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

Tropical Cyclone Forecast Programme
Report Dated 05th December, 2022

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

The Low Pressure Area over south Andaman Sea & neighborhood with associated cyclonic circulation extending up to mid tropospheric levels persists. It is likely to move west-northwestwards and concentrate into a Depression over Southeast Bay of Bengal by 06th December evening. Thereafter, it is likely to continue to move west-northwestwards, intensify further gradually into a Cyclonic Storm and reach Southwest Bay of Bengal near north Tamil Nadu-Puducherry & adjoining south Andhra Pradesh coasts by 08th December morning.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	Around 28-29^{0}C over Andaman sea and increase to 29^{0}C over southeast and adjoining parts of central BoB, southwest BoB and off Tamil Nadu and Sri Lanka coast.	About 30-32°C over the southeast and adjoining southwest AS off Karntaka and Kerala, south Gujarat coasts, north AS, 26-28°C over eastcentral and adjoining north AS, along and off kerala and Karnataka coasts, 25-26°C over southwest AS, less than 24°C over southwest AS off Oman and Yemen coasts and adjoining sea areas.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	80-100 KJ/cm2 over south Andaman sea and adjoining southeast BoB and less than 50 KJ/cm2 over westcentral and southwest BoB along east coast of India.	70-90 over southeast and adjoining eastcentral and adjoining southwest AS, and less than 40 over remaining AS and also off west coast of India, Comorin area.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	around 50-60 x10-6 s-1 over south Andaman sea and adjoining southeast BoB	30-40 over Maldives and Comorin area. 10-20 over northeast AS, southeast AS & adjoining EIO.
Low Level convergence (X10^{-5} s^{-1})	10 over south Andaman sea.	5 over small pockets of south AS, Comorin area and Maldives.
Upper Level divergence (X10^{-5} s^{-1})	20 over south Andaman sea	30-40 over southeast AS, Comorin area, Lakshadweep area and Maldives.
Vertical Wind Shear (VWS knots)	5-10 knots over south Andaman sea and 10-20 knots over	15 over south AS, 30-40 over central and north AS

	southeast BoB, along the expected track	
Wind Shear Tendency (knots)	Decreasing over south Andaman sea & adjoining southeast BoB.	Decreasing over southeast AS off Kerala coast and northeast AS.
Upper tropospheric Ridge	Along 14.0°N over the BoB.	Along 10.0°N over the AS.
Trough in westerlies	No significant trough	

Satellite observations based on INSAT imagery (0300 UTC):

a) Over the BoB & Andaman Sea:-
Scattered to broken low and medium clouds with embedded intense to very intense convection lay over southeast Bay of Bengal and Andaman sea. Scattered to broken low and medium clouds with embedded moderate to intense convection lay over southwest Bay of Bengal.

b) Over the Arabian Sea:-
Scattered low and medium clouds with embedded moderate to intense convection lay over south Arabian sea, Lakshadweep islands area and Comorin area.

M.J.O. Index:
The Madden Julian Oscillation (MJO) Index is currently in Phase 2 with amplitude less than 1. It will continue in same phase for next 2 days. Thereafter, it will move to phase 3 remain there till and will remain there for next 5 days.

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

NIL

Model guidance based on 0000 UTC for the next 7 days

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	The extended low over south Andaman Sea and neighboring areas as on today, will become deep depression over southeast BoB on 6th, severe cyclonic storm (SCS) over southwest BoB on 7th, will move in west-northwest ward and will lay as SCS over southwest BoB close to Tamil Nadu - Puducherry coast on 8th Dec morning.	No significant system
IMD-GEFS	The LPA over south Andaman Sea as on today will become depression/deep depression over southeast BoB on 6th Dec, SCS over southwest BoB on 7th, and over southwest BoB close to Tamil Nadu - Puducherry coast on 8th morning as SCS. It will make landfall along Tamil Nadu coast on the same day.	No significant system
GEFS Probabilistic guidance	Based on the models guidance, 70-90 % probability is indicating that system to make landfall along north Tamil Nadu coast.	Not available

IMD WRF	Extended low over south Andaman Sea and neighbouring areas on 5th, depression/deep depression over southeast BoB on 6th, CS over southwest BoB on 7th, SCS over southwest BoB northeast of Sri Lanka coast on 8th.	No significant system within forecast duration.
NCMRWF-NCUM	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, deep depression over southwest BoB on 7th, CS/SCS over southwest BoB close to northeast of Sri Lanka coast on 8th, close to Tamil Nadu – Puducherry coast as SCS on 9th, will make landfall with reduced intensity on the same day and lay as WML over land.	No significant system
NCMRWF-NEPS	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, deep depression over southwest BoB on 7th, CS/SCS over southwest BoB close to northeast of Sri Lanka coast on 8th, close to Tamil Nadu – Puducherry coast as SCS on 9th, will make landfall with reduced intensity on the same day and lay as WML over land.	No significant system
NCMRWF-UM (Regional)	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, deep depression over southwest BoB on 7th, CS over southwest BoB close to northeast of Sri Lanka coast on 8th,	No significant system
ECMWF	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, CS on 7th over southwest BoB, CS over southwest BoB close to northeast Sri Lanka coast on 8th and it will have its maximum intensity on this day, it will close to Tamil Nadu – Puducherry coast on 9th 0600 UTC and cross the coast at around 1800 UTC of the same day with reduced intensity.	No significant system
ECMWF ensemble	WML over South Andaman Sea as on 5th Dec, will track west-northwest wards with intensification up to Cyclonic Storm with 70-80% probability on 7th Dec and will reach Tamil Nadu coast.	No significant system
NCEP-GFS	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, deep depression over southwest BoB on 7th, CS over southwest BoB on 8th Dec. Continuing to move west-northwestwards and weakening into deep depression over southwest BoB on 9th, it will move in same direction and lay as deep depression on 10th, weaken further to depression over southwest BoB close to north Tamil Nadu – south Andhra Pradesh coasts on 11th, it will cross the coast as LPA along north Tamil Nadu – south	No significant system

	Andhra Pradesh coasts on 12th morning.	
IMD MME	The LPA over south Andaman Sea will become depression over southeast BoB on 6th, DD on 7th Dec over southwest BoB, CS over southwest BoB on 8th, it will then move northwest wards and will weaken slightly over southwest BoB as CS on 9th, will cross Tamil Nadu – south Andhra Pradesh coasts as LPA on 09th 00 UTC.	No significant system
IMD HWRF	Available during cyclonic disturbance period only	Available during cyclonic disturbance period only
IMD-Genesis Potential Parameter	A significant potential zone over south Andaman Sea as on 5th Dec having northwestward movement.	No potential zone over Arabian Sea during next 7 days

Summary and conclusion:

- Most of the NWP models are indicating LPA over south Andaman Sea as on 5th Dec will have west-northwest ward movement. All the models are unanimously indicating its intensification into depression around 6th. ECMWF, NCUM group & GFS are indicating intensification into a cyclonic storm with ECMWF indicating intensification up to CS stage during 7th; GFS is indicating intensification up to severe cyclonic storm stage; Most of the models are indicating landfall along Tamil Nadu – Puducherry coasts at during 8th to 9th, whereas, ECMWF is indicating its landfall along Tamil Nadu – south Andhra Pradesh coasts on 9th 1800 UTC and NCEP GEFS on 12th morning along the Tamil Nadu – south Andhra Pradesh coasts.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

The Low Pressure Area over south Andaman Sea & neighborhood with associated cyclonic circulation extending up to mid tropospheric levels persists. It is likely to move west-northwestwards and concentrate into a Depression over Southeast Bay of Bengal by 06th December evening. Thereafter, it is likely to continue to move west-northwestwards, intensify further gradually into a Cyclonic Storm and reach Southwest Bay of Bengal near north Tamil Nadu-Puducherry & adjoining south Andhra Pradesh coasts by 08th December morning.

