



India Meteorological Department
(Ministry of Earth Sciences)

BULLETIN NO. 65 (ARB/01/2023)

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DATED: 14.06.2023

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

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

The Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over Northeast Arabian Sea moved slowly northwards with a speed of 3 kmph during past 6-hours and lay centered at 0830 hours IST of today, the 14th June, 2023 over the same region near latitude 21.9°N and longitude 66.3°E, about 280 km west-southwest of Jakhau Port (Gujarat), 290 km west-southwest of Devbhumi Dwarka, 300 km west-southwest of Naliya, 350 km west-northwest of Porbandar, and 340 km south-southwest of Karachi (Pakistan).

It is very likely to move nearly 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 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
14.06.23/0830	21.9/66.3	145-155 Gusting To 170	Very Severe Cyclonic Storm
14.06.23/1130	22.1/66.5	145-155 Gusting To 170	Very Severe Cyclonic Storm
14.06.23/1730	22.4/66.8	140-150 Gusting To 165	Very Severe Cyclonic Storm
14.06.23/2330	22.7/67.2	135-145 Gusting To 160	Very Severe Cyclonic Storm
15.06.23/0530	23.0/67.7	130-140 Gusting To 155	Very Severe Cyclonic Storm
15.06.23/1730	23.5/68.5	125-135 Gusting To 150	Very Severe Cyclonic Storm
16.06.23/0530	24.2/69.7	90-100 Gusting To 110	Severe Cyclonic Storm
16.06.23/1730	24.8/71.1	50-60 Gusting To 70	Deep Depression
17.06.23/0530	25.1/72.4	25-35 Gusting To 45	Well Marked Low Pressure Area

(i) Heavy Rainfall warning:

- Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over Kachchh, 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 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 145-155 kmph gusting to 170 kmph prevailing over the region likely to decrease becoming 125-135 kmph gusting 150 kmph during 15th morning to 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 60-70 kmph gusting to 80 kmph is prevailing and would become squally wind speed reaching 40-50 kmph gusting to 60 kmph from 15th morning for subsequent 12 hours.

Adjoining Areas of westcentral & northwest Arabian Sea: Squally wind speed reaching 45-55 kmph gusting to 65 kmph is likely to prevail on 14th June.

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 65-75 kmph gusting to 85 kmph will prevail along & off Porbandar & Devbhoomi Dwarka district coasts from forenoon of today, the 14th June.
- It would gradually increase becoming gale wind speed reaching 125-135 kmph gusting to 150 kmph during 15th forenoon to night along & off Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts. Thereafter, it would decrease gradually becoming 85-95 kmph gusting to 105 kmph over Kachchh and adjoining districts of Saurashtra & Kutch by 16th early morning and squally wind speed reaching 50-60 kmph gusting to 70 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 14th & 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 till 15th evening and rough to very rough over adjoining eastcentral Arabian Sea during the same period.

Along & off Saurashtra & Kutch coasts:

Sea condition is likely to be very rough till 14th evening and high to phenomenal thereafter till 15th June evening 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.

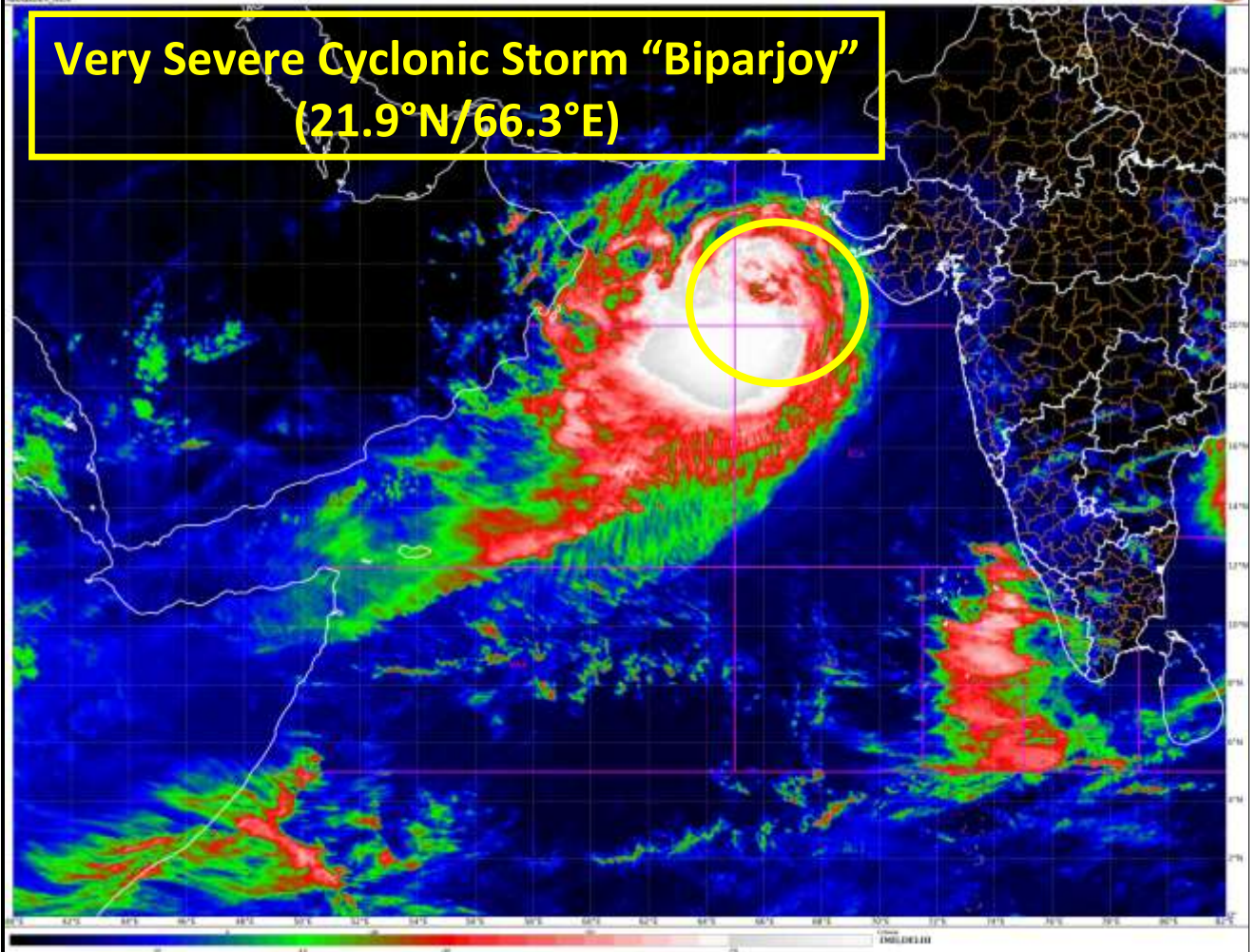
The system is under continuous surveillance and the next message will be issued at 1430 hours IST of today, the 14th June, 2023.

