low Level convergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	-5 over parts of south BoB.	5 over Comorin area, 5-10 over parts of westcentral and southwest AS,
<b>Upper Level divergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	5-10 over southeast BoB, -5 over parts of southwest BoB.	10-20 over westcentral AS, 5 over Comorin area, -10 over north part of central AS

<b>Vertical Wind Shear (VWS knots)</b> Low: 05-10 knots Moderate: 10-20 knots High: >20 knots	10-20 over southeast BoB, north parts of BoB and adjoining central BoB, High (> 20 knots) over remaining parts of BoB.	5-10 over southeast and adjoining southwest, central BoB, 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>	Increasing over southwest & adjoining westcentral BoB. Decreasing over north Andaman Sea.	Decreasing over south AS, increasing over remaining parts of AS.
<b>Upper Tropospheric Ridge</b>	Along 15°N over BoB.	Along 12°N over AS.

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

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

Scattered low/med clouds with embedded moderate to intense convection over south BoB, Andaman Sea.

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

Scattered low/med clouds with embedded intense to very intense convection over south and adjoining central Arabian Sea and moderate to intense convection over Comorin area.

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

Scattered low/med clouds with embedded moderate to intense convection over Palk Strait, Gulf of Mannar, Maldives, west Nepal, Tibet, China, Thailand, Gulf of Thailand, Cambodia, Laos, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java islands & Sea, Celebes islands & Sea, Philippines, East China Sea, Yellow Sea, North Madagascar, and over Indian ocean between lat 5.0N to 10.0S long 40.0E to 100.0E and between lat 20.0S to 35.0S long 50.0E to 90.0E.

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

MJO index is currently in Phase 6 with amplitude less than 1. It will be in phase 7 with amplitude less than 1 on 12<sup>th</sup> November & will remain there till 13<sup>th</sup> November. It will be in phase 8 on 14<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>	A cycir over southeast BoB on 14 <sup>th</sup> . Nearly west-northwestwards is indicated. Low pressure area (LPA) over central parts of south BoB on 15 <sup>th</sup> and depression over westcentral & adjoining southwest BoB on 16 <sup>th</sup> . To cross South Andhra Pradesh-North Tamil Nadu coasts in the night of 18 <sup>th</sup> .	No significant system during next 7 days
<b>IMD-GEFS</b>	A cycir over central parts of south BoB on 14 <sup>th</sup> . To move initially west-northwestwards and then north-northeastwards. Low pressure area (LPA) over southwest BoB on 15 <sup>th</sup> and marginal intensification.	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>	An extended cycir over southwest BoB off Tamil Nadu & adjoining Sri Lanka coasts on 14 <sup>th</sup> & 15 <sup>th</sup> with very slow nearly north-northeastwards off Tamil Nadu-Andhra Pradesh coasts till 17 <sup>th</sup> . LPA off North Tamil Nadu coast on 18 <sup>th</sup> and crossing as LPA over North Tamil Nadu – South Andhra Pradesh coasts on 19 <sup>th</sup> .	No significant system during next 7 days
<b>NCMRWF-NEPS</b>	No significant system during next 5 days	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 & adjoining South Andaman Sea on 14 <sup>th</sup> . Depression over southeast & adjoining southwest BoB on 15 <sup>th</sup> with west-northwestwards movement till 17 <sup>th</sup> . From 18 <sup>th</sup> onwards, weakening and gradual north-northeastwards movement is indicated. The system is predicted to become less marked over northwest & adjoining westcentral BoB off South Odisha coast on 19 <sup>th</sup> Nov.	No significant system during next 7 days.
<b>NCEP-GFS</b>	LPA over southeast BoB on 13 <sup>th</sup> . To move west-northwestwards and intensify into a depression over southwest BoB on 14 <sup>th</sup> , cyclonic storm over southwest BoB on 15 <sup>th</sup> . Thereafter, it would move nearly northwards and intensify into a severe cyclonic storm on 16 <sup>th</sup> and recurve gradually northeastwards. It is predicted to reach near southeast Bangladesh coast on 17 <sup>th</sup> /0000 UTC. Thereafter, it is predicted as a cyclonic circulation over southeast Bangladesh around 17 <sup>th</sup> /0600 UTC.	No significant system.
<b>IMD-Genesis Potential Parameter</b>	GPP is indicating potential zone for cyclogenesis over eastcentral BoB on 13 <sup>th</sup> , with nearly westwards movement initially till 15 <sup>th</sup> and over northwest BoB on 16 <sup>th</sup> .	No potential zone over AS for next 7 days.

