



India Meteorological Department
(Ministry of Earth Sciences)

BULLETIN NO. 70 (ARB/01/2023)

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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 northeastward with a speed of 5 kmph during past 6-hours and lay centered at 2330 hours IST of 14th June, 2023 over the same region near latitude 22.2°N and longitude 66.9°E, about 210 km west-southwest of Jakhau Port (Gujarat), 220 km west-southwest of Devbhumi Dwarka, 230 km west-southwest of Naliya, 290 km west-northwest of Porbandar, and 300 km south-southwest of Karachi (Pakistan).

It is very likely to move northeastwards and cross Saurashtra & Kutch and adjoining Pakistan coasts between Mandvi (Gujarat) and Karachi (Pakistan) near Jakhau Port (Gujarat) by evening of 15th June as a very severe cyclonic storm with maximum sustained wind speed of 120-130 kmph gusting to 145 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
14.06.23/2330	22.2/66.9	130-140 Gusting To 155	Very Severe Cyclonic Storm
15.06.23/0530	22.5/67.3	130-140 Gusting To 155	Very Severe Cyclonic Storm
15.06.23/1130	22.9/67.8	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/1730	23.2/68.2	120-130 Gusting To 145	Very Severe Cyclonic Storm
15.06.23/2330	23.7/68.9	90-100 Gusting To 110	Severe Cyclonic Storm
16.06.23/1130	24.4/69.9	55-65 Gusting To 75	Deep Depression
16.06.23/2330	25.0/71.0	40-50 Gusting To 60	Depression

(i) Heavy Rainfall warning:

- Light to moderate rainfall at most places with heavy to very heavy rainfall at a few places and extremely heavy falls at isolated places very likely over Kachchh, 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 15th 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 16th and southeast Rajasthan & adjoining North Gujarat region on 17th June.

(ii) Wind warning:

Northeast Arabian Sea: Gale wind speed reaching 130-140 kmph gusting to 155 kmph prevailing over the region likely to gradually decrease and becoming 120-130 kmph gusting 145 kmph during 15th evening. It would weaken gradually further more thereafter becoming squally wind speed reaching 45-55 kmph gusting to 65 kmph by 16th morning.

Eastcentral Arabian Sea: Gale wind speed reaching 55-65 kmph gusting to 75 kmph is prevailing and would become squally wind speed reaching 45-55 kmph gusting to 65 kmph from 15th morning for subsequent 12 hours.

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

- Gale wind speed reaching 70-80 kmph gusting to 90 kmph are prevailing along & off Porbandar & Devbhoomi Dwarka district coasts. It would gradually increase becoming gale wind speed reaching 120-130 kmph gusting to 145 kmph during 15th forenoon to night along & off Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts. Thereafter, it would decrease gradually becoming 75-85 kmph gusting to 95 kmph over Kachchh and adjoining districts of Saurashtra & Kutch by 16th early morning and squally wind speed reaching 45-55 kmph gusting to 65 kmph by 16th afternoon.
- Squally wind speed reaching 55-65 kmph gusting to 75 kmph very likely to prevail along & off remaining districts of Saurashtra coast on 15th June.

Wind Warning for South Rajasthan

- Squally wind speed reaching 45-55 kmph gusting to 65 kmph is likely over South Rajasthan during 16th noon to evening and 35-45 kmph gusting to 55 kmph till mid-night of 16th June.

(iii) Sea condition

Sea condition will be phenomenal over northeast Arabian Sea and rough to very rough over adjoining eastcentral Arabian Sea till 15th evening.

Along & off Saurashtra& Kutch coasts:

Sea condition is likely to be high to phenomenal thereafter till 15th June night and would improve thereafter.

(iv) Storm Surge Warning (Kachchh, 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 Kachchh, 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 (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) and for Offshore & Onshore Industries (Graphics Attached):

