



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

**Tropical Cyclone Forecast Programme  
Report Dated 19<sup>th</sup> October, 2022**

**Time of Issue: 1200 UTC**

**Synoptic features (based on 0900 UTC analysis):**

- ❖ The cyclonic circulation over north Andaman Sea and neighbourhood extending upto 3.1 km above mean sea level persists. Under its influence, a Low Pressure Area is likely to form over Southeast and adjoining Eastcentral Bay of Bengal during next 12 hours. It is likely to move westnorthwestwards and concentrate into a Depression by 22<sup>nd</sup> October morning over Central Bay of Bengal. It is very likely to intensify further into a Cyclonic Storm over Westcentral Bay of Bengal during subsequent 48 hours.
- ❖ The trough from cyclonic circulation over north Andaman sea & neighbourhood to Tamil Nadu coast across South Bay of Bengal extending upto 3.1 km above mean sea level persists.
- ❖ The cyclonic circulation over Eastcentral Arabian sea off Maharashtra coast extending upto 1.5 km above mean sea level persists.
- ❖ The north-south trough from Southeast Arabian Sea off Kerala coast to cyclonic circulation over Eastcentral Arabian Sea off Maharashtra coast extending upto 1.5 km above mean sea level persists.
- ❖ The cyclonic circulation over Southwest Arabian Sea & neighbourhood extending upto 3.1 km above mean sea level persists.
- ❖ The Western Disturbance as a trough in mid-tropospheric westerlies with its axis at 5.8 km above mean sea level now runs roughly along Long 70°E to the north of Lat 32°N.

**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>	About 29-31°C over entire BoB and Andaman Sea except over some parts of southwest BoB.	30-31°C over eastcentral AS and off Maharashtra-South Gujarat coasts. 27-29°C over eastcentral, westcentral and southwest BoB. Less than 26°C off Oman & Somalia coast.
<b>Tropical Cyclone Heat Potential (TCHP) kJ/cm<sup>2</sup></b>	(a) 110-120 over South Equatorial Indian Ocean region off Sumatra Islands. (b) 90-110 over eastcentral BoB (c) 60-80 over western parts of BoB	(a) 90-110 over northwest Equatorial Indian Ocean region. (b) 60-80 over south AS & adjoining eastcentral AS.

	and parts of southeast BoB. (d) 30-40 over some parts of westcentral & southwest BoB off TamilNadu & Andhra Pradesh coasts.	(c) 30-40 over remaining AS off west coast of India.
<b>Cyclonic Relative vorticity (<math>\times 10^{-6} \text{s}^{-1}</math>)</b>	(a) Positive vorticity of 50-60 over Andaman Sea along gulf of Thailand. (b) 30-40 over south BoB enclosing Andaman Sea. (c) 20-30 over remaining south BoB	(a) Positive vorticity of 30-40 over central AS, eastcentral AS and Comorin area. (b) 30-40 over southwest AS off Yemen coasts. (c) 20-30 over remaining south AS.
<b>Low Level convergence (<math>\times 10^{-5} \text{s}^{-1}</math>)</b>	5-15 over Andaman Sea and adjoining Gulf of Thailand and off Sumatra Islands and south Equatorial Indian Region. Small zone of value 05 over southwest BoB and another zone of 05 over Comorin Area.	Small zones of value 05 over central AS, southeast AS and Comorin Area.
<b>Upper Level divergence (<math>\times 10^{-5} \text{s}^{-1}</math>)</b>	Divergence has further organized during past 24 hours. 05-30 over south Andaman Sea and southeast BoB. 5-20 over southeast Equatorial Indian Ocean region. Small zones of 5 over westcentral BoB off Tamilnadu coast.	05-10 over southwest AS & adjoining equatorial Indian Ocean region, Lakshadweep Islands and Comorin Area. Small zones of 5 over northwest AS off Oman coast.
<b>Vertical Wind Shear (VWS knots)</b>	5-15 (favourable) over Andaman Sea along Gulf of Thailand. 25-40 (unfavourable) over extreme south BoB & adjoining EIO.	5-15 (favourable) over central & adjoining south AS. 25-40 (unfavourable) over extreme south AS & adjoining EIO and Comorin area.
<b>Wind Shear Tendency (knots)</b>	Decreasing over south Andaman Sea and adjoining Thailand area	Decreasing over westcentral AS off Yemen coast and Comorin area
<b>Upper tropospheric Ridge</b>	Along 19.0°N over the BoB.	Along 19.0°N over the AS.

### **Satellite observations based on INSAT imagery (0900 UTC):**

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

At 0900 UTC, Scattered to broken low and medium clouds with embedded intense to very intense convection lay over south Bay of Bengal and Andaman Sea.

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

At 0900 UTC, Broken low and medium clouds with embedded intense convection lay over eastcentral & southeast Arabian Sea and Lakshadweep Islands Area. Scattered low and medium clouds with embedded moderate to intense convection lay over westcentral & southwest Arabian Sea and Comorin area.

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

MJO index is currently in Phase 6 with amplitude greater than 1. It will continue in same phase for next 7 days with amplitude remaining greater than 1.

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

Vortex (NESAT) over South China Sea and neighbourhood lay near 17.1N / 109.9E with intensity T.No./C.I. No. 4.5/4.5 at 0600 UTC. Associated scattered low and medium clouds with embedded intense to very intense convection lay over area between latitude 17.5N & 21.0N and longitude 107.0E & 111.0E, Tonkin and Hainan.

