



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

**Tropical Cyclone Forecast Programme
Report Dated 15th December 2022**

Time of Issue: 1200 UTC

Synoptic features (based on 0600 UTC analysis):

Deep Depression over Eastcentral Arabian Sea moved west-northwestwards with a speed of 11 kmph during past 06 hours and lay centered at 1130 hrs IST of today, the 15th December 2022 over the same region near latitude 13.9° N and longitude 67.5° E about 650 km west-northwest of Aminidivi (Lakshadweep), about 700 km west-southwest of Panjim (Goa) and 1480 km east-southeast of Salalah (Oman). It is very likely to move nearly westwards over central Arabian Sea away from Indian coast, maintain intensity of deep depression till early hours of tomorrow, the 16th December and weaken gradually thereafter.

The Low Pressure Area over Southeast Bay of Bengal & adjoining East Equatorial Indian Ocean persists. It is likely to move gradually westwards and become Well Marked Low Pressure Area over the same region during next 12 hours. Thereafter, it would continue to move westwards and maintain its intensity over South Bay of Bengal till morning of 17th December 2022.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) °C	28-30 over entire BoB except southern parts of southwest BoB and Gulf of Mannar where the same is 26-28.	28-30 around the system and over eastcentral and southeast and adjoining southwest AS, 26-27 over westcentral and southwest AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm ²	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 ⁻⁶ s ⁻¹)	30-50 over southeast and adjoining south Andaman Sea.	50-100 around the system center.
Low Level convergence (X10 ⁻⁵ s ⁻¹)	5-10 over southeast BoB and adjoining EIO and adjoining southwest BoB.	5-10 to the northeast of system center.
Upper Level divergence (X10 ⁻⁵ s ⁻¹)	5-10 over southeast BoB and adjoining EIO and adjoining southwest BoB.	10-20 around system center.

Vertical Wind Shear (VWS knots)	20 over south BoB and 5 over south Andaman Sea.	10 -15 around system center.
Wind Shear Tendency (knots)	Decreasing over southeast and adjoining Andaman Sea.	Decreasing around system center.
Upper tropospheric Ridge	Along 13.0°N over the BoB.	Along 14.0°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 adjoining equatorial Indian Ocean and south andaman sea. Sct low/med clouds with embdd mod to int convtn over central BoB, rest south BoB and north Andaman Sea.

b) Over the Arabian Sea: -

Vortex (dd) over eastcentral AS & neighbourhood lay centered within half a degree of 13.8N / 67.5E. Intensity T2.0/2.0. Associated Scattered to broken low and medium clouds with embedded intense to very intense convection lay over eastcentral Arabian sea between lat 12.5N to 18.0E long 65.0E to 71.0E. Minimum Cloud Top Temperature is -85 degree Celsius.

M.J.O. Index:

The Madden Julian Oscillation (MJO) Index is currently in Phase 2 with amplitude less than 1. It will remain in same phase tomorrow and day after with increasing in amplitude. Thereafter, it will move to phase 3 for next 4 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 low pressure area (LPA) over southeast BoB and adjoining EIO as on today will move westwards and will become well marked low (WML) by 16 th morning. Continue to move in same direction till 17 th and lay over southwest BoB and adjoining EIO with similar intensity and less marked thereafter.	The deep depression (DD) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as DD by 16 th morning, will become less marked thereafter.
IMD-GEFS	The low pressure area (LPA) over southeast BoB and adjoining EIO as on today will lay over same	The deep depression (DD) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as DD by 16 th

	region by 16 th morning and will move westwards with weakening its intensity and will become less marked by 17 th morning.	morning, will become less marked thereafter.
GEFS Probabilistic guidance	-	-
IMD WRF	No significant system.	The deep depression (DD) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as DD by 16 th morning, it will become depression over westcentral AS by 17 th morning, will become less marked thereafter over westcentral AS.
NCMRWF-NCUM	The low pressure area (LPA) over southeast BoB and adjoining EIO as on today will become less marked thereafter.	The depression (D) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as D by 16 th morning, and will become LPA over westcentral AS by 17 th morning, it will become less marked thereafter.
NCMRWF-NEPS	The low pressure area (LPA) over southeast BoB and adjoining EIO as on today will become less marked thereafter.	The depression (D) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as D by 16 th morning, and will move west-northwestwards and become LPA over westcentral AS by 17 th morning, it will continue as LPA and lay over westcentral AS by 18 th morning, and become less marked thereafter.
NCMRWF-UM (Regional)	No significant system.	The depression (D) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as D by 16 th morning, and will move west-northwestwards and become LPA over westcentral AS by 17 th morning.
ECMWF	A cyclonic circulation over South Andaman Sea on 14 th with nearly westwards movement and no significant intensification	The deep depression (DD) over eastcentral and adjoining southeast AS will move west-northwestwards and lay over westcentral and adjoining southwest Arabian Sea as DD by 16 th morning, it will become less marked thereafter.
ECMWF ensemble	60-70% probability for a fresh LPA over southeast BoB to track west-northwestwards.	High probability of depression over central Arabian Sea during 15 th -18 th with west-northwestwards movement.
NCEP-GFS	The LPA over eastcentral and adjoining southeast Arabian Sea as on today will move west-northwestwards and will become less marked thereafter.	A low pressure area (LPA) over southeast and adjoining eastcentral AS on 15 th Dec will have west-northwestwards till 19 th morning towards Sri Lanka coast.
IMD MME	No guidance	Depression over eastcentral and adjoining southeast Arabian Sea as on today will move west-northwestwards and lay as depression over westcentral and adjoining southwest and adjoining eastcentral AS, it will move in same direction and lay as LPA over westcentral AS by 17 th morning. It will

		then move southwest wards and lay as LPA over westcentral and adjoining southwest by 18 th morning.
IMD HWRF	No guidance	No guidance
IMD-Genesis Potential Parameter	-	A potential zone over eastcentral & adjoining southeast AS on 15 th Dec will have its west-northwest ward movement till 16 th Dec.

