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

Tropical Cyclone Forecast Programme
Report Dated 27th November, 2023

Time of Issue: 1400 UTC

Synoptic features (based on 0300 UTC analysis):

- Under the influence of the cyclonic circulation over South Andaman Sea, a Low Pressure Area has formed over south Andaman Sea & adjoining Malacca Strait at 0830 hours IST of today, the 27th November. It is likely to move west-northwestwards and intensify into a Depression over southeast Bay of Bengal around 29th November, 2023. Thereafter, it is likely to move northwestwards and intensify further into a cyclonic storm over southeast Bay of Bengal during subsequent 48 hours.
- A Cyclonic Circulation lies over Southwest Arabian Sea and extends upto 3.1 km above mean sea level.

Dynamical and thermo-dynamical features

Parameter	Bay of Bengal (BoB)	Arabian Sea (AS)
Sea Surface Temperature (SST) ºC	27-29 over major parts of BoB. 26-27^{0}C over parts of north and adjoining westcentral BoB.	29-30 over southeast and adjoining southwest AS, 27-29 over major parts of central and southwest AS, 26-27 over north and adjoining westcentral AS.
Tropical Cyclone Heat Potential (TCHP) kJ/cm^2	80-100 over Andaman Sea, parts of central BoB. 100-120 over southeast BoB, Comorin Area.	140-160 over southeast and adjoining southwest AS. 100-120 over southeast and southern parts of southwest AS. 80-100 over central AS. Less than 40 over westcentral AS along and off Yemen-Oman coast, northwest AS.
Cyclonic Relative vorticity (X10^{-6}s^{-1})	60-80 over Malacca Strait and southeast BoB adjoining to EIO. 10-20 over south of south BoB.	60-70 over southwest AS, 10-20 over parts of central and north AS.
Low Level convergence (X10^{-5} s^{-1})	5-10 over South Andaman Sea, 05 over parts of south and central BoB, 5 over Gulf of Mannar and 10 over Comorin area.	15-10 over central parts of south AS, and southwest AS.
Upper Level divergence (X10^{-5} s^{-1})	5-10 over Mallaca Strait and South Andaman Sea.	10-30 over southwest and adjoining southeast AS, -5 to -10 over north and adjoining central AS.
Vertical Wind Shear (VWS knots) Low: 05-10 knots	5-10 over south BoB and South Andaman Sea, 20 over north part of south BoB,	10-30 over south AS, >30 over north and central AS.

Moderate:10-20 knots High: >20 knots	High (>20knots) over central & north BoB.	
Wind Shear Tendency (knots)	Decreasing over South Andaman Sea, southeast and adjoining southwest BoB, north BoB. Increasing over westcentral and adjoining southwest BoB.	Decreasing over eastcentral and northeast AS. Increasing over south AS.
Upper Tropospheric Ridge	Along 11^{o}N over BoB.	Along 9^{0}N over AS.

Satellite observations based on INSAT imagery (0600 UTC):

(a) Over the Bay of Bengal & Andaman Sea:-

Scattered to broken low/med clouds with embedded intense to very intense convection over South Andaman Sea. Scattered low/med clouds with embedded moderate to intense convection over south BoB, rest of Andaman Sea and weak to moderate convection over central & northwest BoB.

(b) Over the Arabian Sea:-

Scattered to broken low/med clouds with embedded intense to very intense convection over south arsea. Scattered low/med clouds with embedded isolated moderate to intense convection over eastcentral Arabian Sea, Comorin area, westcentral Arabian Sea.

(c) convection outside India:-

Scattered low/med clouds with embedded mod to intense convection over Maldives, East Sri Lanka, Pakistan, South Thailand, Gulf of Thailand, Sumatra, Strait of Malacca, Malaysia, Borneo, South China Sea, South of lat 11.5N, Java Sea, Celebes Islands & Sea, North Madagascar, and over Indian Ocean bet lat 5.0N to 8.0S east of long 72.0E and between lat 5.0N to 16.0S long 40.0E to 70.0E.

M.J.O. Index:

MJO index is currently in Phase 2 with amplitude greater than 1. It will be in phase 3 with amplitude greater than 1 on 28th Nov, it will be in the same phase with amplitude greater than 1 till 30th Nov. Further it will be in the same phase with amplitude less than 1 till 3rd Dec.

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

Nil

Input for FDP Cyclone based on 0000 UTC for the next 7 days

MODEL GUIDANCE	Bay of Bengal (BoB)	Arabian Sea (AS)
IMD-GFS	Low pressure area (LPA) over South Andaman Sea (7.5^{o}N/94^{o}E) on 28th Nov, moving westnorthwestward and lay over southwest BoB (8.5^{o}N/86^{o}E) as LPA on 30th Nov, moving in the same direction and lay over same region (10.5^{o}N/83.5^{o}E) as DD on 1st Dec, it intensifies into CS over southwest BoB (11^{o}N/83^{o}E) on 2nd Nov, moves then northward and lay over westcentral and adjoining southwest BoB (13^{o}N/83^{o}E) as CS/SCS on 3rd Dec, moving further north and lay over westcentral BoB (16.5^{o}N/83^{o}E) as SCS on 4th Dec. It crosses north Andhra adjoining to Odisha coast (18^{o}N/84.5^{o}E) as VSCS on 5th Dec. It then moves along the coast by weakening.	A cycir over southwest AS having westward movement without intensification.