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

<b>MODEL GUIDANCE</b>	<b>BoB</b>	<b>AS</b>
<b>IMD-GFS</b>	GFS is indicating a low-pressure area (LPA) over southeast and adjoining Eastcentral Bay of Bengal on 20 <sup>th</sup> , with nearly west-north westwards movement till 21 <sup>st</sup> . It would lie as a depression over central BoB on 22 <sup>nd</sup> morning, a deep depression (DD) over southeast BoB on 23 <sup>rd</sup> , cyclonic storm (CS) over Westcentral BoB on 23 <sup>rd</sup> , moving northwestward further intensify on 24 <sup>th</sup> to become Severe cyclonic storm (SCS) over Westcentral BoB. Moving continuously north-northwestwards the system is likely to become a very severe cyclonic storm (VSCS) on 25 <sup>th</sup> and subsequently cross north Andhra Pradesh coast near 16.8N/82.0E in the evening of 27 <sup>th</sup> morning. The model is indicating rapid intensification of the system during 0000 UTC of 24 <sup>th</sup> to 0000 UTC of 25 <sup>th</sup> October.	A cycir over north AS and another over southeast AS on 20 <sup>th</sup> Cycir, moving slightly westwards gradually 21 <sup>st</sup> over southwest AS. The cycir is likely to move further westward over southwest As weaken gradually on 22 <sup>nd</sup> and 23 <sup>rd</sup> .
<b>IMD-GEFS</b>	Extended low over Andaman & Nicobar Islands and central BoB on 19 <sup>th</sup> , LPA over eastcentral BoB on 20 <sup>th</sup> , WML over southeast & adjoining eastcentral on 21 <sup>st</sup> , depression over westcentral & adjoining southwest BoB on 22 <sup>nd</sup> , deep depression/CS over the westcentral & adjoining southwest BoB on 23 <sup>rd</sup> , further intensification on 24 <sup>th</sup> and west-northwestwards movement towards Andhra Pradesh coast on 24 <sup>th</sup> , crossing North Andhra Pradesh coast on 25 <sup>th</sup> around 00 UTC as a CS and weakening over north coastal Andhra Pradesh on 26 <sup>th</sup> .	A cycir over eastcentral & adjoining southwest AS during 19 <sup>th</sup> -21 <sup>st</sup> . Extended low over southeast AS on 22 <sup>nd</sup> & 23 <sup>rd</sup> , becoming more intensify on 24 <sup>th</sup> .
<b>GEFS Probabilistic guidance</b>	About 70-80% ensemble members are indicating initial westwards movement towards southwest & adjoining westcentral BoB. 20-50 % members are thereafter indicating nearly northwestwards movement and crossing over Andhra Pradesh coast (from southern tip to northern tip).	Not available
<b>IMD-WRF</b>	A cycir over central parts of Andaman Islands and adjoining eastcentral BoB on 19 <sup>th</sup> & 20 <sup>th</sup> with gradual west-northwestwards movement and	An LPA over southeast and adjoining Eastcentral AS on 20 <sup>th</sup> , likely to move west-

	LPA over southeast BoB on 21st, intensified into a cyclonic storm over westcentral BoB on 23 <sup>rd</sup> morning.	westward and become more marked on 22 <sup>nd</sup> morning over central AS and likely remain over the region till 23 <sup>rd</sup> .
<b>NCMRWF-NCUM</b>	A cycir over southeast & adjoining eastcentral BoB till 19 <sup>th</sup> -21 <sup>st</sup> as an LPA, depression over southwest BoB on 22 <sup>nd</sup> , DD over westcentral BoB on 23 <sup>rd</sup> and CS over westcentral on 24 <sup>th</sup> . Thereafter, the system is predicted to move nearly north-northeastwards and cross Bangladesh & adjoining West Bengal coast near 23.0N/90.0E around 1200 UTC of 24 <sup>th</sup> .	A cycir lies over eastcentral AS off Maharashtra coast on 19 <sup>th</sup> moving gradually westwards till 24 <sup>th</sup> .
<b>NCMRWF-NEPS</b>	An extended circulation over central & south BoB during 19 <sup>th</sup> to 20 <sup>th</sup> . WML over southeast BoB on 20 <sup>th</sup> , depression over southeast & adjoining eastcentral BoB on 22 <sup>nd</sup> , SCS over westcentral BoB on 24 <sup>th</sup> , and crossing Bangladesh coast around 1200 UTC of 23 <sup>rd</sup> near 22.0N/90.1E.	A cycir lies over eastcentral AS and another over central AS on 19 <sup>th</sup> . Another cycir over central AS on 23 <sup>rd</sup> becoming less marked thereafter. A fresh cycir over Comorin area and adjoining Lakshadweep on 27 <sup>th</sup> becoming less marked thereafter.
<b>NCMRWF-UM (Regional)</b>	Circulation over North Andaman Sea till 21 <sup>st</sup> October, intensifying further and moving northwards towards eastcentral BoB.	A cycir over southeast AS on 21 <sup>st</sup> becoming less marked thereafter.
<b>ECMWF</b>	A cycir over North Andaman Sea & adjoining southeast & eastcentral BoB during 19 <sup>th</sup> , LPA over southeast BoB on 20 <sup>th</sup> , WML/depression over southeast BoB on 21 <sup>st</sup> , DD over southeast BoB 22 <sup>nd</sup> , CS over westcentral & adjoining southwest BoB at 1200 UTC of 23 <sup>rd</sup> , SCS over westcentral BoB on 24 <sup>th</sup> and landfall over Sunderbans as CS/SCS in the afternoon of 25 <sup>th</sup> near 21.8N/88.3E.	A extended cycir over central AS on 19 <sup>th</sup> becoming less marked thereafter.
<b>ECMWF-EPS</b>	70-80% cyclogenesis probability of cyclogenesis over southeast BoB during next 2 days. Large variation in track with some members indicating nearly west-northwestwards movent towards westcentral & adjoining southwest BoB and some members indicating initial west-northwestwards movement, followed by nearly northwards movement towards north BoB.	Model is indicating 20-30% probability of cyclogenesis over central parts of south AS during next 3-5 days.
<b>NCEP-GFS</b>	Model is indicating an LPA over southeast BoB on 22 <sup>nd</sup> , depression over northwest BoB on 25 <sup>th</sup> , with marginal intensification on 25 <sup>th</sup> and crossing over Bangladesh coast as DD around 1500 UTC of 25 <sup>th</sup> .	No significant system
<b>IMD-Genesis Potential Parameter</b>	Potential zone over North Andaman Sea on 19 <sup>th</sup> & 20 <sup>th</sup> which move north-northwestward over Eastcentral BoB on 23 <sup>rd</sup> . Another Potential zone over southeast BoB on 21 <sup>th</sup> & 22 <sup>nd</sup> , over southeast BoB move north-northwestward over Eastcentral BoB on 23 <sup>rd</sup> and 24 <sup>th</sup> .	Development of a significant zone over southeast AS around Lakshadweep area during 23 <sup>rd</sup> and 24 <sup>th</sup> October

	The guidance product is indicating further northward movement of the potential zone reaching over North West Bengal. till 25 <sup>th</sup> October.	
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**Summary and conclusion:**

**1. For the Bay of Bengal:**

Most of the models are indicating development of low pressure area over southeast BoB during next 24 hours. Models are also indicating further intensification of this system into a depression by 22<sup>nd</sup>/0000 UTC and into a cyclonic storm around 0000 UTC of 24<sup>th</sup>. However, there is large variation among various models wrt. track & peak intensification of this system. The landfall point is varying between South Odisha (IMD GFS), West Bengal (ECMWF) to Bangladesh coast (NCUM group). There is large variation wrt landfall time as well with IMD GFS (27<sup>th</sup> midnight), ECMWF (25<sup>th</sup>/1200 UTC) and NCUM group (24<sup>th</sup> midnight).

