



**REGIONAL SPECIALISED METEOROLOGICAL CENTRE-TROPICAL CYCLONES, NEW DELHI
TROPICAL CYCLONE ADVISORY**

DEMS-RSMC SPECIAL TROPICAL CYCLONES NEW DELHI DATED 11.06.2023

FROM: RSMC –TROPICAL CYCLONES, NEW DELHI

**TO: STORM WARNING CENTRE, NAYPYI TAW (MYANMAR)
STORM WARNING CENTRE, BANGKOK (THAILAND)
STORM WARNING CENTRE, COLOMBO (SRILANKA)
STORM WARNING CENTRE, DHAKA (BANGLADESH)
STORM WARNING CENTRE, KARACHI (PAKISTAN)
METEOROLOGICAL OFFICE, MALE (MALDIVES)
OMAN METEOROLOGICAL DEPARTMENT, MUSCAT (THROUGH RTH JEDDAH)
YEMEN METEOROLOGICAL SERVICES, REPUBLIC OF YEMEN (THROUGH RTH JEDDAH)
NATIONAL CENTRE FOR METEOROLOGY, UAE (THROUGH RTH JEDDAH)
PRESIDENCY OF METEOROLOGY AND ENVIRONMENT, SAUDI ARABIA (THROUGH RTH JEDDAH)
IRAN METEOROLOGICAL ORGANISATION, (THROUGH RTH JEDDAH)
QATAR METEOROLOGICAL DEPARTMENT (THROUGH RTH JEDDAH)**

TROPICAL CYCLONE ADVISORY NO. 45 FOR NORTH INDIAN OCEAN (THE BAY OF BENGAL AND ARABIAN SEA) VALID FOR NEXT 120 HOURS ISSUED AT 0330 UTC OF 12.06.2023 BASED ON 0000 UTC OF 12.06.2023

SUB: EXTREMELY SEVERE CYCLONIC STORM “BIPARJOY” (PRONOUNCED AS “BIPORJOY”) OVER EASTCENTRAL AND ADJOINING NORTHEAST ARABIAN SEA

THE EXTREMELY SEVERE CYCLONIC STORM “BIPARJOY” (PRONOUNCED AS “BIPORJOY”) OVER EASTCENTRAL ARABIAN SEA MOVED NORTHWARDS WITH A SPEED OF 5 KMPH DURING PAST 6-HOURS AND LAY CENTERED AT 0000 UTC OF TODAY, THE 12TH JUNE, 2023 OVER THE EASTCENTRAL AND ADJOINING NORTHEAST ARABIAN SEA NEAR LATITUDE 19.2°N AND LONGITUDE 67.7°E, ABOUT 340 KM SOUTHWEST OF PORBANDAR (42830), 380 KM SOUTH-SOUTHWEST OF DEVBHUMI DWARKA (42731), 460 KM SOUTH OF JAKHAU PORT (23.24°N, 68.60°E, INDIA), 470 KM SOUTH-SOUTHWEST OF NALIYA (42631) AND 640 KM SOUTH OF KARACHI (PAKISTAN, 41780).

IT IS VERY LIKELY TO MOVE NEARLY NORTHWARD TILL 14TH MORNING, THEN MOVE NORTH-NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT, 42729) AND KARACHI (PAKISTAN, 41780) NEAR JAKHAU PORT (GUJARAT, INDIA) DURING 0600-0900 UTC OF 15TH JUNE AS A VERY SEVERE CYCLONIC STORM WITH MAXIMUM SUSTAINED WIND SPEED OF 125-135 KMPH GUSTING TO 150 KMPH.

