



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

**Tropical Cyclone Forecast Programme
Report Dated 04th December, 2022**

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

A cyclonic circulation lies over south Andaman Sea & adjoining equatorial Indian ocean-Strait of Malacca extending upto mid-tropospheric levels. Under its influence, a Low Pressure Area is likely to form over Southeast Bay of Bengal & adjoining south Andaman Sea by 05th December. It is likely to move west-northwestwards and concentrate into a Depression over Southeast Bay of Bengal by 07th December morning. Thereafter, it is likely to continue to move west-northwestwards 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) °C	About 30-32°C over Andaman Sea, entire BoB except small pockets of southwest BoB, and Gulf of Mannar.	About 30-32°C over the southeast and adjoining southwest AS off Karnataka 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/cm²	>110 over south Andaman sea & adjoining southeast BoB, 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 Andhra Pradesh and Tamil Nadu coasts, west coast of Sri Lanka, Gulf of Mannar, some parts of southwest BoB.	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 (X10⁻⁶s⁻¹)	10-20 over small pockets of westcentral BoB off Sri Lanka coast.	10-20 over northeast AS, westcentral AS, southwest AS, Comorin, Lakshadweep and Maldives, southeast AS.
Low Level convergence (X10⁻⁵ s⁻¹)	10 over south Andaman sea, and southwest BoB.	10 over Comorin area, Maldives.

Upper Level divergence ($X10^{-5} s^{-1}$)	10-15 over Andaman Sea, adjoining southeast BoB.	10-20 over southeast AS, Maldives, 5-10 over Comorin area.
Vertical Wind Shear (VWS knots)	20 over southwest BoB, adjoining eastcentral and southeast BoB, 15 over Andaman Sea, 25-35 over central and north BoB.	20 over south AS, 30-40 over central and north AS.
Wind Shear Tendency (knots)	Decreasing over north & central BoB	Decreasing over southwest and central AS.
Upper tropospheric Ridge	Along 12.0°N over the BoB.	Along 12.0°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 to med clouds with embedded intense to very intense convection over south Andaman sea, Tenasserim coast, scattered low to med clouds with embedded moderate to intense convection over south Bay, north Andaman Sea and weak to moderate convection over eastcentral BoB.

b) Over the Arabian Sea:-

Scattered to broken low to medium clouds with embedded intense convection over Lakshadweep area, scattered low to medium clouds with embedded moderate to intense convection over southeast AS, Comorin area and weak to moderate convection over eastcentral AS.

M.J.O. Index:

The Madden Julian Oscillation (MJO) Index is currently in Phase 4 with amplitude less than 1. Thereafter, it would move across phases 3 & 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	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , deep depression over southeast & adjoining southwest BoB on 6 th Dec morning, move west-northwestwards, intensify into a severe cyclonic storm over southwest BoB on 7 th , will made landfall around 11N/80E on 8 th as DD, less marked over land on 9 th , will emerge into southeast AS depression on 10 th .	No significant system
IMD-GEFS	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , become depression over southeast & adjoining South Andaman Sea on 5 th /6 th Dec, into a cyclonic storm (CS) over southwest BoB	No significant system

	on 6 th Dec /1200 UTC and severe cyclonic storm (SCS) over southwest BoB near North Tamil Nadu, on 7 th . It is making landfall on 8 th UTC near 11N/80E and lay as a LPA over south Tamil Nadu region on 9 th , will emerge southeast Arabian Sea as LPA on 10 th .	
GEFS Probabilistic guidance	Based on the models guidance, 70-90 % probability is indicating that system to made landfall along north Tamil Nadu coast.	Not available
IMD WRF	No significant system within forecast duration.	No significant system within forecast duration.
NCMRWF-NCUM	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , WML/depression over southeast BoB and adjoining Andaman Sea on 6 th , deep depression over southwest BoB on 7 th , CS over southwest BoB to the southeast of Chennai on 8 th , will made landfall around 11N/80E on 9 th , less marked over land on 10 th .	No significant system
NCMRWF-NEPS	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , depression over southeast BoB and adjoining south Andaman Sea on 6 th , deep depression/CS over southwest BoB on 7 th , CS over southwest BoB to the southeast of Chennai on 8 th , crossing coast as an DD near 11N/80E on 9 th , less marked over land on 10 th .	No significant system
NCMRWF-UM (Regional)	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , will become depression over southeast BoB on 6 th , deep depression over southwest BoB on 7 th .	No significant system
ECMWF	The cycir over south Andaman Sea on 4 th , under its influence a low pressure area will form over southeast BoB and adjoining south Andaman Sea on 5 th , Depression over southeast BoB on 6 th , cyclonic storm over southwest BoB on 7 th , system to maintain peak intensity during 8 th . Thereafter, slight weakening is indicated. System will cross the coast on 9 th at 11N/80E around 12/18 UTC.	No significant system
ECMWF ensemble	Likely cyclogenesis over South Andaman Sea around 4 th Dec, will track west-northwest wards with intensification up to Cyclonic Storm with 70-80% probability on 7 th Dec.	No significant system