**In view of all the above, it is inferred that a Low Pressure Area is likely to form over Southeast and adjoining Eastcentral Bay of Bengal during next 12 hours. It is likely to move westnorthwestwards and concentrate into a Depression by 22nd October morning over Central Bay of Bengal. It is very likely to intensify further into a Cyclonic Storm over Westcentral Bay of Bengal during subsequent 48 hours.**

The environmental conditions like SST and ocean thermal energy are favourable over south & central BoB for formation of low/depression. The La Nina conditions supported with negative IOD conditions will support the movement of remnant circulations from South China Sea to Andaman Sea with possible further intensification. However, MJO being in phase 6 with amplitude more than 1, will not be supportive for amplification of convection and hence the system.

**2. For the Arabian Sea:**

No significant system is likely to develop over Arabian Sea during next 7 days.

**Probability of cyclogenesis (formation of depression and above intensity systems) over the BAY OF BENGAL of Bengal and Andaman Sea during next 168 hours: an 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	MODERATE	HIGH	HIGH	HIGH

**Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea**

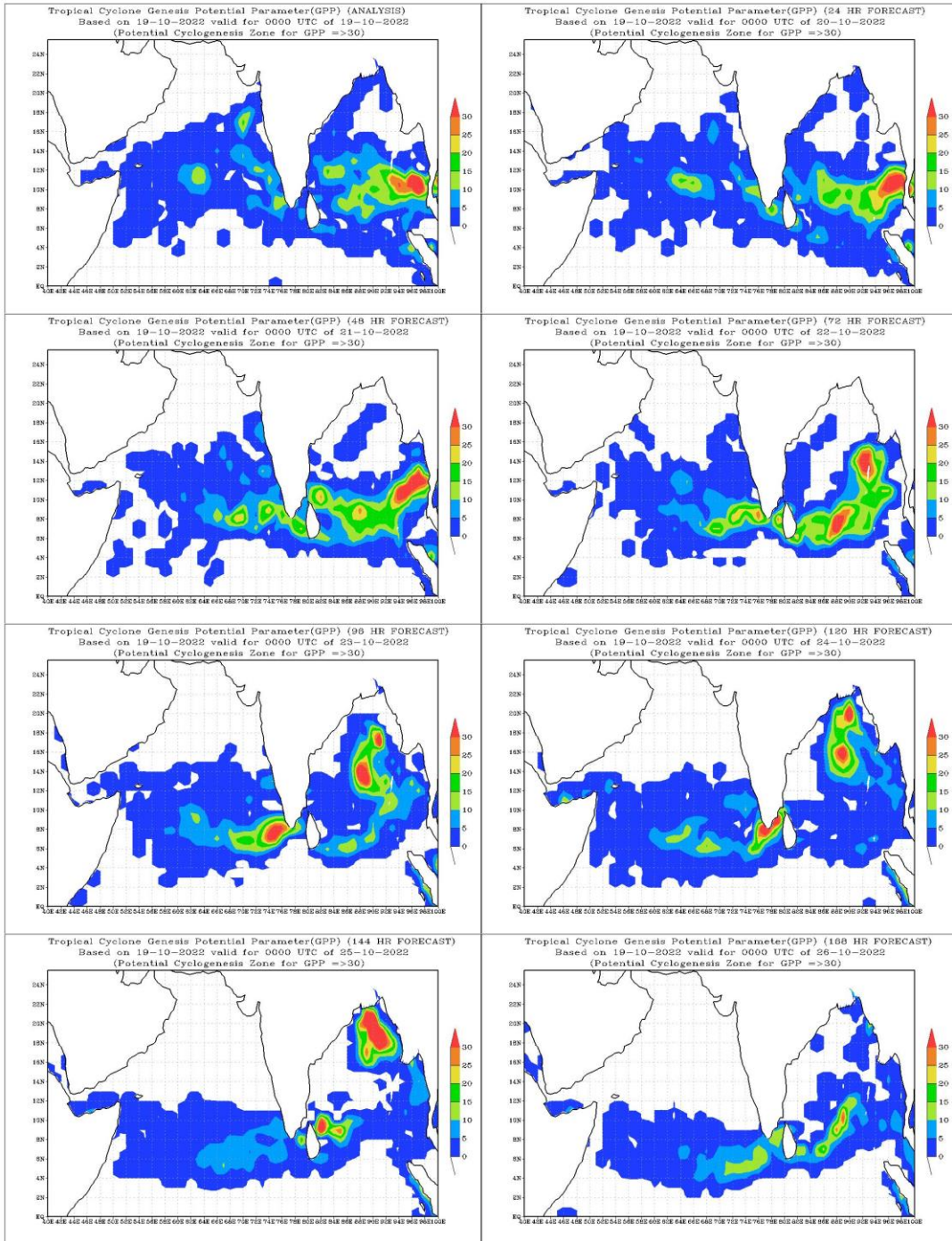
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

**Advisory:**

The intensification & movement of depression likely to form over central Bay of Bengal by 22<sup>nd</sup> October morning need to be monitored closely.

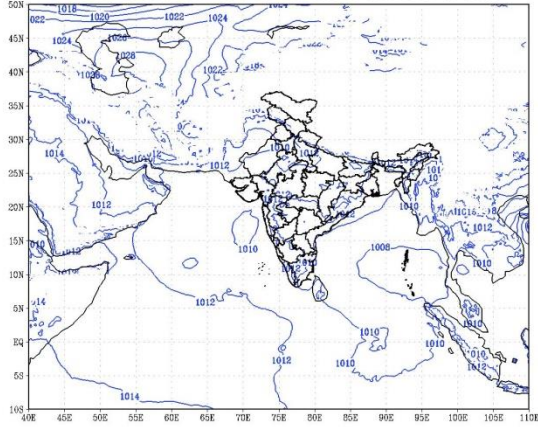
**IOP is suggested for Andaman & Nicobar Islands on 19<sup>th</sup> & 20<sup>th</sup>.**





