

The advantages of decisions based on and derived from EWS: The Case of Vayu

Repaul Kanji,
Research Scientist & Program Manager, GIDM
IRDR Young Scientist



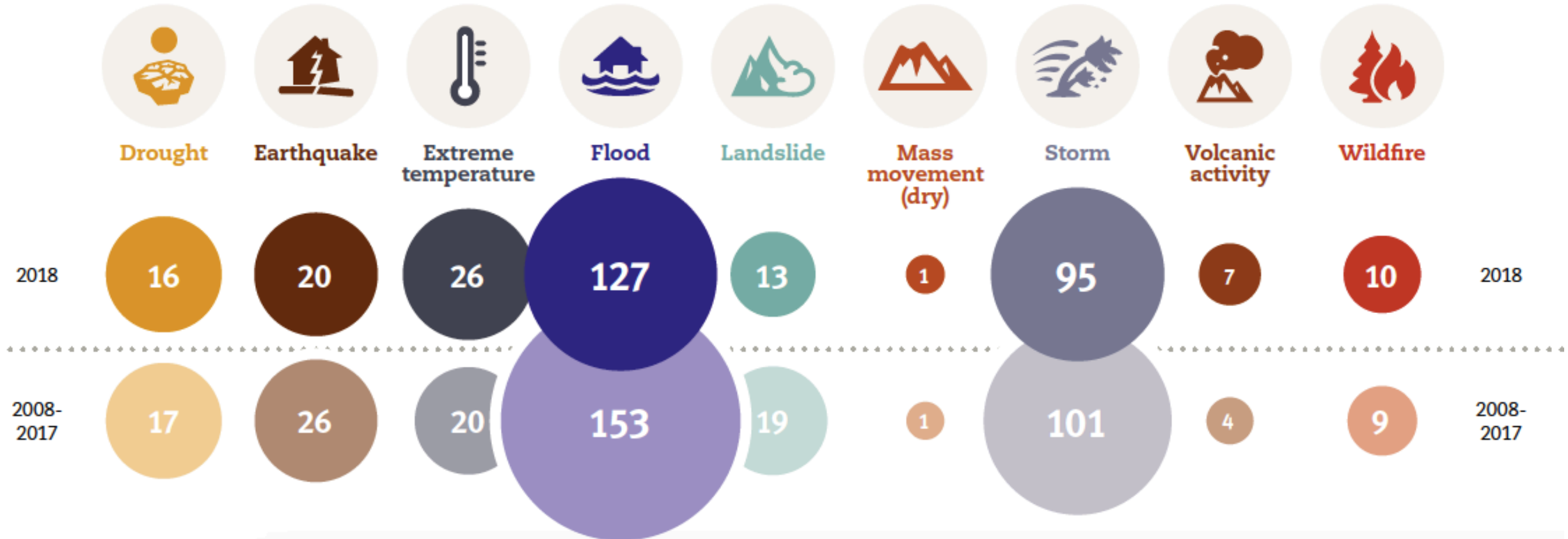
Extreme events are on the rise!