2. For the Arabian Sea:

No significant system 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

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

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

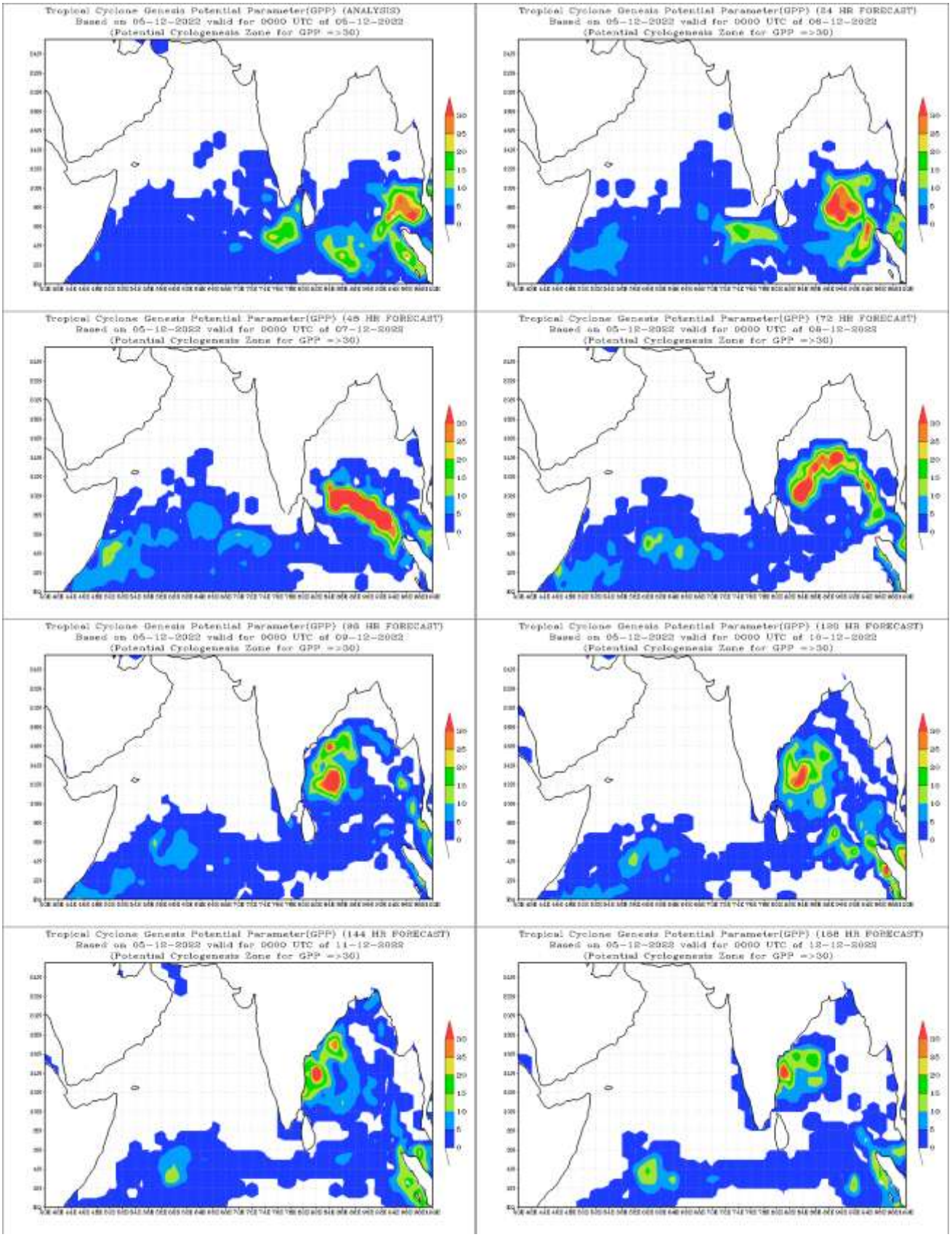
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

Advisory:

The movement and intensification of low pressure area/depression (remnant from South China Sea) likely to emerge into south Andaman Sea around 4th December need to be monitored through various observations.

IOP: NIL

Annexure


Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 05-12-2022 valid for 0000 UTC of 05-12-2022
(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) (144 HR FORECAST)
Based on 05-12-2022 valid for 0000 UTC of 11-12-2022
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Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
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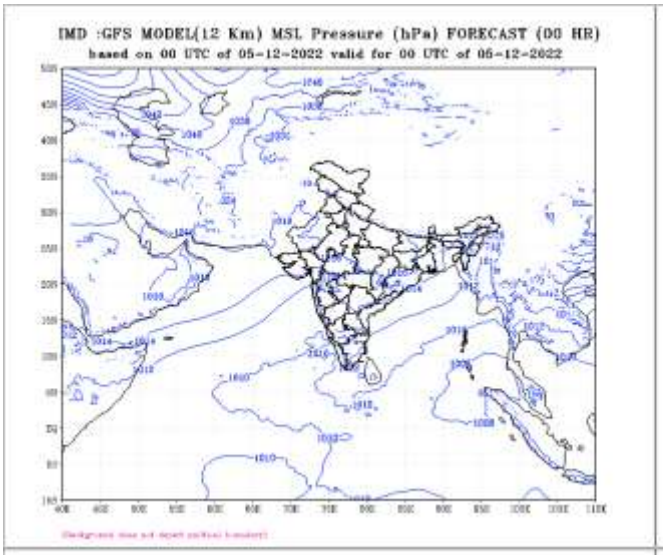
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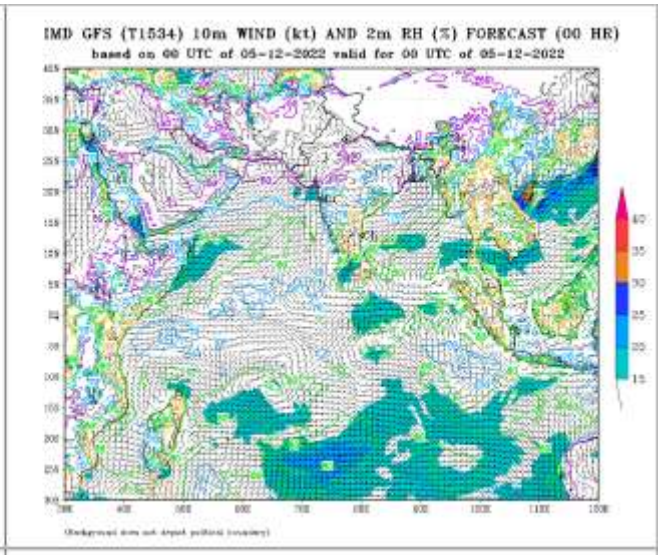
based on 00 UTC of 05-12-2022 valid for 00 UTC of 06-12-2022


