



India Meteorological Department  
(Ministry of Earth Sciences)

BULLETIN NO. 57 (ARB/01/2023)

TIME OF ISSUE: 1145 HOURS IST

DATED: 13.06.2023

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

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**Sub: Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over Northeast and adjoining Eastcentral Arabian Sea: Cyclone Warning for Saurashtra & Kutch Coasts (Orange Message)**

The Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over Northeast and adjoining Eastcentral Arabian Sea moved nearly north-northwestwards with a speed of 12 kmph during past 6-hours and lay centered at 0830 hours IST of today, the 13<sup>th</sup> June, 2023 over the same region near latitude 20.9°N and longitude 66.9°E, about 280 km southwest of Devbhumi Dwarka, 300 km west-southwest of Porbandar, 310 km southwest of Jakhau Port, 330 km southwest of Naliya and 450 km south of Karachi (Pakistan).

It is very likely to move nearly northwards till 13<sup>th</sup> midnight, then move north-northeastwards and cross Saurashtra & Kutch and adjoining Pakistan coasts between Mandvi (Gujarat) and Karachi (Pakistan) near Jakhau Port (Gujarat) around evening 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(IST)</b> | <b>Position<br/>(Lat. °N/ long. °E)</b> | <b>Maximum sustained surface<br/>wind speed (Kmph)</b> | <b>Category of cyclonic<br/>disturbance</b> |
|-----------------------|---|--|---|
| 13.06.23/0830         | 20.9/66.9                               | 150-160 Gusting To 180                                 | Very Severe Cyclonic Storm                  |
| 13.06.23/1130         | 21.1/66.8                               | 145-155 Gusting To 170                                 | Very Severe Cyclonic Storm                  |
| 13.06.23/1730         | 21.4/66.8                               | 140-150 Gusting To 165                                 | Very Severe Cyclonic Storm                  |
| 13.06.23/2330         | 21.7/67.0                               | 135-145 Gusting To 160                                 | Very Severe Cyclonic Storm                  |
| 14.06.23/0530         | 22.1/67.3                               | 135-145 Gusting To 160                                 | Very Severe Cyclonic Storm                  |
| 14.06.23/1730         | 22.5/67.6                               | 130-140 Gusting To 155                                 | Very Severe Cyclonic Storm                  |
| 15.06.23/0530         | 22.9/67.9                               | 125-135 Gusting To 150                                 | Very Severe Cyclonic Storm                  |
| 15.06.23/1730         | 23.4/68.4                               | 125-135 Gusting To 150                                 | Very Severe Cyclonic Storm                  |
| 16.06.23/0530         | 23.9/69.0                               | 80-90 Gusting To 100                                   | Cyclonic Storm                              |
| 16.06.23/1730         | 24.4/70.0                               | 50-60 Gusting To 70                                    | Deep Depression                             |

**(i) Heavy Rainfall warning:**

- Light to moderate rainfall at many places in Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Junagarh and Rajkot districts of Saurashtra & Kutch with isolated heavy to very heavy rainfall on 13<sup>th</sup> June.
- Light to moderate rainfall at most places with heavy to very heavy rainfall and extremely heavy falls at isolated places very likely over Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts of Saurashtra & Kutch on 14<sup>th</sup> June.
- The intensity of rainfall would increase with heavy to very heavy rainfall at a few places and extremely heavy falls at isolated places very likely over Kutch, Devbhumi Dwarka & Jamnagar and heavy to very heavy rainfall at a few places over Porbandar, Rajkot, Morbi & Junagarh districts of Gujarat and Isolated heavy to very heavy rainfall is very likely over remaining districts of Saurashtra and north Gujarat region on 15<sup>th</sup> June.
- Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over north Gujarat and adjoining south Rajasthan on 16<sup>th</sup> June.

**(ii) Wind warning:**

**Northeast Arabian Sea:** Gale wind speed reaching 150-160 kmph gusting to 180 kmph prevailing over the region likely to decrease becoming 125-135 kmph gusting 150 kmph by 15<sup>th</sup> morning to evening. It would weaken gradually further more thereafter becoming 45-55 kmph gusting to 65 kmph by 16<sup>th</sup> morning.

**Eastcentral Arabian Sea:** Gale wind speed reaching 150-160 kmph gusting to 180 kmph prevailing over the region likely to decrease becoming 90-100 kmph gusting to 110 kmph on 14<sup>th</sup> morning and 40-50 kmph gusting to 60 kmph on 16<sup>th</sup> morning.

**Wind warning along & off Saurashtra & Kutch coasts (Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) including Gulf of Kutch:**

- Squally wind speed reaching 50-60 kmph gusting to 70 kmph prevailing over these regions and likely to continue till 13<sup>th</sup> midnight.
- It would increase becoming Gale wind speed reaching 65-75 kmph gusting to 85 kmph from 14<sup>th</sup> June morning along & off Porbandar & Devbhoomi Dwarka district coasts.
- It would become 125-135 kmph gusting to 150 kmph from 15<sup>th</sup> morning for subsequent 12 hours along & off Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts. Thereafter it would decrease gradually becoming 45-55 kmph gusting to 65 kmph over north Gujarat and adjoining south Rajasthan from 16<sup>th</sup> morning to evening.
- Squally wind speed reaching 55-65 kmph gusting to 75 kmph very likely to prevail along & off remaining districts Saurashtra coast on 14<sup>th</sup> & 15<sup>th</sup> June and 30-40 kmph gusting to 50 kmph during 16<sup>th</sup> morning to evening.