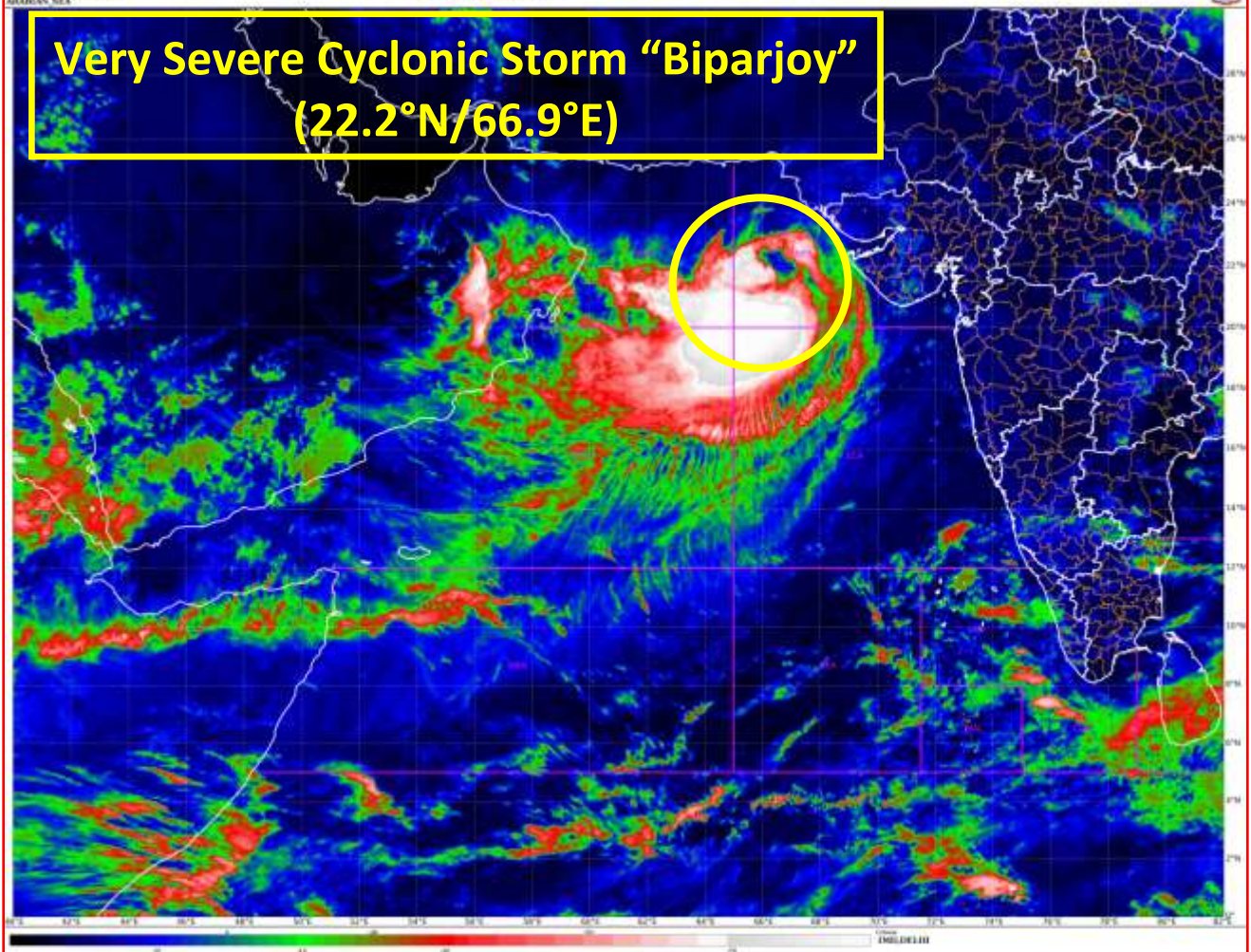
- Total suspension of fishing operations over eastcentral and adjoining Westcentral Arabian Sea till 15th June and over northeast Arabian Sea during 14th -15th June
- Those out at sea are advised to return to coast.
- Judicious regulation of offshore and onshore activities.
- Ports along the west coast 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 (Kachchh, 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 0530 hours IST of 15th June, 2023.

(Shobhit Katiyar)
Scientist C, Cyclone Warning Division, New Delhi

Copy to: ACWC Kolkata/ ACWC Chennai/ CWC Bhubaneswar/CWC Visakhapatnam/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"
(22.2°N/66.9°E)**



Radar Imagery of Doppler Weather Radar at Bhuj

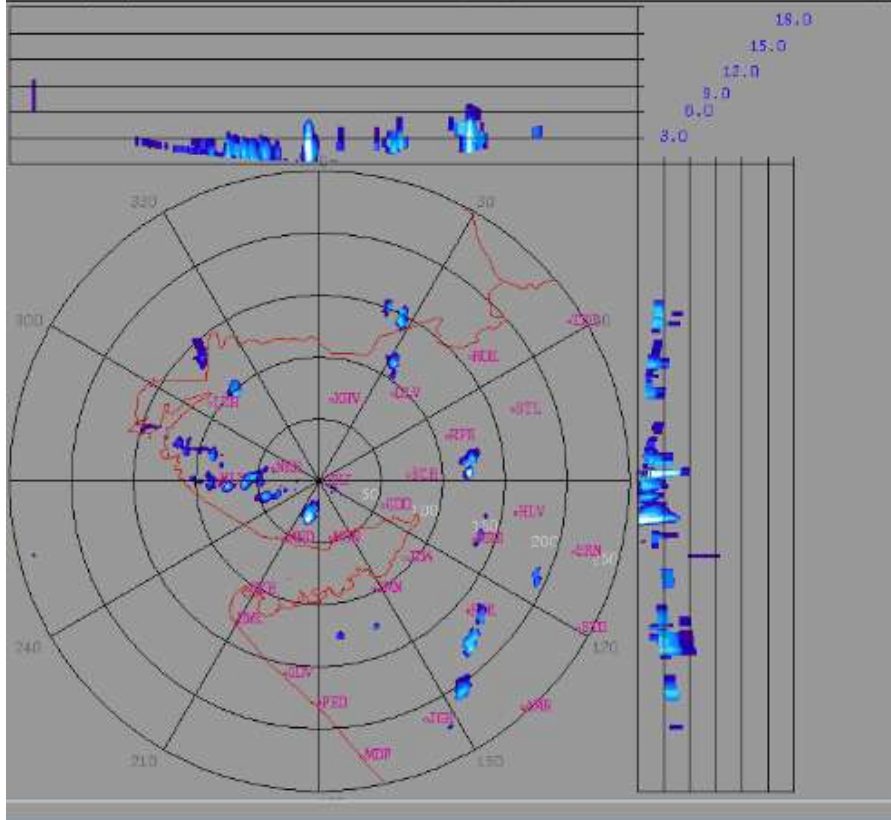
bhuj_weather_2023_06_14_19_31_36_hsfim-b-bel.dwr

2023/06/14

19:51:36 (UTC)

MAX(Z)

DWR BHUJ
(23.2416N , 69.6458E , 100.00 mts)