Summary and conclusion:

- ❖ Most of the models captured formation of deep depression over eastcentral and adjoining southeast Arabian Sea on 15th December except NCUM group which did not indicate intensification into deep depression. Most of the models are showing its west-northwestward movement till 17th morning as a depression/ deep depression and weaken gradually thereafter
- ❖ Most of the models predicted formation of LPA over southeast BoB and adjoining EIO today and its westward movement towards Sri Lanka coast with same intensity till 17th/18th morning and weaken thereafter.

In view of all the above, it is inferred that

1. For the Bay of Bengal:

The existing low pressure area over southeast Bay of Bengal and adjoining EIO will move nearly westwards. It would maintain its intensity till 17th/18th morning and weaken gradually thereafter while moving towards Sri Lanka coast.

2. For Arabian Sea:

Yesterday's depression over Eastcentral and adjoining Southeast Arabian Sea off north Kerala-Karnataka coasts moved northwestwards and became deep depression over eastcentral and adjoining southeast AS by today. It moved west-northwestwards with a speed of 11 kmph during past 06 hours and lay centered at 1130 hrs IST of today, the 15th December 2022 over the same region near latitude 13.9 0 N and longitude 67.5 0 E about 650 km west- northwest of Aminidivi (Lakshadweep), about 700 km west-southwest of Panjim (Goa) and 1480 km east-southeast of Salalah (Oman). It is very likely to move nearly westwards over central Arabian Sea away from Indian coast, maintain intensity of deep depression till early hours of tomorrow, the 16th December and weaken gradually thereafter.

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

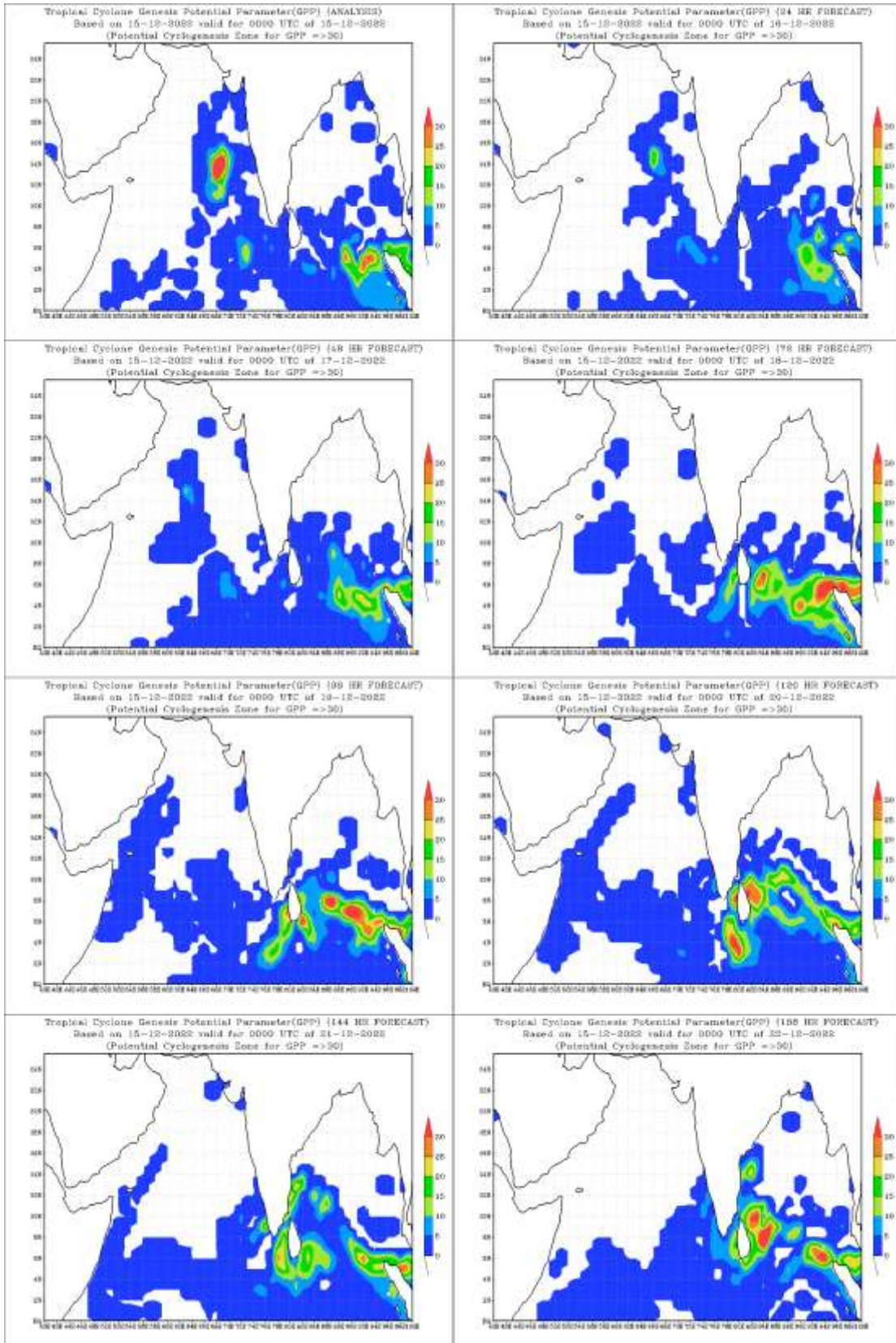
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
Low	Low	Nil	NIL	NIL	NIL	NIL