(Ananda Kumar Das)
Scientist F, 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"
(21.9°N/66.3°E)**



Radar Imagery of Doppler Weather Radar at Bhuj

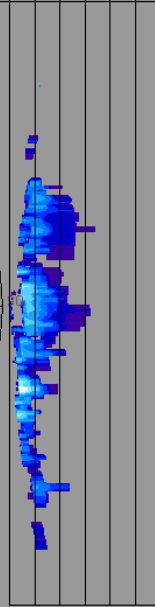
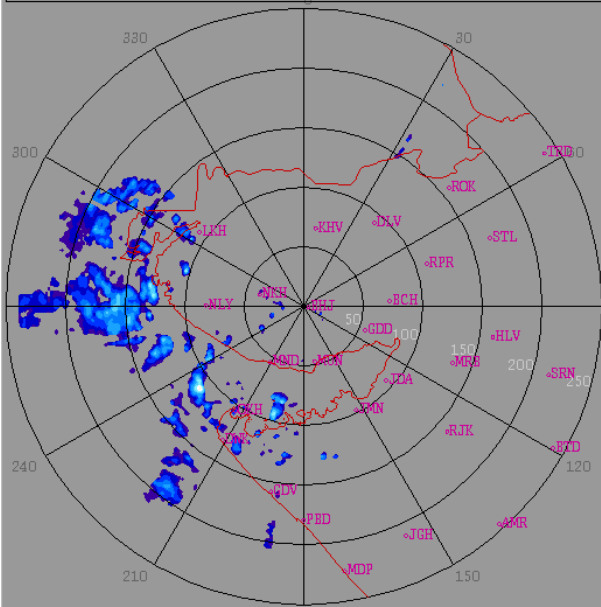
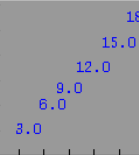
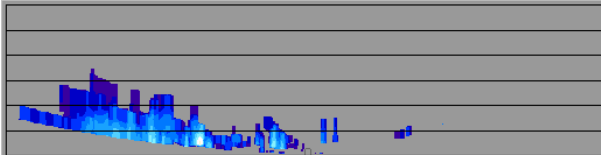
bhuj_weather_2023_06_14_04_21_33_hsfimd-b-bel.dwr

2023/06/14

04:21:33 (UTC)

MAX(Z)