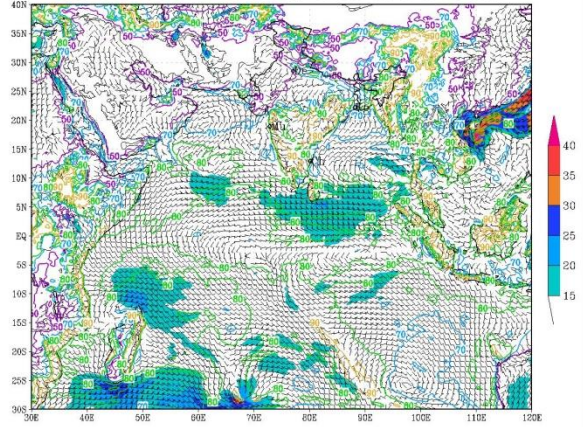


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)  
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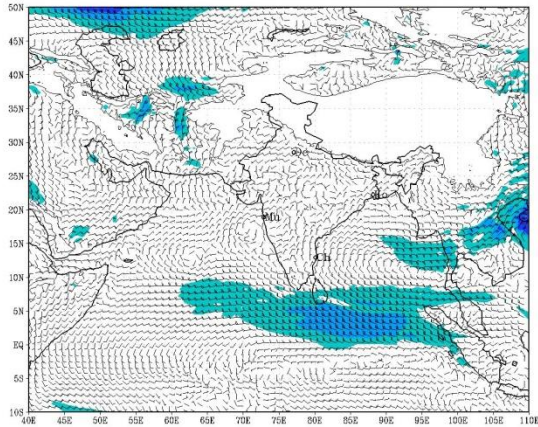
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)  
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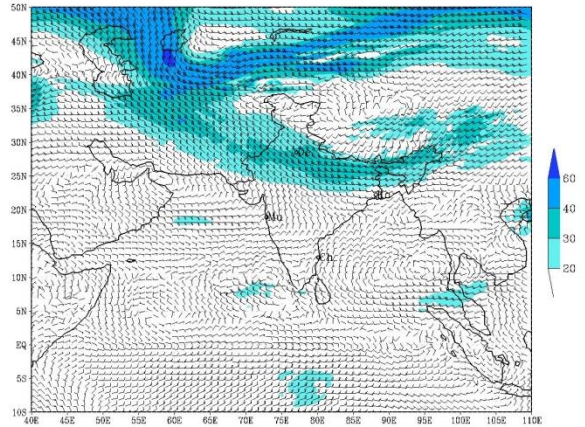
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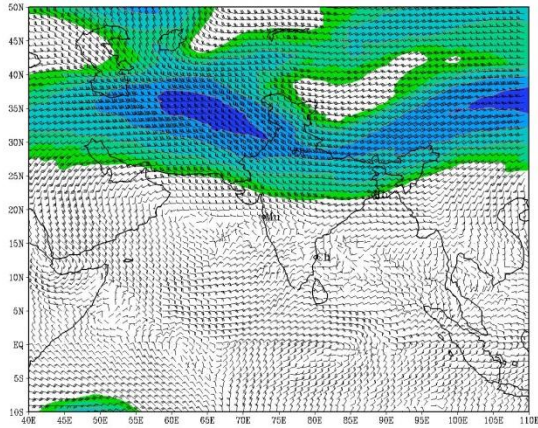
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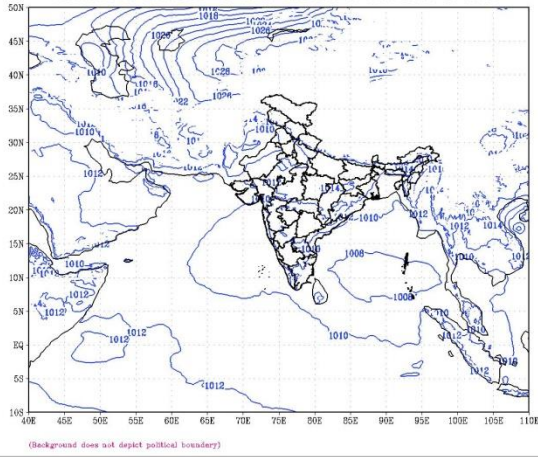
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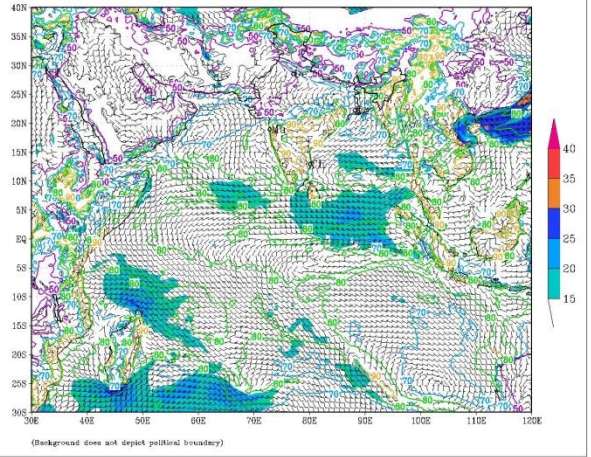
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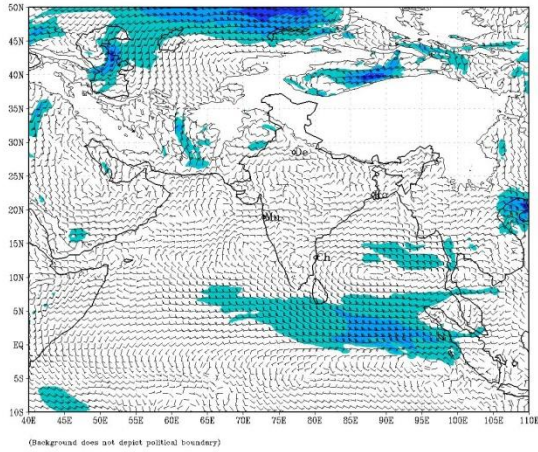
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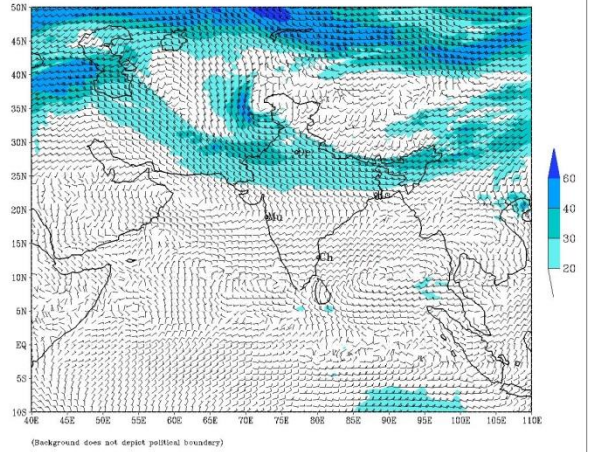
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)  
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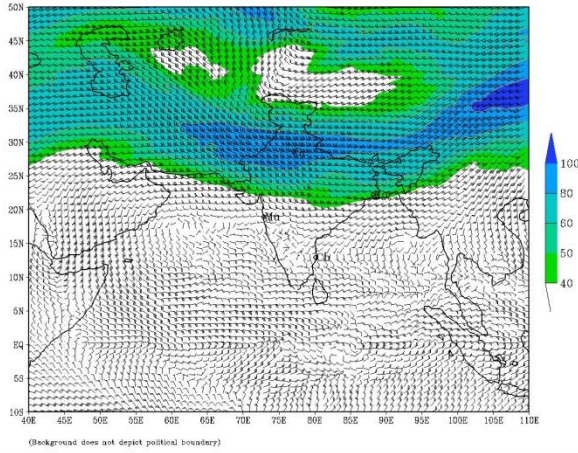
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)  
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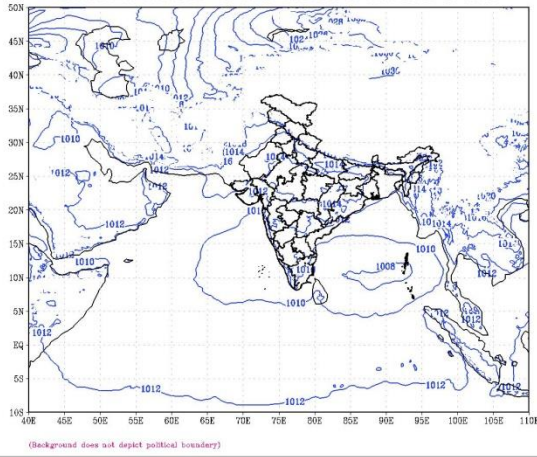


