



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

**DEMS-RSMC SPECIAL TROPICAL CYCLONES NEW DELHI DATED 13.06.2023**

**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. 60 FOR NORTH INDIAN OCEAN (THE BAY OF BENGAL AND ARABIAN SEA) VALID FOR NEXT 120 HOURS ISSUED AT 0000 UTC OF 14.06.2023 BASED ON 2100 UTC OF 13.06.2023**

**SUB: VERY SEVERE CYCLONIC STORM “BIPARJOY” (PRONOUNCED AS “BIPORJOY”) OVER NORTHEAST ARABIAN SEA (CYCLONE WARNING FOR SAURASHTRA & KUTCH COASTS (ORANGE MESSAGE))**

THE VERY SEVERE CYCLONIC STORM “BIPARJOY” (PRONOUNCED AS “BIPORJOY”) OVER NORTHEAST ARABIAN SEA MOVED NEARLY NORTH-NORTHWESTWARDS WITH A SPEED OF 5 KMPH DURING PAST 6-HOURS AND LAY CENTERED AT 2100 UTC OF 13<sup>TH</sup> JUNE, 2023 OVER THE SAME REGION NEAR LATITUDE 21.7°N AND LONGITUDE 66.3°E, ABOUT 290 KM SOUTHWEST OF JAKHAU PORT (GUJARAT), 300 KM WEST-SOUTHWEST OF DEVBHUMI DWARKA (42731), 310 KM SOUTHWEST OF NALIYA (42631), 350 KM WEST OF PORBANDAR (42830), AND 370 KM SOUTH-SOUTHWEST OF KARACHI (PAKISTAN, 41780).

IT IS VERY LIKELY TO MOVE NEARLY NORTH-NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT, 42929) AND KARACHI (PAKISTAN, 41780) NEAR JAKHAU PORT (GUJARAT) BY 1200 OF 15<sup>TH</sup> JUNE AS A VERY SEVERE CYCLONIC STORM WITH MAXIMUM SUSTAINED WIND SPEED OF 125-135 KMPH GUSTING TO 150 KMPH.

**Forecast track and intensity are given below:**

<b>Date/Time(UTC)</b>	<b>Position (Lat. °N/ long. °E)</b>	<b>Maximum sustained surface wind speed (Kmph)</b>	<b>Category of cyclonic disturbance</b>
13.06.23/2100	21.7/66.3	150-160 Gusting To 180	Very Severe Cyclonic Storm
14.06.23/0000	22.0/66.4	145-155 Gusting To 170	Very Severe Cyclonic Storm
14.06.23/0600	22.3/66.7	140-150 Gusting To 165	Very Severe Cyclonic Storm
14.06.23/1200	22.6/67.0	135-145 Gusting To 160	Very Severe Cyclonic Storm
14.06.23/1800	22.9/67.5	135-145 Gusting To 160	Very Severe Cyclonic Storm
15.06.23/0600	23.3/68.2	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/1800	23.9/69.3	90-100 Gusting To 110	Severe Cyclonic Storm
16.06.23/0600	24.5/70.4	50-60 Gusting To 70	Deep Depression
16.06.23/1800	25.1/71.7	35-45 Gusting To 55	Depression

AS PER INSAT 3D IMAGERY, INTENSITY OF THE SYSTEM IS T4.5. CLOUDS ARE ORGANISED IN CENTRAL DENSE OVERCAST PATTERN. ASSOCIATED BROKEN LOW AND MEDIUM CLOUDS WITH EMBEDDED INTENSE TO VERY INTENSE CONVECTION LAY MAINLY OVER CENTRAL AND ADJOINING NORTH ARABIAN SEA BETWEEN LATITUDE 17.0°N & 24.0°N AND LONGITUDE 61.0°E & 68.0°E. MINIMUM CLOUD TOP TEMPERATURE IS MINUS 93°C. CLOUDS ARE ORIENTED IN SOUTH-SOUTHWEST TO NORTH-NORTHEAST DIRECTION. IN ASSOCIATION WITH THE OUTER BAND, CONVECTIVE CLOUDS ARE COVERING COASTAL DISTRICTS OF SAURASHTRA AND KUTCH, EXTENDING FROM DEVBHUMI DWARKA DISTRICT TO KACHCHH DISTRICT. MICROWAVE IMAGERY AT 0824 UTC INDICATES, INTENSE CONVECTIVE CLOUD MASS IN THE SOUTHERN SECTOR. MULTISAT WINDS INDICATE STRONGER WINDS IN THE NORTHEAST SECTOR. THE CONVECTION IN ASSOCIATION WITH CYCLONE HAS SHOWN DIURNAL VARIATION TODAY BEING MAXIMUM AT 0900 UTC LIKE PREVIOUS DAYS.

