



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

BULLETIN NO. 78 (ARB/01/2023)

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DATED: 17.06.2023

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

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Sub: Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) crossed Saurashtra & Kutch coasts and weakened into a Severe Cyclonic Storm

The Very Severe Cyclonic Storm “Biparjoy” (pronounced as “Biporjoy”) over Northeast Arabian Sea moved nearly northeastwards with a speed of 13 kmph during past 6-hours, crossed Saurashtra & Kutch and adjoining Pakistan coasts between Mandvi (Gujarat) and Karachi (Pakistan) close to Jakhau Port (Gujarat) near latitude 23.28°N and longitude 68.56°E between 2230 hours IST and 2330 hours IST of 15th June, 2023 as a very severe cyclonic storm with maximum sustained wind speed of 115-125 kmph gusting to 140 kmph. It then weakened into a severe cyclonic storm and lay centered at 2330 hours IST of 15th June, 2023 over Saurashtra & Kutch near latitude 23.3°N and longitude 68.6°E, about 10 km north of Jakhau Port (Gujarat) and 30 km west-northwest of Naliya.

It is very likely to move nearly northeastwards across north Gujarat and weaken gradually into a cyclonic storm over Saurashtra & Kutch by early morning of 16th June and subsequently into a depression over south Rajasthan by evening of the same day.

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
15.06.23/2330	23.3/68.6	105-115 Gusting To 125	Severe Cyclonic Storm
16.06.23/0530	23.8/69.4	75-85 Gusting To 95	Cyclonic Storm
16.06.23/1130	24.3/70.2	50-60 Gusting To 70	Deep Depression
16.06.23/1730	25.0/71.2	35-45 Gusting To 55	Depression

(i) Heavy Rainfall warning:

- Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over Saurashtra & Kutch, north Gujarat region and south Rajasthan on 16th and over southeast Rajasthan & adjoining North Gujarat region on 17th June.

(ii) Wind warning:

Northeast Arabian Sea: Gale wind speed reaching 100-110 kmph gusting to 120 kmph prevailing over the region likely to decrease gradually and becoming squally wind speed reaching 50-60 kmph gusting to 70 kmph by 16th June morning.

Eastcentral Arabian Sea: Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely to prevail till noon of 16th 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 100-110 kmph gusting to 120 kmph is prevailing along & off Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts. It would decrease gradually becoming 70-80 kmph gusting to 90 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 June noon.
- Squally wind speed reaching 50-60 kmph gusting to 70 kmph very likely to prevail along & off remaining districts of Saurashtra coast till 16th June morning and decrease thereafter.

Wind Warning for South Rajasthan

- Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over South Rajasthan during 16th noon to evening and 35-45 kmph gusting to 55 kmph till 17th June morning.

(iii) Sea condition

Prevailing very high to high sea condition over northeast Arabian Sea would improve gradually and become rough by 16th June noon.

Along & off Saurashtra & Kutch coasts:

Very high to high Sea condition prevailing over the region is likely to become very rough to rough by 16th June noon and improve thereafter.

(iv) Storm Surge Warning (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar and Morbi districts) during next 3 hours:

Storm surge of about 1-2 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 during next 6 hours:

- Major damage to thatched houses/ huts. Roof tops may blow off. Unattached metal sheets may fly.
- Minor damage to power and communication lines.
- Major damage to Kutchha and some damage to Pucca roads. Flooding of escape routes.
- Breaking of tree branches, uprooting of large avenue trees. Moderate damage to banana and papaya trees. Large dead limbs blown from trees.

- Major damage to coastal crops.
- Damage to embankments/ salt pans.

(vi) Fishermen Warning & Action Suggested (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) and for Offshore & Onshore Industries till 16th June noon: (Graphics Attached)

- Total suspension of fishing operations over northeast and adjoining eastcentral Arabian Sea till 16th June morning.
- 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 unsafe.
- Judicious regulation of rail and road traffic.
- Tourism activities may be regulated over these areas.
- People in affected areas to remain indoors.