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

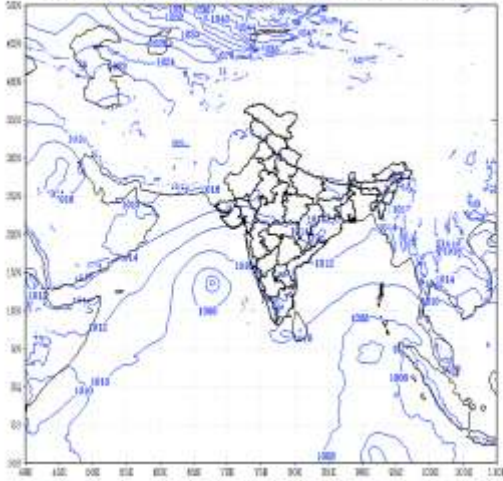
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
-	-	-	-	NIL	NIL	NIL

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

IOP: NIL

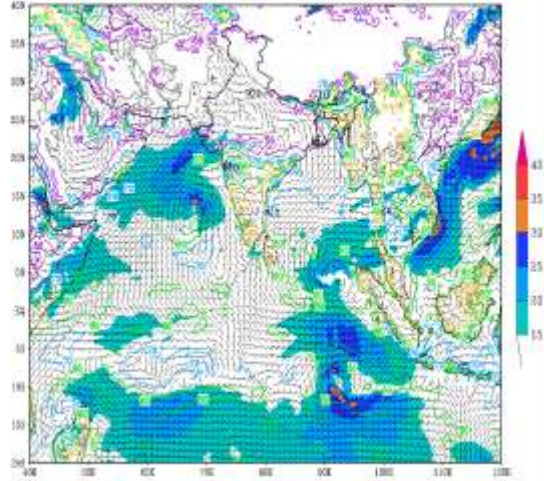


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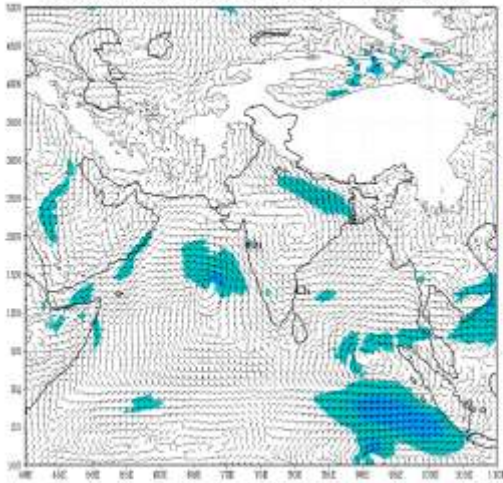
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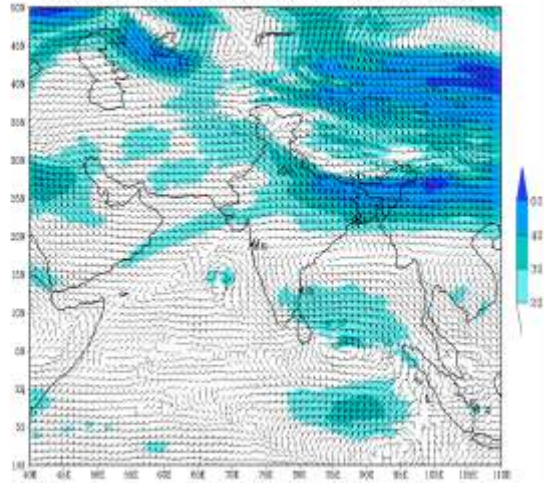
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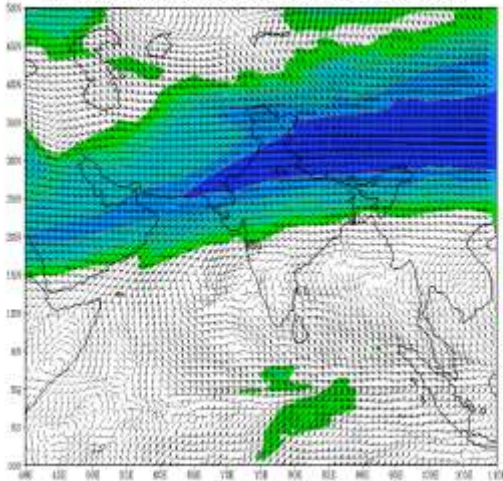
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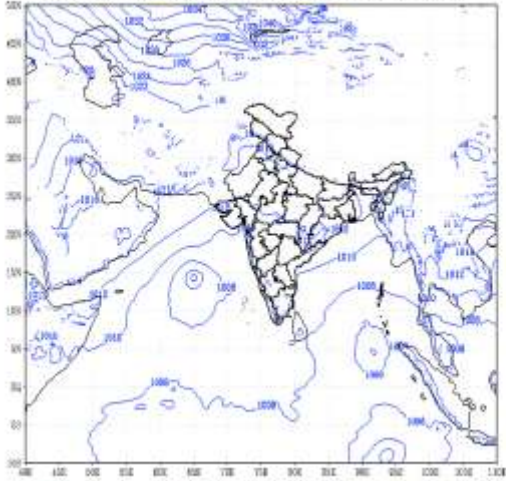