IMD-GEFS	Low pressure area (LPA) over southwest BoB ($9^oN/85.5^oE$) as LPA on 30th Nov, moving in the westnorthwestward direction and lay over same region ($10^oN/84^oE$) as DD on 1st Dec, it lay into CS over southwest BoB ($11^oN/83^oE$) on 2nd Nov, moves then northward and lay over westcentral and adjoining southwest BoB ($13^oN/83^oE$) as DD on 3rd Dec, moving further north and lay over westcentral BoB ($16.5^oN/83^oE$) as WML on 4th Dec. It moves then parallel the coast while weakening.	A cycir over southwest AS having westward movement without intensification.
IMD-WRF	No significant system during next 3 days.	No significant system during next 3 days.
NCMRWF-NCUM	LPA over southeast and adjoining southwest BoB ($8.5^oN/88^oE$) on 30th Nov, it moves westnorthwestward and lay over southwest BoB ($9^oN/83^oE$) as LPA on 2nd Dec, it moves in same direction and lay over southwest BoB close to Tamil Nadu coast ($10.5^oN/80.5^oE$) as a depression on 4th Dec, it crosses the Tamil Nadu coast ($11.5^oN/80^oE$) as a WML on 5th Dec.	A cycir over southwest AS having westward movement without intensification.
NCMRWF-NEPS	LPA over southeast and adjoining southwest BoB ($8.5^oN/88^oE$) on 01st Nov, it moves westnorthwestward and lay over southwest BoB ($9^oN/83^oE$) as WML on 2nd Dec, it moves in same direction and lay over southwest BoB close to Tamil Nadu coast ($10.5^oN/80.5^oE$) as a depression on 4th Dec, it crosses the Tamil Nadu coast ($11.5^oN/80^oE$) as a WML on 5th Dec. It moves in the same direction over land without weakening till 9th Dec.	A cycir over southwest AS having westward movement without intensification.
NCMRWF-UM (Regional)	No significant system during next 3 days.	-
ECMWF	Cycir over southeast BoB adjoining to Malacca Strait ($6.4^oN/92.7^oE$), moving westnorthwestward and lay over southeast and adjoining southwest BoB ($8.3^oN/89^oE$) as a depression, moving in the same direction and lay over ($9.5^oN/87.9^oE$) as D/DD on 18 UTC of 30th Nov, it lay over southwest BoB ($12.6^oN/84.5^oE$) on 21UTC of 2nd Dec as CS, it lay over westcentral and adjoining southwest BoB ($13.6^oN/84.0^oE$) as CS on 00 UTC of 4th Dec, it lay over westcentral BoB ($14.3^oN/83.2^oE$) as CS at 00 UTC of 5th Dec, it moves then northeastward and lay over westcentral BoB ($16.2^oN/83.7^oE$) as SCS on 00 UTC of 6th Dec. It continues to move northeastward while weakening.	A cycir over southwest AS having westward movement without intensification.
NCEP-GFS	LPA over southeast BoB $7.7^oN/91.7^oE$) on 29th Dec, moving westnorthwestward and lay over southeastand adjoining southwest BoB ($9.0^oN/88.1^oE$) as a WML on 15 UTC of 30th Nov, moving in the same direction and lay over southwest BoB ($10.7^oN/86.5^oE$) as a depression on 18 UTC of 1st Dec. Moving in the same direction and lay over southwest BoB ($12.1^oN/84.9^oE$) as a DD/CS on 12 UTC of 2nd Dec, it lay over westcentral BoB ($13.8^oN/83.6^oE$) as a SCS on 12 UTC of 4th Dec. Moving then northeastward and lay over westcentral BoB ($16.0^oN/83.9^oE$) as VSCS on 00 UTC of 6th Dec. It continues to move northeastward while weakening.	A cycir over southwest AS having westward movement without intensification.
IMD-Genesis Potential Parameter	Potential zone over Malacca Strait as on today and over south Andaman Sea on 28th Nov. It moves westnorthwestward and lay over southeast BoB on 29th and 30th Nov. It lay over eastcentral and adjoining westcentral BoB on 1st and 2nd Dec. It lay over westcentral and adjoining eastcentral BoB on 3rd and 4th Dec.	No potential zone of cyclogenesis over AS.

Summary and conclusion:

1. For Bay of Bengal:

Most of the models are indicating formation of depression over south Bay of Bengal during 29th - 30th November, it's intensification into a cyclonic storm and it's northeastwards recurvature. However, there is variation among various models wrt area of formation of depression, time of formation and point of recurvature. IMD-GFS is indicating extended low pressure area over southwest Bay of Bengal on 27th, depression on 30th/1200 UTC over southwest Bay of Bengal and cyclonic storm on 1st December over southwest Bay of Bengal. It is indicating further intensification. It is also indicating north-northwestwards movement of system till 4th December and then north-northeastwards recurvature. The system is indicated to cross North Andhra Pradesh-South Odisha coast on 5th December as a very severe cyclonic storm. Thereafter, it is indicated to move along coast with rapid weakening. ECMWF is indicating formation of depression on 29th/1500 UTC over southeast Bay of Bengal. It is also indicating intensification into cyclonic storm on 2nd December over southwest Bay of Bengal. Further intensification is also suggested. It is also indicating crossing over North Andhra Pradesh-South Odisha coasts, but on 6th December. Similarly, NCUM is indicating formation of low pressure area on 30th November over southeast Bay of Bengal with west-northwestwards movement till 3rd December. As a low pressure area and depression over southwest Bay of Bengal on 4th (delayed development as compared to other models). It is also suggesting further intensification into a severe cyclonic storm. IMD multi model ensemble (MME) is indicating formation of depression around 29th November with initial west-northwestwards movement till 30th November. Thereafter system is indicated to recurve gradually north-northeastwards. Peak intensification upto severe cyclonic storm stage is indicated.

Considering all the above, the low-pressure area over South Andaman Sea & adjoining Malacca Strait is likely to move west-northwestwards and intensify into a depression over southeast Bay of Bengal around 29th November, 2023. Thereafter, it is likely to move northwestwards and intensify further into a cyclonic storm over southeast Bay of Bengal during subsequent 48 hours.

Probability of Cyclogenesis (formation of depression and above intensity systems) over Bay 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	HIGH

Every 24 hour forecast is valid upto 0300 UTC of the next day.

2. For the Arabian Sea:

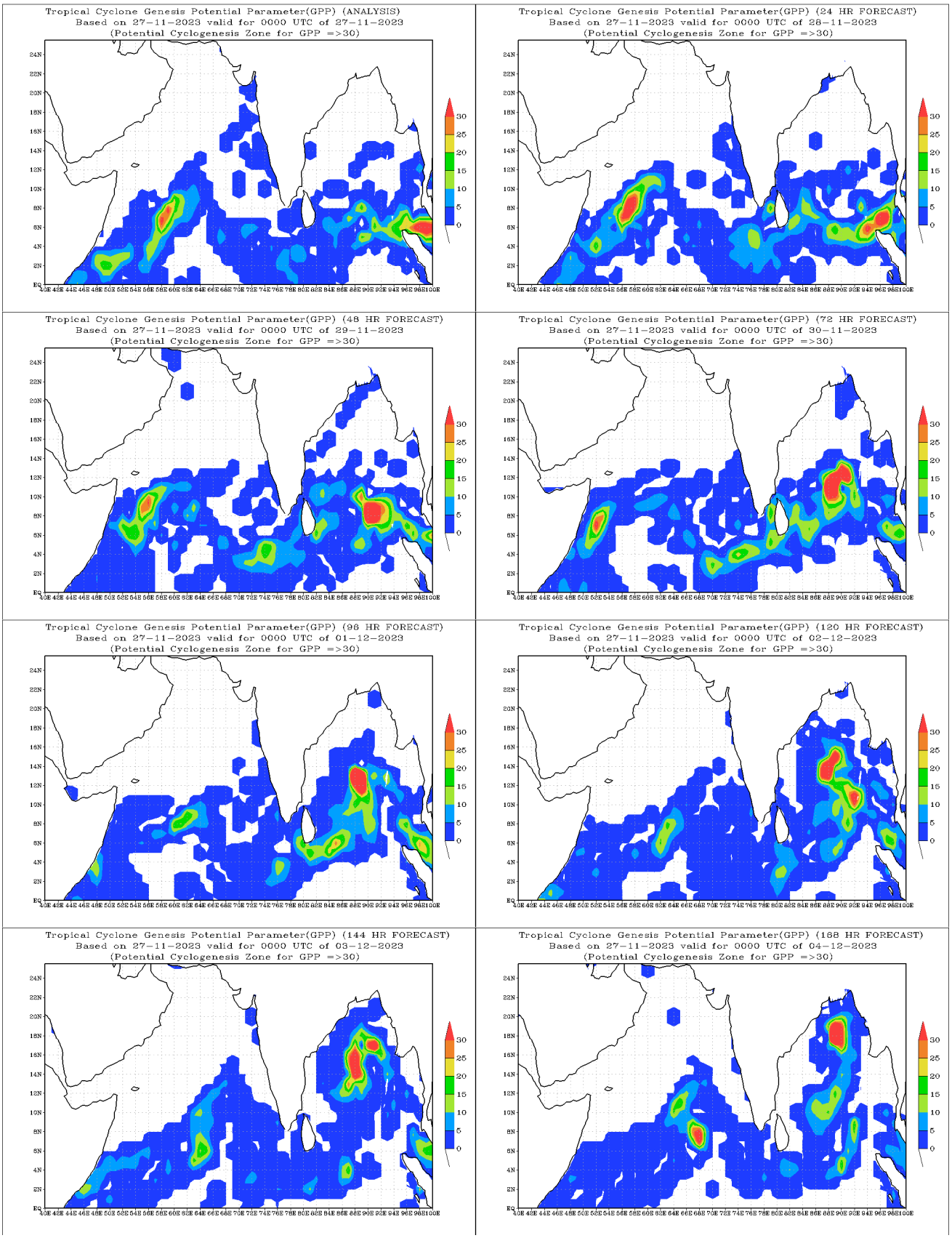
Most of the models are indicating that there will be no significant system for the next seven days. However, models are indicating a cyclonic circulation over southwest Arabian Sea as on today i.e., 27th November having westward movement till 28th November without further intensification.

