



India Meteorological Department
(Ministry of Earth Sciences)

BULLETIN NO. 59 (ARB/01/2023)

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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 Arabian Sea: Cyclone Warning for Saurashtra & Kutch Coasts
(Orange Message)**

The Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over Northeast Arabian Sea moved nearly northwestwards with a speed of 8 kmph during past 6-hours and lay centered at 1430 hours IST of today, the 13th June, 2023 over the same region near latitude 21.1°N and longitude 66.5°E, about 300 km west-southwest of Devbhumi Dwarka, 330 km west of Porbandar, 320 km southwest of Jakhau Port, 340 km southwest of Naliya and 430 km south of Karachi (Pakistan).

It is very likely to move nearly northwards till 13th 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 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
13.06.23/1430	21.1/66.5	150-160 Gusting To 180	Very Severe Cyclonic Storm
13.06.23/1730	21.4/66.6	145-155 Gusting To 170	Very Severe Cyclonic Storm
13.06.23/2330	21.7/66.7	140-150 Gusting To 165	Very Severe Cyclonic Storm
14.06.23/0530	22.0/67.0	135-145 Gusting To 160	Very Severe Cyclonic Storm
14.06.23/1130	22.3/67.3	135-145 Gusting To 160	Very Severe Cyclonic Storm
14.06.23/2330	22.7/67.7	130-140 Gusting To 155	Very Severe Cyclonic Storm
15.06.23/1130	23.2/68.2	125-135 Gusting To 150	Very Severe Cyclonic Storm
15.06.23/2330	23.6/68.6	105-115 Gusting To 125	Very Severe Cyclonic Storm
16.06.23/1130	24.1/69.3	70-80 Gusting To 90	Cyclonic Storm
16.06.23/2330	24.5/70.2	40-50 Gusting To 60	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 13th 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 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 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 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 15th morning to evening. It would weaken gradually further more thereafter becoming 45-55 kmph gusting to 65 kmph by 16th 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 14th morning and 40-50 kmph gusting to 60 kmph on 16th 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 13th midnight.
- It would increase becoming Gale wind speed reaching 65-75 kmph gusting to 85 kmph from 14th June morning along & off Porbandar & Devbhoomi Dwarka district coasts.
- It would become 125-135 kmph gusting to 150 kmph from 15th 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 16th morning to evening.
- 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 and 30-40 kmph gusting to 50 kmph during 16th morning to evening.

(iii) Sea condition

Sea condition will be phenomenal over northeast and adjoining eastcentral Arabian Sea till 15th 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 14th morning and high to phenomenal thereafter till 15th 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 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 13th -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 system is under continuous surveillance and the next message will be issued at 2030 hours IST of today, the 13th June, 2023.

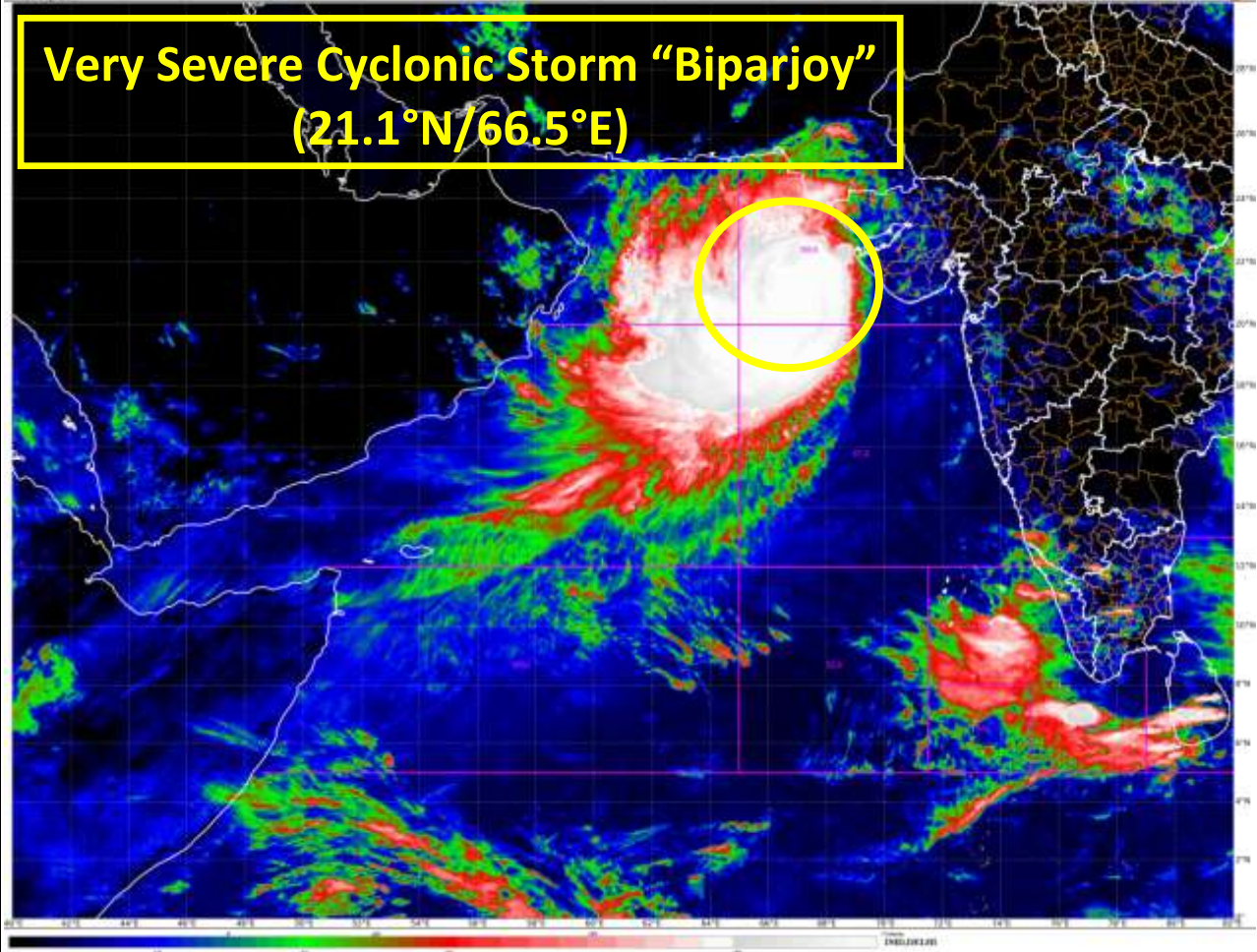
(Ananda Kumar Das)
Scientist F, Cyclone Warning Division, New Delhi