(vi) Post Landfall Outlook for interior districts of Saurashtra and north Gujarat region (Districts apart from those mentioned under warning above):

After the landfall the system is very likely to move northeastwards, across north Gujarat and weaken gradually. It is likely to maintain the intensity of Cyclonic Storm till the morning of 16th June and thereafter it will weaken gradually into a Depression over south Rajasthan by evening of the same day.

Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over Banaskantha and Patan; heavy to very heavy at isolated places over Kachchh, Morbi, Mehsana and Sabarkantha of north Gujarat and isolated heavy rainfall over remaining districts on 16th June.

Light to moderate rainfall at most places with heavy to very heavy rainfall at isolated places likely over Banaskantha and Sabarkantha on 17th June.

Damage expected over interior districts of Saurashtra and north Gujarat region (Districts apart from those mentioned under warning):

- (i) Damage to Kutcha and minor damage to Pucca roads. (ii) Water logging and flooding in low lying areas (iii) Breaking of tree branches, uprooting of small tree and damage to orchards.

People in affected areas are advised to remain indoors.

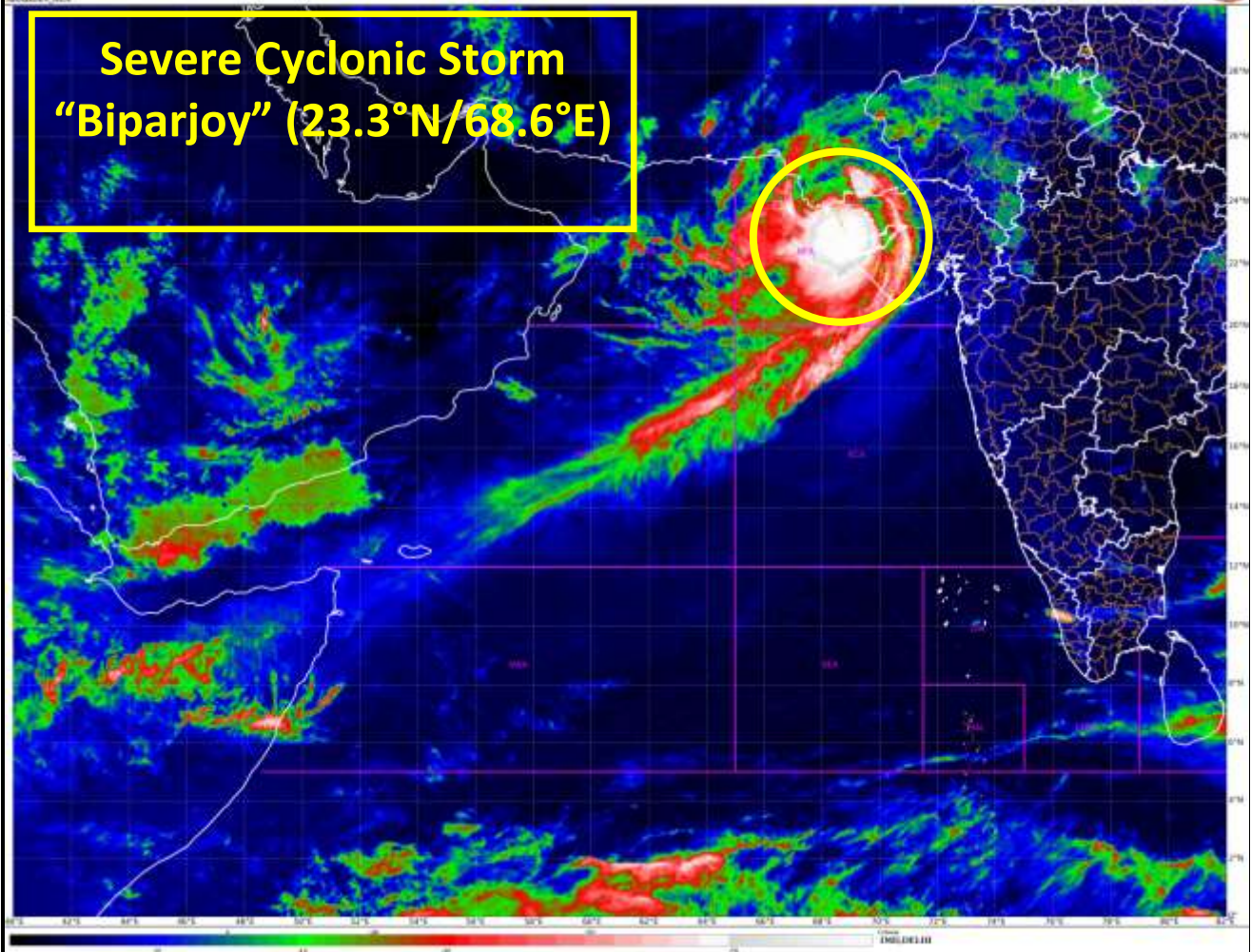
The system is under continuous surveillance and the next message will be issued at 0530 hours IST of today, the 16th June, 2023.