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

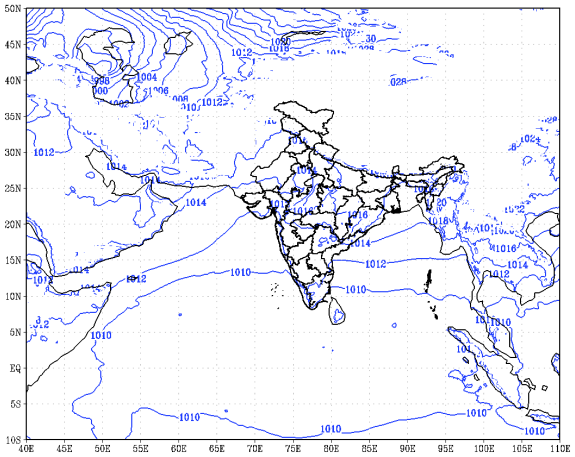
24 HOURS	24-48 HOURS	48-72 HOURS	72-96 HOURS	96-120 HOURS	120-144 HOURS	144-168 HOURS
NIL	NIL	NIL	NIL	NIL	NIL	NIL

Every 24 hour forecast is valid upto 0300 UTC of the next day.

IOP: IOP for Andaman & Nicobar Islands for 26th - 29th November.

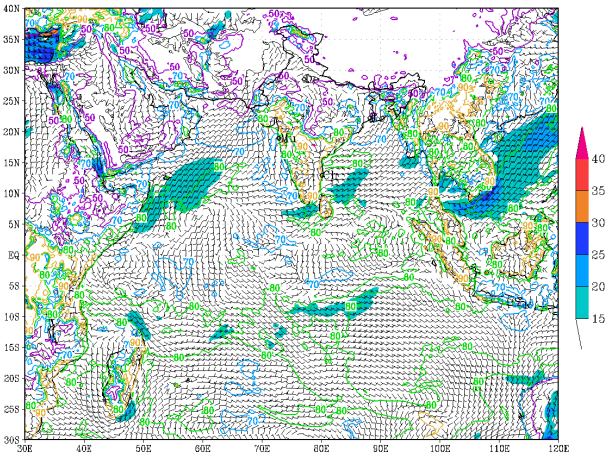

Tropical Cyclone Genesis Potential Parameter(GPP) (ANALYSIS)
Based on 27-11-2023 valid for 0000 UTC of 27-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (24 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 28-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (48 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 29-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (72 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 30-11-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (96 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 01-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (120 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 02-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (144 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 03-12-2023
(Potential Cyclogenesis Zone for GPP =>30)
Tropical Cyclone Genesis Potential Parameter(GPP) (168 HR FORECAST)
Based on 27-11-2023 valid for 0000 UTC of 04-12-2023
(Potential Cyclogenesis Zone for GPP =>30)

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (00 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 27-11-2023



(Background does not depict political boundary)

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (00 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 27-11-2023



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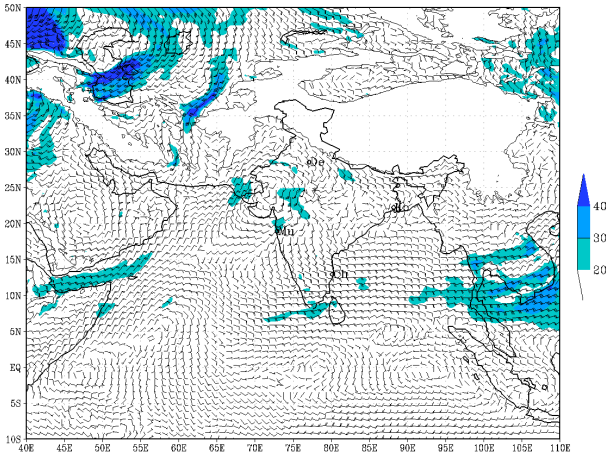
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 27-11-2023



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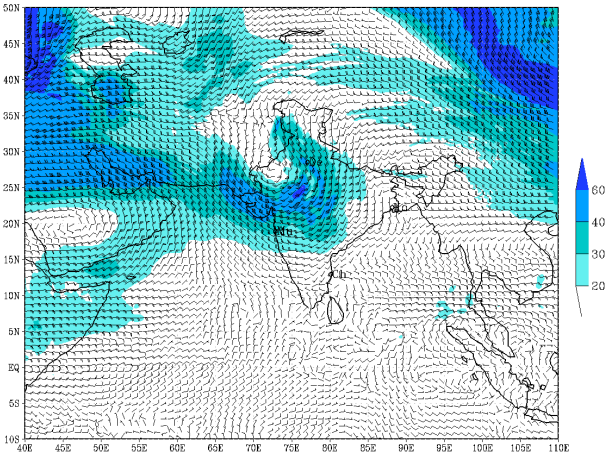

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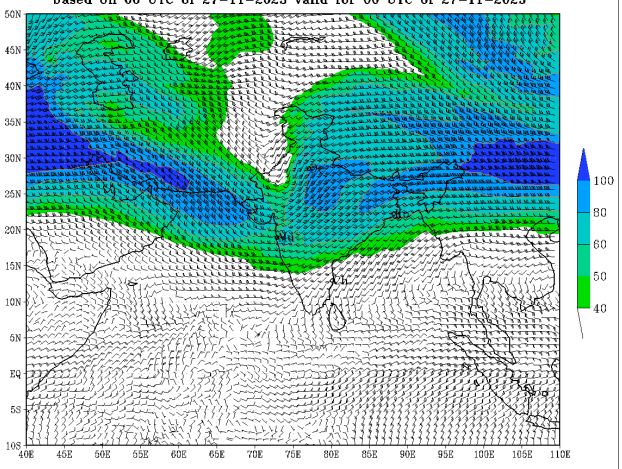
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (00 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 27-11-2023