ASSOCIATED MAXIMUM SUSTAINED WIND SPEED (MSW) IS 85 KNOTS GUSTING TO 95 KNOTS. THE ESTIMATED CENTRAL PRESSURE IS 970 HPA. SEA CONDITION IS LIKELY TO BE PHENOMENAL OVER NORTHEAST AND ADJOINING EASTCENTRAL ARABIAN SEA.

THE PRESSURE HAS FALLEN ALONG SAURASHTRA AND KUTCH COASTS BY ABOUT 0.5-1.0 HPA DURING PAST 24 HOURS, ENDING AT 1200 UTC OF TODAY. DIU (42914) REPORTED MEAN SEA LEVEL PRESSURE (MSLP) OF 999.8 HPA AND MSW OF 180°/ 27 KT. PORBANDER (42830) REPORTED MSLP OF 997.1 HPA AND MSW OF 140°/ 18 KT.

#### **REMARKS:**

SEA SURFACE TEMPERATURE IS AROUND 29-30°C OVER NORTHEAST ARABIAN SEA AND IS HIGHER 30-31°C, OFF SAURASHTRA COAST ALONG THE FORECAST TRACK. OCEAN HEAT CONTENT IS 60-70KJ/CM<sup>2</sup> AND IS EXPECTED TO DECREASE GRADUALLY ALONG THE FORECAST TRACK BECOMING 30-40 KJ/CM<sup>2</sup> OFF SAURASHTRA & KUTCH COASTS. TOTAL PRECIPITABLE WATER IMAGERY INDICATES WARM MOIST AIR INCURSION INTO THE CORE OF SYSTEM. THE LOW LEVEL VORTICITY IS THE SAME DURING PAST TWELVE HOURS AND IS AROUND 300X10<sup>-6</sup>S<sup>-1</sup> TO THE SOUTH-SOUTHWEST OF THE SYSTEM CENTRE AND IS NORTHEAST-SOUTHWEST ORIENTED. LOW LEVEL CONVERGENCE HAS INCREASED AND IS ABOUT 40X10<sup>-5</sup>S<sup>-1</sup> TO THE SOUTHWEST OF THE SYSTEM CENTRE AND UPPER LEVEL DIVERGENCE IS ABOUT 30X10<sup>-5</sup> S<sup>-1</sup> TO THE SOUTHWEST OF SYSTEM CENTRE. VERTICAL WIND SHEAR HAS SLIGHTLY DECREASED AND IS AROUND (20-25 KNOTS) OVER THE SYSTEM AREA AND IS DECREASING TO 10-15 KNOTS ALONG THE FORECAST TRACK. CURRENTLY, THE SYSTEM IS TRACKING NORTH-NORTHWESTWARDS ALONG THE WESTERN PERIPHERY OF THE ANTICYCLONIC CIRCULATION LOCATED OVER CENTRAL INDIA. THE RIDGE RUNS ALONG 22°N. AS, THE CYCLONE WILL CROSS THE RIDGE LATITUDE, IT WILL EXHIBIT NORTH-NORTHEASTWARDS MOVEMENT. THE DEEP LAYER MEAN WINDS, INDICATE A DEEP TROUGH ALONG 66.0E TO THE WEST OF SYSTEM CENTRE. THIS TROUGH, WOULD TEND TO PUSH THE CYCLONE NORTHEASTWARDS AND ALSO WOULD LEAD TO INCREASE IN TRANSLATIONAL SPEED OF THE SYSTEM. AS THE SYSTEM WILL APPROACH COAST, IT IS LIKELY TO EXPERIENCE LOWER OCEAN THERMAL ENERGY (40-50 KJ/CM<sup>2</sup>) AND DECREASE IN MIDDLE LEVEL HUMIDITY DUE TO DRY COLD AIR

