



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

**DEMS-RSMC SPECIAL TROPICAL CYCLONES NEW DELHI DATED 14.06.2023**

**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. 64 FOR NORTH INDIAN OCEAN (THE BAY OF BENGAL AND ARABIAN SEA) VALID FOR NEXT 120 HOURS ISSUED AT 1200 UTC OF 14.06.2023 BASED ON 0900 UTC OF 14.06.2023**

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

THE VERY SEVERE CYCLONIC STORM “BIPARJOY” (PRONOUNCED AS “BIPORJOY”) OVER NORTHEAST ARABIAN SEA MOVED NEARLY NORTHEASTWARD DURING PAST 6-HOURS AND LAY CENTERED AT 0900 UTC OF TODAY, THE 14<sup>TH</sup> JUNE, 2023 OVER THE SAME REGION NEAR LATITUDE 21.9°N AND LONGITUDE 66.5°E, ABOUT 260 KM SOUTHWEST OF JAKHAU PORT (GUJARAT), 270 KM WEST-SOUTHWEST OF DEVBHUMI DWARKA (42731), 280 KM WEST-SOUTHWEST OF NALIYA (42631), 330 KM WEST OF PORBANDAR (42830), AND 340 KM SOUTH-SOUTHWEST OF KARACHI (PAKISTAN, 41780).

IT WOULD CONTINUE TO MOVE NEARLY NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT, 42929) AND KARACHI (PAKISTAN, 41780) NEAR JAKHAU PORT (GUJARAT) BY 1200 UTC 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:

| Date/Time(UTC) | Position<br>(Lat. °N/ long. °E) | Maximum sustained surface<br>wind speed (Kmph) | Category of cyclonic<br>disturbance |
|----------------|---------------------------------|--|-------------------------------------|
| 14.06.23/0900  | 21.9/66.5                       | 140-150 Gusting To 165                         | Very Severe Cyclonic Storm          |
| 14.06.23/1200  | 22.0/66.7                       | 135-145 Gusting To 160                         | Very Severe Cyclonic Storm          |
| 14.06.23/1800  | 22.3/67.1                       | 135-145 Gusting To 160                         | Very Severe Cyclonic Storm          |
| 15.06.23/0000  | 22.7/67.5                       | 130-140 Gusting To 155                         | Very Severe Cyclonic Storm          |
| 15.06.23/0600  | 23.2/68.1                       | 125-135 Gusting To 150                         | Very Severe Cyclonic Storm          |
| 15.06.23/1800  | 23.8/69.0                       | 105-115 Gusting To 125                         | Severe Cyclonic Storm               |
| 16.06.23/0600  | 24.4/70.1                       | 70-80 Gusting To 90                            | Cyclonic Storm                      |
| 16.06.23/1800  | 24.9/71.3                       | 40-50 Gusting To 60                            | Depression                          |
| 17.06.23/0600  | 25.4/72.7                       | 20-30 Gusting To 50                            | Well Marked Low Pressure Area       |

AS PER INSAT 3D IMAGERY, INTENSITY OF THE SYSTEM IS T4.0/C.I.4.5. CLOUDS ARE ORGANISED IN CENTRAL DENSE OVERCAST PATTERN. ASSOCIATED BROKEN LOW AND MEDIUM CLOUDS WITH EMBEDDED INTENSE TO VERY INTENSE CONVECTION LAY MAINLY OVER NORTH AND ADJOINING CENTRAL ARABIAN SEA BETWEEN LATITUDE 17.5°N & 22.5°N AND LONGITUDE 62.0°E & 70.0°E AND WEAK TO MODERATE CONVECTION LAY OVER SOUTH PAKISTAN, KUTCH & SAURASHTRA. MINIMUM CLOUD TOP TEMPERATURE IS MINUS 93°C. MAJOR CONVECTION AREA IS SEEN IN SOUTHWEST SECTOR. 24 HOUR ANIMATION INDICATES THAT DISTANCE BETWEEN CENTRE OF SYSTEM AND INTENSE CLOUD MASS HAS INCREASED. THIS IS INDICATING WEAKENING OF THE SYSTEM IN PAST 24 HOURS. MULTISAT WINDS INDICATE STRONGER WINDS ARE SEEN IN THE EASTERN SECTOR.