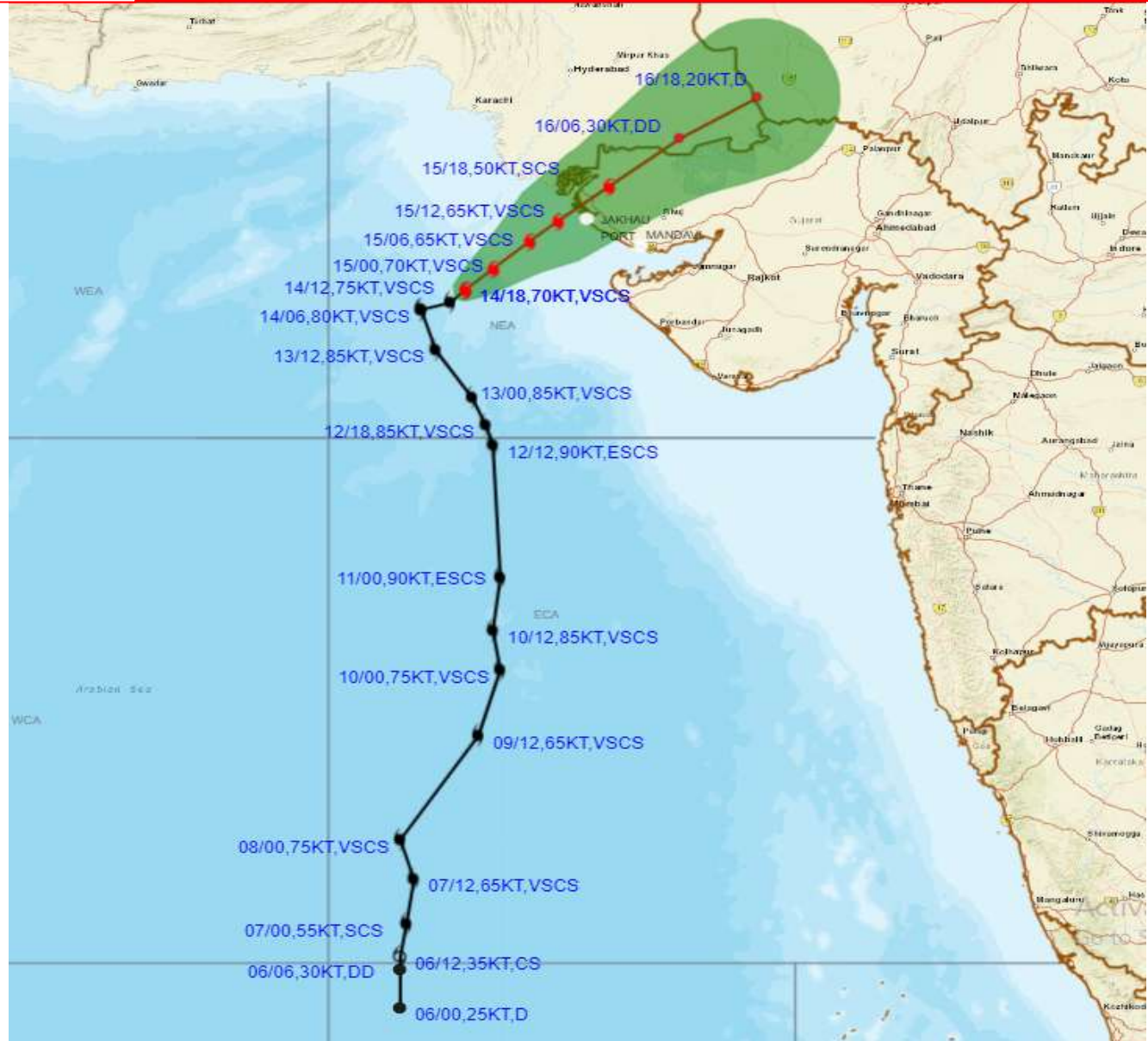
Height : 18.0 Km
 Layer Sporing : 0.100 Km
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 Grid size : 1 Km
 Display Range : 250 Km
 Display Res : 1.0 Km/Pix
 DCR Enable : Yes
 Scan Elev (Lo, Hi) : 0.2, 21.0 Deg
 PRF (Lo, Hi) : 450, 500 Hz
 Scan Res : 150 mts
 Scan RPM : 2.0
 Log Threshold : 4 dB
 ZIF : 42
 Pulse Width : 1.0
 North Width : 54.0 Hz
 SQI : 0.25
 CSA : 20
 Scan Range : 240 Km
 Preprocessings : NONE

dBZ

No Data	
61.3: > 65.0	
57.7: 61.3	
54.0: 57.7	
50.3: 54.0	
46.7: 50.3	
43.0: 46.7	
39.3: 43.0	
35.7: 39.3	
32.0: 35.7	
28.3: 32.0	
24.7: 28.3	
21.0: 24.7	
17.3: 21.0	
13.7: 17.3	
10.0: 13.7	



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 14TH JUNE 2023.