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

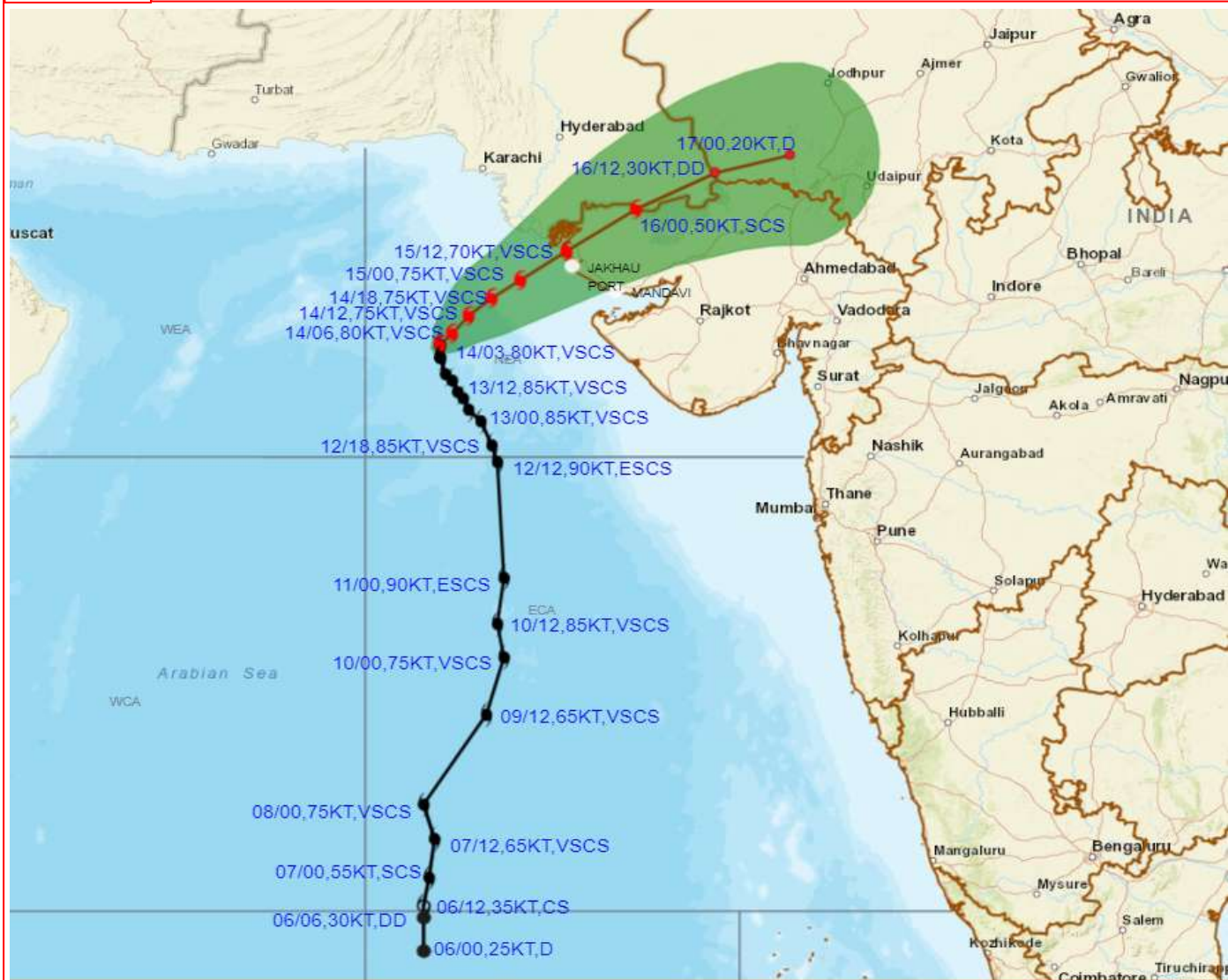


Height	: 18.0 Km
Layer Spacing	: 0.100 Km
Z (Lo, Hi)	: -32.0, 95.0 dBZ
Grid size	: 1 Km
Display Range	: 250 Km
Display Res	: 1.0 Km/Pix
DDR Enable	: Yes
Scan Elev (Lo, Hi)	: 0.2, 21.0 Deg
PRF (Lo, Hi)	: 450, 600 Hz
Scan Res	: 150 mts
Scan RPM	: 2.0
Log Threshold	: 4 dB
DTP	: 42
Pulse Width	: 1.0
Notch Width	: 54.0 Hz
SQI	: 0.25
CSR	: 20
Scan Range	: 240 Km
Preprocessings	: NONE

dBZ	
No Data	
61.3: > 65.0	Red
57.7: 61.3	Dark Red
54.0: 57.7	Orange
50.3: 54.0	Light Orange
46.7: 50.3	Yellow
43.0: 46.7	Light Yellow
39.3: 43.0	White
35.7: 39.3	Light Blue
32.0: 35.7	Blue
28.3: 32.0	Dark Blue
24.7: 28.3	Very Dark Blue
21.0: 24.7	Black
17.3: 21.0	Dark Purple
13.7: 17.3	Light Purple
10.0: 13.7	Very Light Purple



OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 0300 UTC (0830 IST) OF 14TH JUNE 2023.



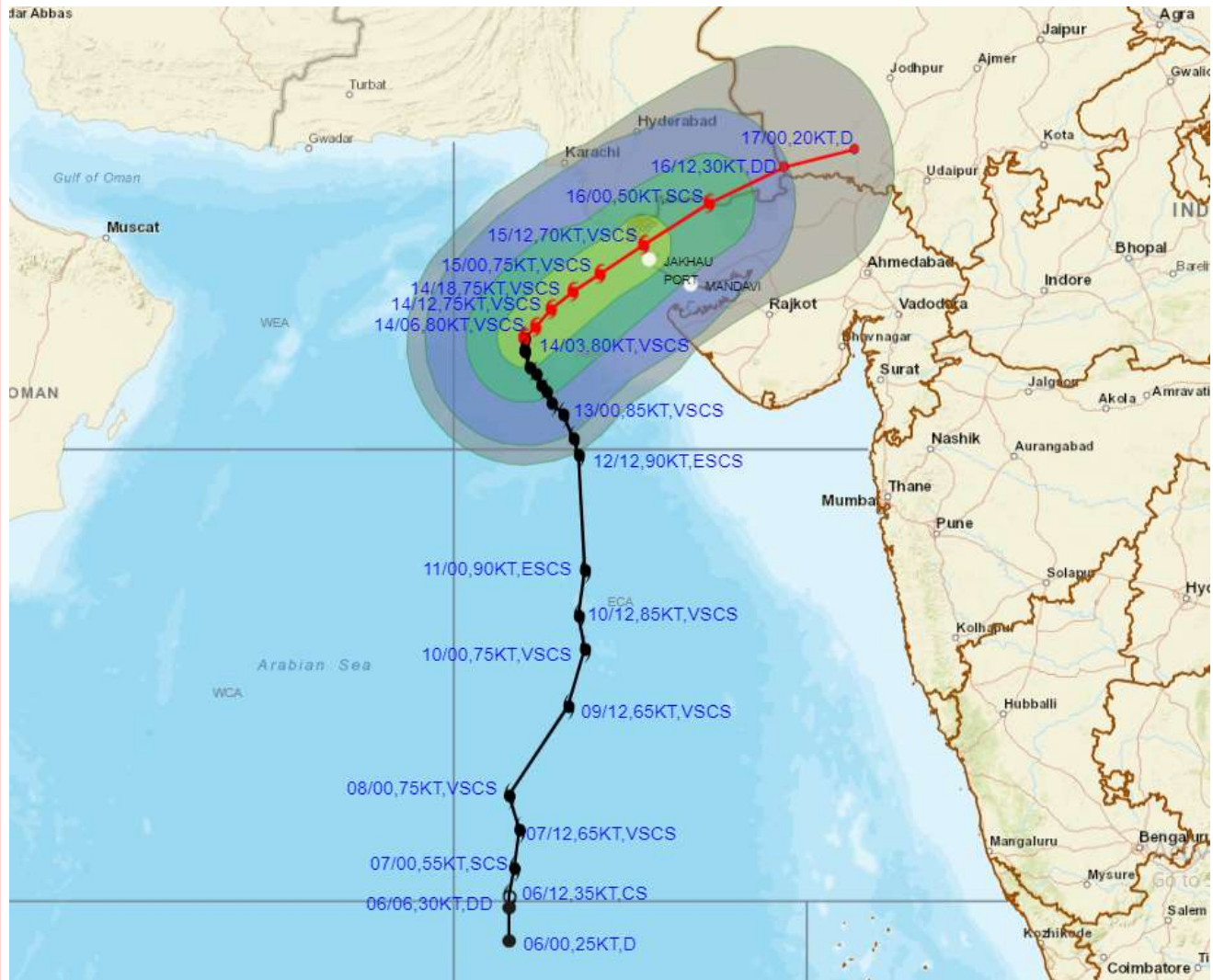
DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34-47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM (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				
Date and Time	PORBANDAR	DWARKA	JAKHAU PORT	NALIYA	KARACHI AIRPORT
15.06.23/0000	260, NW	160, WNW	100, WSW	130, WSW	220, SSE
16.06.23/0000	290, N	220, NNE	160, NE	140, NE	280, ESE
17.06.23/0000	470, NE	450, NE	440, ENE	420, ENE	530, E



OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 0300 UTC (0830 IST) OF 14TH JUNE 2023.