## Summary and conclusion:

### 1. For Bay of Bengal:

Guidance from various models indicate that there is likelihood of formation of low pressure area over southeast Bay of Bengal around 14<sup>th</sup> November (GFS & GEFS on 15<sup>th</sup>, ECMWF on 14<sup>th</sup>, NCEP GFS on 13<sup>th</sup>, NCUM group around 17<sup>th</sup> over westcentral & adjoining southwest BoB off Tamil Nadu-Andhra Pradesh coasts). However, NCUM group of models is not indicating intensification into depression. IMD GFS, NCEP GFS and ECMWF are indicating formation of depression around 16<sup>th</sup> November (IMD GFS on 16<sup>th</sup>, ECMWF on 15<sup>th</sup>, NCEP GFS on 14<sup>th</sup>). IMD GFS is indicating crossing over North Tamil Nadu-South Andhra Pradesh on 18<sup>th</sup> as depression. NCUM is indicating crossing over North Tamil Nadu-South Andhra Pradesh on 19<sup>th</sup> as a low pressure area. ECMWF is indicating weakening over northwest & adjoining westcentral BoB off South Odisha coast on 19<sup>th</sup> Nov. NCEP GFS is indicating the system to intensify further into a severe cyclonic storm and movement towards southeast Bangladesh coast.

Considering all the above, it is inferred that a low pressure area is likely to form over southeast Bay of Bengal around 14<sup>th</sup> November. It is likely to move west-northwestwards and intensify into a depression over central & adjoining south Bay of Bengal around 16<sup>th</sup> 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	NIL	LOW	MOD

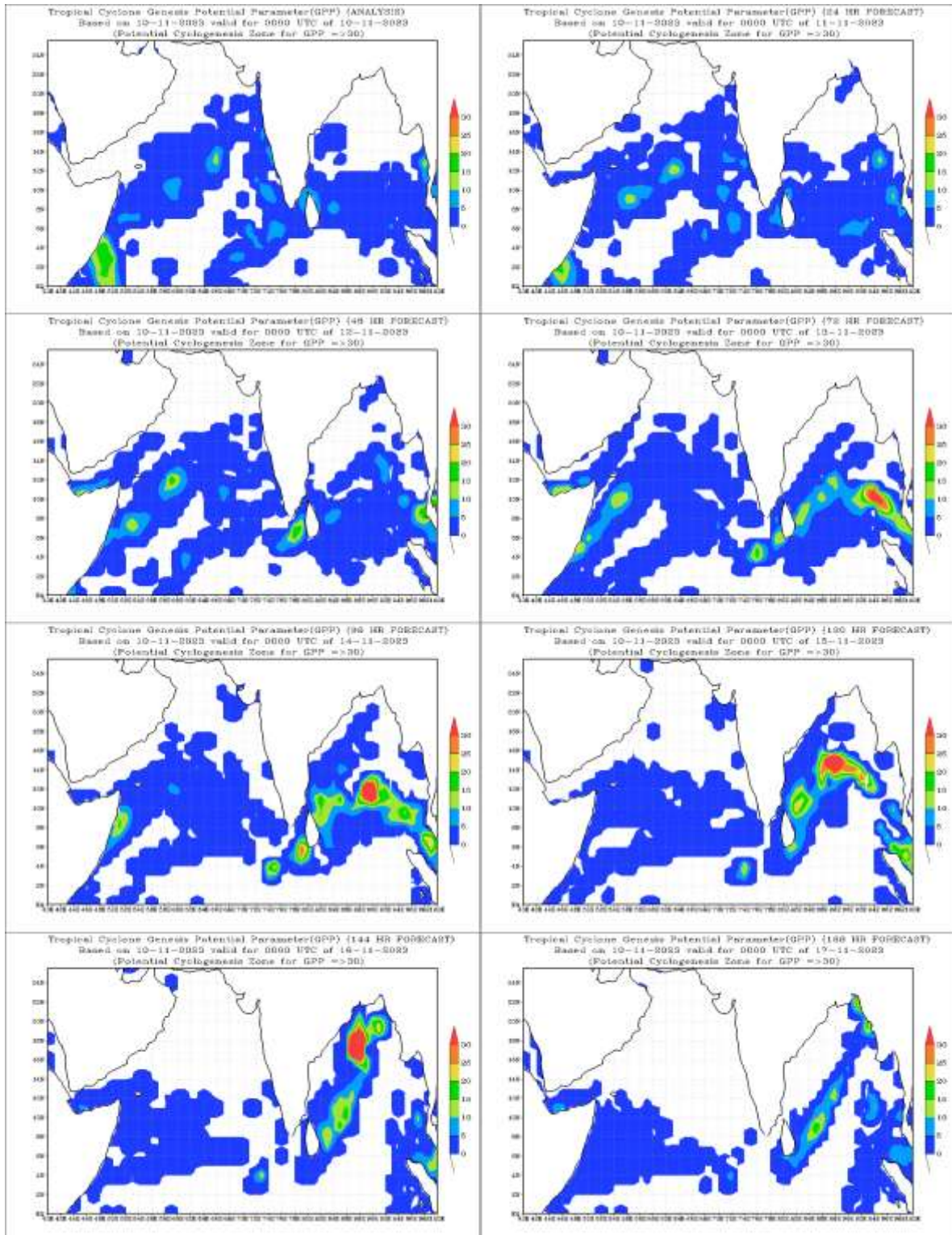
### 2. For the Arabian Sea:

