



**India Meteorological Department
(Ministry of Earth Sciences)**

BULLETIN NO. 51 (ARB/01/2023)

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Sub: Extremely Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over eastcentral and adjoining northeast Arabian Sea:

Cyclone Warning for Saurashtra & Kutch Coasts (Orange Message)

The extremely severe cyclonic storm “Biparjoy” (pronounced as “Biporjoy”) over eastcentral and adjoining northeast Arabian Sea moved north-northwestwards with a speed of 07 kmph during past 6-hours and lay centered at 1430 hours IST of today, the 12th June, 2023 over the same region near latitude 19.7°N and longitude 67.5°E, about 310 km southwest of Porbandar, 340 km south-southwest of Devbhumi Dwarka, 410 km south-southwest of Jakhau Port, 420 km south-southwest of Naliya and 580 km south of Karachi (Pakistan).

It is very likely to move nearly northwards till 14th morning, then move north-northeastwards and cross Saurashtra & Kutch and adjoining Pakistan coasts between Mandvi (Gujarat) and Karachi (Pakistan) near Jakhau Port (Gujarat) by noon of 15th 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(IST)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
12.06.23/1430	19.7/67.5	165-175 Gusting To 190	Extremely Severe Cyclonic Storm
12.06.23/1730	19.9/67.3	155-165 Gusting To 185	Very Severe Cyclonic Storm
12.06.23/2330	20.2/67.2	145-155 Gusting To 175	Very Severe Cyclonic Storm
13.06.23/0530	20.6/67.2	145-155 Gusting To 175	Very Severe Cyclonic Storm
13.06.23/1130	21.0/67.3	140-150 Gusting To 165	Very Severe Cyclonic Storm
13.06.23/2330	21.4/67.4	135-145 Gusting To 160	Very Severe Cyclonic Storm
14.06.23/1130	22.0/67.6	130-140 Gusting To 155	Very Severe Cyclonic Storm
14.06.23/2330	22.7/68.0	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/1130	23.2/68.6	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/2330	23.7/69.3	80-90 Gusting To 100	Cyclonic Storm
16.06.23/1130	24.3/70.3	40-50 Gusting To 60	Depression
16.06.23/2330	24.9/71.3	25-35 Gusting To 45	Well Marked Low Pressure Area

(i) Heavy Rainfall warning for Gujarat (Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts):

- Light to moderate rainfall at most places with heavy to very heavy rainfall at isolated places very likely over Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts of Saurashtra & Kutch on 14th 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 on 15th June.
- Isolated heavy rainfall is very likely over remaining districts of Saurashtra and north Gujarat region on 15th June.
- Light to moderate rainfall at most places with heavy to very heavy rainfall at isolated places very likely over north Gujarat and adjoining south Rajasthan on 16th June.

(ii) Wind warning:

12th June: Gale wind speed reaching 165-175 kmph gusting to 195 kmph is likely to prevail over northeast and adjoining eastcentral Arabian Sea becoming 145-155 kmph gusting to 175 kmph from night. Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over adjoining areas of westcentral Arabian Sea.

13th June: Gale wind speed reaching 145-155 kmph gusting to 175 kmph is likely to prevail over northeast Arabian Sea. Gale wind speed reaching 80-90 kmph gusting to 100 kmph is likely to prevail over adjoining areas of eastcentral Arabian Sea. Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over adjoining areas of northwest Arabian Sea.

14th June: Gale wind speed reaching 130-140 kmph gusting to 155 kmph is likely to prevail over northeast Arabian Sea. Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over adjoining areas of eastcentral Arabian Sea.

15th June: Gale wind speed reaching 125-135 kmph gusting to 150 kmph is likely to prevail over northeast Arabian Sea and likely to decrease becoming 90-100 kmph gusting to 110 kmph from evening. Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over adjoining areas of eastcentral Arabian Sea.

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 45-55 kmph gusting to 65 kmph on 12th and becoming 50-60 kmph gusting to 70 kmph from 13th to evening to 14th June.
- Gale wind speed reaching 65-75 kmph gusting to 85 kmph very likely to prevail from 14th June evening and becoming 125-135 kmph gusting to 150 kmph from 15th early morning for subsequent 12 hours. It would decrease gradually becoming 45-55 kmph gusting to 65 kmph over north Gujarat and adjoining south Rajasthan from 16th 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 14th & 15th June and 30-40 kmph gusting to 50 kmph during 16th morning to evening.

(iii) Sea condition

12th June: Sea condition is likely to be phenomenal over northeast and adjoining eastcentral Arabian Sea and rough over adjoining westcentral Arabian Sea.

13th June: Sea condition is likely to be phenomenal over northeast and adjoining eastcentral Arabian Sea and rough over adjoining northwest Arabian Sea

14th June: Sea condition is likely to be phenomenal over northeast Arabian Sea and rough to very rough sea condition is likely over adjoining areas of eastcentral Arabian Sea.

15th June: Sea condition is likely to be phenomenal to high over northeast Arabian Sea and very rough to rough over adjoining eastcentral Arabian Sea till 15th June noon and improve thereafter.

Along & off Saurashtra & Kutch coasts:

Sea conditions likely to be rough to very rough till 14th morning and high to phenomenal thereafter till 15th June noon and 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.

(v) Damage expected over Kutch, Devbhumi Dwarka, Porbandar, Jamnagar, Morbi & Junagarh & Rajkot districts of Gujarat on 15th 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 15th June.

- Northeast Arabian Sea during 12th -15th 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 systems are under continuous surveillance and the next message will be issued at 2030 hours IST of 12th June, 2023.