(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



**Severe Cyclonic Storm
"Biparjoy" (23.3°N/68.6°E)**



Radar Imagery of Doppler Weather Radar at Bhuj

bhuj_weather_2023_06_15_18_21_37_hsfimd-b-bel.dwr

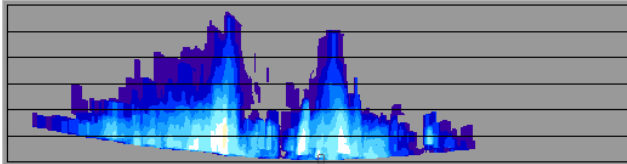
2023/06/15

18:21:37 (UTC)

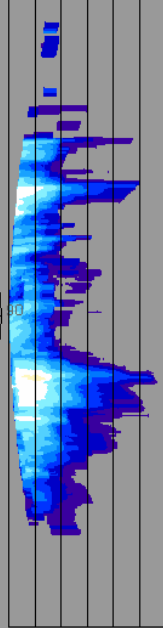
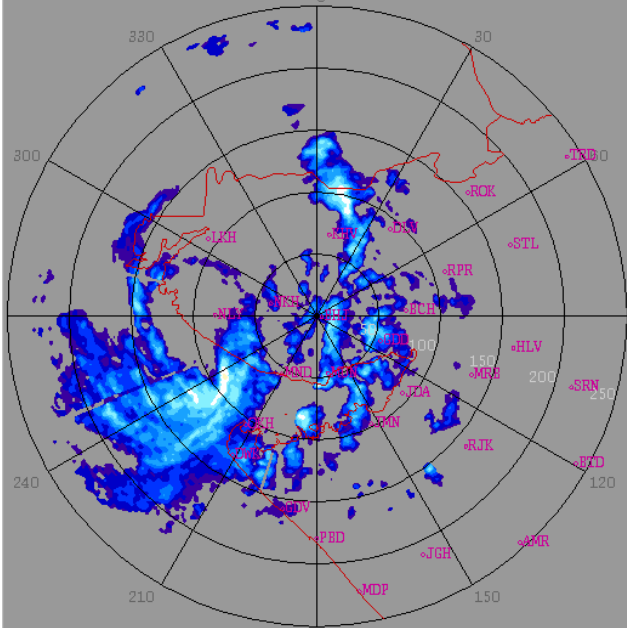
MAX(Z)

DWR BHUJ

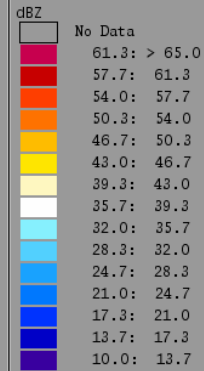
(23.2416N , 69.6458E , 100.00 mts)



