

# Actuarial Weather Extremes Series

## Hurricane Melissa 2025

Michael Reis, FSA, CERA, JD  
Soham Kupale, SCR  
Priya Rohatgi, ASA

November 2025

### Introduction

The 2025 Atlantic hurricane season concluded with the extraordinary severity of Hurricane Melissa. Melissa's unique track and intensity near Jamaica shocked many people familiar with tropical cyclones. Since traditional models often rely on broad, long-term averages, this report, which utilizes over 180 years of best-track data from the International Best Track Archive for Climate Stewardship (IBTrACS) archive, aims to provide a historical context for the extreme storm. The exhibits that follow detail the historical track density, event seasonality, and influence of major climate drivers on Jamaica's risk profile during Hurricane Melissa.

### Historical Strength and Path of Hurricane Melissa

The IBTrACS is a key resource for analyzing historical behavior of tropical cyclones and tracking the features and paths of tropical cyclones. It is provided by the National Center for Environmental Information (NCEI) within the National Oceanographic and Atmospheric Administration (NOAA). **The exact data used for this analysis can be found by following the link in the data source for Figures 1-7, which will download the NetCDF file.** The IBTrACS includes tropical cyclones going as far back as 1842 for storms that are within 50 miles of the Jamaica coast. For the analysis in this report, only storms with an eye within 50 miles of the coast of Jamaica are considered in order to isolate the storms that have had the greatest impact on Jamaica specifically.

Firstly, the path of Melissa was a bit unprecedented compared to hurricanes of similar strength going through the area in the last 180 years. Melissa originated as a cluster of thunderstorms off the coast of West Africa in mid-October. It strengthened into a tropical storm by October 21, 2025, and rapidly intensified to a Category 4 hurricane