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

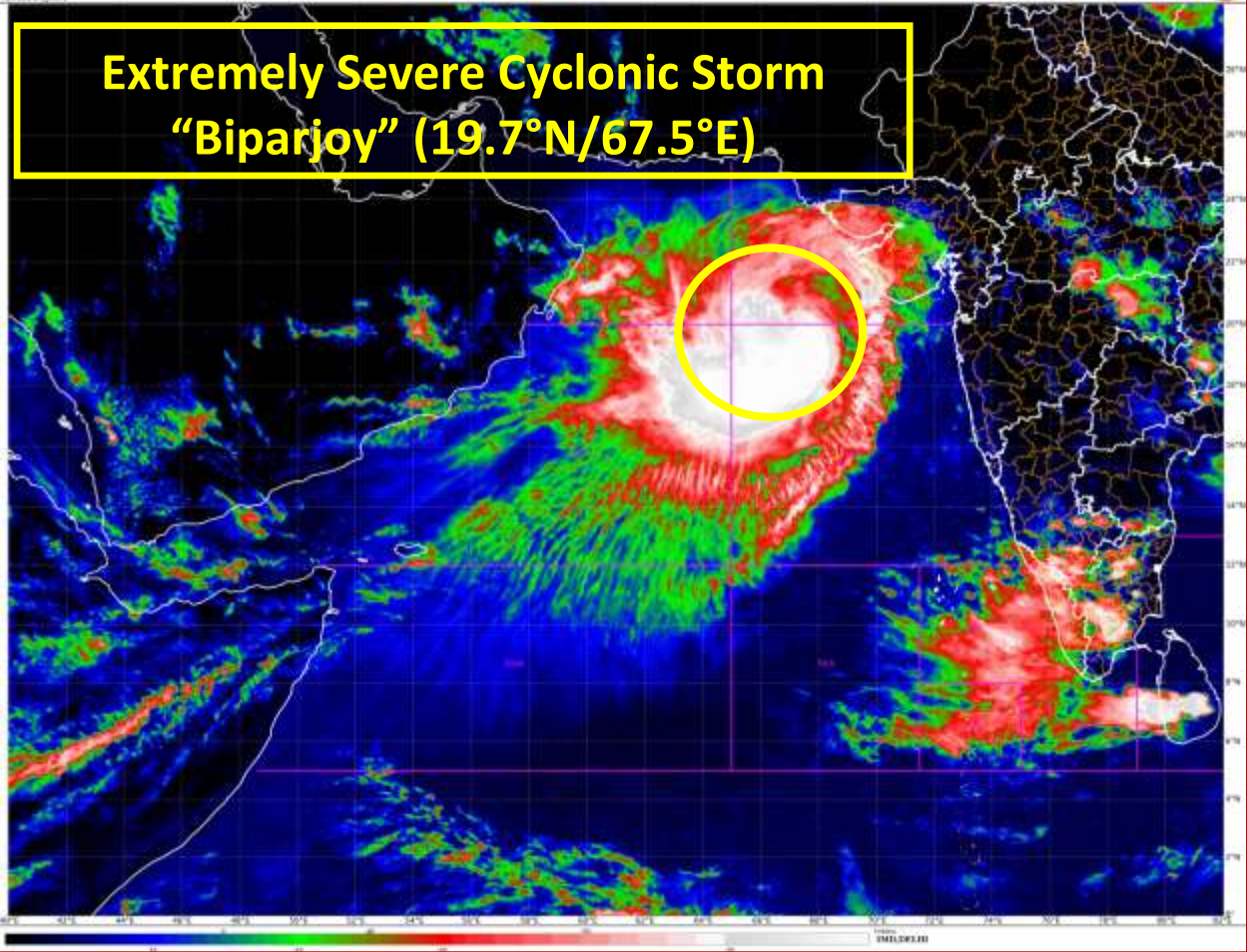
Copy to: ACWC Kolkata/ ACWC Chennai/ CWC Bhubaneswar/CWCVisakhapatnam/CWC Ahmedabad/ MO Port Blair/MC Raipur/MC Bhopal/MC Hyderabad/RMC Nagpur