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

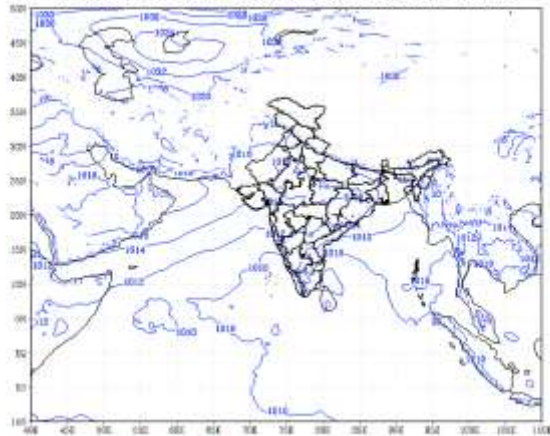
### **Probability of Cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:**

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: Nil



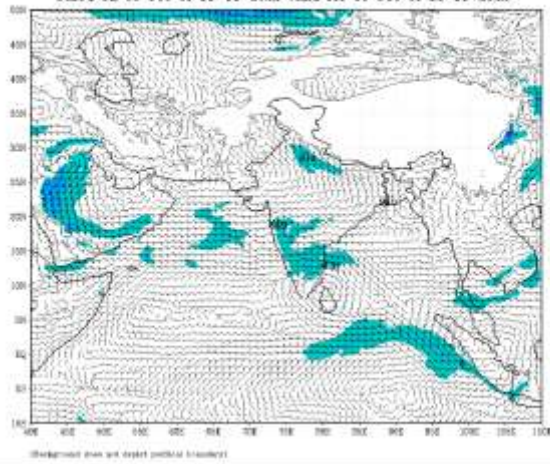
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 12-11-2022



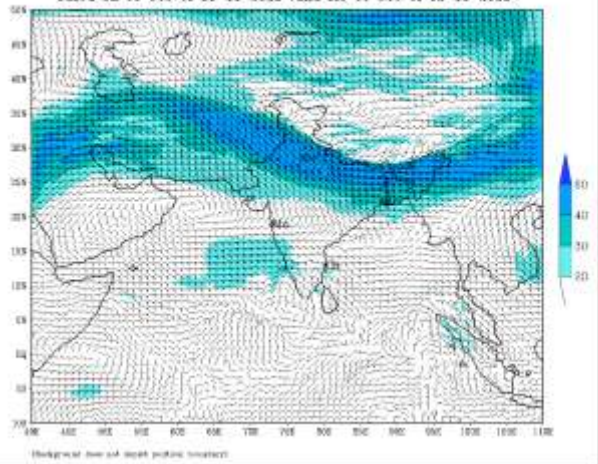
IMD GFS (T1634) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 12-11-2022