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
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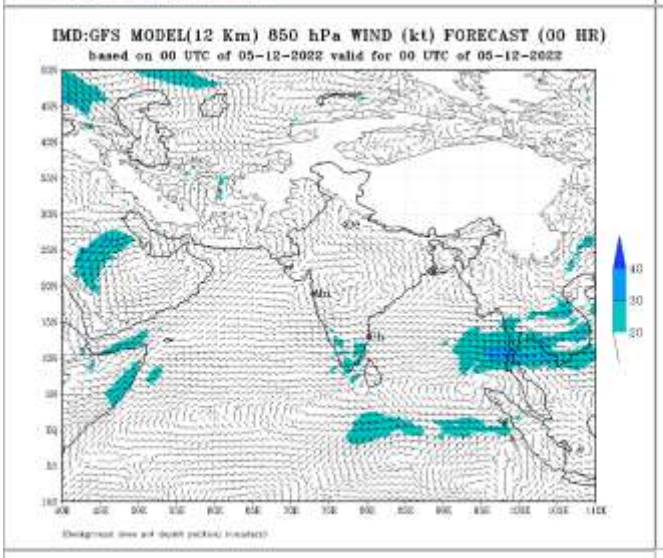
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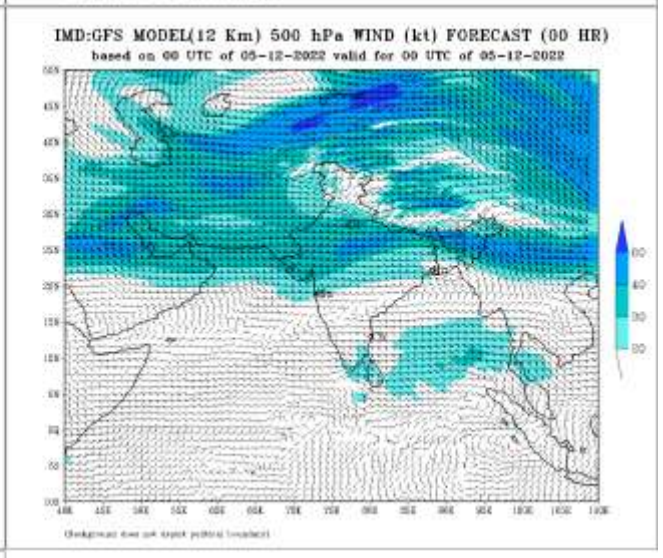
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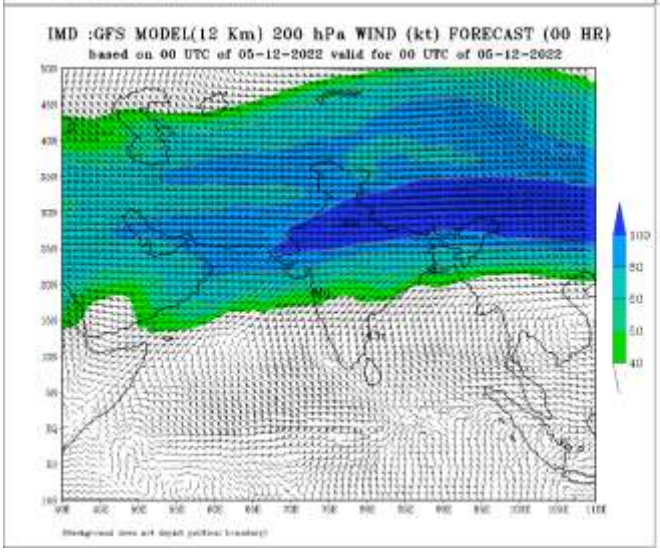
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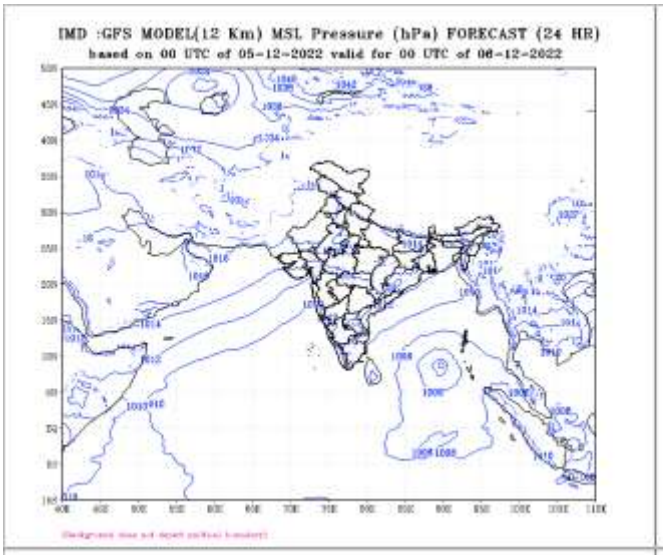
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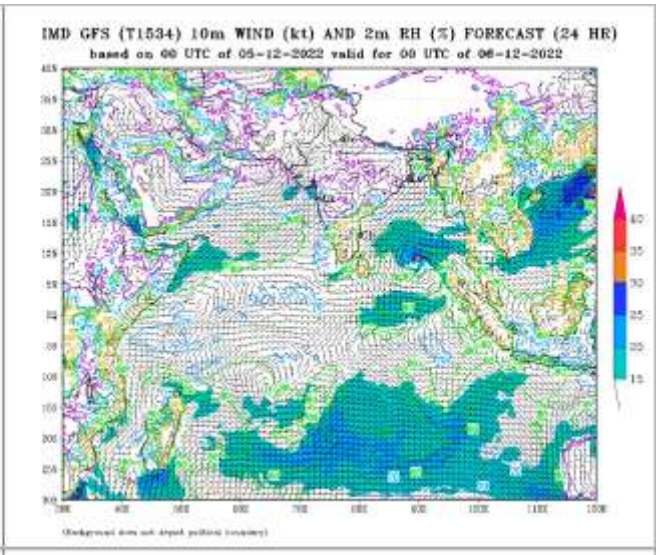
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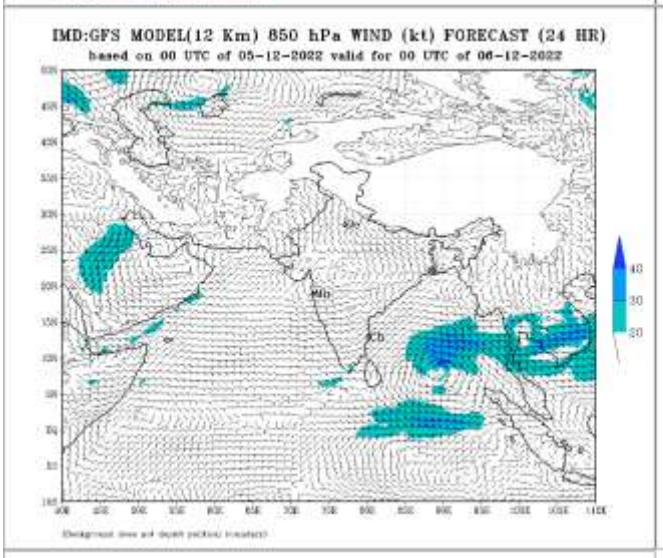
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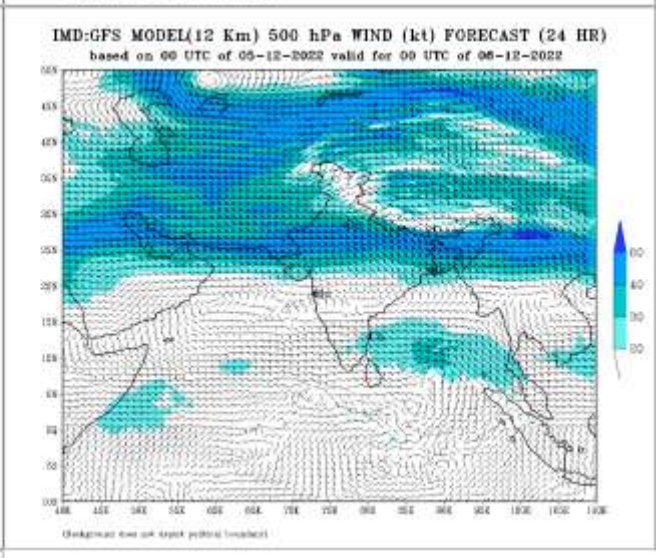