**INTRUSION**  
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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LATEST GUIDANCE FROM VARIOUS MODELS (NCUM-G, NCUM-R, ECMWF, IMD HWRF, VARIOUS IMD MME SYSTEMS) IS CONVERGING AND ALL OF THESE ARE INDICATING INITIAL NEAR NORTHWARDS MOVEMENT FOLLOWED BY GRADUAL NORTH-NORTHEASTWARDS MOVEMENT TOWARDS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS. ONLY IMD GFS AND NCEP GFS ARE INDICATING CROSSING OVER ADJOINING PAKISTAN COAST. THE LANDFALL TIME IS VARYING BETWEEN 1000 UTC TO 1800 UTC OF 15<sup>TH</sup> JUNE AND LANDFALL POINT IS VARYING BETWEEN LONGITUDE 67.5E AND 68.5E EXCEPT (IMD GFS, NCEP GFS).

CONSIDERING ALL THE ABOVE, TC BIPARJOY IS VERY LIKELY TO IT IS VERY LIKELY TO MOVE NEARLY NORTHWARDS TILL 13TH MIDNIGHT, THEN MOVE NORTH-NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT, 42929) AND KARACHI (PAKISTAN, 41780) NEAR JAKHAU PORT (GUJARAT) BY 1200 OF 15TH JUNE AS A VERY SEVERE CYCLONIC STORM WITH MAXIMUM SUSTAINED WIND SPEED OF 125-135 KMPH GUSTING TO 150 KMPH.

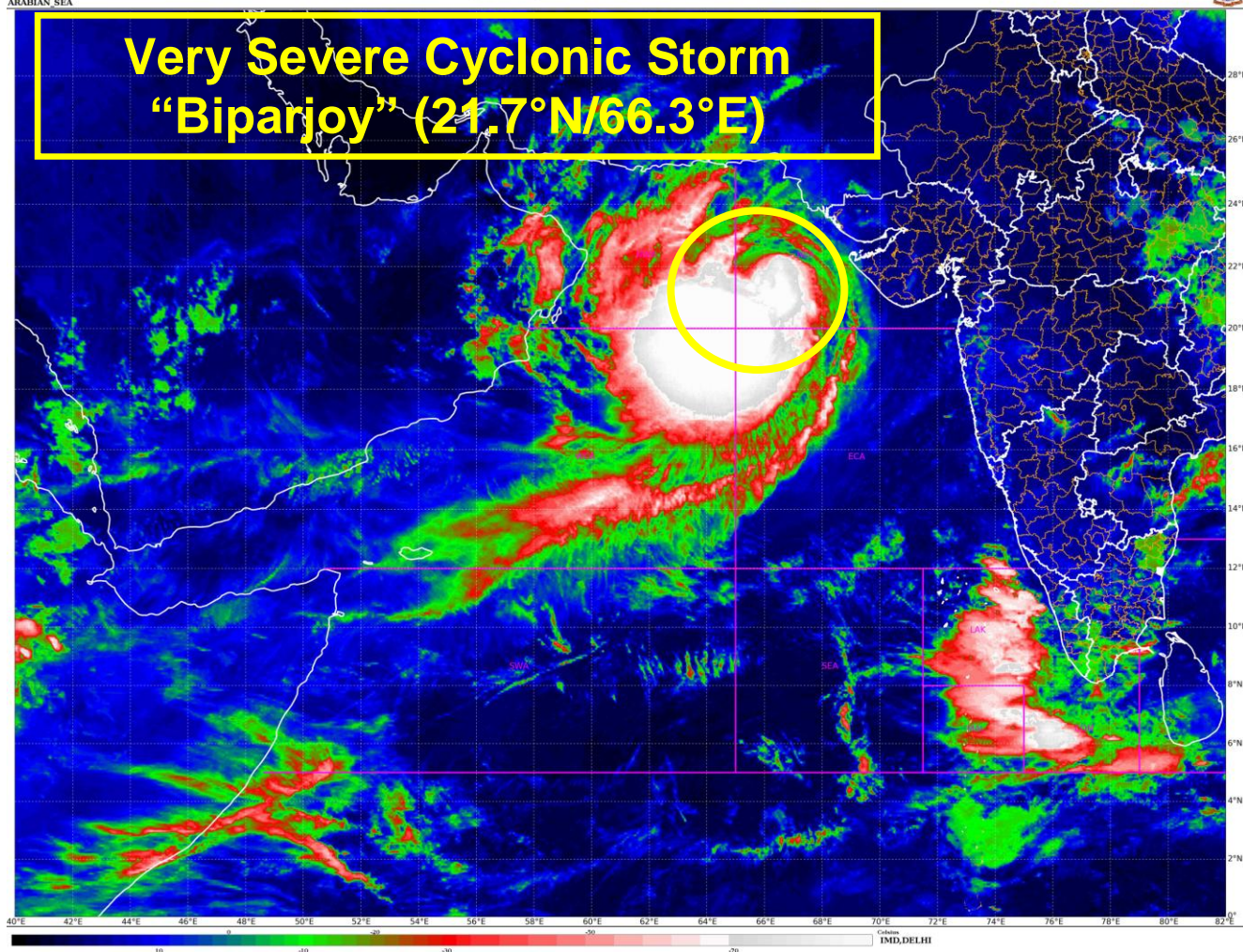
**M. T. BUSHAIR  
SCIENTIST C  
RSMC NEW DELHI**