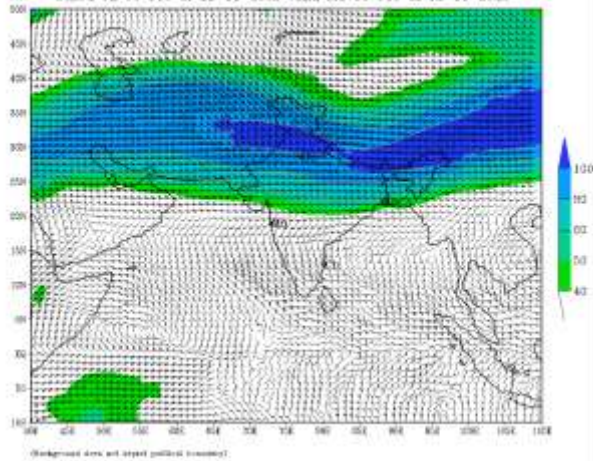
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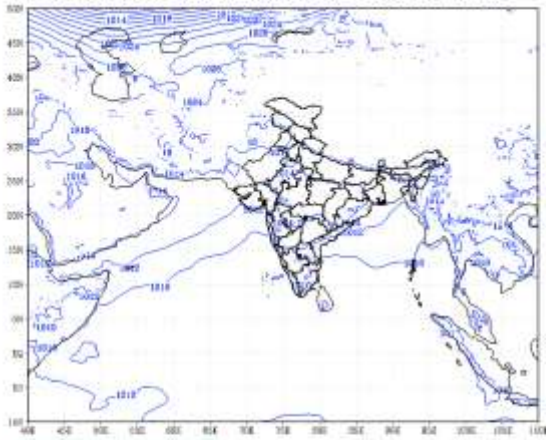
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 12-11-2022



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (24 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 12-11-2022



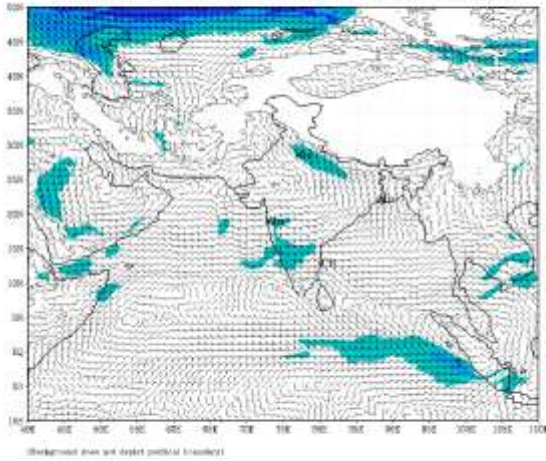
**IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)**  
 based on 00 UTC of 11-11-2022 valid for 00 UTC of 13-11-2022



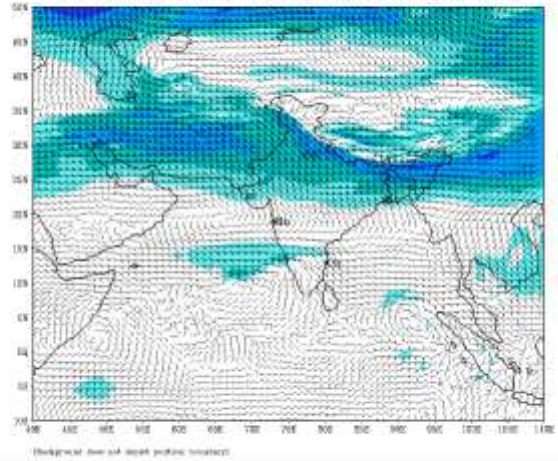
**IMD GFS (T1634) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)**  
 based on 00 UTC of 11-11-2022 valid for 00 UTC of 13-11-2022



