



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



FDP (Cyclone) NOC Report Dated 24<sup>th</sup> November, 2019

Time of Issue: 1100 UTC

**Synoptic features:**

- A cyclonic circulation lies between 4.5 & 5.8 km above mean sea level over Lakshadweep area.

**Dynamical and thermodynamical features**

**Sea Surface Temperature (SST):**

Sea Surface Temperature is around 25-28°C over westcentral Arabian Sea and north Arabian Sea and western parts of southwest Arabian Sea. It increases to 28-30°C over eastcentral and southeast Arabian Sea.

SST is around 25-28 °C over most parts of north BoB and adjoining WC BoB. It is between 28 - 30°C over rest BoB with higher values over eastcentral and south BoB.

**Tropical Cyclone Heat Potential (TCHP):**

Tropical Cyclone Heat Potential (TCHP) is 20-40 kJ/cm<sup>2</sup> over north Arabian Sea and westcentral and adjoining eastcentral Arabian Sea. Over south Arabian Sea it is of value 60-100 kJ/cm<sup>2</sup>. There are areas of values more than 100 kJ/cm<sup>2</sup> southeast Arabian Sea.

TCHP is around 30-50 kJ/cm<sup>2</sup> over north BoB and adjoining westcentral BoB. It is around 80-90 kJ/cm<sup>2</sup> over rest of the BOB.

**Relative Vorticity:**

No significant areas of cyclonic relative vorticity seen over BoB except for the positive vorticity over north and south BoB.

An area of cyclonic relative vorticity of value 10-20x10<sup>-5</sup> s<sup>-1</sup> seen over north Arabian Sea and also some areas of positive vorticity seen over southeast Arabian Sea.

**Low level Convergence:**

An area of positive lower level convergence of value 5x10<sup>-5</sup> s<sup>-1</sup> is seen over south BoB and also over Comorin area.

No significant area of positive lower level convergence is seen over Arabian Sea.

**Upper level Divergence:**

No significant areas of upper level divergence are seen over BoB.

Upper level divergence of value 5-10x10<sup>-5</sup> s<sup>-1</sup> is seen over south Arabian Sea and adjoining equatorial Indian Ocean.

**Wind Shear:**

Wind shear is high over north and central Arabian Sea except south Arabian Sea where it is low to moderate.

Wind shear is high over north and adjoining central BoB. It is low to moderate over rest BoB and Andaman Sea.

**Wind Shear Tendency:**

The wind shear tendency is positive or neutral over most parts of BoB.

It is negative or neutral over westcentral and adjoining southeast Arabian Sea.

**Upper tropospheric ridge:**

The upper tropospheric ridge at 200 hPa runs roughly along 12°N over BoB and Arabian Sea.

## **Satellite observations based on INSAT imagery:**

### **Arabian Sea:-**

As per the satellite imagery at 0600 UTC of 24<sup>th</sup> November, 2019, scattered low to medium clouds with embedded moderate to intense convection lies over south Arabian Sea and Comorin- Maldives area.

### **Bay of Bengal & Andaman Sea:**

According to 0600 UTC satellite imagery, scattered low/medium clouds with embedded isolated moderate to intense convection lies over southwest BoB and extreme south Andaman Sea.

## **Large scale features**

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

MJO index is in Phase 2 with amplitude less than 1. It is likely to remain in phase 1 for about 3-4 days with amplitude less than 1 and move to phase 1 thereafter.

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

## **NWP Input for FDP Cyclone based on 0000 UTC of today**

**IMD-GFS T-1534:** Indicates development of a low pressure area over southwest BoB off Sri Lanka coast on 30<sup>th</sup>, which is seen to move westwards and intensifies into a well marked low on 01<sup>st</sup> December and a CS on 02<sup>nd</sup> December over southeast Arabian Sea. Further it is seen to intensify while moving westwards.

**IMD-GEFS:** Indicates a low pressure area over Maldives area on 30<sup>th</sup> and 01<sup>st</sup> December.

**IMD-WRF:** Analysis shows no Low Pressure systems for the next 3 days.

**NCMRWF-NCUM:** Indicates development of two low pressure areas over equatorial Indian ocean and adjoining southeast and southwest Arabian Seas on 30<sup>th</sup>, which move northwestwards without much intensification.

**NCMRWF-UM-Regional Model:** Indicates development of no low pressure systems for the next 3 days.

**NEPS Model:** Indicates development of no low pressure areas, one over equatorial Indian ocean to the south of southwest BoB and the other over equatorial Indian Ocean to the south of southwest Arabian Sea on 30<sup>th</sup>. They are seen to move northwestwards and the one over southwest AS becomes a WML on 4<sup>th</sup> December.

**ECMWF:** Indicates no significant low pressure system over NIO region for the next 10 days.

**NCEP-GFS:** Indicates development of no low pressure systems for the next 10 days.

**ARP-Meteo France :** Indicates development of no low pressure systems for the next 3 days

### **Dynamical statistical models**

#### **IMD Genesis Potential Parameter (GPP):**

Areas of significant zone of GPP are seen to develop over southwest Arabian Sea during 28<sup>th</sup> November to 01<sup>st</sup> December.

