



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

**Tropical Cyclone Forecast Programme  
Report Dated 22<sup>nd</sup> December 2024**

**Time of Issue: 0930 UTC**

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

The Depression over Westcentral Bay of Bengal moved slowly east-northeastwards and weakened into a Well Marked Low Pressure area over the same region in the same evening (1200 UTC/ 1730IST) of the 21<sup>st</sup> December 2024. It persisted over the same region at (0830 hrs IST/0300 UTC) of today, the 22<sup>nd</sup> December 2024. The associated cyclonic circulation extended upto 3.1 km above mean sea level. It is likely to move west-southwestwards and reach southwest Bay of Bengal near north Tamil Nadu & south Andhra Pradesh coasts around 24<sup>th</sup> December.

**Environmental Features based on 0300 UTC:**

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
<b>Sea Surface Temperature (SST) °C</b>	<ul style="list-style-type: none"> <li>➤ 26-28°C over north &amp; adjoining central BoB and western coast.</li> <li>➤ 28-30°C over rest of BoB.</li> </ul>	<ul style="list-style-type: none"> <li>➤ 28-30°C over southeast AS &amp; adjoining southwest AS, most parts of eastcentral BoB, Lakshadweep Islands and Maldives.</li> <li>➤ 25-28°C over rest of AS.</li> </ul>
<b>Tropical Cyclone Heat Potential (TCHP) kJ/cm<sup>2</sup></b>	<ul style="list-style-type: none"> <li>➤ 150-200 over northeast BoB and adjoining parts of northwest &amp; eastcentral BoB.</li> <li>➤ 100-150 over Andaman Sea and southeast BoB.</li> <li>➤ 20-30 over some parts of southwest BoB along &amp; off north Sri Lanka coast and adjoining southeast BoB.</li> <li>➤ 60-80 over rest of BoB.</li> </ul>	<ul style="list-style-type: none"> <li>➤ 100-120 over southeast AS, Maldives Islands, Lakshadweep Islands and areas of eastcentral AS along Karnataka-Kerala coasts.</li> <li>➤ 20-60 over rest AS.</li> </ul>
<b>Cyclonic Relative vorticity (X10<sup>-6</sup>s<sup>-1</sup>)</b>	<ul style="list-style-type: none"> <li>➤ 50 over system area.</li> </ul>	<ul style="list-style-type: none"> <li>➤ 20-30 over eastcentral AS and adjoining northeast AS.</li> </ul>
<b>Low-Level convergence (X10<sup>-5</sup> s<sup>-1</sup>)</b>	<ul style="list-style-type: none"> <li>➤ 05 to the northeast of the system and another zone of 05 to southeast of system center. However, over the system area negative convergence is seen.</li> </ul>	<ul style="list-style-type: none"> <li>➤ 5 over Comorin Region and southwest AS.</li> <li>➤ 5-10 over northeast AS along &amp; off Gujarat coast.</li> </ul>

<b>Upper-Level divergence</b> ( $\times 10^{-5} \text{ s}^{-1}$ )	➤ 10 to the southeast of system area. However, over the system area -ve divergence is seen.	➤ 5 over of westcentral AS ➤ 10-20 over Comorin region adjoining southwest AS.
<b>Vertical Wind Shear (VWS knots)</b> Low: 05-10 knots Moderate: 10-20 knots High: >20 knots	➤ Moderate over system area.	➤ High over north and adjoining central AS. ➤ Low-Moderate over rest of AS.
<b>Wind Shear Tendency (knots)</b>	➤ Increasing over north and southwest BoB. ➤ Decreasing over southeast, north Andaman Sea and westcentral BoB along & off Andhra Pradesh coast.	➤ Increasing over westcentral AS. ➤ Decreasing over southwest AS and adjoining EIO.
<b>Upper tropospheric Ridge</b>	10°N over BoB.	10°N over AS.

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

**a) Over the BoB & Andaman Sea:**

Scattered low and medium clouds with embedded intense to very intense convection lay over central Bay of Bengal (minimum CTT minus 70-80 degree Celsius). Scattered low and medium clouds with embedded moderate to intense convection lay over south Bay of Bengal & south Andaman Sea and weak to moderate convection lay over north Bay of Bengal and north Andaman Sea.

**b) Over the Arabian Sea:**

Scattered low and medium clouds with embedded weak to moderate convection lay over southeast Arabian sea, Lakshadweep islands area, Maldives & Comorin area. Scattered low and medium clouds over rest Arabian sea.

**c) Outside India:**

Scattered low & medium clouds with embedded moderate to intense convection over Sri Lanka, Palk Strait, Gulf of Mannar, Maldives, North Pakistan, West Nepal, Tibet China, east China Sea, Myanmar, Thailand, Gulf of Thailand, Cambodia, Laos, Vietnam, Gulf of Tonkin, Hainan, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, Java Islands & Sea, Celebes Islands & Sea, Philippines, Sulu Sea, Madagascar, Mozambique Channel and over Indian Ocean between latitude 5.0N to 15.0S longitude 40.0E to 125.0E.

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

MJO is currently in phase 6 with amplitude greater than 1. It will be in same phase till 25<sup>th</sup> December but with amplitude less than 1. Later, it will move to phase 7 and remain there till 1<sup>st</sup> of January 2025.