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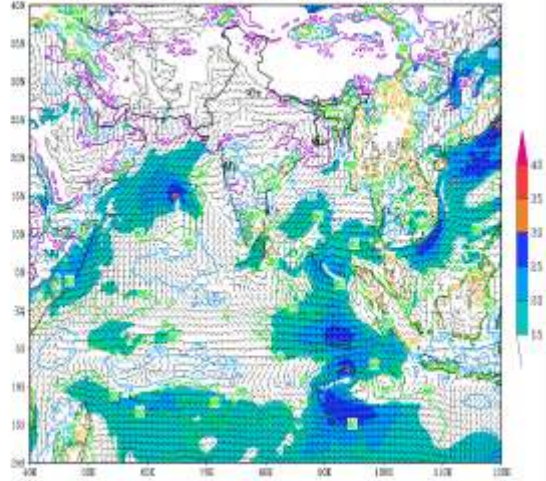
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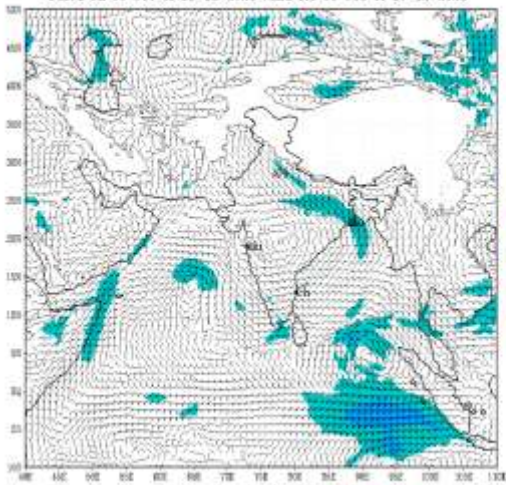
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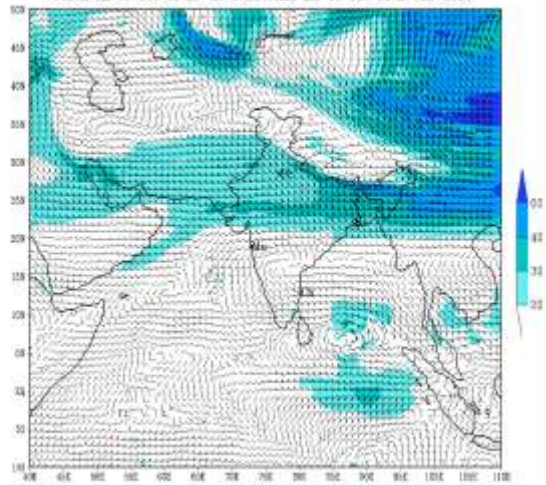
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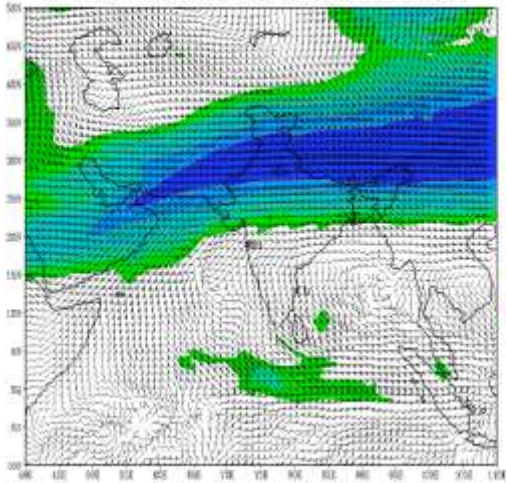
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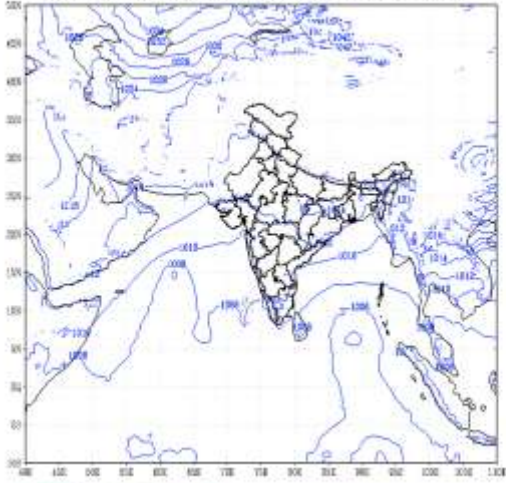
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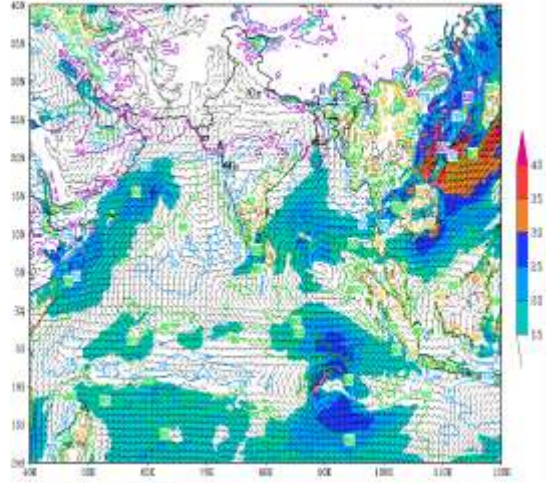
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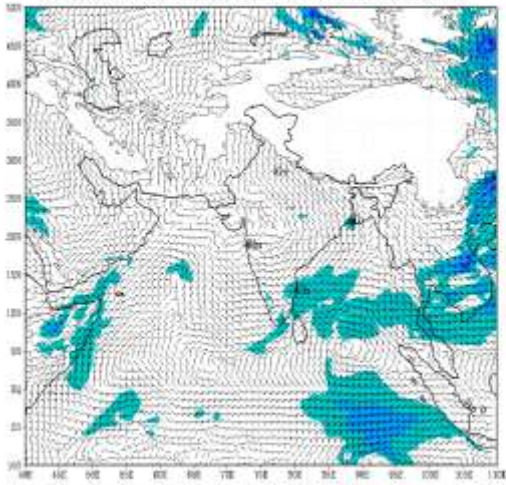