#### **IMD NWP products are available at:**

<http://nwp.imd.gov.in/bias/gfsproducts.php>

<http://nwp.imd.gov.in/bias/wrf27pro.php>

[http://www.rsmcnewdelhi.imd.gov.in/NWP\\_CYC/Analysis.htm](http://www.rsmcnewdelhi.imd.gov.in/NWP_CYC/Analysis.htm) or

[http://www.rsmcnewdelhi.imd.gov.in/NWP\\_CYC/<HH> hrs.htm](http://www.rsmcnewdelhi.imd.gov.in/NWP_CYC/<HH> hrs.htm)

<HH> are forecast hours i.e. 24, 48, 72 and etc.

## Summary and Conclusion:

As per the NWP models considered, IMD GFS and NCUM and its ensemble models are indicating a low pressure area over southeast Arabian Sea and adjoining Maldives area around 30<sup>th</sup> November-01<sup>st</sup> December. IMD GFS model is forecasting it to further intensify into a CS over southeast Arabian Sea by 02<sup>nd</sup> December. The development of this low pressure area and any possible intensification needs to be monitored.

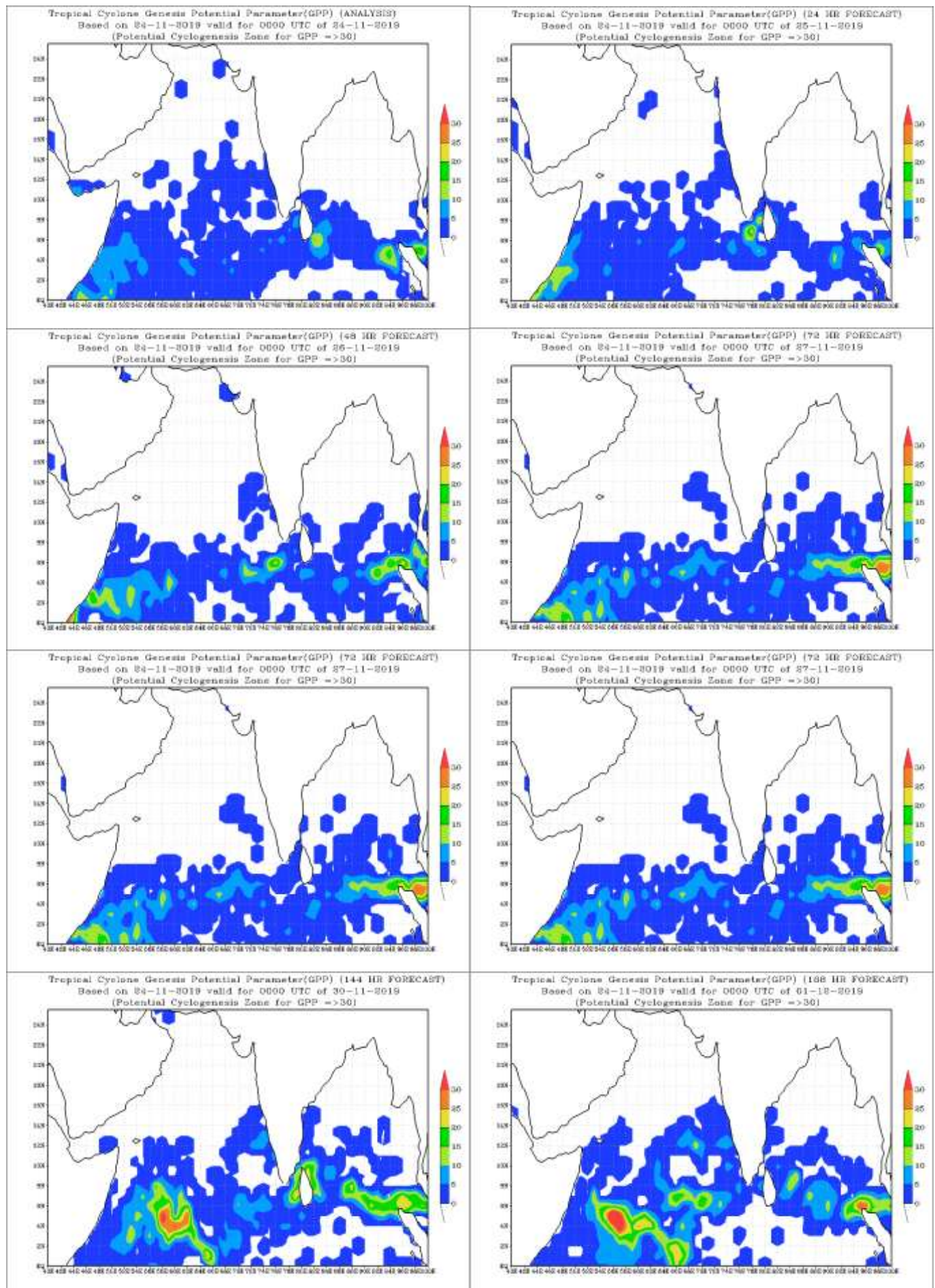
### **Probability of cyclogenesis over Bay of Bengal and Andaman Sea during next 120 hours:**

| 24 HOURS | 24-48 HOURS | 48-72 HOURS | 72-96 HOURS | 96-120 HOURS |
|----------|-------------|-------------|-------------|--------------|
| Nil      | Nil         | Nil         | Nil         | Nil          |