SAT : INSAT-3D IMG  
IMG\_TIR1\_TEMP 10.8 um  
ARABIAN SEA

13-06-2023/(2300 to 2326) GMT  
14-06-2023/(0430 to 0456) IST

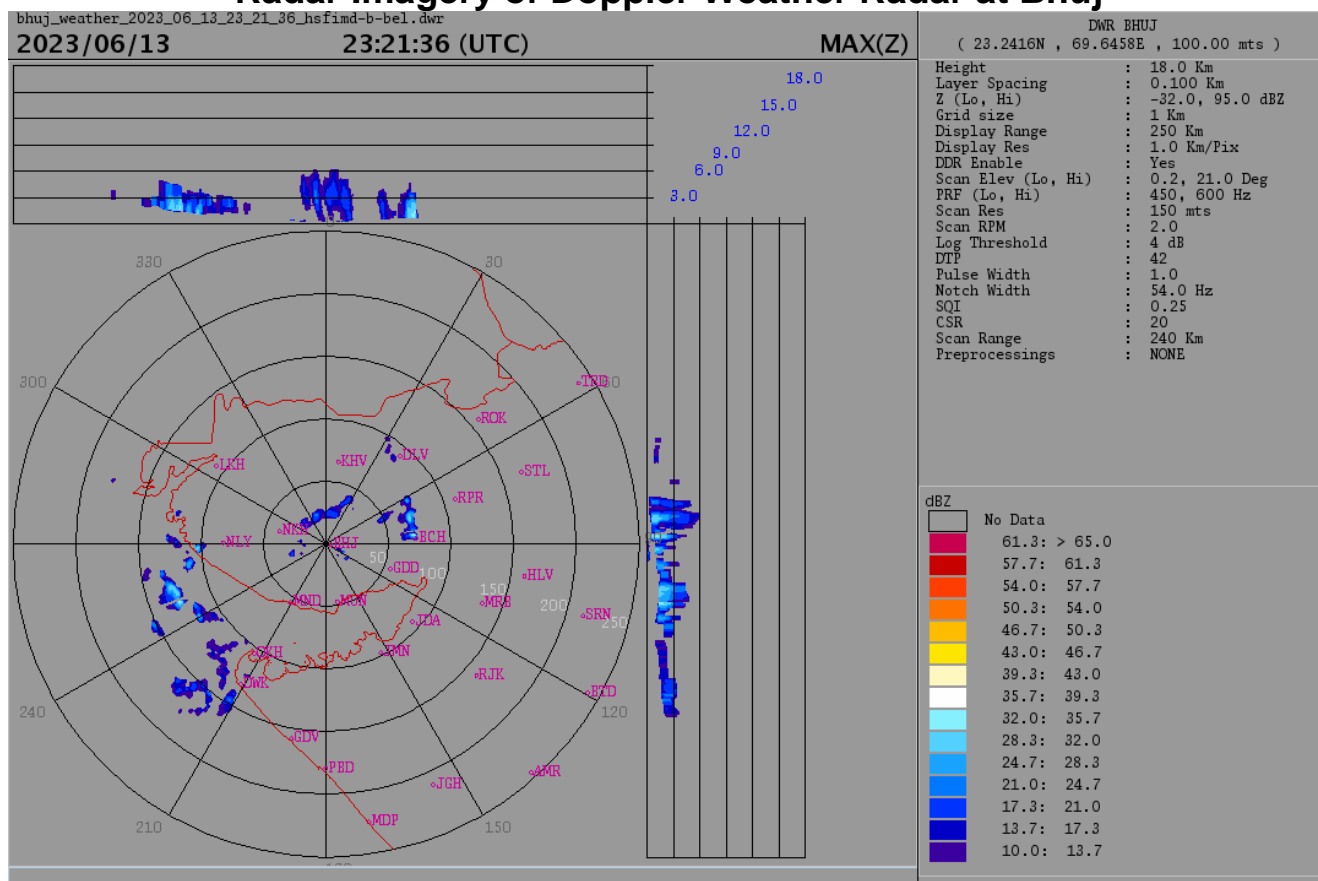


## Very Severe Cyclonic Storm "Biparjoy" (21.7°N/66.3°E)



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## Radar Imagery of Doppler Weather Radar at Bhuj