Cloud distribution: (a) Isolated: <25%, Scattered: 25-50%, Broken: 51-75%, Solid: >75%, Convection Intensity: (a) Weak: Cloud Top Temperature (CTT) >-25°C, (b) Moderate: CTT: - 25°C to -40°C, (c) Intense: CTT: - 41°C to -70°C and (d) Very Intense: : Less than -70°C
PROBABILITY OF CYCLOGENESIS (FORMATION OF DEPRESSION): NIL: 0%, LOW: 1-33%, MODERATE: 34-66% AND HIGH: 67-100%
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Forecast track and intensity are given below:

Date/Time(UTC)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
12.06.23/0000	19.2/67.7	165-175 Gusting To 195	Extremely Severe Cyclonic Storm
12.06.23/0600	19.5/67.6	160-170 Gusting To 190	Extremely Severe Cyclonic Storm
12.06.23/1200	20.0/67.5	155-165 Gusting To 185	Very Severe Cyclonic Storm
12.06.23/1800	20.5/67.4	145-155 Gusting To 175	Very Severe Cyclonic Storm
13.06.23/0000	20.7/67.4	145-155 Gusting To 175	Very Severe Cyclonic Storm
13.06.23/1200	21.2/67.3	140-150 Gusting To 165	Very Severe Cyclonic Storm
14.06.23/0000	21.8/67.4	135-145 Gusting To 160	Very Severe Cyclonic Storm
14.06.23/1200	22.4/67.7	130-140 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/0000	23.0/68.3	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/1200	23.5/69.0	90-100 Gusting to 100	Severe Cyclonic Storm
16.06.23/0000	24.1/69.9	50-60 Gusting to 70	Deep Depression
16.06.23/1200	24.7/70.9	30-40 Gusting to 50	Well Marked Low Pressure Area

AS PER INSAT 3D IMAGERY INTENSITY OF THE SYSTEM IS T 5.0/5.0. ASSOCIATED BROKEN LOW AND MEDIUM CLOUDS WITH EMBEDDED INTENSE TO VERY INTENSE CONVECTION LAY OVER CENTRAL ARABIAN SEA BETWEEN LATITUDE 15°N & 20.0°N AND LONGITUDE 64.0°E & 68.8°E. MINIMUM CLOUD TOP TEMPERATURE IS MINUS 93°C.

ASSOCIATED MAXIMUM SUSTAINED WIND SPEED IS 90 KNOTS GUSTING TO 100 KNOTS. THE ESTIMATED CENTRAL PRESSURE IS 966 HPA. SEA CONDITION IS LIKELY TO BE PHENOMENAL OVER EASTCENTRAL AND ADJOINING WESTCENTRAL & NORTHEAST ARABIAN SEA.

REMARKS:

THE MADDEN JULIAN OSCILLATION (MJO) INDEX IS CURRENTLY IN PHASE 4 WITH AMPLITUDE LESS THAN 1. IT WOULD MOVE ACROSS PHASE 4 DURING NEXT 2 DAYS. THEREAFTER, IT WOULD MOVE ACROSS PHASES 5 AND 6 DURING SUBSEQUENT 3 DAYS. HENCE, MJO IS LIKELY TO SUPPORT THE ENHANCEMENT OF CONVECTIVE ACTIVITY AND CYCLOGENESIS OVER THE ARABIAN SEA DURING THE SAME PERIOD.

SEA SURFACE TEMPERATURE IS AROUND 30-31°C OVER CENTRAL & ADJOINING SOUTH ARABIAN SEA AND DECREASE TO 28-30°C OVER NORTH ARABIAN SEA. THE CYCLONIC STORM "BIPARJOY" IS CURRENTLY IN A VERY FAVOURABLE ENVIROMENT.POSITIVE LOW LEVEL VORTICITY IS AROUND $300 \times 10^{-6} \text{S}^{-1}$ TO THE SOUTH-SOUTHWEST OF THE SYSTEM CENTRE, LOW LEVEL CONVERGENCE IS ABOUT ABOUT $30 \times 10^{-5} \text{S}^{-1}$ TO THE WEST OF THE SYSTEM CENTRE AND UPPER LEVEL DIVERGENCE HAS INCREASED AND IS IS ABOUT $40 \times 10^{-5} \text{S}^{-1}$ TO THE SOUTH-SOUTHWESTOF SYSTEM CENTRE. WIND SHEAR IS MODERATE (20-25 KNOTS) OVER SYSTEM AREA AND IS REDUCED TO 05-15 KNOTS ALONG THE FORECAST TRACK.