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" (21.1°N/66.5°E)



Radar Imagery of Doppler Weather Radar at Bhuj

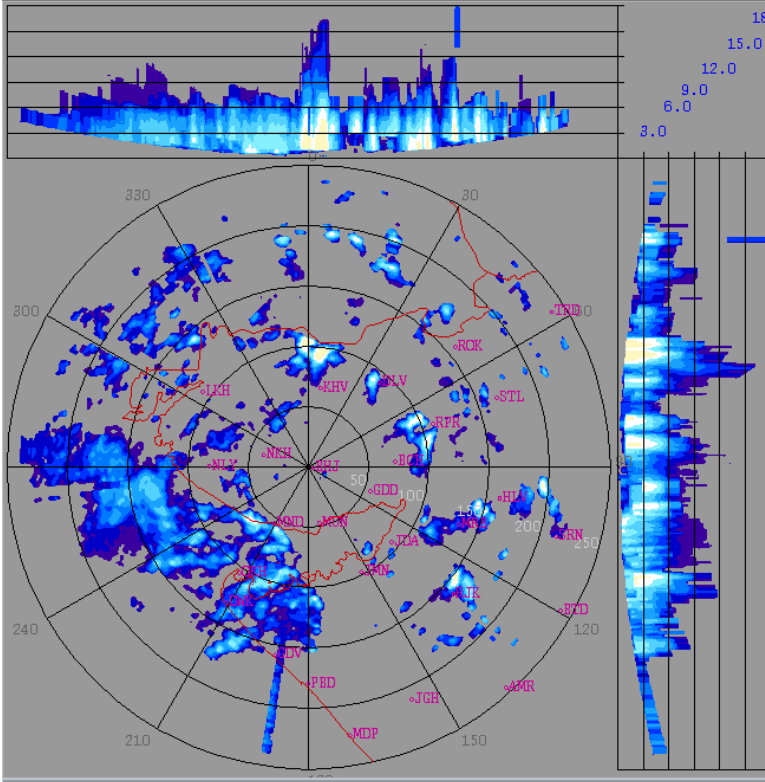
bhuj_weather_2023_06_13_10_51_35_hsfimd-b-bel.dwr

2023/06/13

10:51:35 (UTC)

MAX(Z)