NCEP-GFS	The cycir over south Andaman Sea on 4 th , under its influence an extended low pressure area will form over the same region on 4 th , LPA over southeast BoB and adjoining south Andaman Sea on 5 th , depression over southeast BoB on 6 th morning, deep depression on 6 th evening over southwest and adjoining southeast BoB on 6 th , CS on 7 th Dec over southwest BoB. Continuing to move west-northwestwards and maintaining same intensity on 8 th over southwest BoB southeast off Chennai, crossing North Tamil Nadu – Puducherry coast as a depression on 9 th Dec around 11N/80E.	No significant system
IMD MME	A cyclonic circulation from Gulf of Thailand is likely to emerge into South Andaman Sea on 4th Dec morning. It will move west-northwestward and become an LPA over southeast BoB on 5th Dec, depression over southeast BoB on 6th, DD on 7th Dec over southwest BoB, CS over southwest BoB on 8 th , will cross Tamil Nadu – Puducherry coast as depression on 9 th 00 UTC.	No significant system
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 today. A significant potential zone over south Andaman Sea on 5 th Dec having northwestward 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 over South Andaman Sea as on today, LPA over southeast BoB and adjoining South Andaman Sea around 5th Dec. All the models are unanimously indicating west-northwestward movement of system with intensification into depression around 6th. ECMWF, NCMRWF-NCUM, NCMRWF-NEPS & 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; NCMRWF-UM (Regional) is indicating up to deep depression stage. Most of the models are indicating landfall along Tamil Nadu – Puducherry coasts at 11N/80E during 8th to 9th.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

A cyclonic circulation lies over south Andaman Sea & adjoining equatorial Indian ocean-Strait of Malacca extending up to mid-tropospheric levels. Under its influence, a Low Pressure Area is likely to form over Southeast Bay of Bengal & adjoining south Andaman Sea by 05th December. It is likely to move west-northwestwards and concentrate into a Depression over Southeast Bay of Bengal by 07th December morning. Thereafter, it is likely to continue to move west-northwestwards 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	LOW	MOD	HIGH	HIGH	HIGH	--

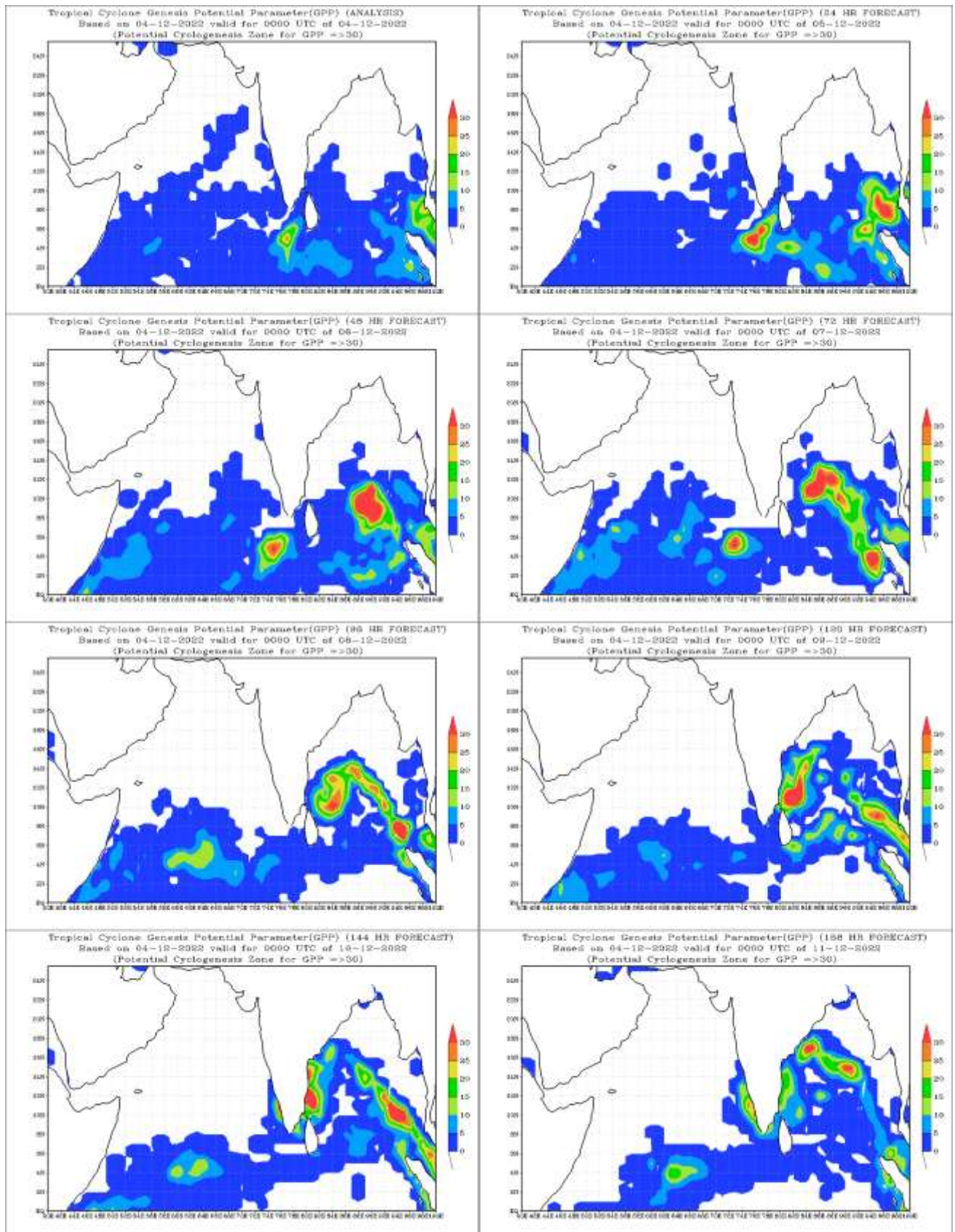
Probability of cyclogenesis (formation of depression and above intensity systems) over the Arabian Sea during next 168 hours:

