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

FDP (Cyclone) NOC Report Dated 17 October, 2019

Time of Issue: 1200 UTC

Synoptic features:

- Under the influence of the cyclonic circulation over Maldives area & neighbourhood, a Low Pressure Area has formed over southeast Arabian Sea & adjoining Lakshadweep area. The associated cyclonic circulation extends upto 5.8 km above mean sea level.
- A trough runs from the above cyclonic circulation to Telangana across Kerala, South Interior Karnataka and Rayalseema between 3.1 and 5.8 km above mean sea level.

Dynamical and thermodynamical features

Surface Temperature (SST):

SST is around 29-30°C over entire BOB with higher values over most parts of central BOB around 30-31°C.

SST is more than 28°C over most parts of westcentral Arabian Sea and western parts of southwest Arabian Sea, except over small areas over western parts of southwest and westcentral Arabian Sea, where it is between 26-28 °C. It is around 29-30°C to the east of 63°E.

Tropical Cyclone Heat Potential (TCHP):

TCHP is around 70-90 kJ/cm^2 over entire BoB, except some pockets in central and south BOB, and north Andaman Sea where it is more than 100 kJ/cm^2. It is less than 50 kJ/cm^2 over extreme northern parts of north Bay of Bengal and along the coastal belt.

TCHP is below 50kJ/cm^2 over northwest and most parts of westcentral and adjoining southwest Arabian Sea. It is 70-80 kJ/cm^{2}over remaining parts of AS. Small areas of value more than 100 kJ/cm^2 is seen over western part of southwest Arabian Sea.

Relative Vorticity:

There are no significant zones of relative vorticity at 850 hPa is 50X10^{-6}s-1 over BoB and Andaman sea. The vorticity is positive over some parts of south and westcentral BoB.

It is positive and around 25X10^{-5}s-1 over most parts of southwest AS and also off Maharshtra coast. It is negative over most parts of north as well as central Arabian Sea.

Convergence:

Lower level convergence of about 5 x 10^{-5}s^{-1} is seen over westcentral BoB off Andhra Pradesh coast and also over southern parts of southwest BOB.

An elongated area of lower level convergence of 5 x 10^{-5}s^{-1} lies over west coast of India.

Divergence:

Upper level divergence area with values around 5-10x10^{-5} s-1 lies over western parts of southwest and westcentral BoB off Tamil Nadu coast.

A zone of positive upper level divergence of 5-10x10^{-5} s-1 is seen over southeast Arabian Sea.

Wind Shear:

Wind shear is 5-10 knots over central & south BoB and Andaman Sea and is increasing towards north.

Wind shear is 5-10 knots over central and adjoining south AS and is increasing towards southern and northern parts of AS.

Wind Shear Tendency:

The wind shear tendency is mostly positive or neutral over most parts BOB and Andaman Sea. The shear tendency is increasing or neutral over most parts of AS except for western parts of southwest AS and also over Lakshadweep area.

Upper tropospheric ridge:

The upper tropospheric ridge at 200 hPa runs along 18.0°N over Indian Region.

Satellite observations based on INSAT imagery:

Bay of Bengal & Andaman Sea:-

According to 0900 UTC satellite imagery, scattered low/medium clouds with moderate to intense convection is seen over central and south BOB and also over Andaman Sea.

Arabian Sea:-

According to satellite imagery, scattered low/medium clouds with embedded intense to very intense convection is seen over southeast and Lakshadweep area between Lat 8.0N to 12.0N long 68.0E to 75.0E in association with low level circulation (LLC) over the area

Large scale features

M.J.O. Index:

MJO index is in Phase 8 with amplitude more than 1. It will continue in same phase with amplitude greater than 1 for next 2-3 days and will 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

IMD-GFS

The analysis of IMD-GFS T-1534 model charts based on 0000 UTC of 17th October, 2019 shows a low pressure area on 20th over eastcentral Arabian sea, which is seen upto 23rd and becomes less marked thereafter.

IMD-GEFS

The analysis of IMD-GEFS model charts based on 0000 UTC of 17th October, 2019 shows an extended low pressure area over Lakshadweep and adjoining eastcentral Arabian Sea which is seen as a LOPAR during 20th to 22nd which weakens thereafter.

IMD-WRF

The WRF model forecasts based on 17/00 analysis shows a low pressure area (LOPAR) over Lakshadweep area in the analysis field which becomes less marked the next day.

NCMRWF-NCUM: The analysis of model forecast charts based on 0000 UTC of 17th October, 2019 shows a low pressure area on 20th over eastcentral Arabian Sea, which meanders over the same region without any significant intensification.

NCMRWF-UM-Regional Model: The 00UTC forecast based on 00/17 UTC analysis indicate formation of a low pressure area over SE Arabian Sea on 20th .

NEPS Model: The analysis of model forecast charts based on 0000 UTC of 17th October, 2019 shows low pressure area on 20th over eastcentral and adjoining southeast Arabian Sea, which becomes well marked low pressure area (WML) over eastcentral Arabian Sea on 22th, close to Maharashtra coast. Thereafter it is seen to weaken over the same area.

ECMWF: ECMWF forecast gives indication of a low pressure system on 22nd over eastcentral AS, which become less marked the next day. Another low pressure area is seen over the same area during 26-27th

NCEP-GFS : Model suggests a low pressure area over southwest Arabian Sea on 22nd and 23rd October, which is becomes less marked on 24th .

ARP-Meteo France ARP:Nil

Dynamical statistical models

IMD Genesis Potential Parameter (GPP):

The Genesis Potential Parameter (GPP) analysis and forecasts based on 0000 UTC of 17th October 2019 shows a significant GPP zone developing over southeast Arabian Sea off Karnataka coast on 18th, which becomes significant while moving in a nearly northward direction to reach northern parts of eastcentral Arabian Sea on 21st. It becomes less marked on 22nd.