CURRENTLY, THE SYSTEM IS MOVING NEARLY NORTHWARDS UNDER THE INFLUENCE OF 2 ACTIVE ANTICYCLONIC CIRCULATIONS, ONE LOCATED OVER WEST INDIA TO THE EAST-NORTHEAST OF SYSTEM CENTRE AND ANOTHER LOCATED OVER ARABIAN PENINSULAR AND ADJOINING WESTCENTRAL ARABIAN SEA TO THE WEST-NORTHWEST OF SYSTEM CENTRE. DUE TO THE VARIATION IN THE STRENGTH OF THESE ANTICYCLONIC CIRCULATIONS IN THE MIDDLE AND UPPER TROPOSPHERIC LEVELS AND DEPENDING

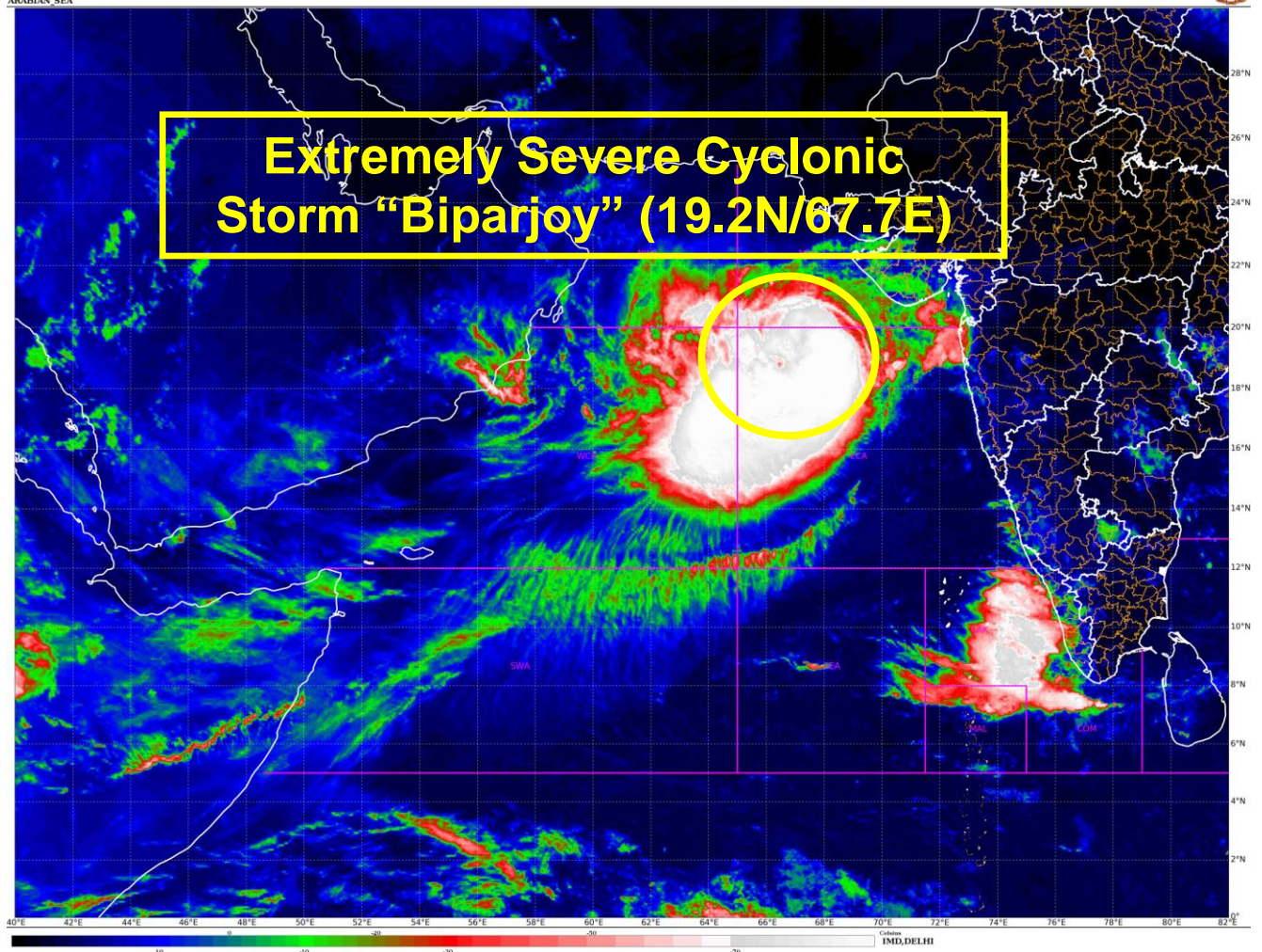
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UPON THE DOMINANCE OF ONE OF THESE ANTI CYCLONIC CIRCULATIONS OVER THE PERIOD OF TIME, THE SYSTEM HAS CHANGED PATH IN THE PAST AND ALSO, IT IS LIKELY TO CHANGE THE DIRECTION OF MOVEMENT ONCE FURTHER DURING THE FORECAST PERIOD. FURTHER, AS THE CYCLONE IS MOVING VERY CLOSE TO THE SOUTH OF THE UPPER TROPOSPHERIC RIDGE IN ASSOCIATION WITH THESE ANTICYCLONIC CIRCULATIONS, THE MOVEMENT OF THE SYSTEM HAS BEEN DOMINANTLY NORTHWARD. WHEN THE SYSTEM WILL APPROACH COAST, IT IS LIKELY TO EXPERIENCE LESSER OCEAN THERMAL ENERGY (40-50 KJ/CM²) AND DECREASE IN MIDDLE LEVEL HUMIDITY DUE TO DRY COLD AIR INTRUSION.