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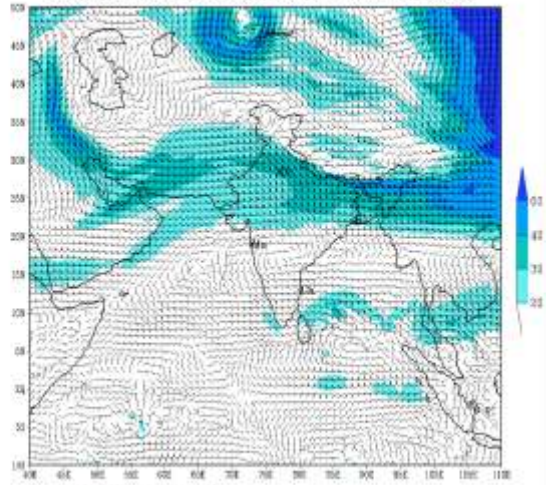
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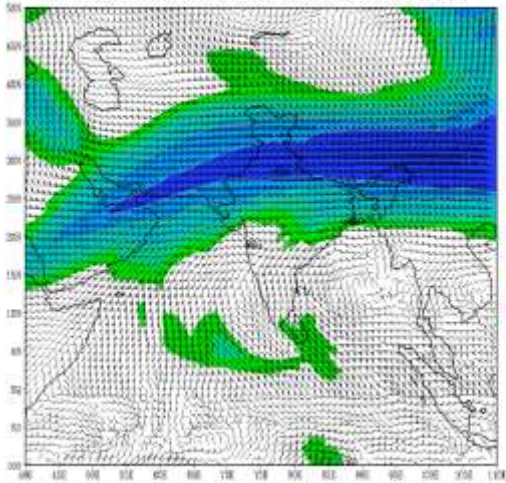
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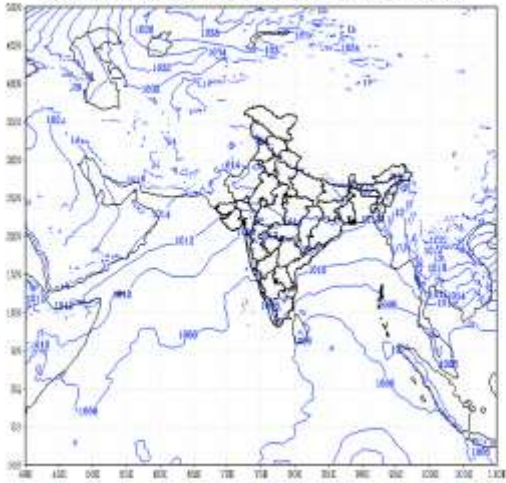
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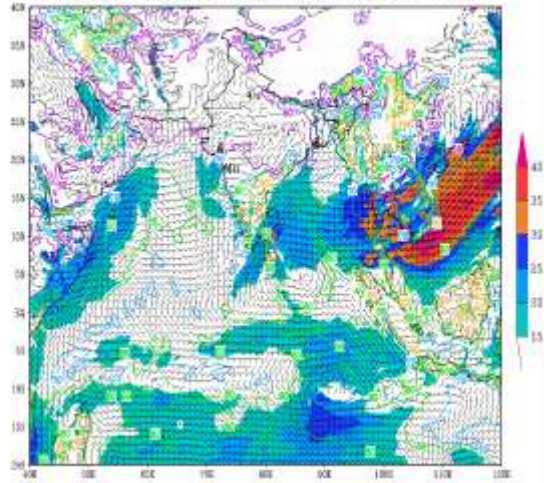
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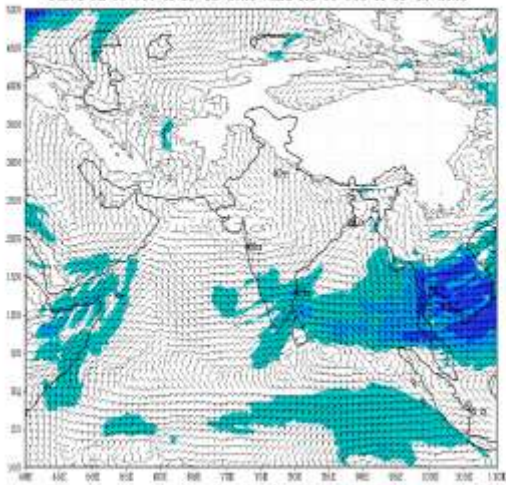
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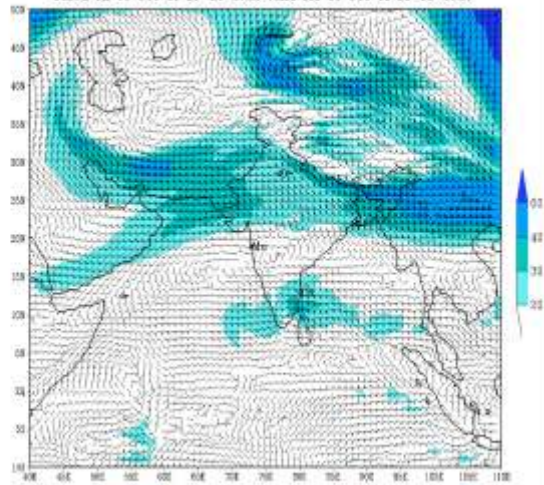
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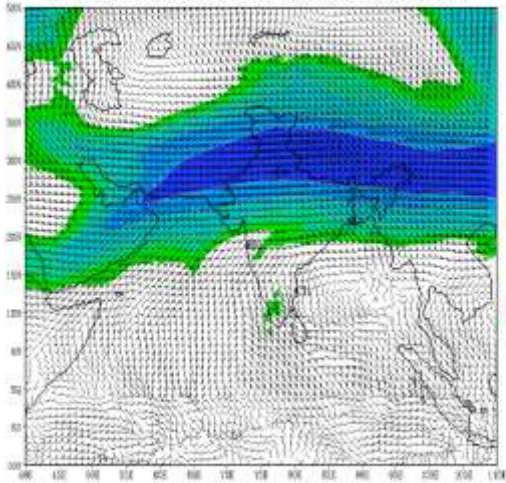