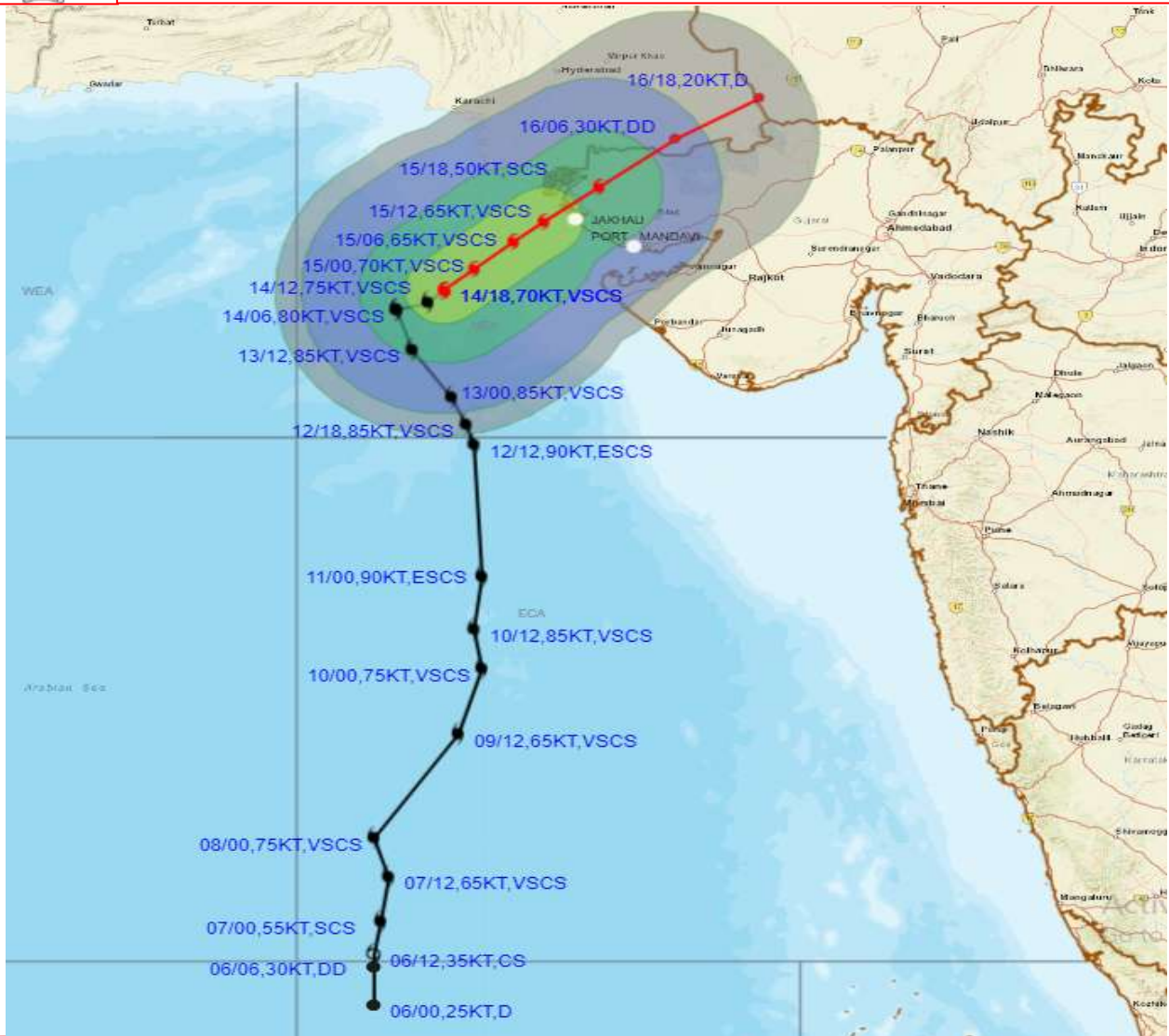
DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34-47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM (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				
	PORBANDAR	DWARKA	JAKHAU PORT	NALIYA	KARACHI AIRPORT
15.06.23/1800	250, NNW	150, N	60, NNE	60, N	230, SE
16.06.23/1800	400, NNE	350, NNE	310, NE	290, NE	390, E



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 14TH 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)

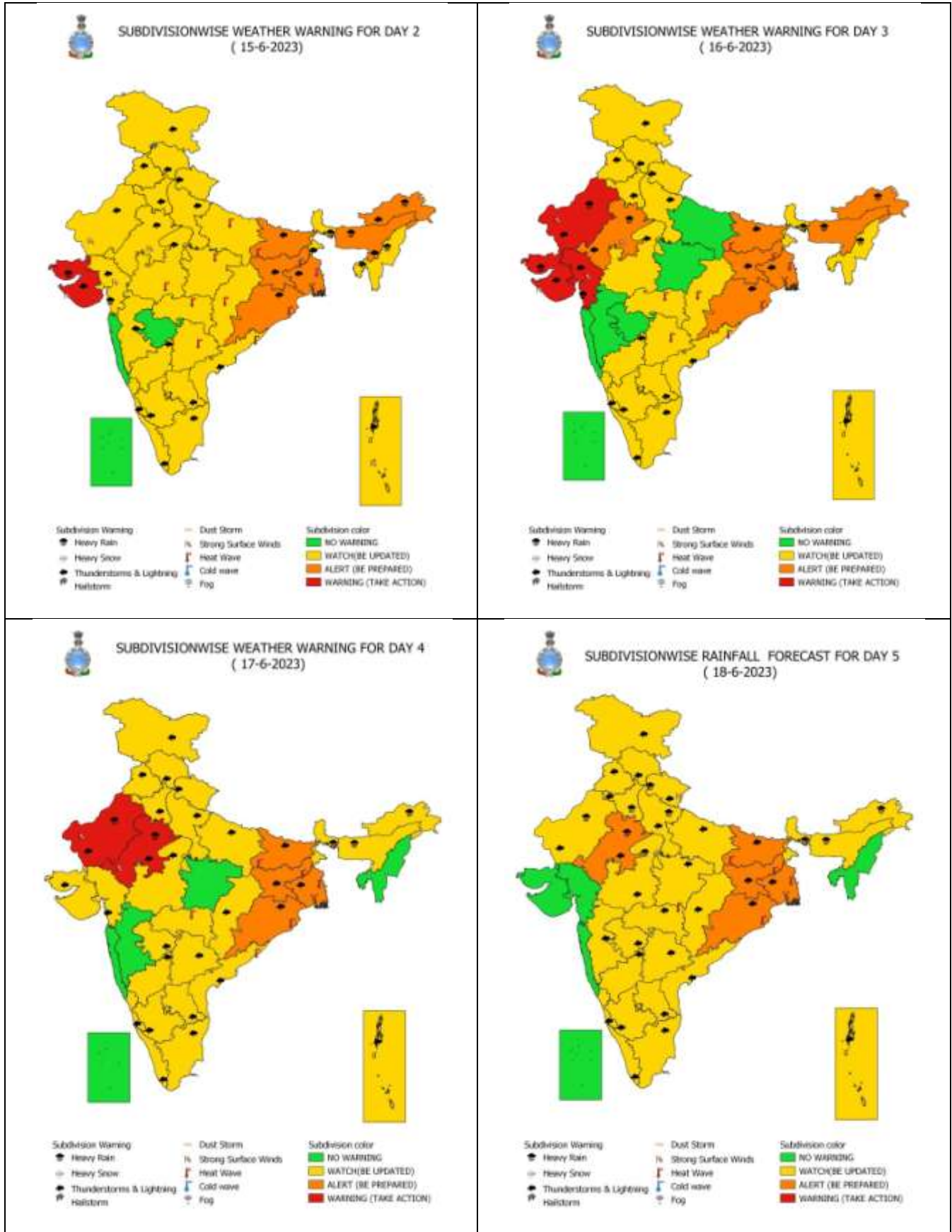
■ 50-63 KT (92-117 KMPH)