LATEST GUIDANCE FROM VARIOUS MODELS (NCUM-R, NCUM-G, NEPS, GEFS, ECMWF, IMD MME) INDICATE INITIAL NEAR NORTHWARDS MOVEMENT FOLLOWED BY GRADUAL NORTH-NORTHEASTWARDS MOVEMENT TOWARDS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS. OVER THE PERIOD OF TIME. THOUGH, THERE HAS BEEN ALSO A CONSENSUS BUILT UP AMONG THESE MODELS INDICATING THE SYSTEM MOVEMENT TOWARDS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS AND THEIR LANDFALL FORECASTS MARGINALLY VARYING BETWEEN 67.7°E-68.6°E. BUT TIMING OF LANDFALL FORECASTS BY THESE MODELS ARE OF HIGH VARIATION AND MOST OF THESE MODELS SHOW LIKELY LANDFALL TIMING BETWEEN 0600-1000 UTC OF 15TH JUNE.

CONSIDERING ALL THE ABOVE, IT IS VERY LIKELY TO MOVE NEARLY NORTHWARD TILL 14TH MORNING, THEN MOVE NORTH-NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT) AND KARACHI (PAKISTAN) AROUND by UTC OF 15TH JUNE AS A VERY SEVERE CYCLONIC STORM WITH MAXIMUM SUSTAINED WIND SPEED OF 125-135 KMPH GUSTING TO 150 KMPH.