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 or
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:

Majority of the numerical models except ECMWF, and NCEP GFS suggest formation of low pressure area (LPA) over southeast and adjoining eastcentral AS on 20th October. ECMWF, and NCEP GFS suggest formation of the low pressure area on 22nd . No model is indicating the intensification of the system beyond well marked low pressure area. The genesis potential parameter index also indicates a significant potential zone for cyclogenesis over southeast & eastcentral AS during 18th -21st October 2019.

Considering the above, the development of a low pressure area over Arabian Sea around 20th October and any possible intensification needs to be monitored.

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

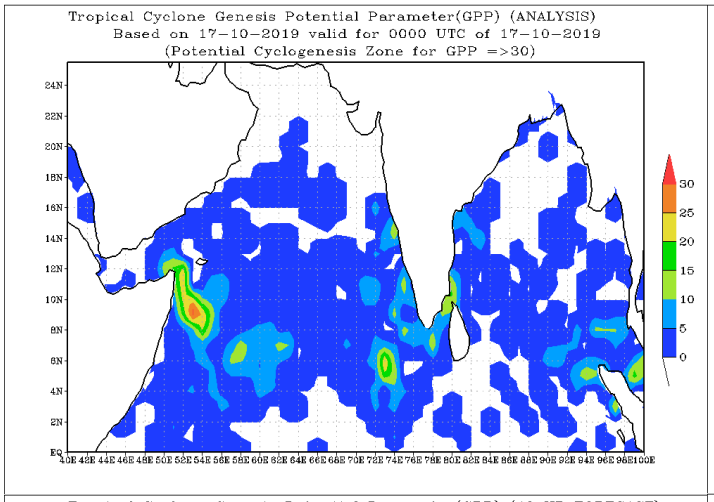
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS
Nil	Nil	Nil	Nil	Nil

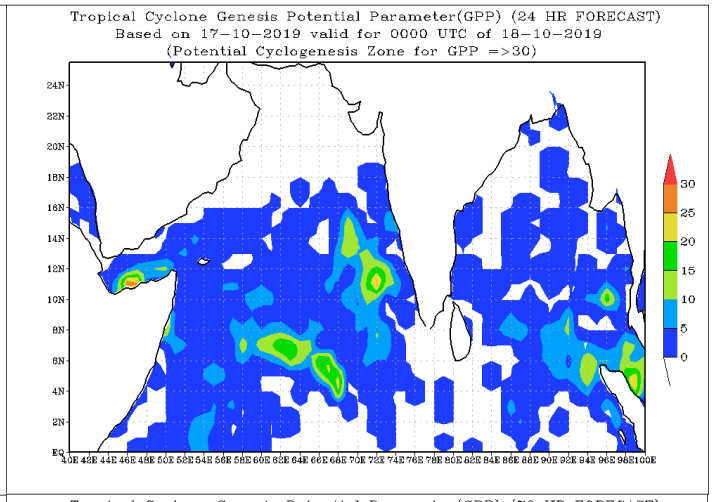
Probability of cyclogenesis over Arabian Sea during next 120 hours:

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.

Annexure-I


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 17-10-2019 valid for 0000 UTC of 17-10-2019
(Potential Cyclogenesis Zone for GPP =>30)


Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
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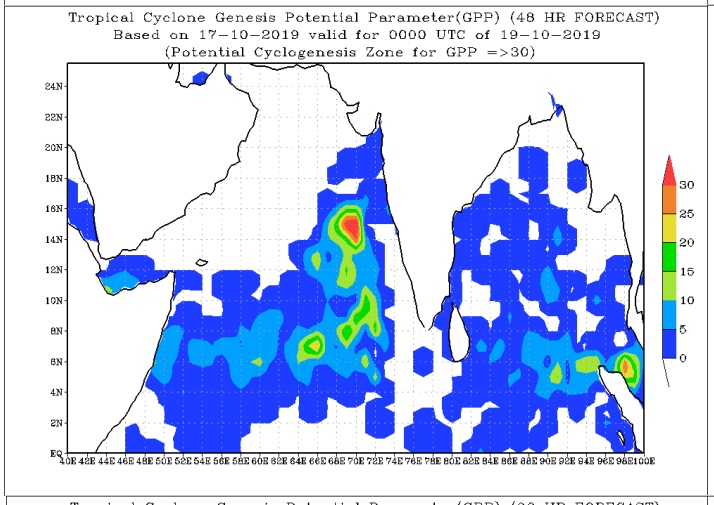
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
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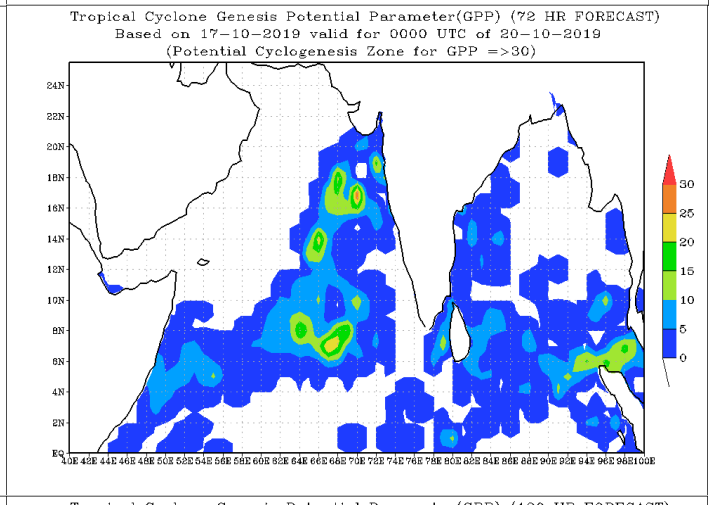
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
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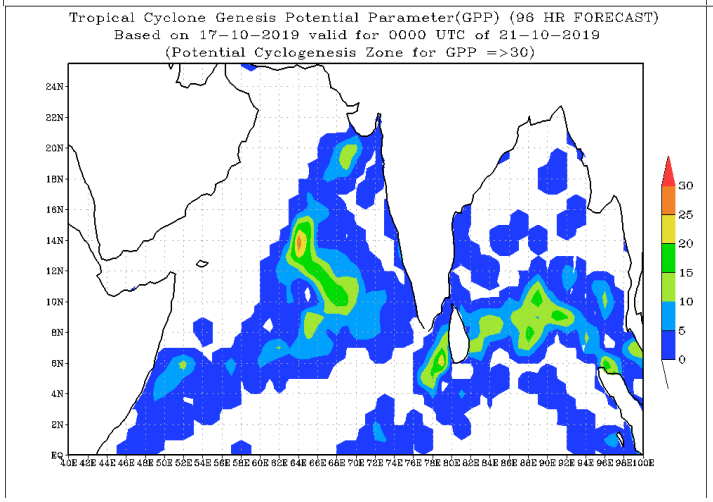
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
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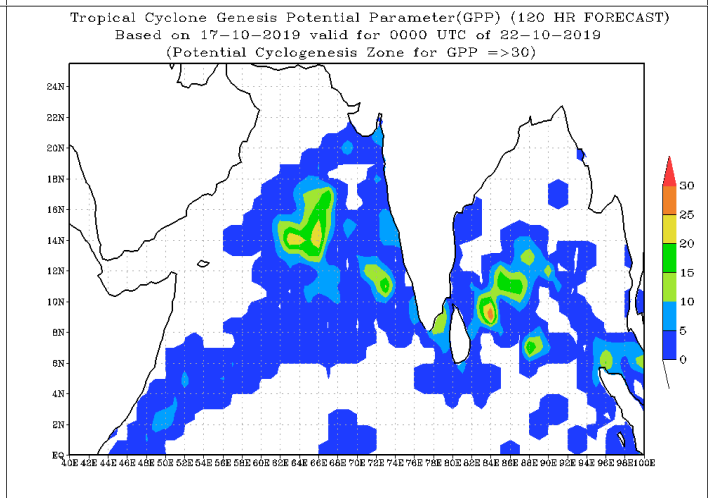
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 17-10-2019 valid for 0000 UTC of 22-10-2019
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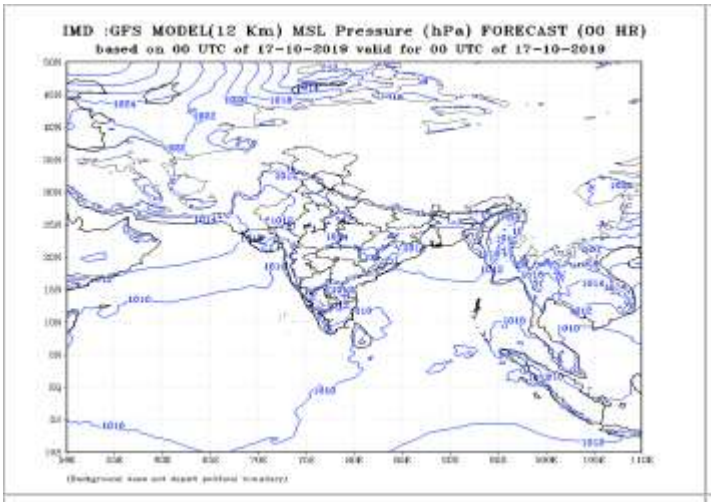
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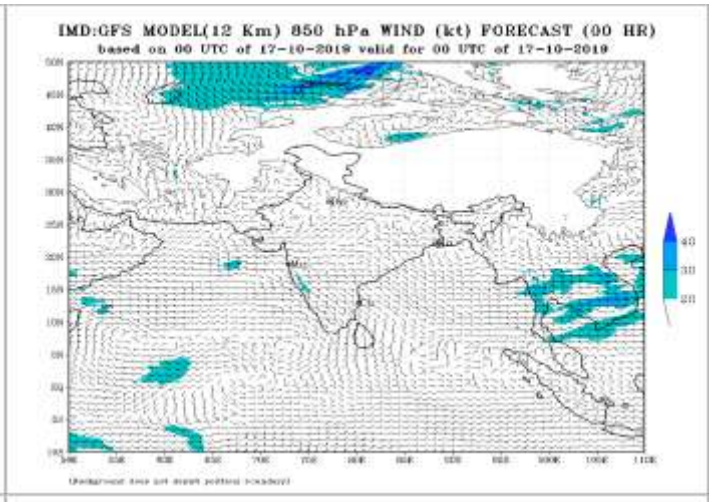
based on 00 UTC of 17-10-2019 valid for 00 UTC of 17-10-2019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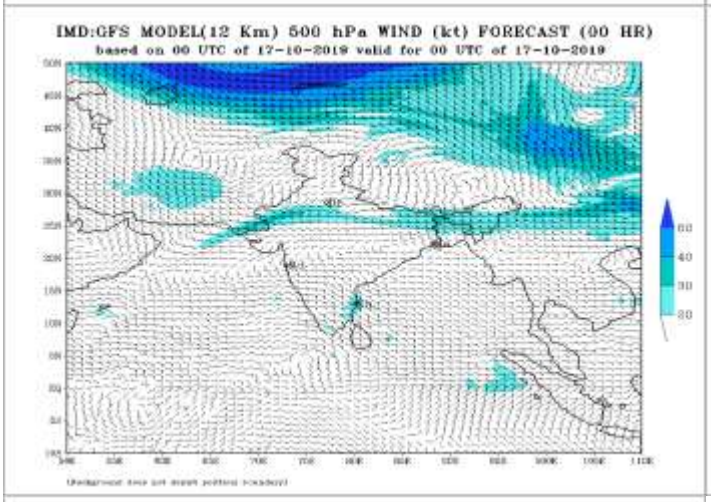
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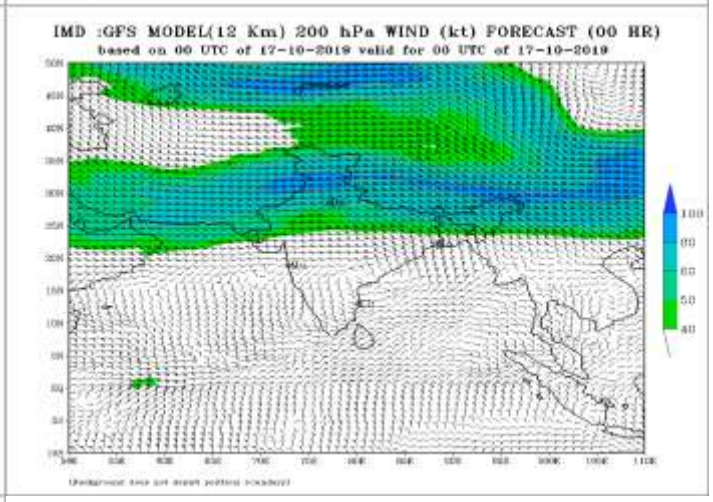