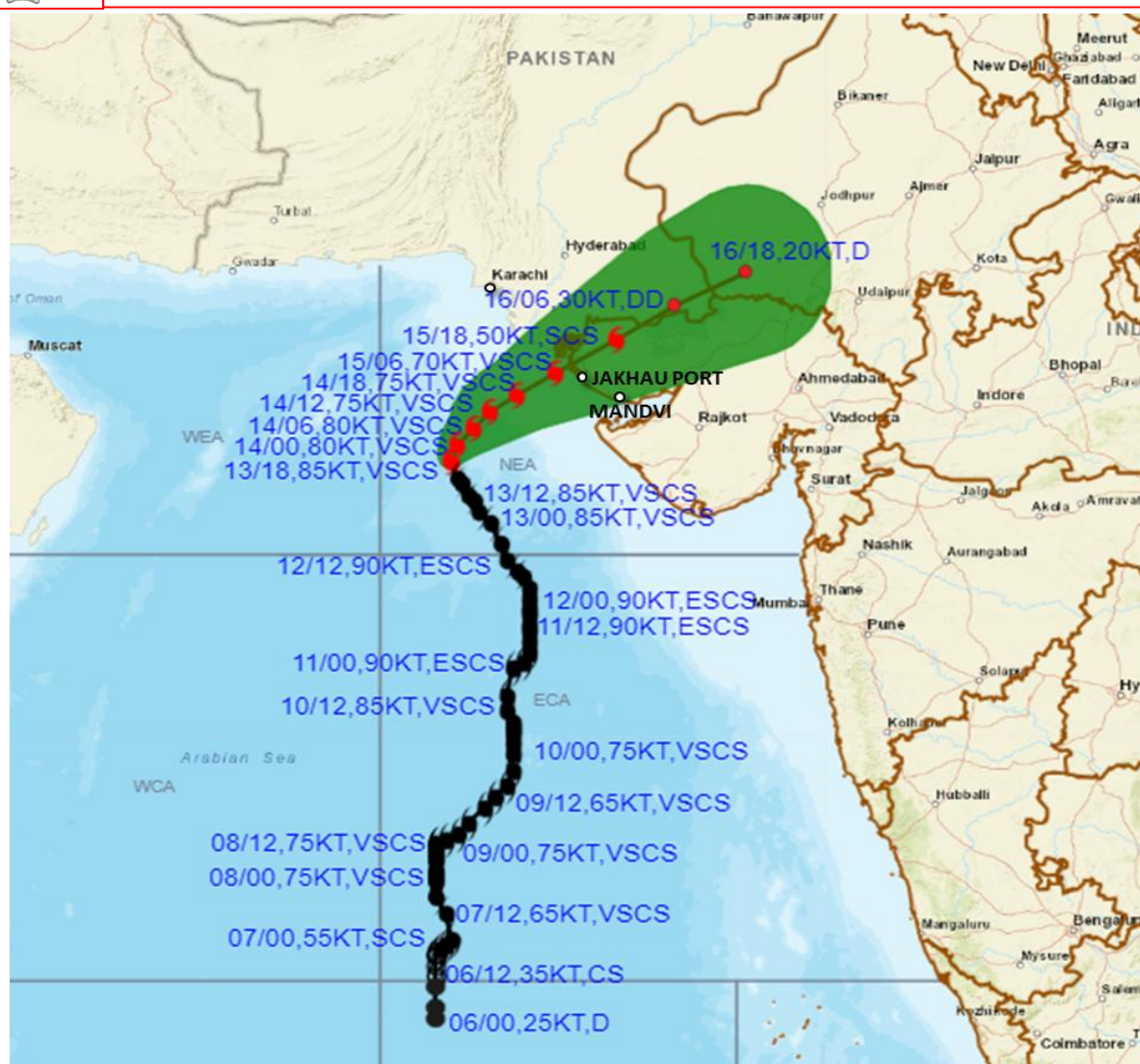


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**OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF VERY SEVERE CYCLONIC STORM “BIPARJOY” OVER NORTHEAST ARABIAN SEA BASED ON 1800 UTC (2330 IST) OF 13<sup>TH</sup> JUNE 2023.**