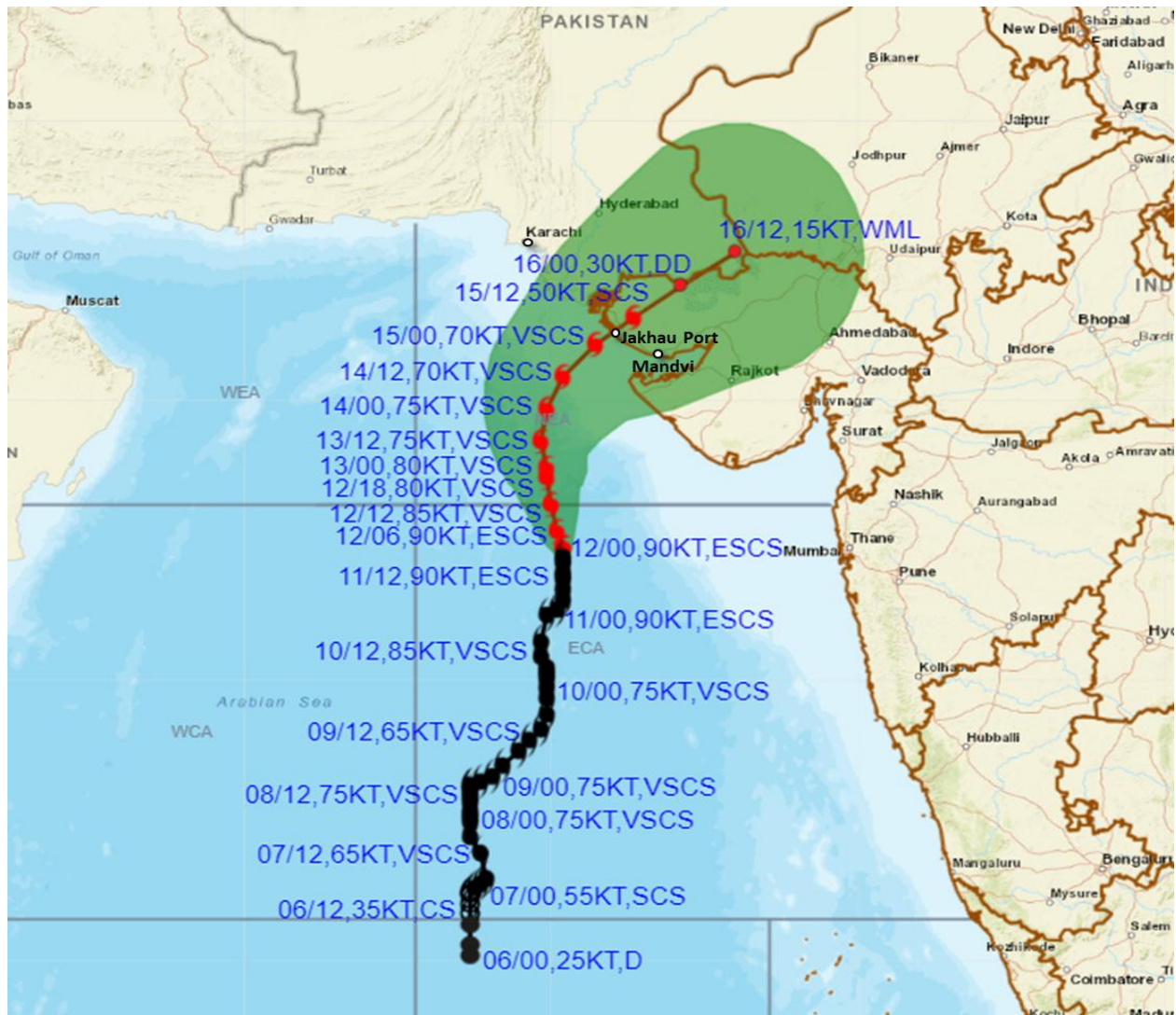
**M. T. BUSHAIR
SCIENTIST C
RSMC NEW DELHI**



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OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF EXTREMELY SEVERE CYCLONIC STORM “BIPARJOY” OVER EASTCENTRAL AND ADJOINING NORTHEAST ARABIAN SEA BASED ON 0000 UTC (0530 IST) OF 12TH JUNE 2023.



DATE/TIME IN UTC

IST=UTC + 0530

L: LOW PRESSURE AREA

WML: WELL MARKED LOW PRESSURE AREA

D: DEPRESSION (17-27 KT)

DD: DEEP DEPRESSION (28-33 KT)

CS: CYCLONIC STORM (34-47 KT)

SCS: SEVERE CYCLONIC STORM (48-63KT)

VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)

ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)

SuCS: SUPER CYCLONIC STORM (≥ 120 KT)

