



THE UNIVERSITY
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WEST INDIES

POLICY BRIEF

What We Learn About Hurricane Melissa From Two Automatic Weather Stations at The UWI, Mona

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Photo Archive – March 23, 2021: Mr. Evan Thompson (Director, Meteorological Service of Jamaica) explains feature of the newly installed Automatic Weather Station at a brief ribbon-cutting hosted prior to the Virtual Launch. Listening keenly, from left to right: Prof. Dale Webber (Principal, The UWI Mona), Dr. Tannecia Stephenson (Head, Department of Physics), the Hon. Parnell Charles Jr., Minister of Housing, Urban Renewal, Environment and Climate Change, Ms. Claire Bernard (Deputy Director General, the Planning Institute of Jamaica) and Prof. Michael Taylor (Dean, Faculty of Science and Technology). Photo credit: Spalding. (<https://www.mona.uwi.edu/fst/uwi-mona-launches-its-aws>) In public domain.

EXECUTIVE SUMMARY

Two automatic weather stations at The University of the West Indies, Mona Campus recorded weather conditions during the period of October 22–30, 2025. The stations are located at The UWI Bowl and on the roof of the Physics Department. The data captures the meteorological conditions associated with Hurricane Melissa that made landfall on October 28, 2025, and brought extreme wind speeds and torrential rainfall to the island. The event produced rainfall totals in a single day, which exceeded the normal October monthly average, along with hurricane-force winds.

INTRODUCTION

- The UWI Mona officially launched its Automatic Weather Station (AWS) on March 31, 2021. The AWS, sited in the vicinity of The UWI Bowl, was installed under a Memorandum of Agreement between The UWI, Mona and the Meteorological Service of Jamaica (MSJ), becoming part of the MSJ's island wide network.
- The station additionally provides climate data for research purposes and is being used as the pilot for an innovative solution being spearheaded jointly by the Climate Studies Group Mona (CSGM) in the Department of Physics and MSJ for electronic real-time data transmission. The installation was funded through a World Bank project under the Pilot Programme for Climate Resilience (PPCR), which was executed by the Planning Institute of Jamaica.
- A second station was also mounted on the roof of the Department of Physics under a research project initiative to support climate and energy research.

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OBSERVATIONS

Temperature: Temperature readings remained consistently warm across both stations during the nine-day observation period.

- The UWI Bowl station recorded an average temperature of 25.4°C, with values ranging from a low of 21.3°C to a high of 32.8°C.
- The Physics Roof station showed slightly warmer conditions, averaging 25.7°C with a narrower range from 22.6°C to 30.5°C. The elevated Physics Roof location exhibited greater temperature stability, likely due to reduced surface cooling effects and better exposure to ambient air masses.

Wind Analysis: The Physics Roof station recorded the highest wind gust of 114.3 km/h at 2:05 PM, representing violent storm conditions on the Beaufort scale and **approaching Category 1 hurricane intensity**. This wind speed is capable of causing widespread structural damage, including uprooting trees as well as damaging roofs on well-built structures.

- The UWI Bowl station recorded a maximum gust of 101.4 km/h at 5:15 PM, occurring three hours later than the Physics Roof peak.
- The elevated position of the Physics Roof station contributed to the higher recorded wind speeds, as rooftop locations experience reduced surface friction and greater exposure to the full force of hurricane winds.
- Average wind speeds during the period were relatively modest—8.3 km/h at UWI Bowl and 7.0 km/h at Physics Roof—highlighting the exceptional nature of Hurricane Melissa's impact on October 28.

Rainfall Analysis: The UWI Bowl station recorded extraordinary rainfall totals during Hurricane Melissa's passage. The station measured 607.2 mm of total rainfall between October 22–30, with 345.0 mm (56.8% of the total) occurring on October 28 alone during the hurricane's landfall.

- According to the Meteorological Service of Jamaica (1991–2020 climatology), Kingston's normal October rainfall is 234 mm. **Hurricane Melissa's single-day total of 345.0 mm represents 147% of the entire normal October monthly rainfall—meaning the hurricane delivered nearly one and a half months' worth of typical October rainfall in just 24 hours.** The total nine-day rainfall of 607.2 mm exceeds 2.6 times the normal October monthly total.
- The maximum instantaneous rain rate of 286.8 mm/hr was recorded at 8:50 PM on October 28, indicating a period of extreme torrential downpour associated with the hurricane's most intense rain-bands. Rain rates of this magnitude overwhelm drainage systems, cause severe flash flooding, trigger landslides on steep terrain, and create life-threatening conditions.
- For context, rainfall exceeding 50 mm/hr is considered very heavy; **the observed rate of 286.8 mm/hr is nearly six times this threshold and represents one of the most intense short-duration rainfall events** that can occur in tropical cyclones.

CONCLUSIONS

Hurricane Melissa underscores the need for real-time data weather data collection. The weather variables measured at The UWI Mona highlight the opportunities that such a system will allow. To place these records in climatological context, the Meteorological Service of Jamaica (1991–2020 climatology) reports that Kingston typically receives 234 mm of rainfall during the entire month of October, making it the second wettest month of the year (after September's 250 mm). Category 1 hurricane winds were experienced on campus and were sufficient to down trees and light poles. An expansion of real time weather data collection will enable Jamaica to learn more about extreme events impacting our shores.