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 ( $\geq 120$  KT)

● LESS THAN 34 KT

○ 34-47 KT

○  $\geq 48$  KT

— OBSERVED TRACK

— FORECAST TRACK

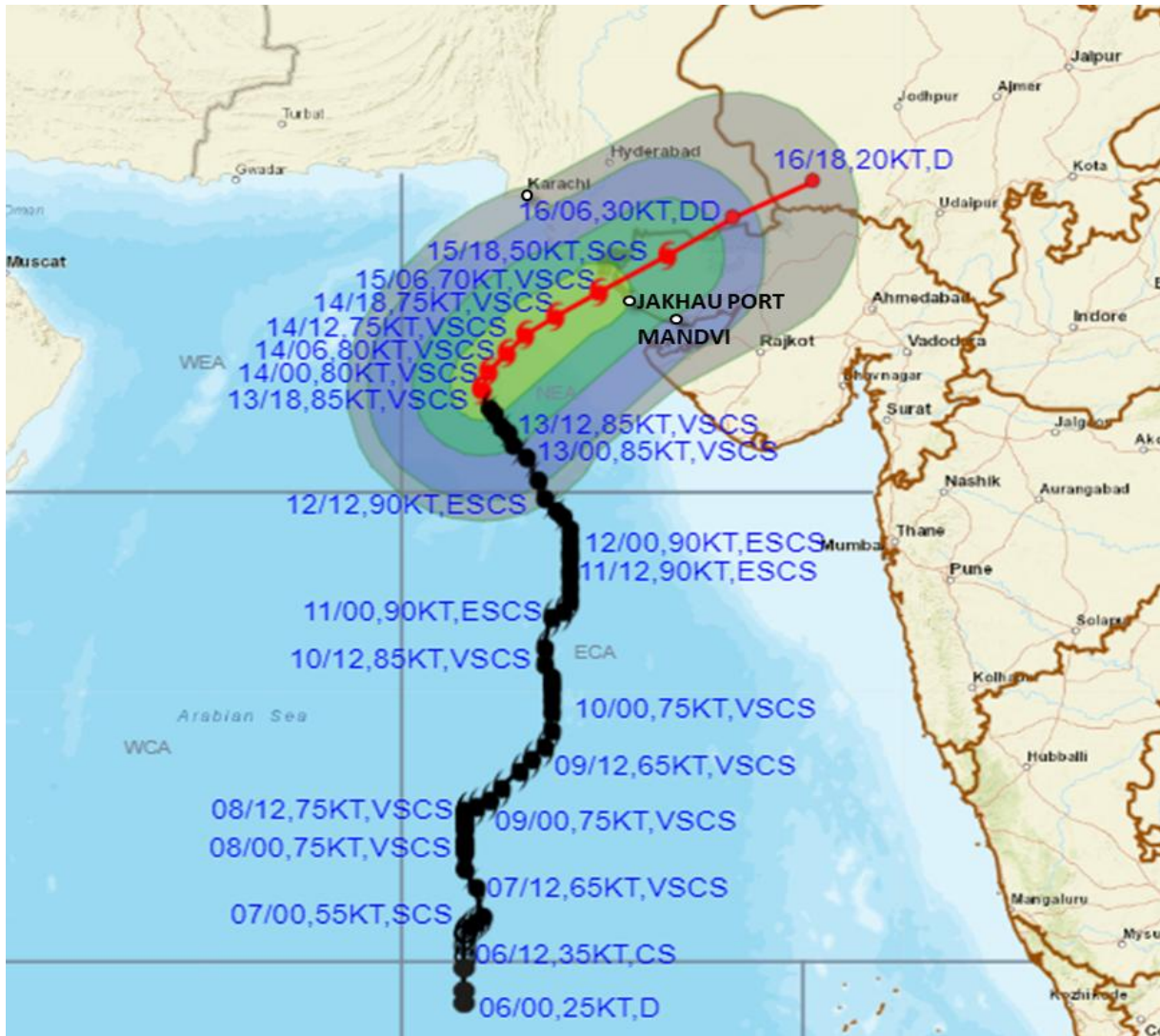
▲ CONE OF UNCERTAINTY

Forecast	DISTANCE(KM) AND DIRECTION FROM STATIONS				
Date and Time	PORBANDAR	DWARKA	JAKHAU PORT	NALIYA	KARACHI AIRPORT
14.06.23/1800	260, WNW	170, WNW	110, WSW	140, WSW	230, S
15.06.23/1800	260, N	180, N	110, NE	90, NNE	250, ESE
16.06.23/1800	440, NNE	400, NE	380, NE	360, NE	460, E