Occurrence by disaster type: 2018
compared to 2008-2017 annual average

348
2008 to 2017

>

315
in 2018

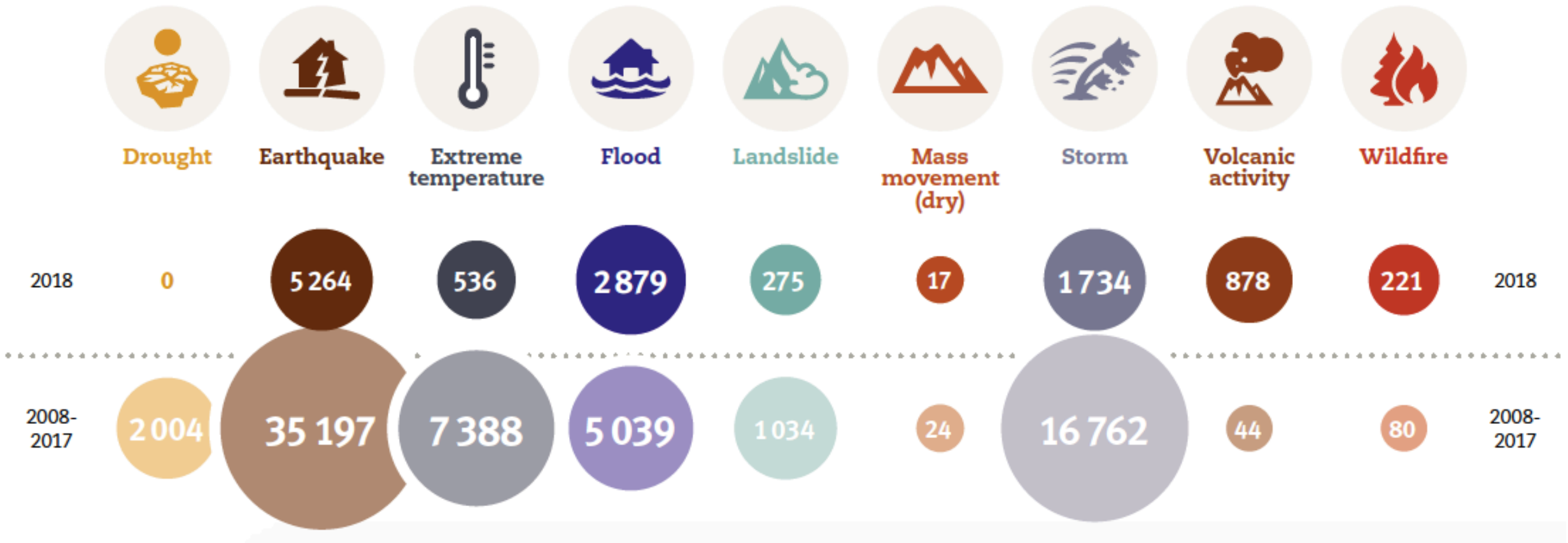




Extreme events are on the rise!

Number of deaths by disaster type: 2018
compared to 2008-2017 annual average

67,572 > **11,804**
2008 to 2017 in 2018

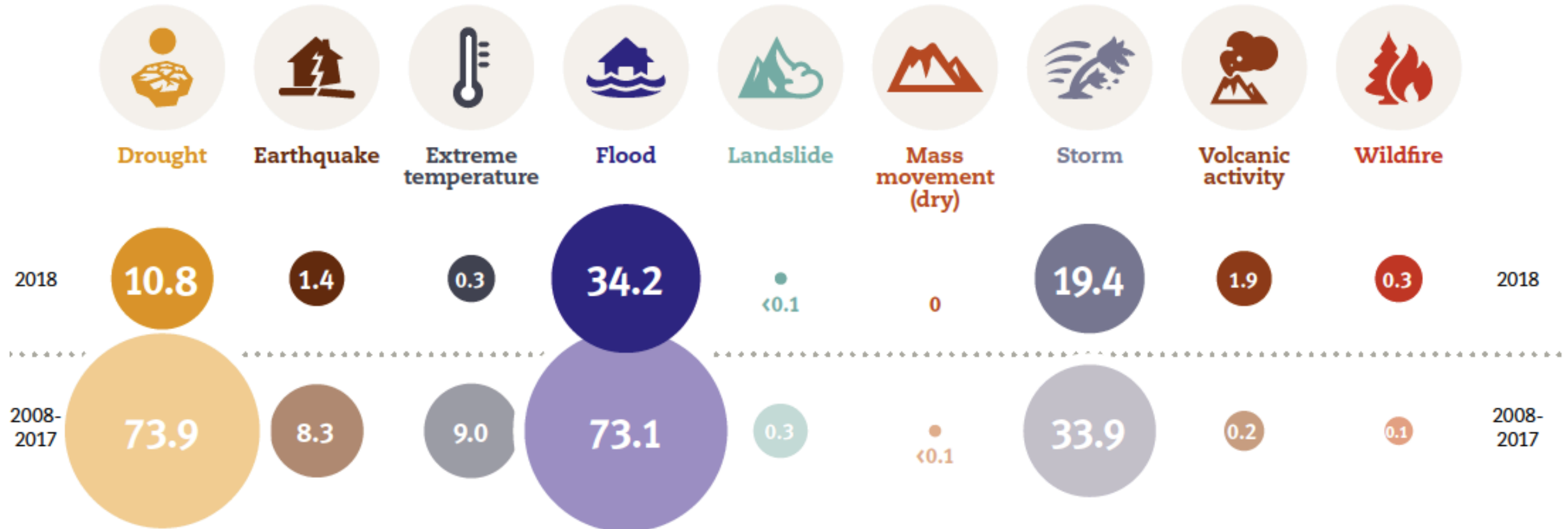




Extreme events are on the rise!