## NWP Guidance for FDP Cyclone:

<b>MODEL GUIDANCE</b>	<b>Bay of Bengal (BoB)</b>	<b>Arabian Sea (AS)</b>
<b>IMD-GFS</b>	<p>The model is indicating the Low-Pressure area (LPA) over central parts of BoB as of today 22<sup>nd</sup> Dec (13.5<sup>o</sup>N, 86.0<sup>o</sup>E), moving southwestwards as LPA over southwest BoB (12.0<sup>o</sup>N, 85.5<sup>o</sup>E) on 23<sup>rd</sup> , LPA over southwest BoB (12.0<sup>o</sup>N, 83.0<sup>o</sup>E) on 24<sup>th</sup> , again LPA over southwest BoB (10.5<sup>o</sup>N, 81.8<sup>o</sup>E) on 25<sup>th</sup> , as a cyclonic circulation over southwest BoB (10.0<sup>o</sup>N, 80.0<sup>o</sup>E) on 26<sup>th</sup> and less marked thereafter.</p> <p>Thus, the model is indicating gradual west-southwestwards movement as a LPA towards Tamil Nadu coast till 25<sup>th</sup> and becoming less marked thereafter.</p>	The model indicates no significant system over AS.
<b>IMD-GEFS</b>	<p>IMD-GEFS is indicating the Low-Pressure area (LPA) over westcentral BoB as of today 22<sup>nd</sup> Dec (13.0<sup>o</sup>N, 83.0<sup>o</sup>E), as LPA over southwest BoB (10.0<sup>o</sup>N, 82.0<sup>o</sup>E) on 23<sup>rd</sup>, cyclonic circulation over southwest BoB (10.0<sup>o</sup>N, 80.5<sup>o</sup>E) on 24<sup>th</sup> and less marked thereafter.</p> <p>Thus, the model is indicating gradual southwestwards movement as an LPA till 24<sup>th</sup> towards Tamil Nadu coast and becoming less marked thereafter.</p>	The model indicates no significant system over AS.
<b>IMD-WRF</b>	<p>IMD-WRF is indicating the Low-Pressure area (LPA) over central parts of BoB as of today 22<sup>nd</sup> Dec (14.5<sup>o</sup>N, 86.0<sup>o</sup>E), LPA over southwest BoB (12.5<sup>o</sup>N, 85.0<sup>o</sup>E) on 23<sup>rd</sup>, LPA over southwest BoB (12.0<sup>o</sup>N, 82.0<sup>o</sup>E) on 24<sup>th</sup> and LPA over southwest BoB off Tamil Nadu coast (11.5<sup>o</sup>N, 81.0<sup>o</sup>E) on 25<sup>th</sup> and less marked thereafter.</p> <p>Thus, the model is indicating west-southwestwards movement as an LPA till 25<sup>th</sup>.</p>	The model indicates no significant system over AS.
<b>NCMRWF-NCUM(G)</b>	<p>NCUM(G) is indicating the Well Marked Low Pressure area (WML) over westcentral BoB as of today 22<sup>nd</sup> Dec (15.0<sup>o</sup>N, 86.0<sup>o</sup>E), LPA over southwest BoB (12.5<sup>o</sup>N, 85.0<sup>o</sup>E) on 23<sup>rd</sup>, LPA over southwest BoB (12.0<sup>o</sup>N, 82.0<sup>o</sup>E) on 24<sup>th</sup> and LPA over southwest BoB off Tamil Nadu coast (11.5<sup>o</sup>N, 81.0<sup>o</sup>E) on 25<sup>th</sup> and less marked thereafter.</p> <p>Thus, the model is indicating west-southwestwards movement as an LPA till 25<sup>th</sup> towards Tamilnadu coast and less marked thereafter.</p>	The model indicates no significant system over AS.
<b>NCMRWF-NCUM(R)</b>	<p>The model is indicating the Well-marked Low Pressure area (WML) over Westcentral BoB (14.8/87) as of today 22<sup>nd</sup> Dec, Low pressure area over Southwest BoB (12/85) on 23<sup>rd</sup> Dec, LPA over southwest BoB (12/83) on 24<sup>th</sup>, cyclonic circulation over southwest BoB (12/82).</p>	The model indicates no significant system over AS.

	Thus, the model is indicating southwestwards movement towards Tamil Nadu coast till 25 <sup>th</sup> .	
<b>NCMRWF-NEPS</b>	NCMRWF-NEPS is indicating the Well Marked Low Pressure area (WML) over westcentral BoB as of today 22 <sup>nd</sup> Dec (15.0 <sup>0</sup> N, 86.0 <sup>0</sup> E), LPA over southwest BoB (12.5 <sup>0</sup> N, 85.0 <sup>0</sup> E) on 23 <sup>rd</sup> , LPA over southwest BoB (12.0 <sup>0</sup> N, 82.0 <sup>0</sup> E) on 24 <sup>th</sup> and LPA over southwest BoB off Tamil Nadu coast (11.5 <sup>0</sup> N, 81.0 <sup>0</sup> E) on 25 <sup>th</sup> and less marked thereafter. Thus, the model is indicating west-southwestwards movement as an LPA till 25 <sup>th</sup> towards Tamil Nadu coast and less marked thereafter.	The model indicates no significant system over AS.
<b>ECMWF</b>	ECMWF is indicating the Low pressure are (LPA) over westcentral BoB as of today 22 <sup>nd</sup> Dec (13.3 <sup>0</sup> N, 86.1 <sup>0</sup> E), LPA over southwest BoB (11.6 <sup>0</sup> N, 85.3 <sup>0</sup> E) on 23 <sup>rd</sup> , LPA over southwest BoB (11.9 <sup>0</sup> N, 83.6 <sup>0</sup> E) on 24 <sup>th</sup> and LPA over southwest BoB (10.6 <sup>0</sup> N, 83.0 <sup>0</sup> E) on 25 <sup>th</sup> and less marked thereafter. Thus, the model is indicating west-southwestwards movement as an LPA till 25 <sup>th</sup> towards Tamilnadu coast and less marked thereafter.	The model indicates no significant system over AS.
<b>NCEP-GFS</b>	The model is indicating the Low-Pressure area (LPA) over westcentral BoB as of today 22 <sup>nd</sup> Dec (13.3 <sup>0</sup> N, 85.7 <sup>0</sup> E), as LPA over southwest BoB (11.2 <sup>0</sup> N, 85.0 <sup>0</sup> E) on 23 <sup>rd</sup> , LPA over southwest BoB (11.4 <sup>0</sup> N, 82.9 <sup>0</sup> E) on 24 <sup>th</sup> , again LPA over southwest BoB (11.0 <sup>0</sup> N, 82.2 <sup>0</sup> E) on 25 <sup>th</sup> and less marked thereafter. Thus, the model is indicating gradual west-southwestwards movement as an LPA towards Tamil Nadu coast till 25 <sup>th</sup> and becoming less marked thereafter.	The model indicates no significant system over AS.

**Summary:**

**(a) Bay of Bengal:**

Most of the models are indicating the existing Well Marked Low Pressure area to weaken into a Low pressure area during next 24 hours. It is likely to move West-southwestwards towards Tamil Nadu coast till 25<sup>th</sup>. There is good convergence among all the models in this regard.

**(b) Arabian Sea**

Most of the models are indicating no significant system over Arabian Sea.

**Inference:**

The Depression over Westcentral Bay of Bengal moved slowly east-northeastwards and weekend into a Well Marked Low Pressure area over the same region in the same evening (1200 UTC/ 1730IST) of the 21<sup>st</sup> December 2024. It persisted over the same region at (0830 hrs IST/0300 UTC) of today, the 22nd December 2024. The associated cyclonic circulation extended upto 3.1 km above mean sea level. It is likely to move west-southwestwards and reach southwest Bay of Bengal near north Tamil Nadu & south Andhra Pradesh coasts around 24th December.