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

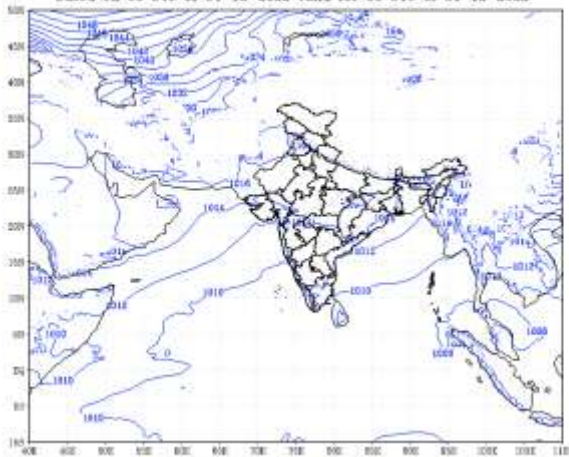
Advisory:

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

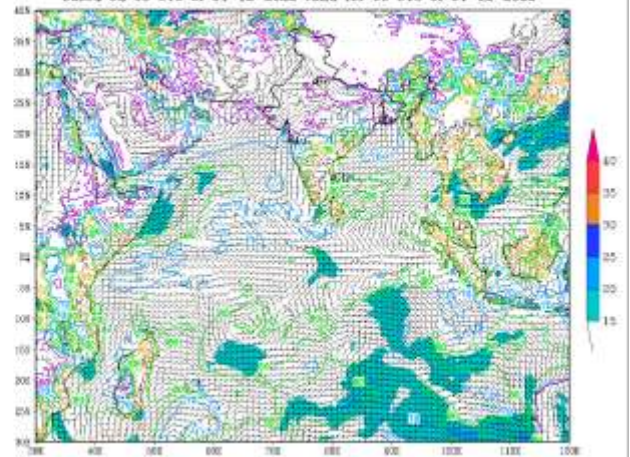


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 04-12-2022



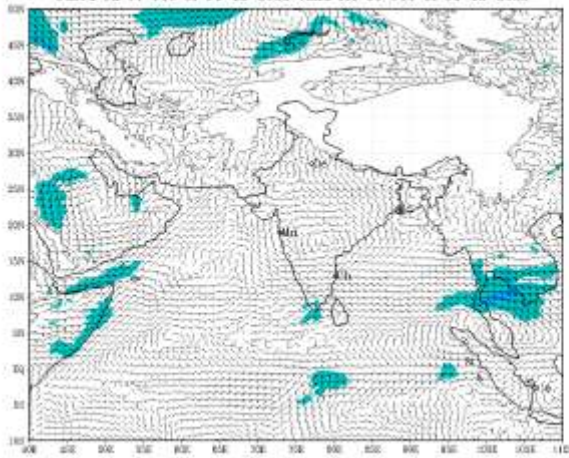
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 04-12-2022