DATE/TIME IN UTC
IST=UTC + 0530

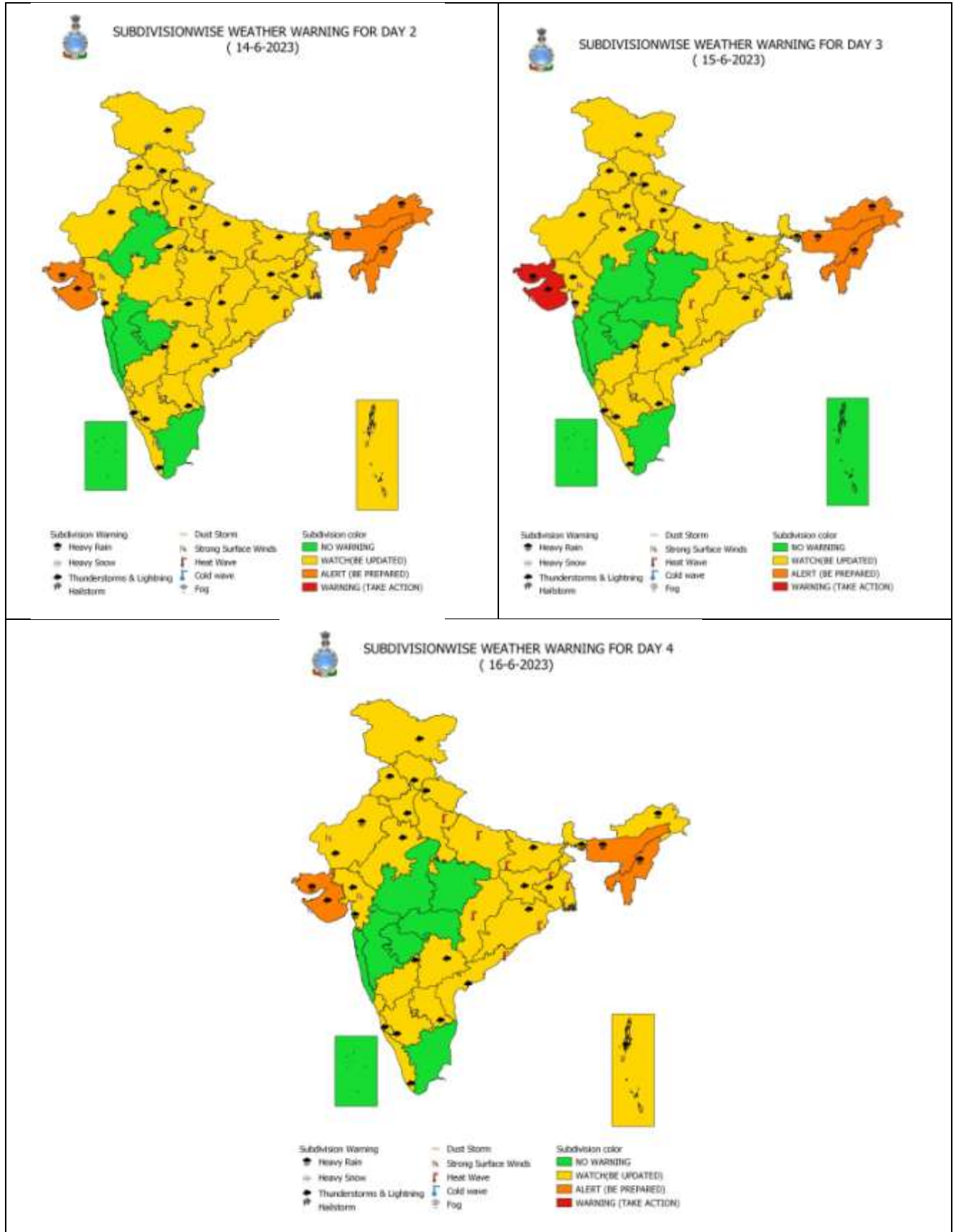
L: LOW PRESSURE AREA
WML: WELL MARKED LOW PRESSURE AREA
D: DEPRESSION (17-27 KT)
DD: DEEP DEPRESSION (28-33 KT)
CS: CYCLONIC STORM (34-47 KT)
SCS: SEVERE CYCLONIC STORM (48-63 KT)
VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)
SuCS: SUPER CYCLONIC STORM (≥ 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)