**Probability of cyclogenesis (formation of depression and above intensity systems) over the Bay of Bengal 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

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

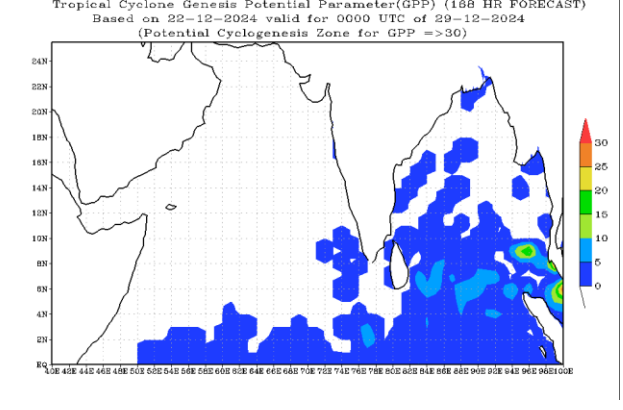
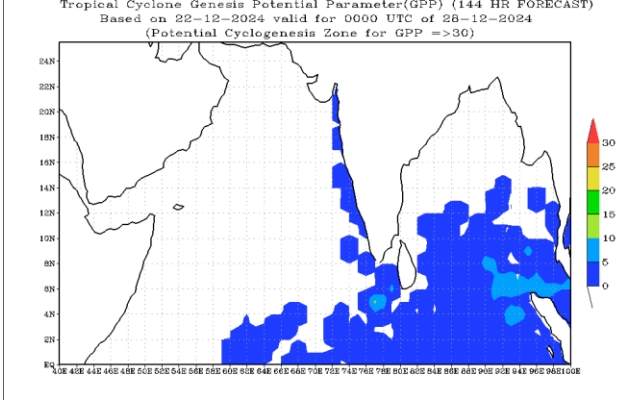
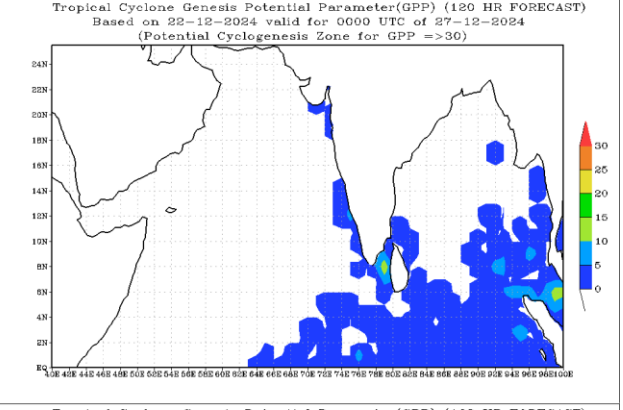
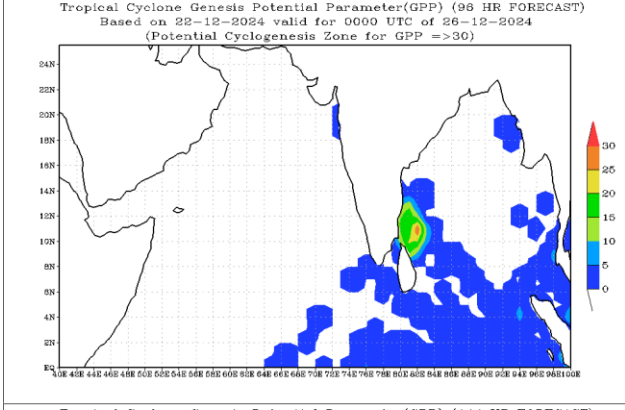
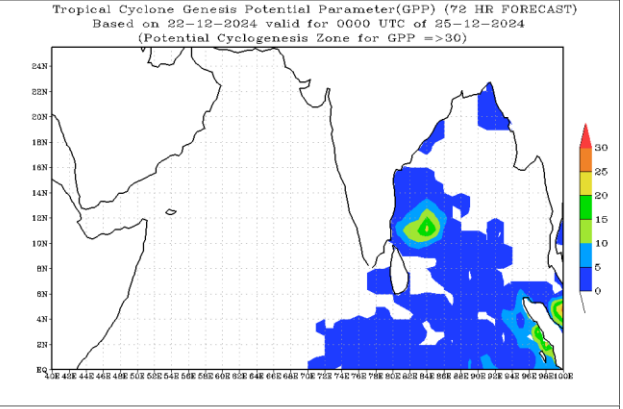
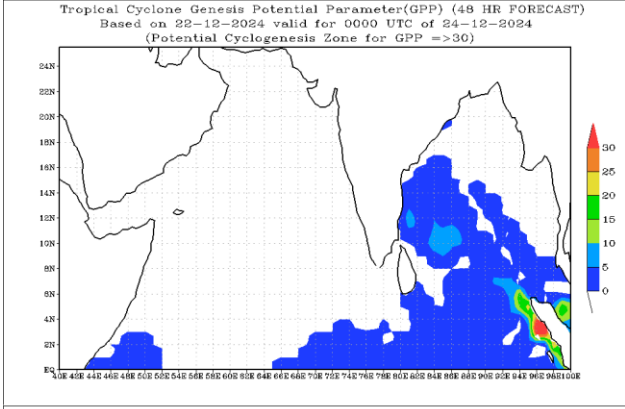
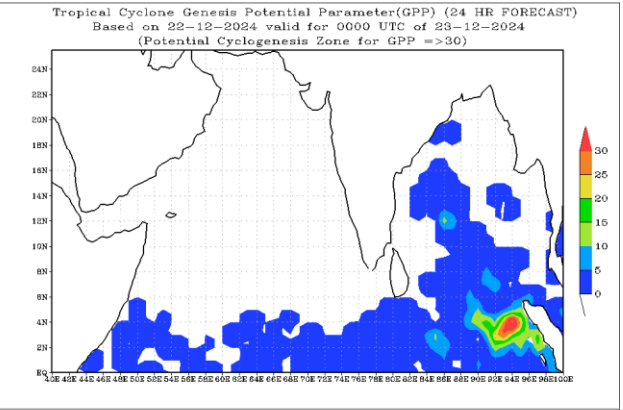
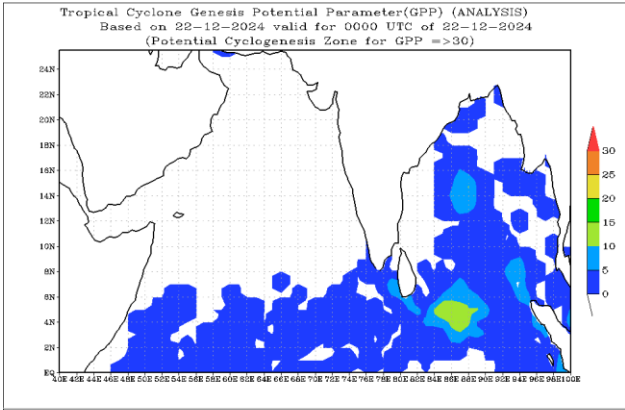
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

“- “indicates genesis has already occurred.