Number of affected (million) by disaster type:
2018 compared to 2008-2017 annual average

198.8 > **68.5**
2008 to 2017 in 2018





Fani 2019 (25th April – 6th May)





Fani 2019



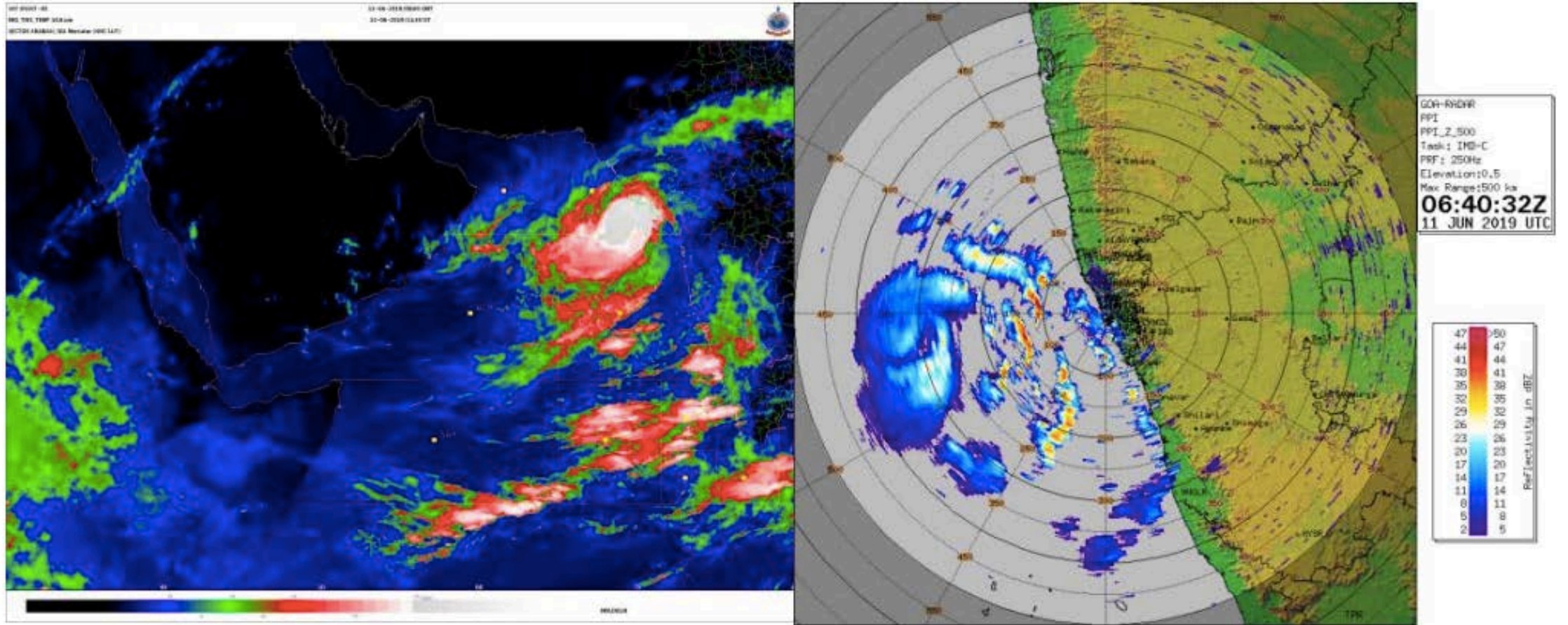




Prequel to Vayu

- **Pre Cyclone watch** for Gujarat coast was issued by **India Meteorological Department (IMD)** at **1230 hrs IST of 10th June** (3 days in advance of commencement of adverse weather) when the system was a **depression** over east-central Arabian Sea and adjoining areas.