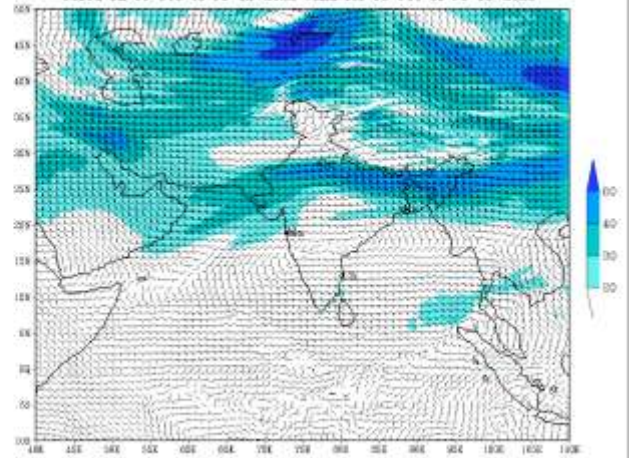
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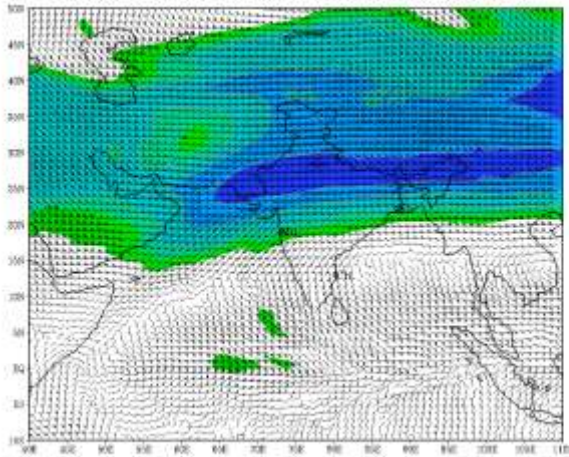
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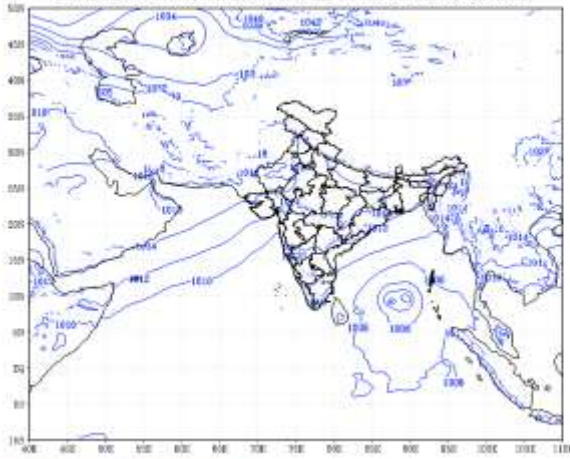
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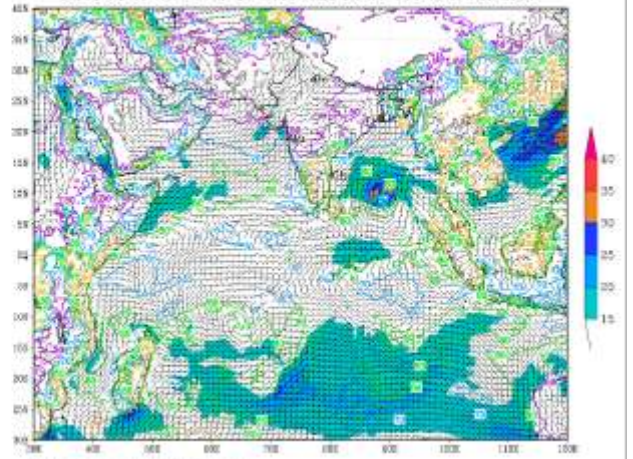
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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 06-12-2022



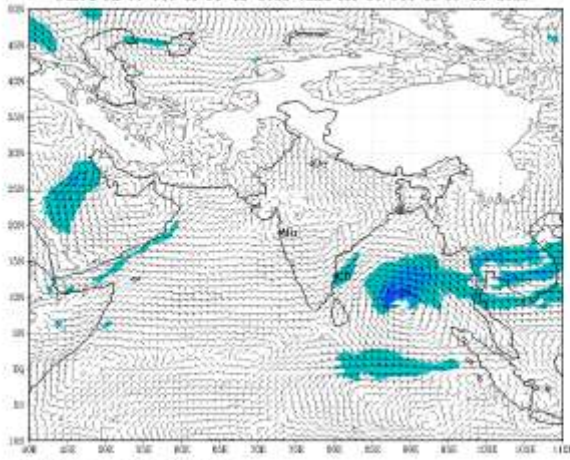
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 06-12-2022