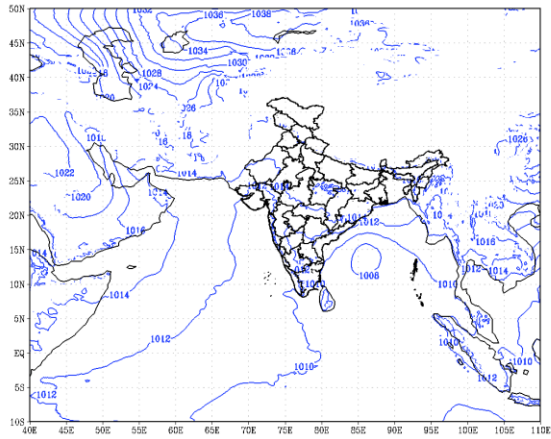
Probability is indicated as NIL for 0%, LOW for 1-33%, MOD for 34-67% and High for 68-100%.

**Intense Observation Period (IOP):** South Odisha, Andhra Pradesh and Tamil Nadu coasts during 23<sup>rd</sup> to 25<sup>th</sup> December, 2024.

# ANNEXURE

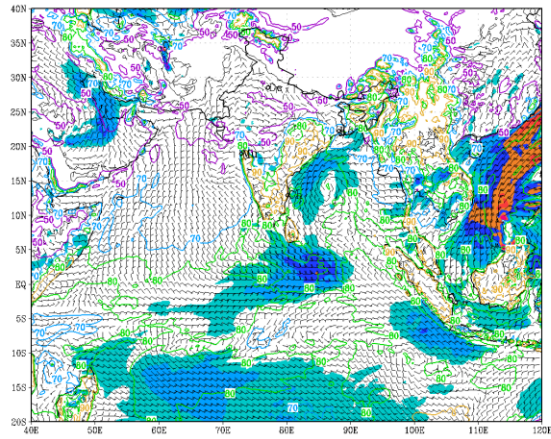


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based on 00 UTC of 22-12-2024 valid for 00 UTC of 22-12-2024



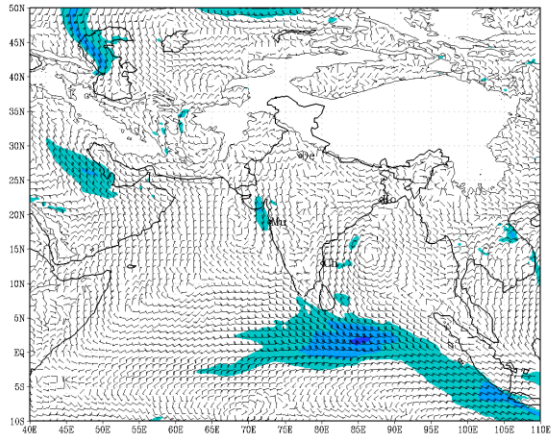
(Background does not depict political boundary)

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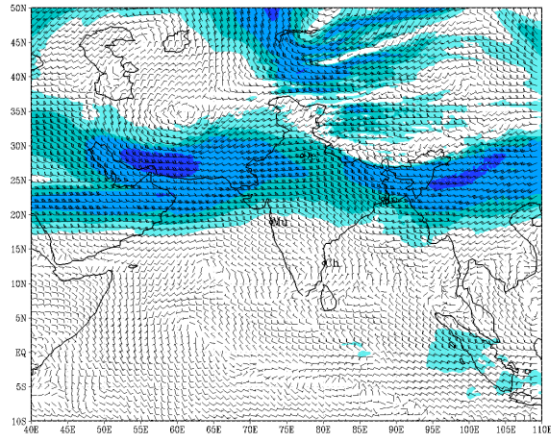
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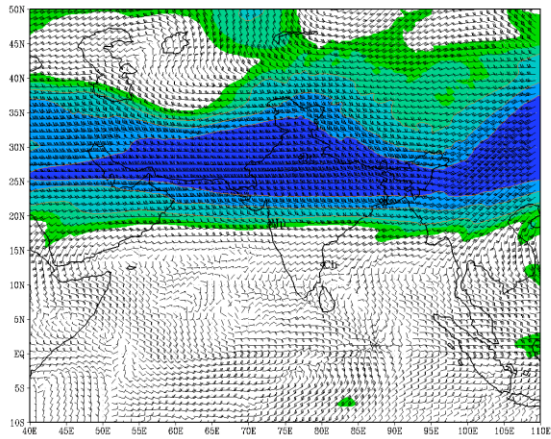
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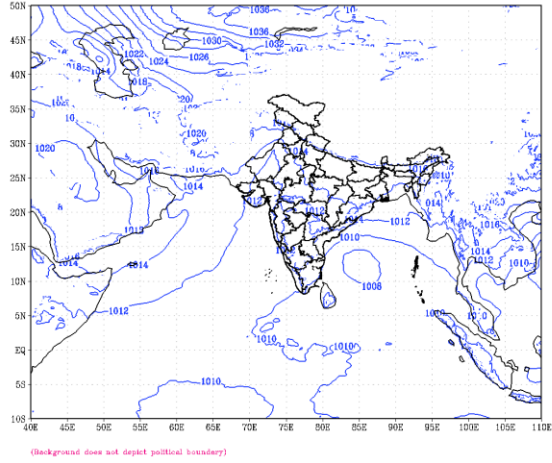
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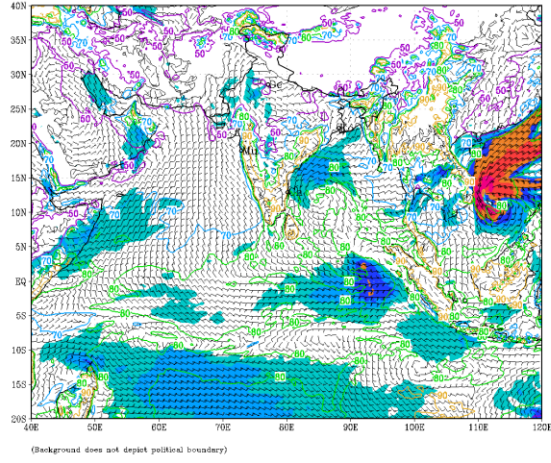