Prequel to Vayu

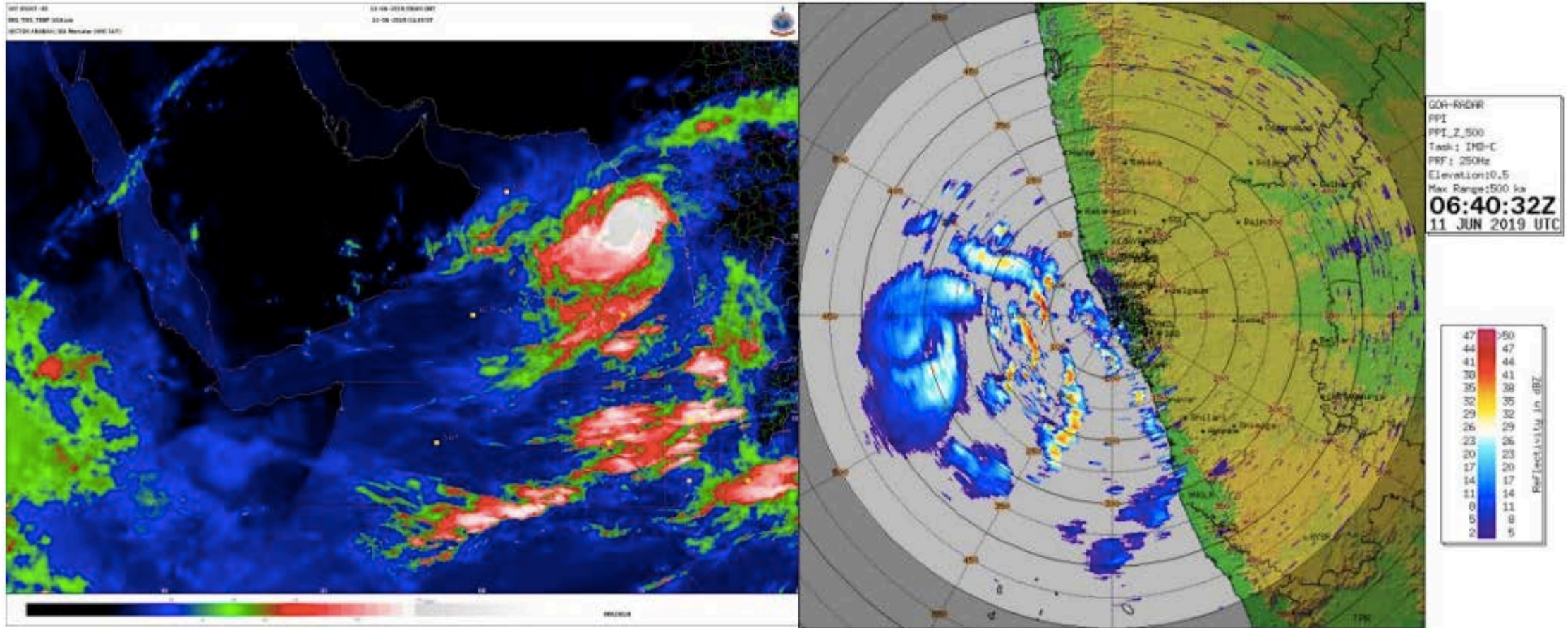




Prequel to Vayu: Use of imagery

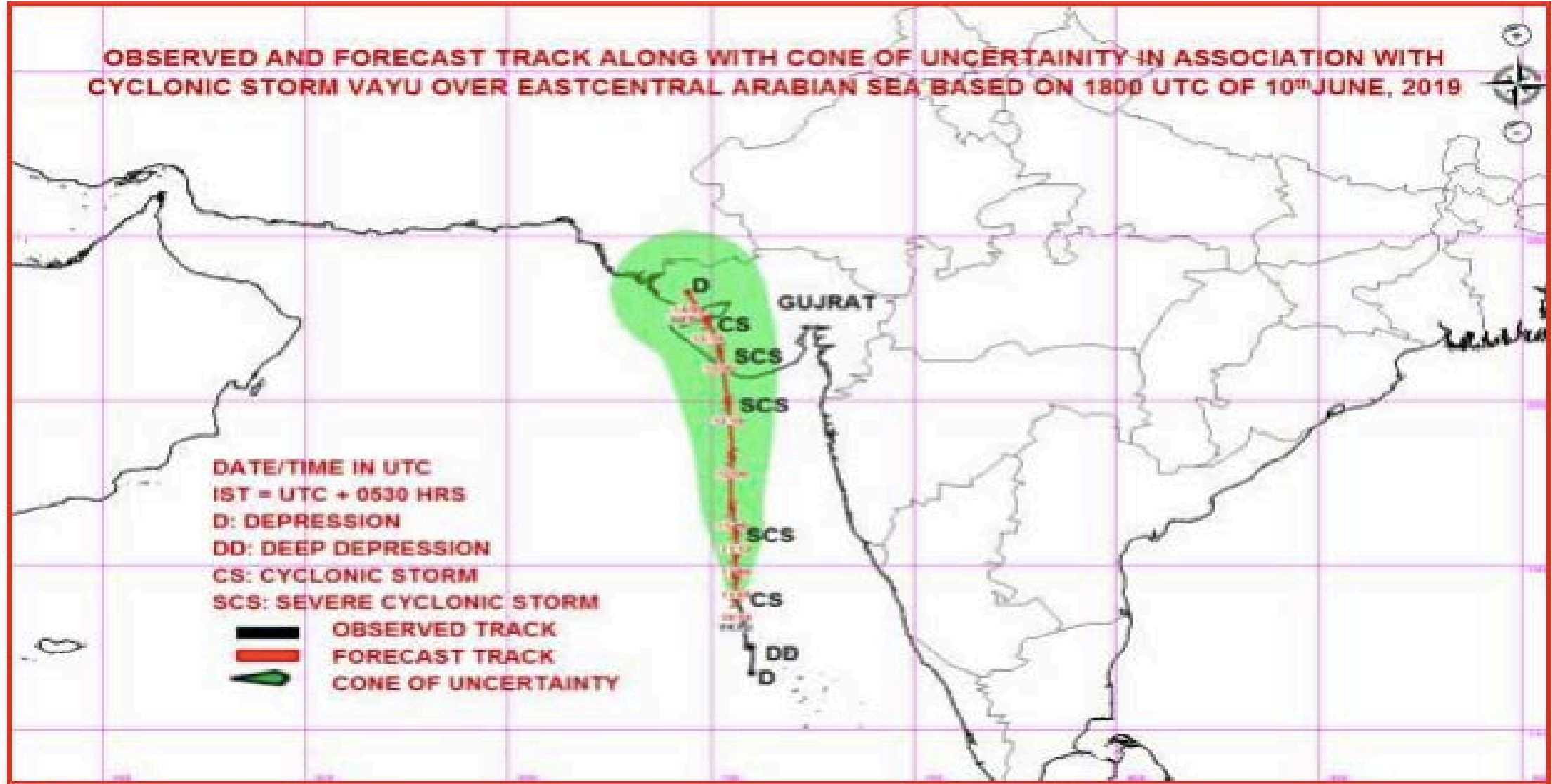
- IMD maintained round the clock watch since 6th June about 4 days prior to cyclogenesis.
- The cyclone was monitored with the help of available satellite observations from INSAT 3D and 3DR, polar orbiting satellites, and available ships & buoy observations in the region.
- The system was also tracked gradually by IMD Doppler Weather Radars (DWR) at Kochi, Goa, Mumbai and Bhuj.
- Various numerical weather prediction models developed by Ministry of Earth Sciences (MoES) institutions and dynamical-statistical models were utilized to predict the genesis, track, landfall and intensity of the cyclone.

Prequel to Vayu: Interpretation?