● LESS THAN 34 KT

○ 34-47 KT

○ ≥ 48 KT

— OBSERVED TRACK

— FORECAST TRACK

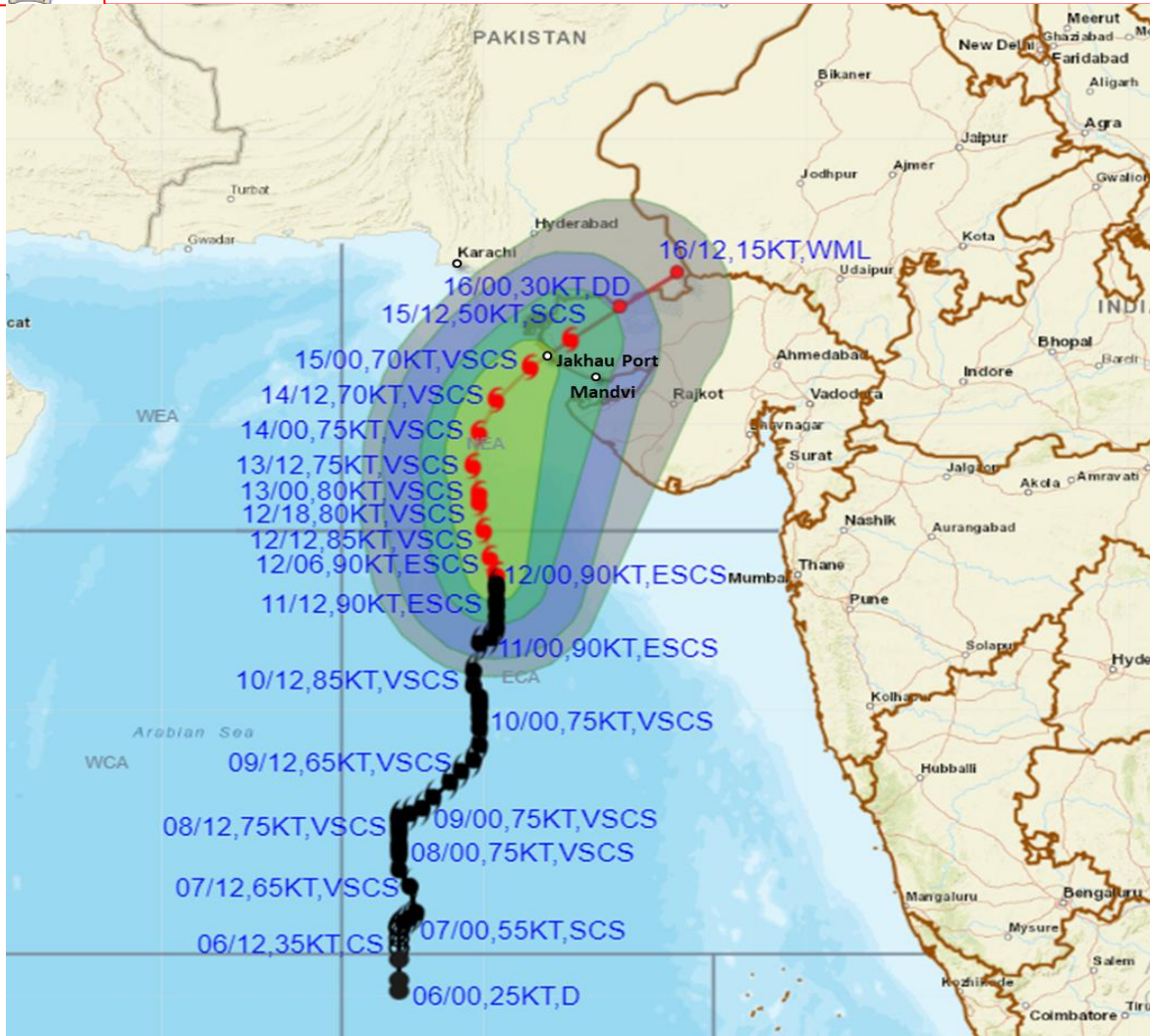
▲ CONE OF UNCERTAINTY

Forecast	DISTANCE(KM) AND DIRECTION FROM STATIONS				
Date and Time	PORBANDAR	DWARKA	JAKHAU PORT	NALIYA	KARACHI AIRPORT
13.06.23/0000	250, WSW	250, SW	300, SSW	320, SSW	460, S
14.06.23/0000	230, W	180, WSW	200, SW	210, SW	340, S
15.06.23/0000	210, NW	110, NW	50, SW	70, WSW	250, SSE
16.06.23/0000	270, N	210, NNE	160, NE	140, NE	290, ESE

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SuCS: SUPER CYCLONIC STORM (\geq 120 KT)

