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INDIAN RAILWAY GEARS UP TO TACKLE CYCLONE ‘MICHAUNG’

Relevant for: Geography | Topic: Important Geophysical Phenomenon - Tropical Cyclones

The Indian Railways has geared up its entire machinery in a big way to ensure and manage smooth and safe railway operations in the areas likely to be affected by the cyclonic storm ‘Michaung’. The Indian Railways, as parts of preparedness for cyclone related Disaster Management, has set up an emergency control cell at the Divisional/HQ level with officers from Operating, Commercial, Engineering, Electrical, Signal/Telecommunications, Security etc branches in each shift, to monitor round the clock and take necessary action in connection with train operations. War room at board level has also been activated and monitoring of all location is being done round the clock. Safety counsellors in each shift are also nominated to assist with the Emergency control. Additionally, all Field officers are available as directed by officials. The officers manning the Emergency control have been directed to liaison with the field officers and supervisors for smooth train operations and to keep a close watch on the movement of the cyclone and forecast issued by IMD and plan for train operations accordingly.

Health Unit, Chennai Division has also geared up its disaster management action plan and formed two teams. Team A including Doctors and other on-duty staff to board the SPART at Platform No:11 as soon as the message arrives and will report to the Officer Incharge at the Disaster /Accident spot and start the relief work. Team B will report casualty and a part of the Team B will proceed by road. Remaining will stay back to inform all concerned, maintain communication with medical team A, CMS Office, to inform Local Railway Hospitals, Railway Hospital, Perambur and local Private hospitals for Emergency Preparedness.

Southern Railways and other concerned zones have also issued a list of General Instructions and emergency contact numbers for the masses in case of any exigency including phone numbers of Railway officials, Medical teams, Emergency vehicles, commercial control for public enquiry, tower wagon drivers along with list of DG sets, pumps, submersible sewage pumps etc. available at various stations. Water logging prone locations have also been identified and various corrective actions have been taken at all such locations.

S.

No.

General Instructions

1

The main focus should be on prevention of loss of life and on minimizing the damage to Railway assets. For this, if essential, all train operations, both passenger and freight, on the target section can be suspended in consultation with HQ.

2

Cyclone will be preceded/accompanied by incessant rains. In sections where trains are to be run inspite of incessant rains, monsoon patrolling should be ensured.

3

The following resources need to be kept in readiness, fully fuelled up and with full complement of tools, spares, accessories and rations (with locos provided wherever not self-powered): -

Monsoon reserve trains Accident relief trains
Tower Wagons

4

Adequate number of Breakdown staff of track, Traction and Signal & Telecommunications to be kept in readiness to attend to restoration work.

5

All DG sets needed for power supply to signals, stations and other vital installations / offices, should be kept in readiness with fuel stocks for enabling 72 hours of continuous running with arrangements for running longer if required kept ready.

6

Sufficient number of diesel locos, fully fueled up, to be kept ready for facilitating movement of trains required for attending to emergencies.

7

As soon as the threat of the cyclone is apparent, all LC gates in the cyclone prone sections to be kept with booms lowered to prevent damage to the booms. For this, it is essential that the concerned District Collectors be kept informed so that traffic

using these LC gates can be appropriately regulated / diverted.

8

The Jibs of all Cranes working near Track area (including that of Non Railway) are to be lowered to prevent damage

9

Hoardings / banners in the vicinity of stations as well as in the vicinity of the track in the mid-section to be removed wherever feasible.

10

Colonies to be kept a watch on by officers/officials to assess the need for evacuation and arranging appropriate relief. DRM to nominate officers / officials for this purpose. A Supervisor should be deployed at such locations to ensure that while basic comfort of the residents at these locations is ensured.

11

Information should be given in time to the passengers in the event of cancellation/ partial

cancellation/ rescheduling/diversion of trains.

12

lt should be ensured by evening of one day prior to the expected landfall of the cyclone that in tall isolated structures like OHE masts on bridges / S&T towers /

lighting masts, all anchor bolts are fully tightened. lf required additional guy wires can be provided.

13

A closer watch to be kept on locations which faced maximum damage during the

previous cyclones.