ASSOCIATED MAXIMUM SUSTAINED WIND SPEED (MSW) IS 80 KNOTS GUSTING TO 90 KNOTS. THE ESTIMATED CENTRAL PRESSURE IS 967 HPA. SEA CONDITION IS LIKELY TO BE PHENOMENAL OVER NORTHEAST ARABIAN SEA AND ROUGH TO VERY ROUGH OVER ADJOINING EASTCENTRAL ARABIAN SEA.

OKHA (42730) REPORTED DEPARTURE FROM NORMAL IN MEAN SEA LEVEL PRESSURE BY -3.3 HPA AND NALIYA (42631) BY -4.2 HPA & DWARKA (42731) REPORTED A DEPARTURE BY -3.6 HPA.

#### REMARKS:

SEA SURFACE TEMPERATURE IS AROUND 29-30°C OVER NORTHEAST ARABIAN SEA. 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 GRADIENT WIND ANALYSIS INDICATES THAT DURING PAST 24 HOURS, RADIUS OF GRADIENT WIND HAS INCREASED AND TEMPERATURE ANOMALY AT 300 HPA HAS DECREASED. ALL THESE FEATURES INDICATE THAT THE SYSTEM HAS WEAKENED IN PAST 24 HOURS.

THE LOW LEVEL VORTICITY IS THE SAME DURING PAST TWELVE HOURS AND IS AROUND  $300 \times 10^{-6} \text{S}^{-1}$  TO THE SOUTHWEST OF THE SYSTEM CENTRE. LOW LEVEL CONVERGENCE IS THE SAME AND IS ABOUT  $50 \times 10^{-5} \text{S}^{-1}$  TO THE SOUTHWEST OF THE SYSTEM CENTRE AND UPPER LEVEL DIVERGENCE HAS SLIGHTLY DECREASED IN PAST 6 HOURS AND IS ABOUT  $20 \times 10^{-5} \text{S}^{-1}$  TO THE SOUTHWEST OF SYSTEM CENTRE. VERTICAL WIND SHEAR HAS SLIGHTLY DECREASED AND IS HIGH AROUND (25-30 KNOTS) OVER THE SYSTEM AREA AND IS DECREASING TO 10-15 KNOTS ALONG THE FORECAST TRACK. THE RIDGE RUNS ALONG 21.5°N. THE DEEP LAYER MEAN WINDS, INDICATE A DEEP TROUGH ALONG 65.0E 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. THE SYSTEM HAS NOW STARTED TRACKING SLOWLY NORTHEASTWARDS UNDER THE INFLUENCE OF SOUTHWESTERLY WINDS PREVAILING TO THE NORTH OF THE RIDGE AND THE WESTERLY TROUGH.