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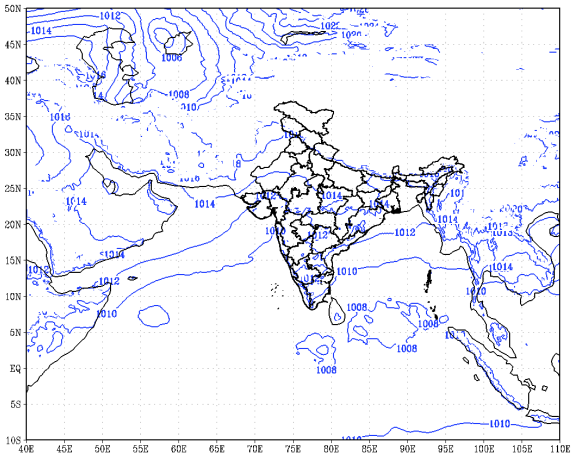
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (24 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 28-11-2023



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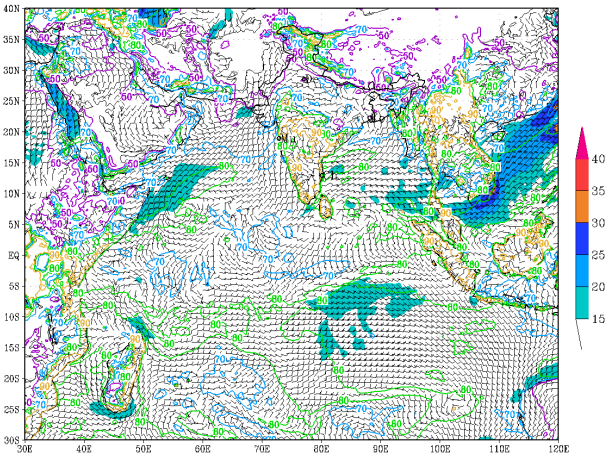
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (24 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 28-11-2023



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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (24 HR)

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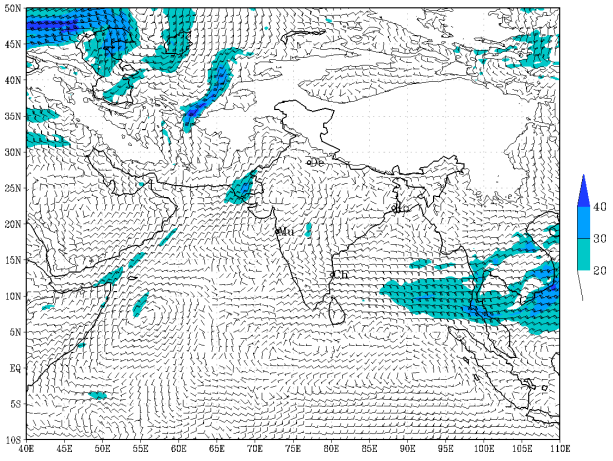

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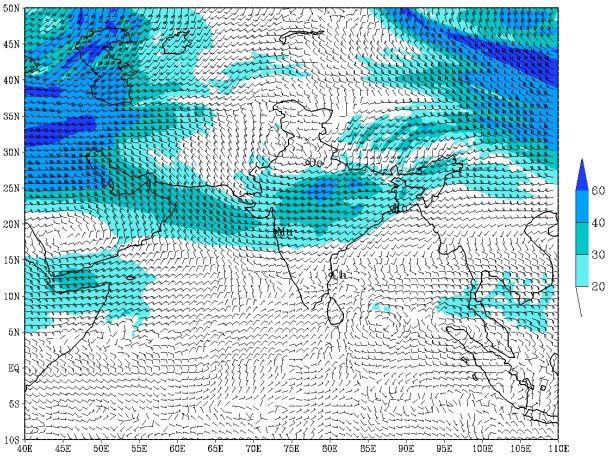
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 28-11-2023



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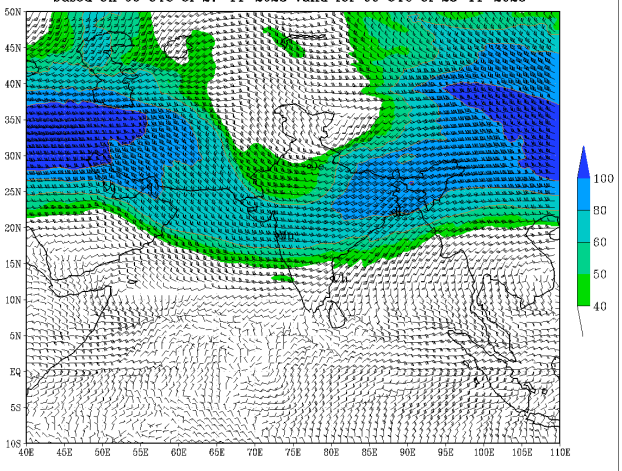
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (24 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 28-11-2023



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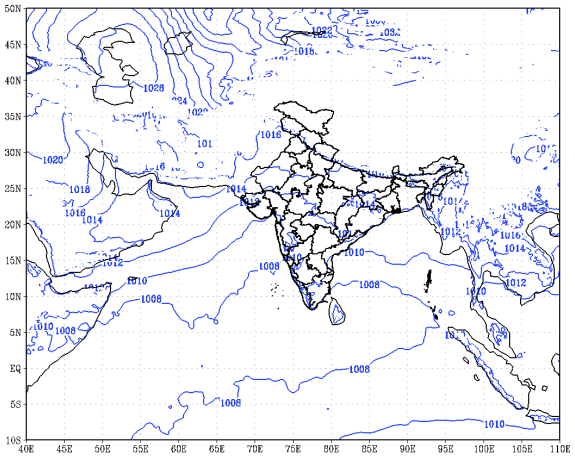
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (48 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 29-11-2023



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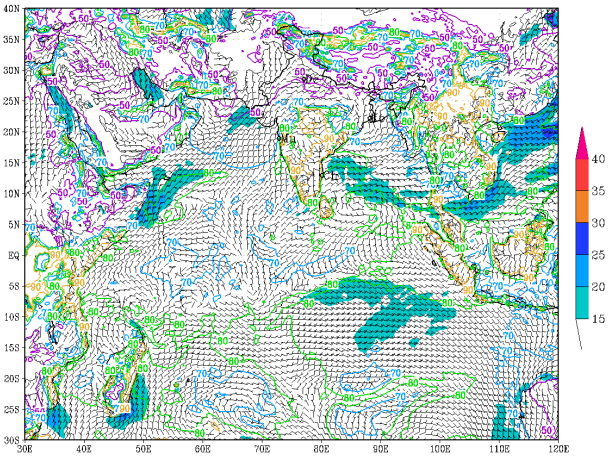
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (48 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 29-11-2023



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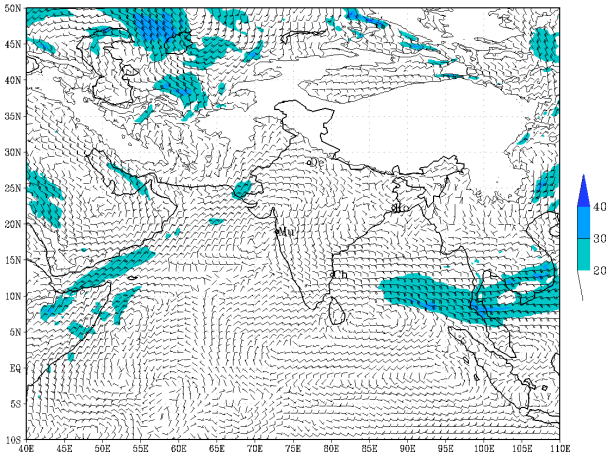
IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (48 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 29-11-2023