### **Probability of cyclogenesis over Arabian Sea during next 120 hours:**

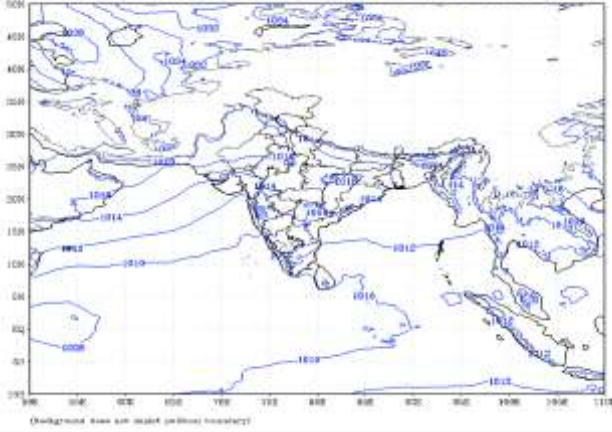
| 24 HOURS | 24-48 HOURS | 48-72 HOURS | 72-96 HOURS | 96-120 HOURS |
|----------|-------------|-------------|-------------|--------------|
| Nil      | Nil         | Nil         | Nil         | Nil          |

**Advisory: No IOP area for the next 5 days**

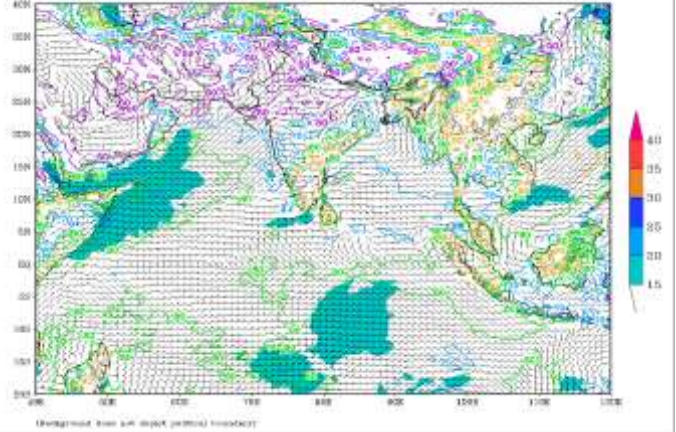




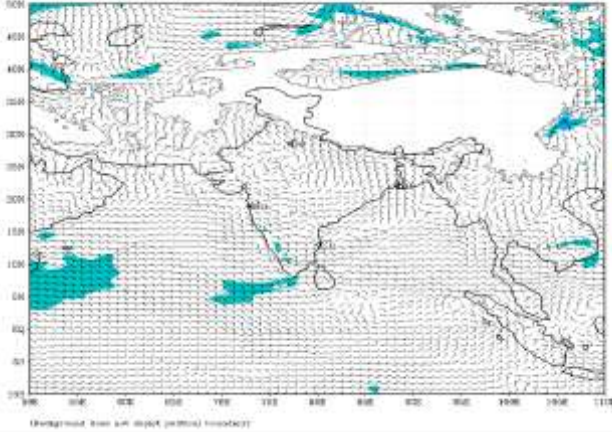
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)  
 based on 00 UTC of 24-11-2018 valid for 00 UTC of 24-11-2019



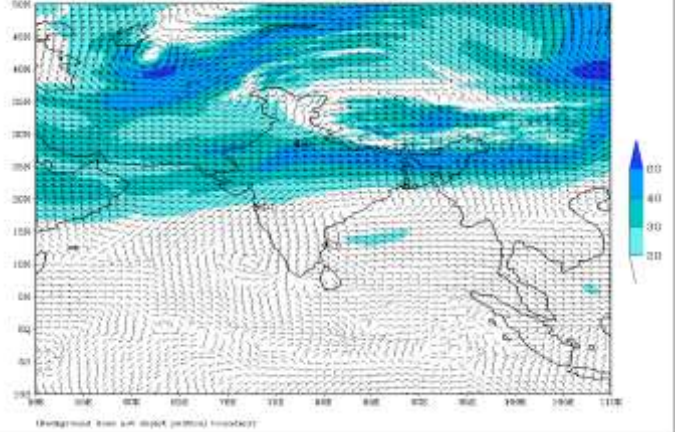
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)  
 based on 00 UTC of 24-11-2018 valid for 00 UTC of 24-11-2019