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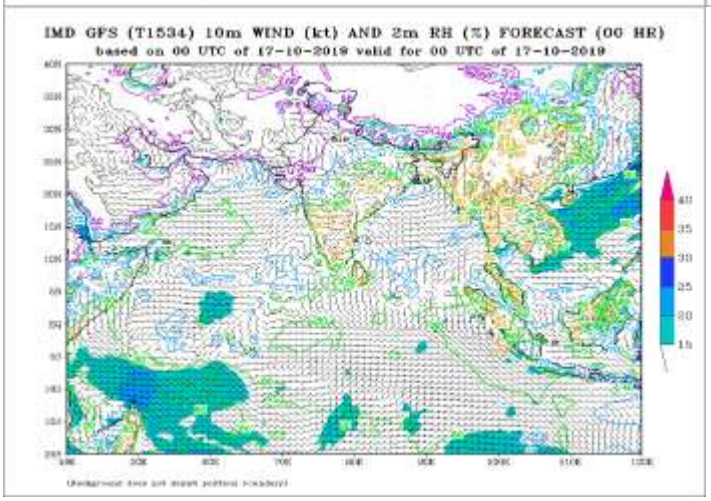
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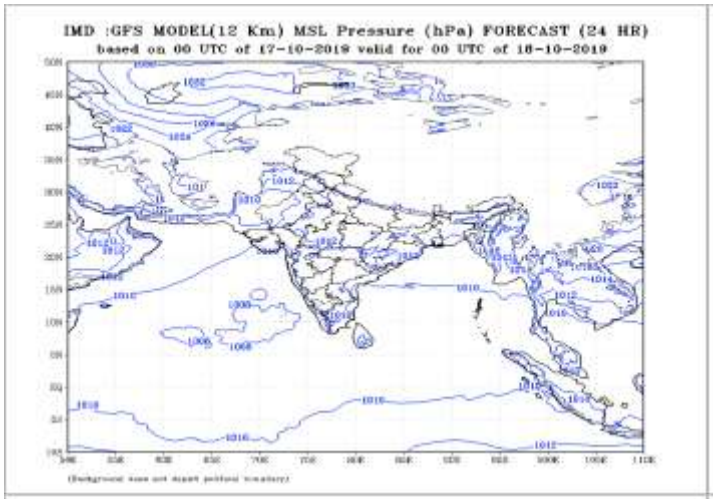
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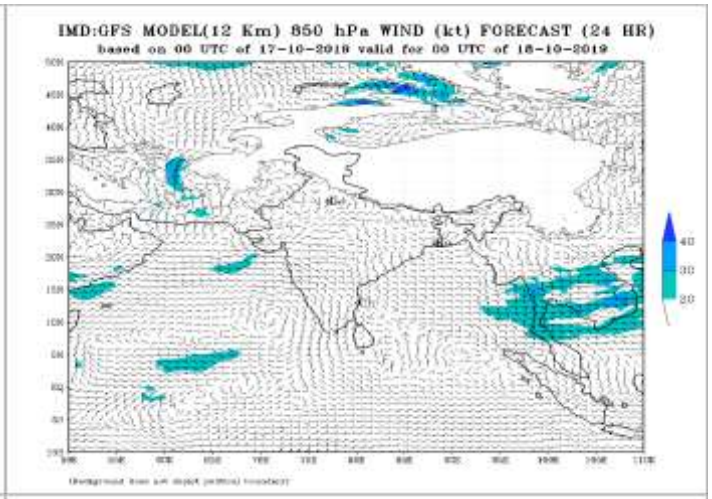
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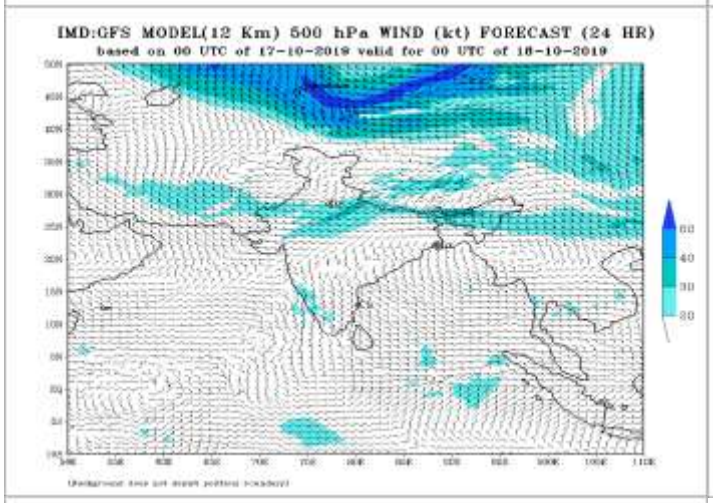
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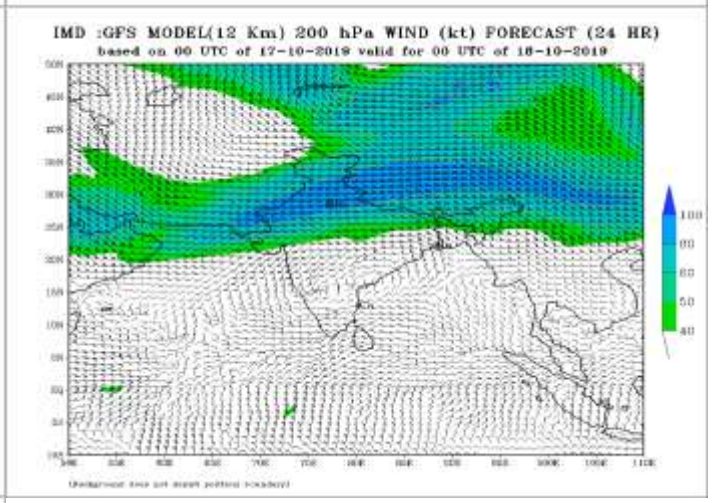
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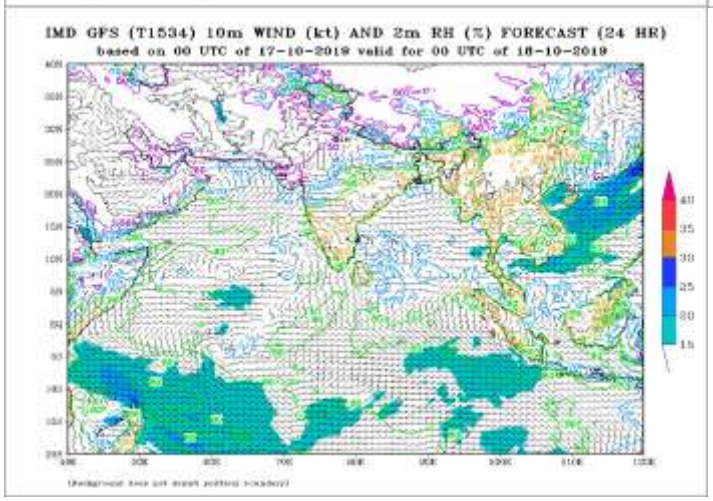
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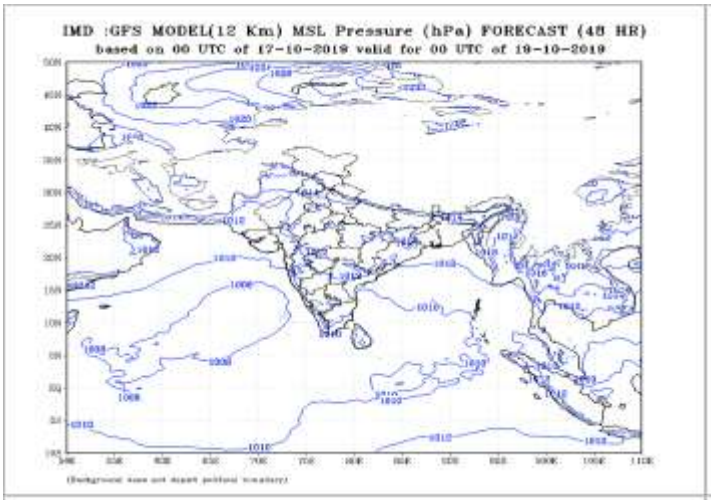
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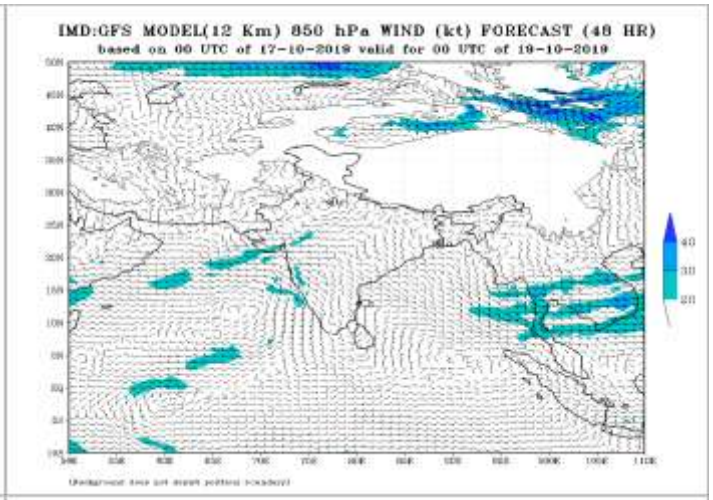
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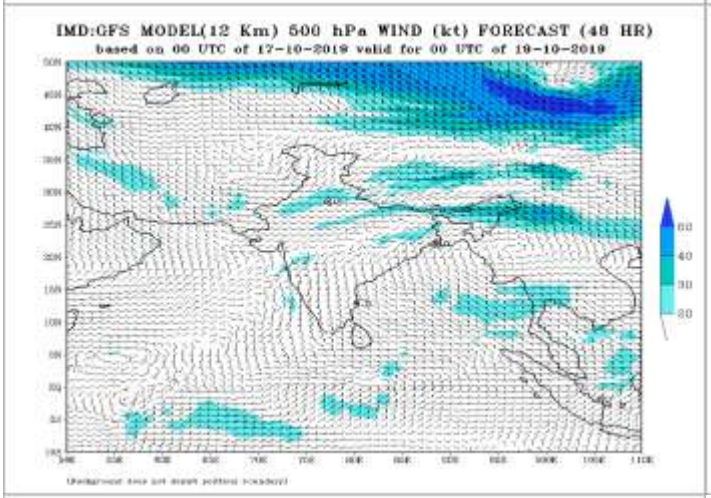
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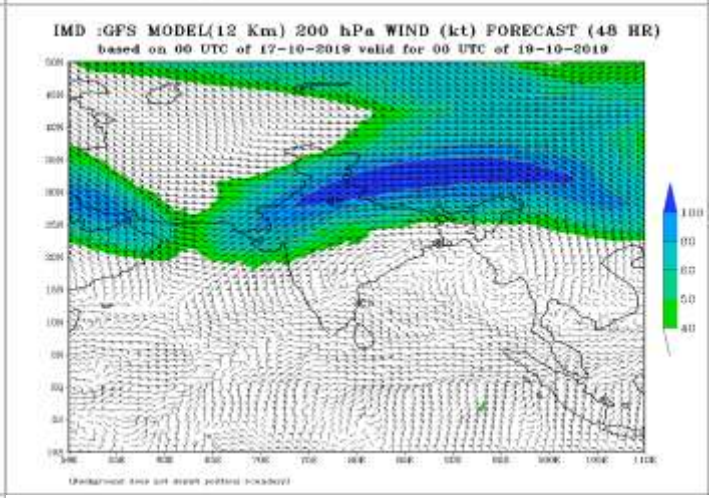
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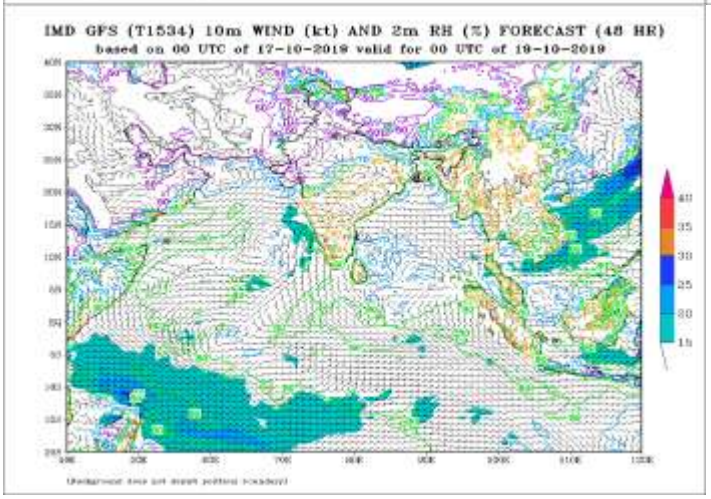
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
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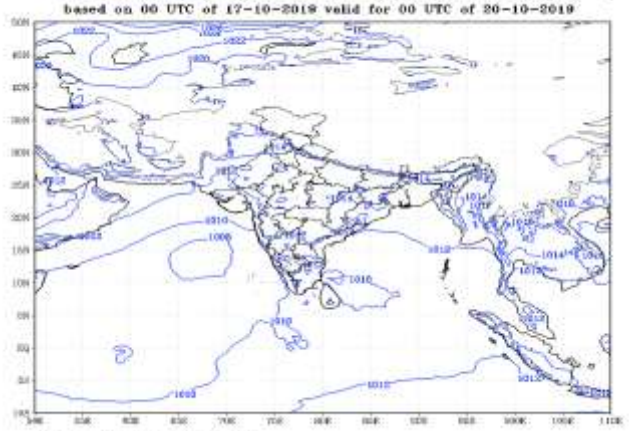

