



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

**Tropical Cyclone Forecast Programme
Report Dated 13th December 2022**

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

- ❖ Under the influence of cyclonic circulation (**remnant of Cyclonic Storm Mandous**) over north Kerala & neighbourhood a Low Pressure has formed over Southeast and adjoining eastcentral Arabian Sea off north Kerala-Karnataka coasts. Associated cyclonic circulation extends upto mid-tropospheric levels. It is very likely to move west-northwestwards away from India coast and become well marked low pressure area over Eastcentral and adjoining Southeast Arabian Sea by 14th December morning and concentrate into a depression over Eastcentral Arabian Sea around 15th December morning.
- ❖ A cyclonic circulation lies over South Andaman Sea and adjoining Strait of Malacca & Sumatra extending upto 3.1 km above mean sea level at 0530 hrs IST/ 0000 UTC of today, the 13th December, 2022.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	Around 28-30°C over almost entire BoB, 26-28°C over southwestern parts of southwest BoB, Gulf of Mannar. Less than 25 over north BoB off Bangladesh & West Bengal coast.	About 28-30°C over the southeast and adjoining eastcentral, southwest AS, along and off south Gujarat, Maharashtra coasts, north AS. About 26-28°C over along and off Kerala, Karnataka coasts, central AS, southwest AS. Less than 24°C along and off Oman and Yemen coasts and adjoining sea areas.
Tropical Cyclone Heat Potential (TCHP) kJ/cm²	90-100 over eastcentral BoB, 90-100 over south Andaman Sea and adjoining southeast BoB. Less than 40 along the Andhra Pradesh and Tamil Nadu coasts, Gulf of Mannar, western 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)	20-30 over southern parts of southwest BoB.	60-80 over along and off Kerala coast, 20-30 over central parts of AS, southwest AS and adjoining EIO.
Low Level convergence (X10⁻⁵ s⁻¹)	15-30 over Sumatra coast & small pockets of southwest BoB	5 over small parts of southeast AS and adjoining EIO.
Upper Level divergence (X10⁻⁵ s⁻¹)	5-30 over southeast BoB off Sumatra coast.	5-20 over southeast AS and off Kerala coast.

Vertical Wind Shear (VWS knots)	5-20 over central & adjoining southwest parts of BoB, 20-30 over north BoB and adjoining central BoB.	10-15 over south AS and adjoining central AS, 25-40 over north and adjoining central AS.
Wind Shear Tendency (knots)	Decreasing over southwest BoB.	Decreasing over southeast AS & adjoining EIO.
Upper tropospheric Ridge	Along 10.0°N over the BoB.	Along 15.0°N over the AS.
Trough in westerlies	No significant trough	

Satellite observations based on INSAT imagery (0600 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 south Andaman sea. Scattered low and medium clouds with embedded weak to moderate convection lay over southwest Bay of Bengal and north Andaman sea.

b) Over the Arabian Sea: -

Scattered to broken low and medium clouds with embedded intense to very intense convection lay over eastcentral Arabian sea, south Arabian sea and Lakshadweep islands area. Scattered low and medium clouds with embedded weak convection lay over Comorin area.

M.J.O. Index:

The Madden Julian Oscillation (MJO) Index is currently in Phase 5 with amplitude less than 1. It will be in phase 6 tomorrow. Thereafter, it will move to phase 6, 7, 8 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	A cyclonic circulation over South Andaman Sea on 13 th with nearly westwards movement and no significant intensification	A low pressure area (LPA) over southeast and adjoining eastcentral AS on 13 th Dec and it will have west-northwestward movement and intensify gradually into a depression on 15 th Dec., depression over westcentral BoB on 16 th , becoming less marked on 17 th .
IMD-GEFS	A cyclonic circulation over South Andaman Sea on 13 th with nearly westwards movement and no significant intensification	A low pressure area (LPA) over southeast and adjoining eastcentral AS on 13 th Dec and it will have west-northwestward movement and intensify gradually into a depression on 15 th Dec., depression over westcentral BoB on 16 th , becoming less marked on 17 th .
GEFS Probabilistic guidance	-	-
IMD WRF	A cyclonic circulation over South Andaman Sea on 13 th with nearly westwards movement and no significant intensification	A low pressure area (LPA) over southeast and adjoining eastcentral AS on 13 th Dec and it will have west-northwestward movement and intensify gradually into a depression on 15 th Dec., depression over westcentral BoB on 16 th

NCMRWF-NCUM	A cyclonic circulation over South Andaman Sea on 14 th with nearly westwards movement and no significant intensification	LPA over eastcentral AS on 13 th Dec, to move west-northwest ward movement, becoming depression on 15 th Dec, moving west-northwestwards towards Gulf of Aden as a depression till 19 th Dec. and less marked thereafter.
NCMRWF-NEPS	A cyclonic circulation over South Andaman Sea on 14 th with nearly westwards movement and no significant intensification	LPA over eastcentral AS on 13 th Dec, to move west-northwest ward movement, becoming depression on 15 th Dec, moving west-northwestwards towards Gulf of Aden as a depression till 19 th Dec. and less marked thereafter.
NCMRWF-UM (Regional)	A cyclonic circulation over South Andaman Sea on 14 th with nearly westwards movement and no significant intensification	LPA over eastcentral AS on 13 th Dec, to move west-northwest ward movement, becoming depression on 15 th Dec, moving west-northwestwards towards westcentral Arabian Sea till 16 th Dec.
ECMWF	A cyclonic circulation over South Andaman Sea on 14 th with nearly westwards movement and no significant intensification	LPA over eastcentral and adjoining southeast Arabian Sea on 13 th Dec, and it will have west-northwest ward movement and intensification into a depression over central Arabian Sea during 15 th -16 th .
ECMWF ensemble	No significant system	High probability of depression over central Arabian Sea during 15 th -19 th with west-northwestwards movement
NCEP-GFS	A cyclonic circulation over South Andaman Sea on 13 th with nearly westwards movement and no significant intensification	A low pressure area (LPA) over southeast and adjoining eastcentral AS on 13 th Dec and it will have west-northwestward movement and intensify gradually into a depression on 15 th Dec., depression over westcentral BoB on 16 th , becoming less marked on 17 th .
IMD MME	No guidance	Depression likely over central Arabian Sea during 15 th -18 th December
IMD HWRF	No guidance	No guidance
IMD-Genesis Potential Parameter	-	A potential zone over southeast and adjoining eastcentral AS on 13 th Dec will have its west-northwest ward movement till 17 th Dec.

