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

Tropical Cyclone Forecast Programme
Report Dated 30th November, 2022

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

- Yesterday's cyclonic circulation over central parts of Bay of Bengal became less marked at 0530 hours IST (0000 UTC) of today, the 30th November, 2022.
- A cyclonic circulation is likely to emerge over south Andaman Sea around 04th December, 2022.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	About 28-29°C over the system and major parts of BoB, 29-30°C over southeast BoB and along south Sri Lanka coast & adjoining Andaman Sea, 25-26°C over northwest BoB along West Bengal, Bangladesh and Odisha coast.	About 29-30°C over the southeast and adjoining southwest AS off Karntaka and Kerala coasts, 26-28°C over eastcentral and adjoining north AS, 25-26°C over southwest AS off south Gujarat and Maharashtra coasts, less than 24°C over southwest AS off Oman and Yemen coasts and adjoining sea areas.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	>110 over south Andaman sea & eastcentral BoB, 70-80 over north Andaman Sea, north parts of southwest BoB and adjoining westcentral BoB, off Sri Lanka, north BoB, and less than 40 over westcentral BoB, along and off east coast of India, west coast of SriLanka, Gulf of Mannar, some parts of southwest BoB.	70-90 over southeast and adjoining eastcentral and adjoining southwest AS, Maldives & adjoining EIO, Comorin area and less than 40 over remaining AS and also off west coast of India, Comorin area.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	30-40 over westcentral & southwest BoB and adjoining EIO.	30-40 over northeast AS, Comorin and Maldives.
Low Level convergence (X10^{-5} s^{-1})	Small zone of 5 over north Andaman Sea & north Srilanka coast.	Small zone of 5 over southwest AS and Maldives.
Upper Level divergence (X10^{-5} s^{-1})	5-10 over southeast BoB. Small zone of 5 over eastcentral BoB.	5-10 over southeast AS.
Vertical Wind Shear (VWS knots)	5-15 over Andaman Sea and central & adjoining south BoB.	5-15 over south AS. 25-30 over Lakshadweep and Comorin area.
Wind Shear Tendency	Decreasing over south BoB &	Increasing over Lakshadweep,

(knots)	adjoining EIO.	Comorin and Maldives area.
Upper tropospheric Ridge	Along 11.0°N over the BoB.	Along 11.0°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 low and medium clouds with embedded moderate to intense convection lay over northwest & westcentral Bay of Bengal and south Andaman Sea.

Scattered low and medium clouds with embedded isolated weak to moderate 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 & adjoining eastcentral Arabian sea and Comorin area.

M.J.O. Index:

The Madden Julian Oscillation (MJO) Index is currently in Phase 7 with amplitude more than 1. It would remain in phase 7 for next one day thereafter, it would move across phases 5 & 4 with amplitude remaining less than 1.

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	A depression over southeast BoB on 5th, to move west-northwestwards and lay as a deep depression & subsequently cyclonic storm (CS) over southwest BoB on 6th, severe cyclonic storm (SCS) over southwest BoB close to northeast Sri Lanka coast on 7th.	No significant system
IMD-GEFS	An extended cyclonic circulation over Gulf of Thailand on 2nd & 3rd December, to emerge into south Andaman Sea on 4th over south Andaman Sea, under its influence a low pressure area likely to form at the surface which is likely to intensify into a depression over south Andaman Sea & adjoining southeast BoB on 5th, intensify into a SCS over southwest BoB on 6th Dec, close to Tamil Nadu - Puducherry coast as SCS on 7th Dec.	No significant system
GEFS Probabilistic guidance	Not available	Not available

IMD WRF	No significant system within forecast duration.	No significant system within forecast duration.
NCMRWF-NCUM	Cyclonic circulation over Gulf of Thailand on 3rd Dec, to emerge into South Andaman Sea on 4th Dec, under its influence a low pressure area likely to form over the same region to move nearly westwards initially and intensify into a depression over southeast BoB and adjoining South Andaman Sea on 6th Dec, moving west-northwestwards become a DD over southwest and adjoining southeast BoB on 7th Dec, and continue to move in the same direction towards Tamil Nadu & Puducherry coasts without further intensification.	No significant system
NCMRWF-NEPS	Cyclonic circulation over Gulf of Thailand to emerge into South Andaman Sea on 4th Dec and induce an extended low pressure area over the same region, move nearly west-northwestwards and intensify into an depression on 6th Dec over southeast BoB and adjoining south Andaman Sea, DD over southwest & adjoining southeast BoB on 7th Dec, continue in west-northwest ward movement with same intensity till 9th and weaken thereafter.	No significant system
NCMRWF-UM (Regional)	No significant system within forecast duration	No significant system within forecast duration
ECMWF	A cyclonic circulation from Gulf of Thailand to emerge into south Andaman Sea on 4th Dec., likely to induce a low pressure area over the region which would move westwards and become a depression on 5th Dec, over southeast & adjoining southwest BoB. Continue to move in same direction towards Tamil Nādu & Puducherry coasts with slight intensification.	No significant system
ECMWF ensemble	Likely cyclogenesis over South Andaman Sea during 4th Dec, will track west-northwest wards with intensification up to Cyclonic Storm with 50-60% probability.	No significant system
NCEP-GFS	Low Pressure Area over Gulf of Thailand on 3rd Dec to emerge into South Andaman Sea on 4th, will have its west-northwest ward direction and become as a depression on 6th, DD over southwest & adjoining southeast BoB on 8th Dec, CS over southwest BoB on 9th Dec, continue in same direction ith same intensity till 11th Dec.	No significant system
IMD MME	Cycir over south Andaman Sea will have its northwest ward movement and induce a LPA over the region which is likely to become a depression on 6th Dec over southeast & adjoining south Andaman Sea, DD over southeast and adjoining	Available during cyclonic disturbance period only

	southwest BoB on 7th Dec, continue in the same direction with decrease in intensity.	
IMD HWRF	Available during cyclonic disturbance period only	Available during cyclonic disturbance period only
IMD-Genesis Potential Parameter	No potential zone over Bay of Bengal till 4th December. A significant potential zone over south Andaman Sea on 5th Dec having nearly westward movement.	No potential zone over Arabian Sea during next 7 days

Summary and conclusion:

- Most of the NWP models are indicating likely emergence of a cyclonic circulation and under its influence formation of a low pressure area (remnant from South China Sea) over south Andaman Sea around 4th December. All models are unanimously indicating initial nearly westwards movement with gradual intensification over southeast BoB and adjoining areas to lay as a depression. Then continuing to move west-northwestwards over southwest & adjoining westcentral BoB towards Tamil Nadu & Puducherry coasts, the system is also likely to intensify further during subsequent 2-3 days.