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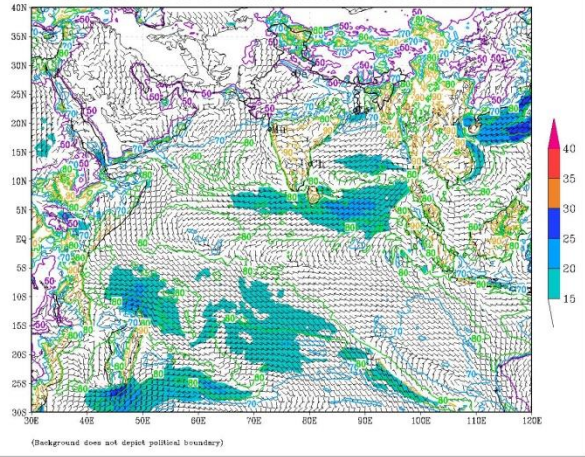




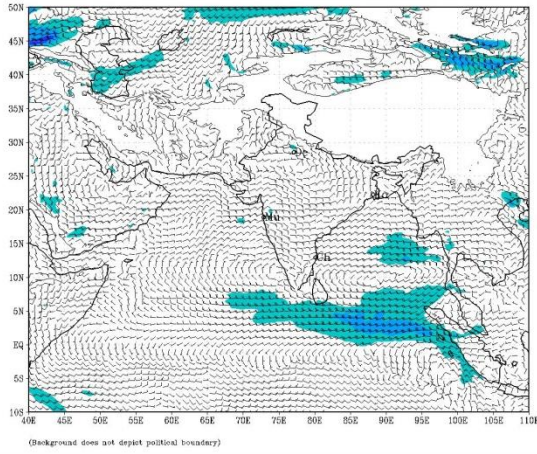
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based on 00 UTC of 19-10-2022 valid for 00 UTC of 21-10-2022



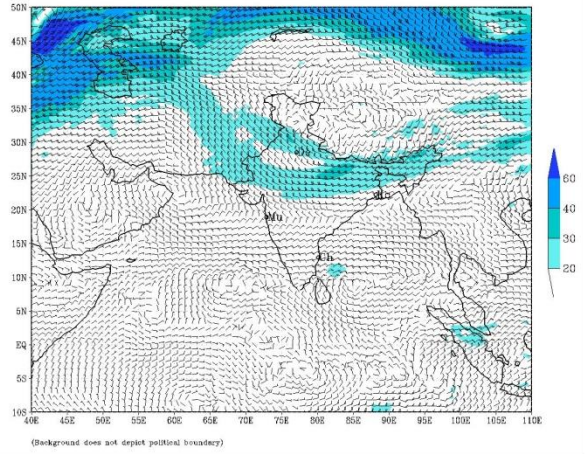
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 21-10-2022



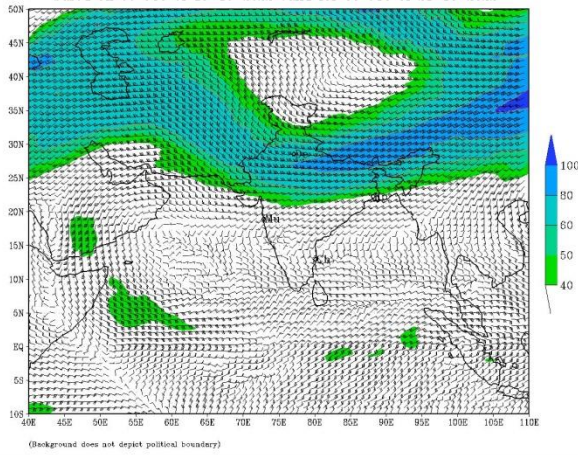
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based on 00 UTC of 19-10-2022 valid for 00 UTC of 21-10-2022



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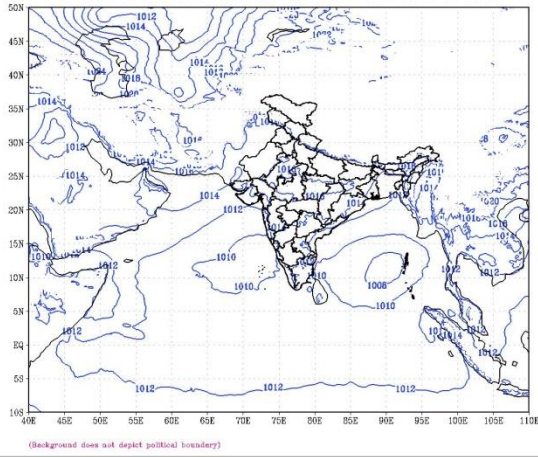