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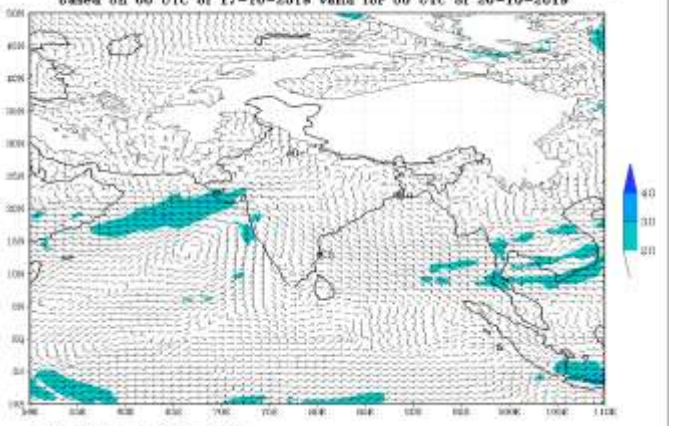

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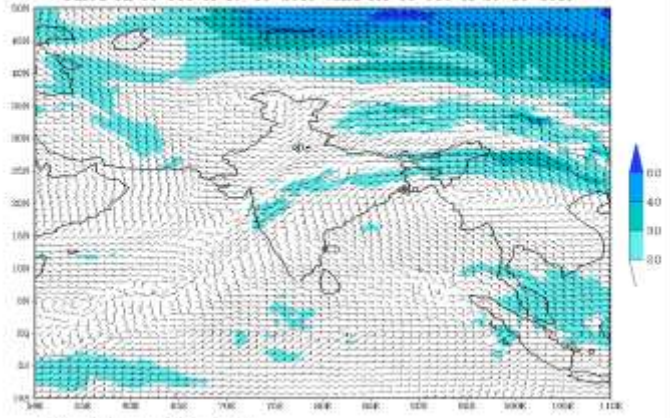