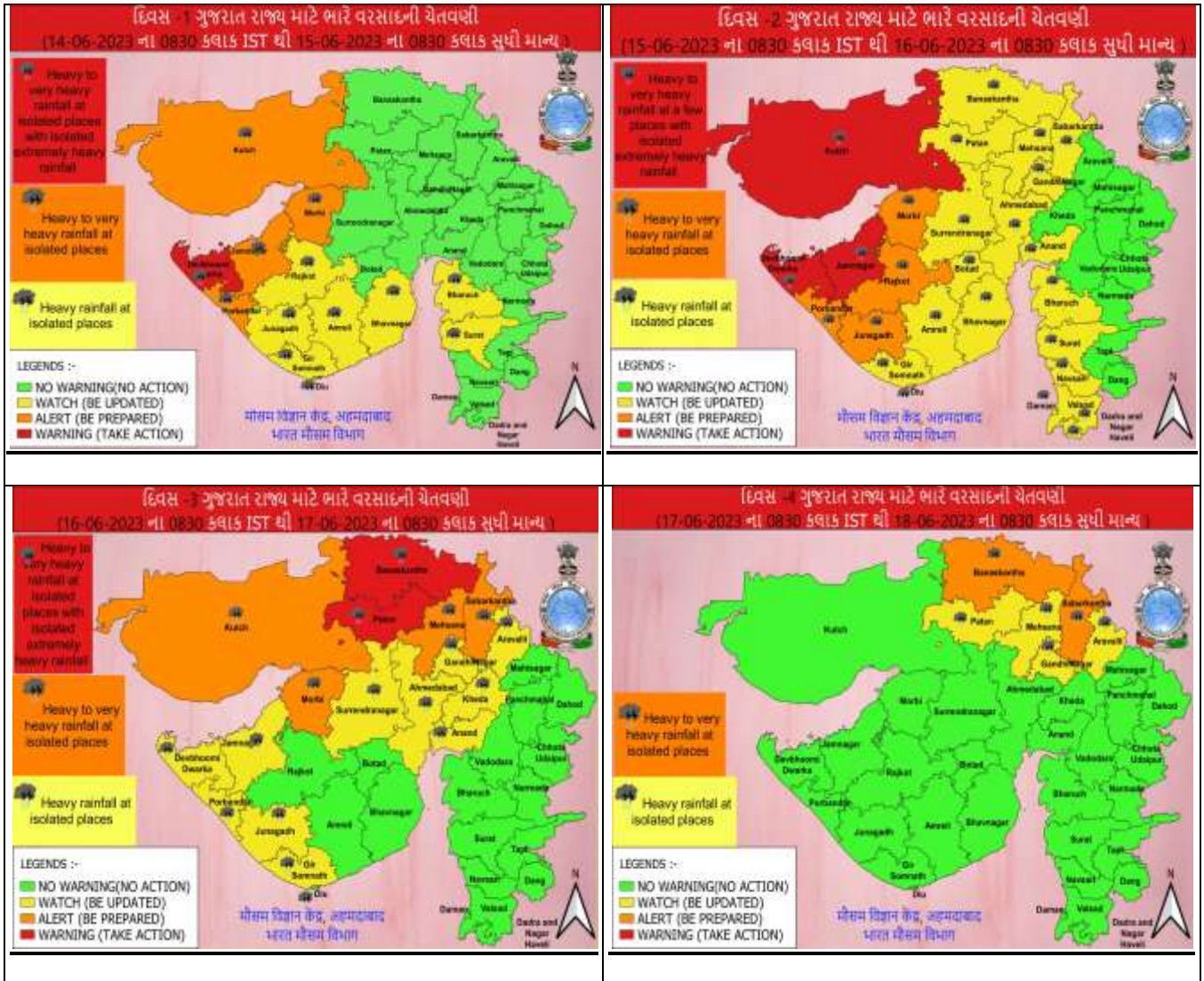
IMPACT OVER THE SEA

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

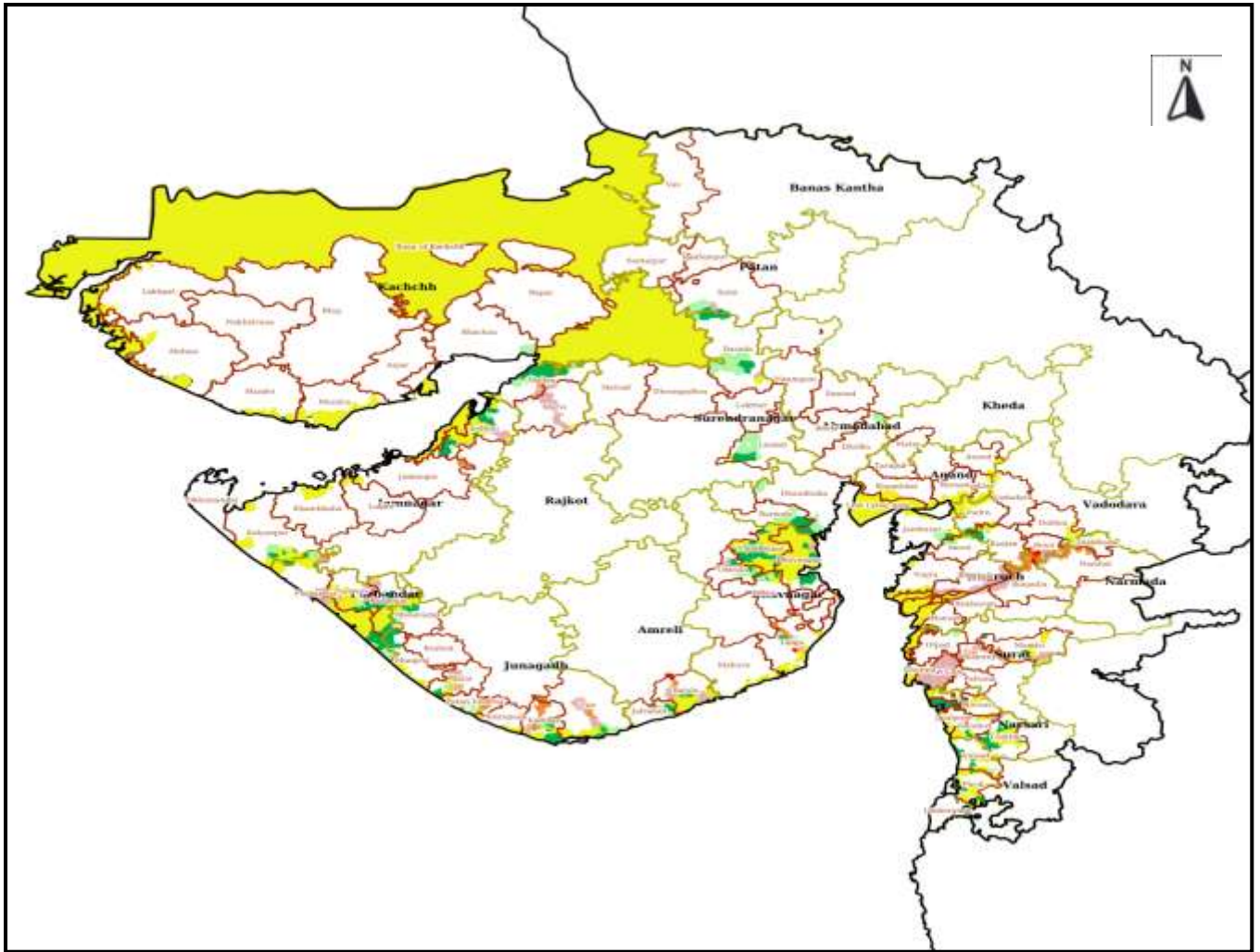
All India Heavy Rainfall Warning for 14th to 16th June 2023