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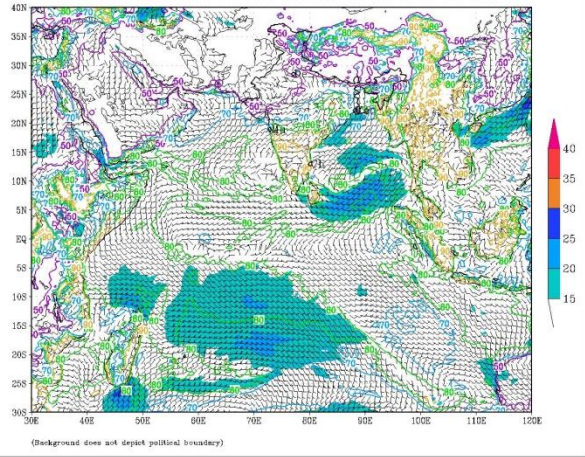




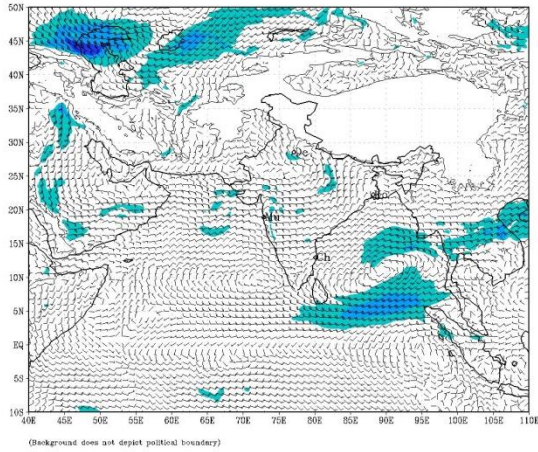
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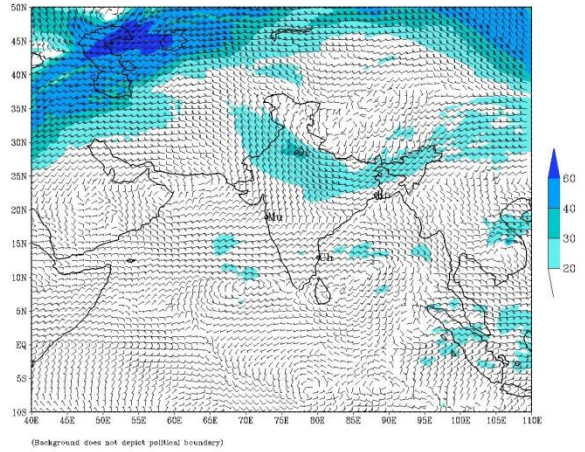
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)  
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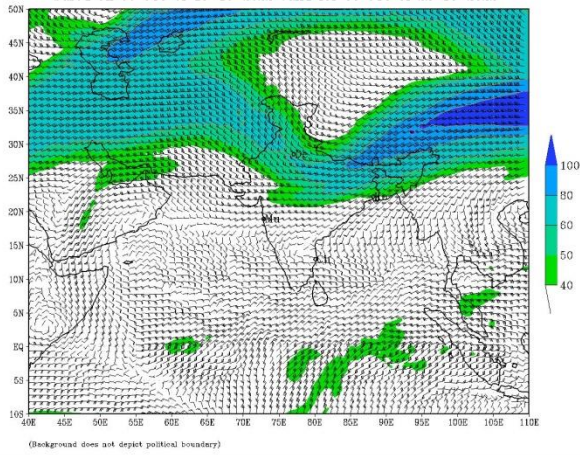
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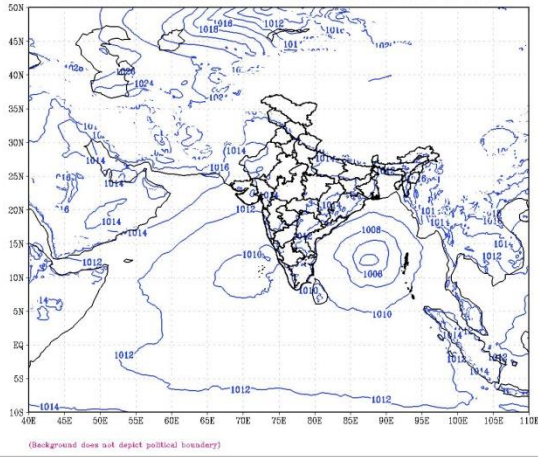


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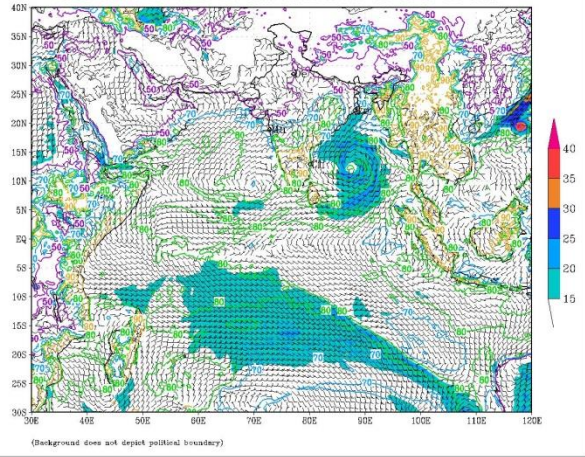