Summary and conclusion:

- ❖ All the models are unanimously indicating a low pressure area over eastcentral and adjoining southeast Arabian Sea on 13th December. Most of the models are showing its west-northwestward movement till 16th December with intensification into depression around 15th December. Most of the models are indicating depression to move west-northwestwards till 17th December. However, NCUM group is indicating it to move towards Gulf of Aden till 19th December.
- ❖ Most of the models are also indicating likely emergence of a cyclonic circulation over South Andaman Sea around 13th/14th with nearly westwards movement and no significant intensification.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

The existing cyclonic circulation over South Andaman Sea and adjoining Strait of Malacca & Sumatra is likely to move westwards without any significant intensification. Hence Nil probability is assigned to formation of depression over Bay of Bengal during next 7 days.

2. For Arabian Sea:

The existing Low Pressure over Southeast and adjoining eastcentral Arabian Sea off north Kerala-Karnataka coasts is very likely to move west-northwestwards away from India coast and become well marked low pressure area over Eastcentral and adjoining Southeast Arabian Sea by 14th December morning and concentrate into a depression over Eastcentral Arabian Sea around 15th December morning. Hence low to moderate probability is assigned to its intensification into a depression during 15th-16th December.

Probability of cyclogenesis (formation of depression and above intensity systems) over the BAY OF BENGAL of Bengal and Andaman Sea during next 168 hours

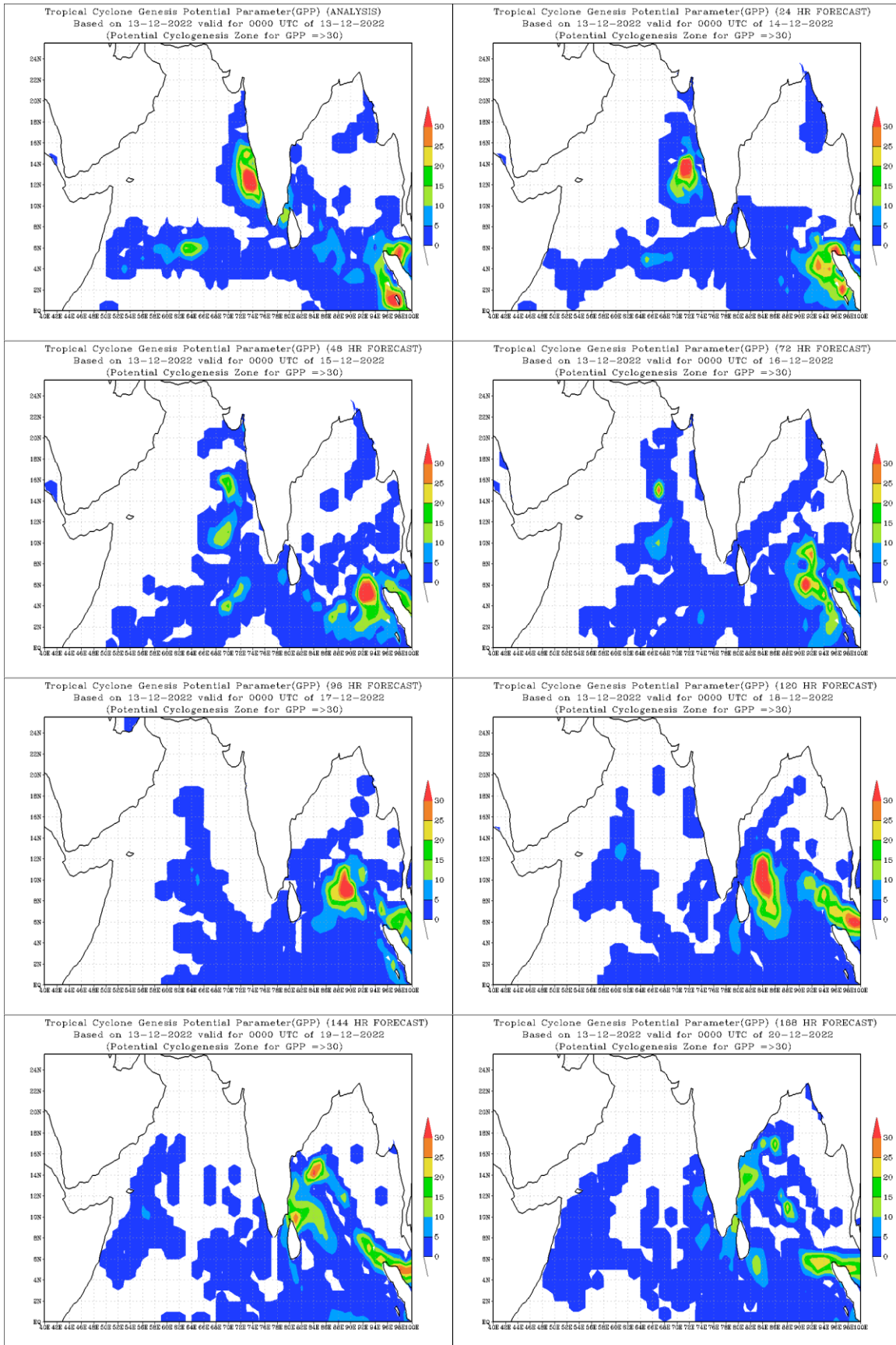
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