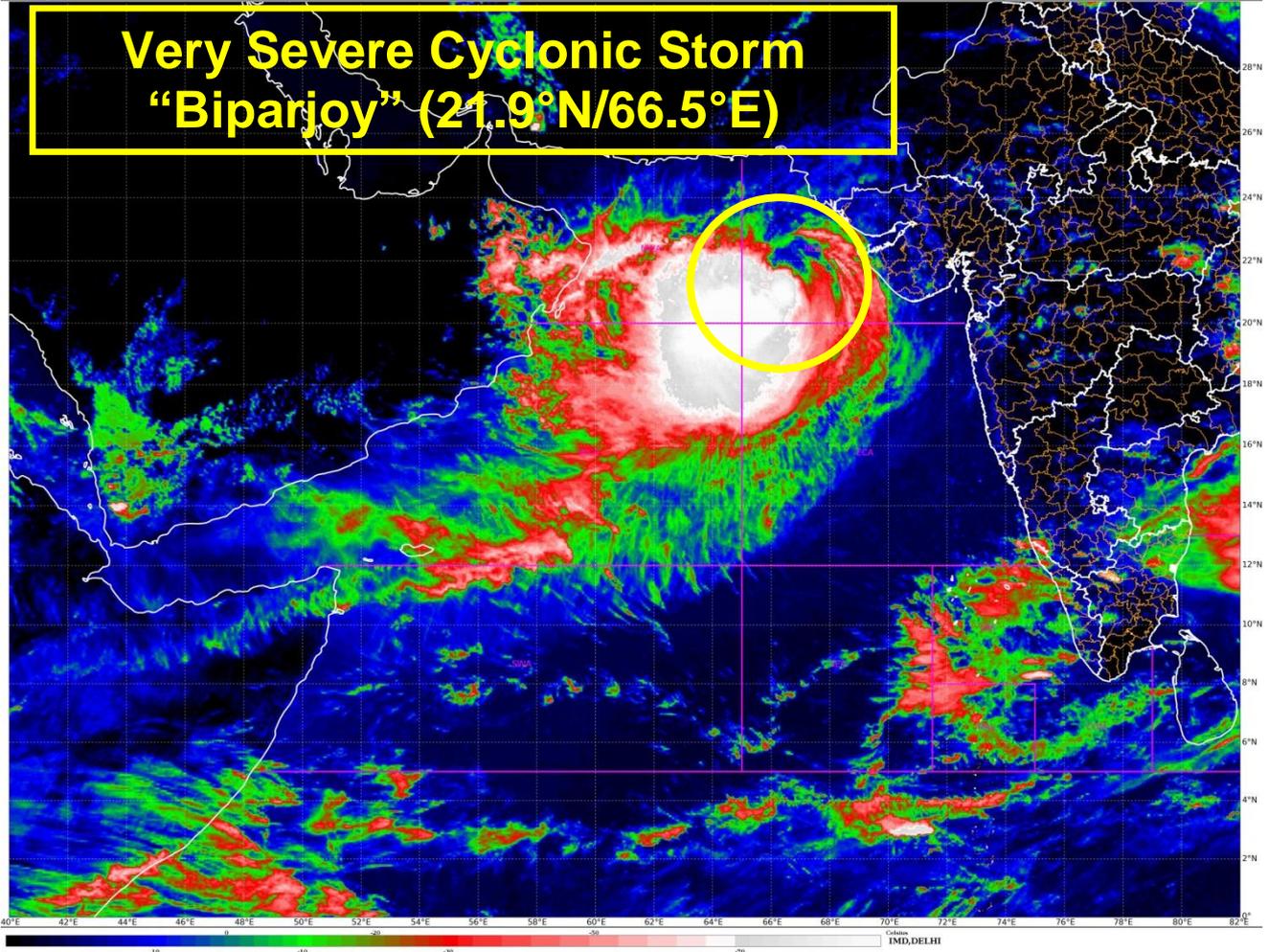
AS THE SYSTEM WILL APPROACH COAST, IT IS LIKELY TO EXPERIENCE LOWER OCEAN THERMAL ENERGY (40-50 KJ/CM<sup>2</sup>) AND DECREASE IN MIDDLE LEVEL HUMIDITY DUE TO DRY COLD AIR INTRUSION. HOWEVER, AFTER LANDFALL, THE SYSTEM IS LIKELY TO WEAKEN GRADUALLY DUE TO MOISTURE FEEDBACK FROM ARABIAN SEA INTO THE CYCLONE FIELD.

CONSIDERING ALL THE ABOVE, TC BIPARJOY IS VERY LIKELY TO MOVE NEARLY NORTHEASTWARDS AND CROSS SAURASHTRA & KUTCH AND ADJOINING PAKISTAN COASTS BETWEEN MANDVI (GUJARAT, 42929) AND KARACHI (PAKISTAN, 41780) NEAR JAKHAU PORT (GUJARAT) BY 1200 UTC 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.