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



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



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

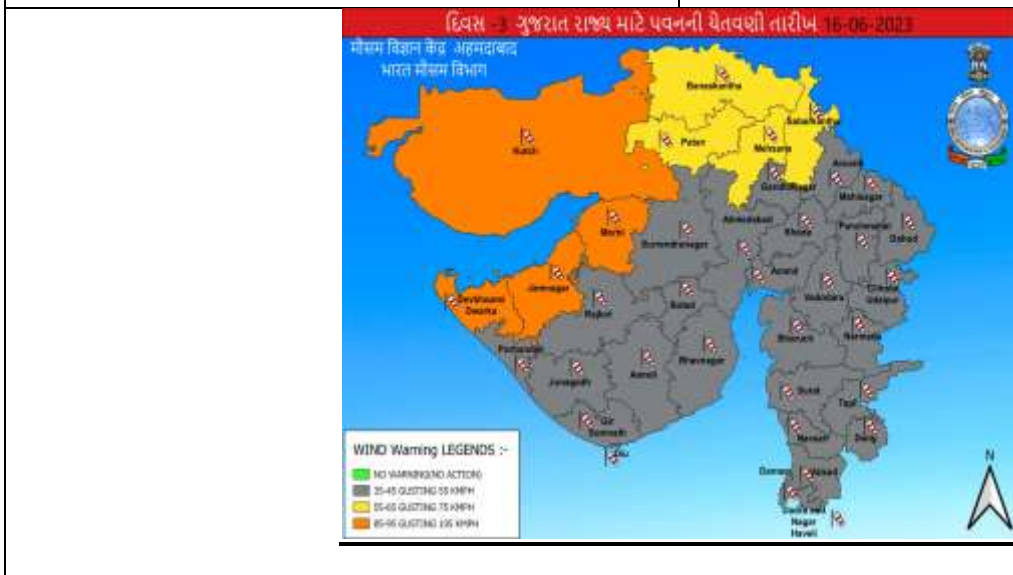
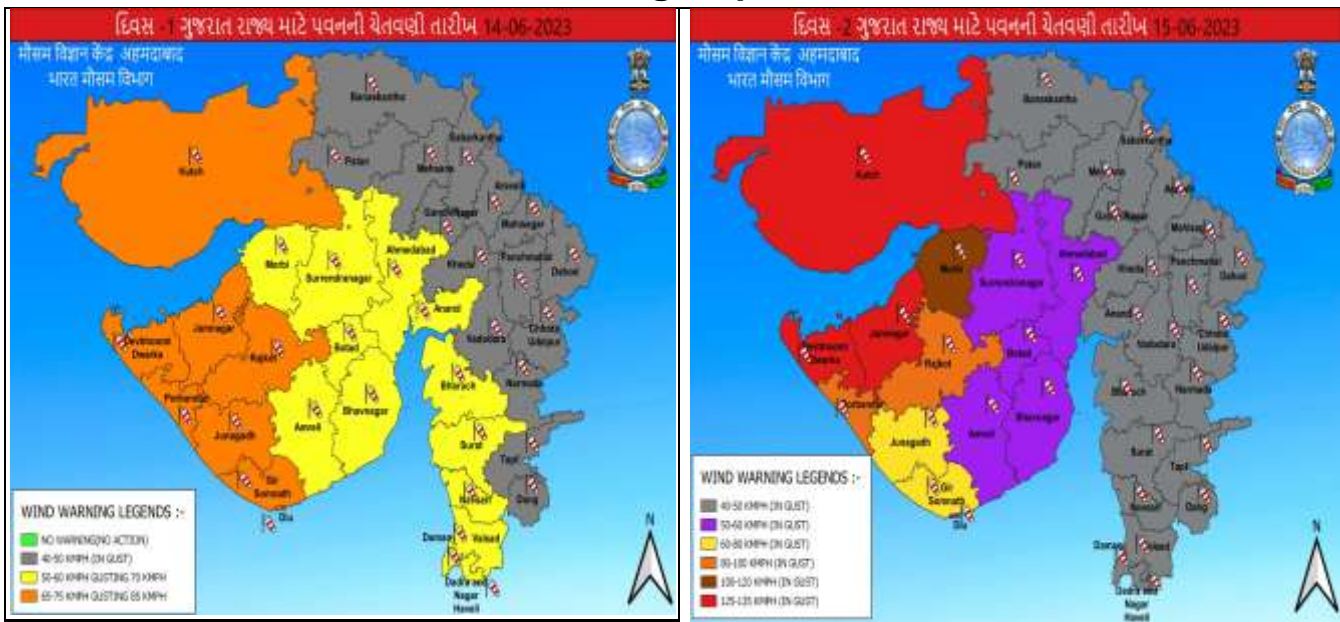
L
E
G
E
N
D

State Boundary
 District Boundary
 Tehsil Boundary
 Village Boundary

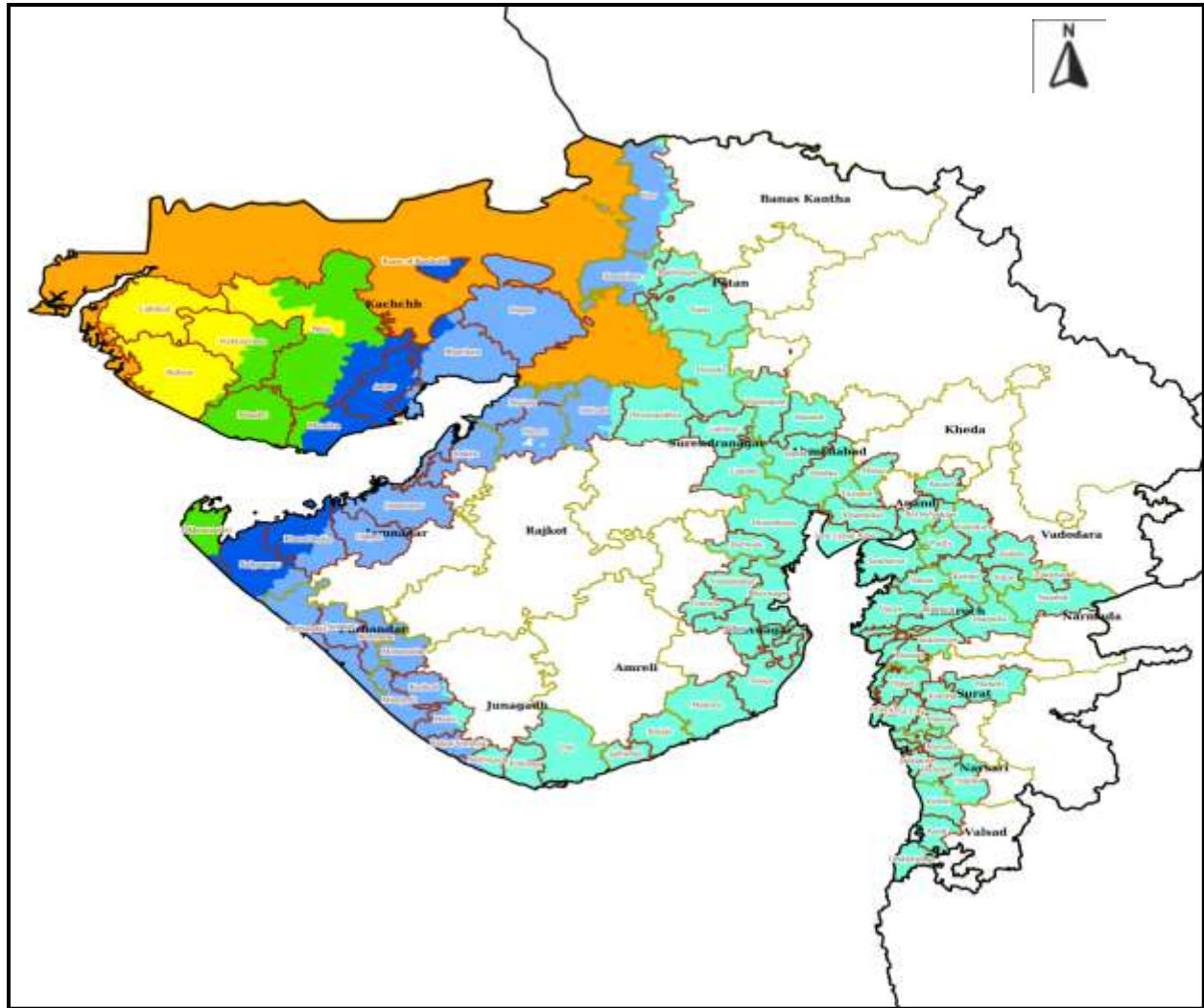
Very Low (Less than 0.25 m)
 Low (0.25 to 0.50 m)
 Moderate (0.50 to 1.0 m)