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

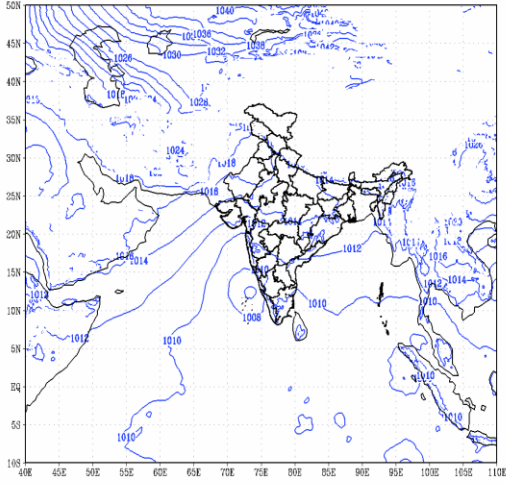
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	LOW	MOD	MOD	NIL	NIL	NIL

Advisory: The movement and intensification of both the systems need to be monitored.

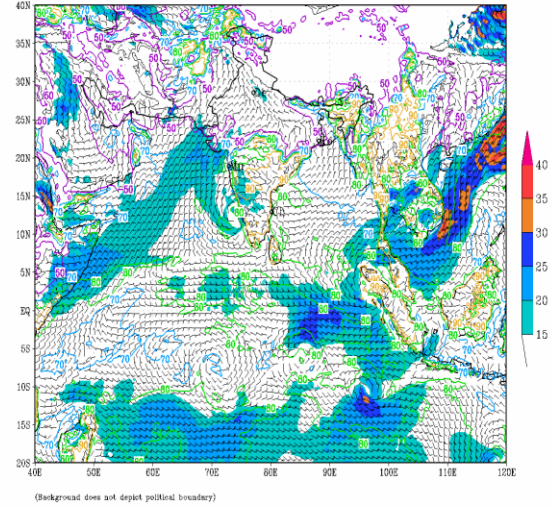
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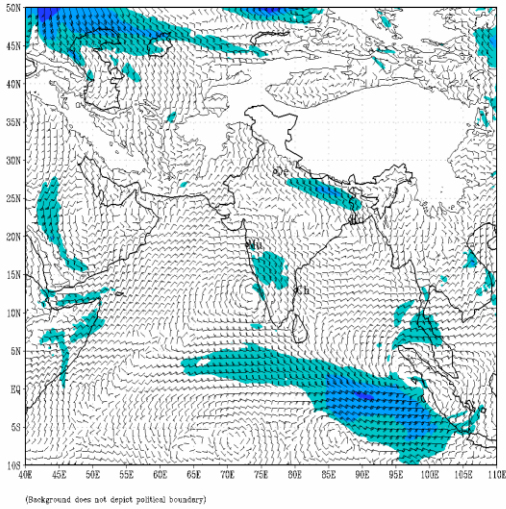
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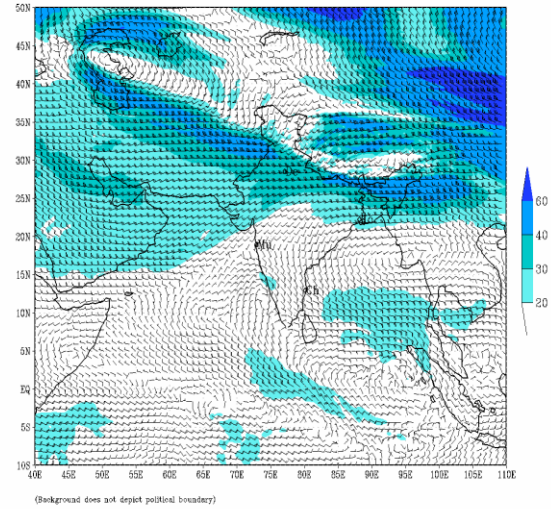
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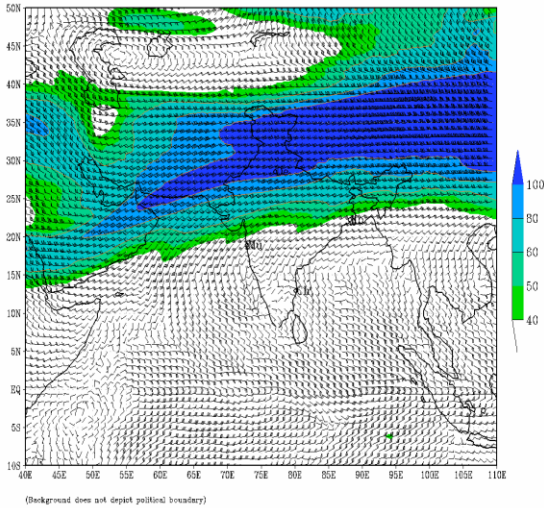