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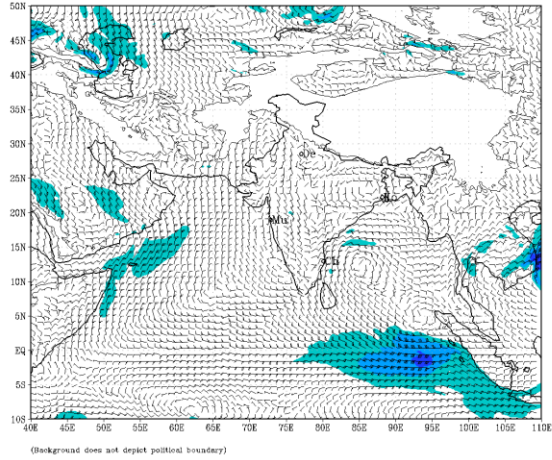
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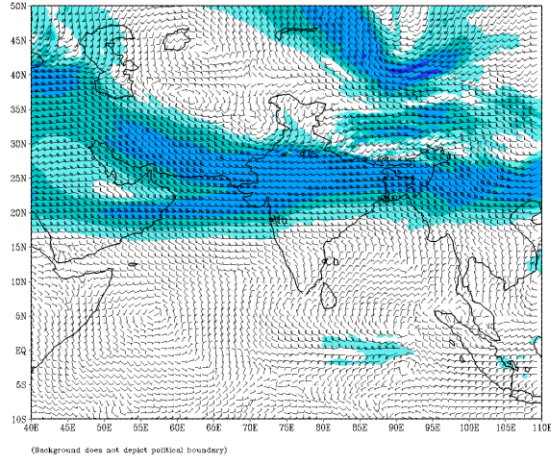
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 23-12-2024



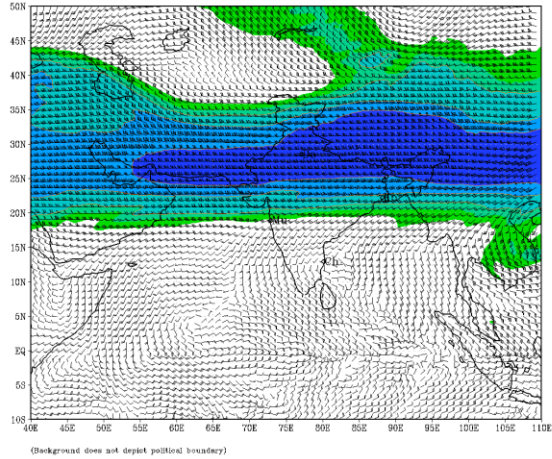
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 23-12-2024



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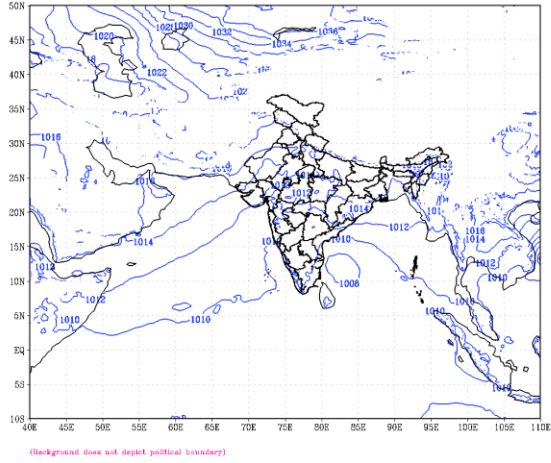


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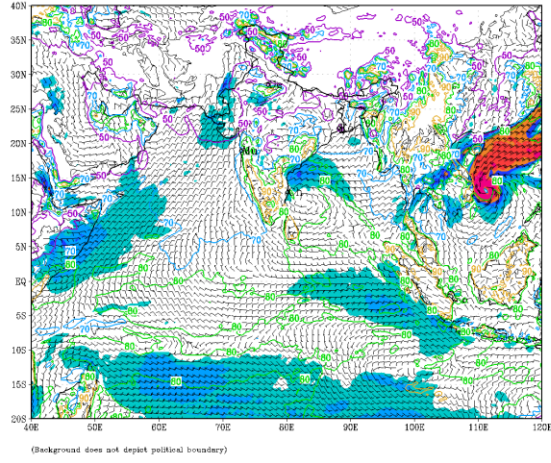




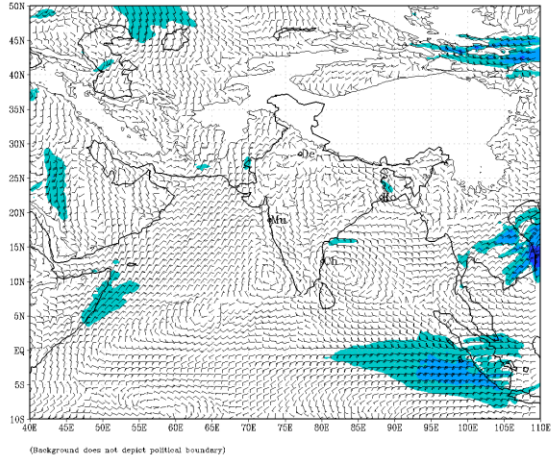
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 24-12-2024



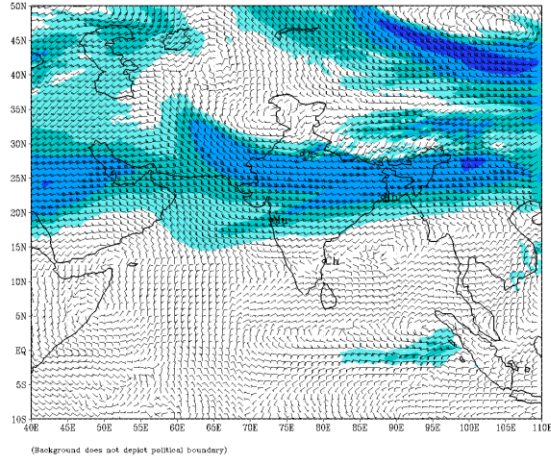
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 24-12-2024