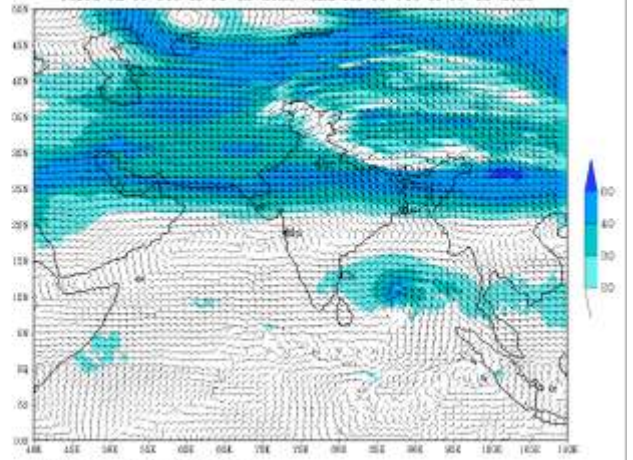
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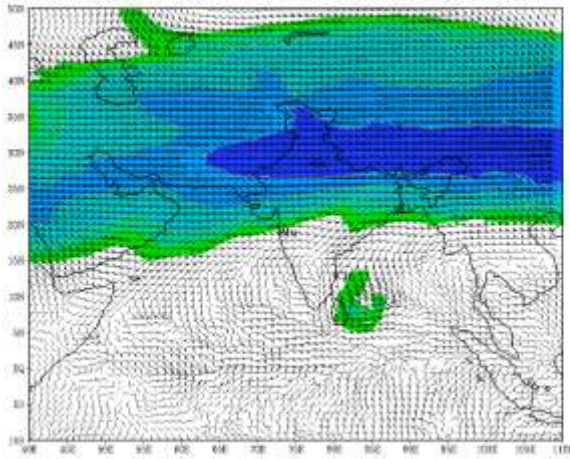
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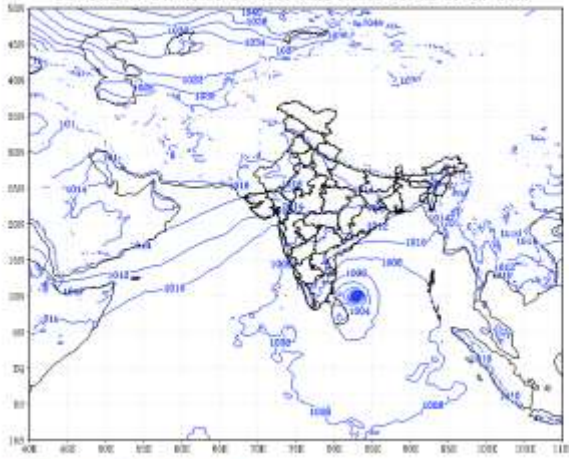
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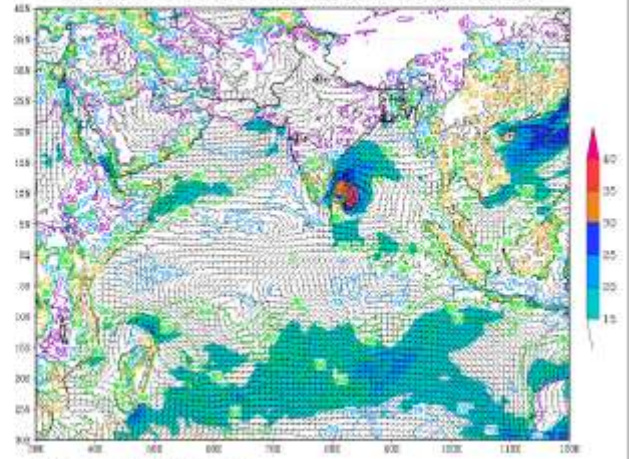
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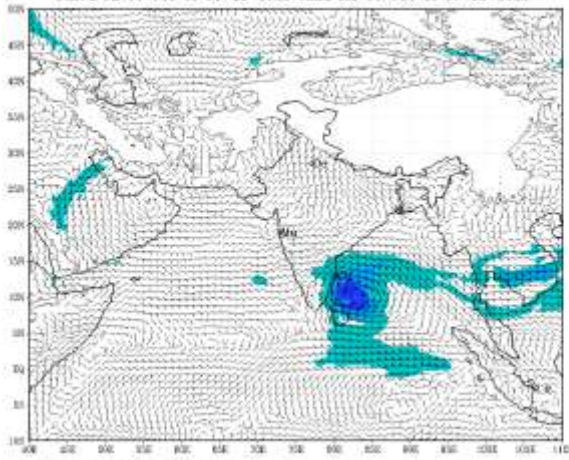