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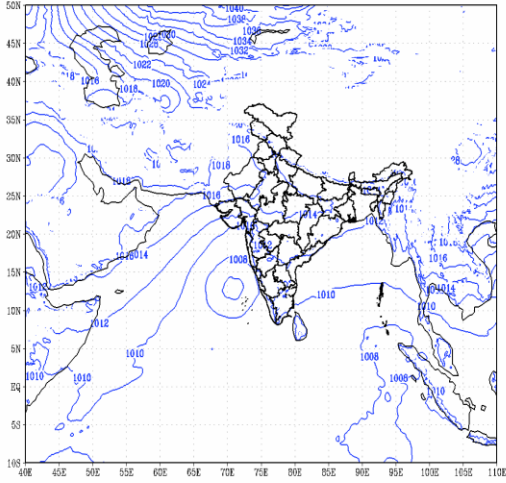
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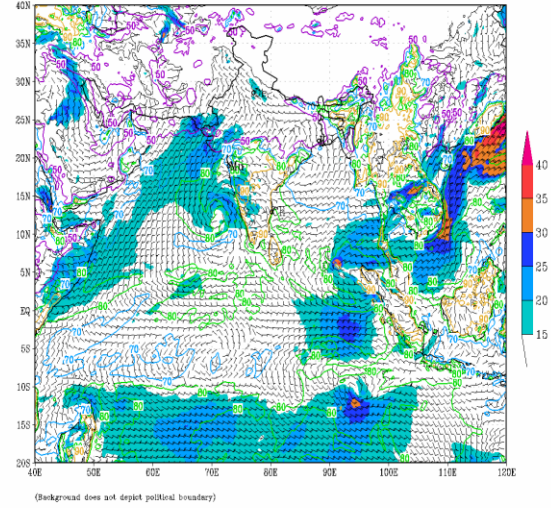
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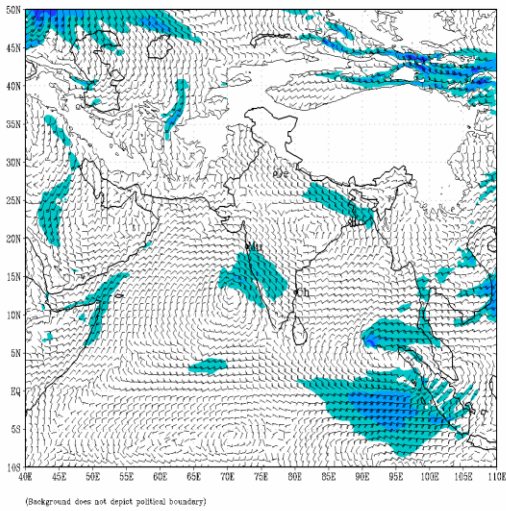
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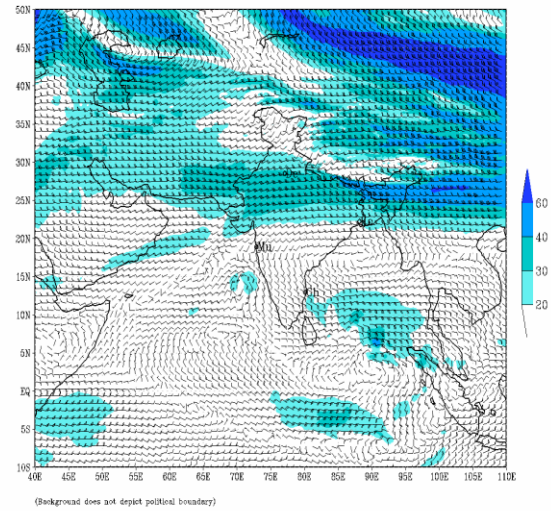
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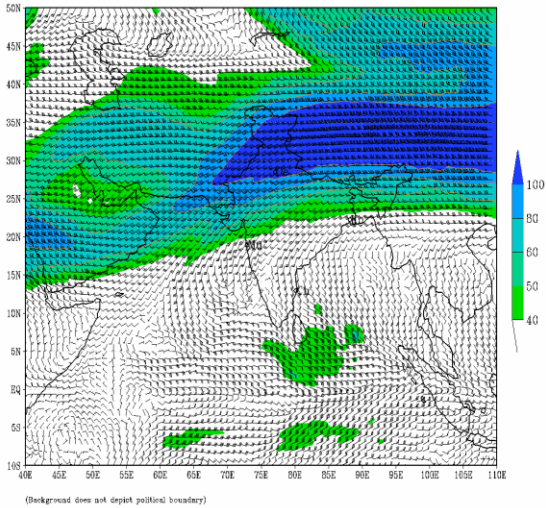
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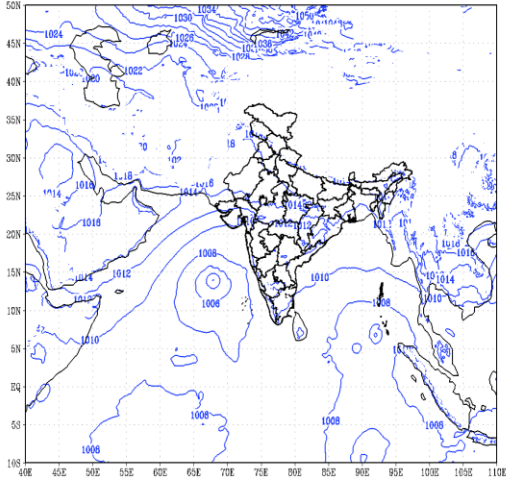
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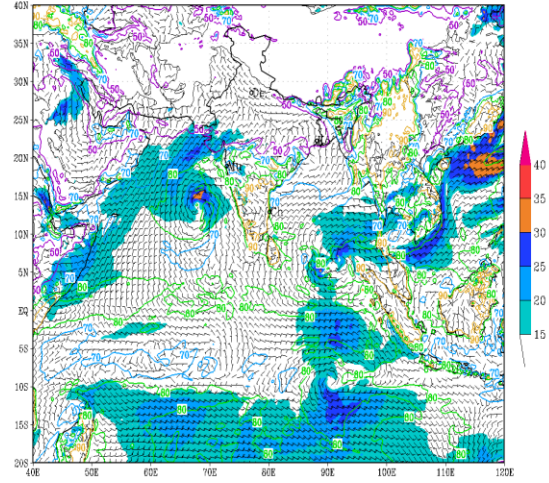