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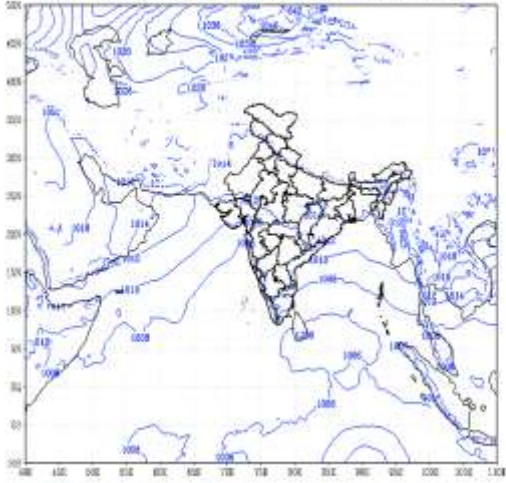
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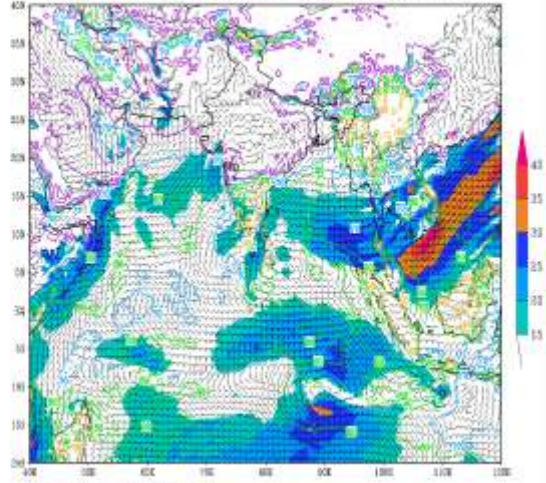
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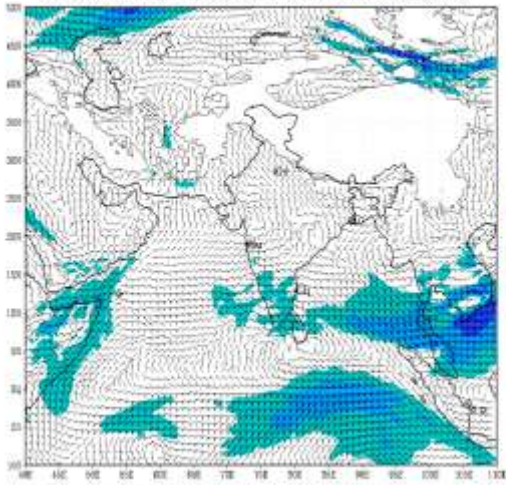
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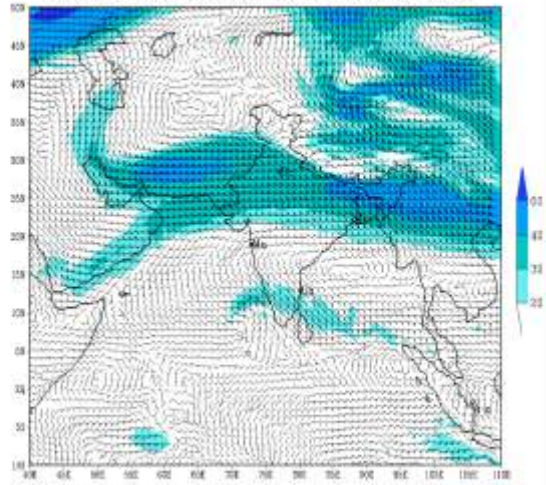
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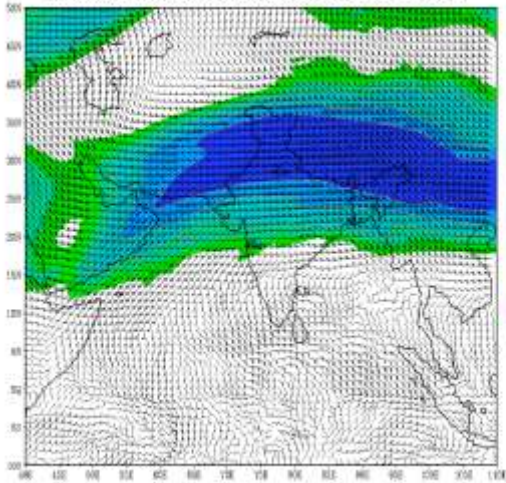
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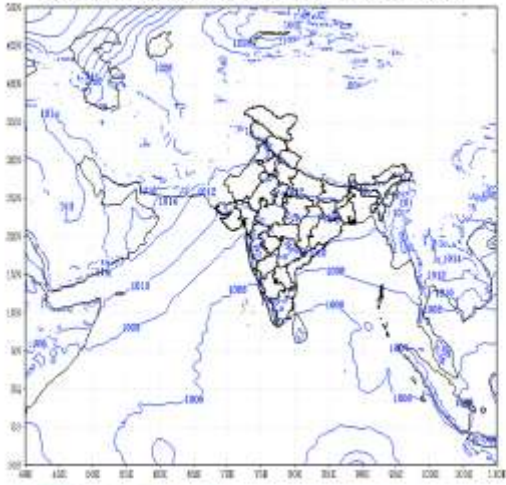
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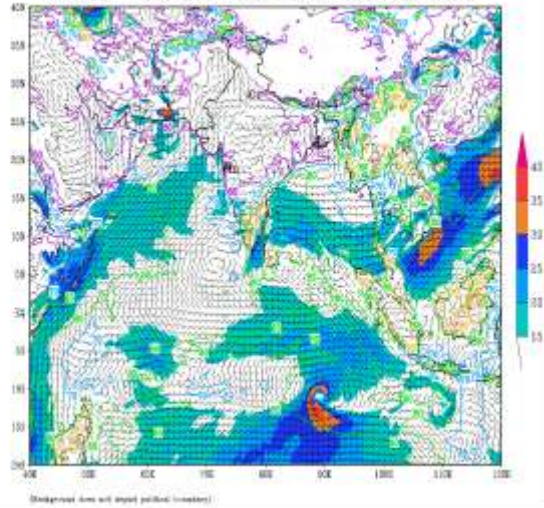