18.0
15.0
12.0
9.0
6.0
3.0

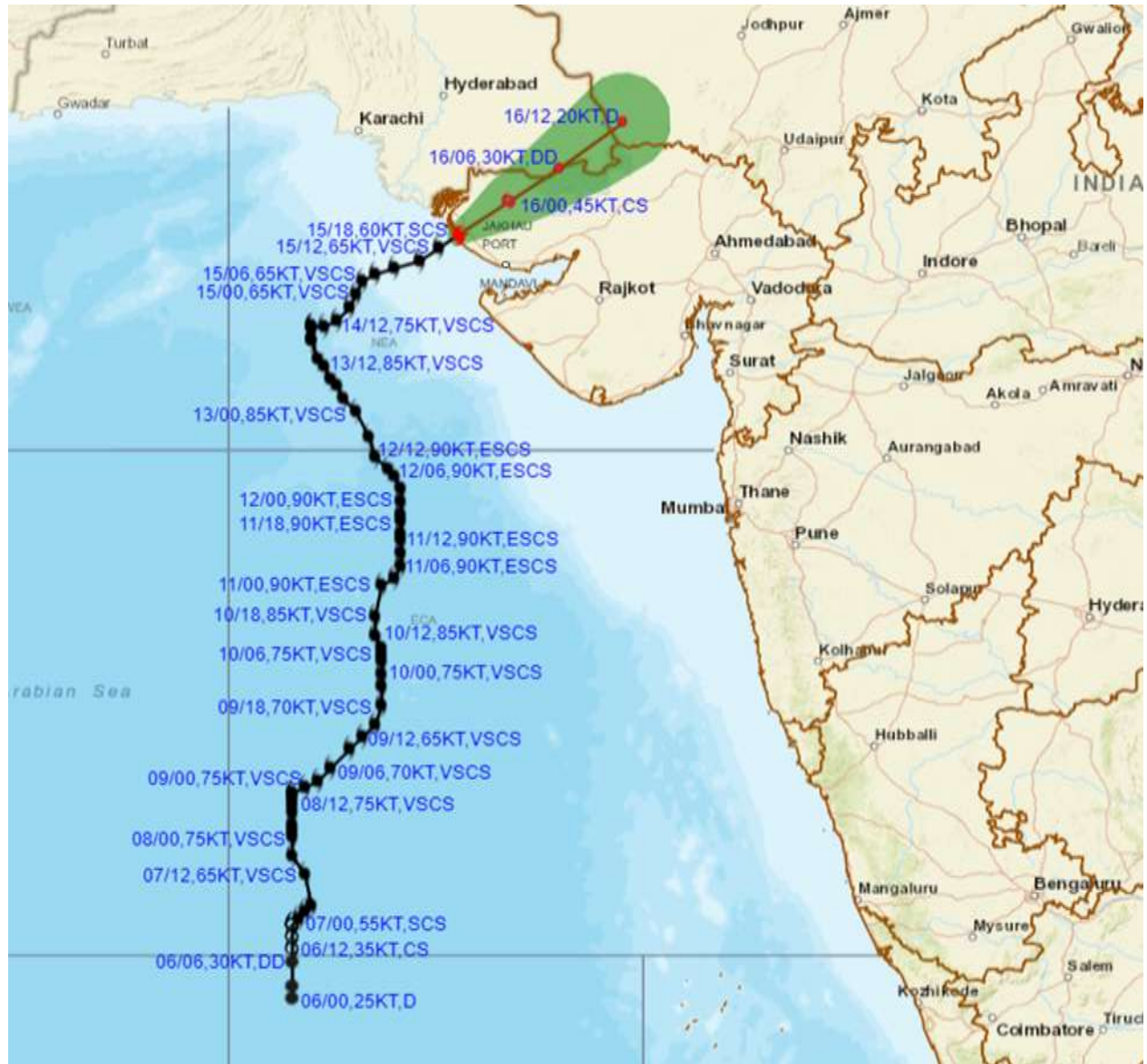


Height : 18.0 Km
Layer Spacing : 0.100 Km
Z (Lo, Hi) : -32.0, 95.0 dBZ
Grid size : 1 Km
Display Range : 250 Km
Display Res : 1.0 Km/Pix
DDR Enable : Yes
Scan Elev (Lo, Hi) : 0.2, 21.0 Deg
PRF (Lo, Hi) : 450, 600 Hz
Scan Res : 150 mts
Scan RPM : 2.0
Log Threshold : 4 dB
DTP : 42
Pulse Width : 1.0
Notch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





OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF SEVERE CYCLONIC STORM "BIPARJOY" OVER SAURASHTRA & KUTCH BASED ON 1800 UTC (2330 IST) OF 15TH JUNE 2023.