In view of all the above, it is inferred that
1. For the Bay of Bengal:

A cyclonic circulation (remnant from South China Sea) is likely to emerge into south Andaman Sea around 4th December under its influence a low pressure area is likely to form over the same region. The movement and intensification of this system need to be monitored critically during the period 5th-10th December.

Thus, LOW probability is assigned to formation of depression over Bay of Bengal during days 6 & 7.

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	NIL	NIL	NIL	NIL	LOW	LOW

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

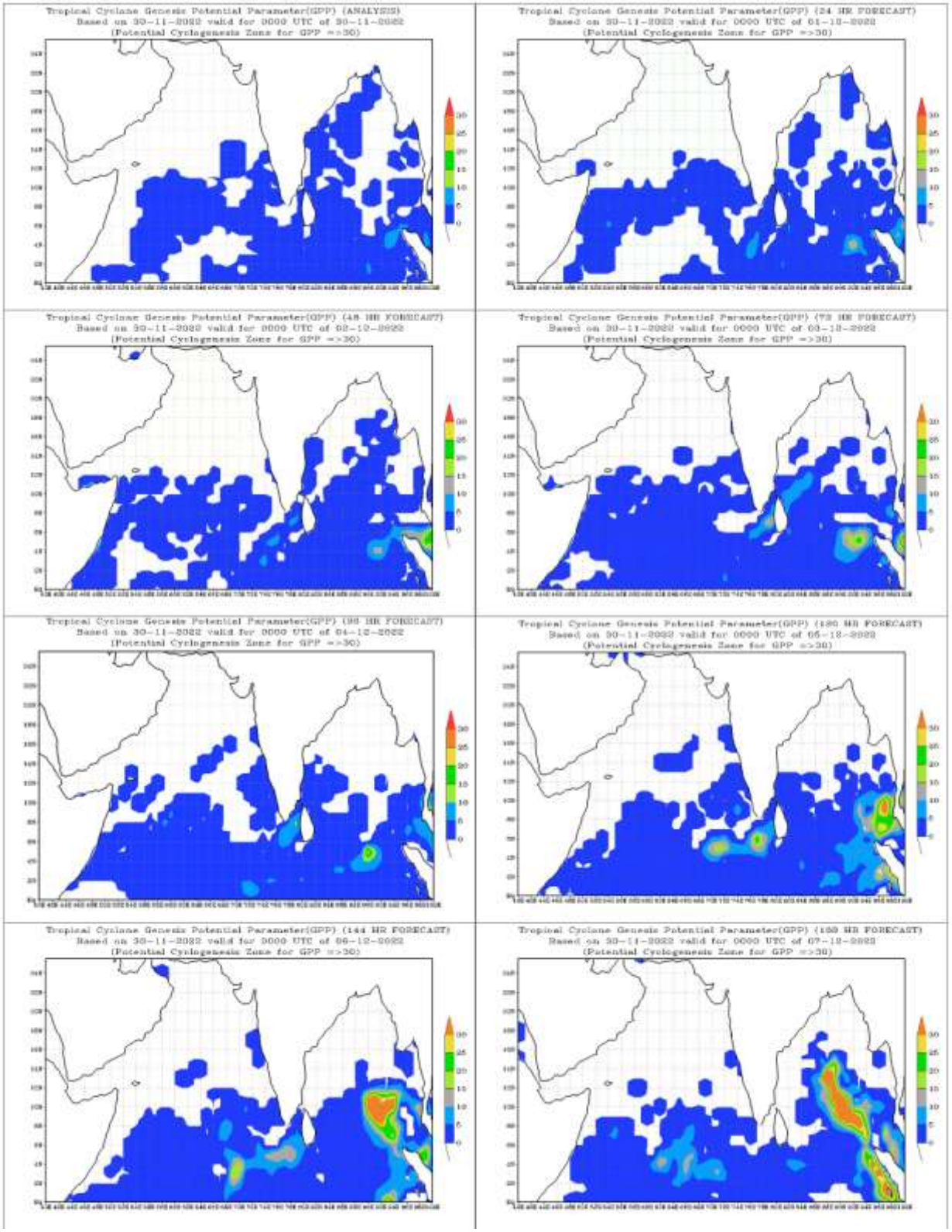
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