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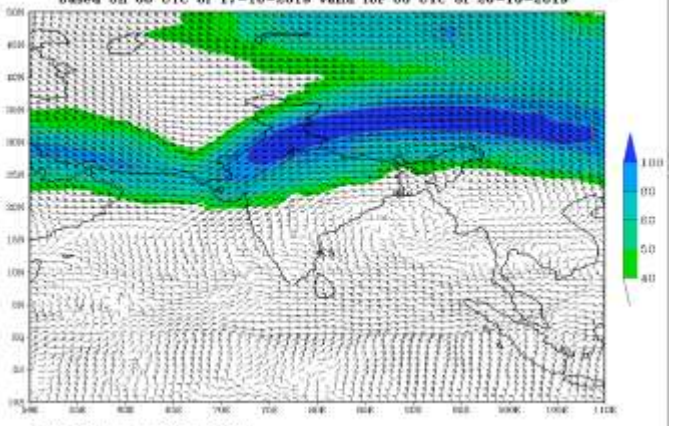

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)
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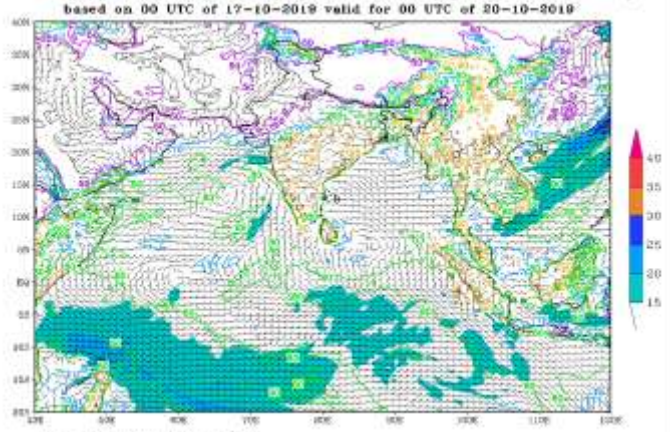