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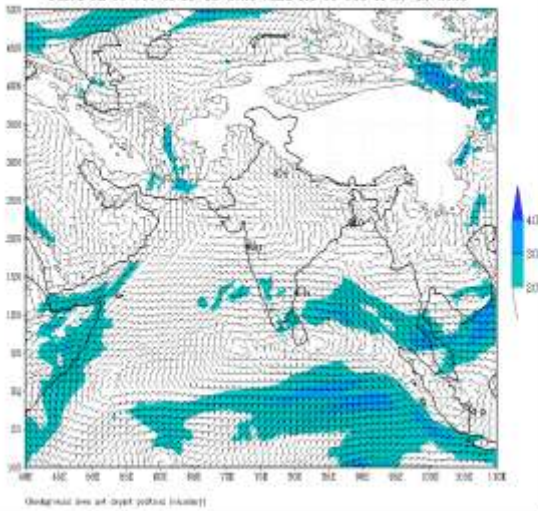
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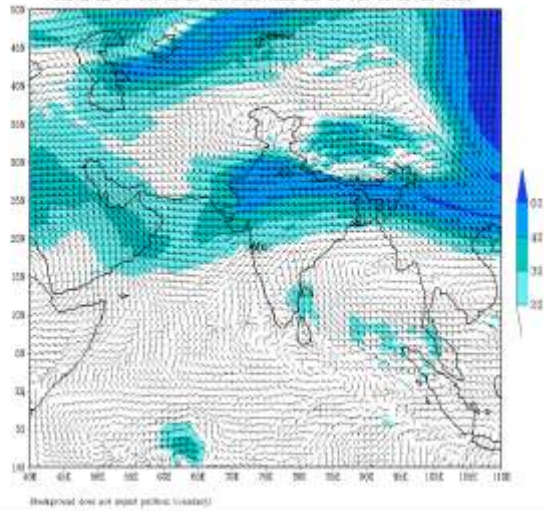
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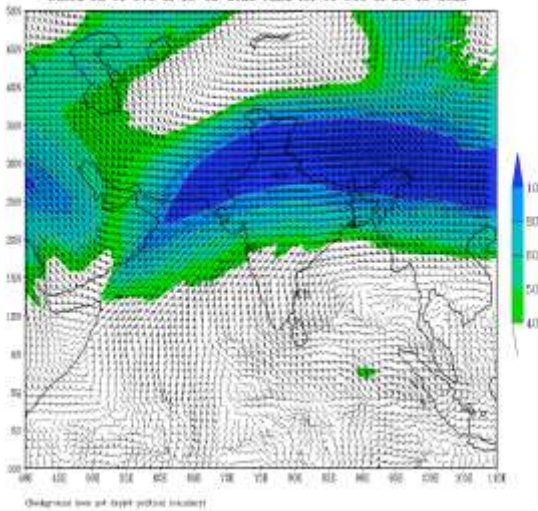
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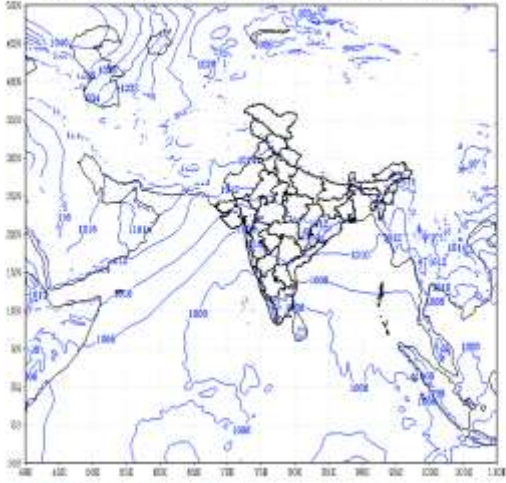
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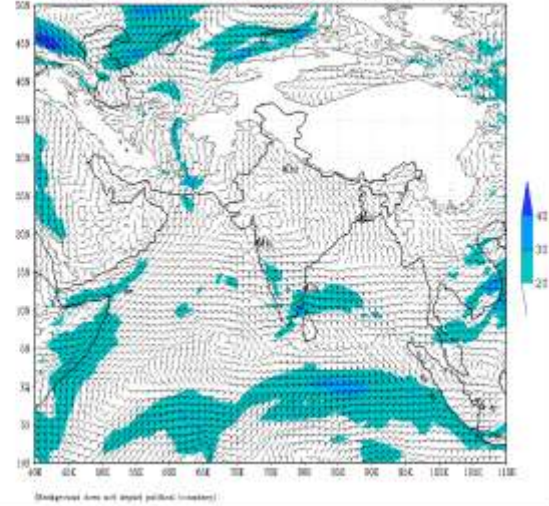