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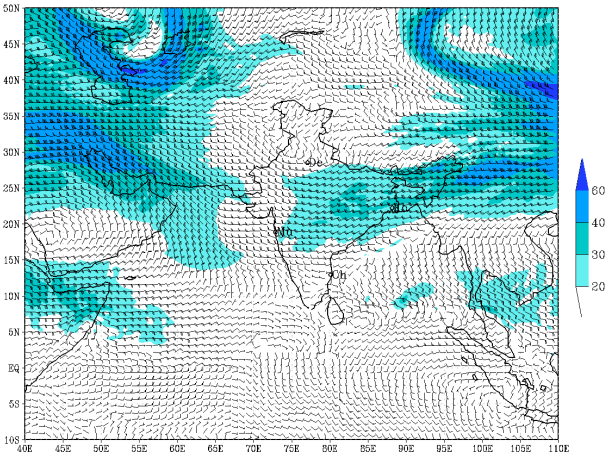
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (48 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 29-11-2023



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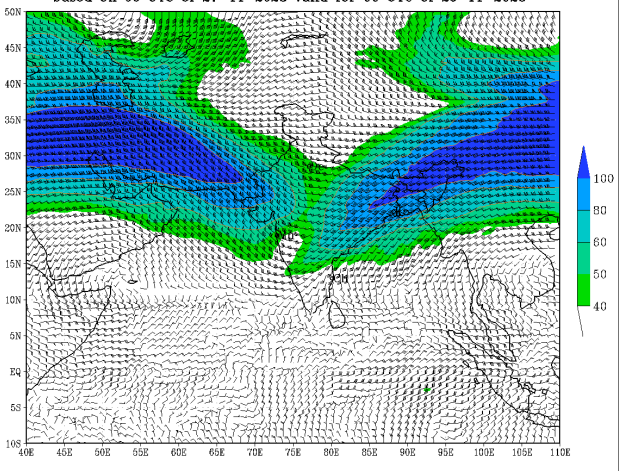
IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (48 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 29-11-2023



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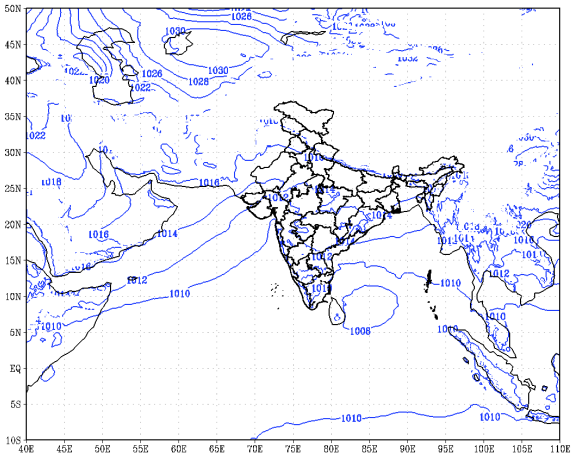
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (72 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 30-11-2023



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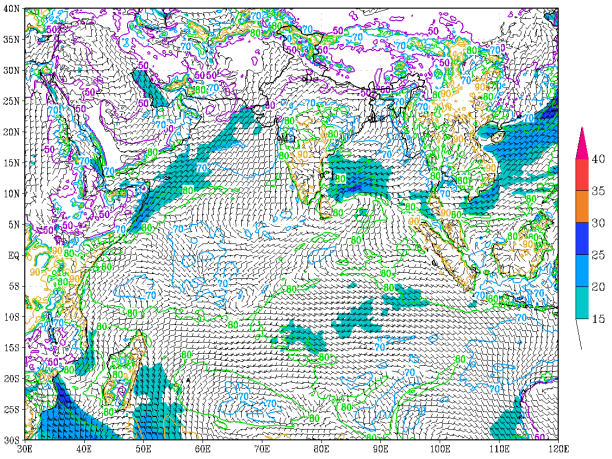
IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (72 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 30-11-2023



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IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (72 HR)

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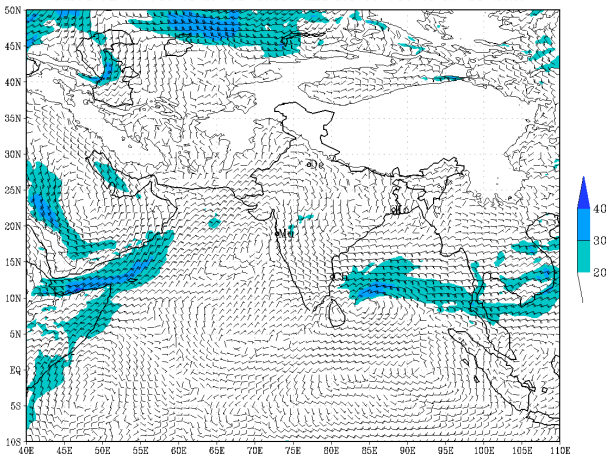

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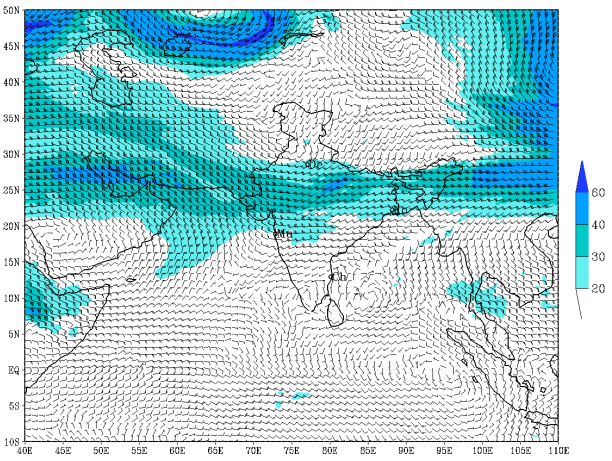
IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (72 HR)

based on 00 UTC of 27-11-2023 valid for 00 UTC of 30-11-2023



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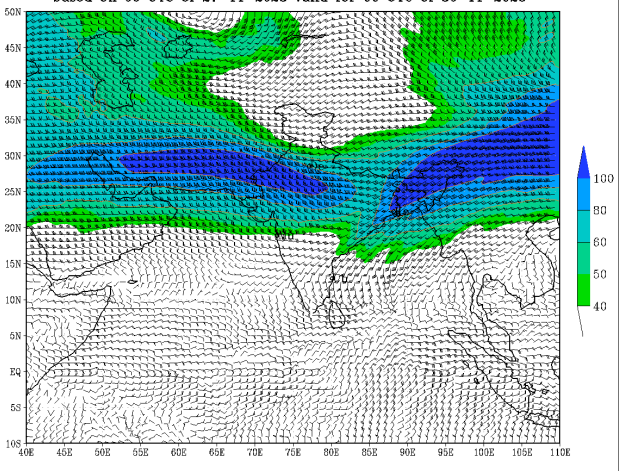