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 30-11-2022 valid for 0000 UTC of 30-11-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 30-11-2022 valid for 0000 UTC of 01-12-2022
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
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Based on 30-11-2022 valid for 0000 UTC of 06-12-2022
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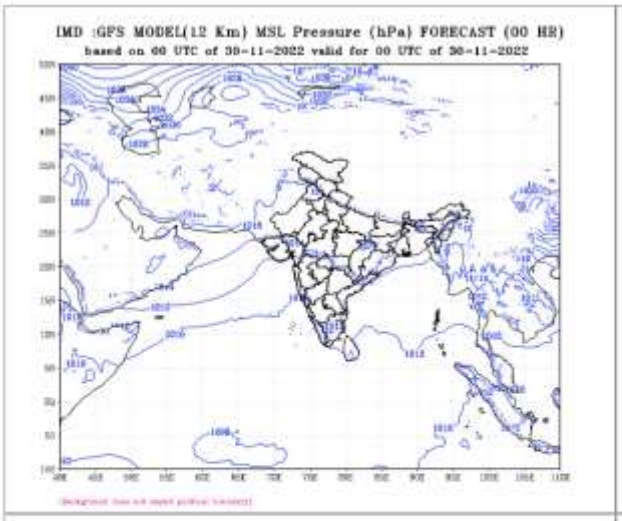
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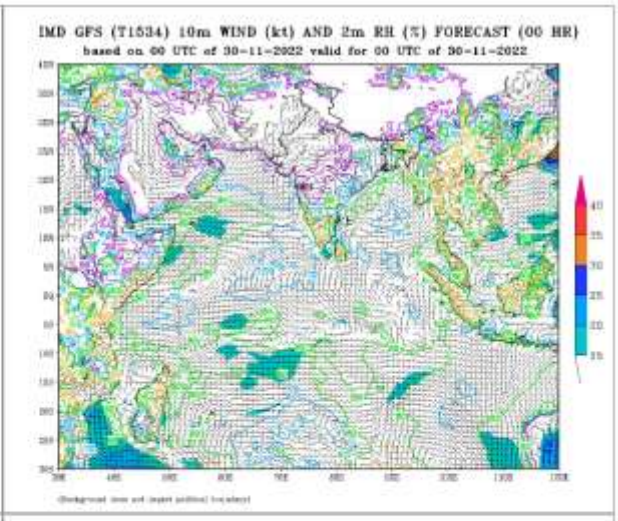
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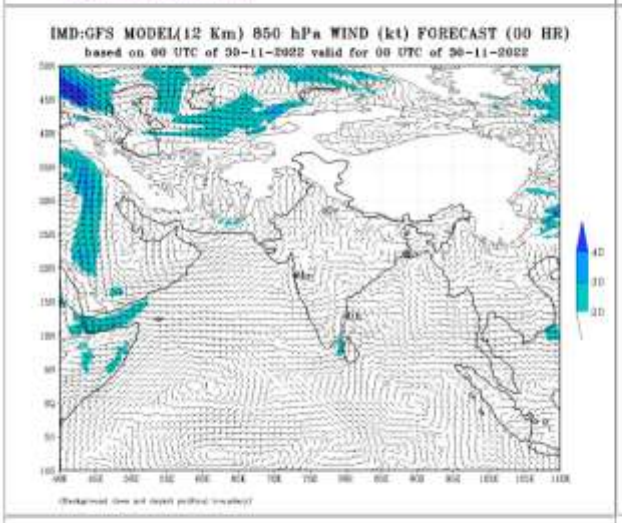