14

High rise buildings all along the anticipated zone of impact are vulnerable to damage and actions like closing of all windows etc, removal of hoarding etc in the vicinity may be ensured by evening of one day prior to the expected landfall of the cyclone.

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YB/AS/PS

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YB/AS/PS

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Source : www.thehindu.com Date : 2023-12-06

HOW CYCLONE MICHAUNG FORMED, INTENSIFIED, RAINED, AND DISSIPATED

Relevant for: Geography | Topic: Important Geophysical Phenomenon - Tropical Cyclones

December 06, 2023 09:30 am | Updated 09:31 am IST

The NASA Aqua satellite's view of Cyclone Michaung on December 4, 2023. The southernmost top of mainland India is visible near the bottom-left corner. | Photo Credit: NASA

The story so far: On December 5, Cyclone Michaung (pronounced mig-jaum) made landfall over Nellore in Andhra Pradesh as a super-cyclonic storm. A day earlier, the weather system had produced 150-200 mm of rain in north Tamil Nadu.

On November 29, the India Meteorological Department (IMD) identified a well-marked low pressure area in the southwest Bay of Bengal. It was expected to become a depression by November 30, a deep depression on December 2, and eventually a cyclonic storm by December 3. Thereafter, the IMD forecast that the system would move north towards coastal Andhra Pradesh, bringing rain and strong winds to areas in north Tamil Nadu on December 3 and 4, while travelling parallel to the latter's coast. It was finally expected to cross over land between Nellore and Machilipatnam as a cyclonic storm, with 80-90 km/hr winds gusting to 100 km/hr.

High tides at Marina beach on December 1, 2023, before the storm was expected to hit the Chennai coast. | Photo Credit: Ragu R./The Hindu

On December 1, the Joint Typhoon Warning Centre (JTWC), a joint U.S. Air Force and Navy command, upgraded the likelihood of cyclone formation to 'high'. By December 2, the depression had intensified into a deep depression, as expected, while it was around 500 km southeast of Chennai and moving at around 17 km/hr. It was expected to approach Chennai within two days even though, soon after, the system also seemed to slow its northward progress. By the end of the day, it had come to within 400 km of Chennai, still as a deep depression, and induced rain over the city's south.

At this time, the JTWC data indicated that the sea surface temperature was around 28 degrees C. More than 27 degrees C is favourable for cyclogenesis, the process by which cyclones are created and intensify.

By the morning of December 3, the system had become cyclonic.

In 2000, a panel of the World Meteorological Organisation together with members of the United Nations Economic and Social Commission prepared the list of names of tropical cyclones in the

Bay of Bengal and the Arabian Sea, to be given from the September 2004 season. The name of each cyclone is picked from this list and cycles through each country's suggestion.

For example, after Michaung (by Myanmar), the next five cyclones will be called 'Remal' (Oman), 'Asna' (Pakistan), 'Dana' (Qatar), 'Fengal' (Saudi Arabia), and 'Shakhti' (Sri Lanka).

As Cyclone Michaung approached north Tamil Nadu, Chennai and the surrounding districts of Kancheepuram, Thiruvallur, and Chengalpattu began to receive rain. The State government declared a public holiday in these areas on December 4, later extended to December 5, after the IMD forecast heavy showers.

By the evening of December 3, Cyclone Michaung was 200 km from the city, roughly east, and had slowed to around 8 km/hr. By December 4 morning, and contrary to expectations, it had moved more westward than northward, bringing it within 150 km of the city, dumping a large quantity of water as rain together with strong winds gusting up to 80 km/hr.

Railway tracks at Egmore Railway Station were submerged after the arrival of Cyclone Michaung near Chennai, December 4, 2023. | Photo Credit: Ragu R./The Hindu

Cyclone Michaung continued to remain close to Chennai on December 4 evening, with many areas in the city reporting receiving more than 120 mm of rain in the previous 24 hours, and some more than 250 mm. There were several reports of localised flooding and people stranded in places where the water refused to drain, together with a city-wide power cut.

Nonetheless, Chennai managed to fare better than it did after the 2015 rains thanks to controlled release of water from the Chembarambakkam reservoir. Eight years ago, an uncontrolled release of a large volume had flooded the city.

Rains in Chennai finally ceased in the wee hours of December 5 as Cyclone Michaung resumed its northward journey.