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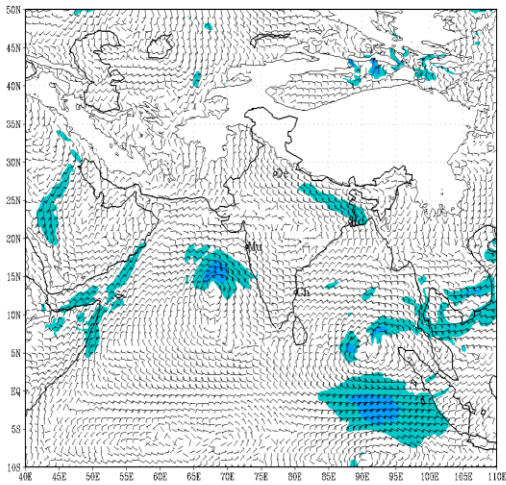
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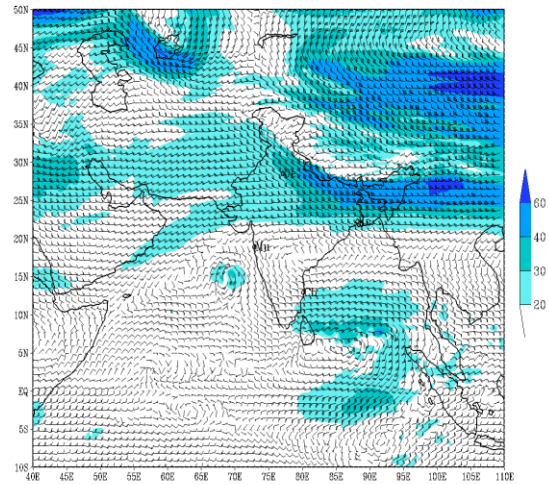
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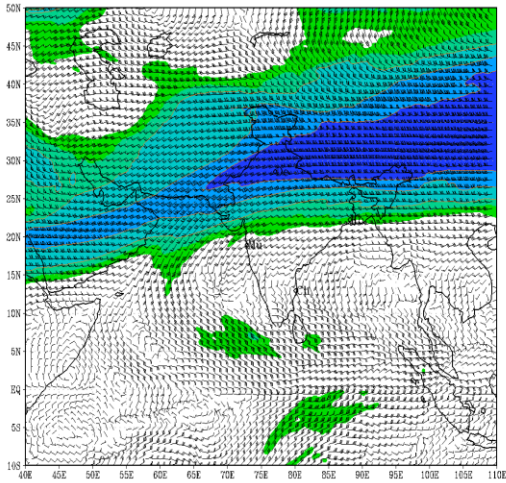
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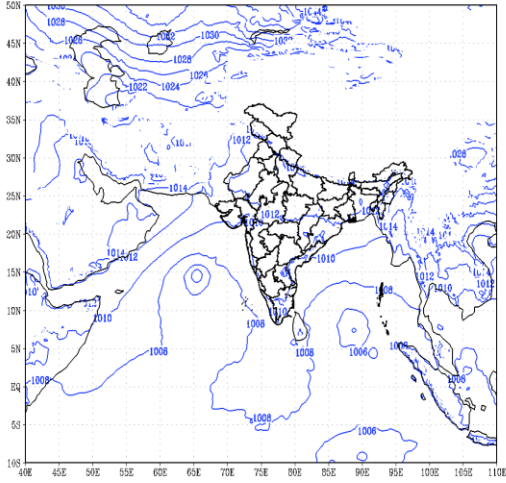
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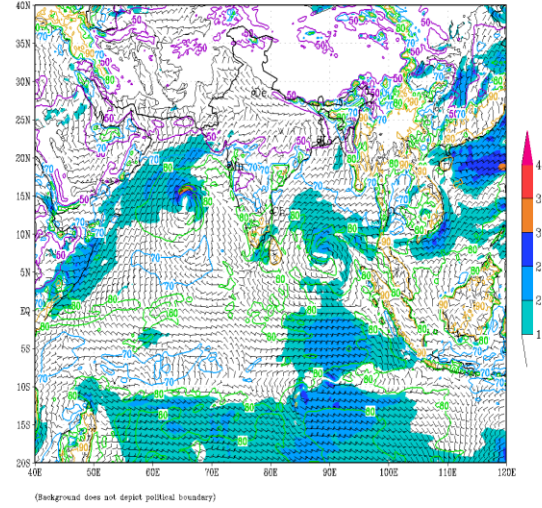