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

NCEP (15N-42.50 15N)
15N0, F100, TEMP 16.0 um
ARABIAN SEA

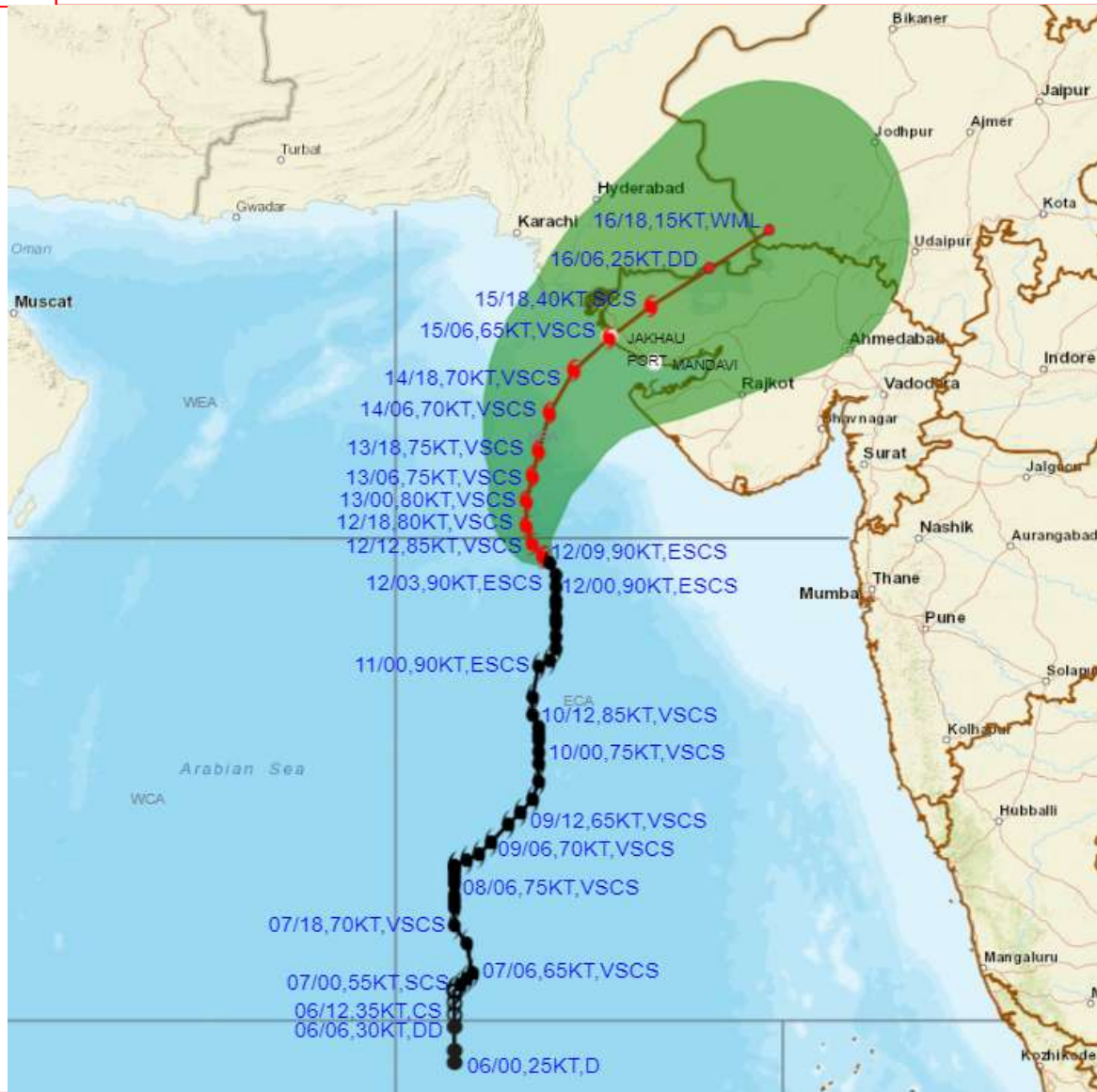
12-08-2023 11:30 to 17:00 GMT
12-08-2023 11:00 to 17:00 IST

**Extremely Severe Cyclonic Storm
"Biparjoy" (19.7°N/67.5°E)**





OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF EXTREMELY SEVERE CYCLONIC STORM "BIPARJOY" OVER EASTCENTRAL AND ADJOINING NORTHEAST ARABIAN SEA BASED ON 0900 UTC (1430 IST) OF 12TH JUNE 2023.