**(iii) Sea condition**

Sea condition will be phenomenal over northeast and adjoining eastcentral Arabian Sea till 15<sup>th</sup> evening and rough to very rough over adjoining northwest Arabian Sea and rest parts of eastcentral Arabian Sea during the same period.

**Along & off Saurashtra & Kutch coasts:**

Sea condition is likely to be rough to very rough till 14<sup>th</sup> morning and high to phenomenal thereafter till 15<sup>th</sup> June evening and would improve thereafter.

**(iv) Storm Surge Warning (Kutch, Devbhumi Dwarka, Porbandar, Jamnagarh and Morbi districts)**

Storm surge of about 2 -3 m above the astronomical tide is likely to inundate the low lying areas of above districts during the time of landfall. The astronomical tides along these districts could be upto 3-6 meters in different places.

**(v) Damage expected over Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Morbi & Junagarh & Rajkot districts of Gujarat on 15<sup>th</sup> June:**

- Total destruction of thatched houses/ extensive damage to kutcha houses. Some damage to Pucca houses.
- Potential threat from flying objects.
- Bending/ uprooting of power and communication poles.
- Major damage to Kutcha and Pucca roads. Flooding of escape routes. Disruption of railways, overhead power lines and signalling systems.
- Widespread damage to standing crops, plantations, orchards, falling of green coconuts and tearing of palm fronds. Blowing down of bushy trees like mango.
- Small boats, country crafts may get detached from moorings.
- Visibility severely affected due to salt spray.

**(vi) Fishermen Warning & Action Suggested (Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) and for Offshore & Onshore Industries (Graphics Attached):**

- Total suspension of fishing operations over
  - Eastcentral and adjoining Westcentral Arabian Sea till 15<sup>th</sup> June.
  - Northeast Arabian Sea during 13<sup>th</sup> -15<sup>th</sup> June
- Those out at sea are advised to return to coast.
- Judicious regulation of offshore and onshore activities.
- Ports along the west coast of India may take necessary precautions.
- Naval base operations may maintain necessary precautions.
- Movement in motor boats and small ships all & off these coasts to be avoided.
- Mobilise evacuation from coastal areas of Saurashtra and Kutch (Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts).
- Judicious regulation of rail and road traffic.
- People in affected areas to remain indoors.
- Tourism activities may be restricted over these areas.
- Preparatory actions before the cyclones.

**The system is under continuous surveillance and the next message will be issued at 1430 hours IST of today, the 13<sup>th</sup> June, 2023.**

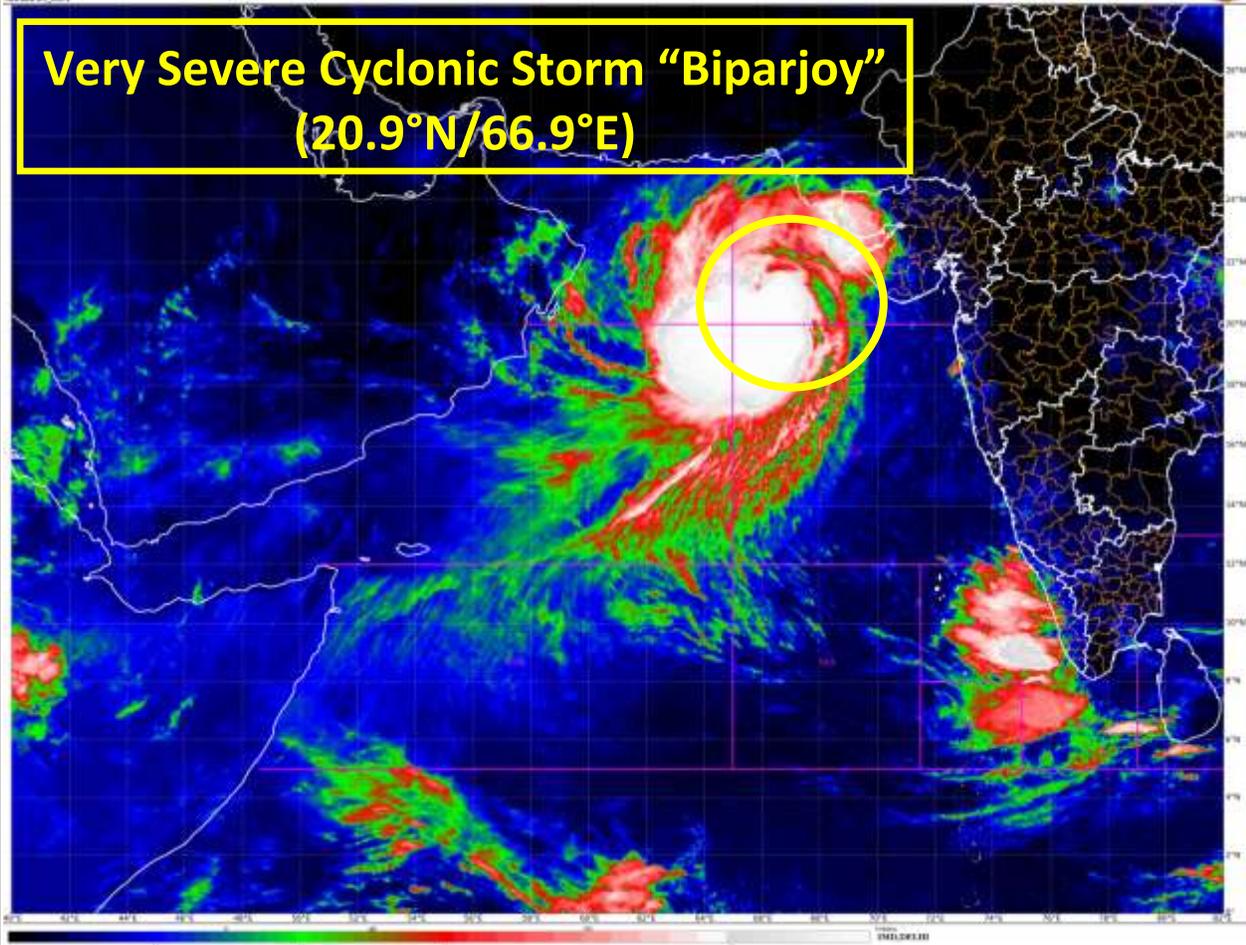
**(Ananda Kumar Das)**  
**Scientist F, Cyclone Warning Division, New Delhi**