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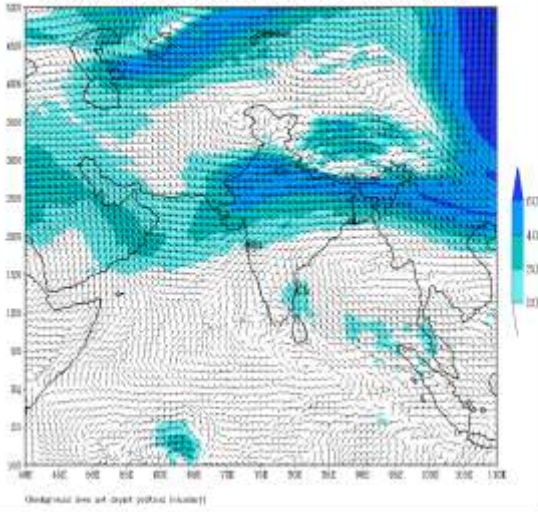
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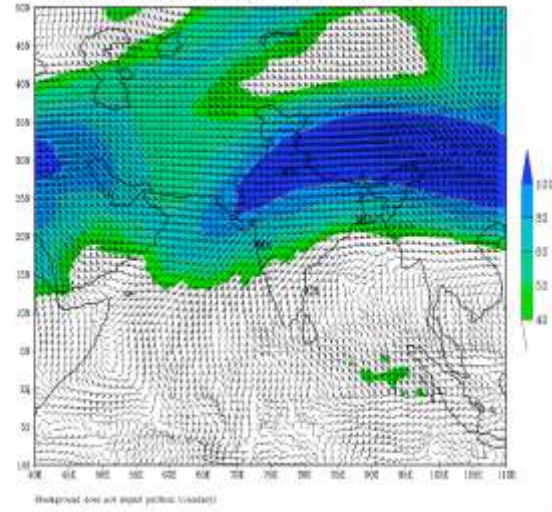
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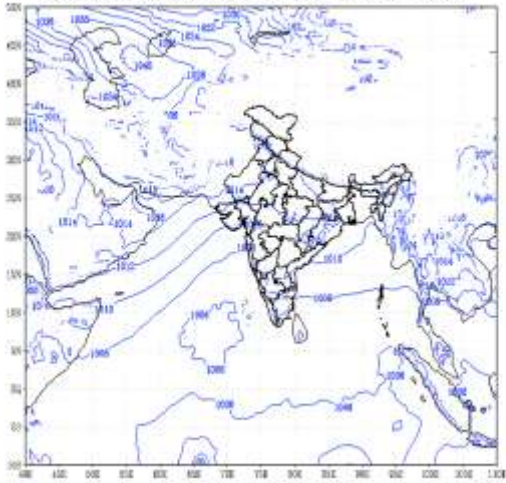
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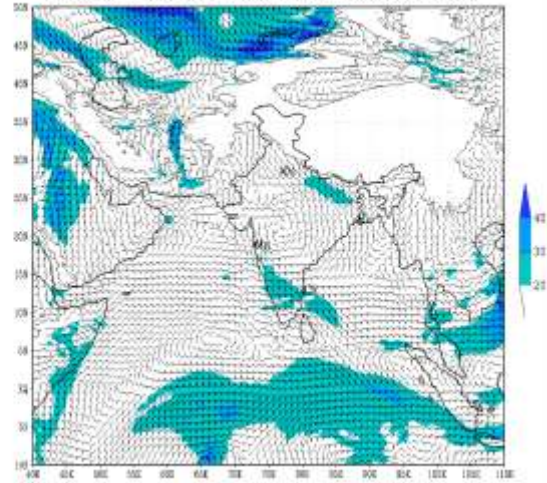
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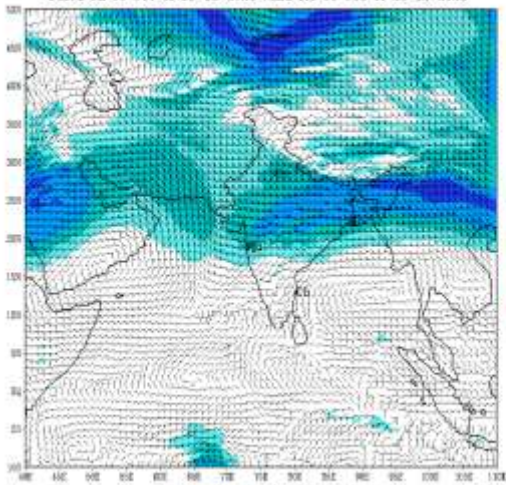
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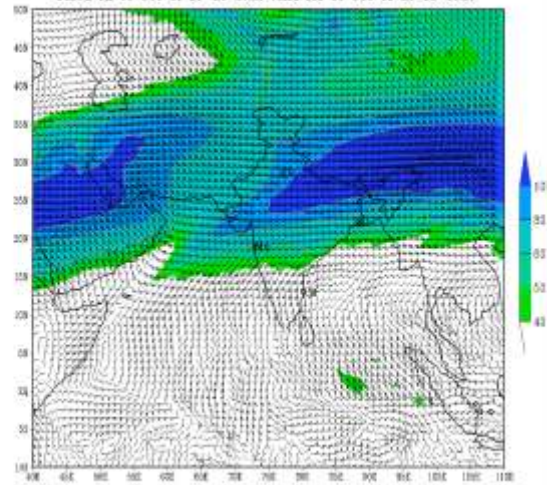
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IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 15-12-2022 valid for 00 UTC of 22-12-2022



(Background line and digit yellow (isobars))

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 15-12-2022 valid for 00 UTC of 22-12-2022



(Background line and digit yellow (isobars))