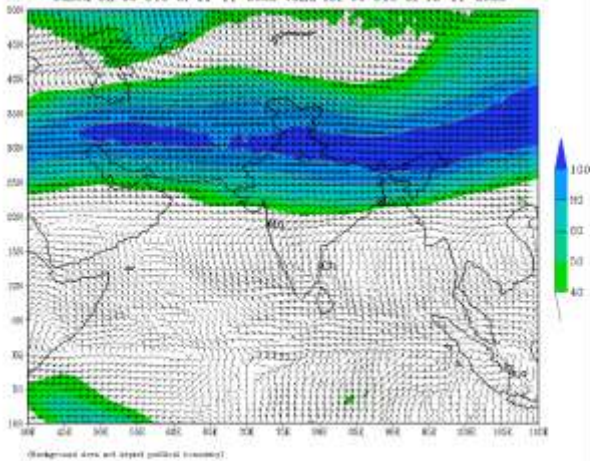
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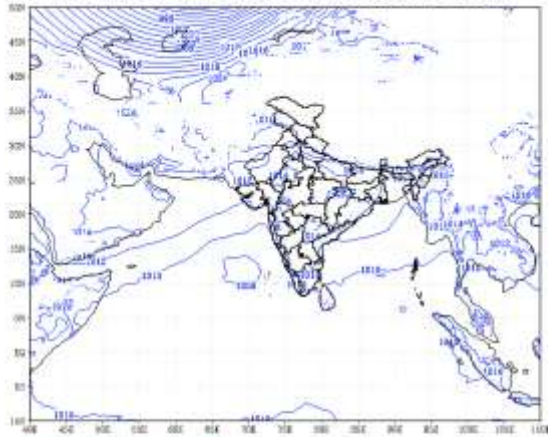
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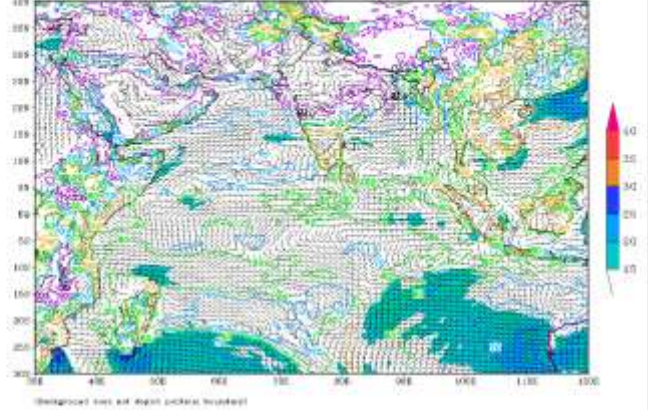
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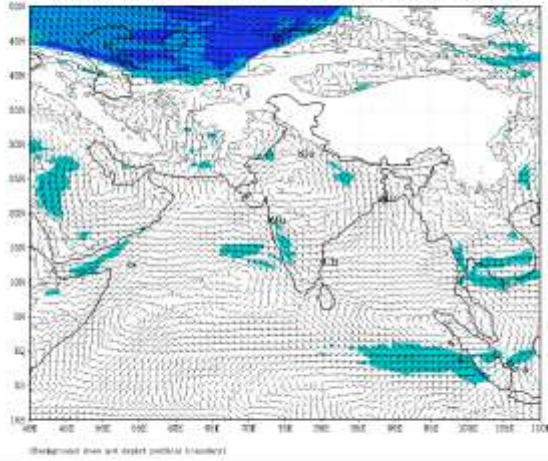
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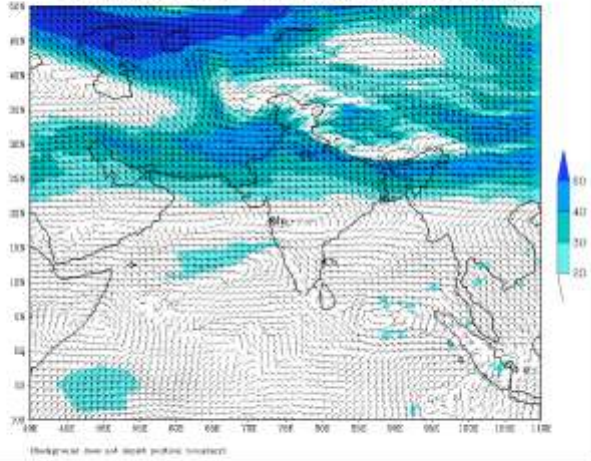
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)  
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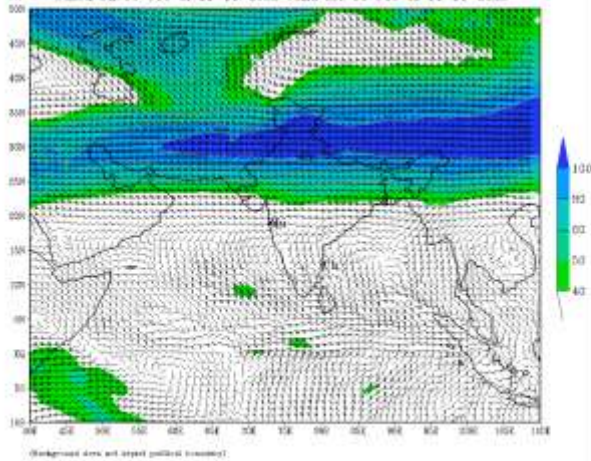
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based on 00 UTC of 11-11-2022 valid for 00 UTC of 14-11-2022