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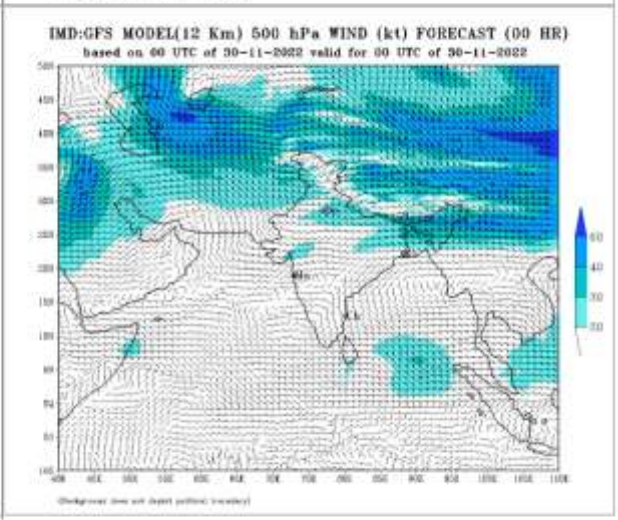
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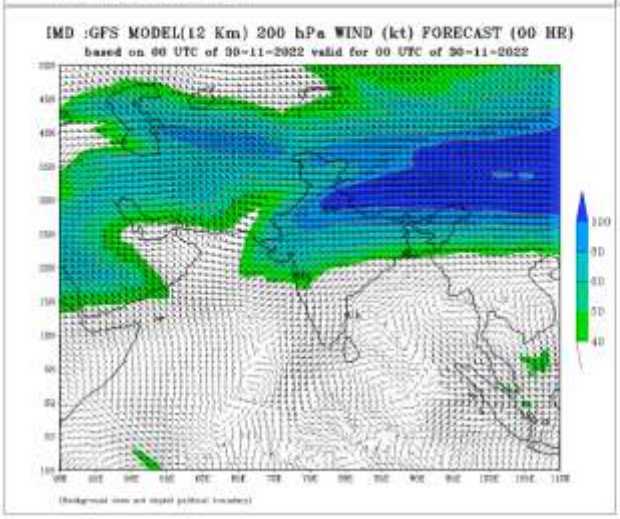
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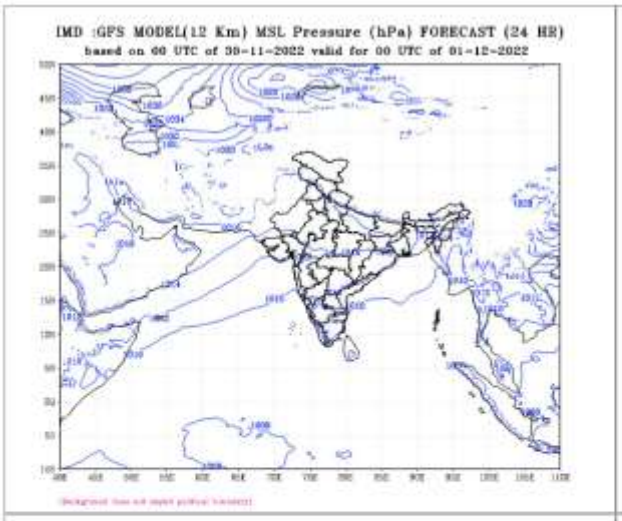
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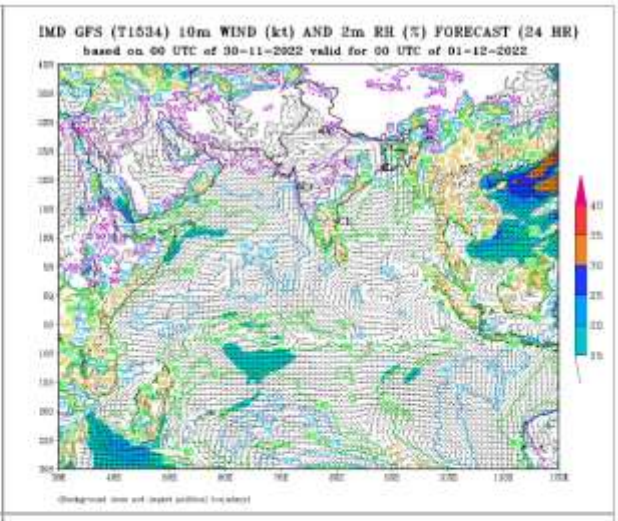
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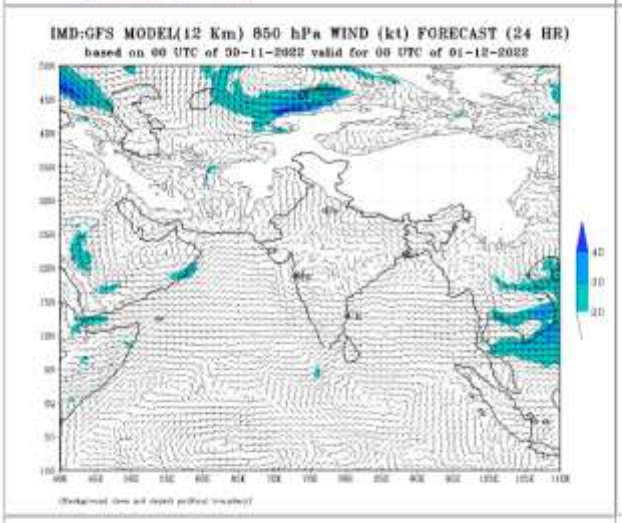
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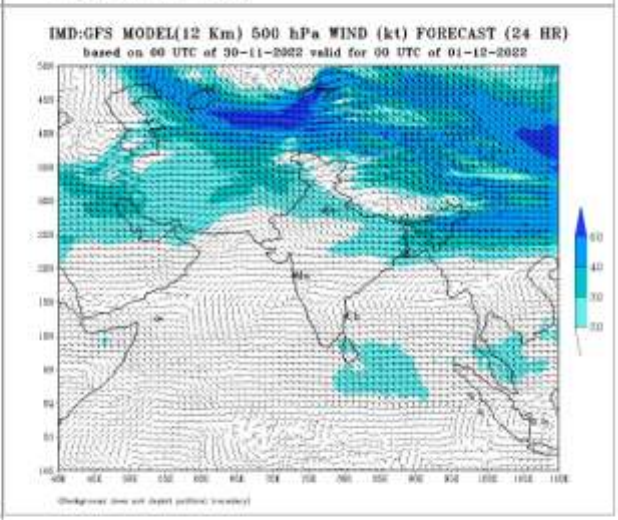
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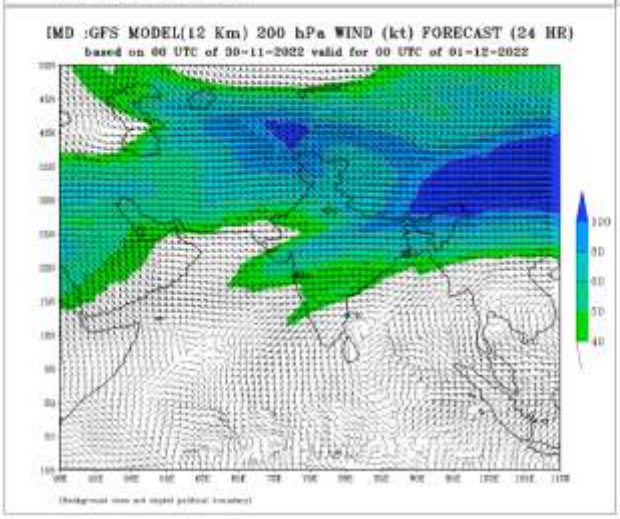