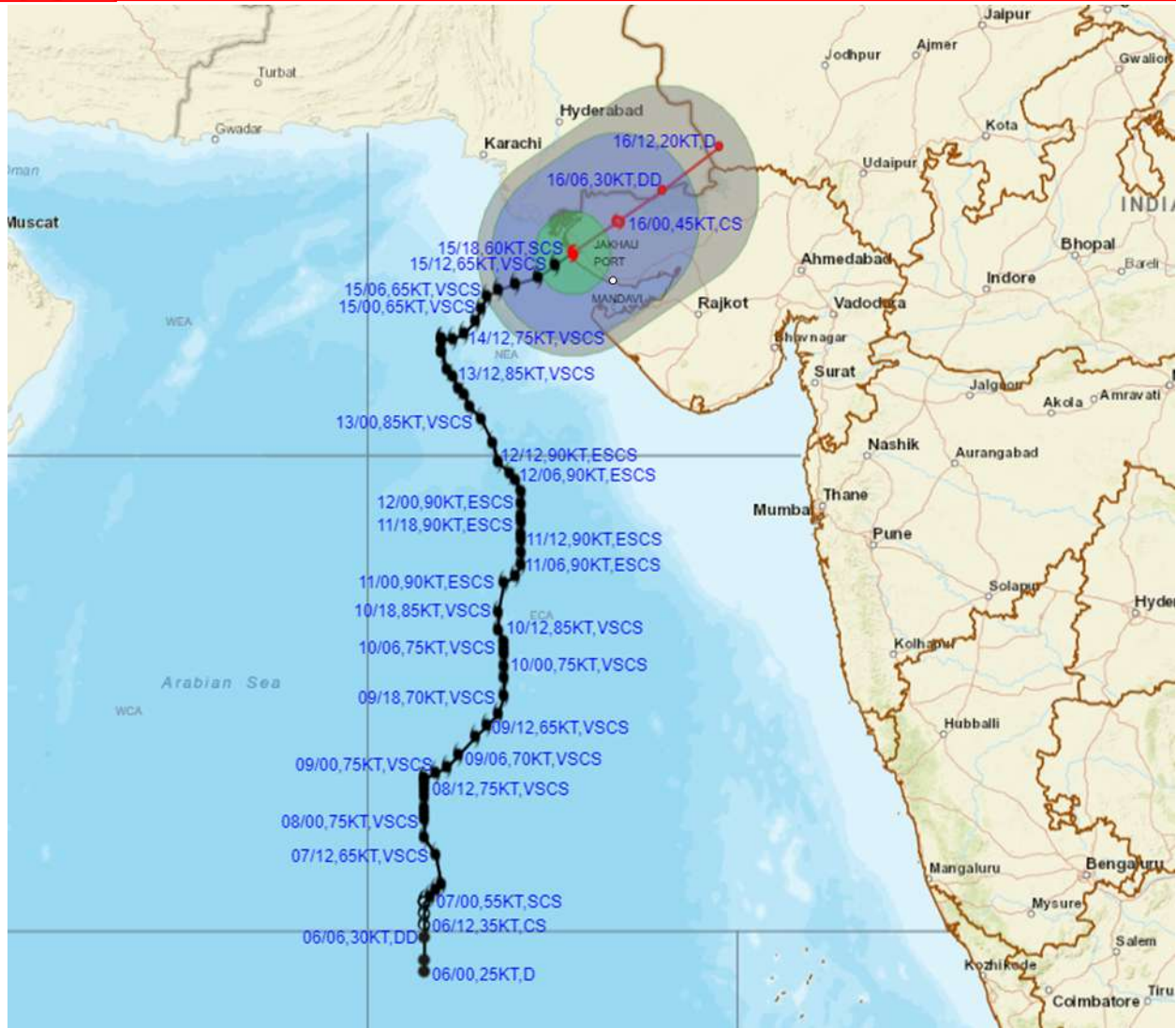


DATE/TIME IN UTC
 IST=UTC + 0530
 L: LOW PRESSURE AREA
 WML: WELL MARKED LOW PRESSURE AREA
 D: DEPRESSION (17-27 KT)
 DD: DEEP DEPRESSION (28-33 KT)
 CS: CYCLONIC STORM (34-47 KT)
 SCS: SEVERE CYCLONIC STORM (48-63KT)
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)
 ESCS: EXTREMELY SEVERE CYCLONIC STORM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



OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF SEVERE CYCLONIC STORM "BIPARJOY" OVER SAURASHTRA & KUTCH BASED ON 1800 UTC (2330 IST) OF 15TH 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)

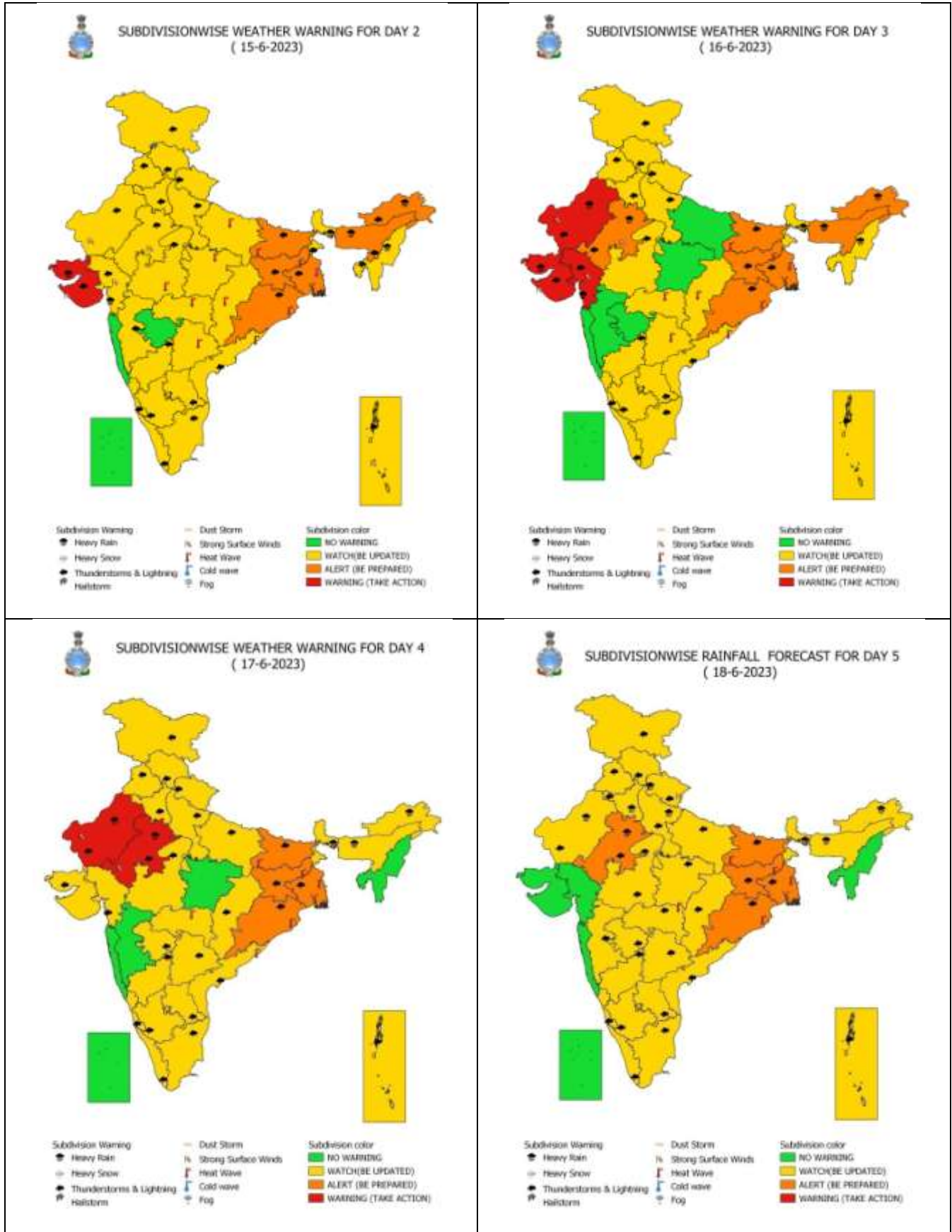
■ 50-63 KT (92-117 KMPH)

■ ≥ 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 16th to 17th June



District-wise Wind Warning Maps for 16th June



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