*Copy to: ACWC Kolkata/ ACWC Chennai/ CWC Bhubaneswar/CWCVisakhapatnam/CWC Ahmedabad/ MO Port Blair/MC Raipur/MC Bhopal/MC Hyderabad/RMC Nagpur*

**LEGEND: Heavy Rainfall:** 64.5 to 115.5mm, **Very Heavy Rainfall:** 115.6 to 204.4mm **Most Places:** more than 76% of total stations, **Isolated Places:** Less than 25% of total

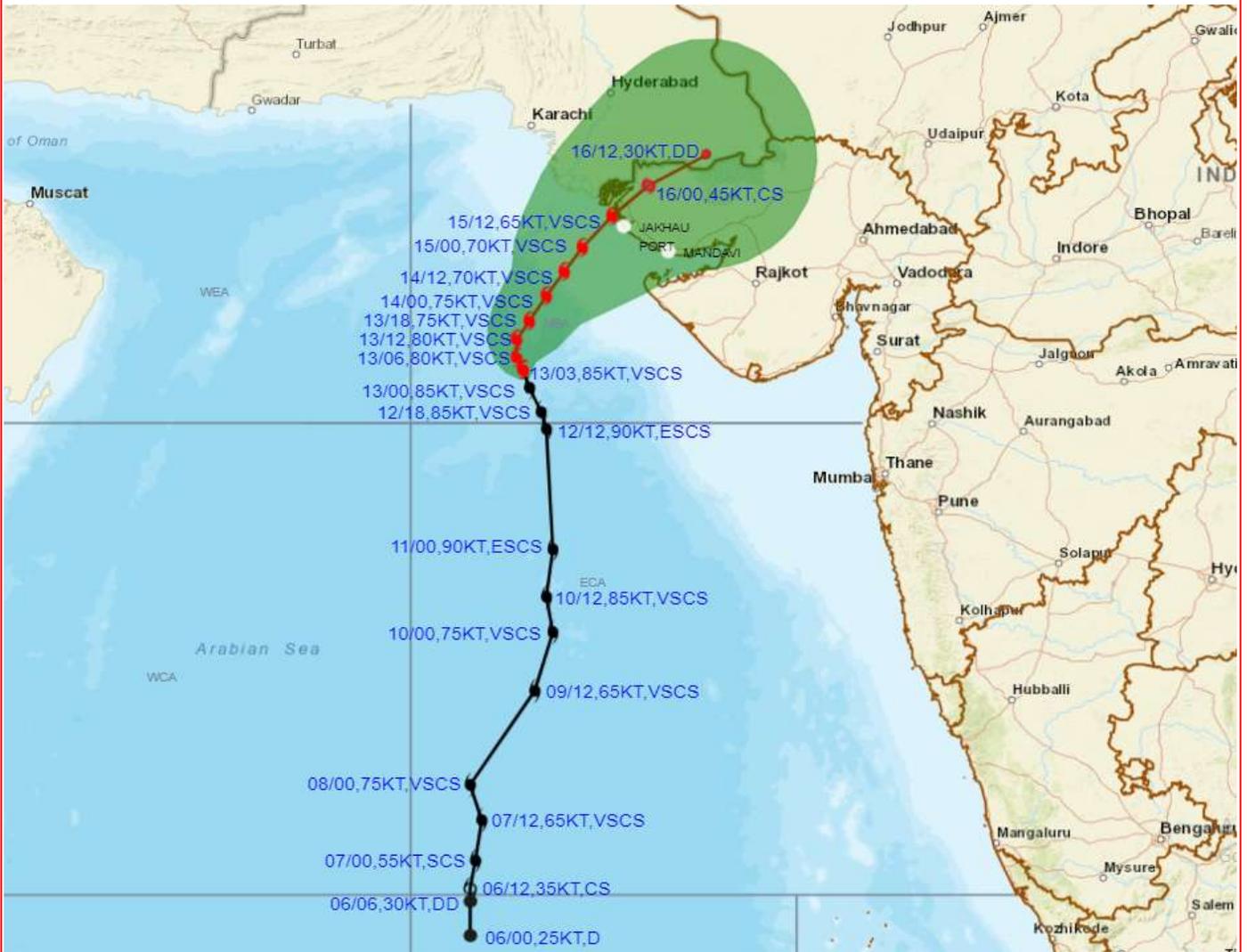


**Very Severe Cyclonic Storm "Biparjoy"  
(20.9°N/66.9°E)**





**OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST AND ADJOINING EASTCENTRAL ARABIAN SEA BASED ON 0300 UTC (0830 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