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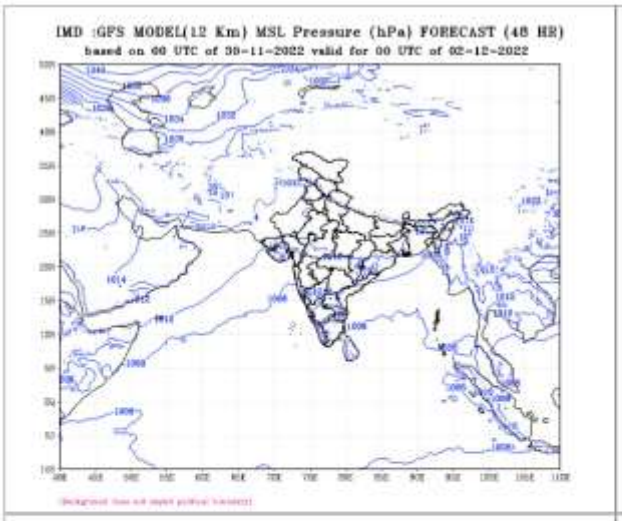
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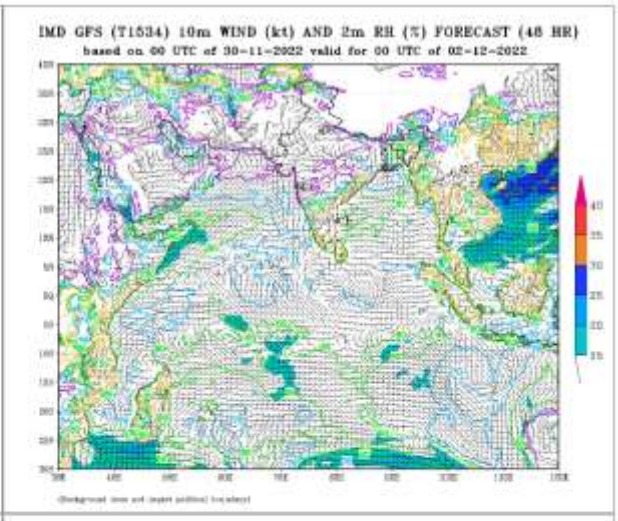
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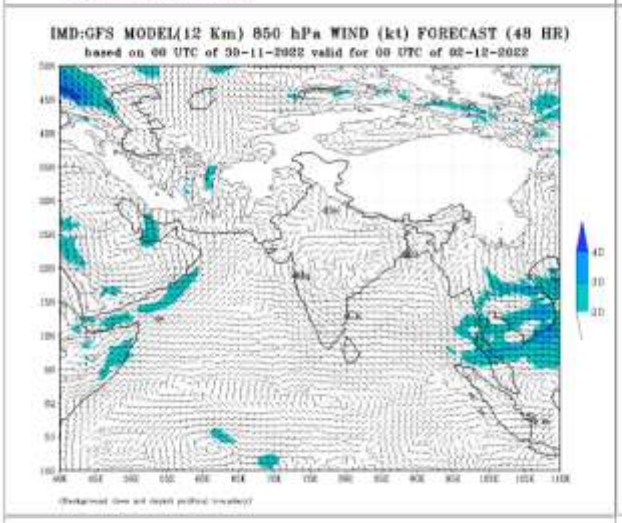
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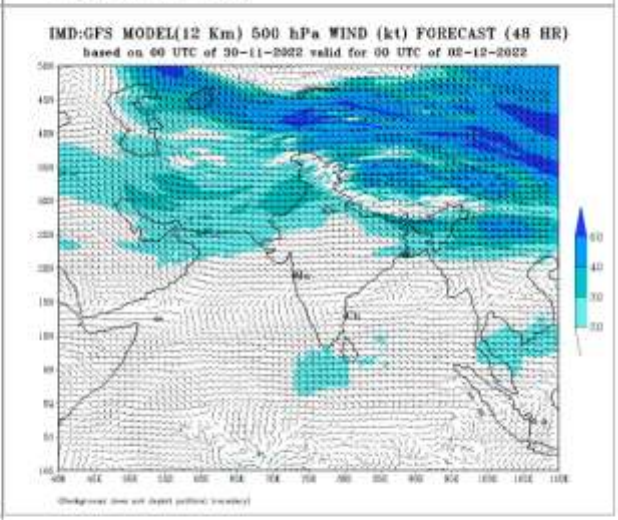
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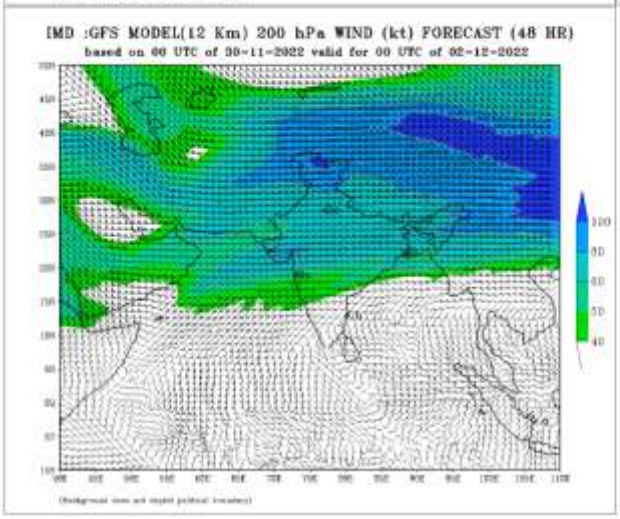
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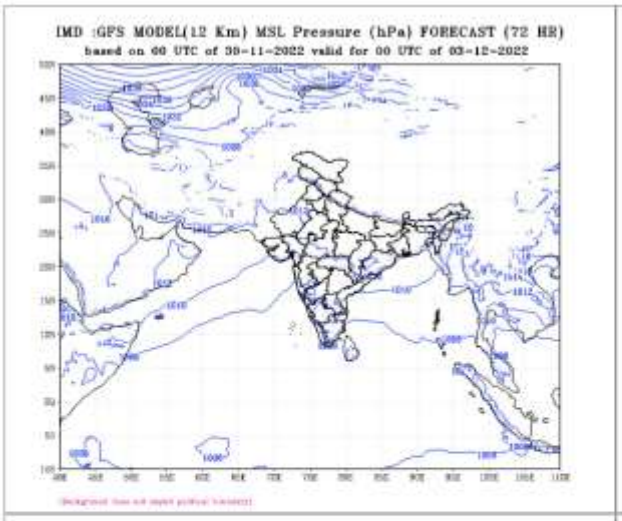
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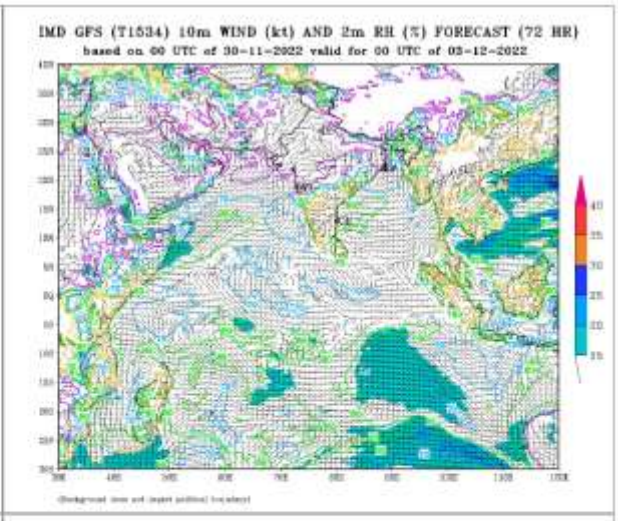