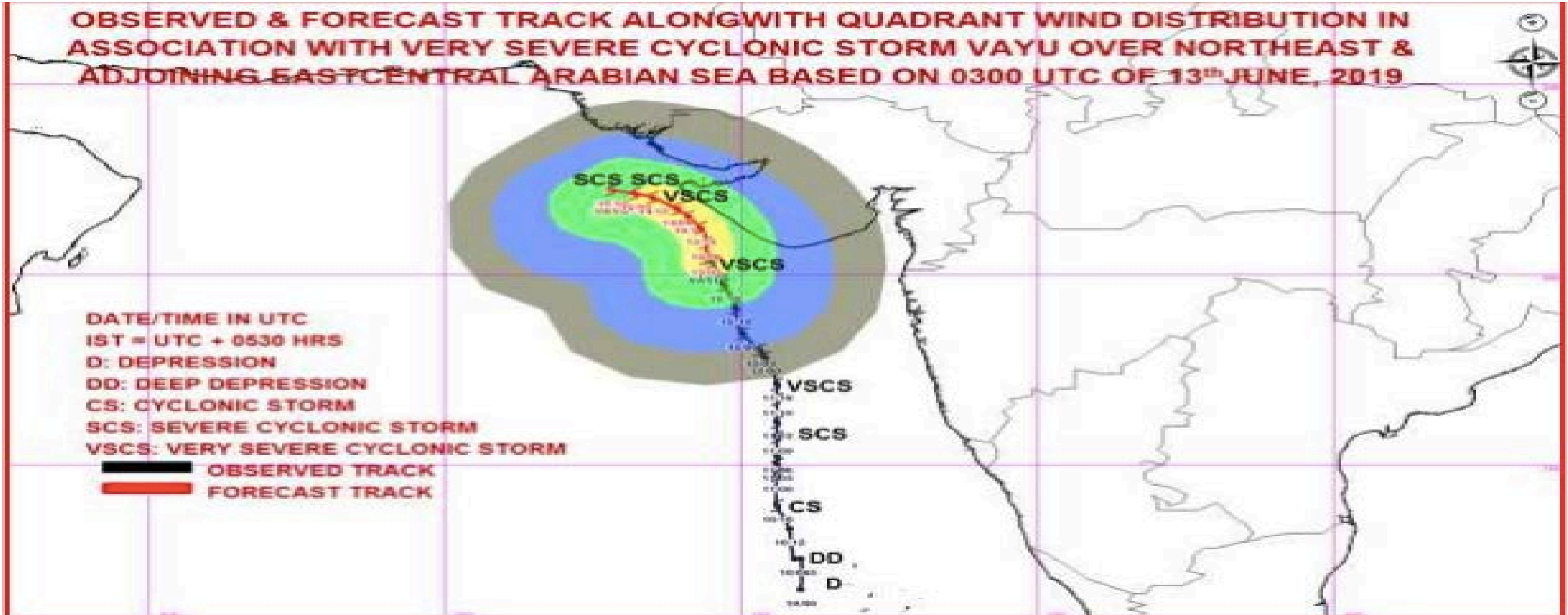


Prequel to Vayu: Emergency Communication





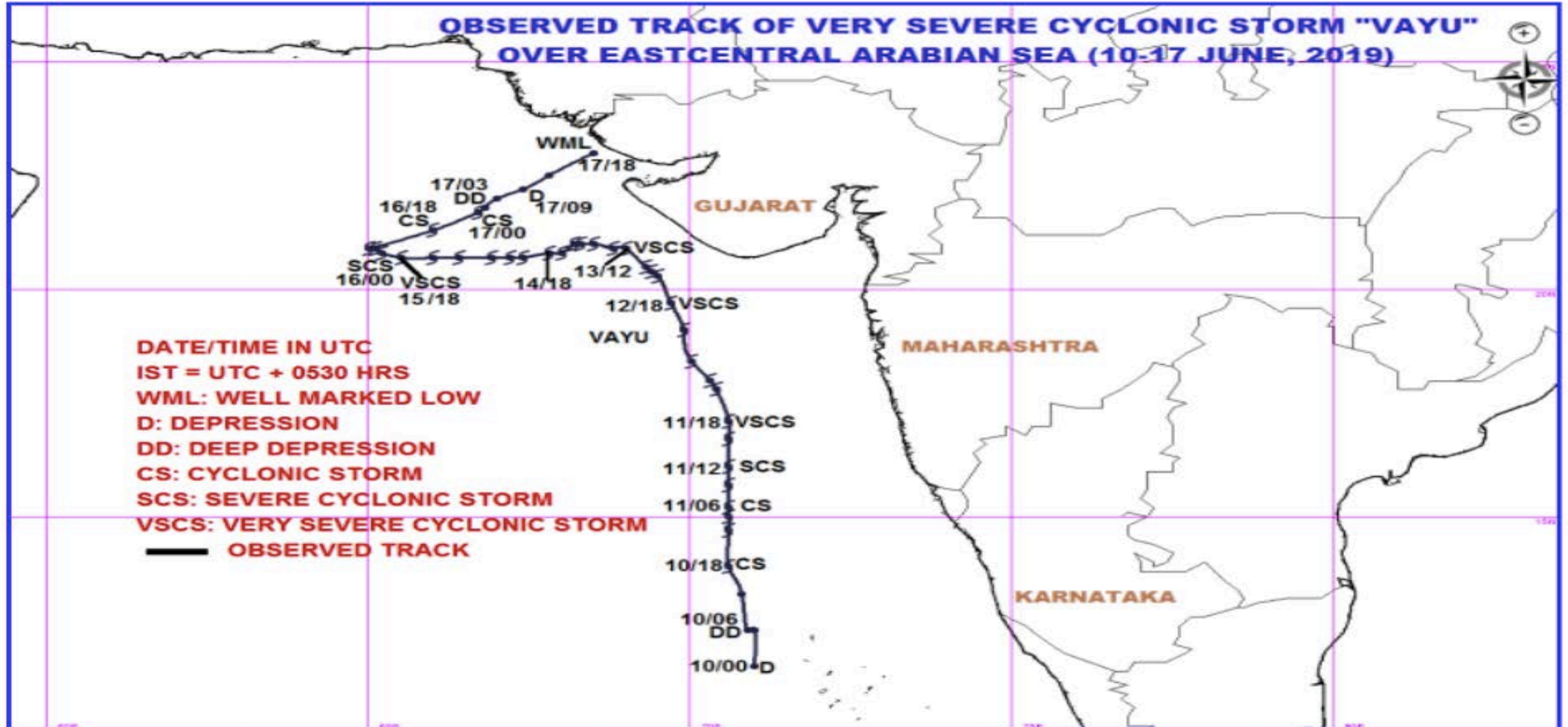
Prequel to Vayu: Emergency Communication