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

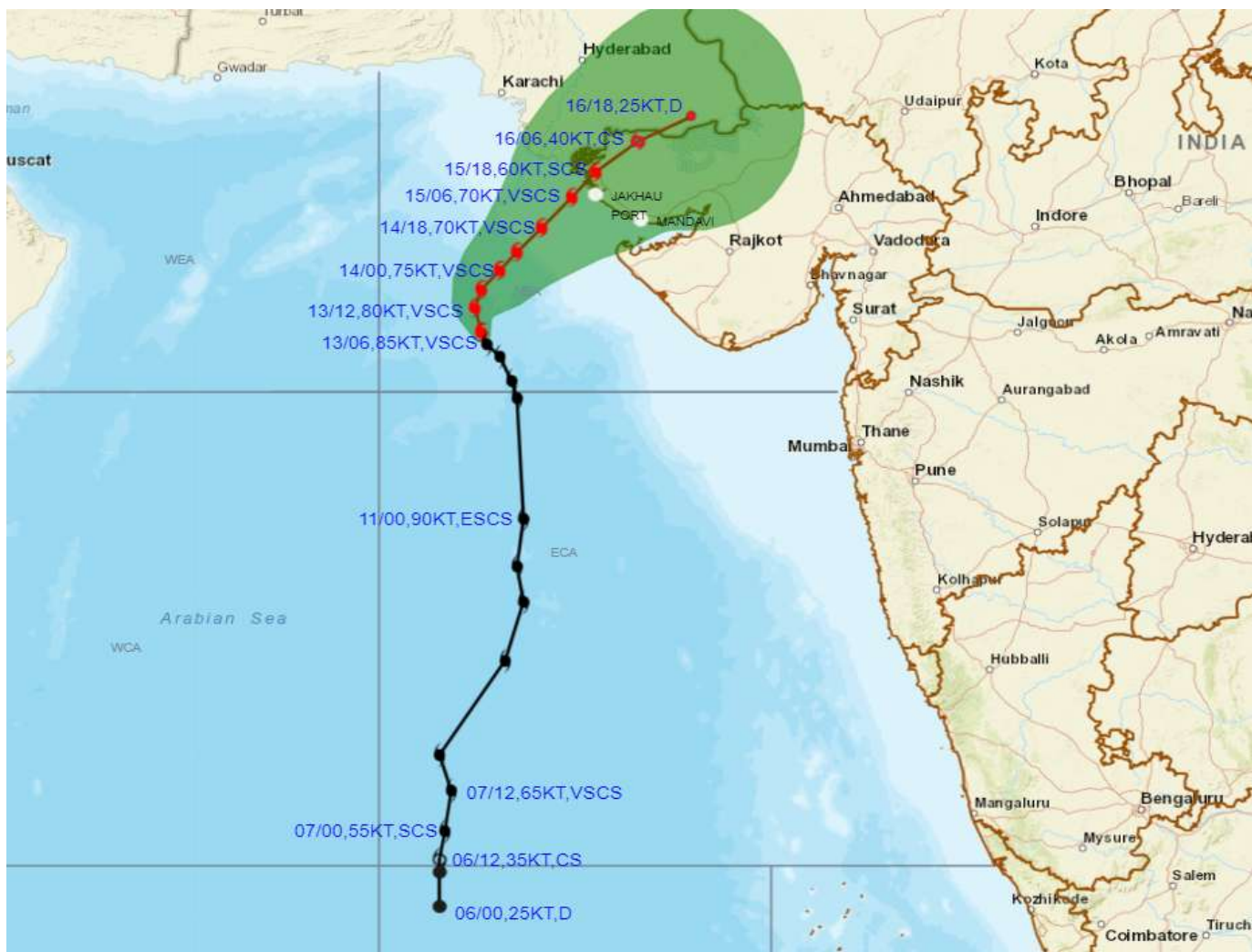


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Z (Lo, Hi)	: -32.0, 95.0 dBZ
Grid size	: 1 Km
Display Range	: 250 Km
Display Res	: 1.0 Km/Pix
DDR Enable	: Yes
Scan Elev (Lo, Hi)	: 0.2, 21.0 Deg
PRF (Lo, Hi)	: 450, 600 Hz
Scan Res	: 150 mts
Scan RPM	: 2.0
Log Threshold	: 4 dB
DTP	: 42
Pulse Width	: 1.0
Notch Width	: 54.0 Hz
SOI	: 0.25
CSR	: 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 0600 UTC (1130 IST) OF 13TH JUNE 2023.



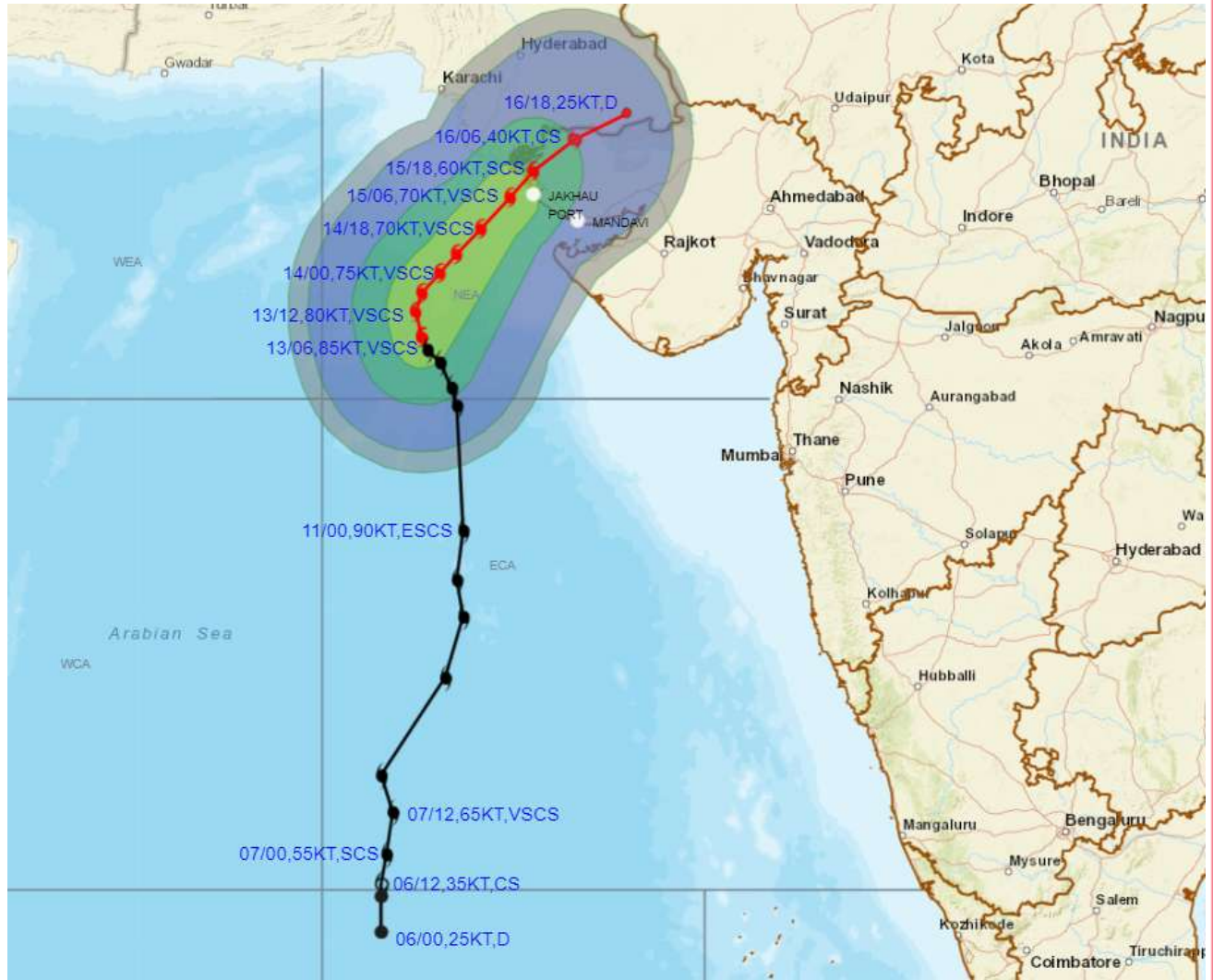
DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34-47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM (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
14.06.23/0600	250, WNW	180, W	160, SW	190, SW	280, S
15.06.23/0600	230, NW	130, NW	50, W	70, W	220, SSE
16.06.23/0600	280, N	190, N	120, NE	110, NNE	240, ESE



OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 0600 UTC (1130 IST) OF 13TH JUNE 2023.



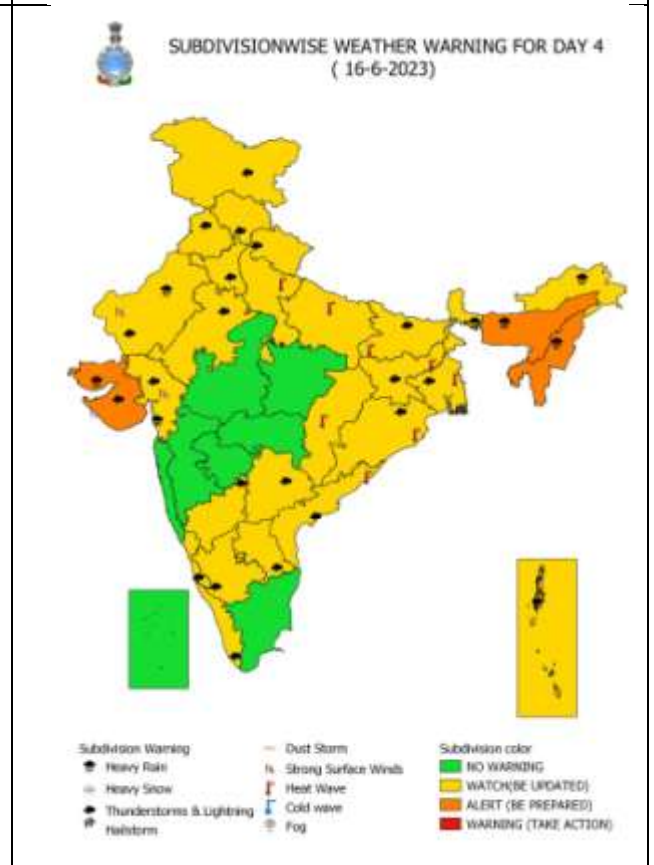
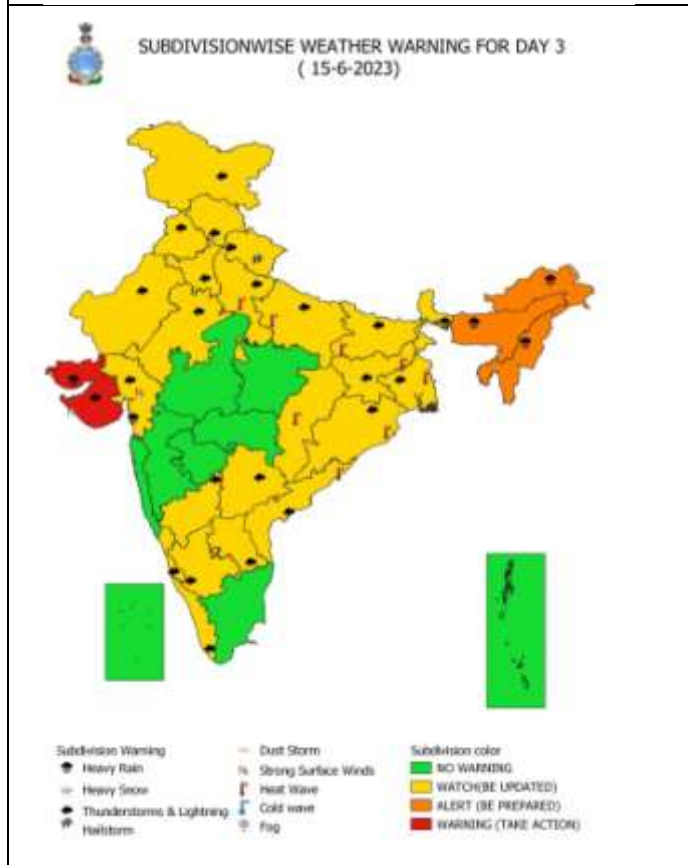
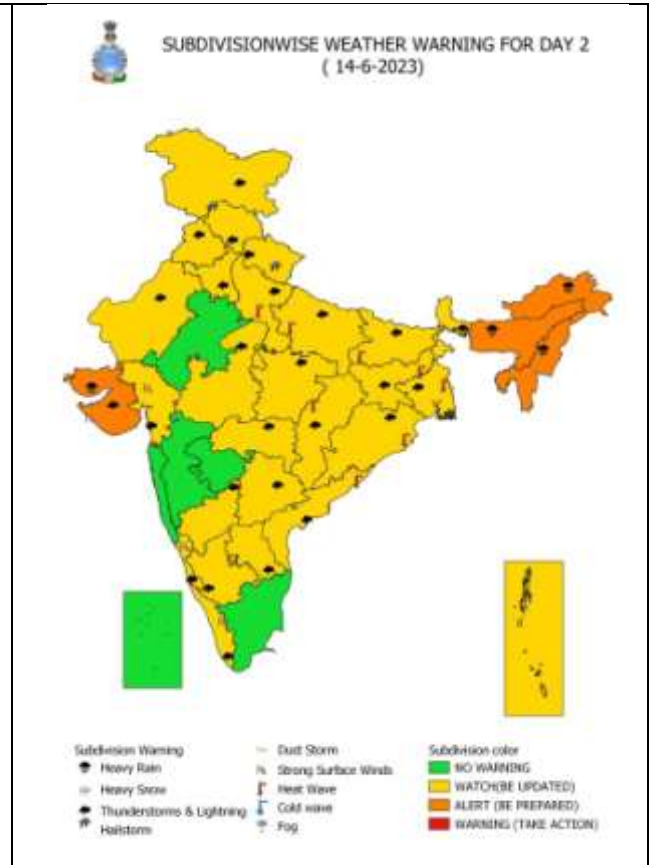
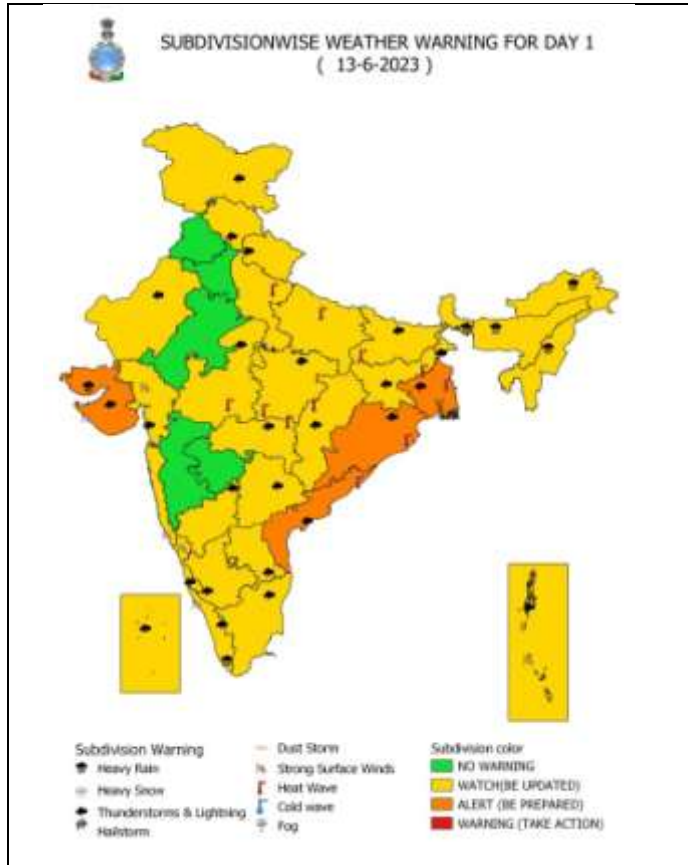
DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34-47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM (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