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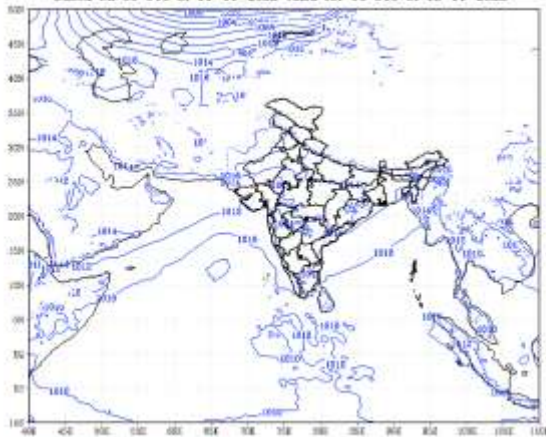


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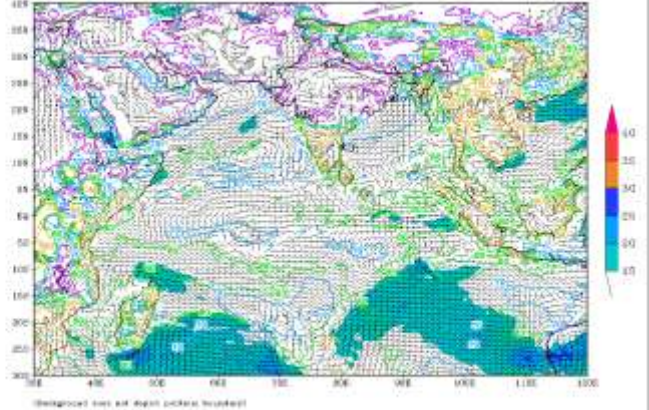




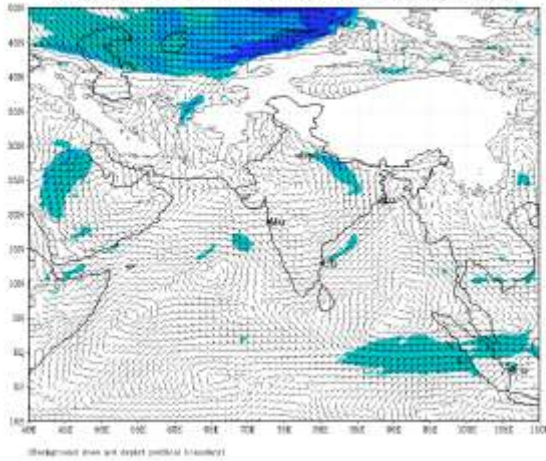
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 15-11-2022



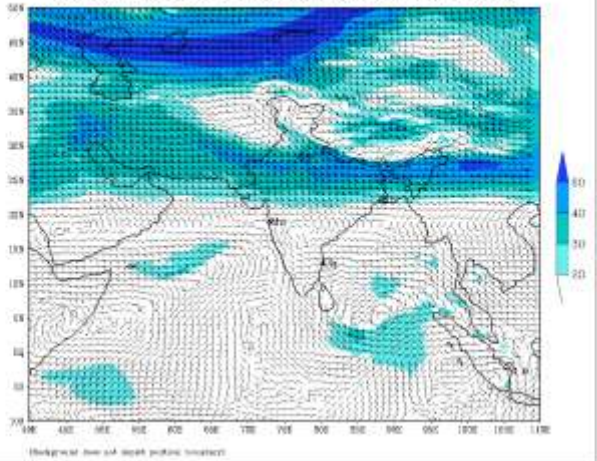
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 15-11-2022