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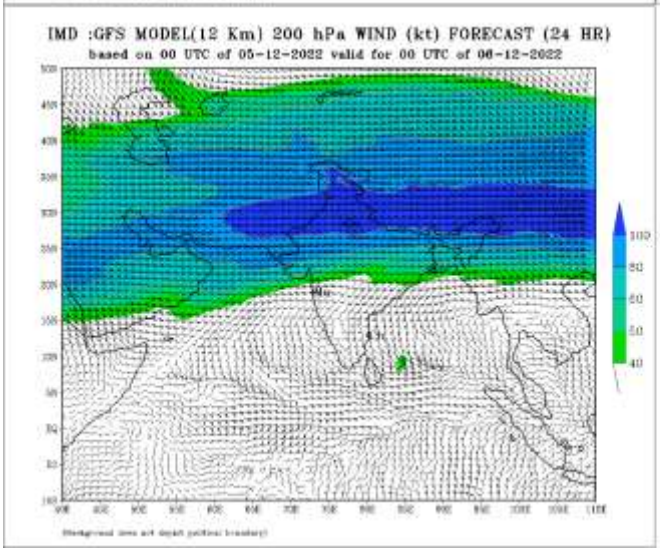
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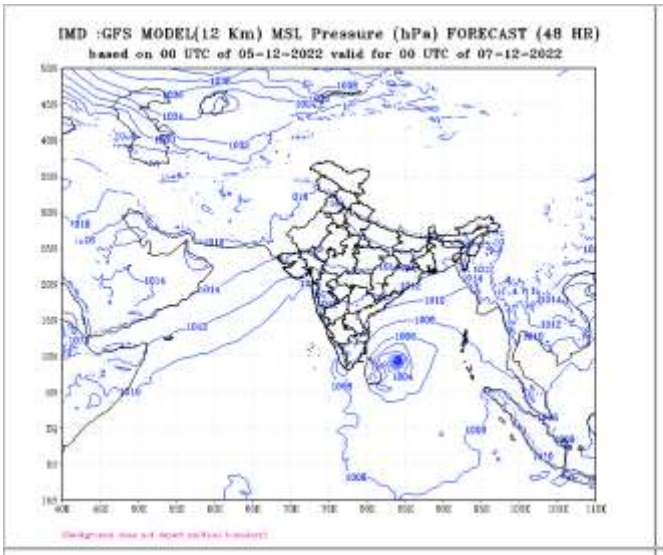
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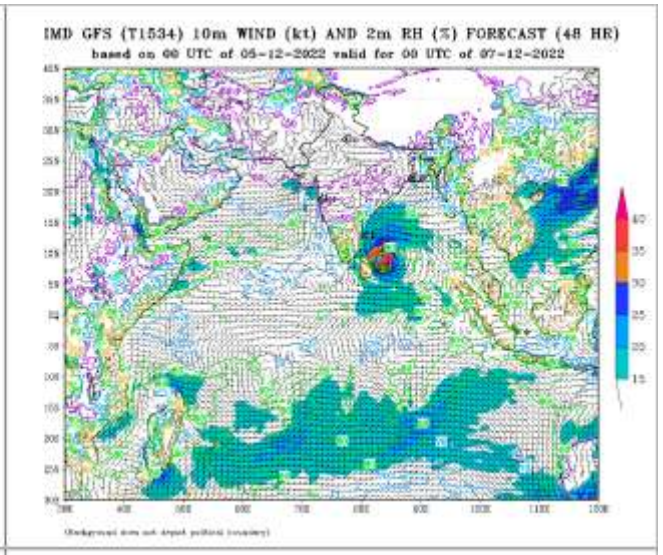
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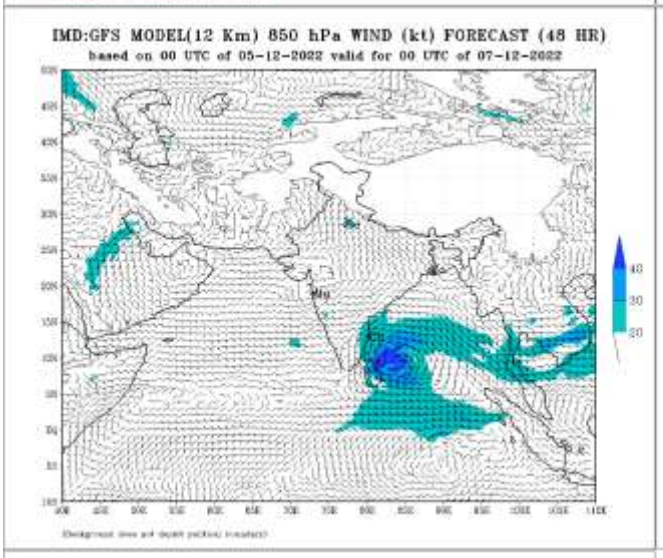
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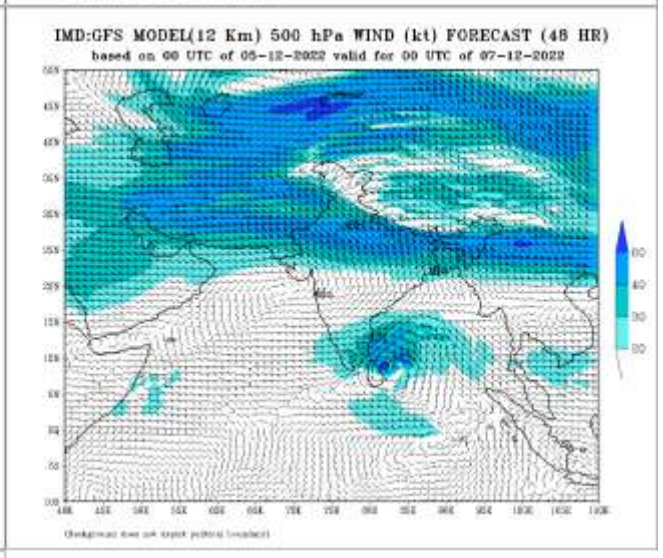
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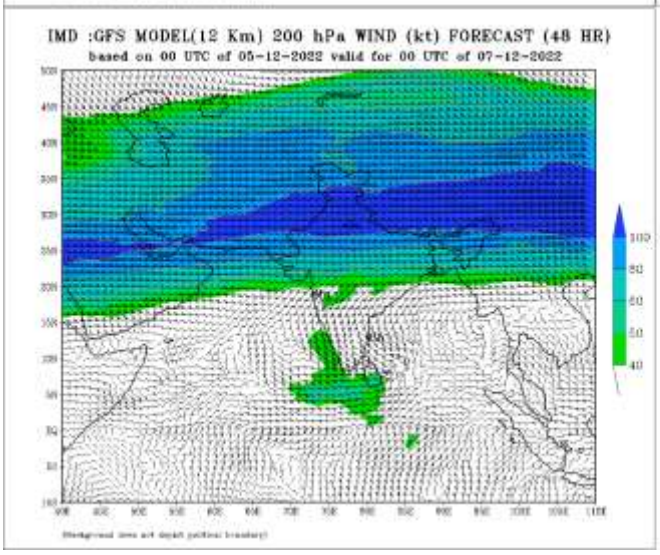
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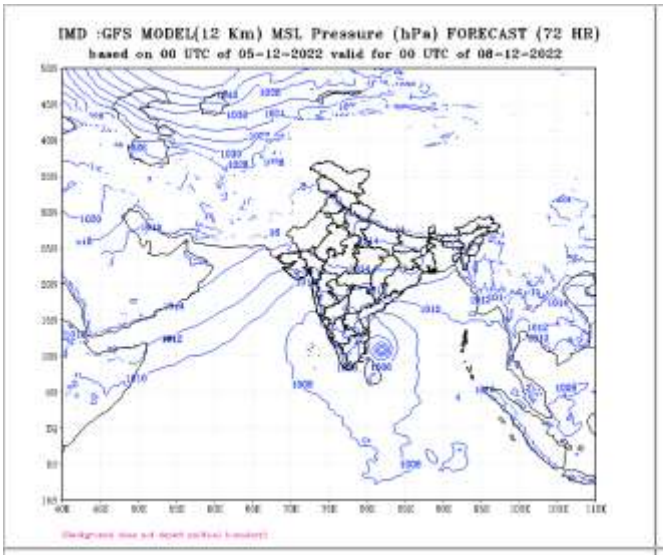