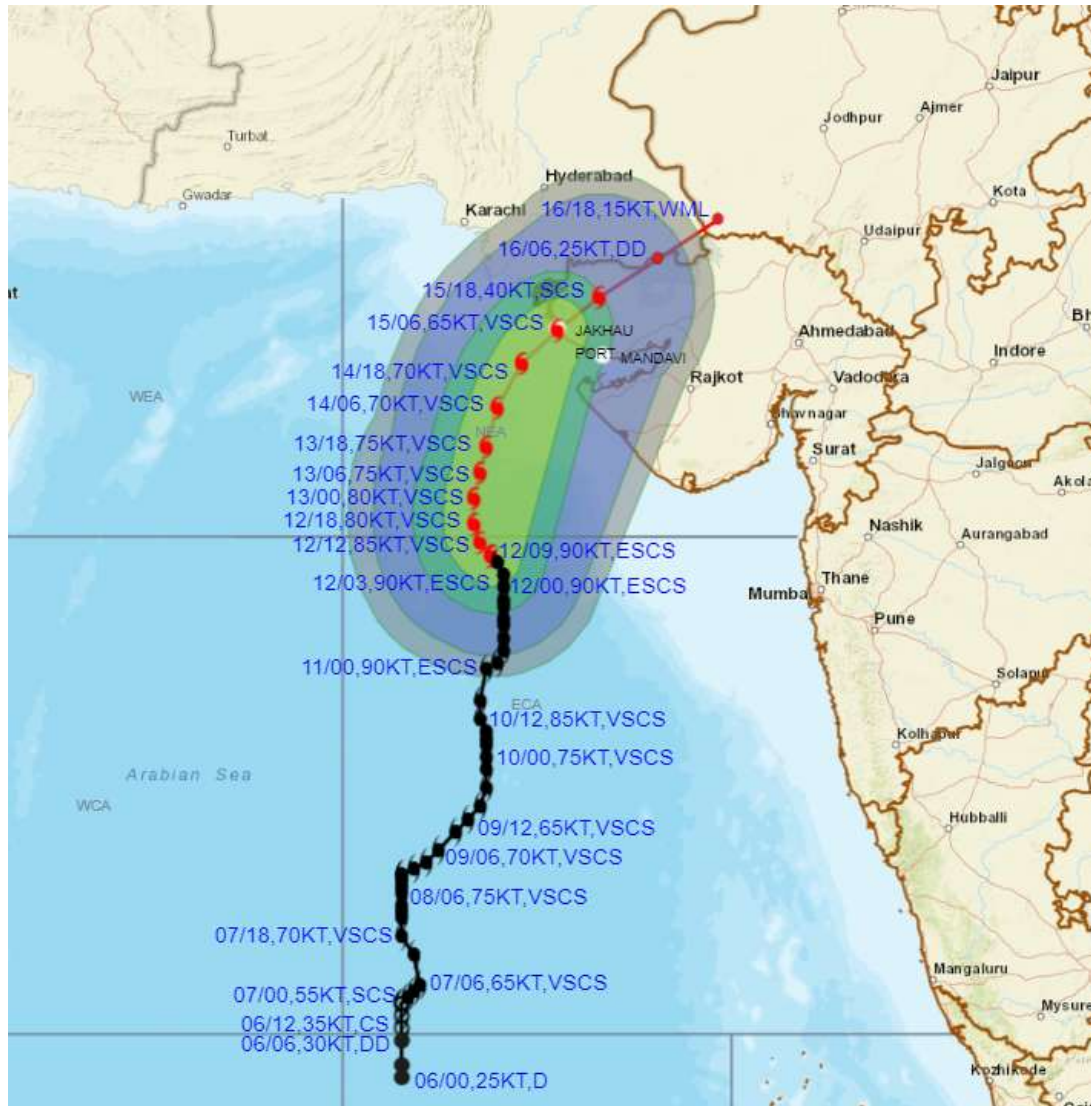
DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34.47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)
 SuCS: SUPER CYCLONIC STORM (\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				
	FORBANDAR	DWARKA	JAKHAU PORT	NALIYA	KARACHI AIRPORT
13.06.23/0600	250, WSW	230, SW	280, SSW	290, SSW	430, S
14.06.23/0600	210, W	150, WSW	170, SW	180, SW	320, S
15.06.23/0600	210, NNW	110, NNW	10, S	30, WSW	250, SE
16.06.23/0600	300, NNE	250, NNE	210, NE	190, NE	330, E



OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF EXTREMELY SEVERE CYCLONIC STORM "BIPARJOY" OVER EASTCENTRAL AND ADJOINING NORTHEAST ARABIAN SEA BASED ON 0900 UTC (1430 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)

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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)

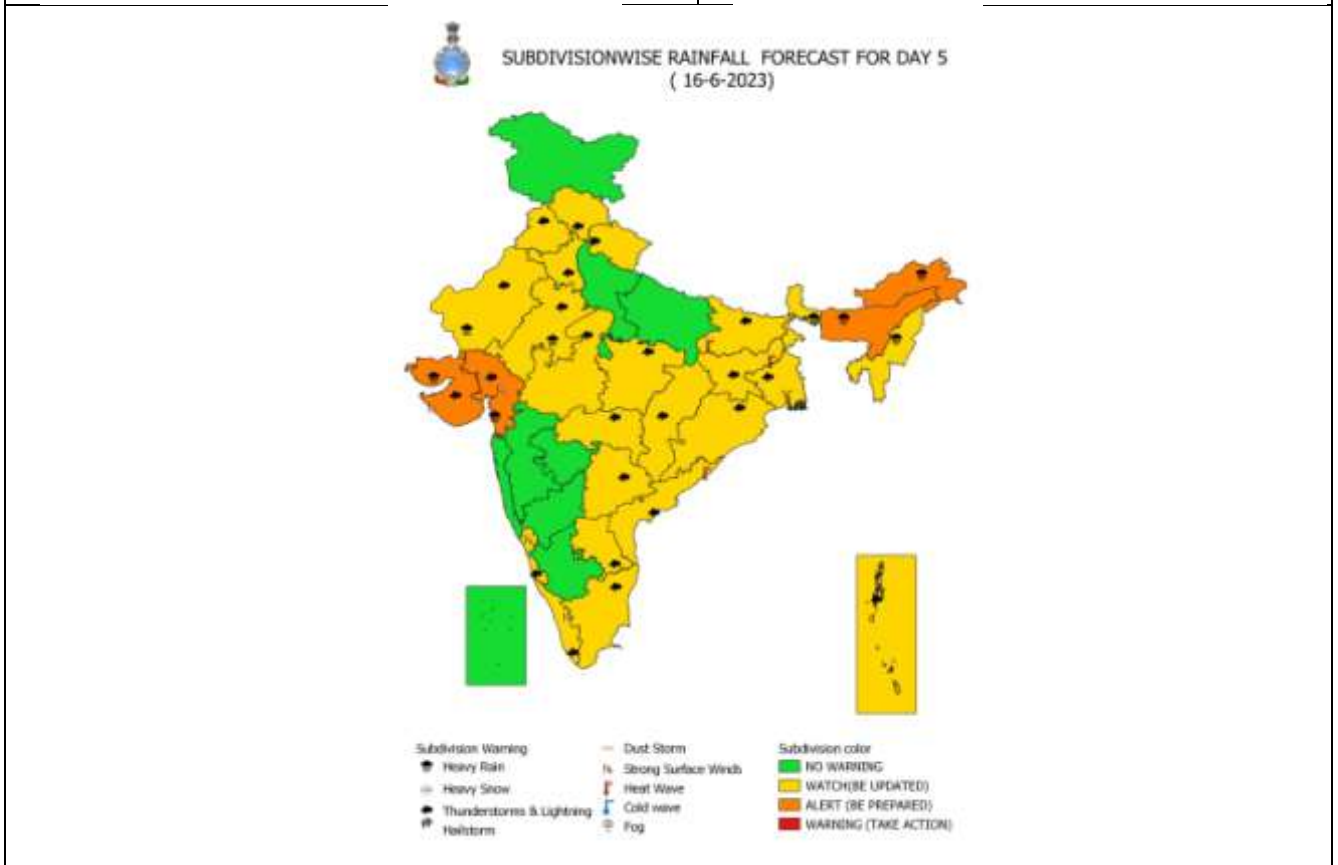
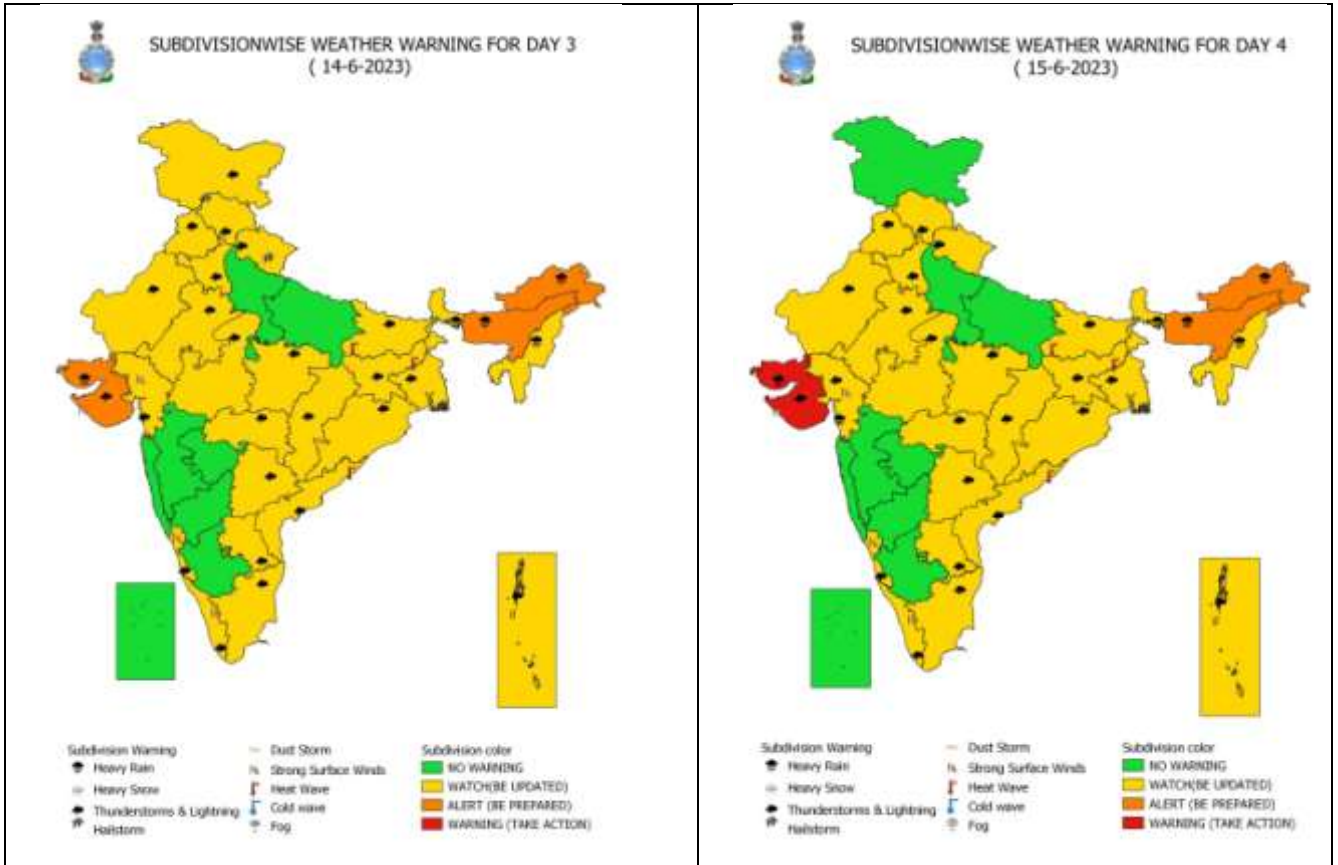
■ 50-63 KT (92-117 KMPH)

■ ≥ 64 KT (≥118 KMPH)