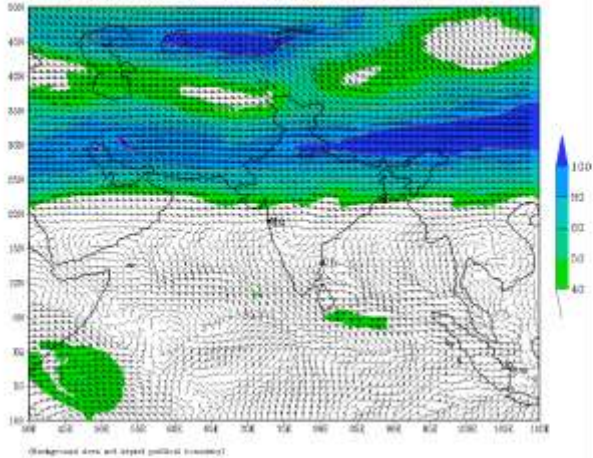
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 15-11-2022



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)  
based on 00 UTC of 11-11-2022 valid for 00 UTC of 15-11-2022

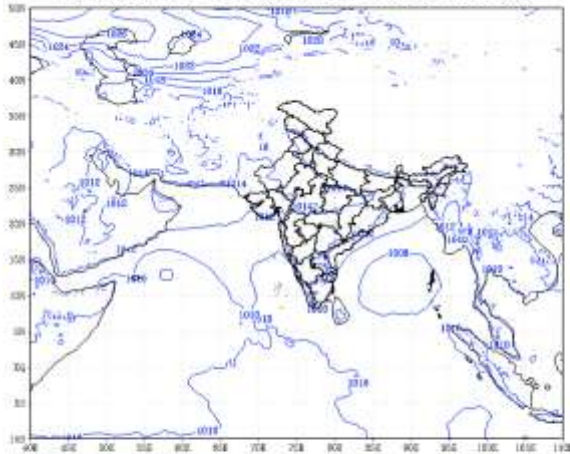


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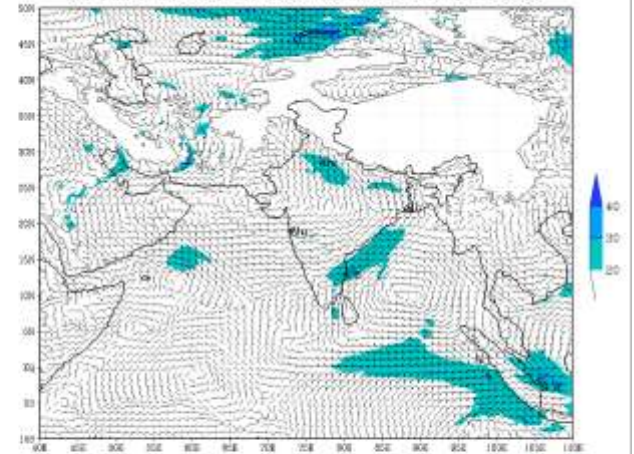


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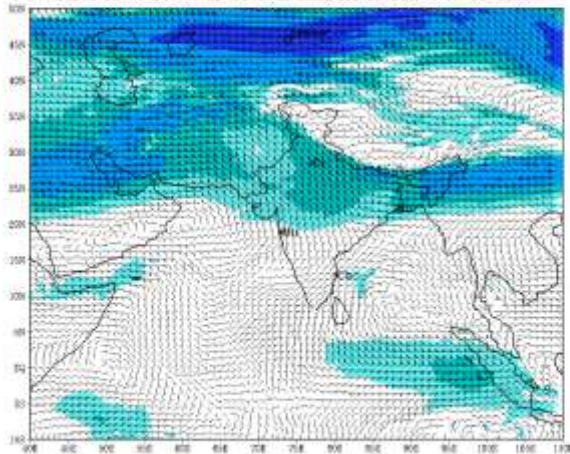
(Background line art depicts political boundary)

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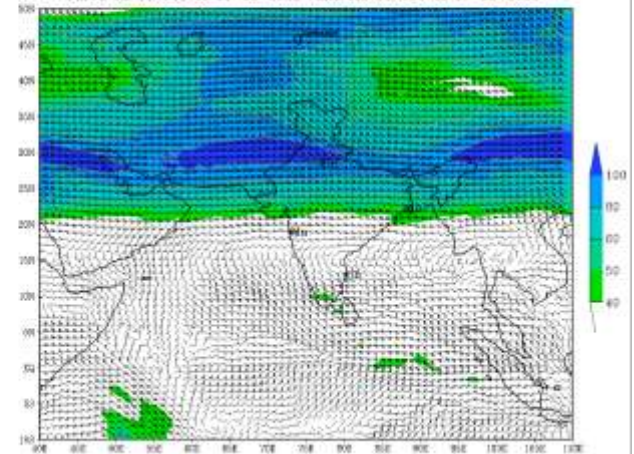
(Background line art depicts political boundary)