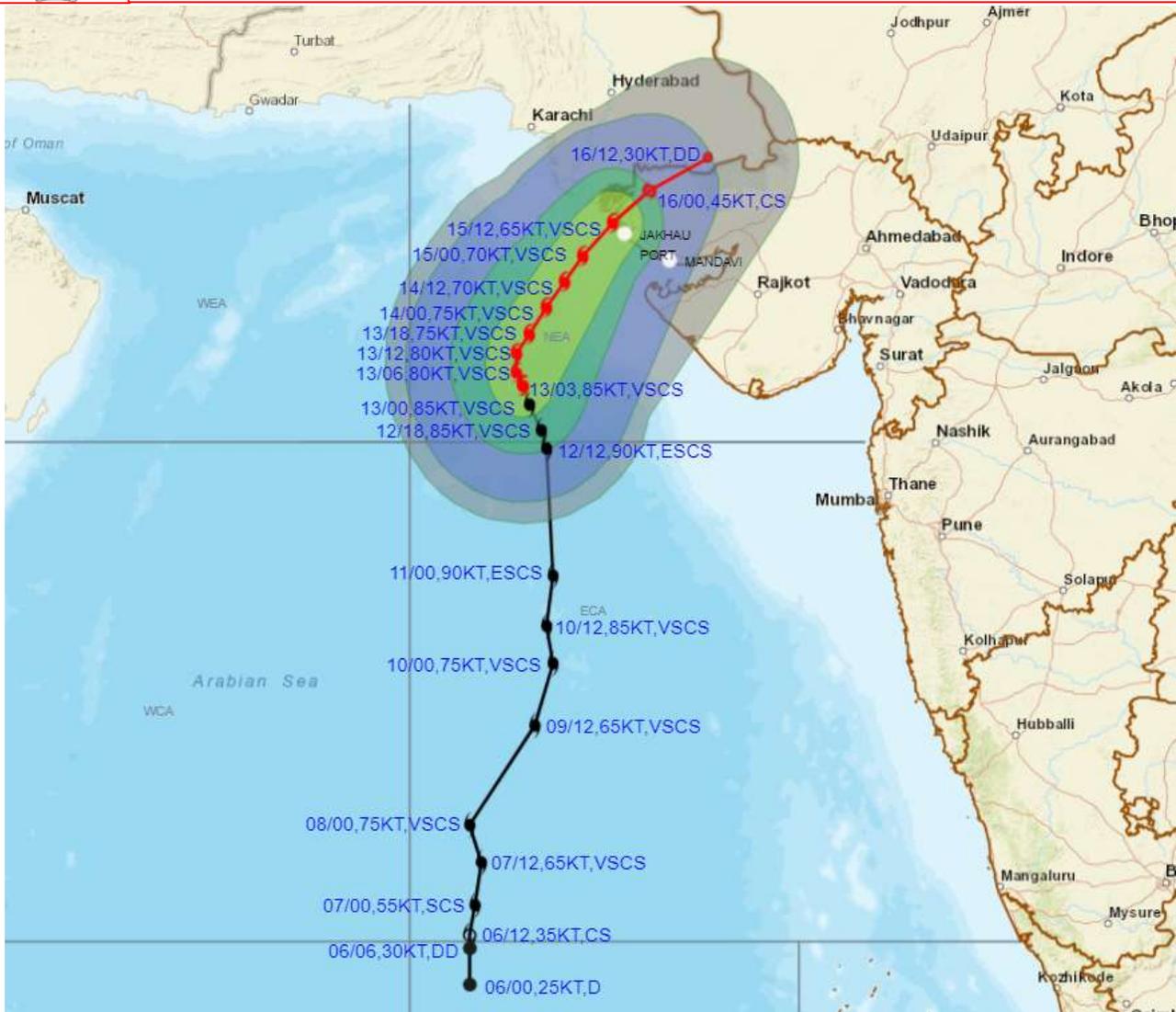
— FORECAST TRACK

▲ CONE OF UNCERTAINTY

| Forecast      | DISTANCE(KM) AND DIRECTION FROM STATIONS |         |             |          |                 |
|---------------|--|---------|-------------|----------|-----------------|
| Date and Time | PORBANDAR                                | DWARKA  | JAKHAU PORT | NALIYA   | KARACHI AIRPORT |
| 14.06.23/0000 | 240, WNW                                 | 180, W  | 180, SW     | 200, SW  | 320, S          |
| 15.06.23/0000 | 150, N                                   | 110, NE | 130, ESE    | 110, ESE | 350, SE         |
| 16.06.23/0000 | 260, NNW                                 | 170, N  | 80, NNE     | 70, NNE  | 220, ESE        |



**OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST AND ADJOINING EASTCENTRAL ARABIAN SEA BASED ON 0300 UTC (0830 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 (≥ 120 KT)