**M. SHARMA  
SCIENTIST D  
RSMC NEW DELHI**

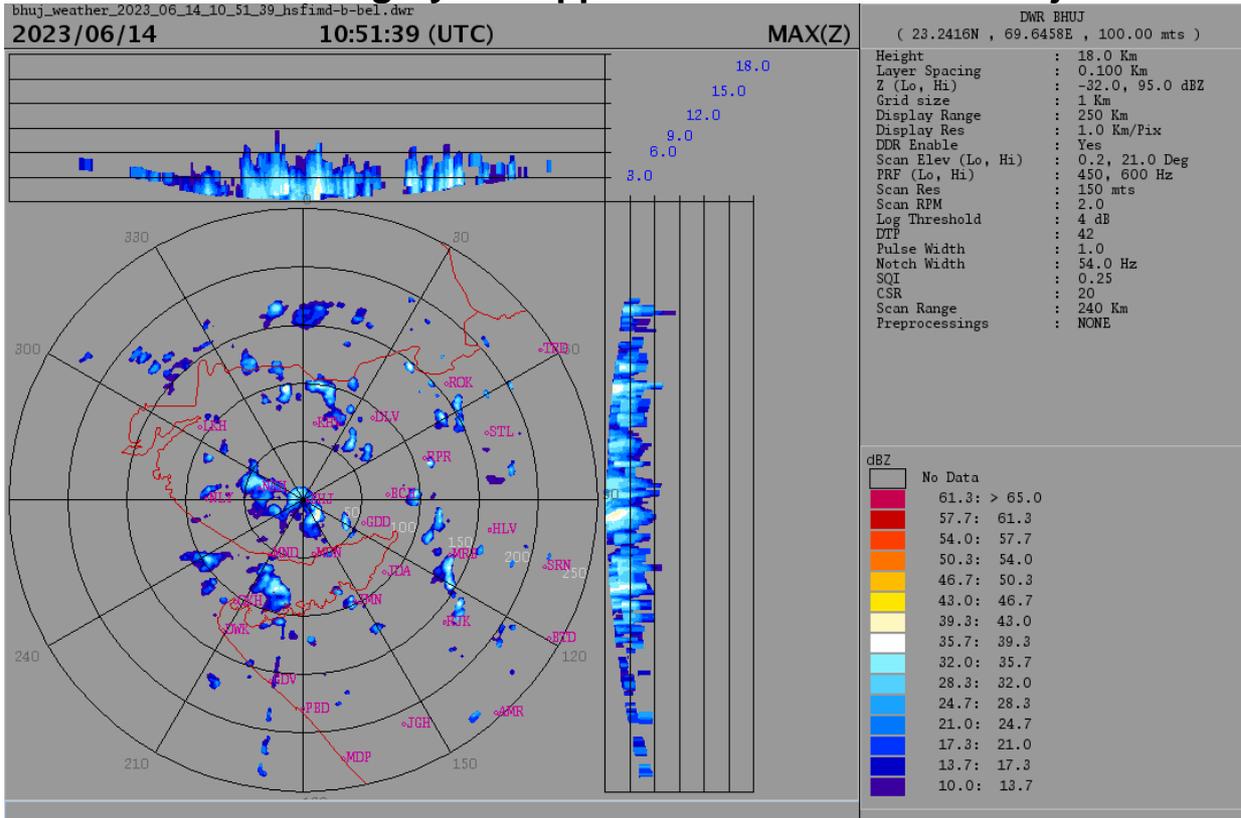


# Very Severe Cyclonic Storm "Biparjoy" (21.9°N/66.5°E)



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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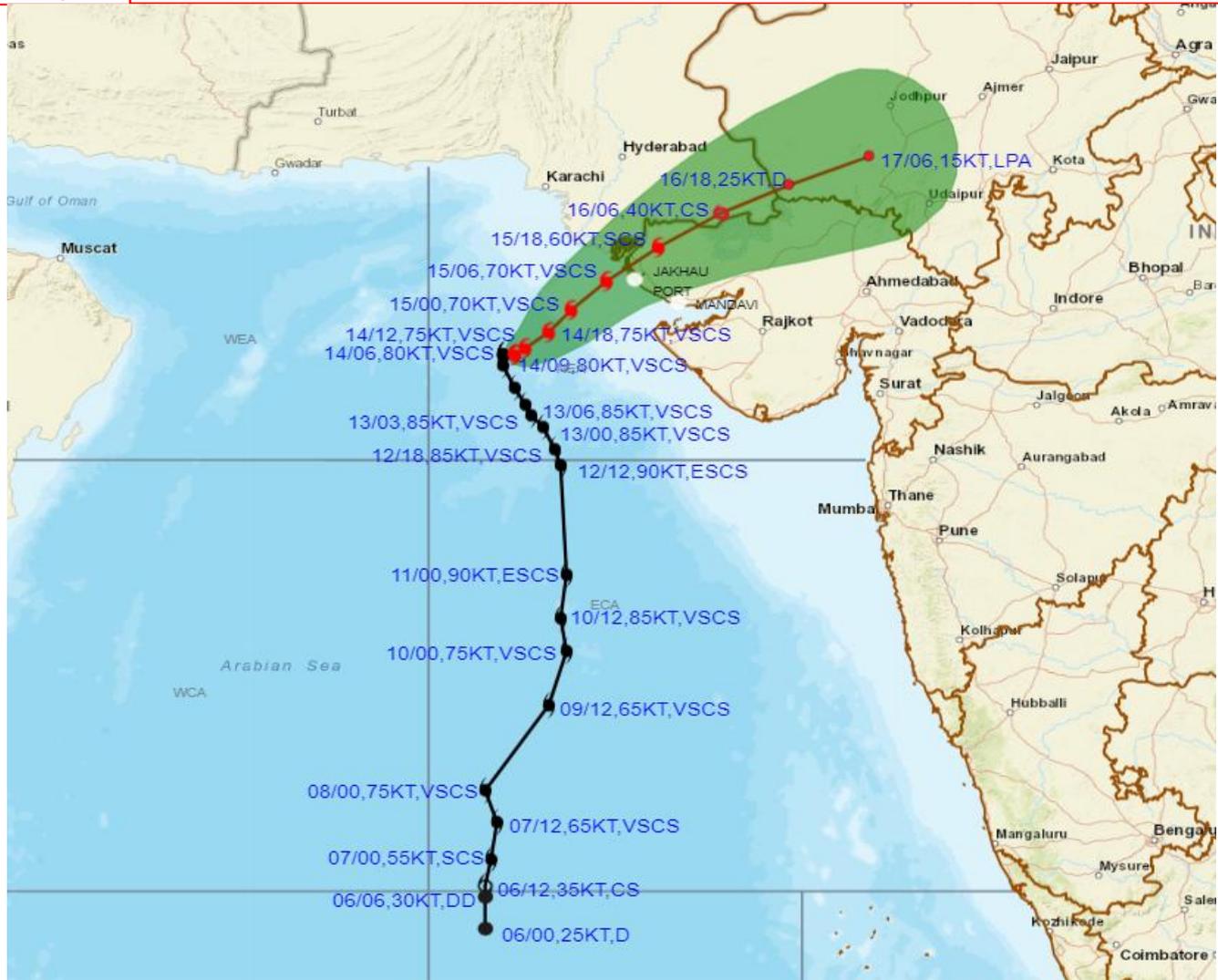
# Radar Imagery of Doppler Weather Radar at Bhuj



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**OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 0900 UTC (1430 IST) OF 14<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)