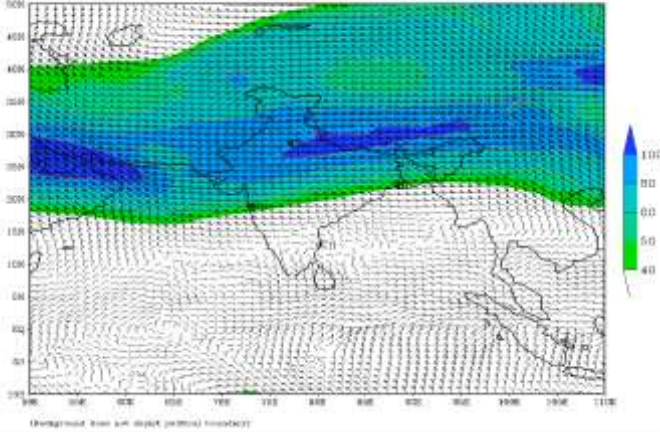
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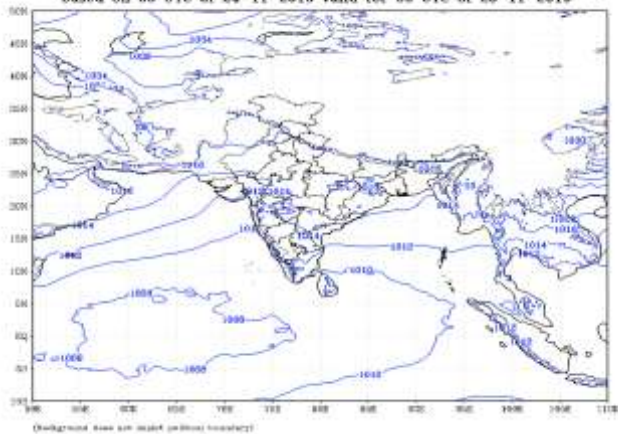


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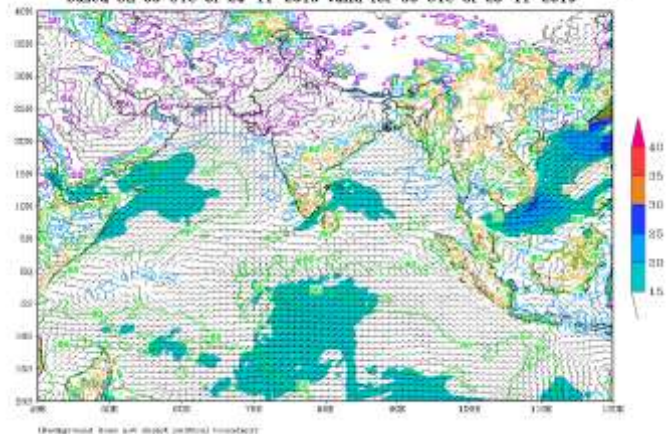