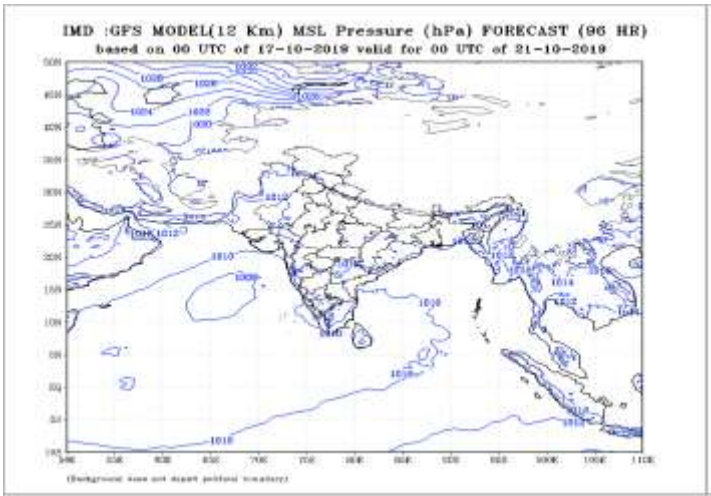
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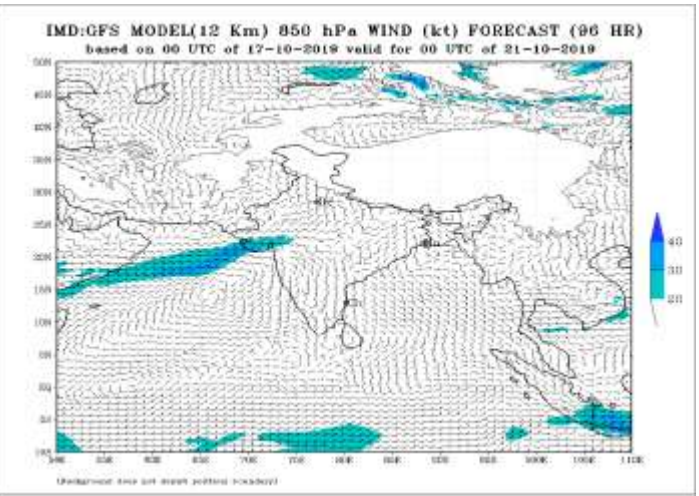
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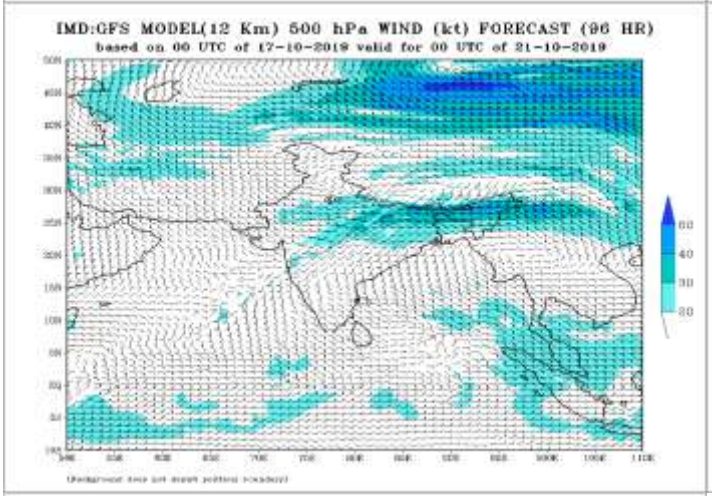
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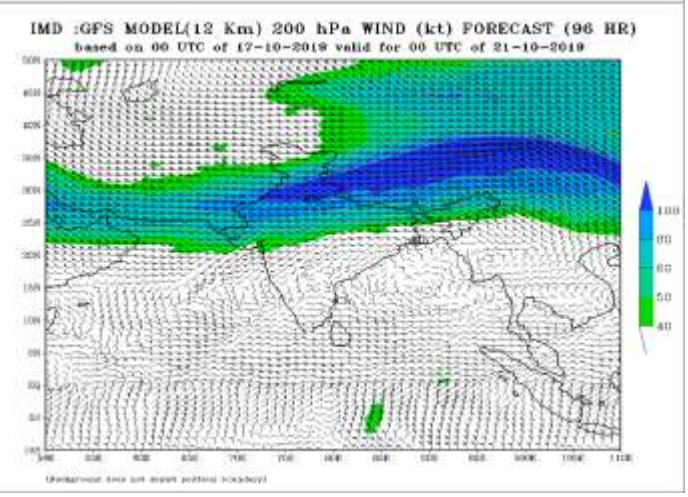
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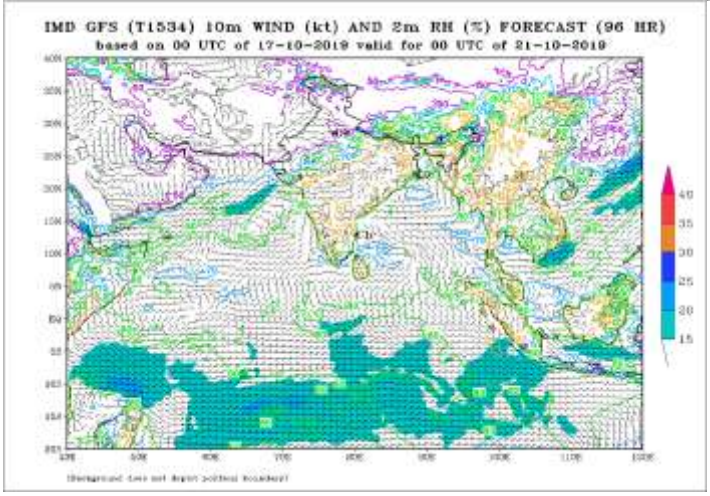
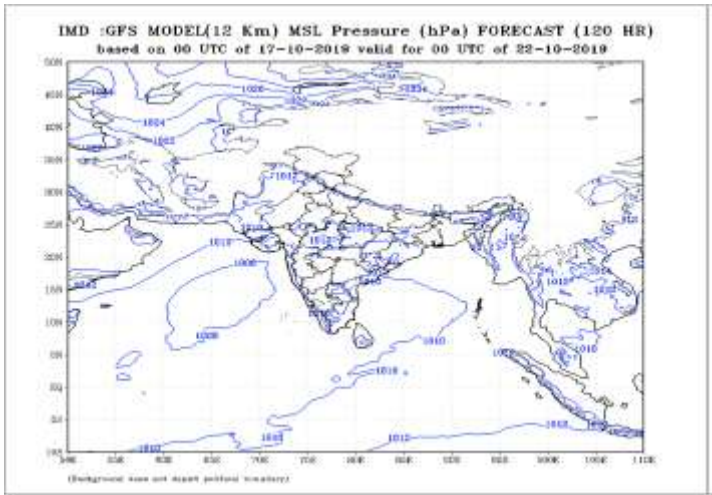