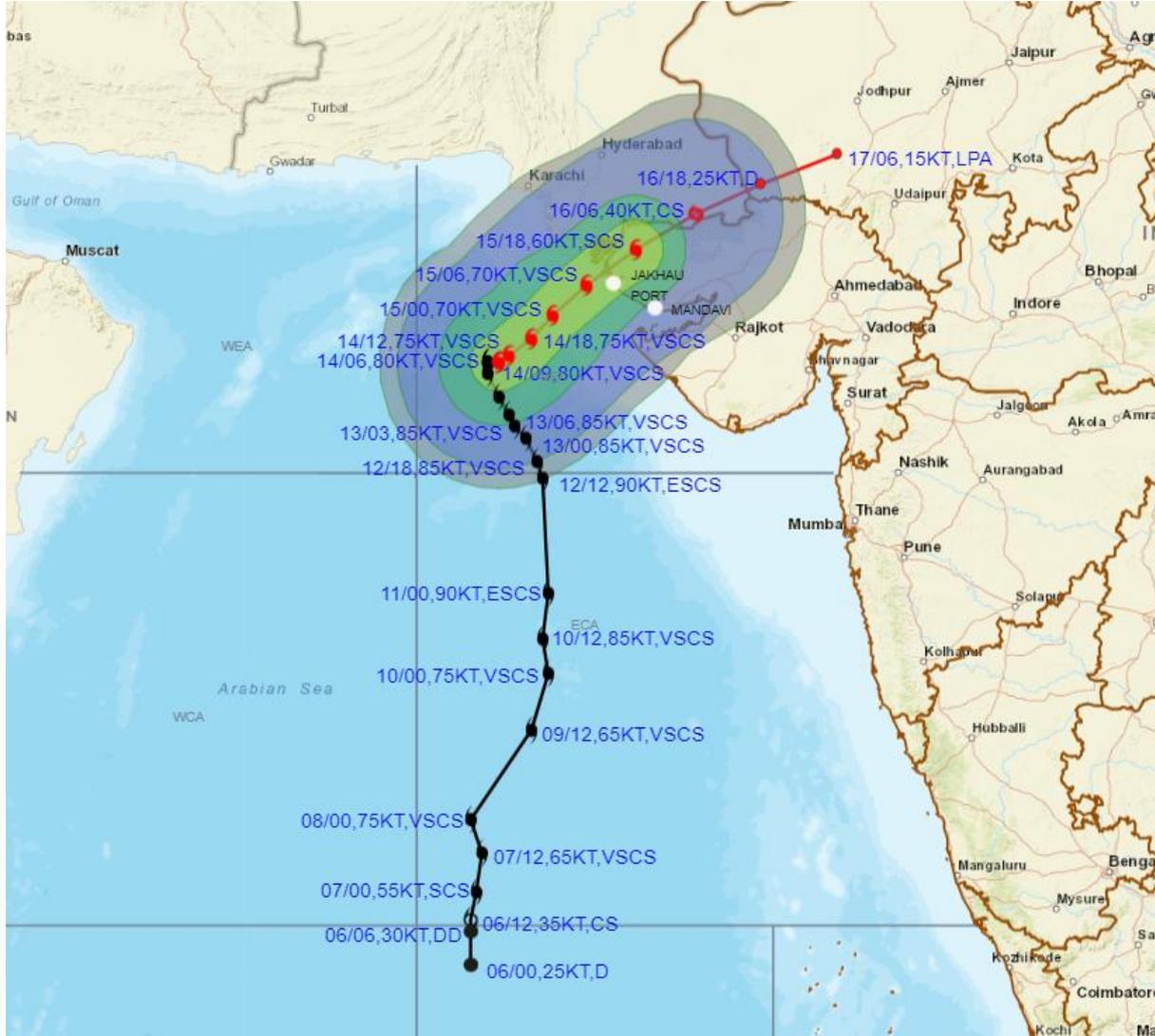
- LESS THAN 34 KT
- 34-47 KT
- $\geq$  48 KT
- OBSERVED TRACK
- FORECAST TRACK
- CONE OF UNCERTAINTY