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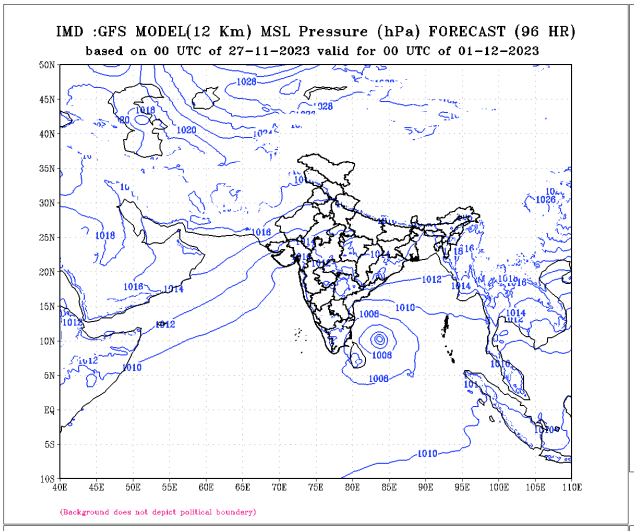
IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (96 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 01-12-2023
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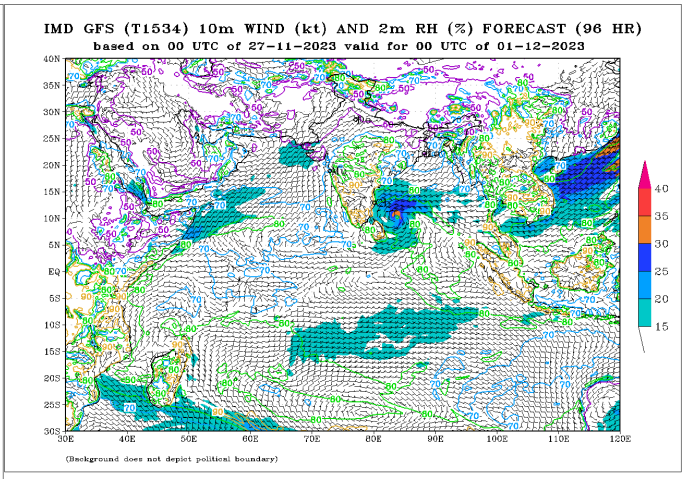
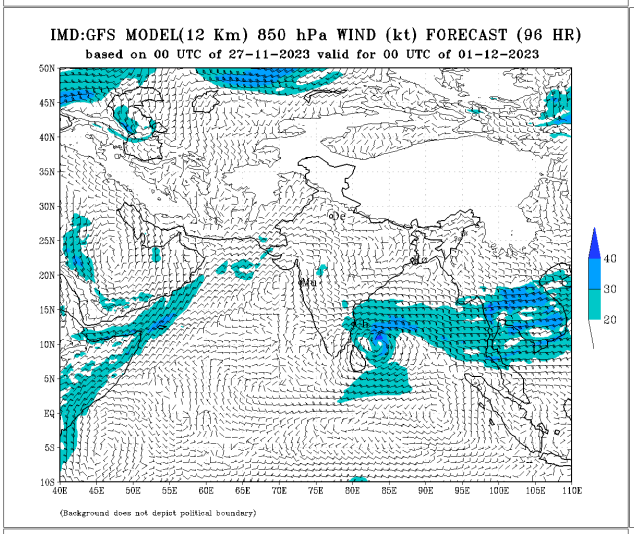
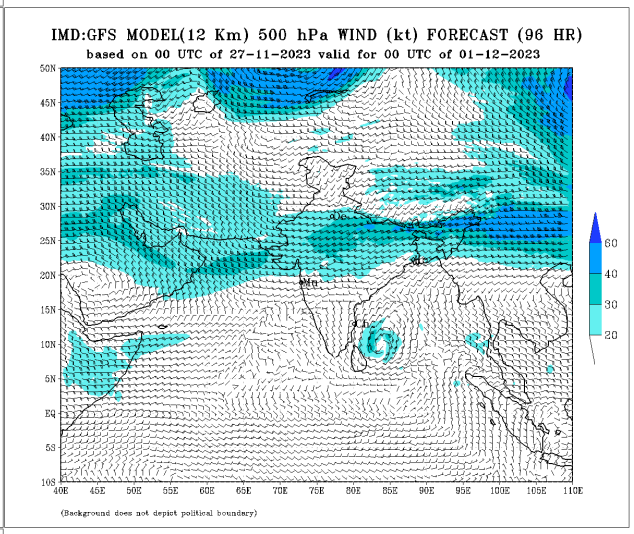
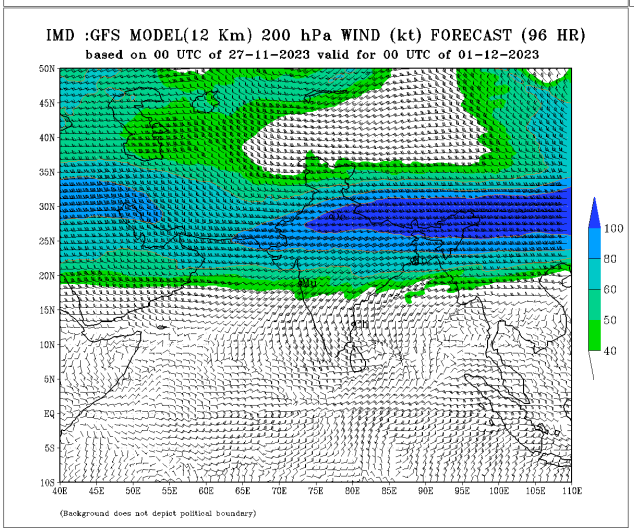
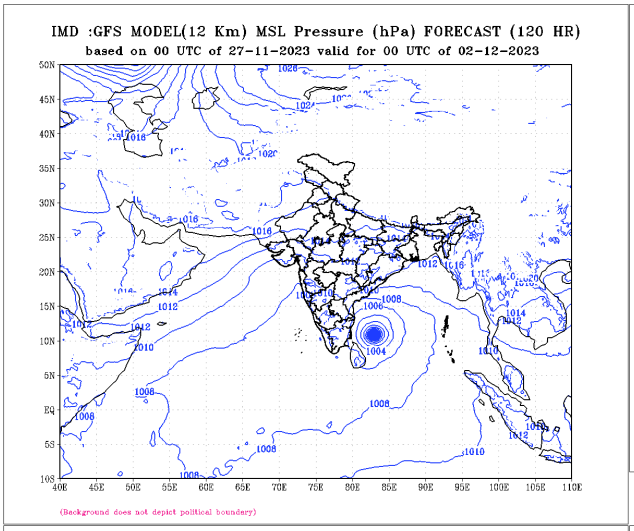
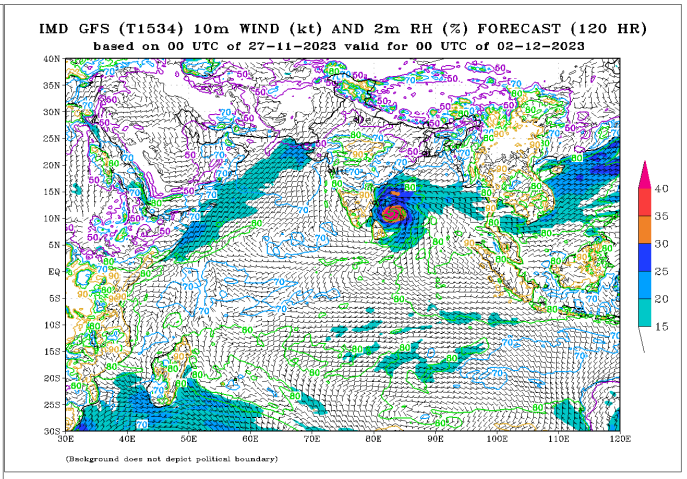