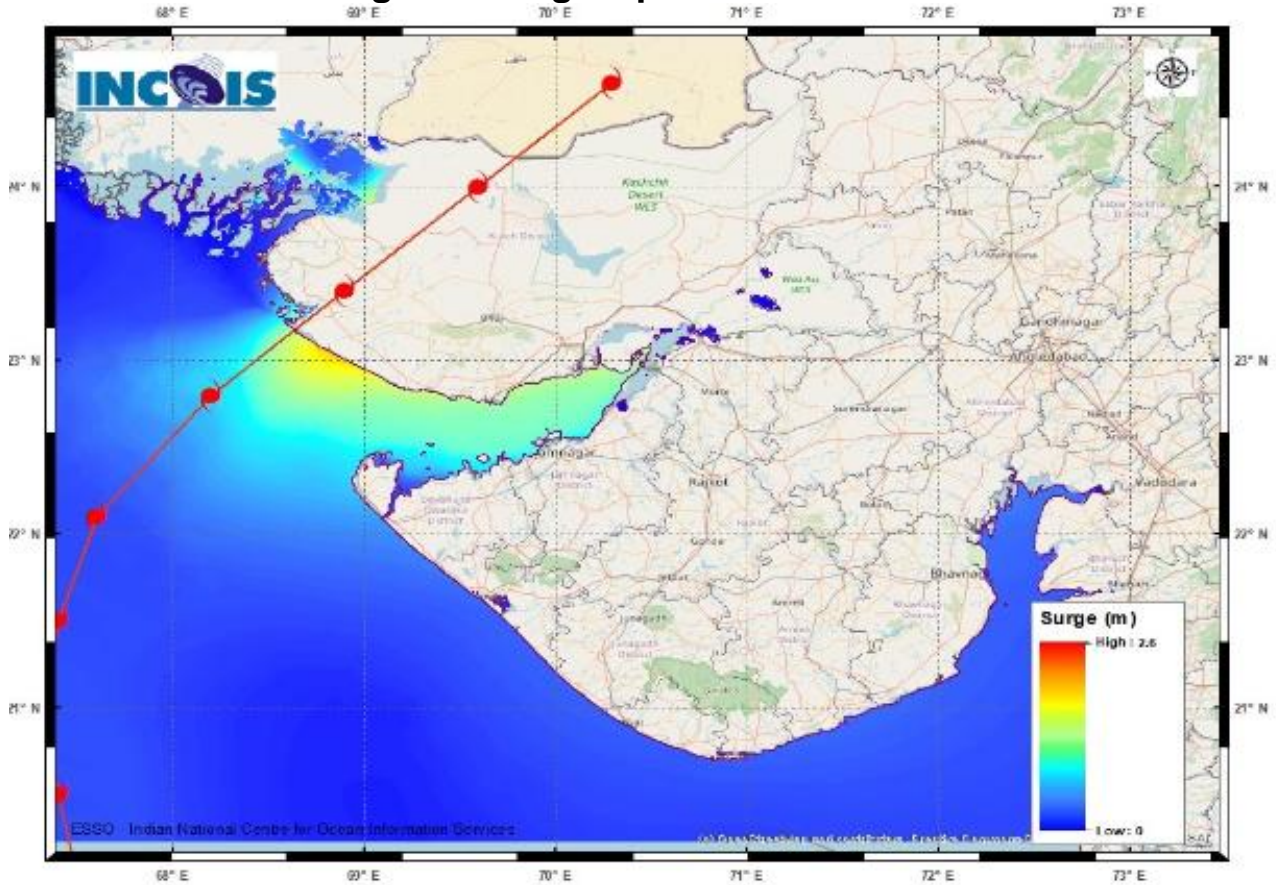
- LESS THAN 34 KT
- 34-47 KT
- \geq 48 KT
- OBSERVED TRACK
- FORECAST TRACK
- CONE OF UNCERTAINTY
- AREA OF MAXIMUM SUSTAINED WIND SPEED:
- 28-33 KT (52-61 KMPH)
- 34-49 KT (62-91 KMPH)
- 50-63 KT (92-117 KMPH)
- \geq 64 KT (\geq 118 KMPH)

IMPACT OVER THE SEA

MSW (knot/kmph)	Impact	Action
28-33 (52-61)	Very rough seas	Total suspension of fishing operations
34-49 (62-91)	High to very high seas	Total suspension of fishing operations
50-63 (92-117)	Very high seas	Total suspension of fishing operations
\geq 64 (\geq 118)	Phenomenal	Total suspension of fishing operations

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Storm Surge Warning Map based on Forecast Track