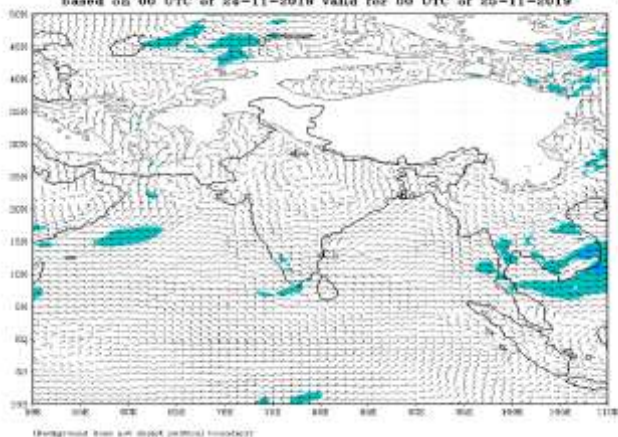
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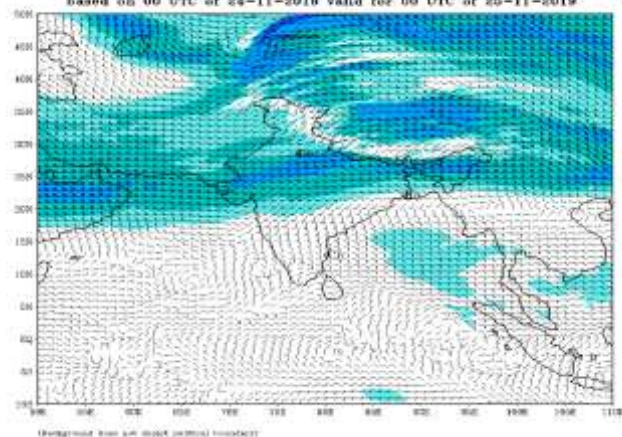
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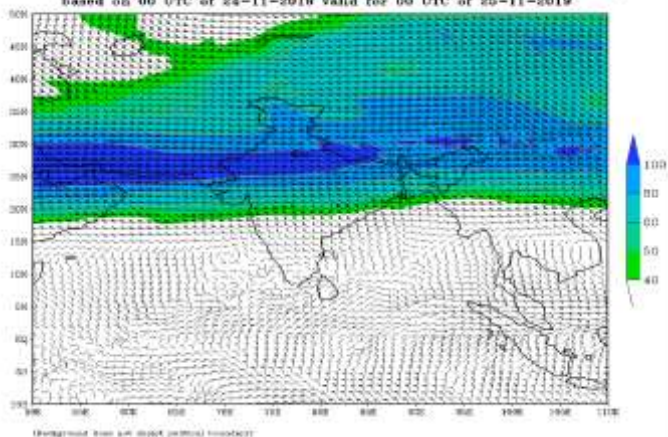
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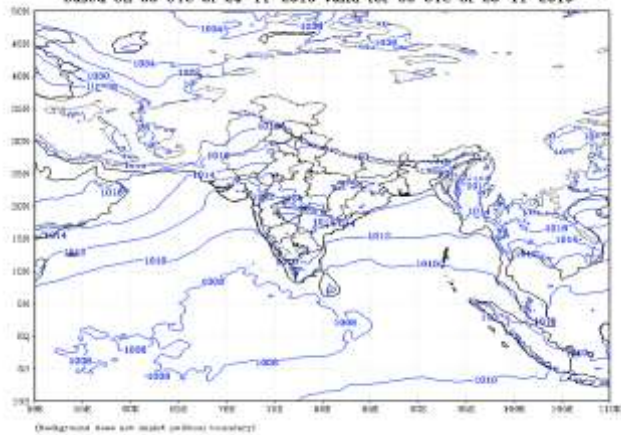