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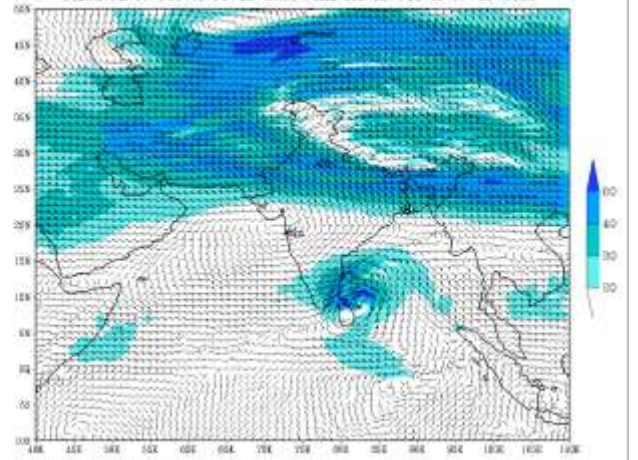
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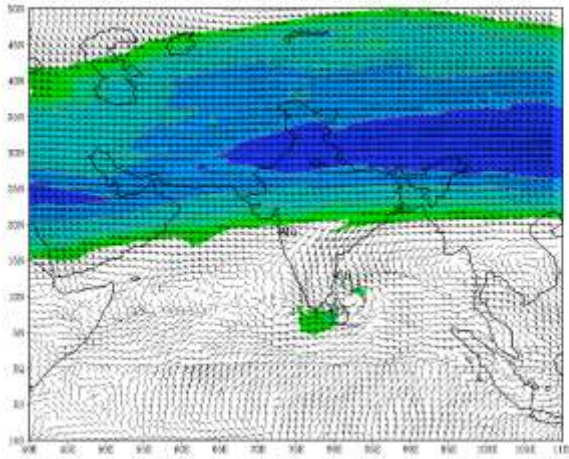
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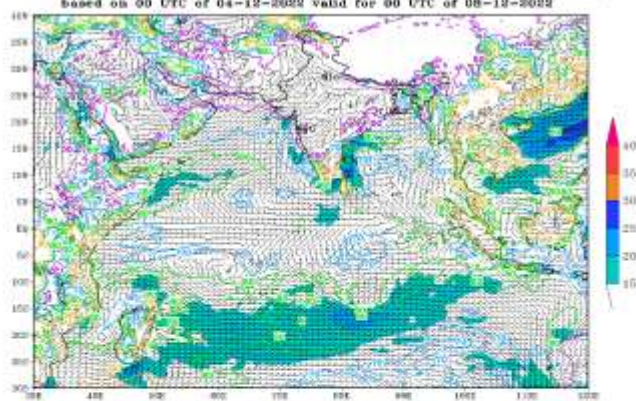
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IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 08-12-2022