■ ≥ 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

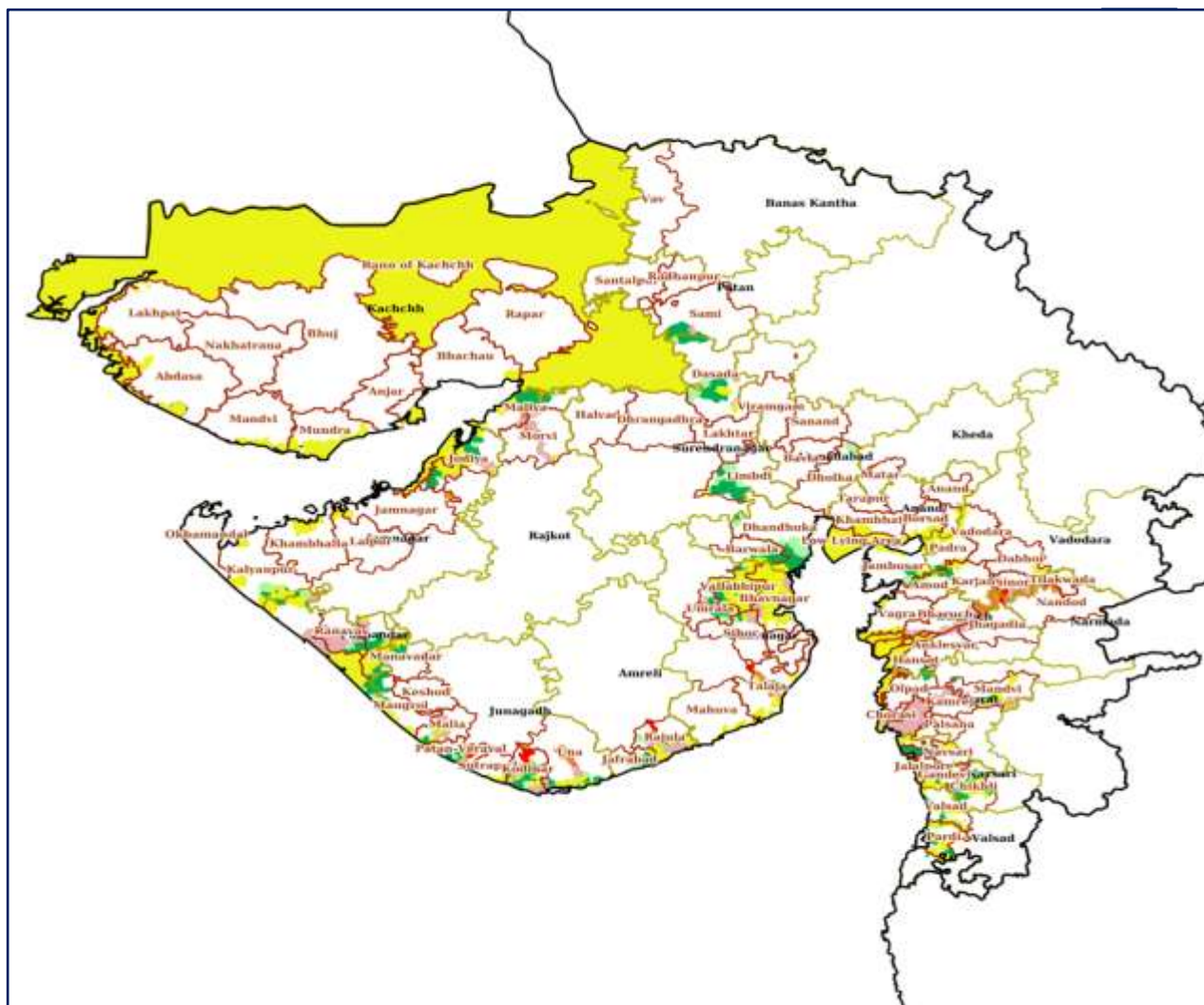
All India Heavy Rainfall Warning for 15th to 18th June 2023