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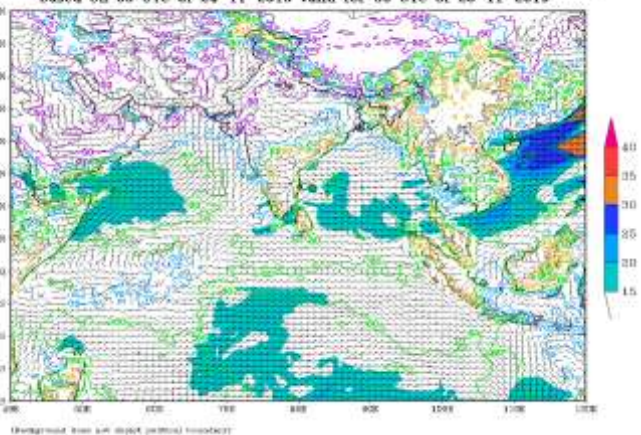
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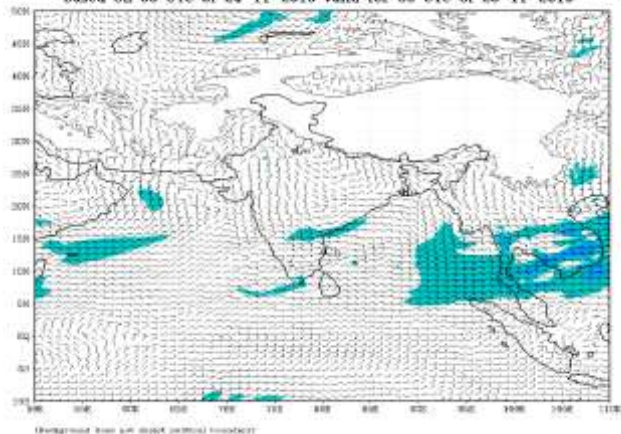
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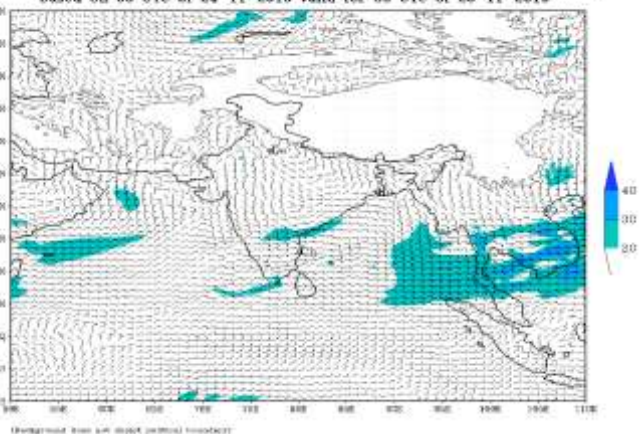
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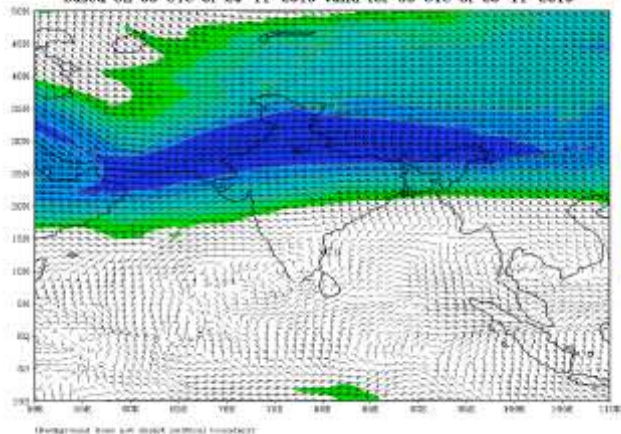