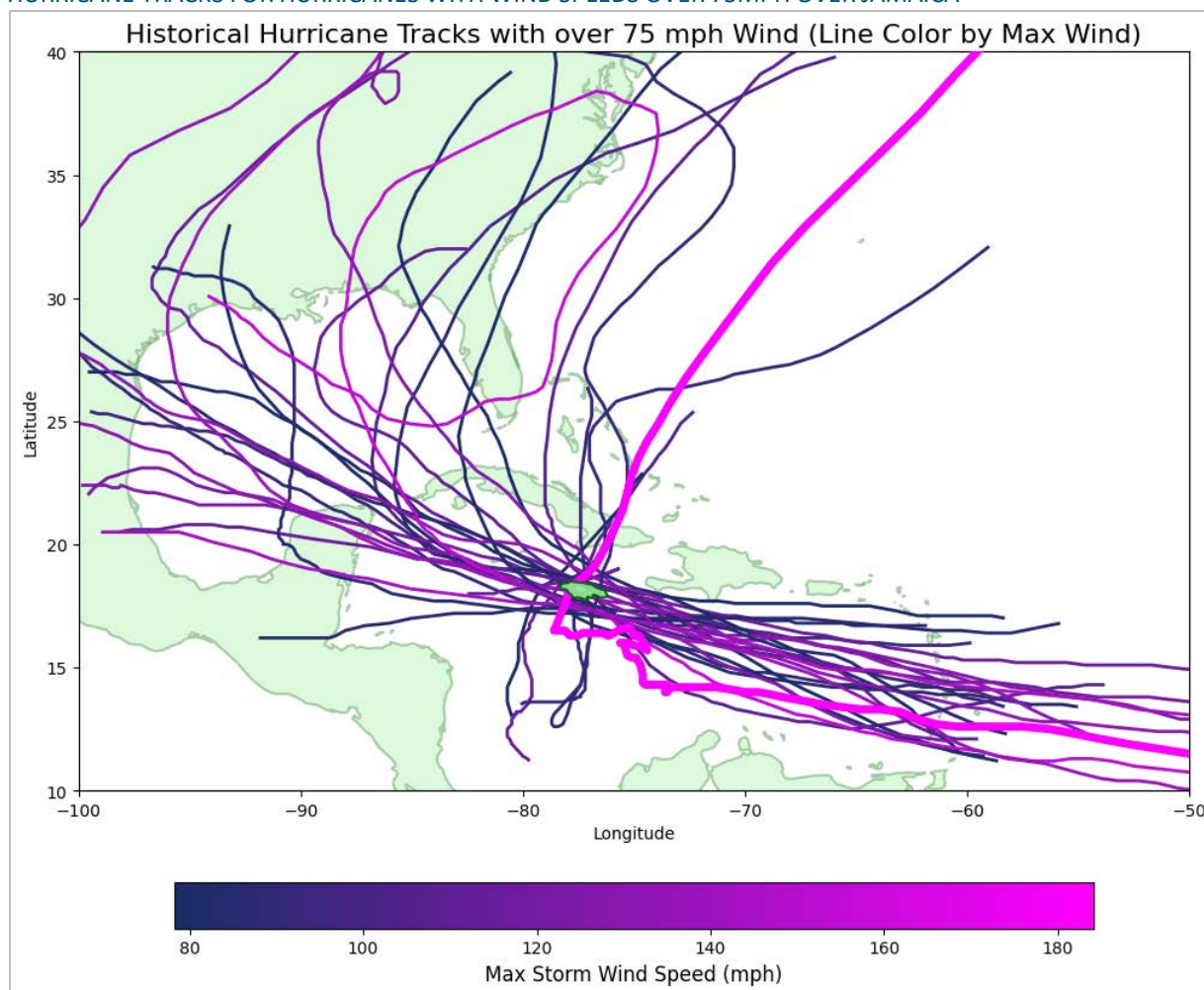
#### Caveat and Disclaimer

The opinions expressed and conclusions reached by the authors are their own and do not represent any official position or opinion of the Society of Actuaries Research Institute, the Society of Actuaries or its members. The Society of Actuaries Research Institute makes no representation or warranty to the accuracy of the information.

by October 26, 2025, as it moved across the Caribbean.<sup>1</sup> Figure 1 below shows Hurricane Melissa in magenta as the strongest hurricane that has passed through Jamaica.

**Figure 1**

**HURRICANE TRACKS FOR HURRICANES WITH WIND SPEEDS OVER 75MPH OVER JAMAICA**



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025; map taken from <https://www.naturearthdata.com/downloads/50m-cultural-vectors/50m-admin-0-countries-2/>