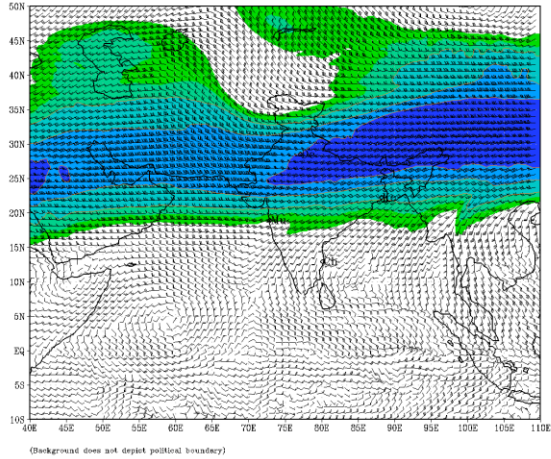
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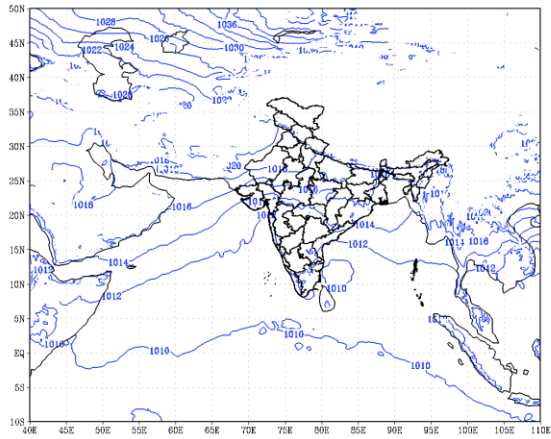
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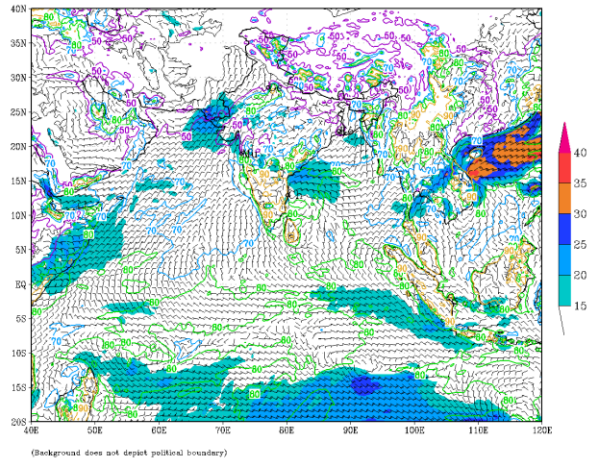
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 24-12-2024



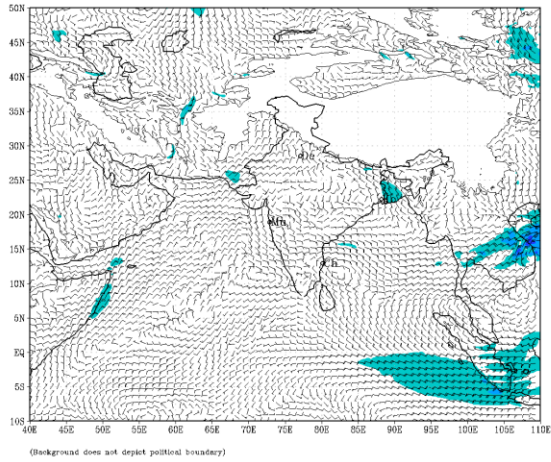
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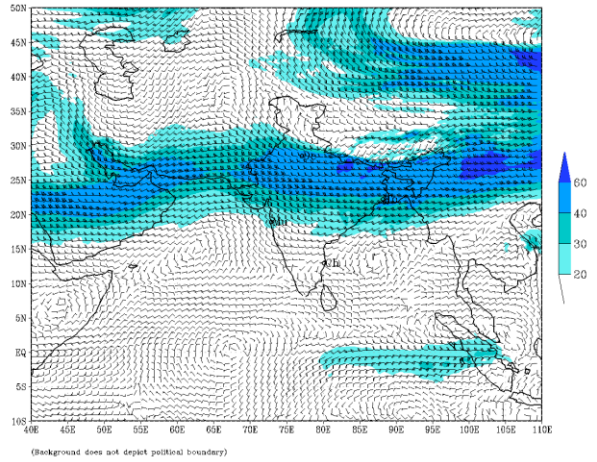
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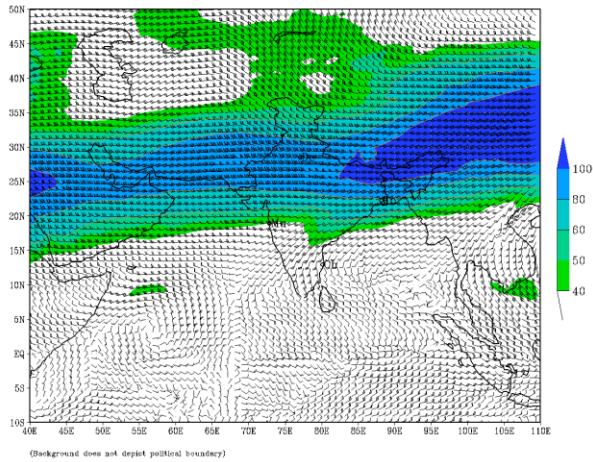
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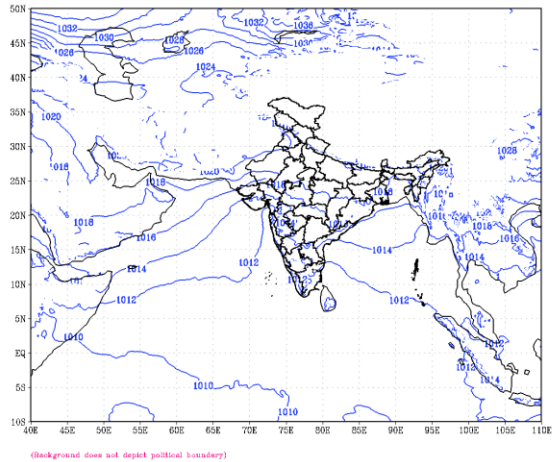
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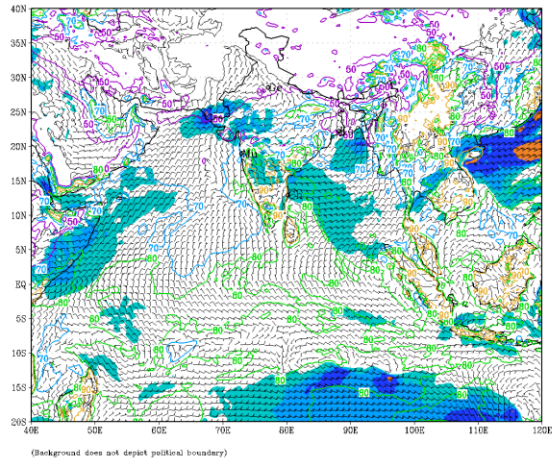
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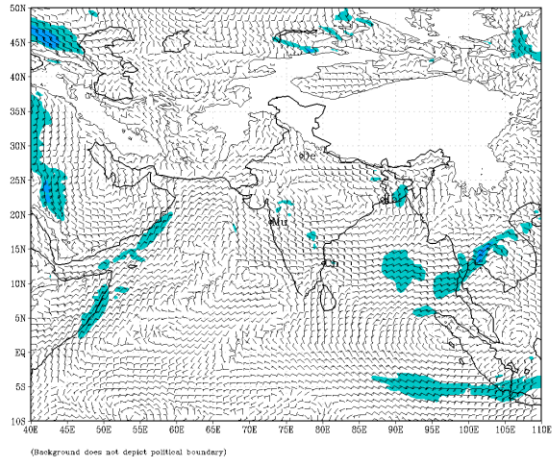
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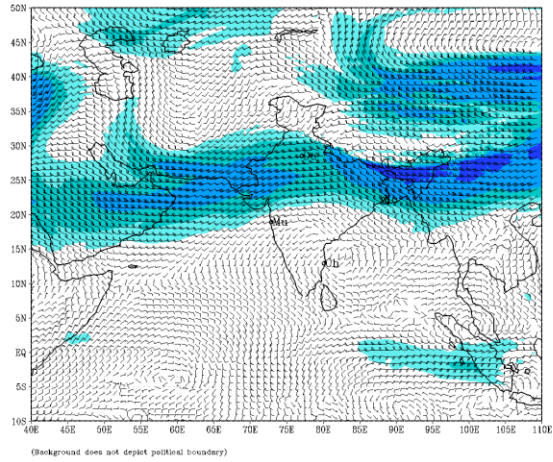
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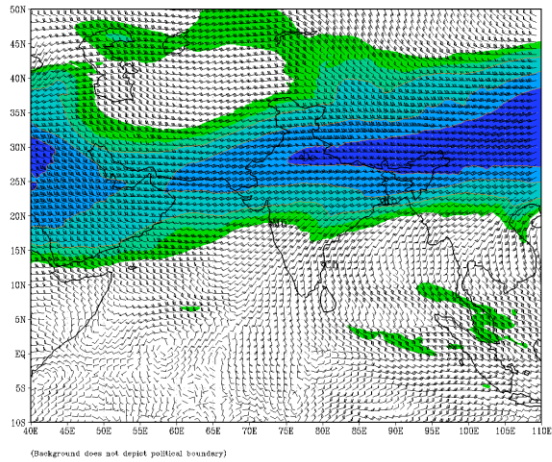
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based on 00 UTC of 22-12-2024 valid for 00 UTC of 26-12-2024