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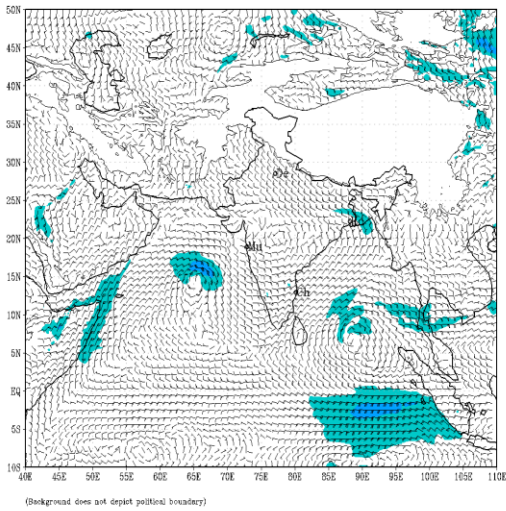
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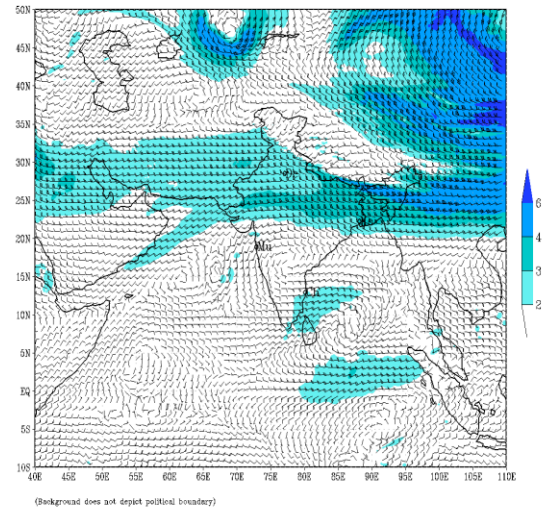
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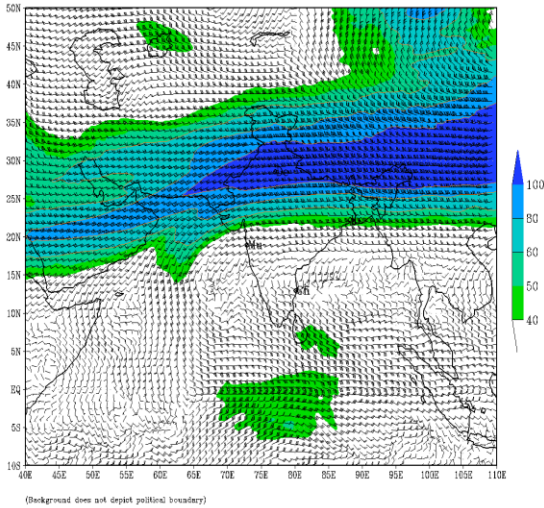
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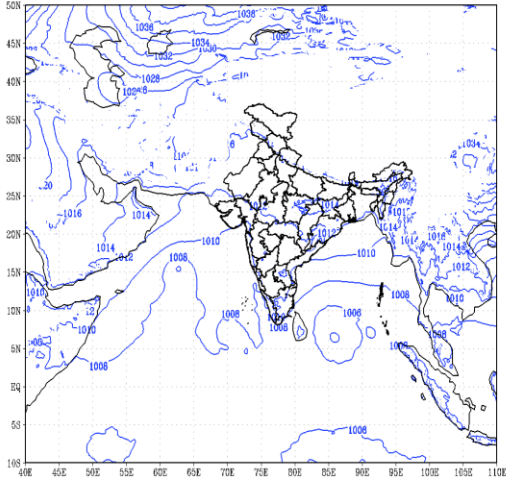
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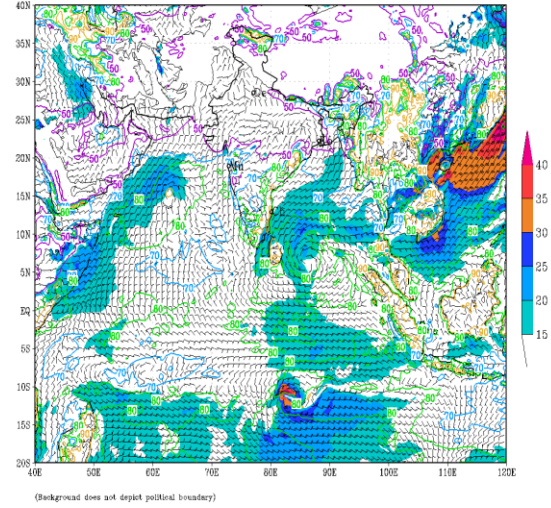
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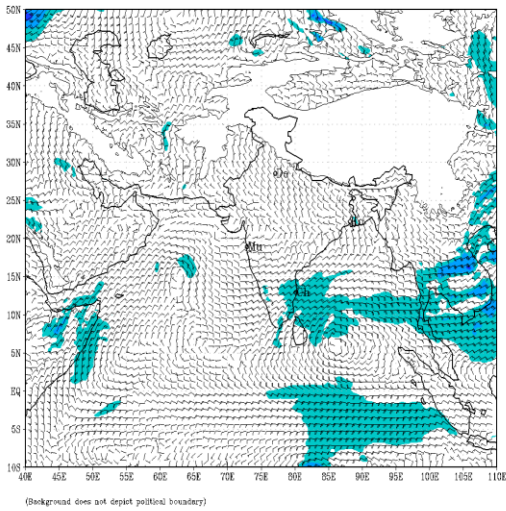
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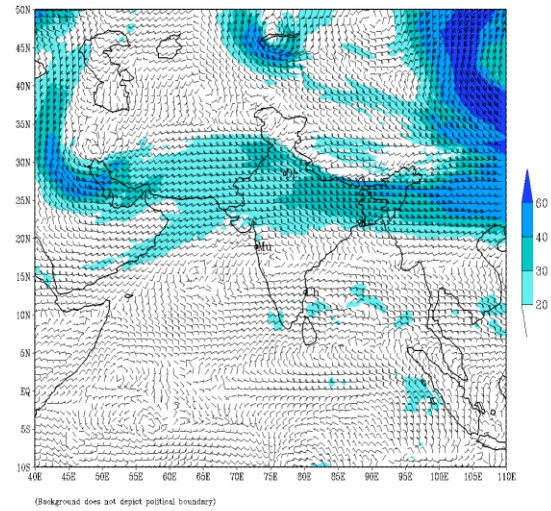
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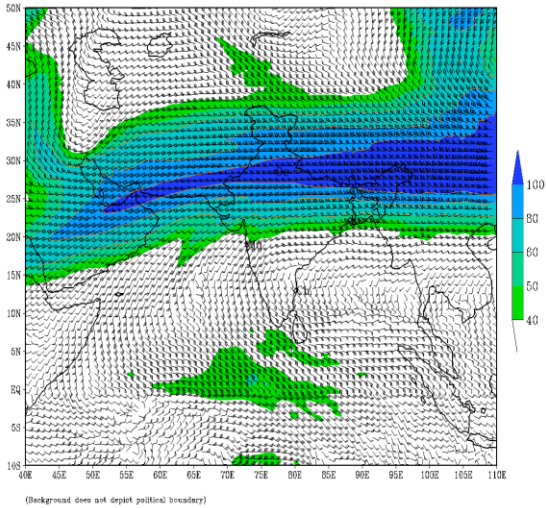
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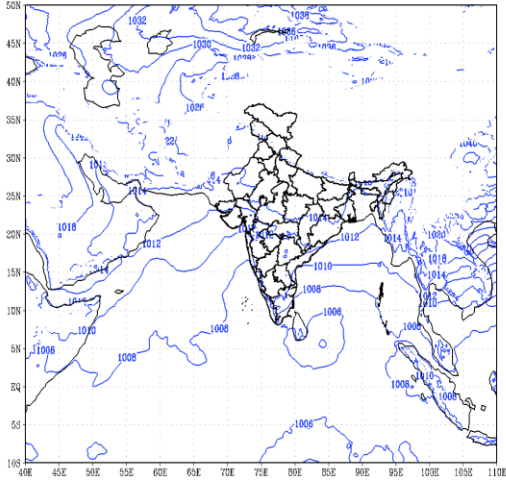
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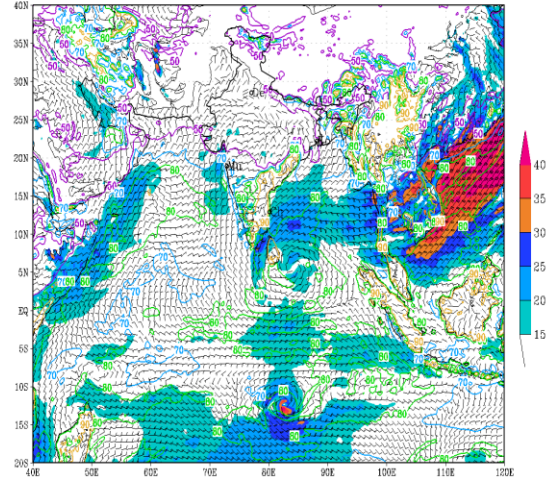