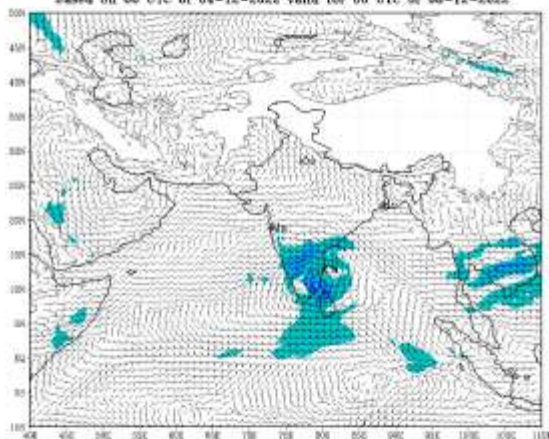
(Background over sea level political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 08-12-2022



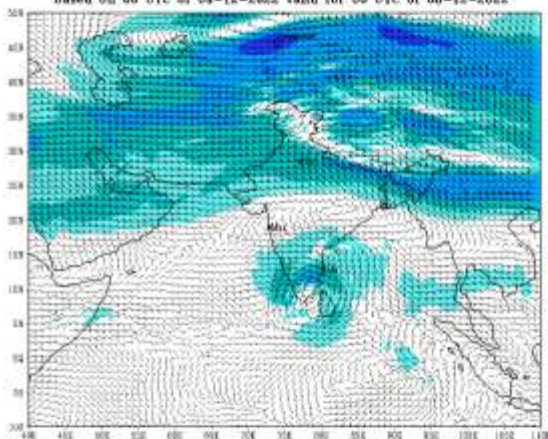
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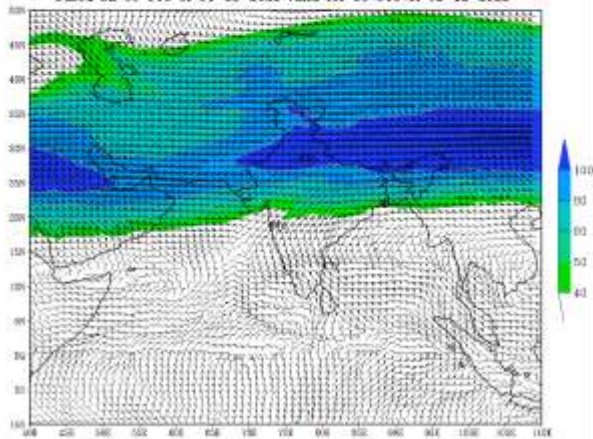
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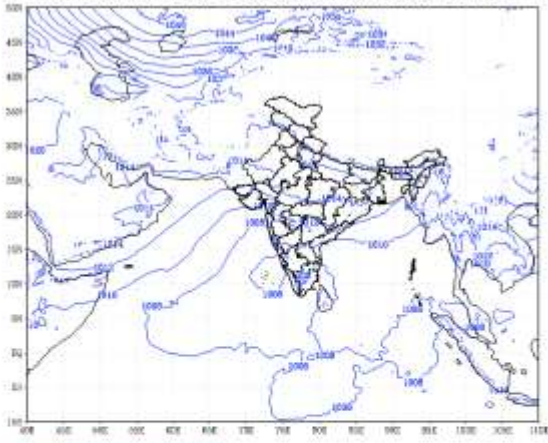
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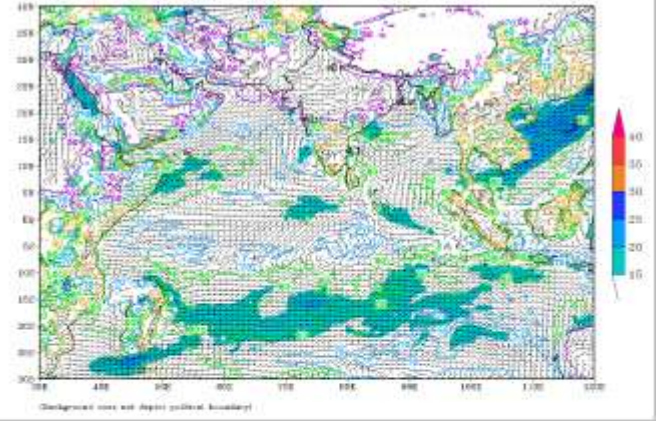
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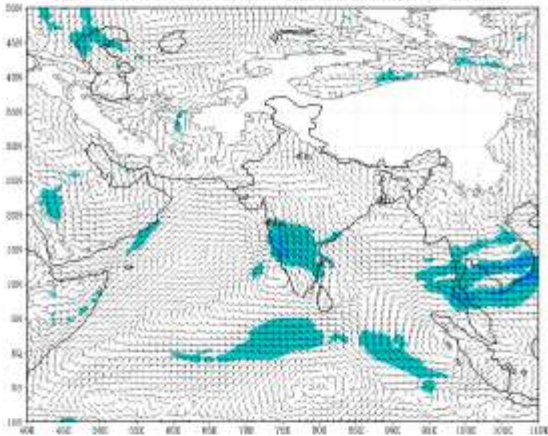
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IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
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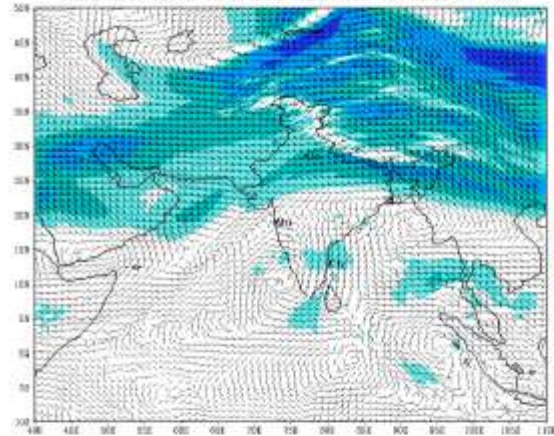