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 17-10-2019 valid for 00 UTC of 21-10-2019


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
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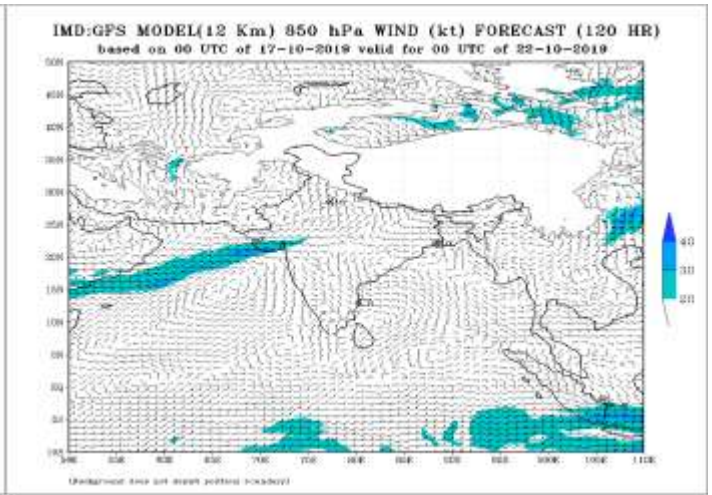
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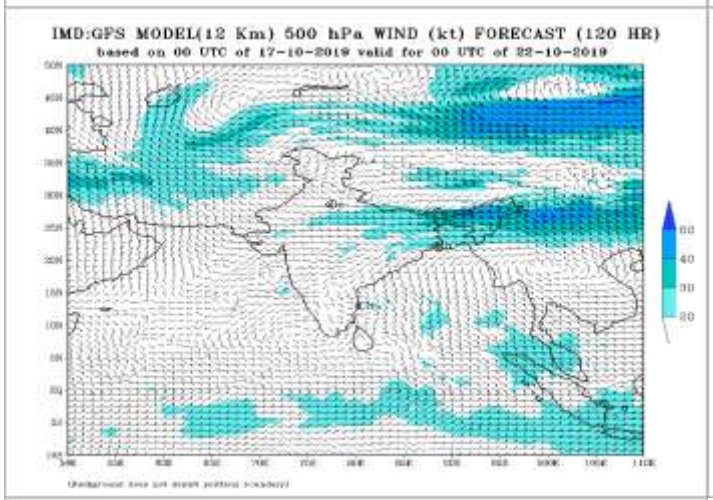
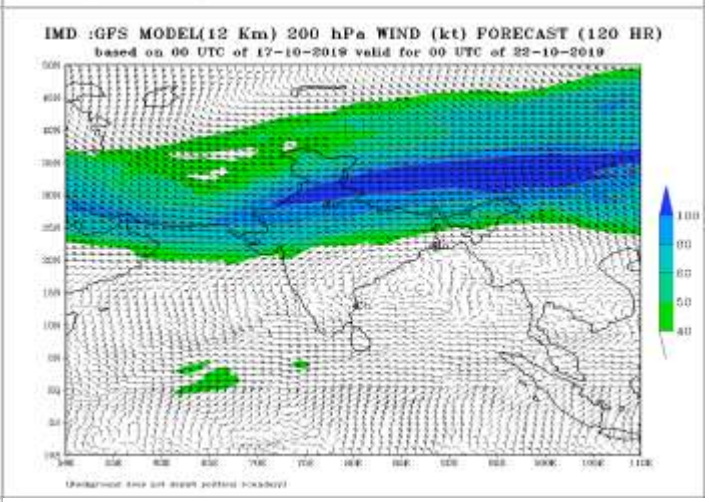
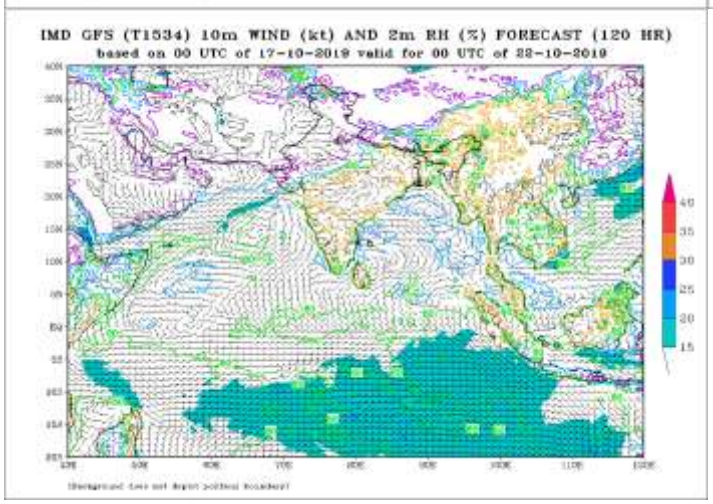

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 17-10-2019 valid for 00 UTC of 22-10-2019


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 17-10-2019 valid for 00 UTC of 22-10-2019


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 17-10-2019 valid for 00 UTC of 22-10-2019