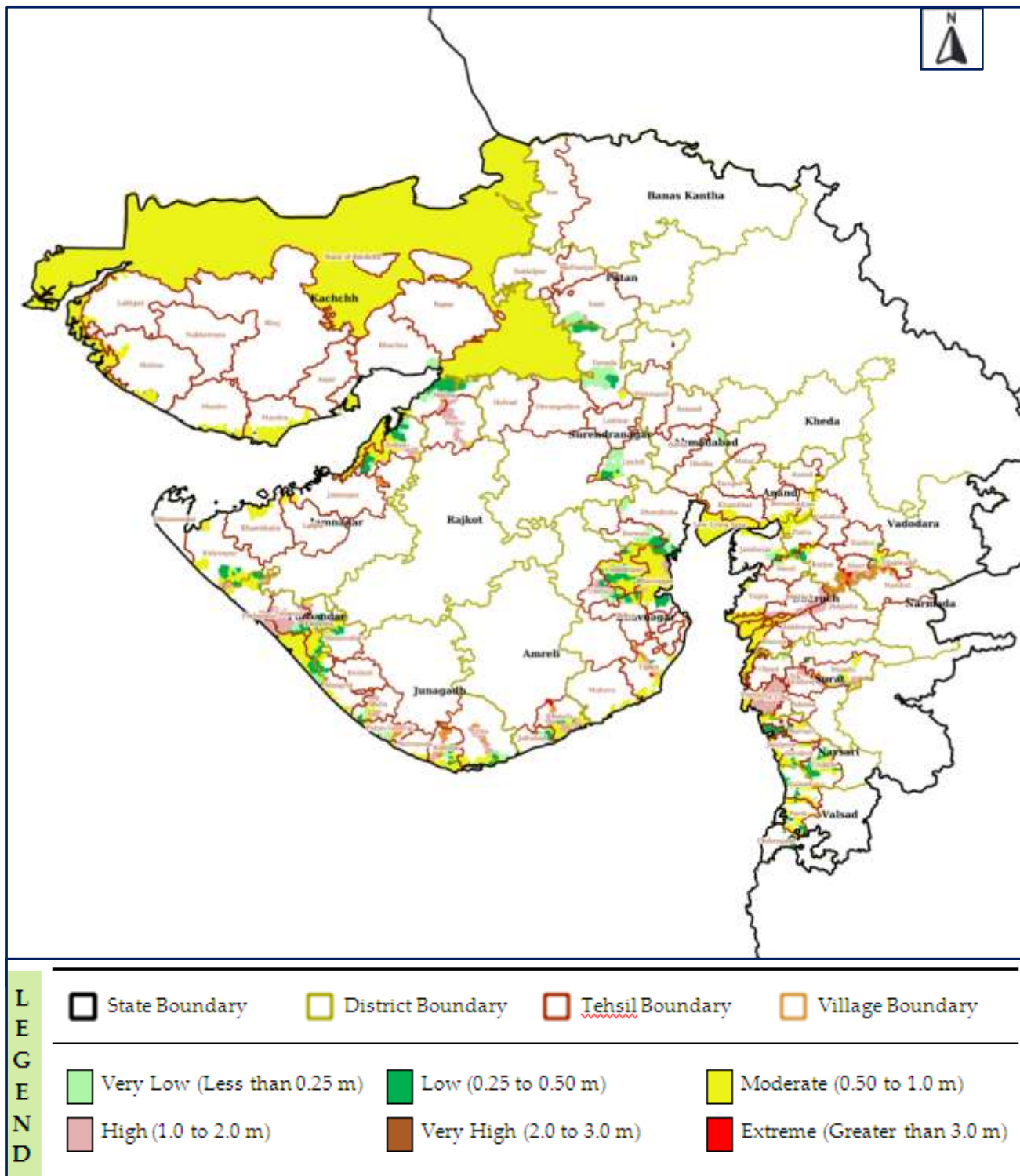
All India Heavy Rainfall Warning for 14th to 16th June 2023