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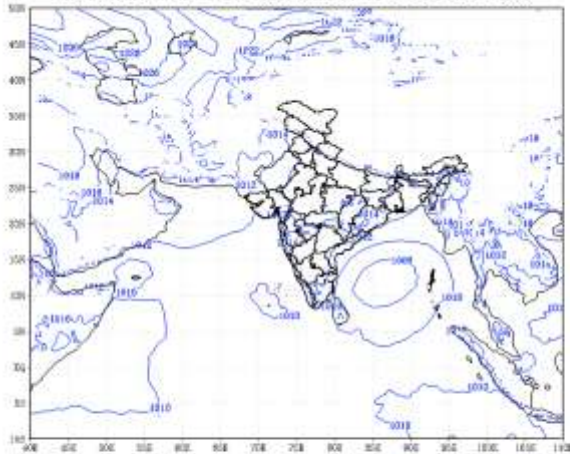
(Background line art depicts political boundary)

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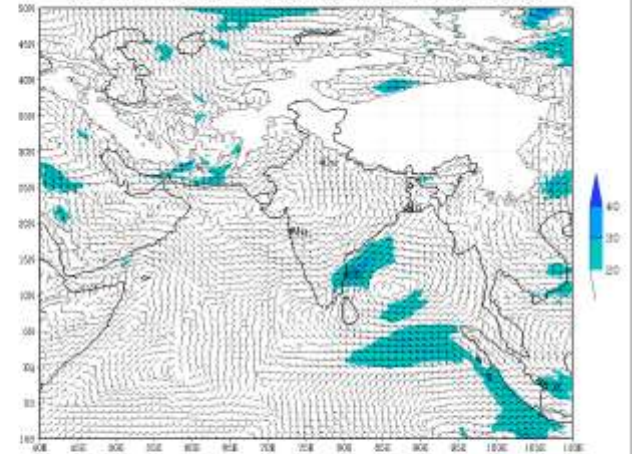
(Background line art depicts political boundary)

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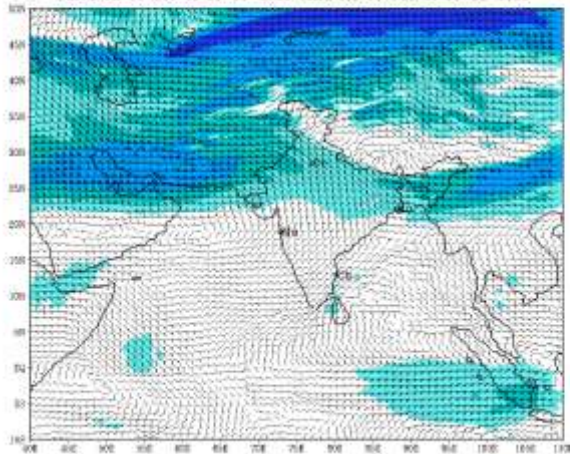
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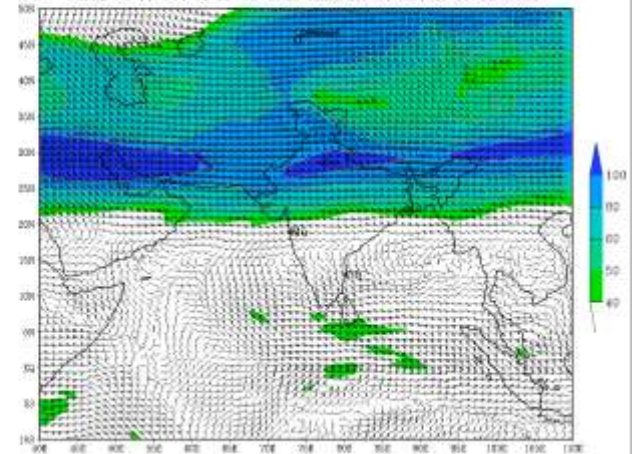
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(Background line art depicts political boundary)

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based on 00 UTC of 11-11-2022 valid for 00 UTC of 18-11-2022



(Background line art depicts political boundary)