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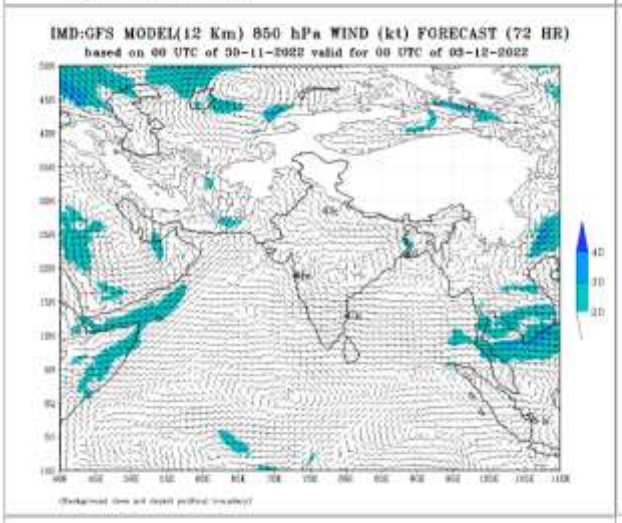
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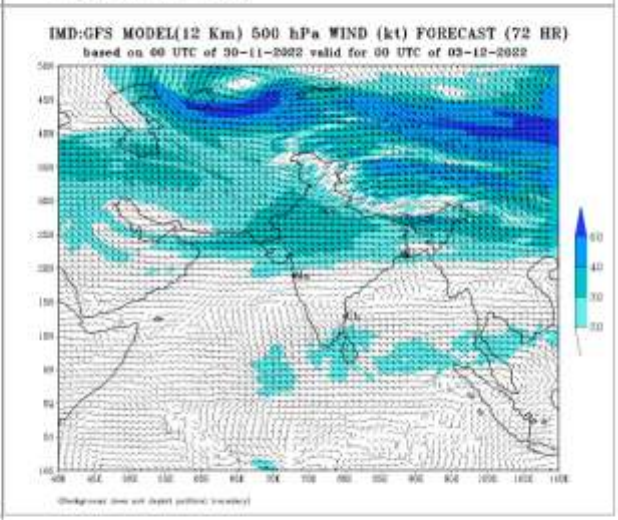
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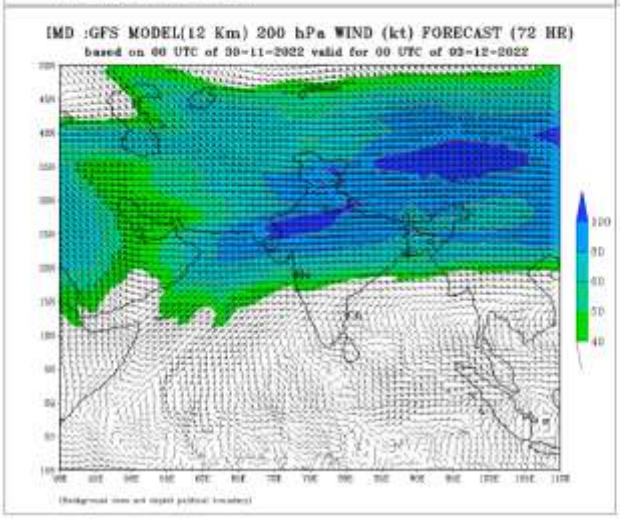
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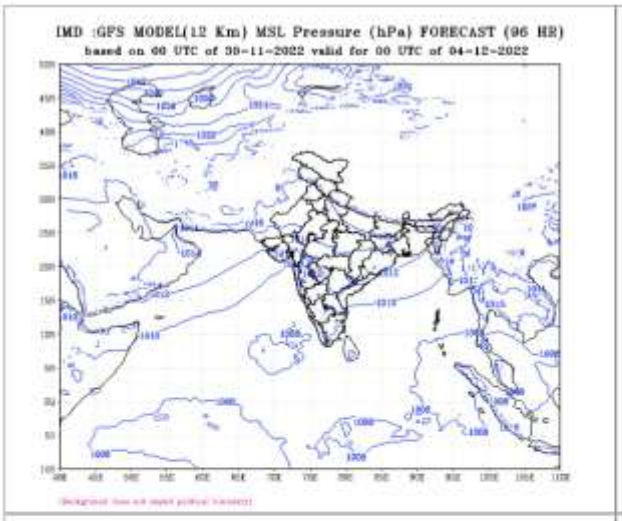
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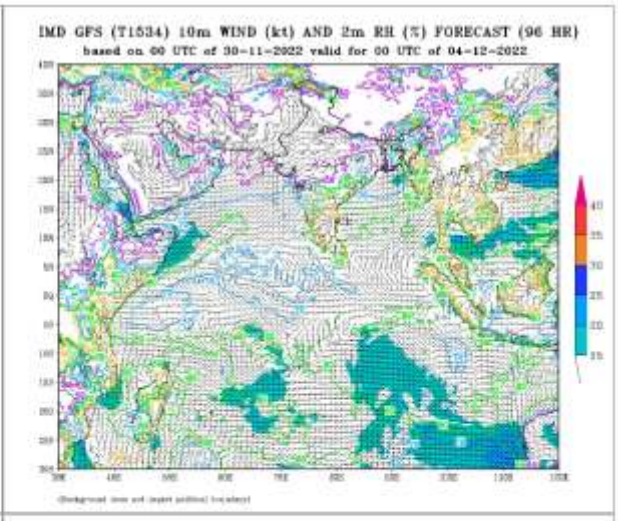
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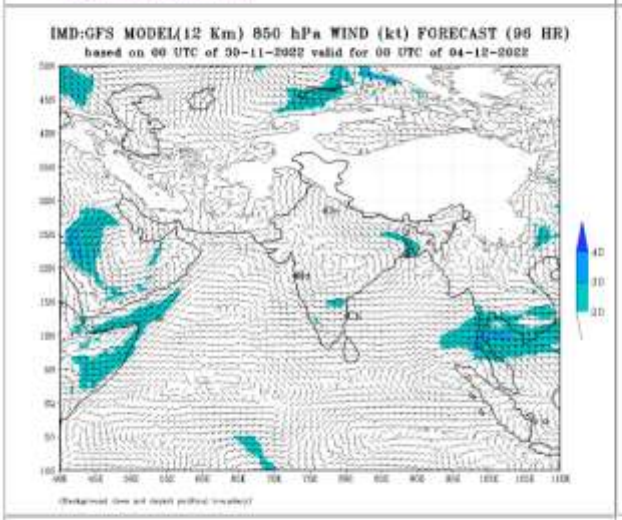
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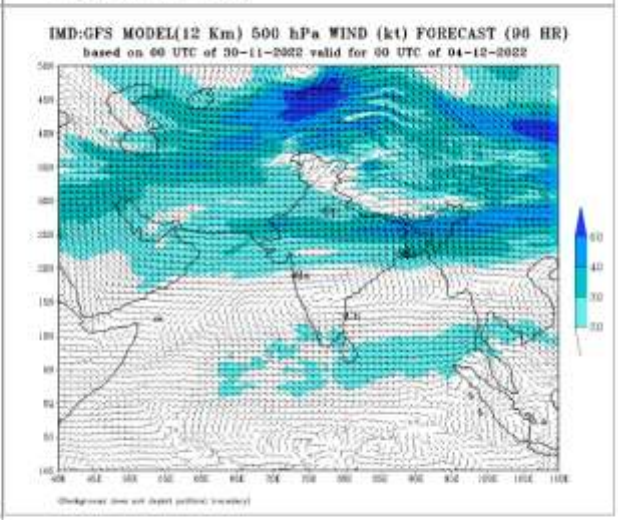