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



Cyclone Biparjoy Flood Hazard Map (Tehsil-wise) on 15th June – Flood Depth

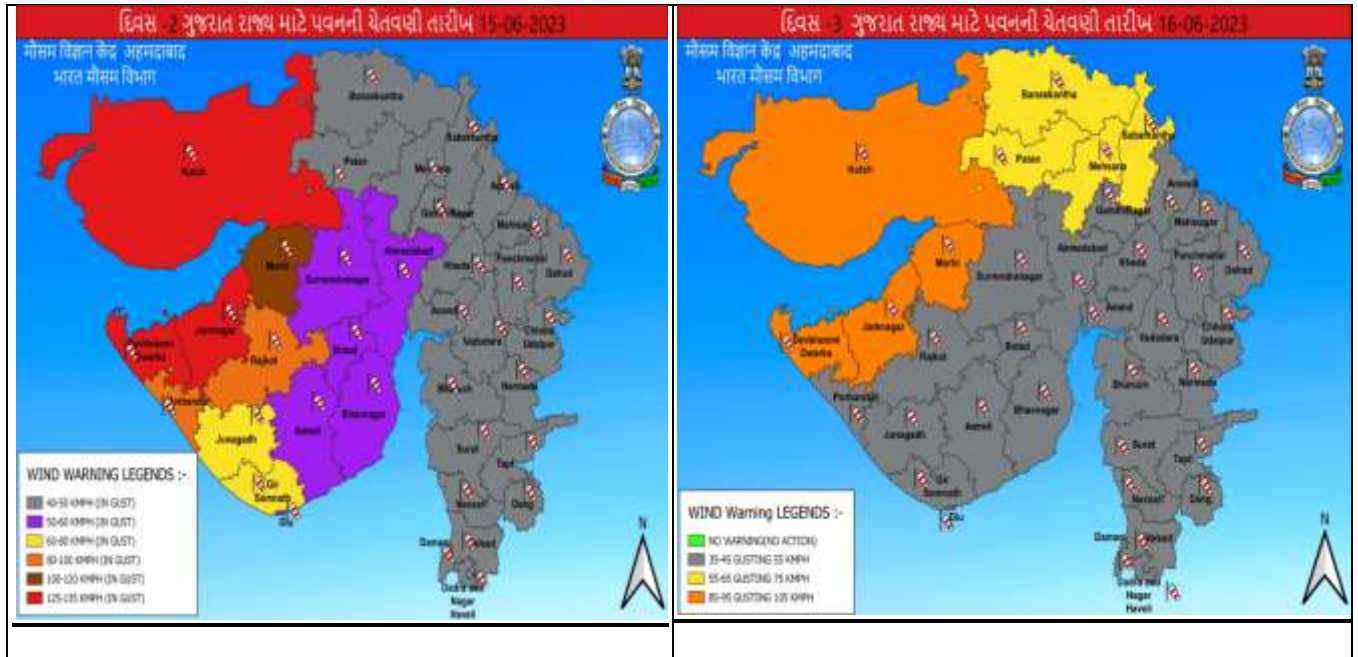


LEGEND

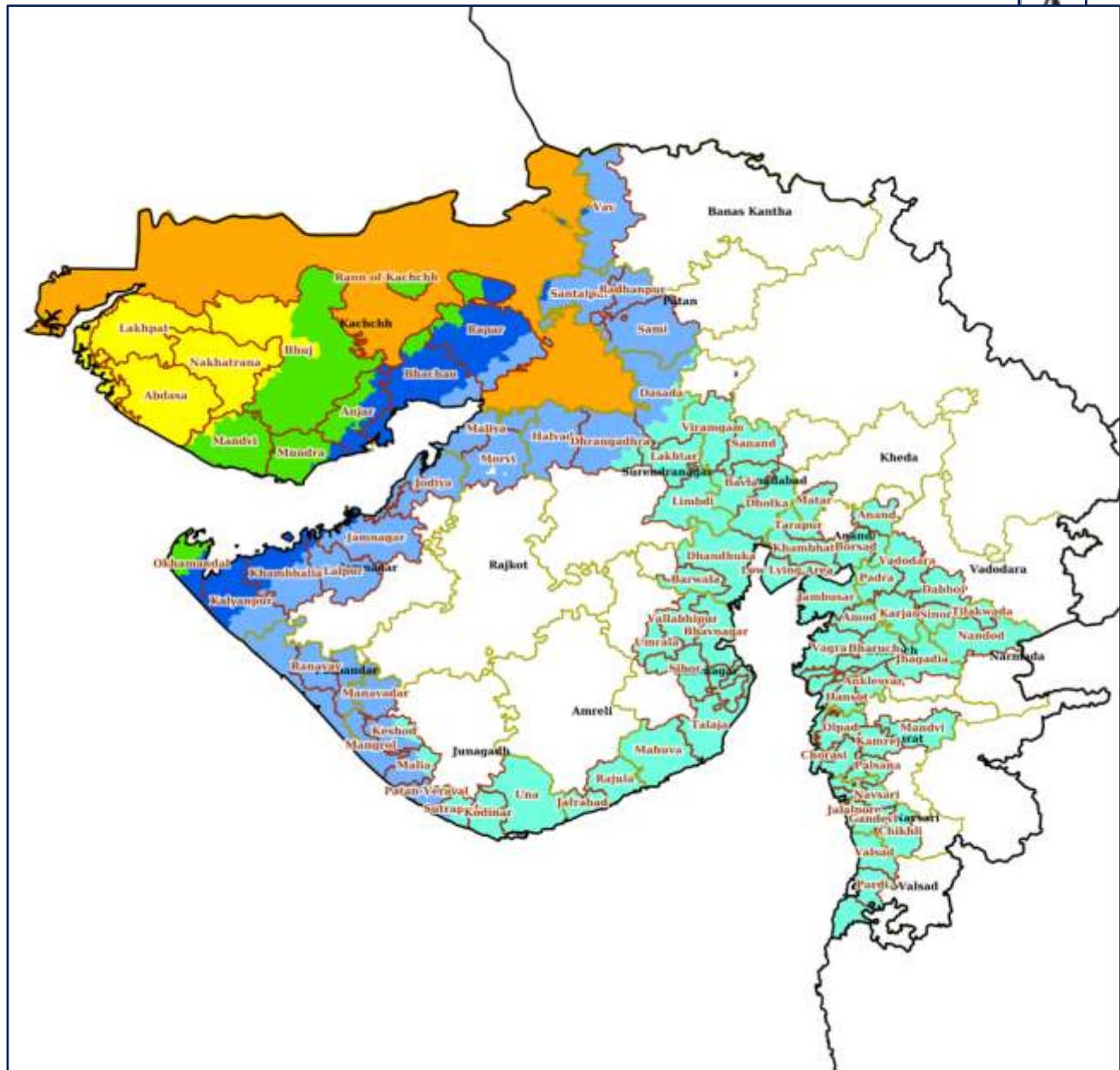
State Boundary	District Boundary	Tehsil Boundary	Village Boundary
Very Low (Less than 0.25 m)	Low (0.25 to 0.50 m)	Moderate (0.50 to 1.0 m)	
High (1.0 to 2.0 m)	Very High (2.0 to 3.0 m)	Extreme (Greater than 3.0 m)	