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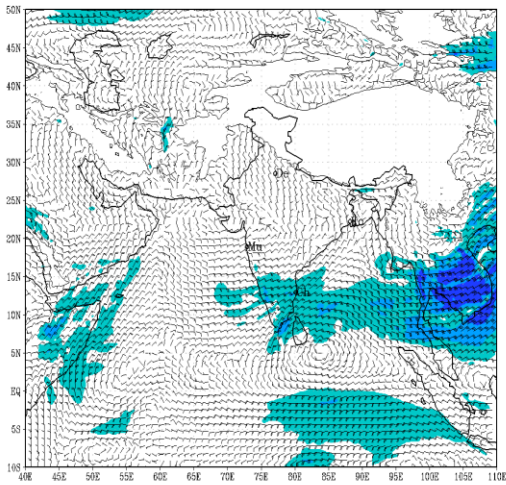
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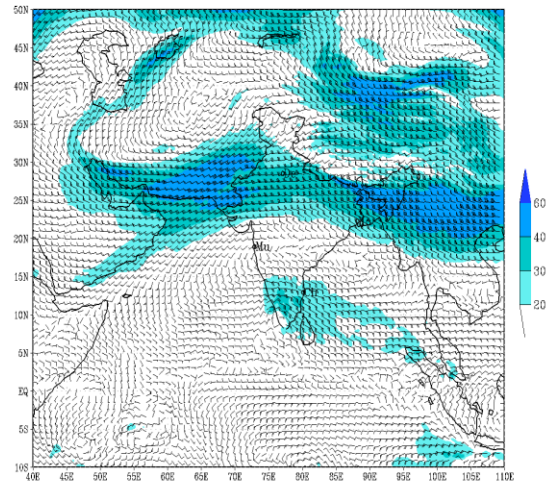
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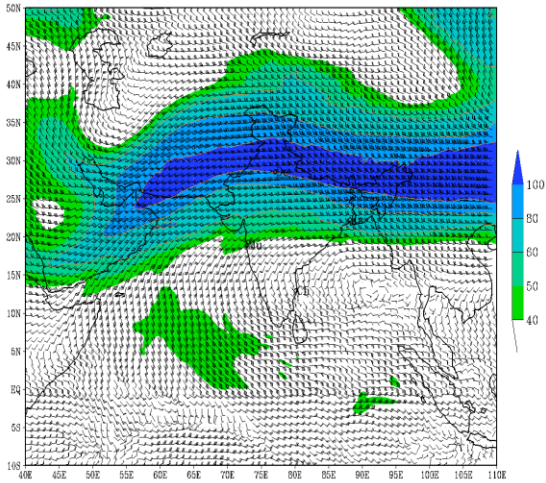
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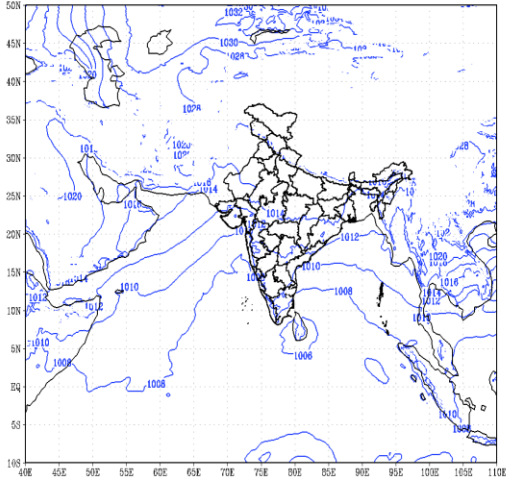
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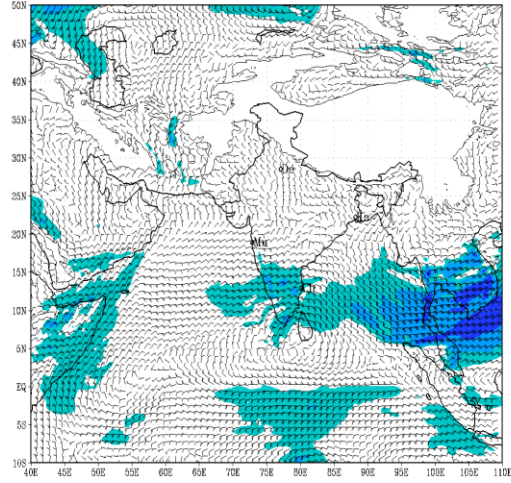
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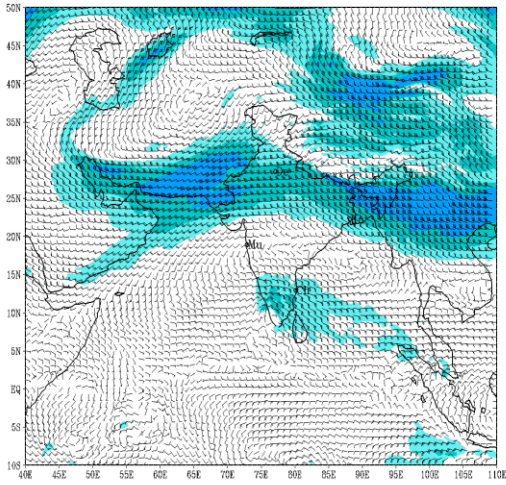