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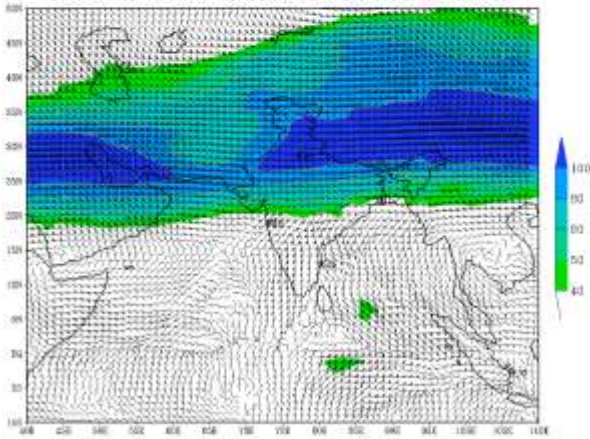
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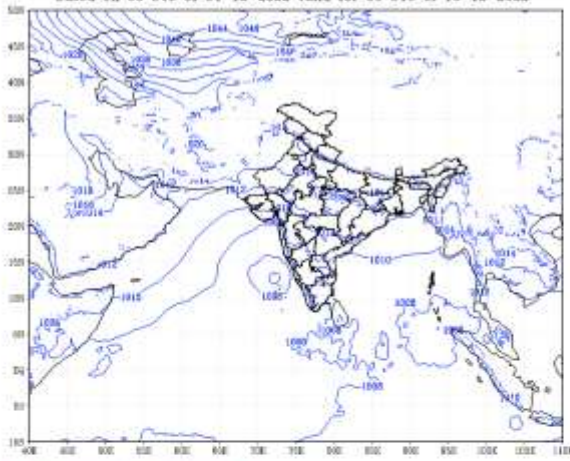
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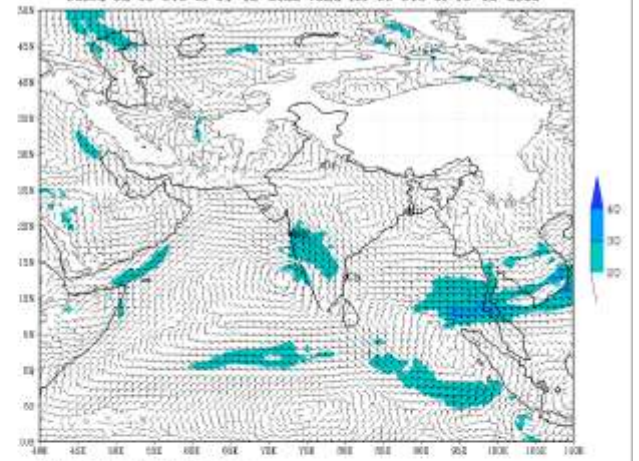
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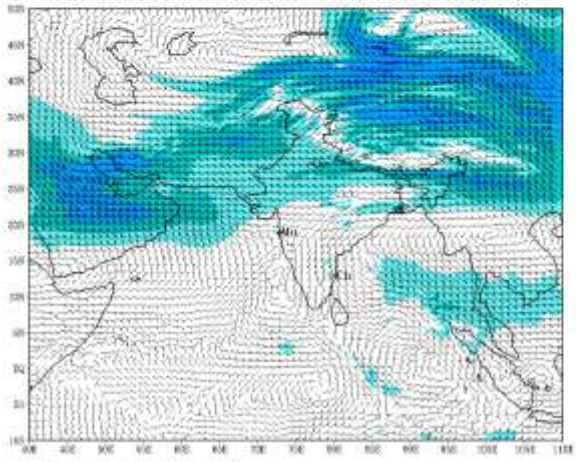
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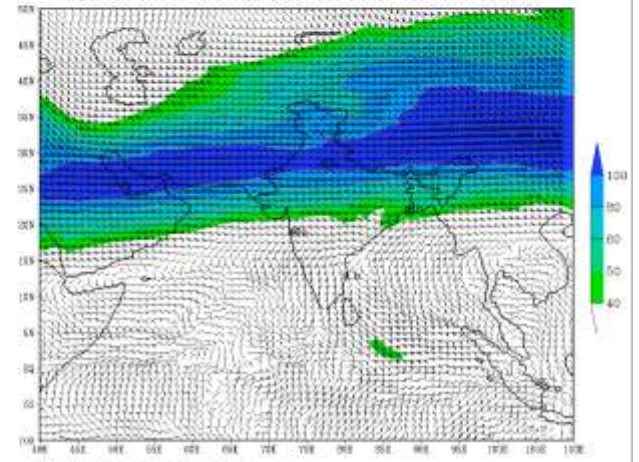
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 10-12-2022



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IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 04-12-2022 valid for 00 UTC of 10-12-2022



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