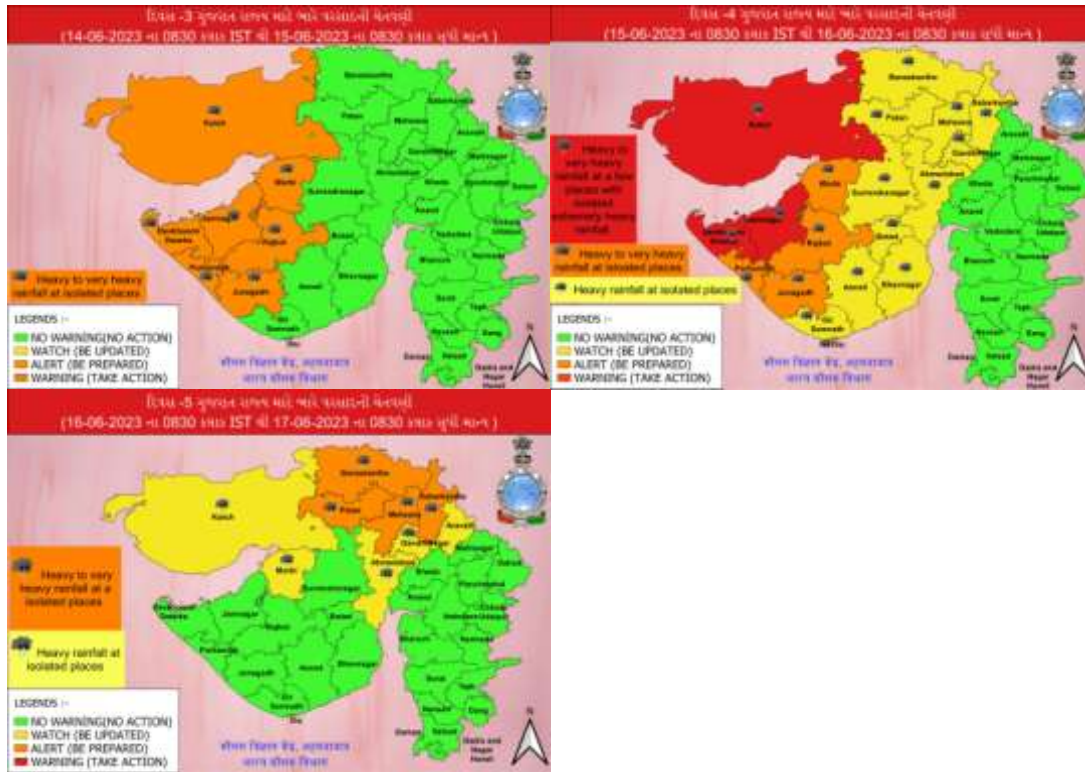
IMPACT OVER THE SEA

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

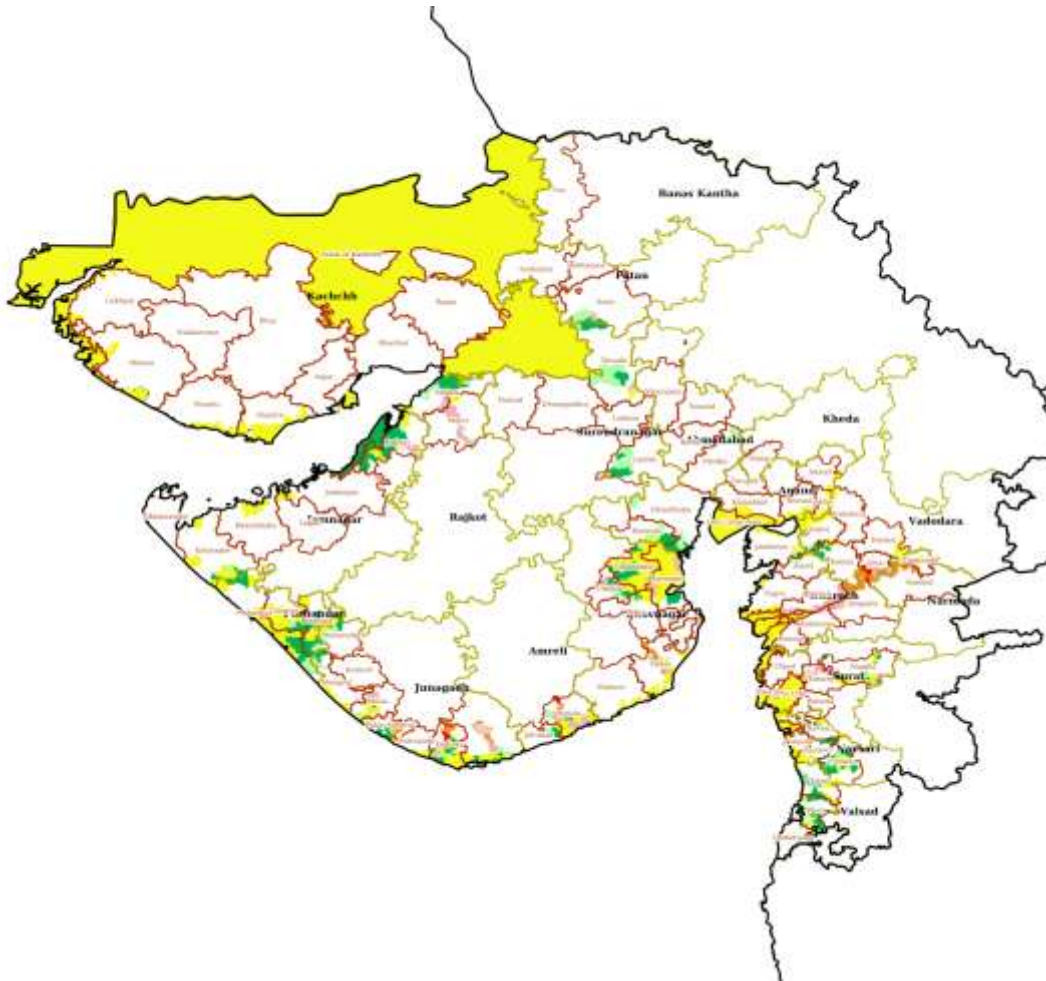
Heavy Rainfall Warning for 14th to 16th June 2023