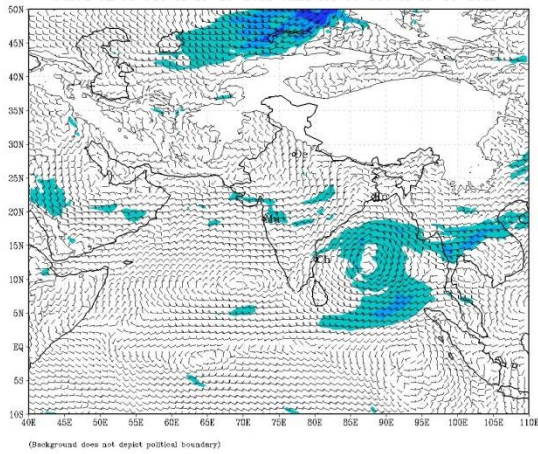
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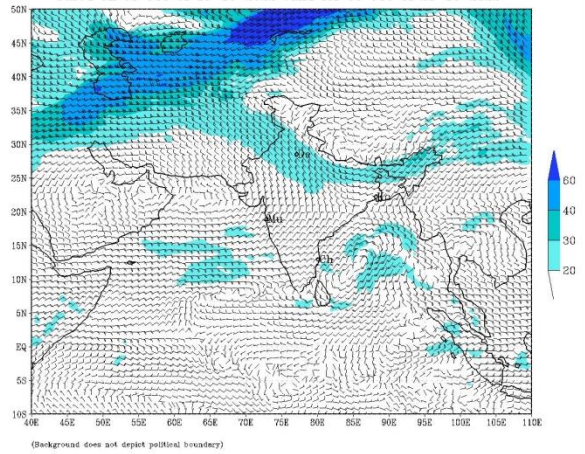
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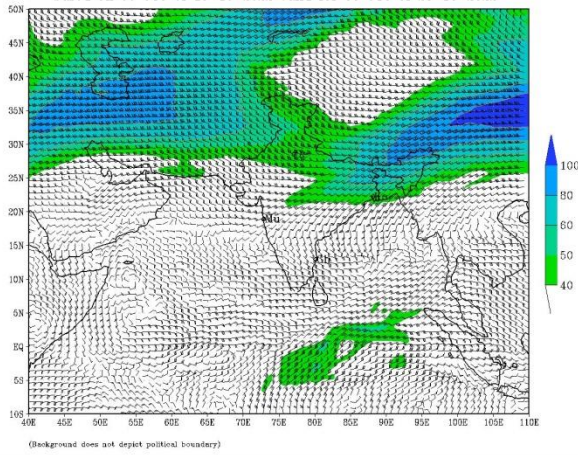
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based on 00 UTC of 19-10-2022 valid for 00 UTC of 23-10-2022



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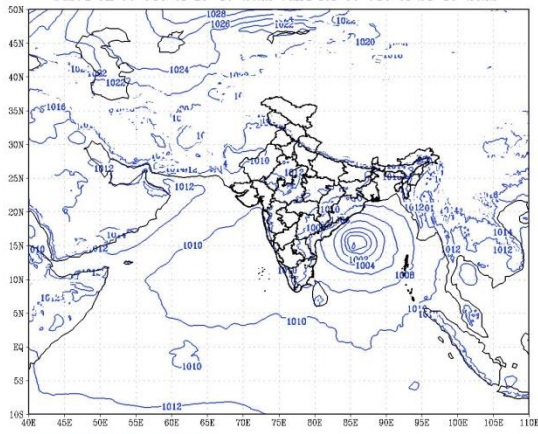


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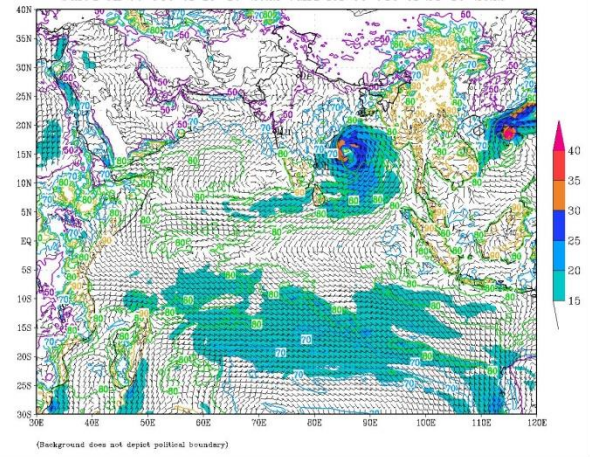




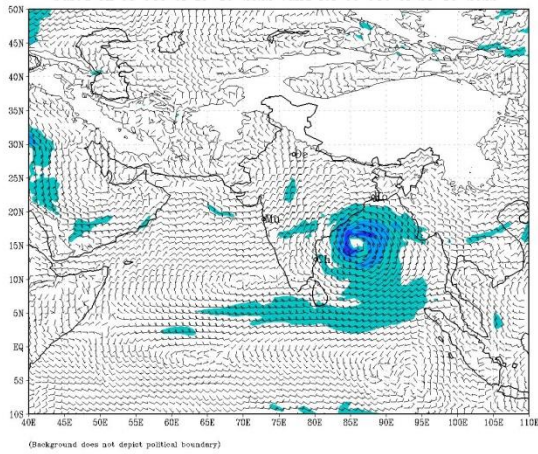
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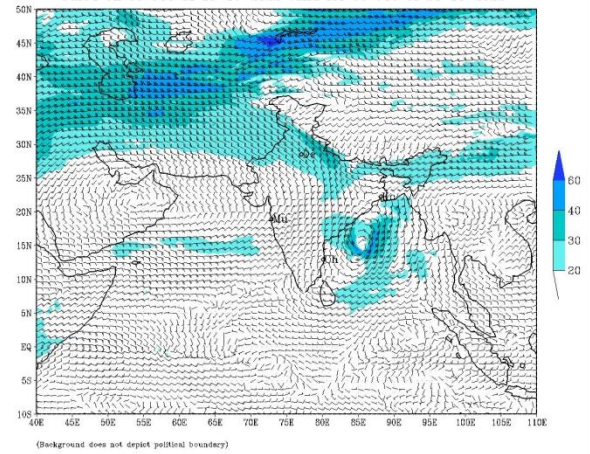
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based on 00 UTC of 19-10-2022 valid for 00 UTC of 24-10-2022



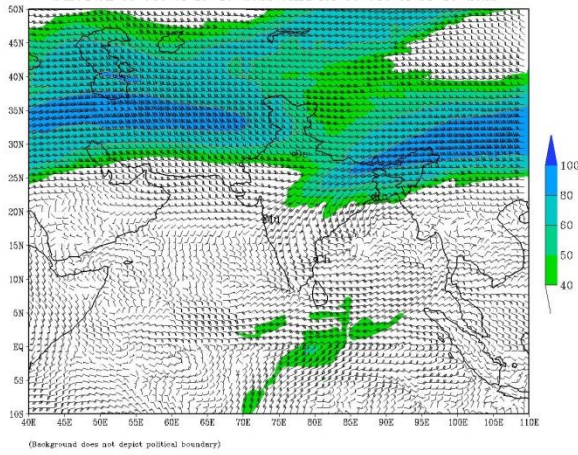
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 24-10-2022