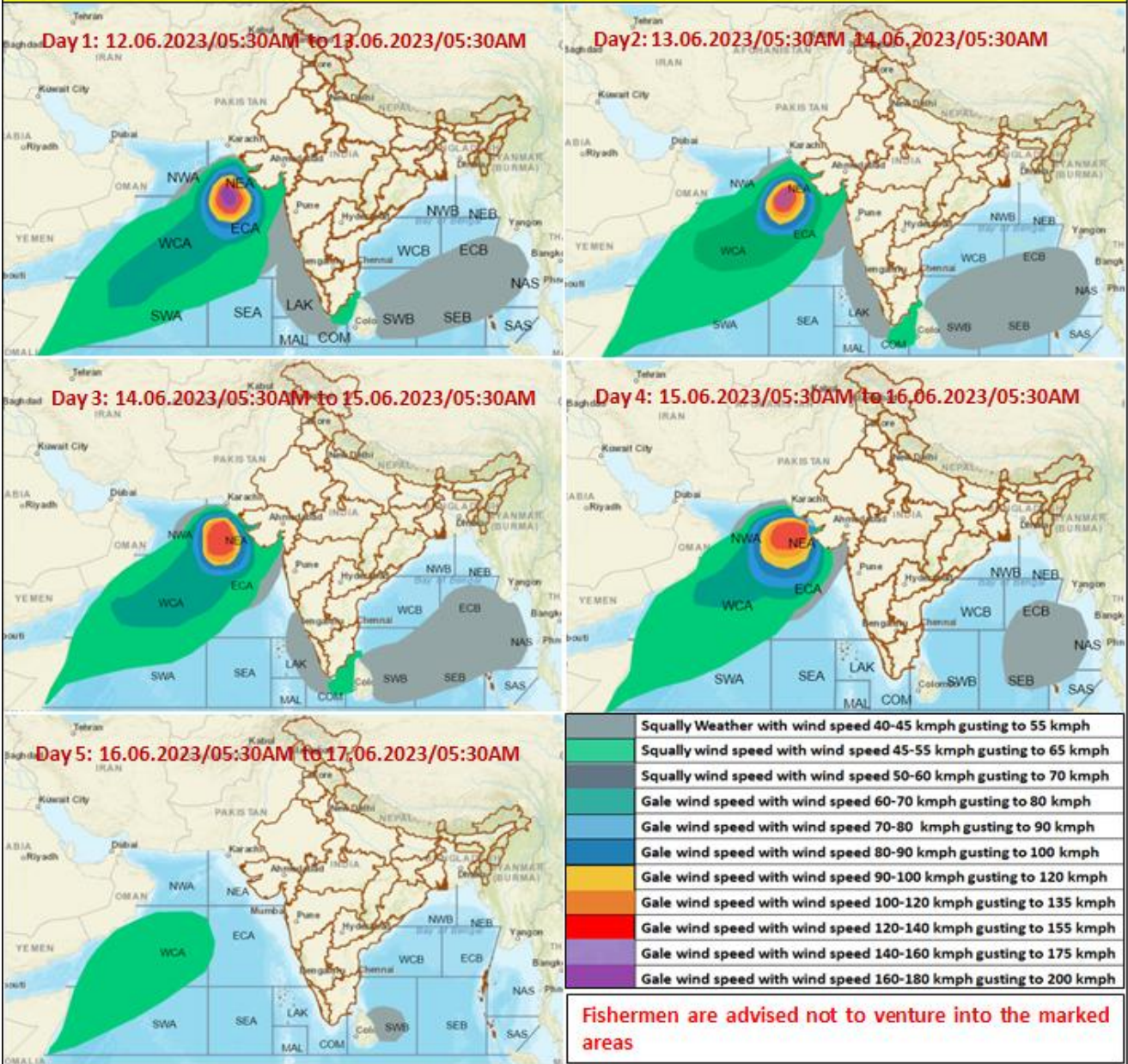


Astronomical Tide on 15th June 2023

Station	Time (IST)	Height (m)
Porbandar	09:37	2.61
Navlakhi	13:38	7.54
OKHA	11:36	3.74
DEENDAYAL PORT (KANDLA)	13:02	6.79

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Fishermen warning graphics



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