The list of affected villages with corresponding estimated wind speed, flood level and surge height can be seen in the Web-DCRA & DSS Application (<https://webdcra.ncrmp.gov.in/>). The concerned States/UTs can generate and download the list of affected villages through the distinct Tab named 'Affected Villages' under MOST AFFECTED DISTRICTS panel at right bottom provided in Real Time Cyclone Impact Forecasting dashboard of the Web-DCRA & DSS Application.

District-wise Wind Warning Maps for 15th to 16th June

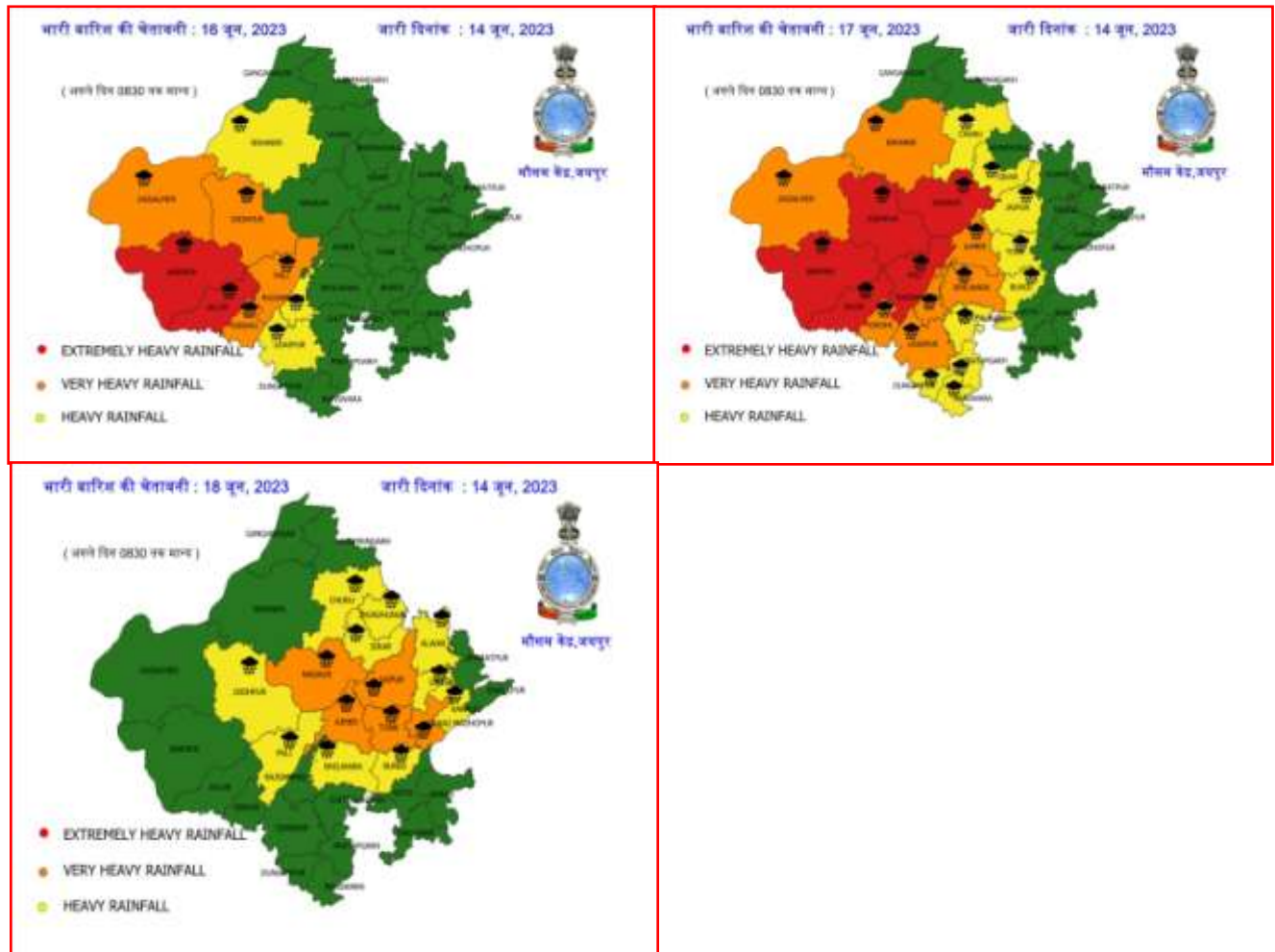