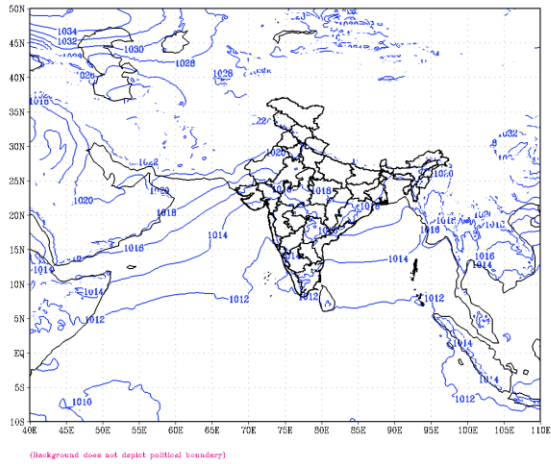
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 26-12-2024



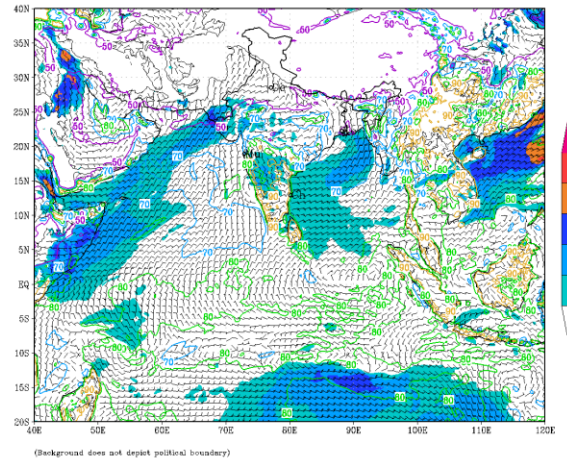
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 26-12-2024



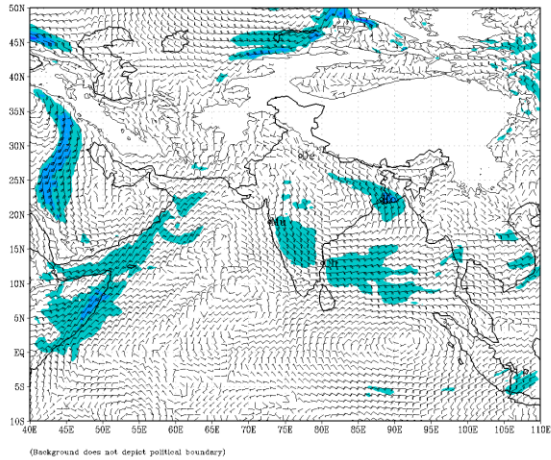
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 27-12-2024



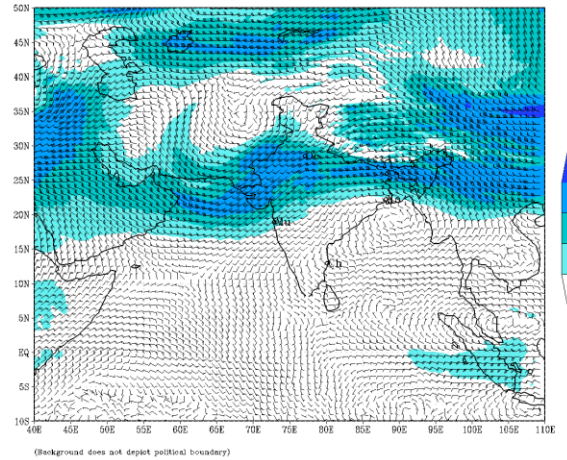
IMD: GFS(12Km) 10m WIND (barb)& GUST (shaded:kt) FORECAST (120 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 27-12-2024



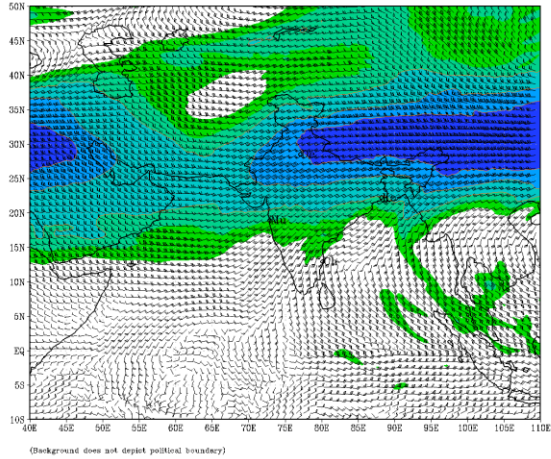
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 27-12-2024