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**OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF VERY SEVERE CYCLONIC STORM “BIPARJOY” OVER NORTHEAST ARABIAN SEA BASED ON 1800 UTC (2330 IST) OF 13<sup>TH</sup> JUNE 2023.**



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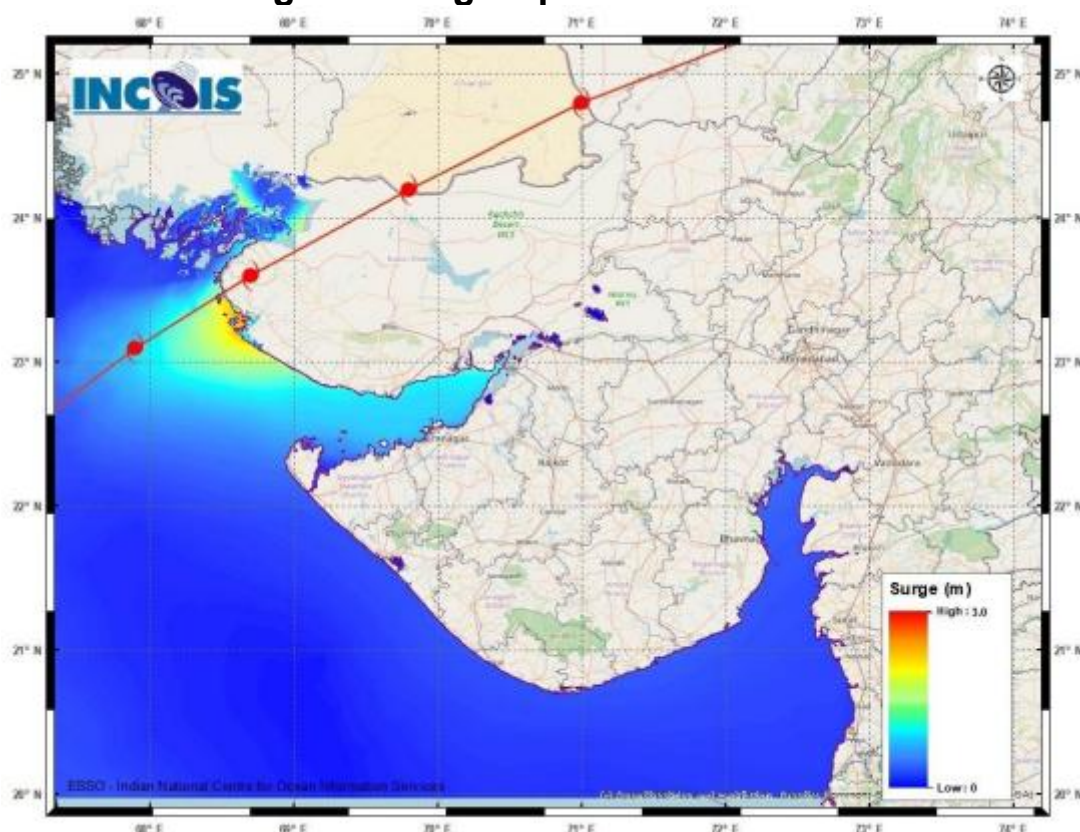
● LESS THAN 34 KT  
○ 34-47 KT  
● ≥ 48 KT  
— OBSERVED TRACK  
— FORECAST TRACK  
▲ CONE OF UNCERTAINTY  
AREA OF MAXIMUM SUSTAINED WIND SPEED:  
■ 28-33 KT (52-61 KMPH)  
■ 34-49 KT (62-91 KMPH)  
■ 50-63 KT (92-117 KMPH)  
■ ≥ 64 KT (≥ 118 KMPH)