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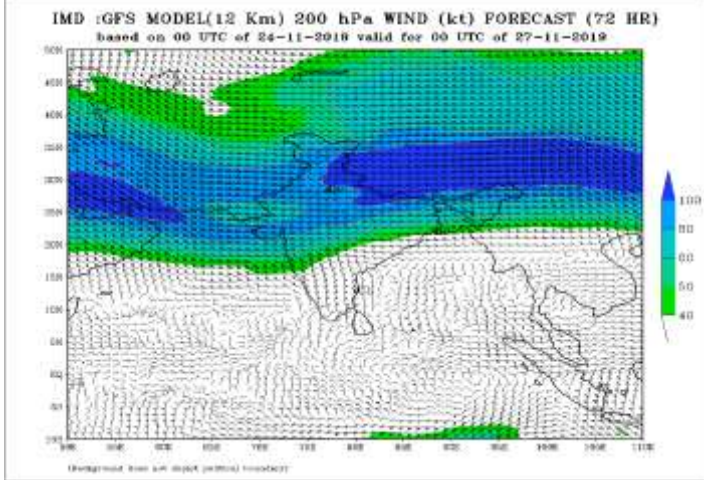
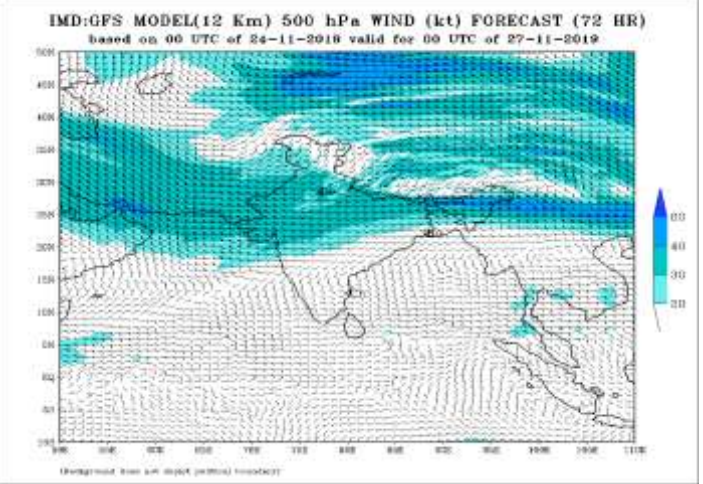
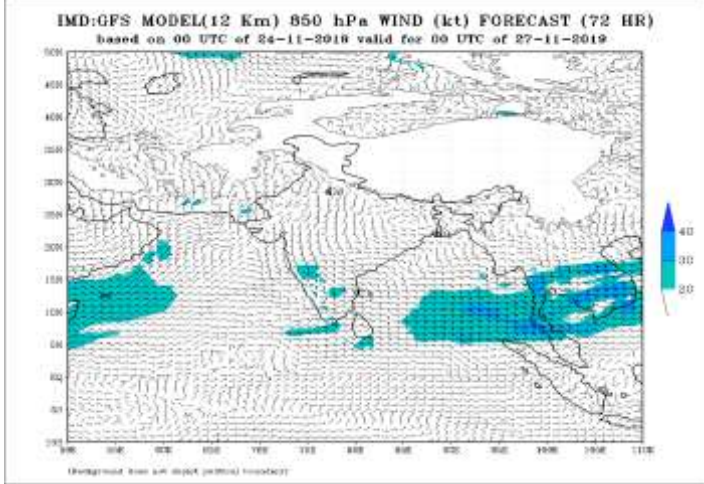
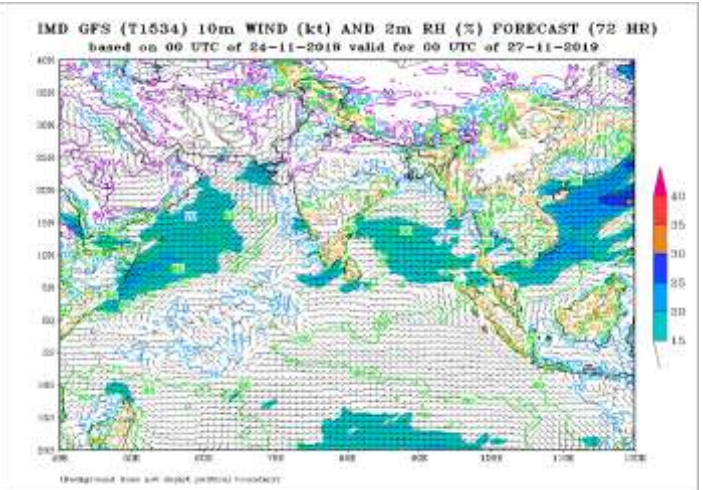
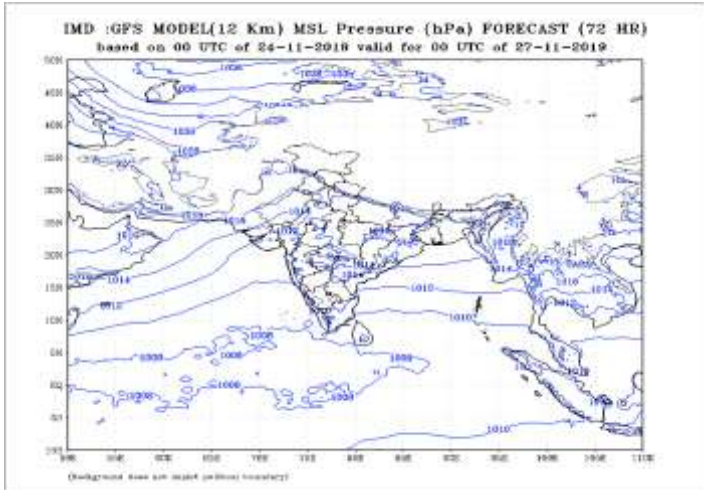
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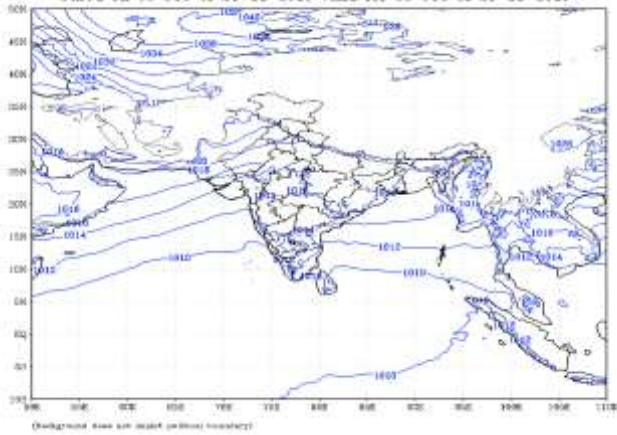