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 14th to 16th June



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



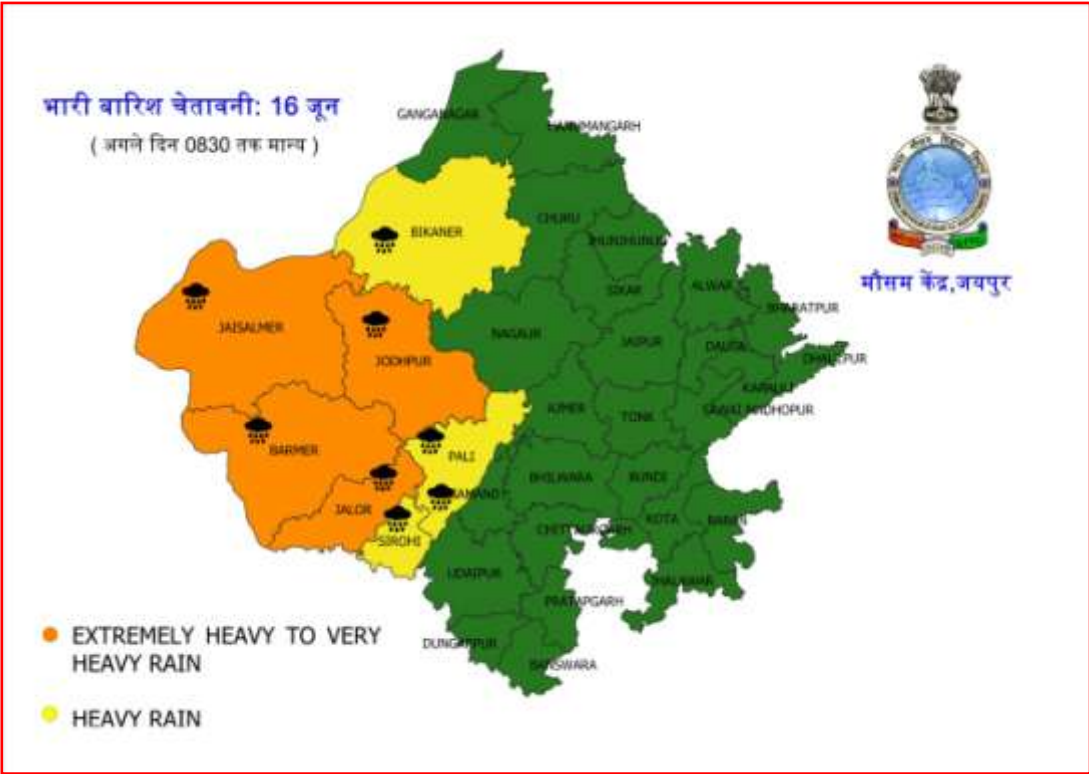
Disclaimer: The hazard estimated are for the study area up to 10 m above sea level.

LEGEND

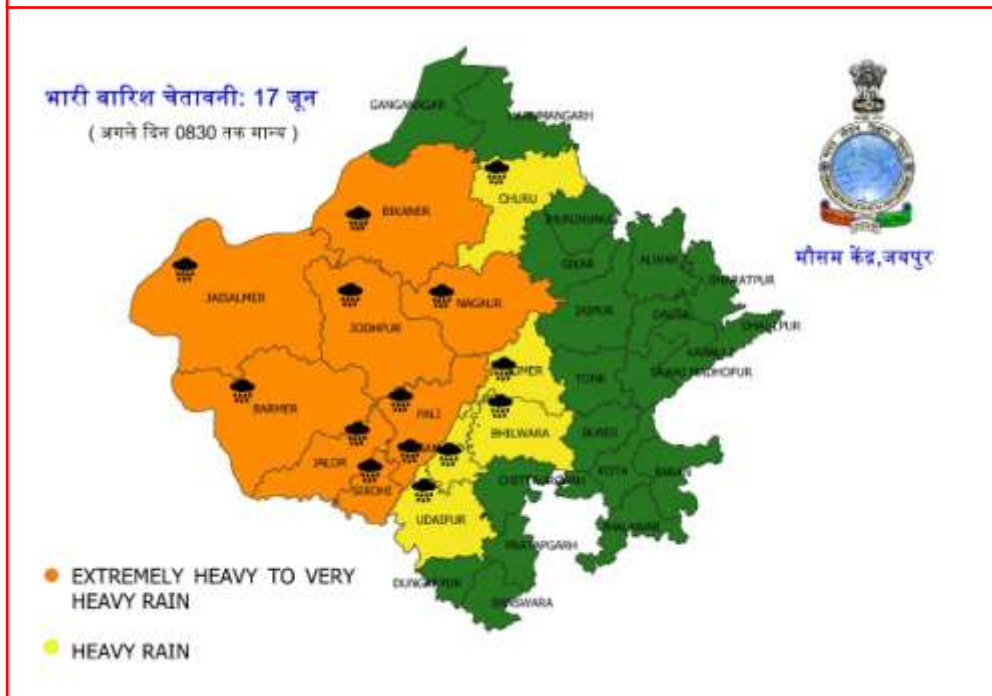
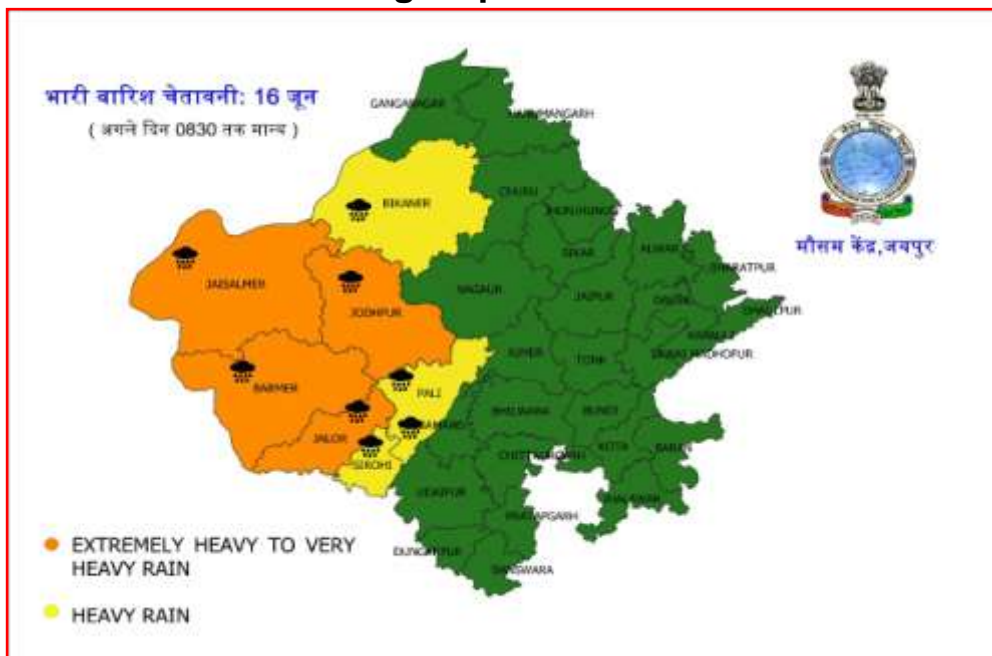
State Boundary
 District Boundary
 Tehsil Boundary
 Village Boundary