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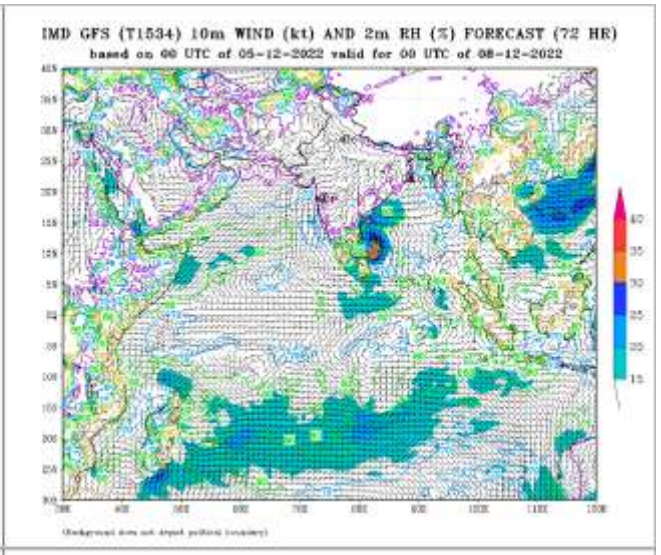
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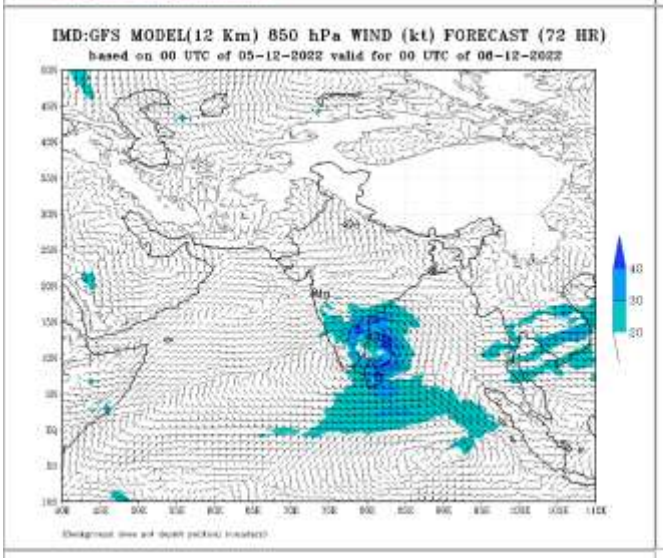
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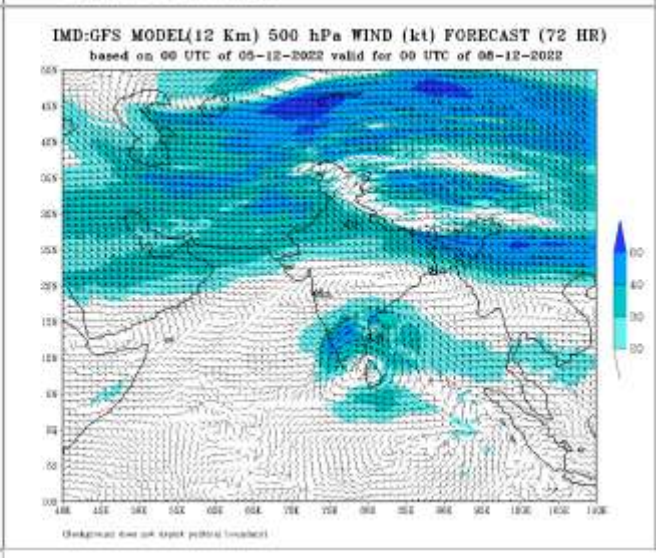
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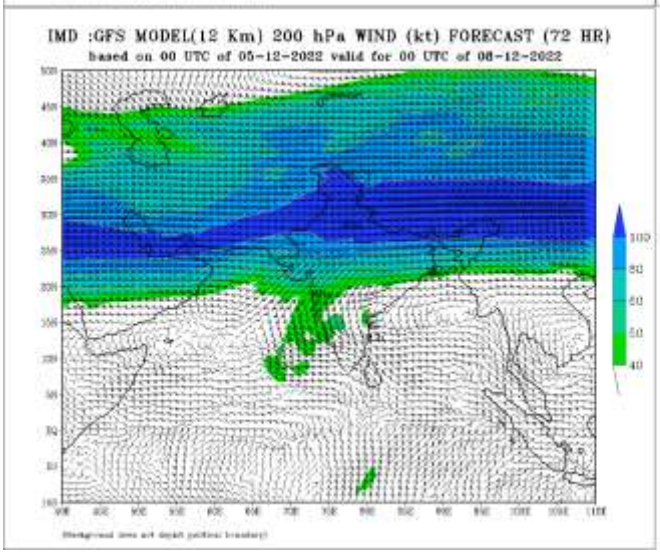
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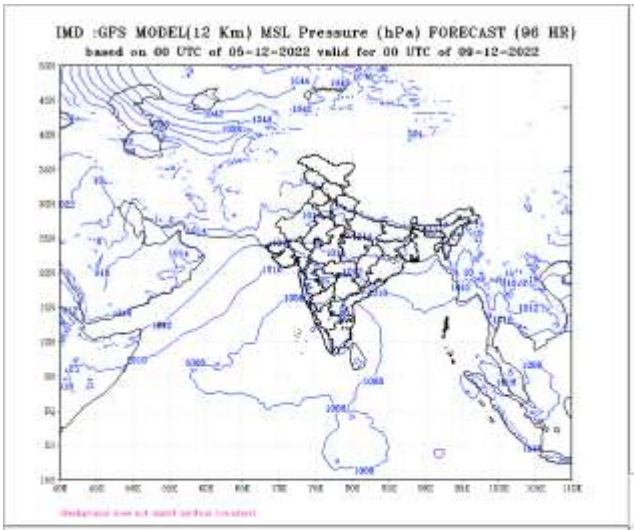
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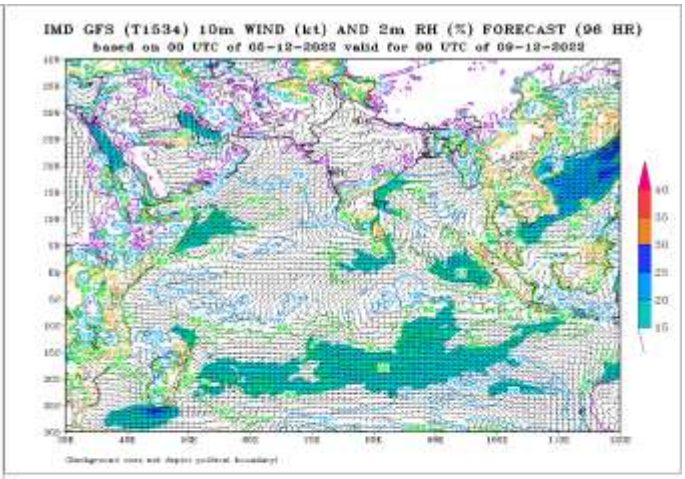
based on 00 UTC of 05-12-2022 valid for 00 UTC of 09-12-2022


IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
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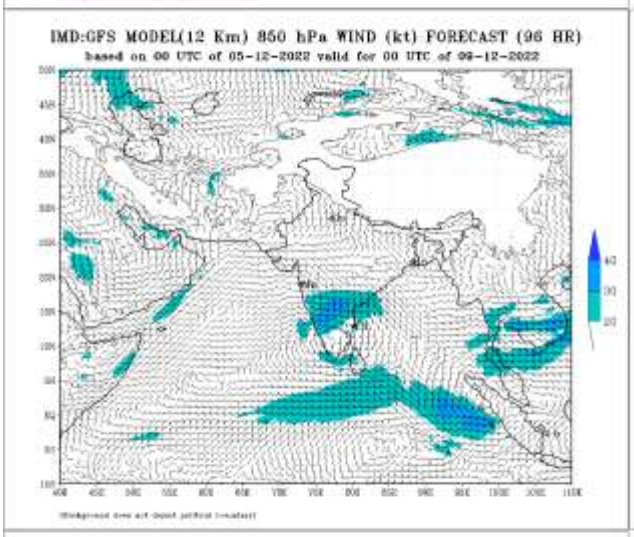
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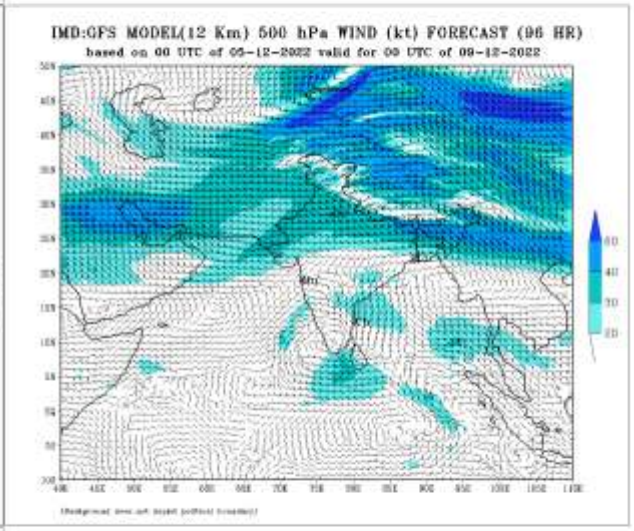
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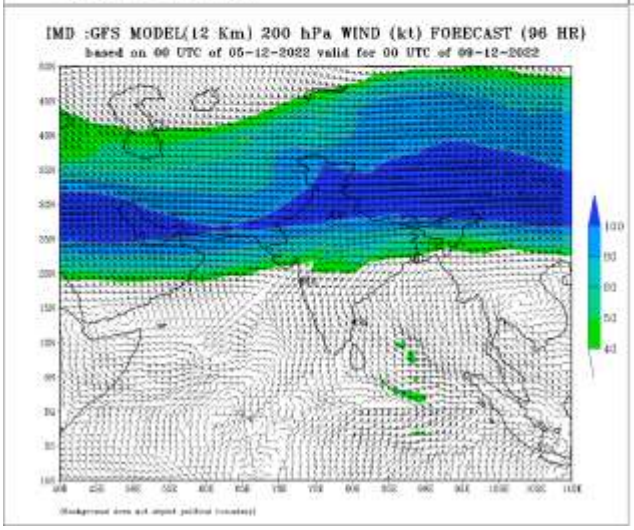
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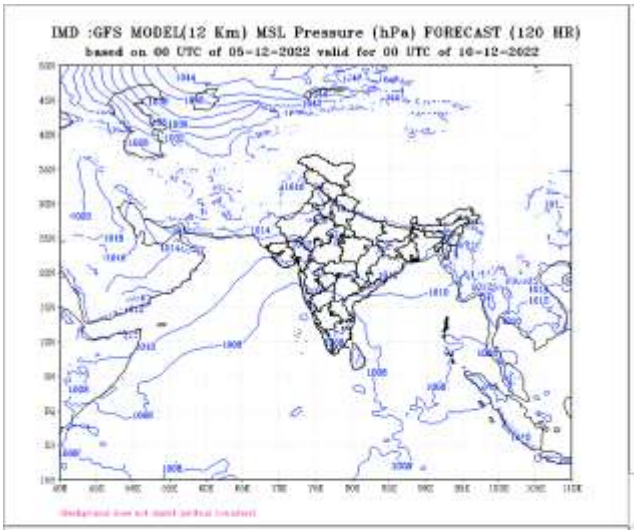
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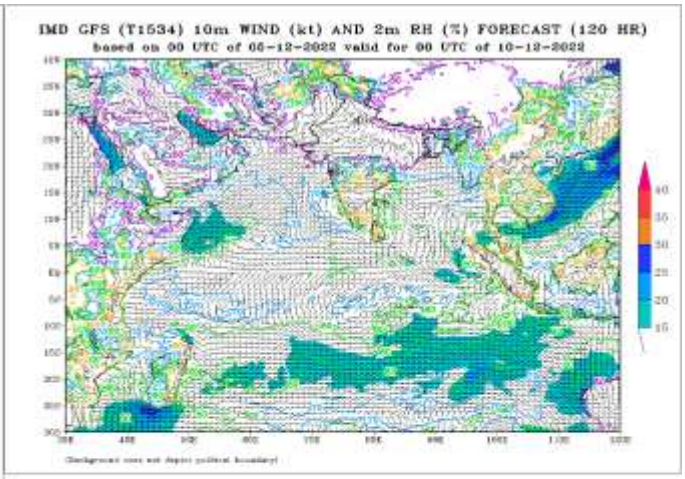
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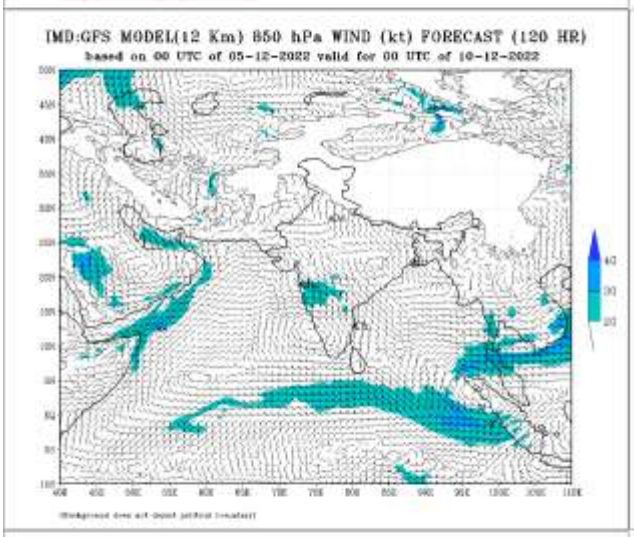
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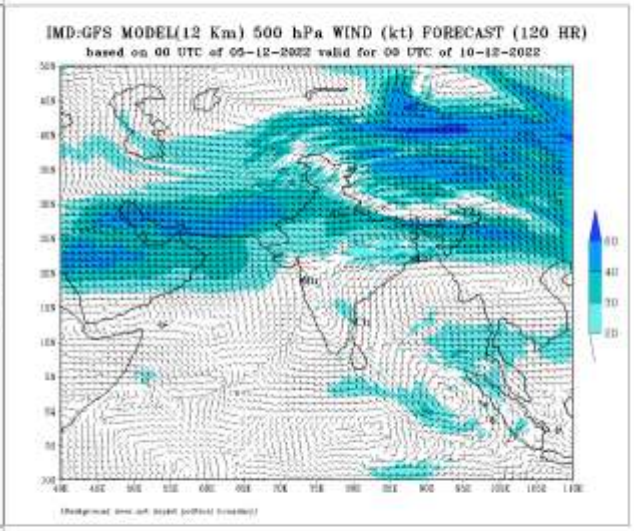
based on 00 UTC of 05-12-2022 valid for 00 UTC of 10-12-2022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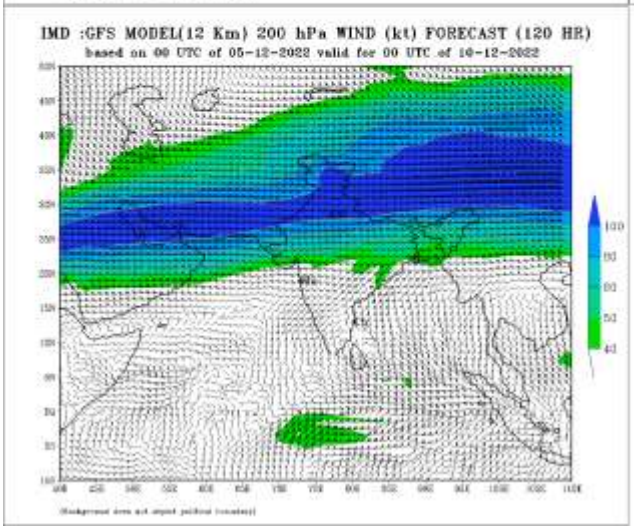
based on 00 UTC of 05-12-2022 valid for 00 UTC of 10-12-2022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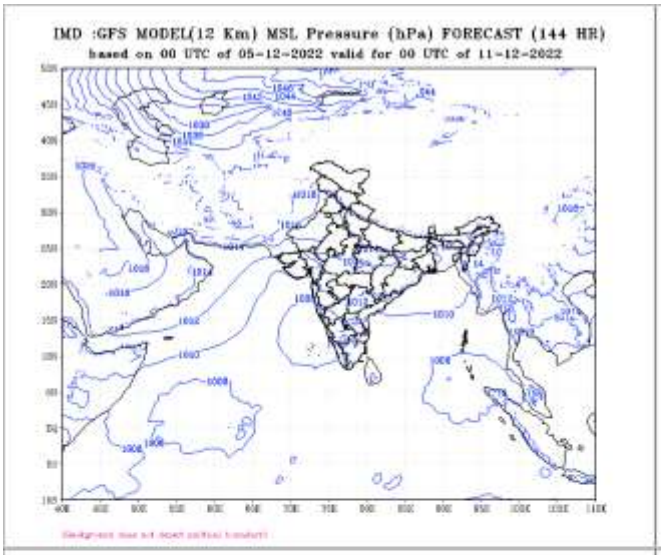
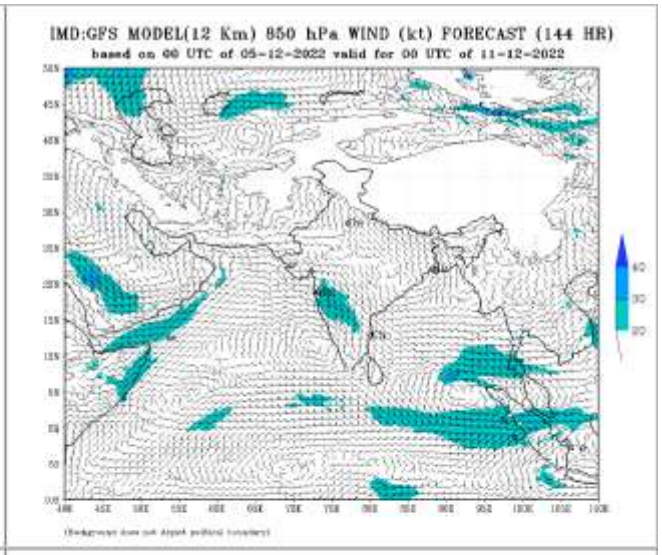
based on 00 UTC of 05-12-2022 valid for 00 UTC of 10-12-2022