● 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)

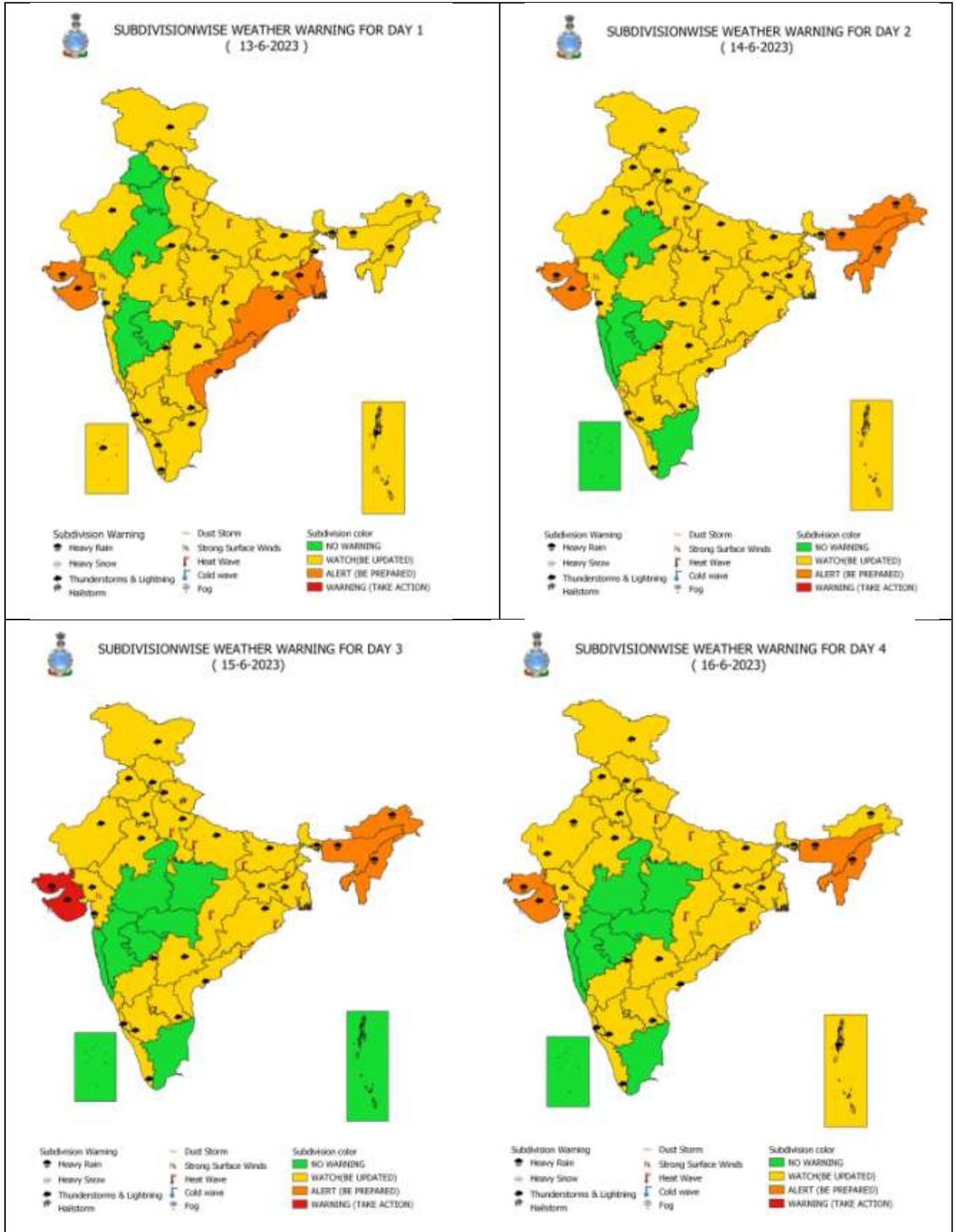
■ 50-63 KT (92-117 KMPH)

■ ≥ 64 KT (≥118 KMPH)