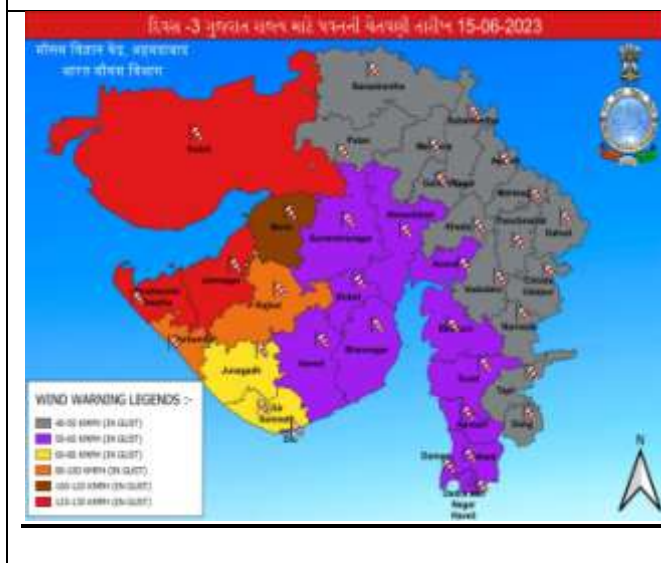
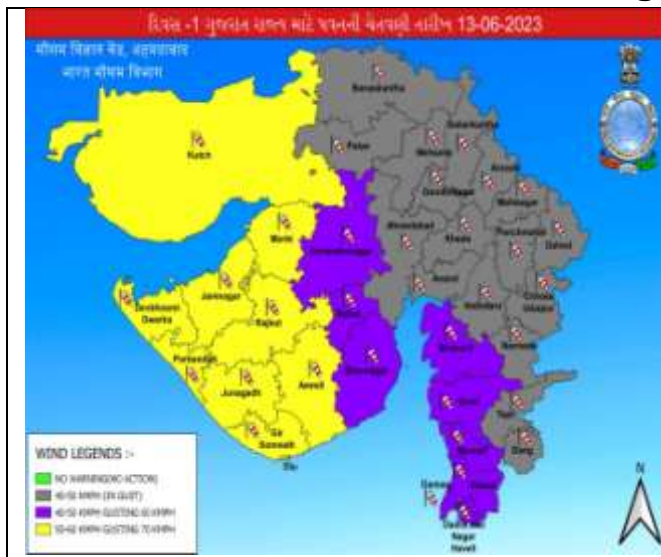
District-wise Heavy Rainfall Warning Maps for 14th to 16th June