Cyclone Biparjoy Wind Hazard Map (Tehsil-wise) on 15th June - Wind Speeds

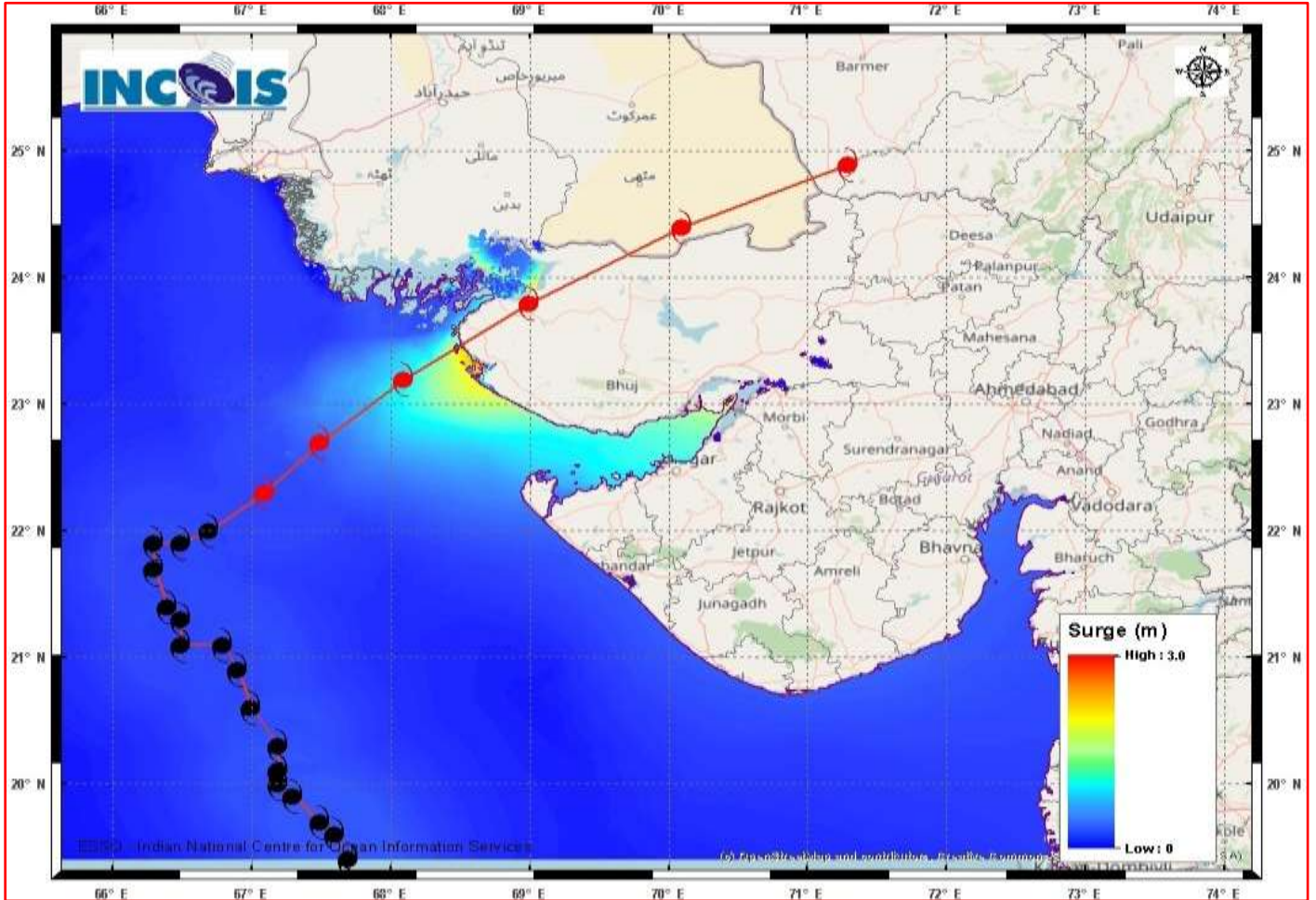


L E G E N D	State Boundary	District Boundary	Tehsil Boundary	Village Boundary
	Wind Speed (Less than 31 Km/h)	Wind Speed (31 - 49 Km/h)	Wind Speed (49 - 61 Km/h)	
	Wind Speed (61 - 88 Km/h)	Wind Speed (88 - 117 Km/h)	Wind Speed (117- 166 Km/h)	
	Wind Speed (166 - 221 Km/h)	Wind Speed (Greater than 221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

District-wise Heavy Rainfall Warning Maps for 16th, 17th and 18th June for Rajasthan



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