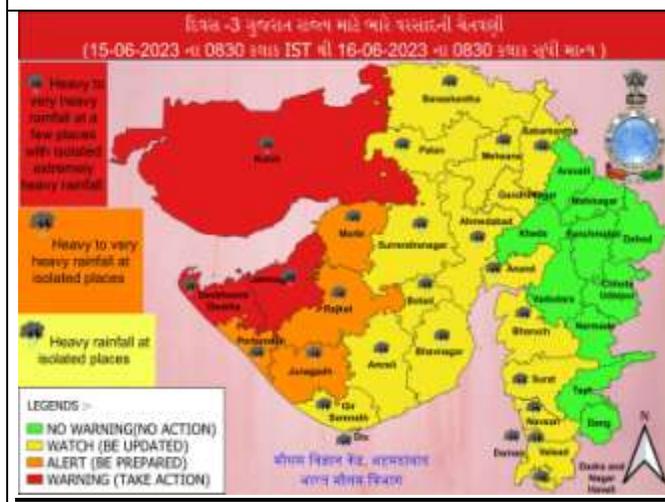
**IMPACT OVER THE SEA**

| 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 |

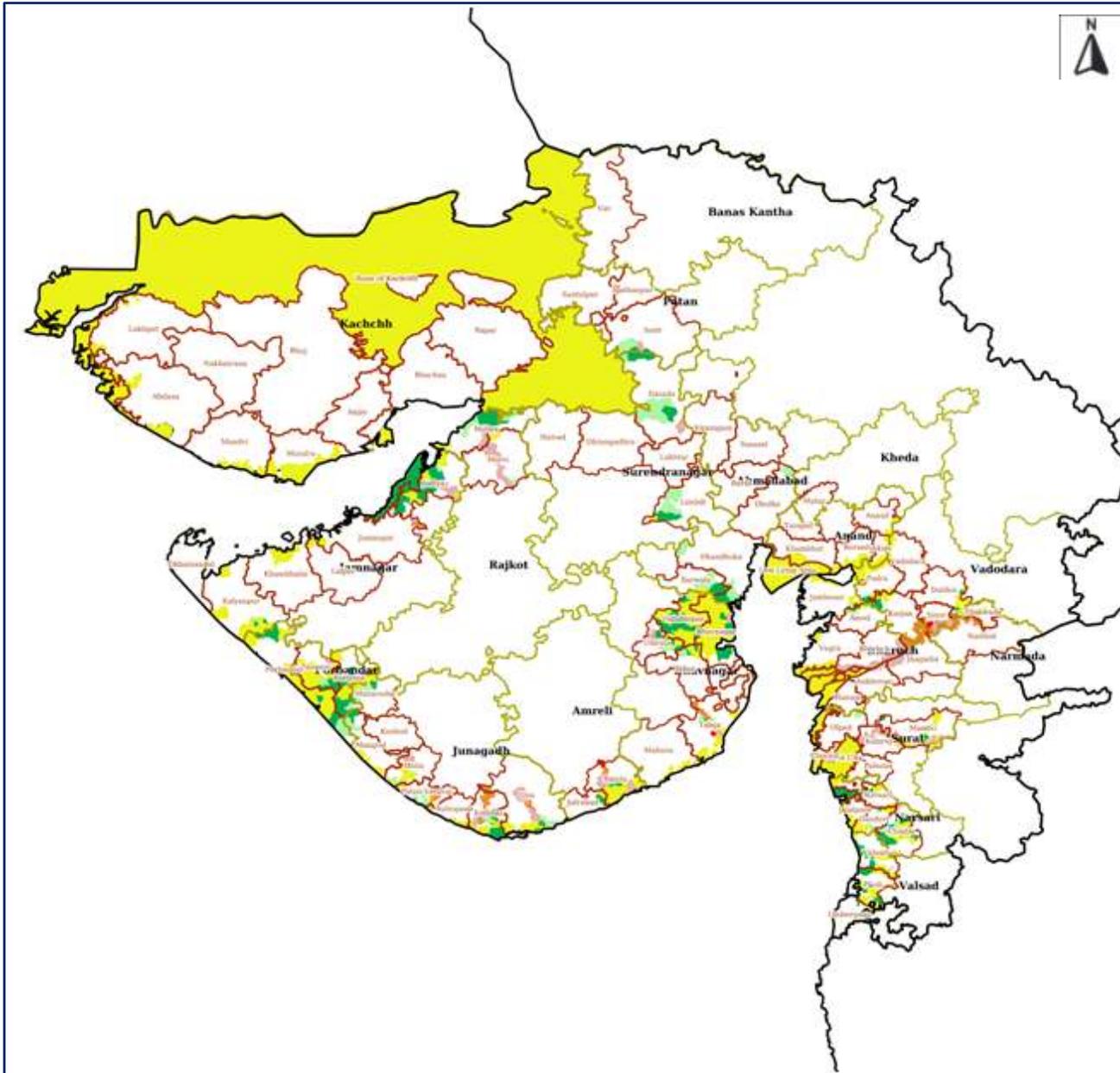
# Heavy Rainfall Warning for 14<sup>th</sup> to 16<sup>th</sup> June 2023