**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
≥ 64 (≥ 118)	Phenomenal	Total suspension of fishing operations



## Storm Surge Warning Map based on Forecast Track

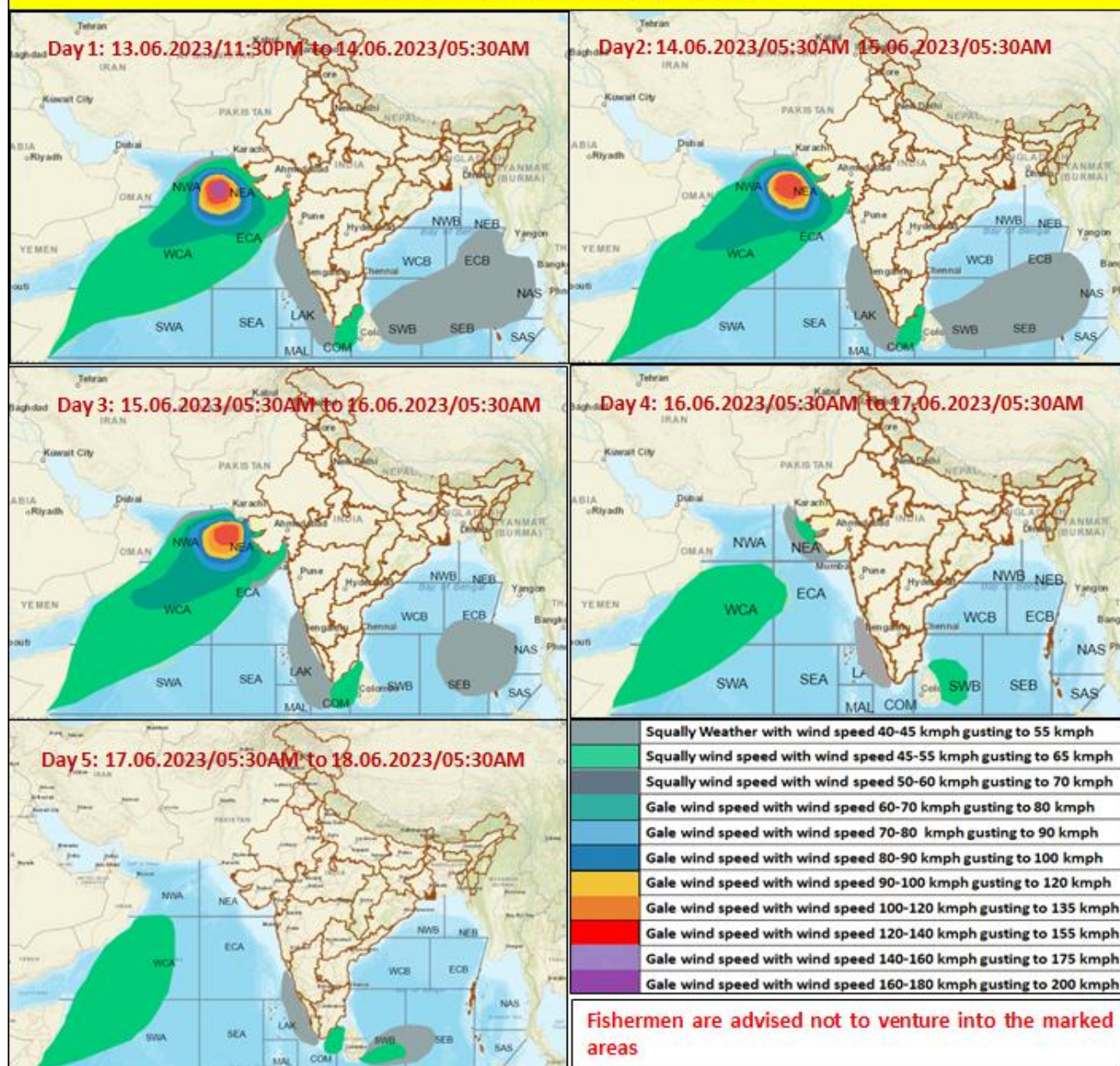


### Astronomical Tide on 15<sup>th</sup> June 2023

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



## Fishermen warning graphics



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