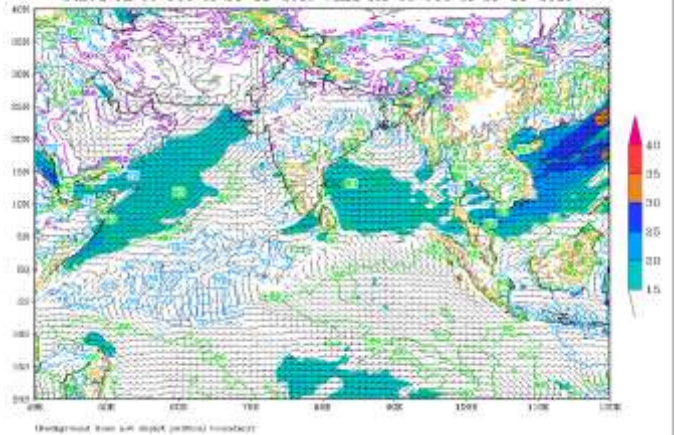




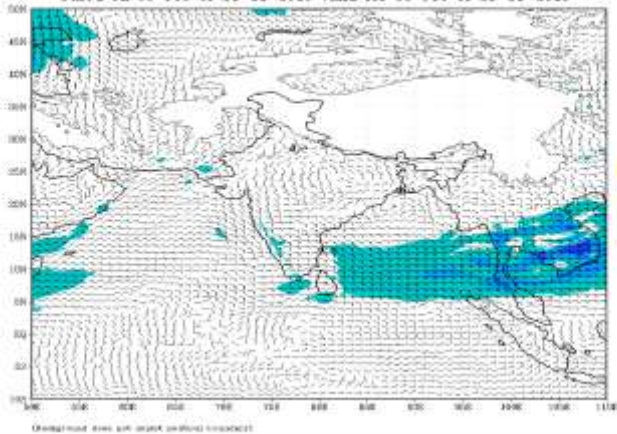
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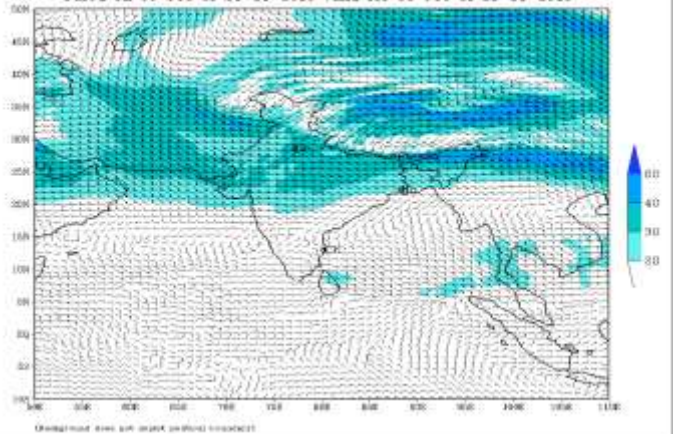
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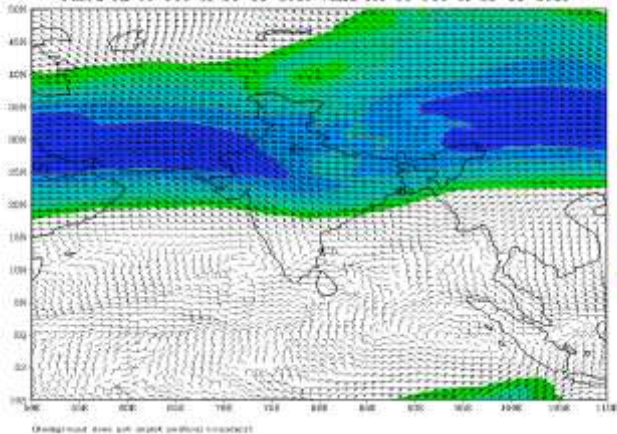
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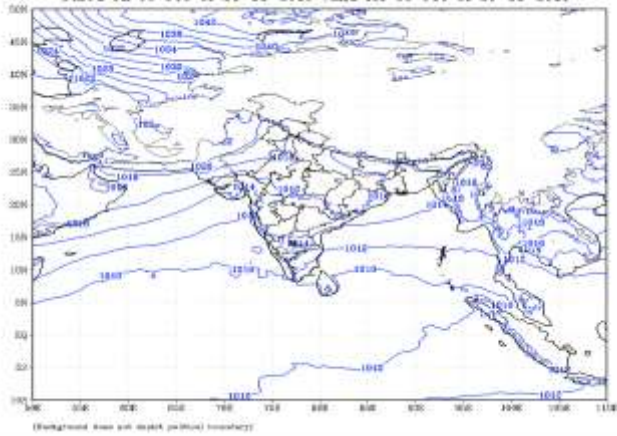


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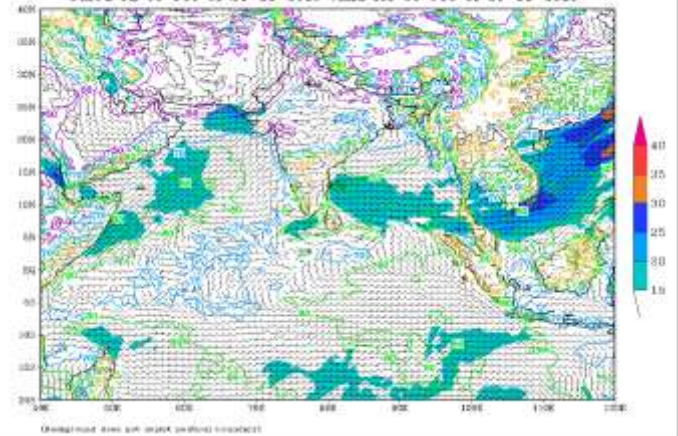




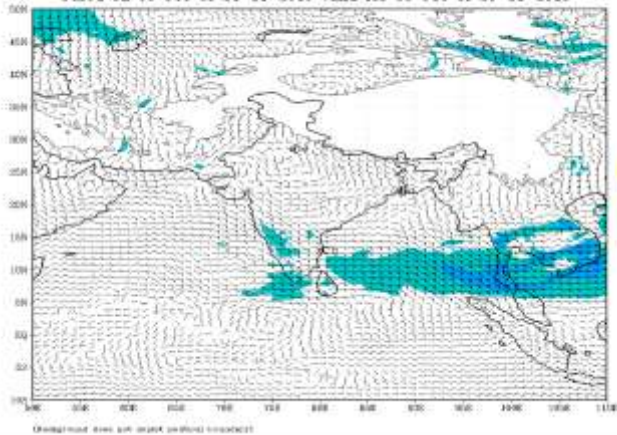
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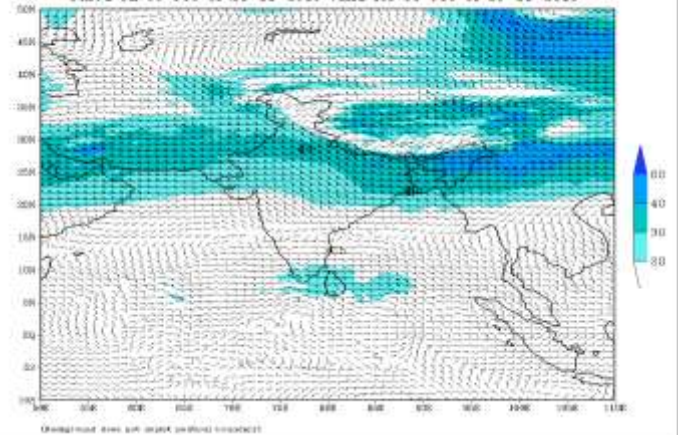
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