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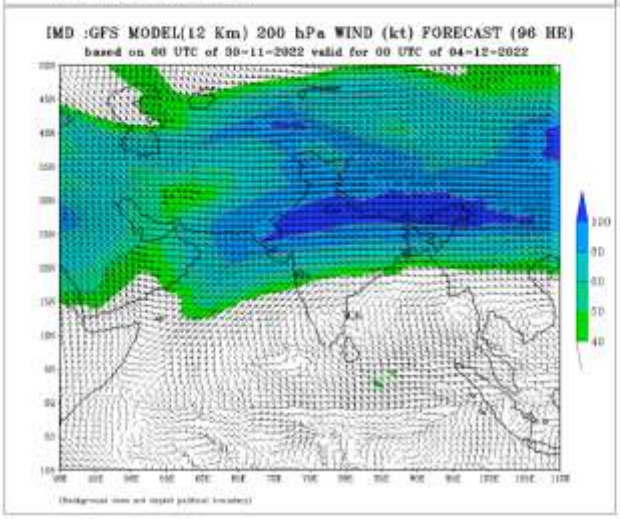
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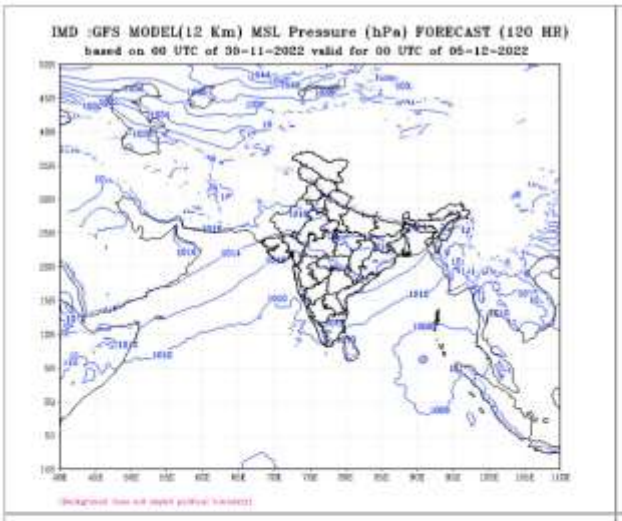
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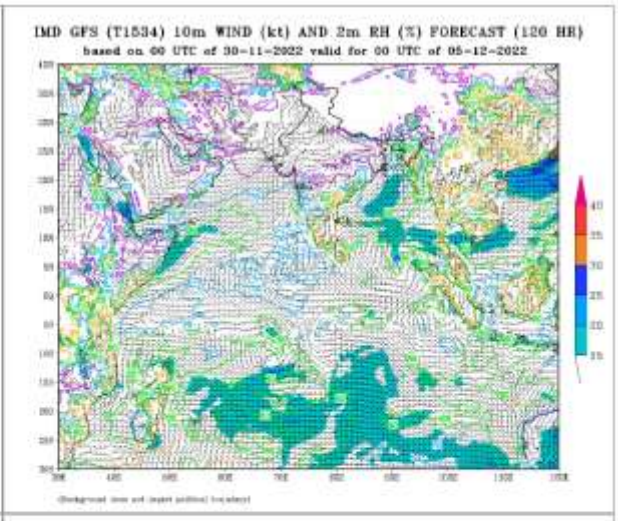
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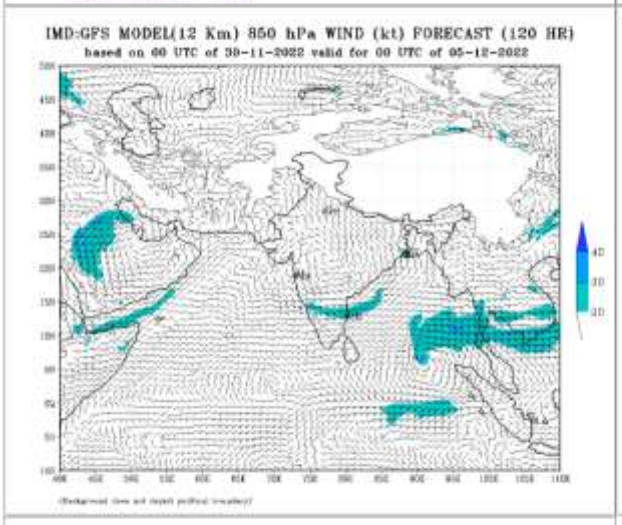
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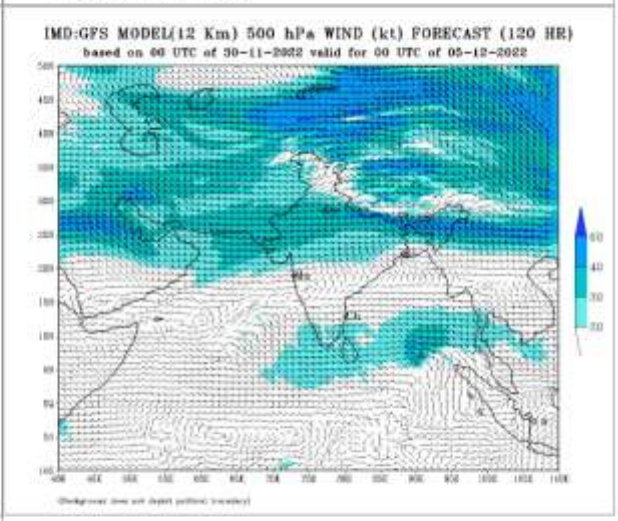
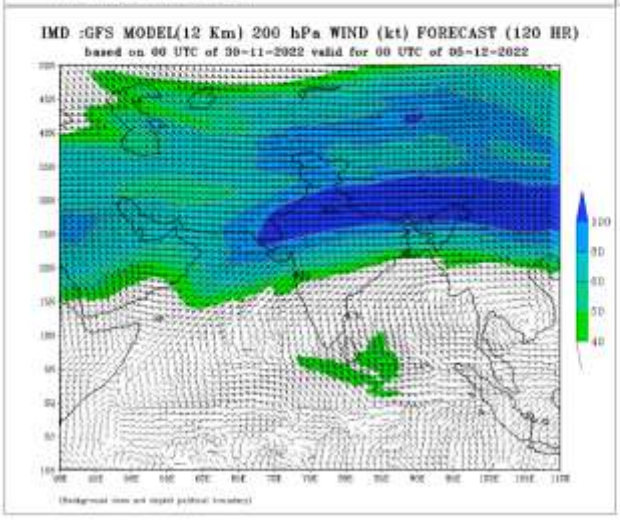
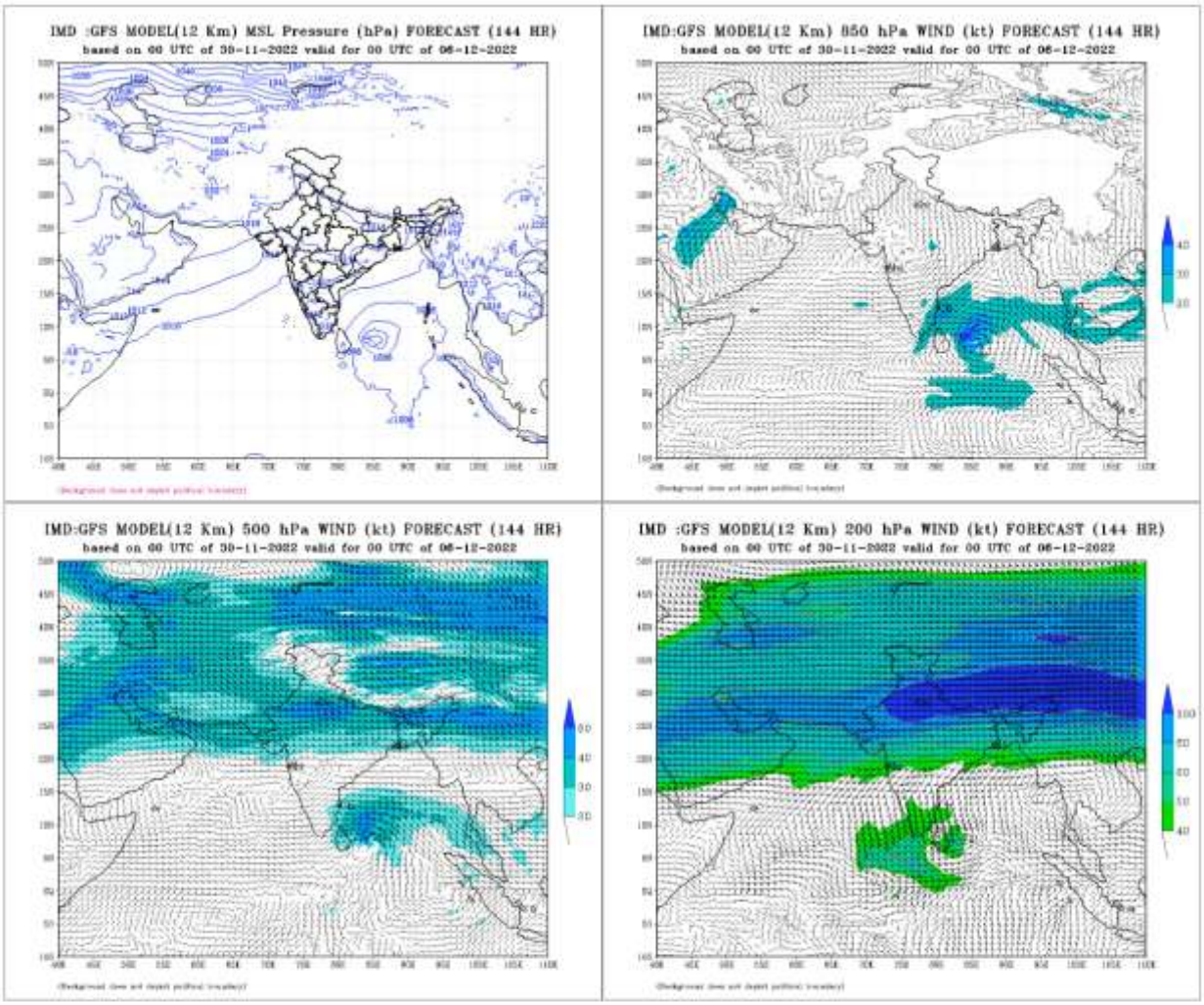
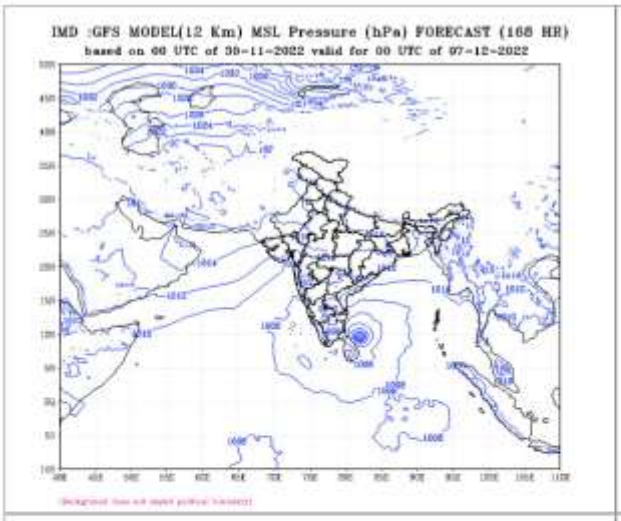
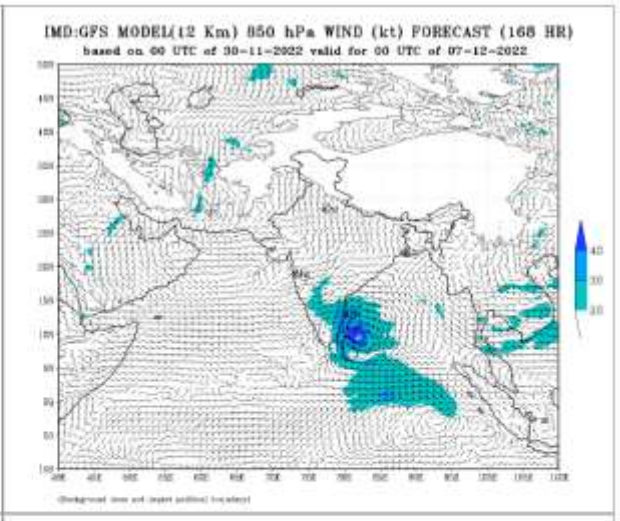
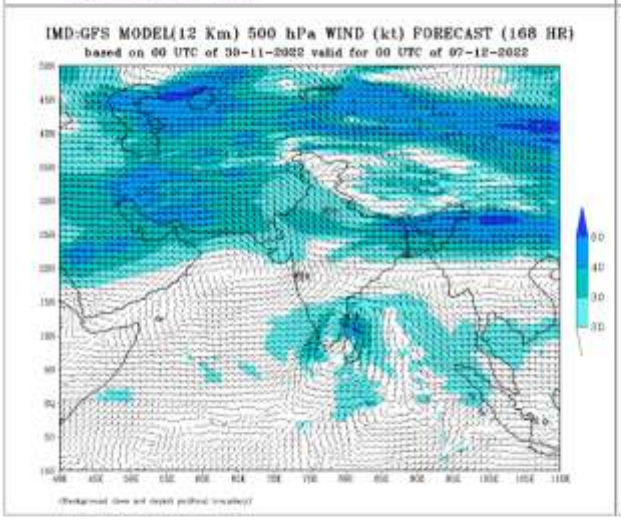