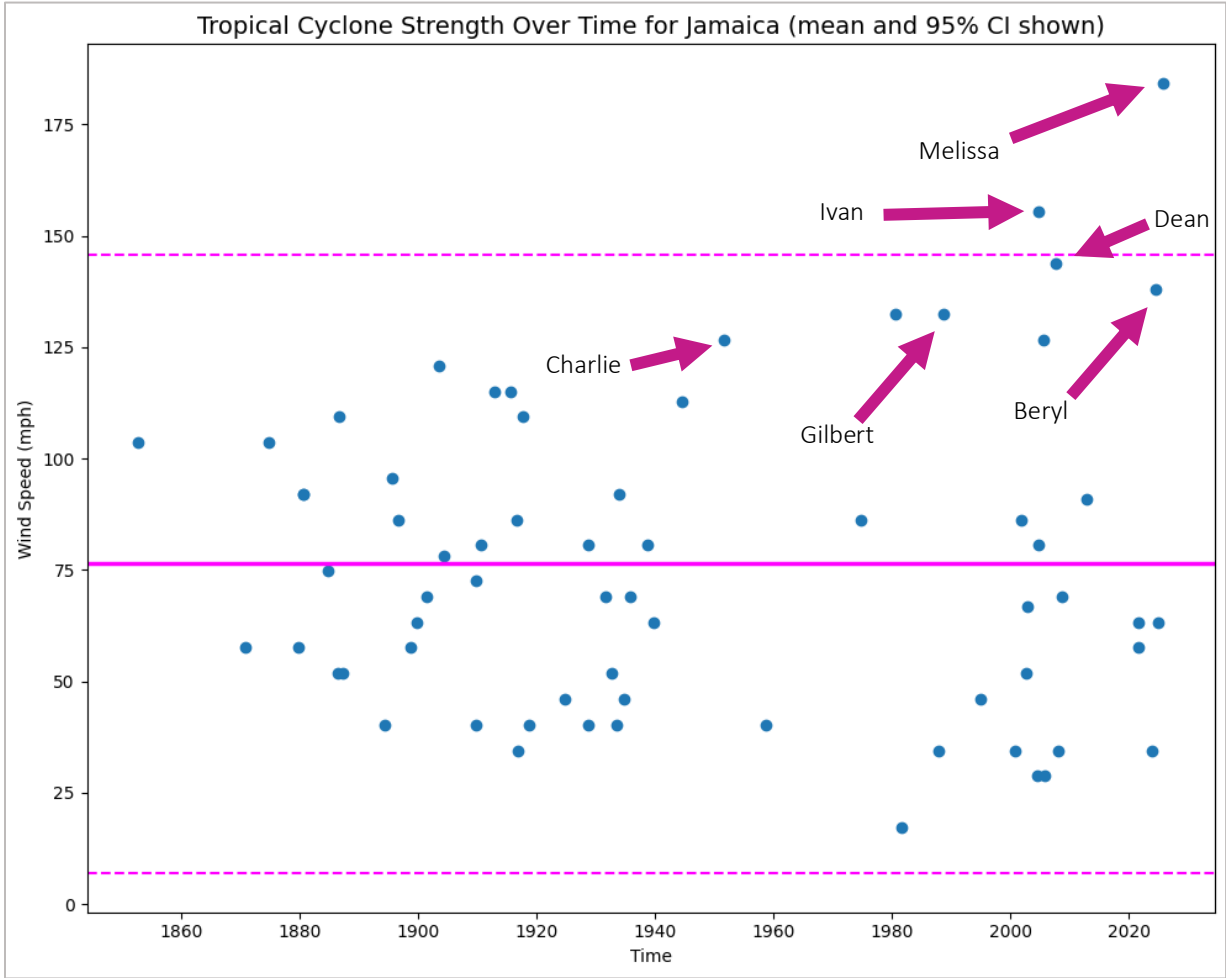
As the map shows, the storm took a western direction (like nearly all other strong tropical cyclones going through Jamaica). It then started to spin around in the warm waters of the Caribbean before taking a sharp turn North through Jamaica. Melissa made landfall on the afternoon of October 28, 2025, as a Category 5 hurricane in southwestern Jamaica near the town of New Hope in Westmoreland Parish, with wind speeds of 185 mph (295 km/h) — exceeding those recorded during Hurricane Katrina in 2005. After moving inland, the hurricane weakened as it crossed the mountainous terrain and emerged off Jamaica's north coast as a Category 4 storm, tracking toward

<sup>1</sup> Hagan, Rachel and Poynting, Mark. What makes Melissa such a dangerous storm? BBC News. October 28, 2025. <https://www.bbc.com/news/articles/cp3d71q32w5o> (accessed Nov 05, 2025)

Cuba. It made landfall in eastern Cuba on October 29, 2025, and subsequently declined to Category 1 intensity as it accelerated northeastward, passing near Long Island in the Bahamas.<sup>2,3,4</sup>

Figure 2 below assesses the intensity of historical cyclone wind speeds (in mph) against time.

**Figure 2**  
**FASTEST TROPICAL CYCLONE WIND SPEEDS OVER JAMAICA (WITHIN 50MI OF COAST)**



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025

The mean wind speed for all qualifying historical events is shown by the solid magenta line, and the 95% Confidence Interval (CI) by dashed magenta lines. This visualization confirms that the average wind speed is high and, critically, several events have significantly exceeded the upper bound of the 95% CI, indicating exceptionally severe, low-

<sup>2</sup> Rawnsley, Jessica and Pomeroy, Gabriella. 'We are all terrified', say locals in path of Hurricane Melissa. BBC News. October 29, 2025. <https://www.bbc.com/news/articles/c2drjx9r0l8o> (accessed Nov 05, 2025)  
<sup>3</sup> Power Outages Across Jamaica Due to Hurricane Melissa. Earth Data, NASA. November 15, 2025. <https://www.earthdata.nasa.gov/news/worldview-image-archive/power-outages-across-jamaica-due-hurricane-melissa> (accessed Nov 15, 2025)  
<sup>4</sup> Verisk Estimates Insured Losses for Hurricane Melissa Will Range Between USD \$2.2 Billion to USD \$4.2 Billion. November 3, 2025. <https://www.verisk.com/company/newsroom/verisk-estimates-insured-losses-for-hurricane-melissa-will-range-between-usd-2.2-billion-to-usd-4.2-billion/> (accessed Nov 05, 2025)