On December 4, the cyclonic storm intensified into a super-cyclonic storm. Such intensification events are a source of uncertainty in cyclone models because they alter the storm's future course.

Tropical cyclones are 'engines' that use a warm sea surface as 'fuel'. This is why they form close to the equator (but seldom at the equator itself because the spinning force, called the Coriolis force, is lowest there).

As air moves over such a warm sea, it also becomes warmer and laden with moisture, and begins to ascend. In the process, it becomes cooler, which condenses the vapour and forms clouds. Condensation releases heat, which makes the air lighter and causes it to ascend further. As it does, the surrounding air moves in underneath, creating the surface winds associated with cyclones.

This (simplified) process is the reason climate change – and the resulting sea-surface warming, since these large water bodies absorb the vast majority of the heat of global warming – has been conducive to cyclone intensification.

Vehicles struggling to cross the submerged Poonamallee High Road after heavy rains in Chennai, December 4, 2023. | Photo Credit: Ragu R./The Hindu

The intensification is also greater if the cyclone spends more time over the water before landfall,

as Cyclone Michaung did off the coast of north Tamil Nadu.

Cyclones draw heat from the sea and move it to the upper atmosphere, where winds carry it to the earth's poles and warm them. An intensifying cyclone will do this more powerfully.

A study published in May 2020 found that tropical cyclones with wind speeds upwards of 185 km/hr had become 15% more likely since 1979.

In 2021, Cyclone Yaas took advantage of an Arabian Sea surface temperature of 32 degrees C for several days before slamming into Gujarat as an extremely severe cyclonic storm. Roxy Mathew Koll, scientist at the Indian Institute of Tropical Meteorology, Pune, had said at the time that "rising ocean temperatures in both [the Arabian Sea and the Bay of Bengal] are assisting … cyclones in their 'rapid intensification' process. Otherwise, we don't see a significant increase in the number of cyclones over the Bay of Bengal as we see in the Arabian Sea."

Cyclone Michaung's own intensification was also assisted by the Madden-Julian oscillation (MJO), among other factors, according to a December 3 advisory from the Regional Specialised Meteorological Centre – Tropical Cyclones, New Delhi.

The MJO consists of a 'pair' of weather anomalies that move eastward around the world once every one to two months. The leading side imposes dry weather while the trailing side imposes wet (rainy) weather. The advisory said that on December 3, the MJO was in phase 4, near Cyclone Michaung, indicating favourable conditions for rain formation.

A man runs to safety as high-speed winds due to Cyclone Michaung lashed the Suryalanka beach in Bapatla district, December 5, 2023. | Photo Credit: K.V.S. Giri/The Hindu

Aside from complicating forecast models, cyclone intensification allows these storms to make landfall with more energy, move further inland, survive longer, and extend their on-ground devastation to previously 'inaccessible' areas.

According to local reports, Cyclone Michaung crossed over land just south of Bapatla district in Andhra Pradesh from 12.30 pm on December 5 as a super-cyclonic storm. It brought heavy rain and winds with a sustained speed of 90-100 km/hr as it crossed over over a period of three or so hours, in the process uprooting trees and electric poles.

As of 9 am on December 6, its effects on the ground — often as a result of poor infrastructure — had led to the deaths of 12 people.

Based on radar data up to 3.30 pm on December 5, the IMD reported that the storm had completed landfall and "lay centred … over south coastal Andhra Pradesh, about 20 km west-southwest of Bapatla and 45 km north-northeast of Ongole".

An hour later, an IMD bulletin said the storm system was moving northward at 11 km/hr while weakening into a cyclonic storm over the next couple hours. This is a direct result of the cyclonic 'engine' losing its source of 'fuel' — a warm water-body underneath. The State's north coast was forecast to experience rain with winds of 50-60 km/hr in this time.

By 6 pm on December 6, the IMD had expected the storm to devolve into a well-marked low pressure area.

Deep Depression (Remnant ofCyclonic Storm "MICHAUNG" weakened into a Depression over Northeast Telangana and adjoining south Chhattisgarh-south InteriorOdisha-Coastal AP, about

50 km east-northeast of Khammam, To weaken further into a Well marked Low Pressure Area in next 06 hrs. pic.twitter.com/kcnPYF2rpj

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