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 05-12-2022

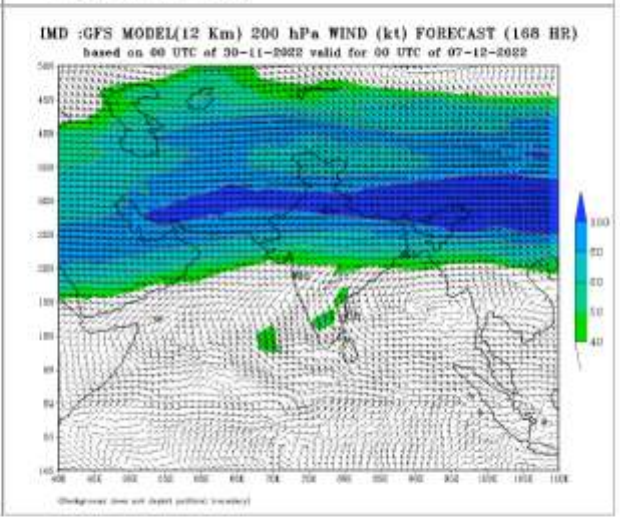

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 05-12-2022


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 06-12-2022
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 06-12-2022
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 06-12-2022
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 06-12-2022


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 07-12-2022


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 07-12-2022


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 07-12-2022


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 30-11-2022 valid for 00 UTC of 07-12-2022