THE UNIVERSITY OF THE WEST INDIES

POLICY BRIEF

Strengthening Local Meteorological Services To Improve Disaster Preparedness

No. 1 - December 11, 2025

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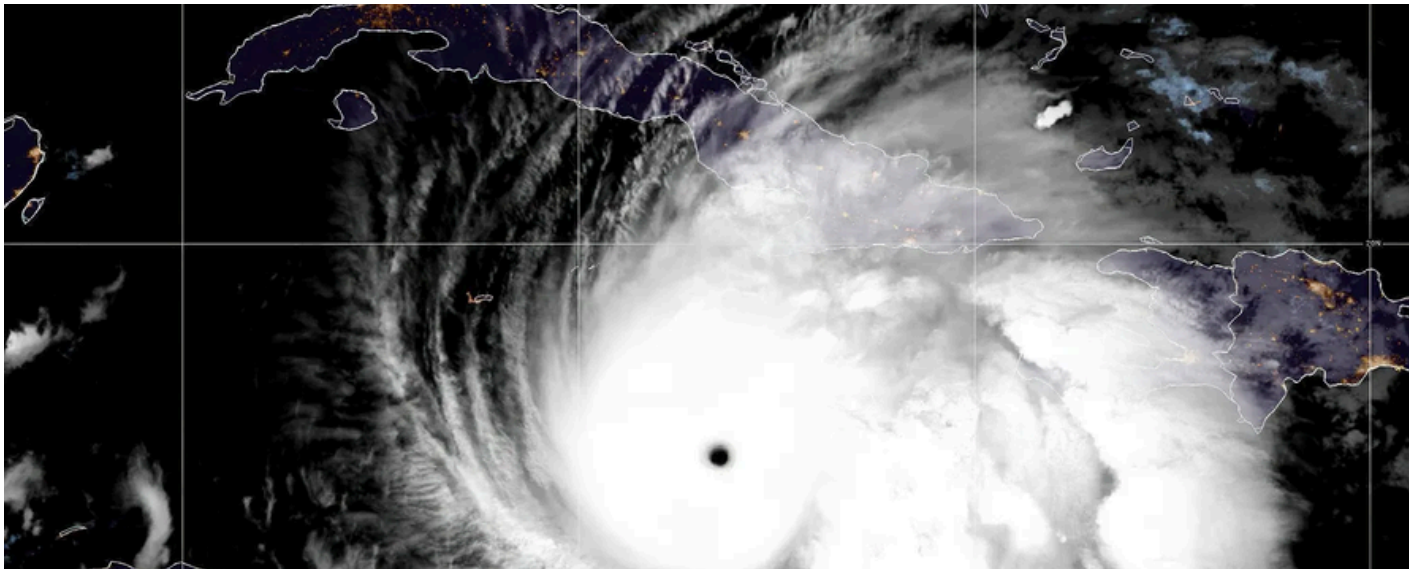

Hurricane Melissa satellite image at around 6 a.m. EST. Credits: Goes-19/Cira/Noaa/Planet Pix via ZUMA Press Wire/Shutterstock

EXECUTIVE SUMMARY

Major Hurricane Melissa made landfall in Jamaica as a category 5 hurricane on October 28, 2025, causing unprecedented destruction. As climate change intensifies hurricanes, rainfall extremes, heatwaves, and drought cycles, Jamaica's ability to forecast, warn, and communicate risk becomes increasingly vital. Strengthening data monitoring and forecast products developed by the Meteorological Services Jamaica, will better support disaster preparedness efforts in the island at the levels of community to agencies, help quantify the extreme nature of the weather events experienced, and provide the data needed for climate change attribution, global advocacy on climate change response, and efforts to operationalize loss and damage financing.

INTRODUCTION

- Hurricane Melissa made landfall in Jamaica as a catastrophic Category 5 storm on October 28, 2025, causing unprecedented destruction.
- The Meteorological Service Jamaica (MJS) successfully provided forecasts of track, category, wind speed, forward moving speed, rainfall and storm surge for Jamaicans, which was crucial to the country's planning ahead of the impact of the hurricane.
- The forecast were informed by monitoring systems maintained by the MSJ, including a radar, and automatic weather stations (AWSs), and incorporated satellite imagery and outputs from computer models. These were further complemented by a combination of observation tools, advanced computer models and forecast products from the Miami-based National Hurricane Centre (NHC), as well as storm surge products from the NHC and Caribbean Institute for Meteorology and Hydrology situated in Barbados.
- The information was directly provided through forecast bulletins, press briefings, and the MSJ app.

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MAKING THE CASE

Hurricane Melissa exposed some of the vulnerabilities in the existing weather monitoring systems in Jamaica:

- **Interruption and unavailability of real time data collection:** Thirty of thirty-one automatic weather stations reporting in near real time via online modality went down due to loss of electricity or internet connection during the passage of Melissa. The MSJ also operates with the unavailability of real time modality for observation of 90% of its AWS network.
- **Inaccessibility of stations after extreme weather**: MSJ teams were deployed to collect rainfall data post the storm, a process that has been impacted by accessibility of roads and communities.
- **Reliance on external partners for key variables**: A subset of the data network comprises manual rain gauges so the MSJ relies on observers to collect rainfall data which, in the case of Melissa, would be almost impossible especially in the western section of the island.
- **Absence of flood forecast maps**: Until there is an expansion of data monitored by the MSJ, some forecast products will not be developed within the country.
- **Limited in-house modelling capacity**: MSJ depends on model simulations produced externally to assist in the forecasting process.
- **Limited information sharing platforms**: ·MSJ does not currently have a functional database, and this hampers the timeliness of quality control and analysis of data to inform critical reports and to inform key stakeholders.

RECOMMENDATIONS

The following are some recommendations emerging from the experience with Hurricane Melissa and other weather extremes that have impacted Jamaica. The MSJ must:

- **Procure 28 robust AWSs and 7 tide level monitoring systems** for the south (3), west (1) and north coasts (3), in the first instance; 4 drones for pre and post monitoring of severe weather events. This will ensure improved quantification of the extreme event, and systematic verification of forecasts. The equipment procured should be satellite-based to improve robustness of the communications to ensure there are stations that can still report under extreme weather conditions. **
- **Develop and deploy a near real time weather data sharing dashboard** that is accessible to heads of emergency and water agencies/authorities to help inform on the extent of weather impact and to provide data to guide allocation and positioning of resources pre and post an extreme weather event. The quality controlled data may also be shared with other local and international stakeholders consistent with a data sharing policy to be developed and MOU with landowners. **
- **Pilot new forecast products** such as flood mapping. This will require partnership with academia. **
- **Develop a training programme** that engages expertise within Jamaica, e.g. the Climate Studies Group Mona, at The University of the West Indies, to expand the capacity of forecasters to run high resolution models over Jamaica, which incorporates local data. ***

* Short-term (0–6 months); **Medium-term (6–18 months): ***Long-term (18+ months)

CONCLUSIONS

The strengthening of meteorological services in Jamaica is critical for minimizing loss of lives and safeguarding livelihoods, property and the country's development. Building resilience in the weather monitoring systems of the country, expanding monitoring systems and forecast products, and investing in additional technical capacities, are approaches that will enhance Jamaica's ability to incorporate data in decision making. With climate-related hazards intensifying, investing in meteorology is not optional—it is one of the most effective strategies for national resilience and long-term prosperity.