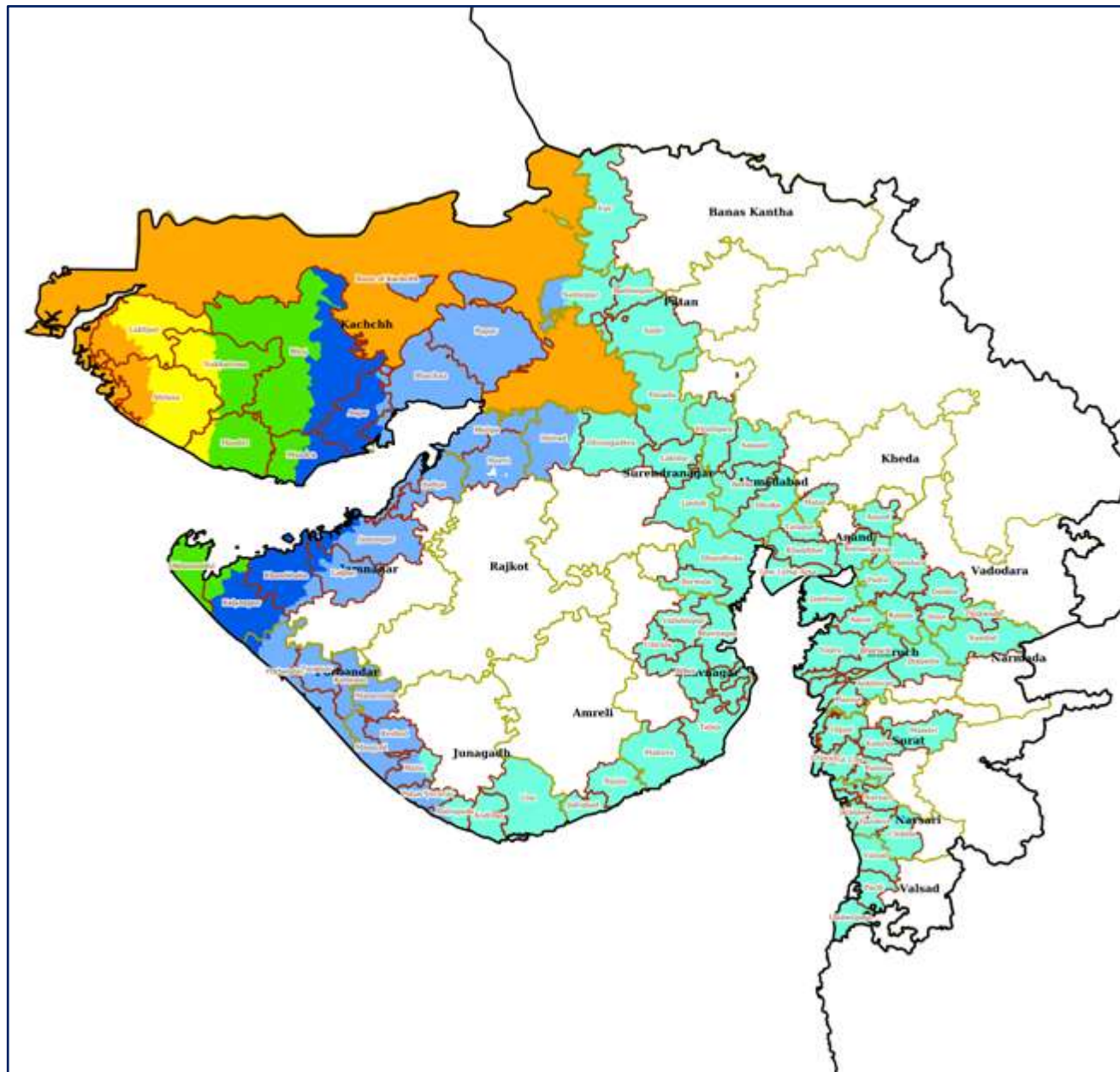
Cyclone Biparjoy Flood Hazard Map (Tehsil-wise) on 15th June – Flood Depth



District-wise Wind Warning Maps for 14th to 16th June



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



L
E
G
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N
D

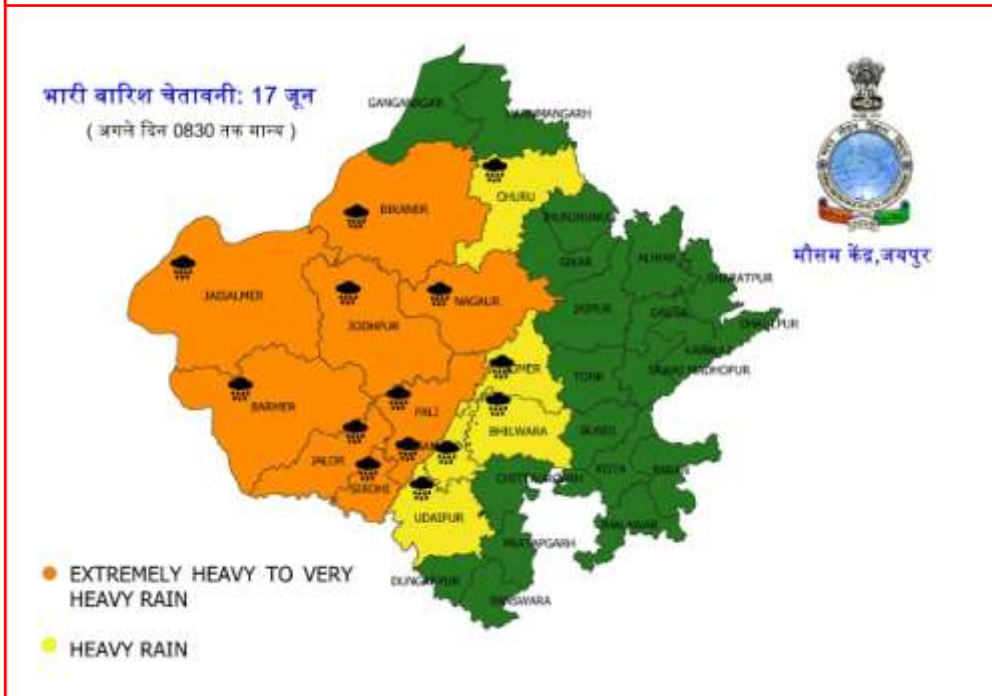
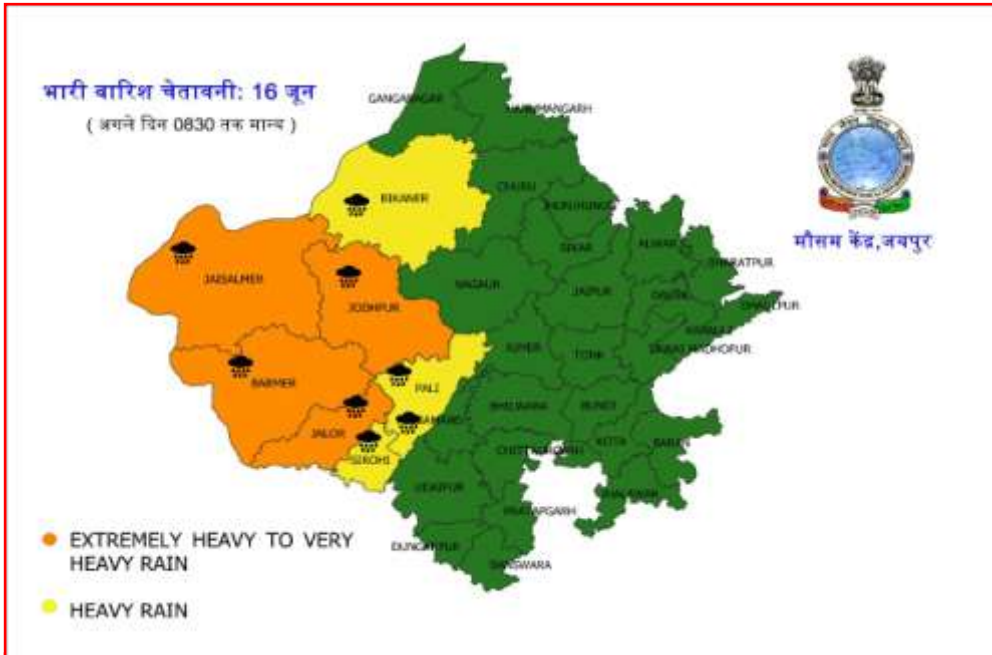
State Boundary
 District Boundary
 Tehsil Boundary
 Village Boundary