 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)	

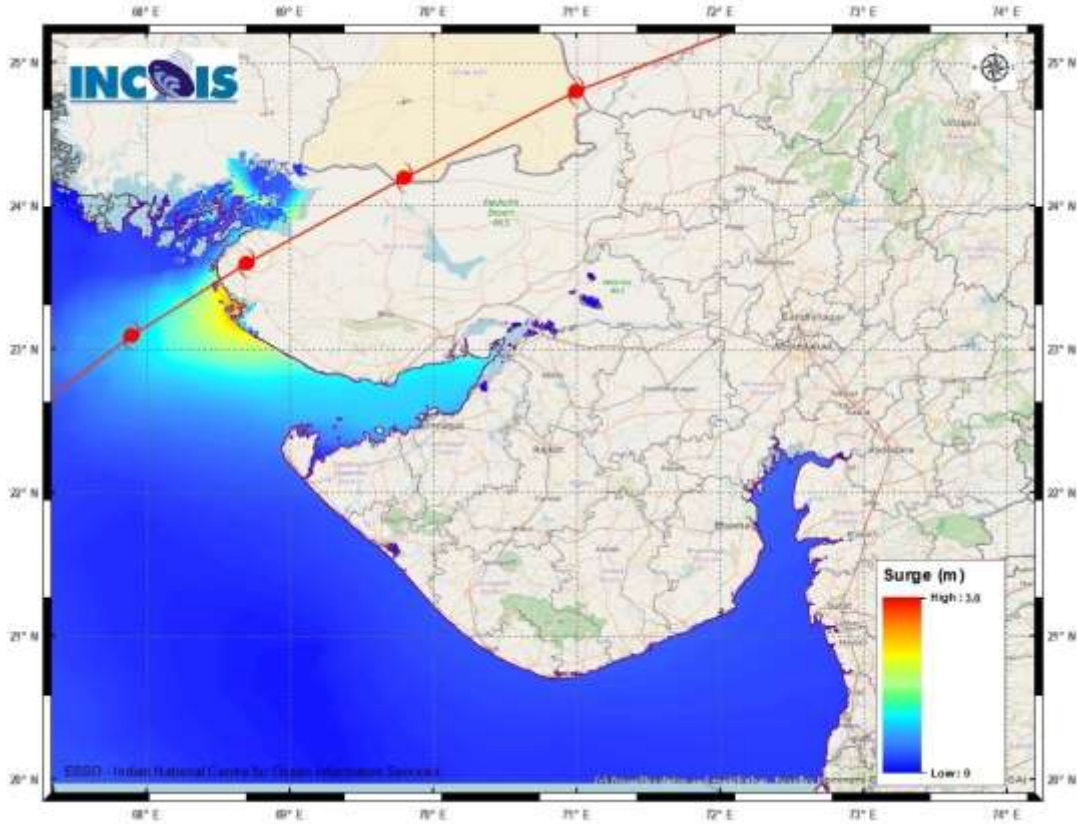
District-wise Heavy Rainfall Warning Maps for 16th June for Rajasthan



District-wise Wind Warning Maps on 16th and 17th June for Rajasthan

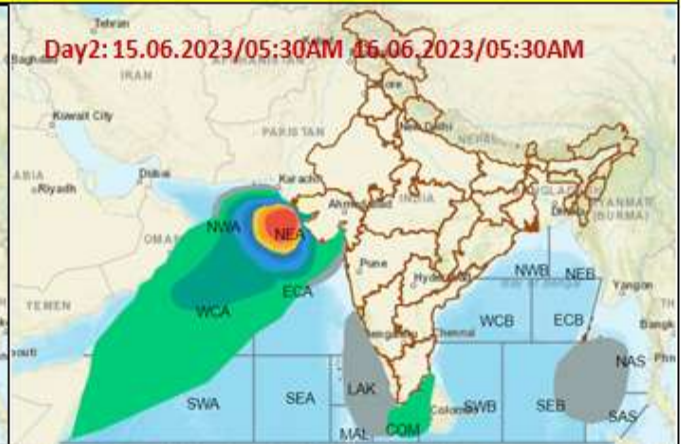


Storm Surge Warning Map based on Forecast Track



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



	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