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 24-10-2022

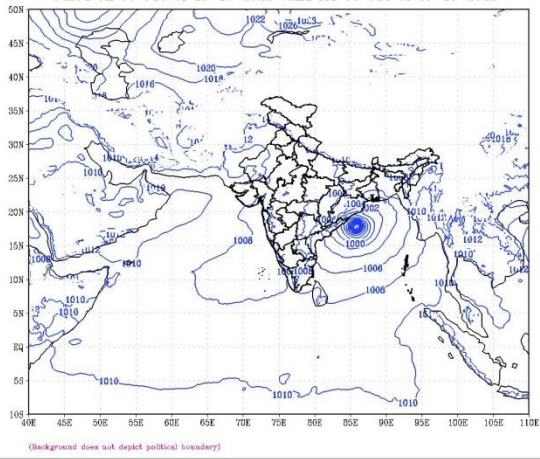


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 24-10-2022

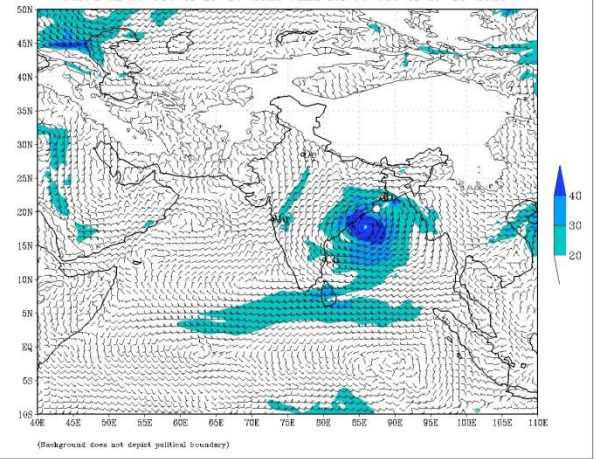




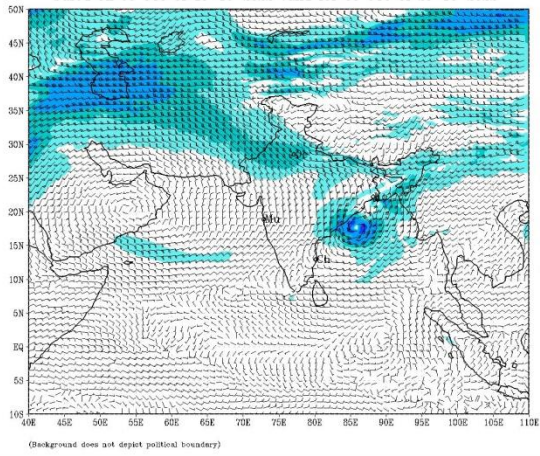
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)  
 based on 00 UTC of 19-10-2022 valid for 00 UTC of 25-10-2022



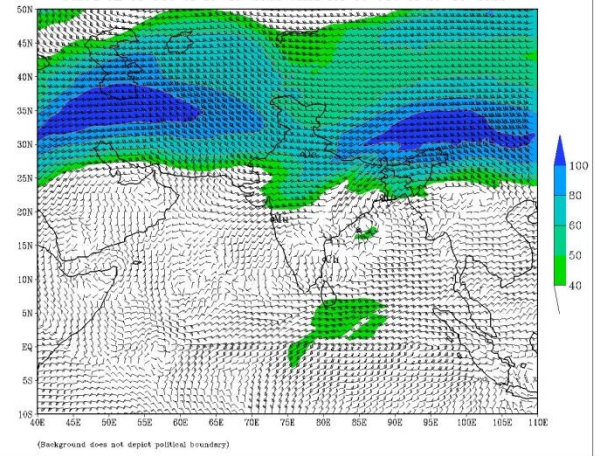
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)  
 based on 00 UTC of 19-10-2022 valid for 00 UTC of 25-10-2022



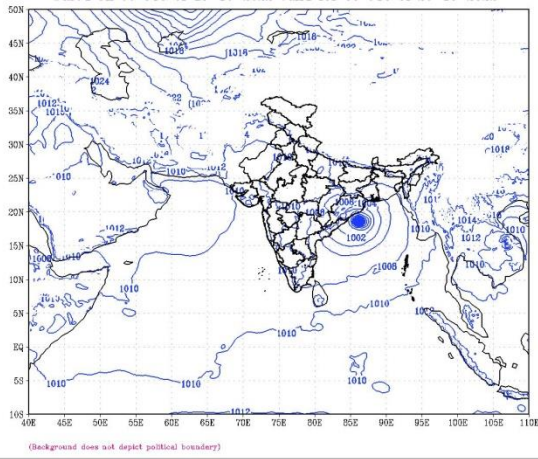
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)  
 based on 00 UTC of 19-10-2022 valid for 00 UTC of 25-10-2022



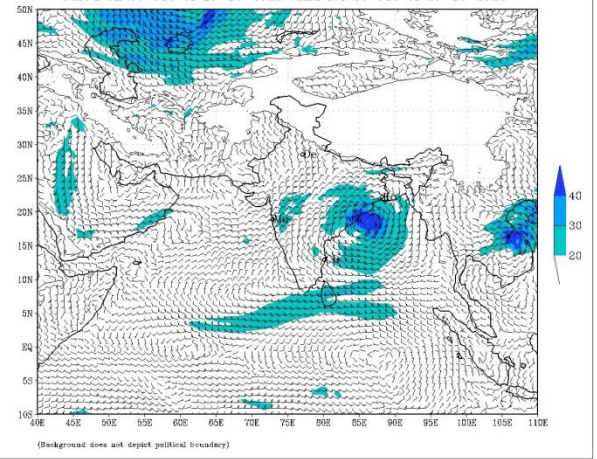
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)  
 based on 00 UTC of 19-10-2022 valid for 00 UTC of 25-10-2022



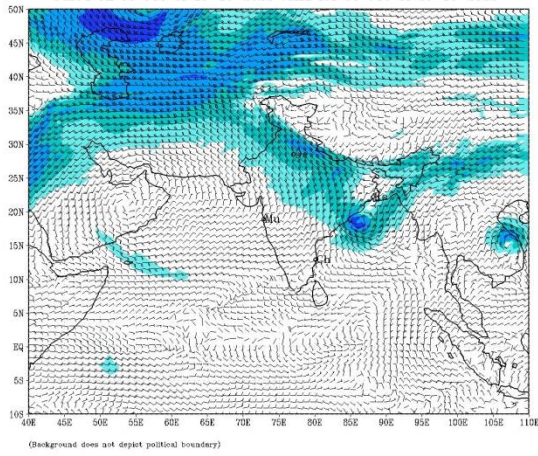
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 26-10-2022



IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 26-10-2022



IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 26-10-2022



IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)  
based on 00 UTC of 19-10-2022 valid for 00 UTC of 26-10-2022