| MSW(knot/kmph) | Impact | Action |
|----------------|------------------------|--|
| 28-33(51-62) | Very rough seas | Total suspension of fishing operations |
| 64-89(63-91) | Very to very High seas | Total suspension of fishing operations |
| 64-89(92-117) | Very High seas | Total suspension of fishing operations |
| 64-89(118-166) | Very High seas | Total suspension of fishing operations |



Observed Track of Vayu

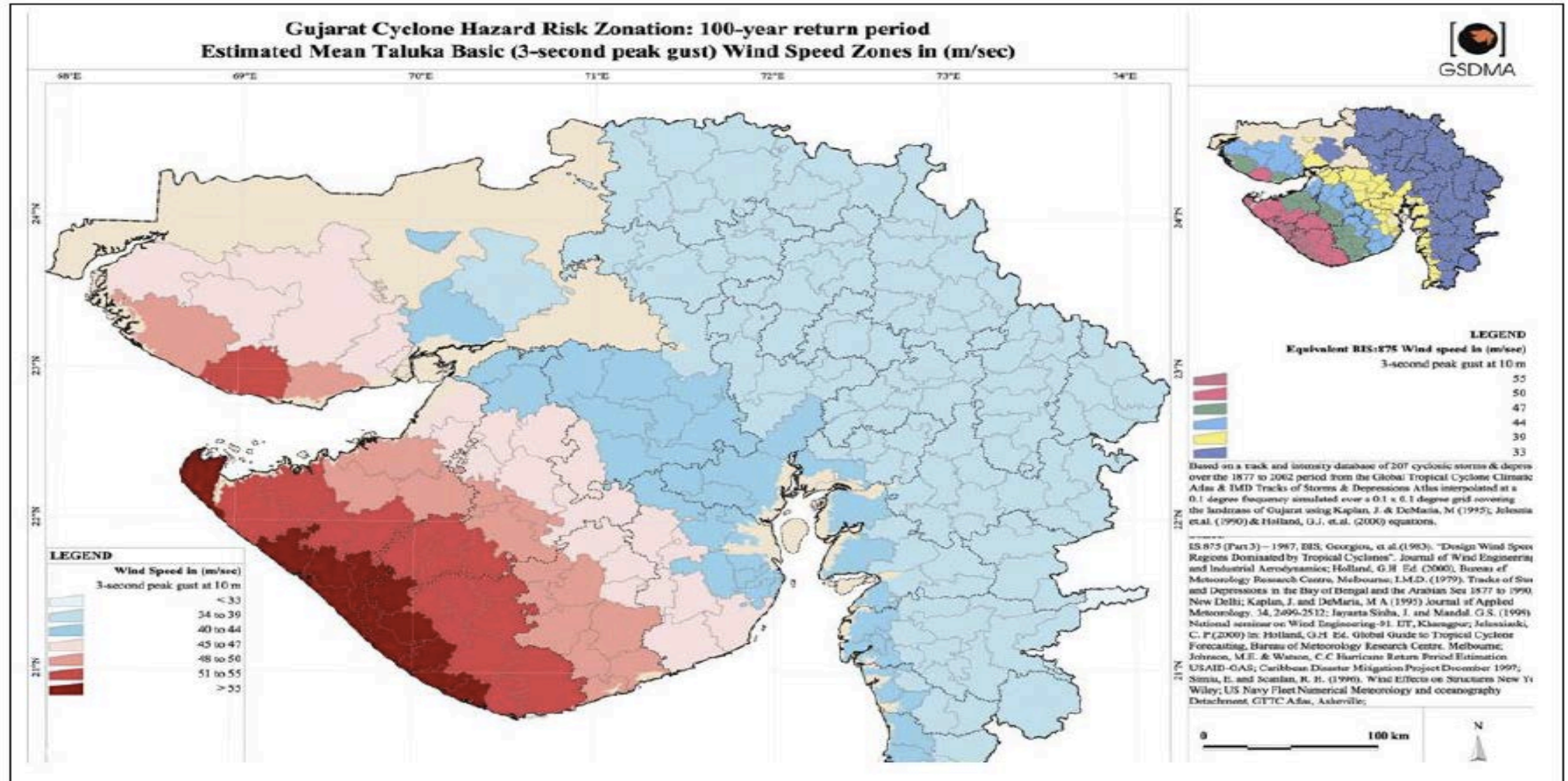




We were not caught off-guard!



Gujarat was prepared!





Steps taken, decisions made

- On receipt of the Bulletin from IMD on 10th June, 2019, of Deep Depression, an **Emergency Weather Watch Group Meeting** was convened to discuss the immediate action to be taken-up.
- On 11 June, 2019, at 1000hrs, a meeting was convened by Gujarat State Disaster Management Authority (GSDMA) with central and state agencies like Army, BSF, NDRF, SDRF, etc. for emergency response planning and operations in the wake of cyclone alert.
- With the deep depression converting into severe cyclonic storm, a meeting of **State Crisis Management Group** was held on 11 June, 2019, at 1315 hrs with all the State Government departments, its respective HoDs and Central government agencies and necessary instructions to be ready to be deployed and respond aiming at '**Zero Casualty**' were imparted.



Steps taken, decisions made

- As a part of immediate execution of decision taken in the State Crisis Management Group Meeting, Video-conferences were held at 1400 hrs with concerned district collectors, DDOs, SPs and CPs to sensitise them for situation and to give guidance for course of action.