District-wise Heavy Rainfall Warning Maps for 15th to 17th June



Hazard Map - Flood Depth for Cyclone Biparjoy Flood

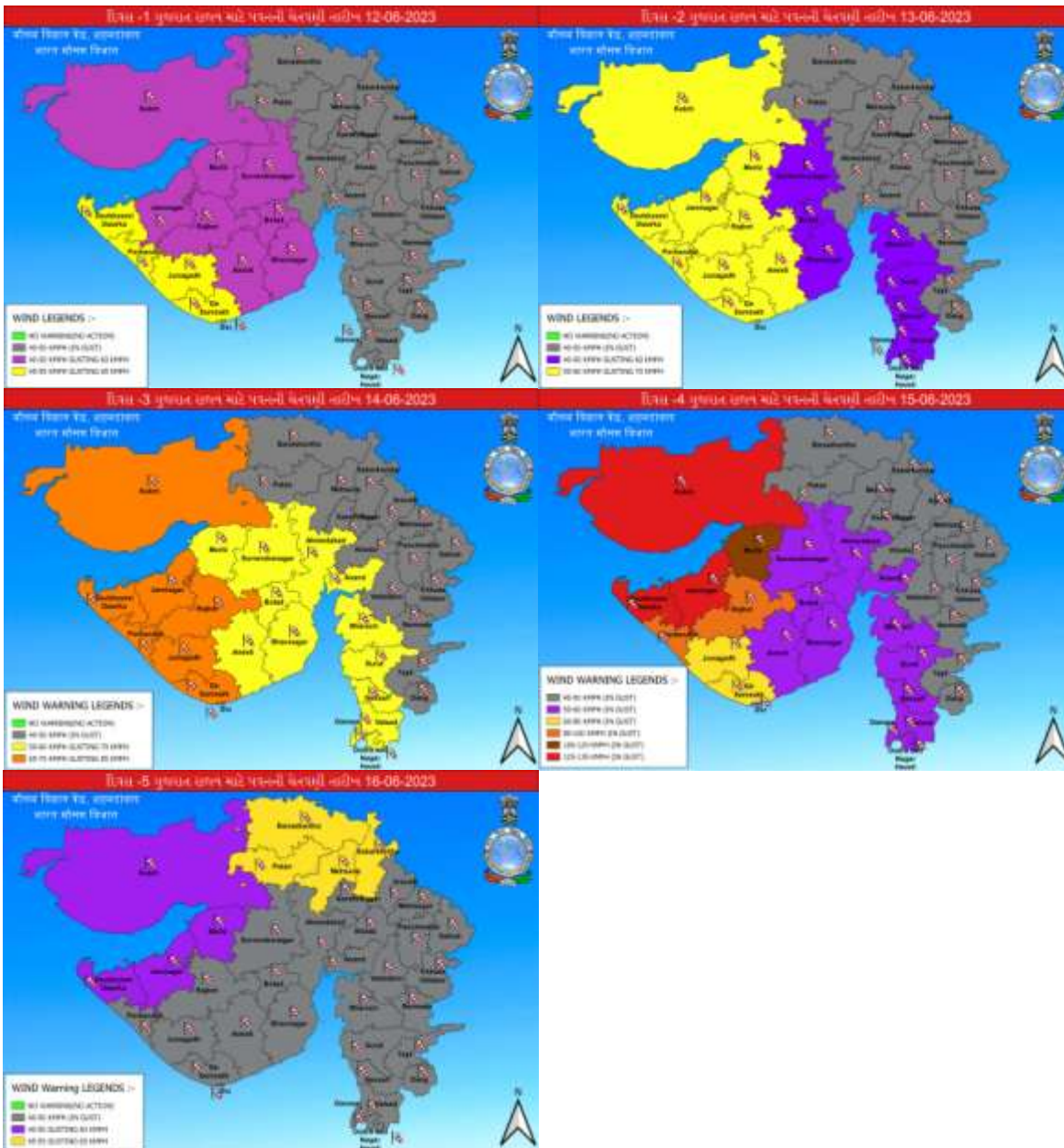


Disclaimer: The hazard estimated are for the study area up to 10 m above sea level.

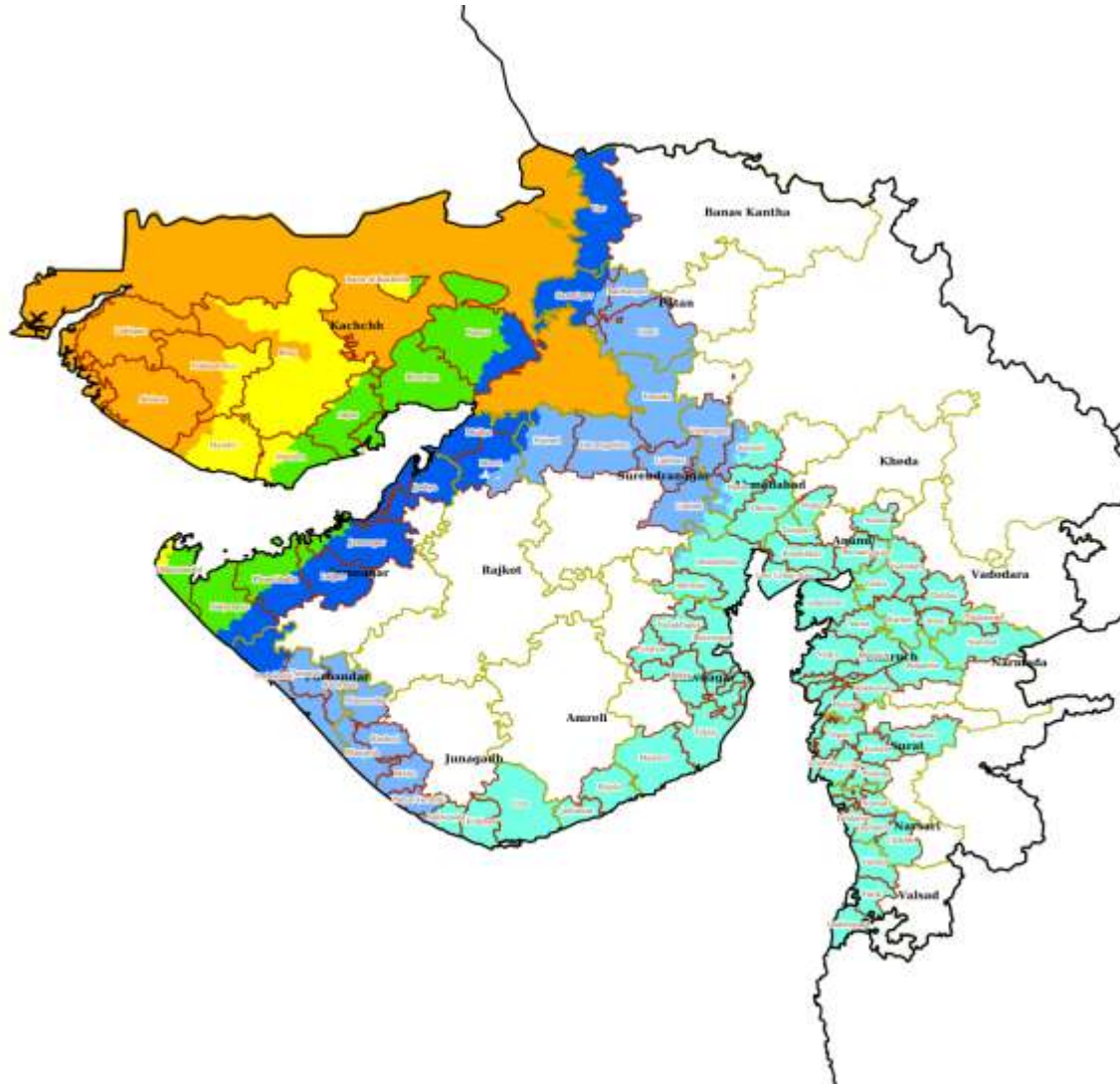
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|-----------------------------|--------------------------|------------------------------|------------------|
| State Boundary | District Boundary | Tehsil Boundary | Village Boundary |
| Very Low (Less than 0.25 m) | Low (0.25 to 0.50 m) | Moderate (0.50 to 1.0 m) | |
| High (1.0 to 2.0 m) | Very High (2.0 to 3.0 m) | Extreme (Greater than 3.0 m) | |