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 05-12-2022 valid for 00 UTC of 11-12-2022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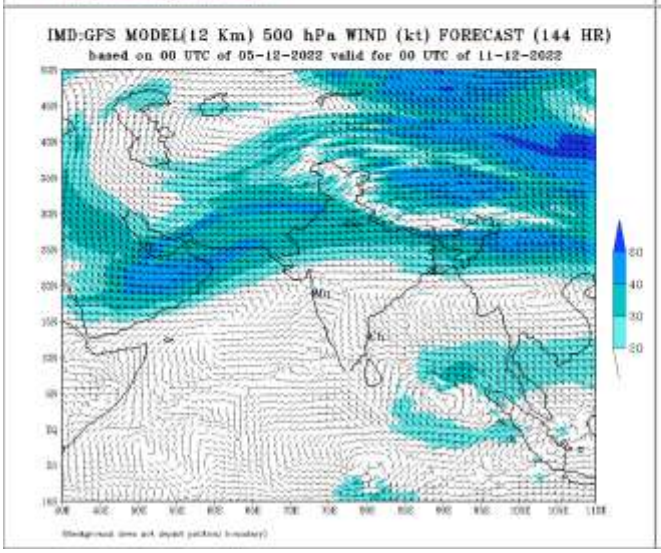
based on 00 UTC of 05-12-2022 valid for 00 UTC of 11-12-2022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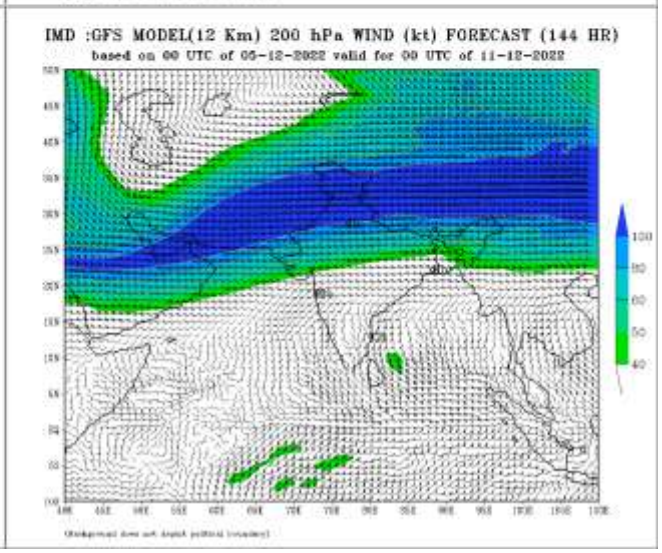
based on 00 UTC of 05-12-2022 valid for 00 UTC of 11-12-2022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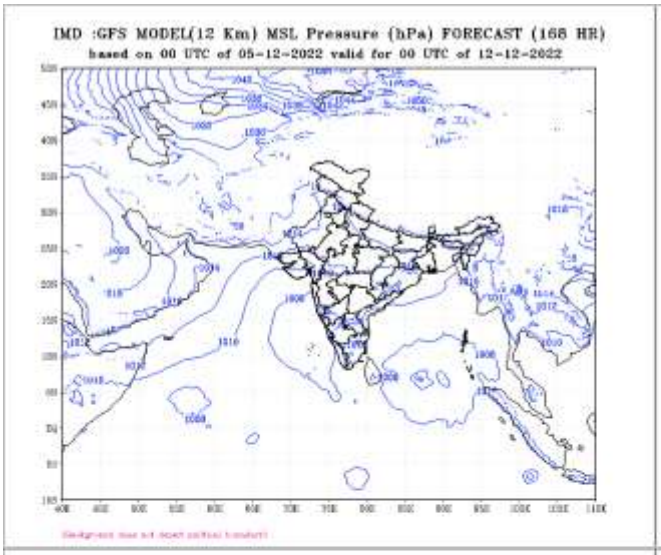
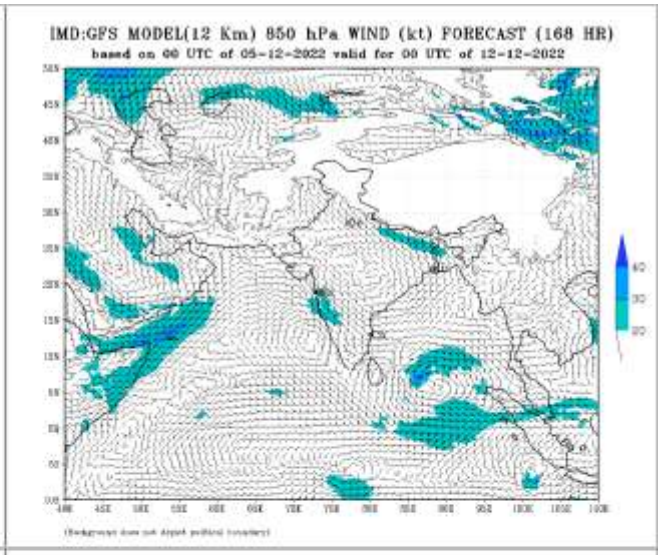
based on 00 UTC of 05-12-2022 valid for 00 UTC of 11-12-2022