| Forecast      | DISTANCE(KM) AND DIRECTION FROM STATIONS |          |             |          |                 |
|---------------|--|----------|-------------|----------|-----------------|
| Date and Time | PORBANDAR                                | DWARKA   | JAKHAU PORT | NALIYA   | KARACHI AIRPORT |
| 15.06.23/0600 | 240, NW                                  | 140, NW  | 60, W       | 80, W    | 220, SSE        |
| 16.06.23/0600 | 310, N                                   | 250, NNE | 210, NE     | 190, NE  | 310, E          |
| 17.06.23/0600 | 520, NE                                  | 500, NE  | 480, ENE    | 460, ENE | 560, 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 0900 UTC (1430 IST) OF 14<sup>TH</sup> JUNE 2023.**



DATE/TIME IN UTC

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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)

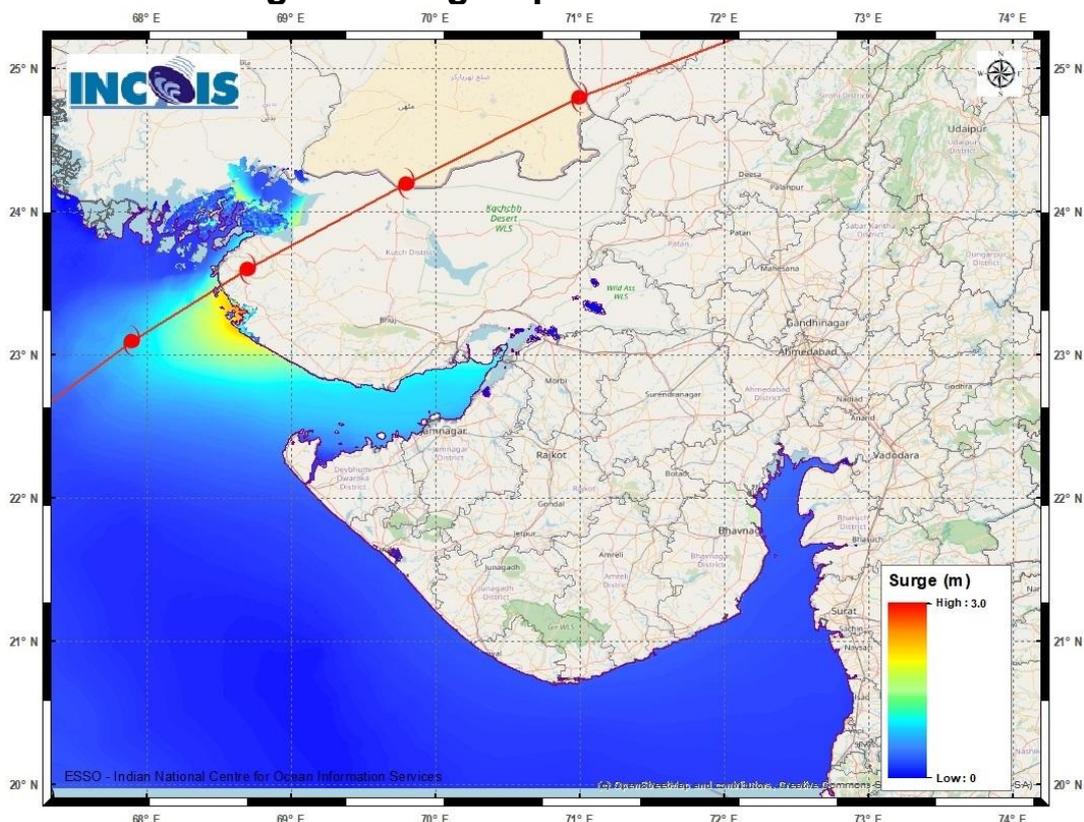
■  $\geq 64$  ( $\geq 118$ ) KMPH

**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 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       |

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