District-wise Wind Warning Maps for 12th to 16th June















Hazard Map - Wind Speeds for Cyclone Biparjoy Wind

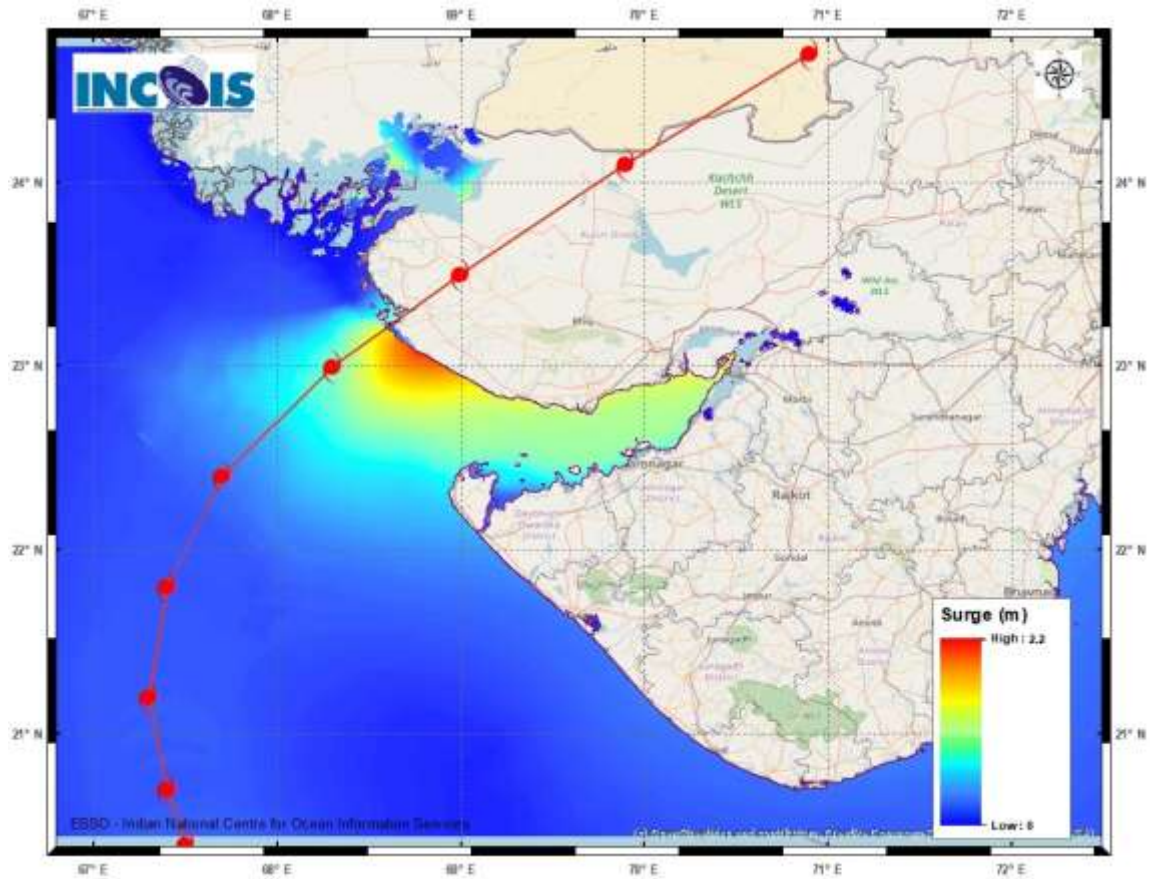


Disclaimer: The hazard estimated are for the study area up to 10 m above sea level.

LEGEND

	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 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

Fishermen warning graphics