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (96 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 01-12-2023
(Background does not depict political boundary)

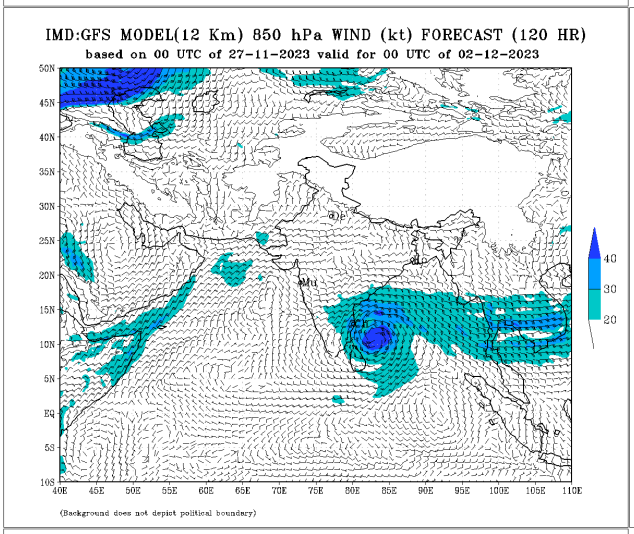

IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 01-12-2023
(Background does not depict political boundary)

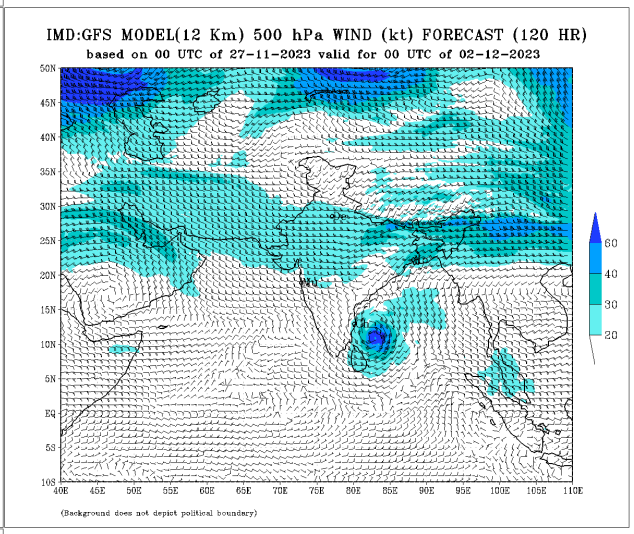

IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 01-12-2023
(Background does not depict political boundary)

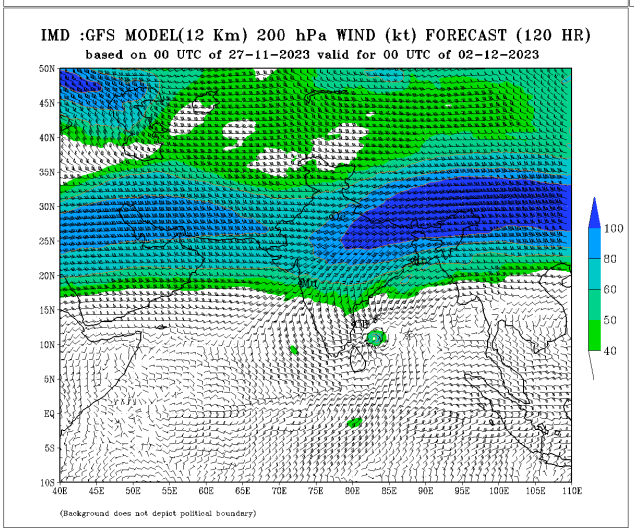

IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (96 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 01-12-2023
(Background does not depict political boundary)

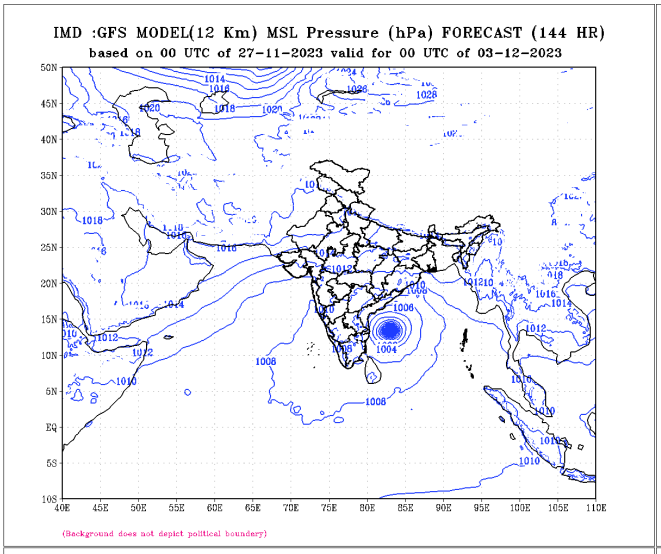

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (120 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)