- **A three tiered Incident Response Mechanism was activated.** The operational command was led by ACS (Revenue); the strategic command was led by the Chief Secretary and Hon. Chief Minister.



Steps taken, decisions made

- The State Government, through district administrations, prepared comprehensive evacuation plans for the people likely to be affected, living within a distance of 10 km from the coast and flood prone areas within 50km from the coast. **Accordingly, 2,78,456 people were evacuated to 2,307 identified shelters.**
- **1862 fishermen, from different districts, in 393 boats were reported to have returned.**
- **5550 pregnant women with expected date of delivery in next 15 days were mapped and contacted.**
- **1316 police officials with 305 vehicles were engaged in 12 districts, to ensure that no one ventures out.**



Steps taken, decisions made

- Damages? Yes!
- Losses? Yes!
- Population severely affected? Very, very less!
- Deaths? Zero casualty Approach!



Thank You

Gujarat Institute of Disaster Management

B/h. Pandit Deendayal Petroleum University

Village Raisan, Gandhinagar – 382007

Website: gidm.Gujarat.gov.in



Observed Track of Vayu

- The track forecast errors for **24, 48 and 72 hrs lead period** were 67.5, 125.9, and 264.9 km respectively against the average track forecast errors of 86.1, 132.3, and 177.7 km during last five years (2014-18) respectively.
- The absolute error (AE) of intensity (wind) forecast for **24, 48 and 72 hrs lead period** were 6.6, 11.9 and 33.7 knots against the LPA of 9.6, 14.1, and 14.3 knots respectively.