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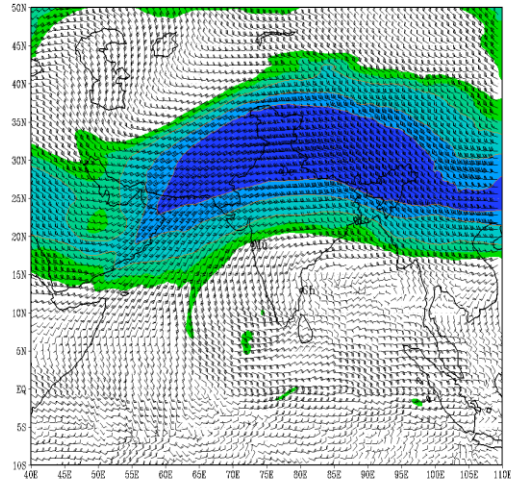
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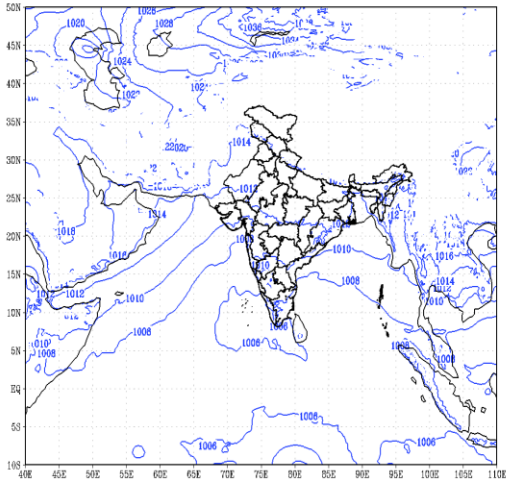
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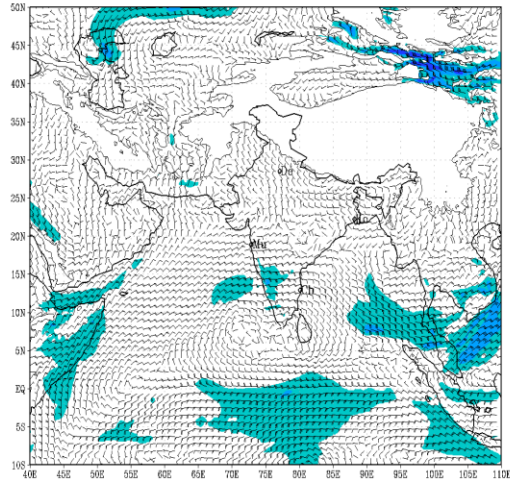
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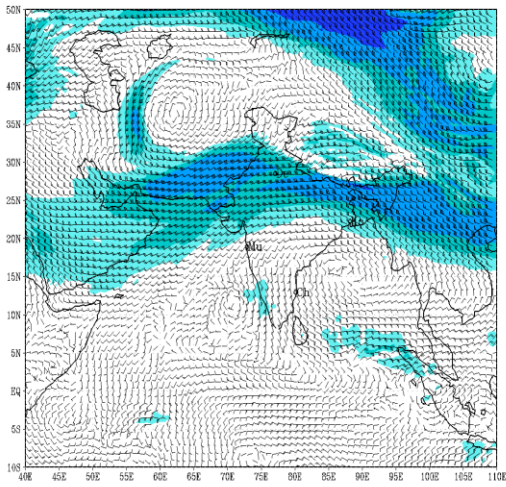
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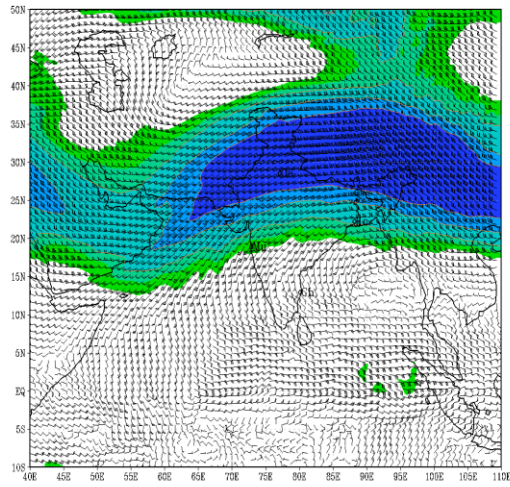
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