 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)	

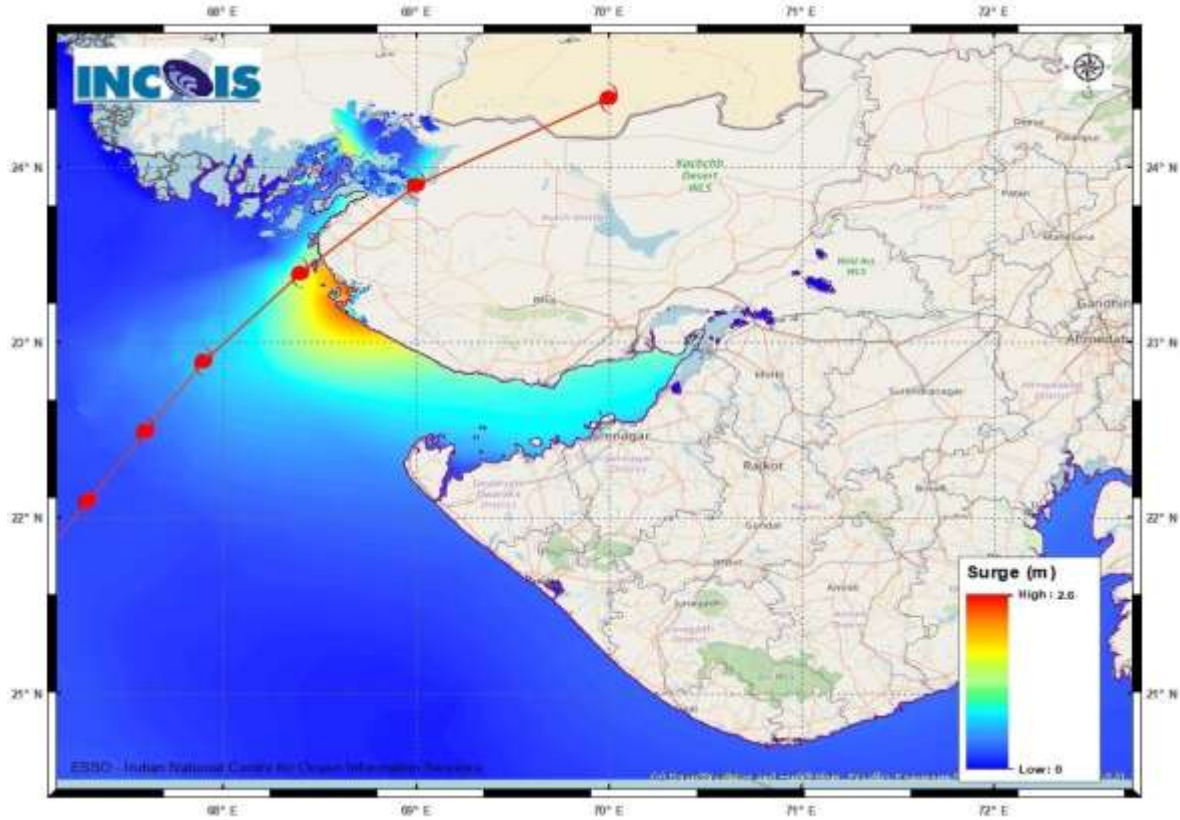
District-wise Heavy Rainfall Warning Maps for 16th June for Rajasthan



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



Storm Surge Warning Map based on Forecast Track



Astronomical Tide on 15 th 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