## District-wise Heavy Rainfall Warning Maps for 13<sup>th</sup> to 17<sup>th</sup> June



## Hazard Map – Flood Depth for Cyclone Biparjoy Flood

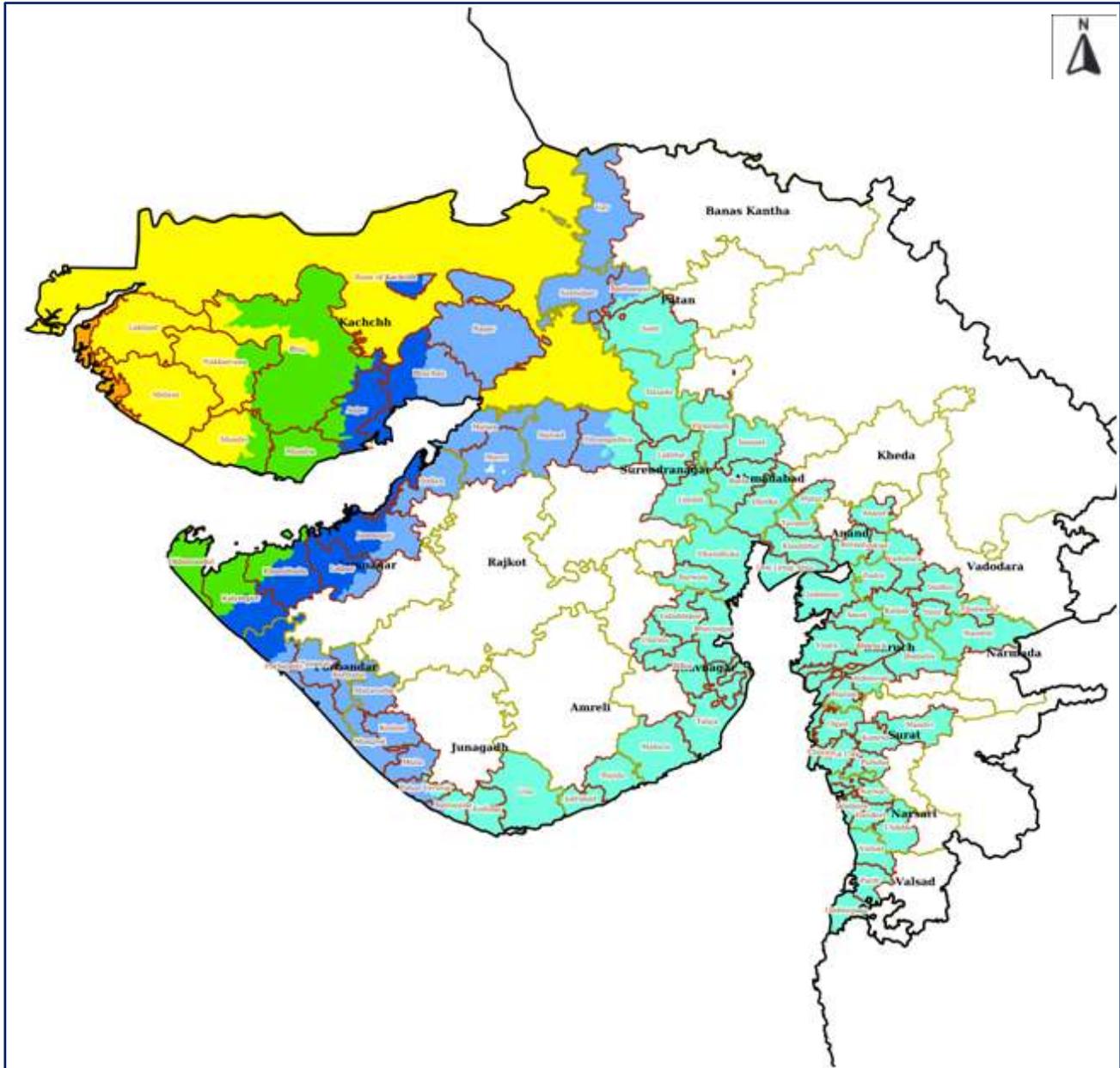


|                            |   |  |  |   |  |
|----------------------------|---|--|--|---|--|
| L<br>E<br>G<br>E<br>N<br>D | <span style="border: 1px solid black; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> State Boundary                | <span style="border: 1px solid yellow; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> District Boundary     | <span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Tehsil Boundary              | <span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Village Boundary     |  |
|                            | <span style="display: inline-block; width: 15px; height: 10px; background-color: #c8e6c9; margin-right: 5px;"></span> Very Low (Less than 0.25 m) | <span style="display: inline-block; width: 15px; height: 10px; background-color: #4caf50; margin-right: 5px;"></span> Low (0.25 to 0.50 m) | <span style="display: inline-block; width: 15px; height: 10px; background-color: #fff9c4; margin-right: 5px;"></span> Moderate (0.50 to 1.0 m) | <span style="display: inline-block; width: 15px; height: 10px; background-color: #f8bbd0; margin-right: 5px;"></span> High (1.0 to 2.0 m) | <span style="display: inline-block; width: 15px; height: 10px; background-color: #795548; margin-right: 5px;"></span> Very High (2.0 to 3.0 m) |