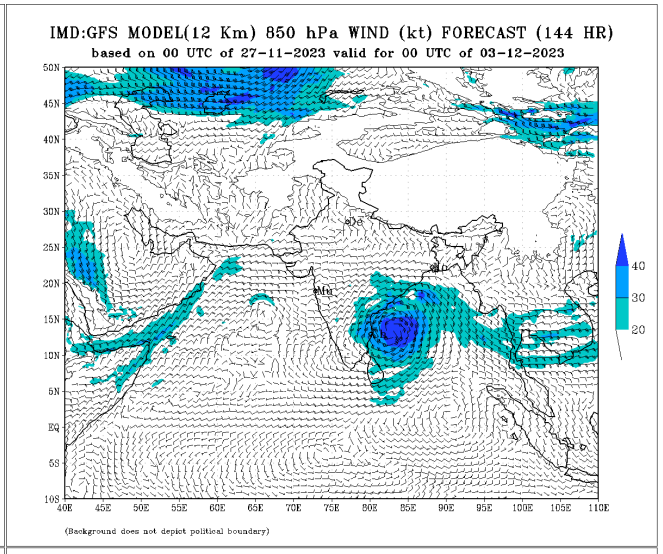

IMD GFS (T1534) 10m WIND (kt) AND 2m RH (%) FORECAST (120 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (120 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 02-12-2023
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (144 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 03-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 03-12-2023
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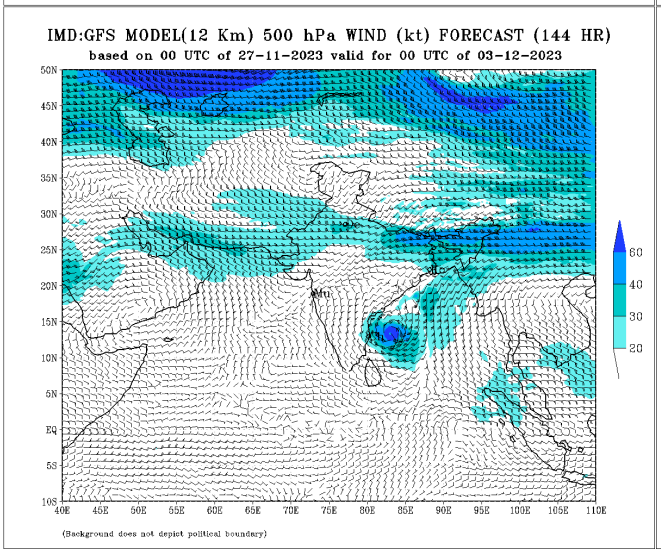
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 03-12-2023
60
40
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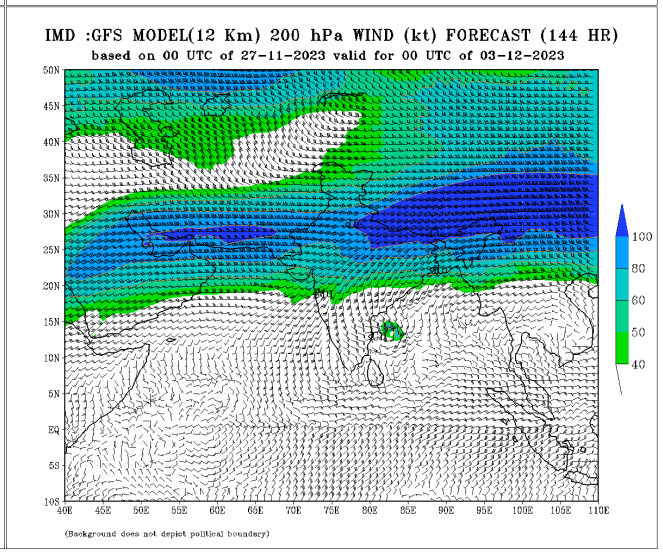
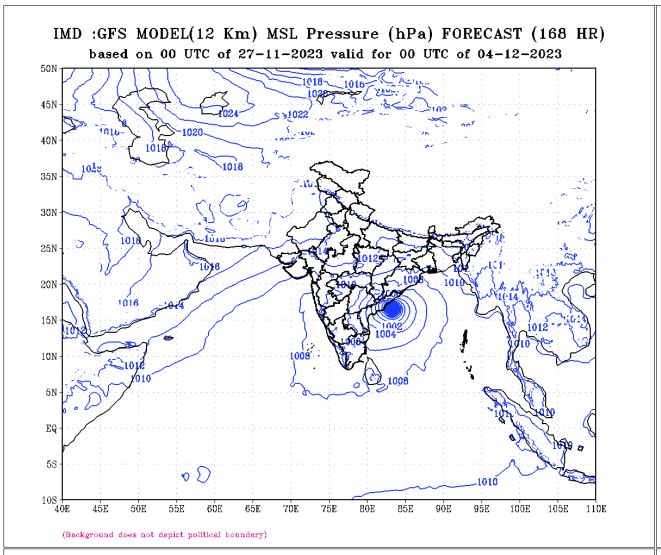
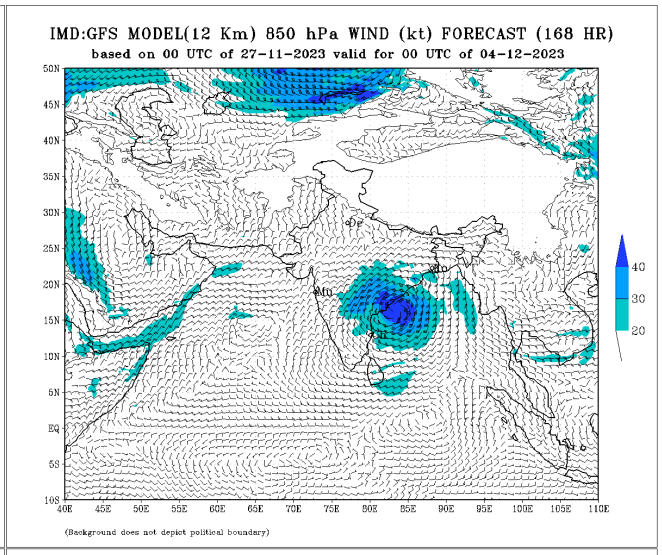
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (144 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 03-12-2023
100
80
60
50
40
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (168 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 04-12-2023
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 850 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 04-12-2023
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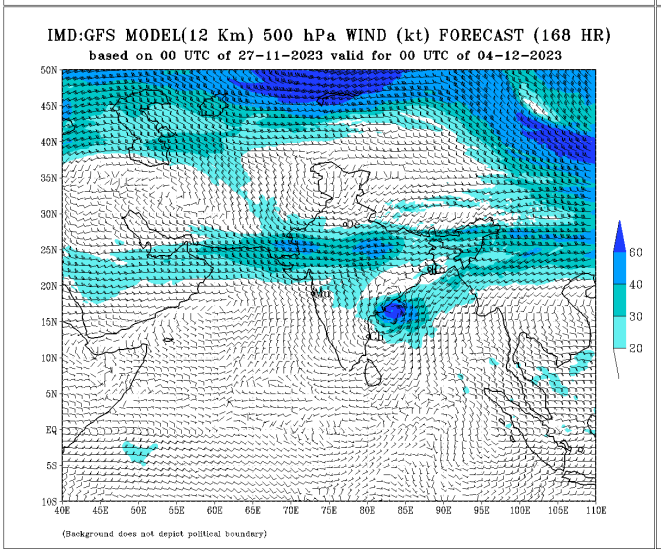
(Background does not depict political boundary)


IMD:GFS MODEL(12 Km) 500 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 04-12-2023
60
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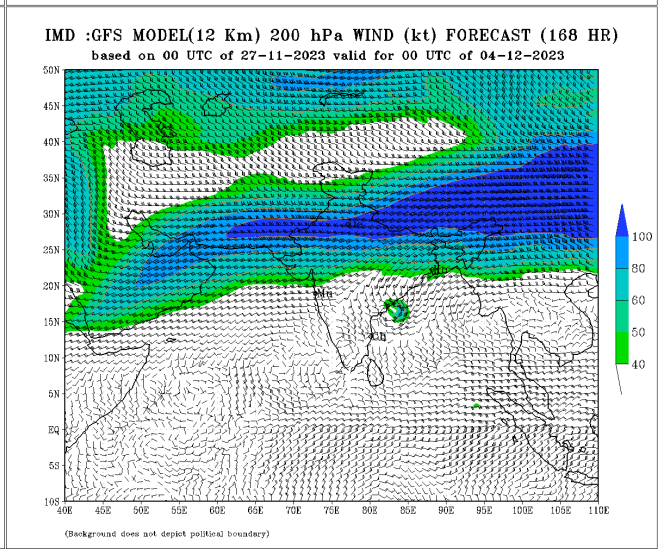
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) 200 hPa WIND (kt) FORECAST (168 HR)
based on 00 UTC of 27-11-2023 valid for 00 UTC of 04-12-2023
100
80
60
50
40
(Background does not depict political boundary)