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 05-12-2022 valid for 00 UTC of 12-12-2022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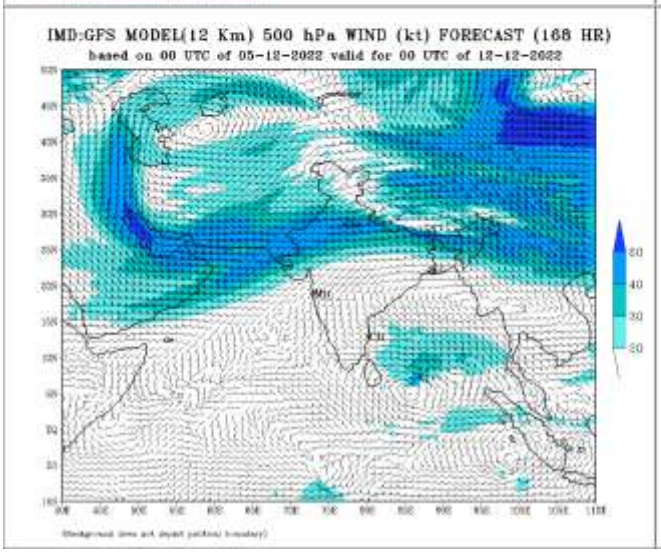
based on 00 UTC of 05-12-2022 valid for 00 UTC of 12-12-2022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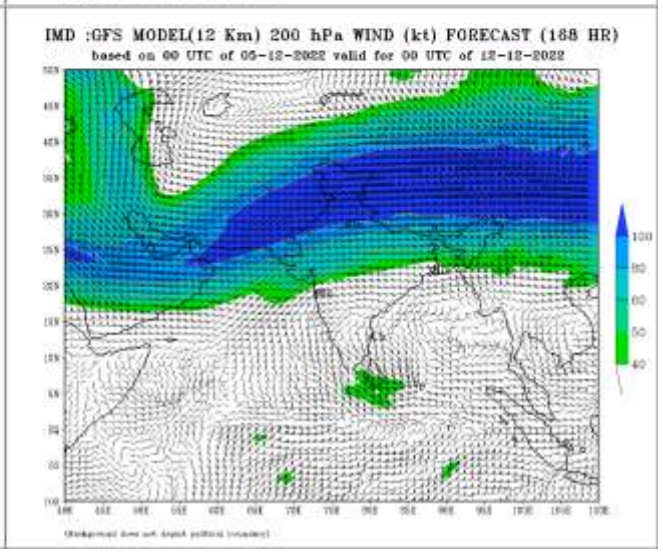
based on 00 UTC of 05-12-2022 valid for 00 UTC of 12-12-2022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based on 00 UTC of 05-12-2022 valid for 00 UTC of 12-12-2022