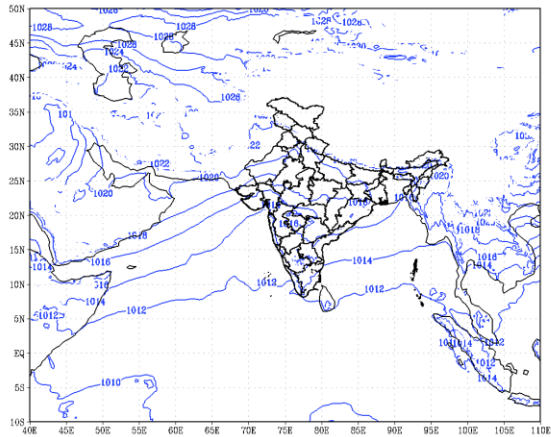
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 27-12-2024



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 27-12-2024

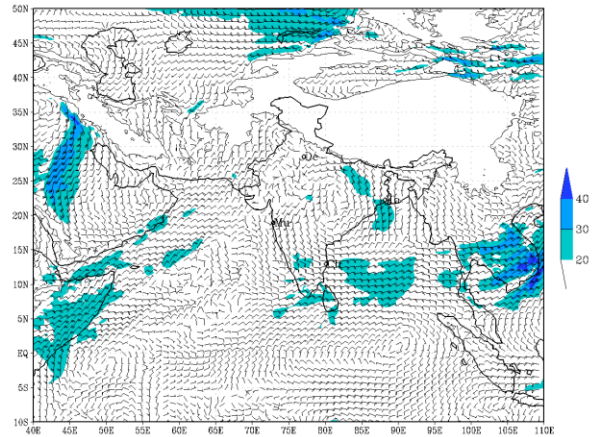


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 28-12-2024



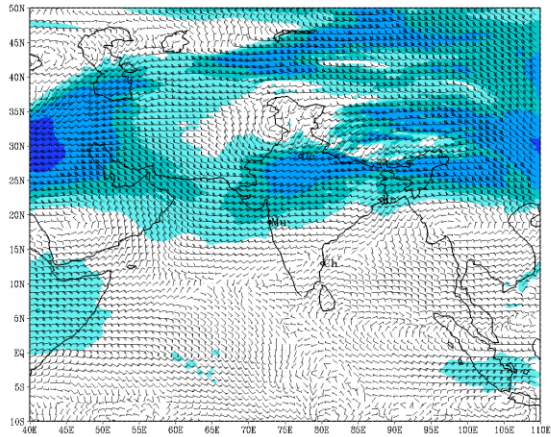
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 28-12-2024



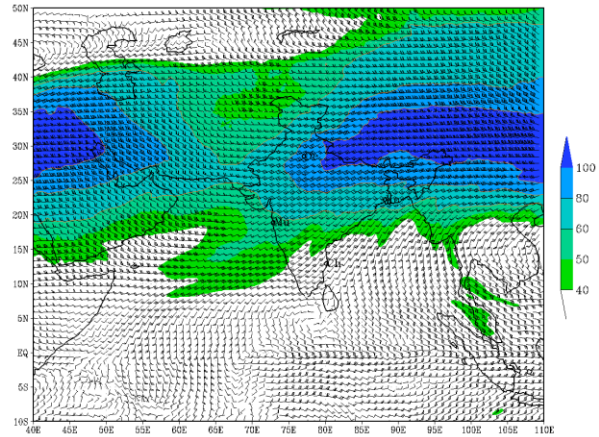
(Background does not depict political boundary)

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 28-12-2024



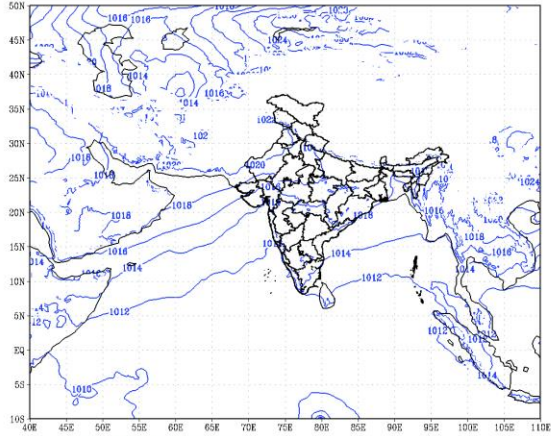
(Background does not depict political boundary)

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 28-12-2024

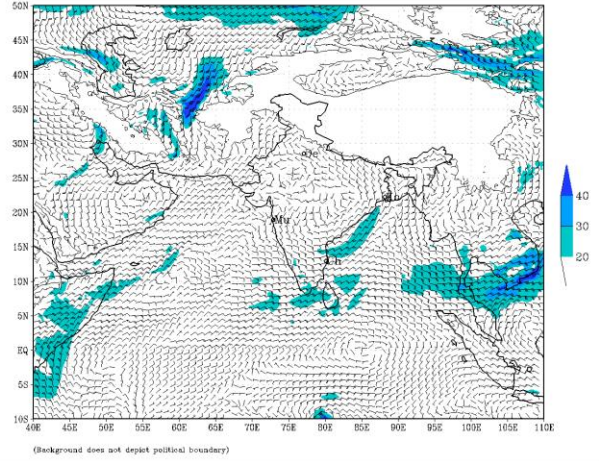


(Background does not depict political boundary)

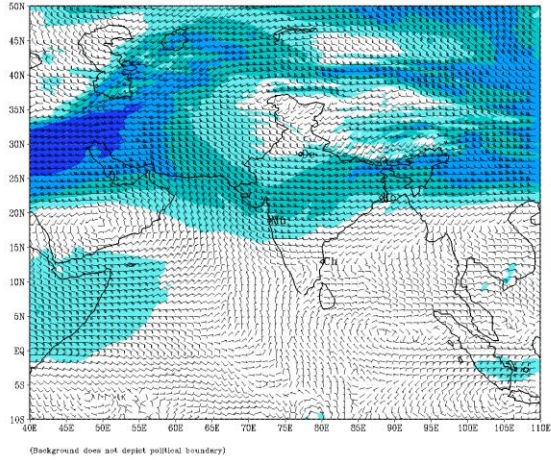
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 29-12-2024



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 29-12-2024



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 29-12-2024



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 22-12-2024 valid for 00 UTC of 29-12-2024