## District-wise Wind Warning Maps for 13<sup>th</sup> to 16<sup>th</sup> June

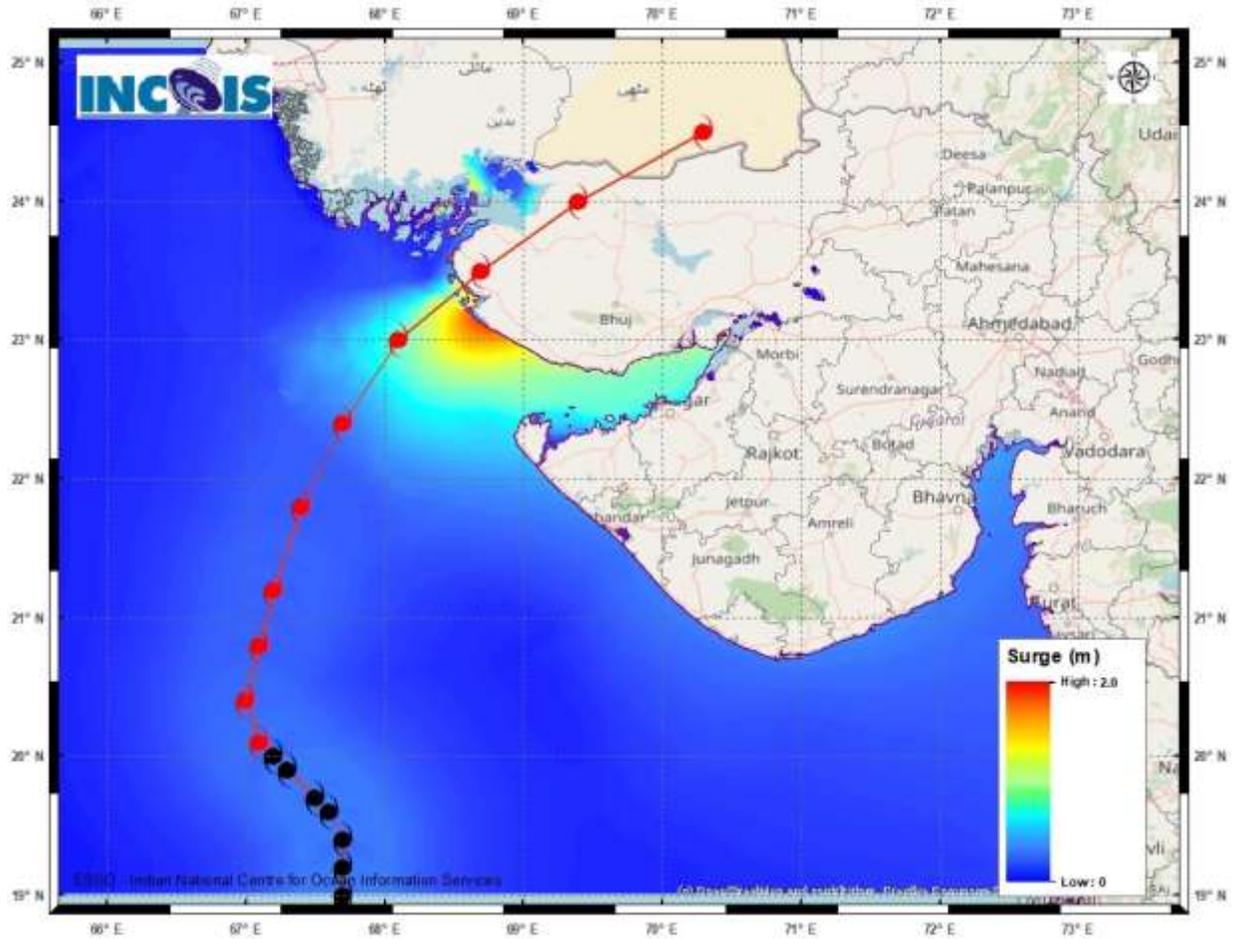


## Hazard Map - Wind Speeds for Cyclone Biparjoy Wind



|                            |                                |                                    |                            |                  |  |
|----------------------------|--------------------------------|------------------------------------|----------------------------|------------------|--|
| L<br>E<br>G<br>E<br>N<br>D | State Boundary                 | District Boundary                  | Tehsil Boundary            | Village Boundary |  |
|                            | Wind Speed (Less than 31 Km/h) | Wind Speed (31 - 49 Km/h)          | Wind Speed (49 - 61 Km/h)  |                  |  |
|                            | Wind Speed (61 - 88 Km/h)      | Wind Speed (88 - 117 Km/h)         | Wind Speed (117- 166 Km/h) |                  |  |
|                            | Wind Speed (166 - 221 Km/h)    | Wind Speed (Greater than 221 Km/h) |                            |                  |  |
|                            |                                |                                    |                            |                  |  |
|                            |                                |                                    |                            |                  |  |
|                            |                                |                                    |                            |                  |  |

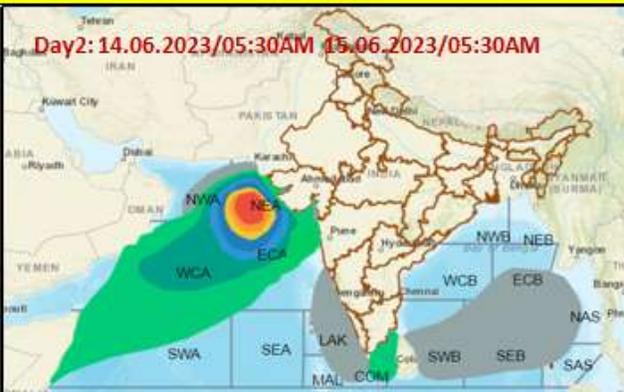
## Storm Surge Warning Map based on Forecast Track



### 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



|  |  |
|--|--|
|  | Squally Weather with wind speed 40-45 kmph gusting to 55 kmph    |
|  | Squally wind speed with wind speed 45-55 kmph gusting to 65 kmph |
|  | Squally wind speed with wind speed 50-60 kmph gusting to 70 kmph |
|  | Gale wind speed with wind speed 60-70 kmph gusting to 80 kmph    |
|  | Gale wind speed with wind speed 70-80 kmph gusting to 90 kmph    |
|  | Gale wind speed with wind speed 80-90 kmph gusting to 100 kmph   |
|  | Gale wind speed with wind speed 90-100 kmph gusting to 120 kmph  |
|  | Gale wind speed with wind speed 100-120 kmph gusting to 135 kmph |
|  | Gale wind speed with wind speed 120-140 kmph gusting to 155 kmph |
|  | Gale wind speed with wind speed 140-160 kmph gusting to 175 kmph |
|  | Gale wind speed with wind speed 160-180 kmph gusting to 200 kmph |

**Fishermen are advised not to venture into the marked areas**