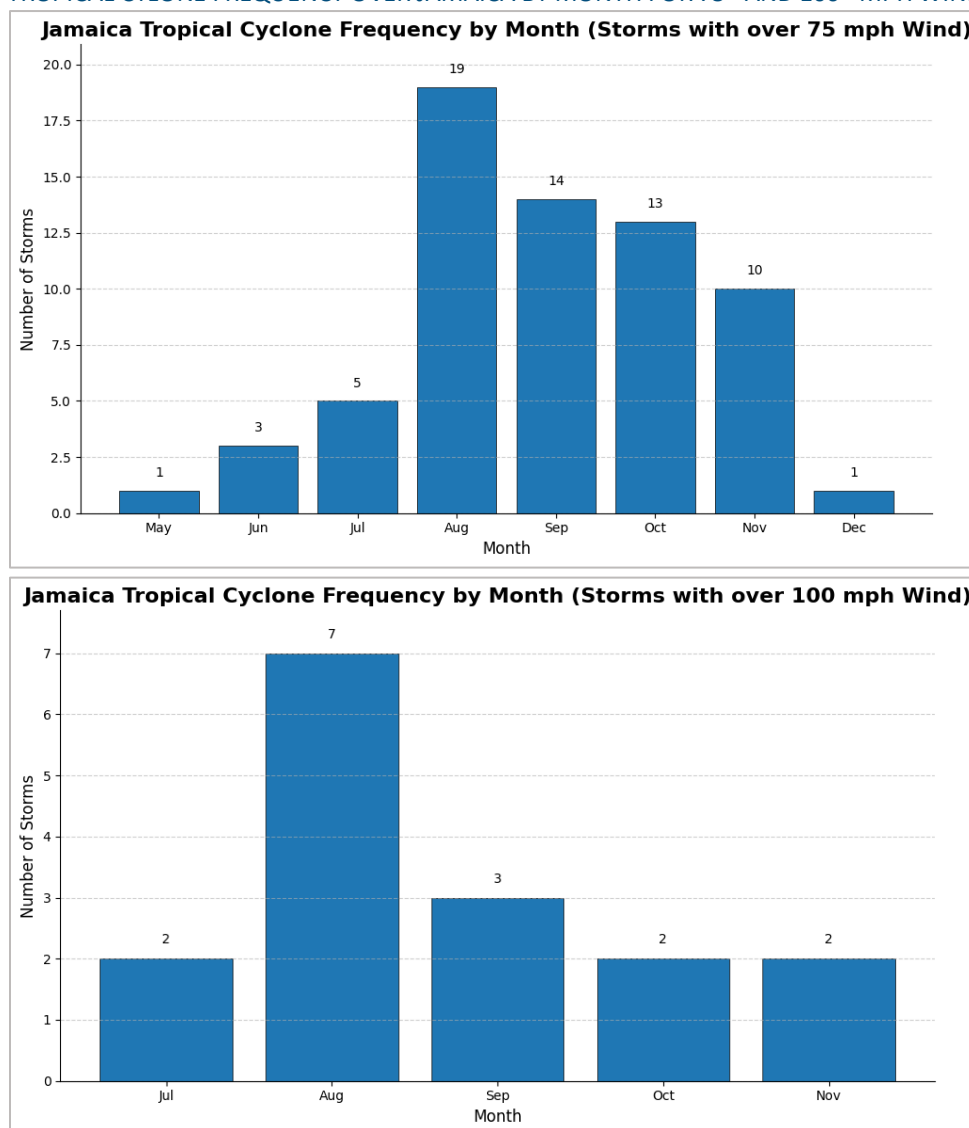
probability events. While the plot does not present a clear, monotonically increasing long-term trend in maximum observed wind speed, the data points in the modern era (post-2000) include several of the most intense recorded observations (e.g., storms around 150+ mph), suggesting that recent decades continue to experience the highest-end wind events.

## Timing of Hurricanes Over Jamaica

The graphs in Figure 3 show when strong tropical cyclones tend to cross Jamaica. Both graphs show that tropical cyclones peak in August and then trail off until November, with only one tropical cyclone over 75 mph occurring in December since 1842. There are very few strong tropical cyclones that have occurred before August. Hurricane Melissa occurred toward the end of the hurricane season, having made landfall in Jamaica at the end of October.

**Figure 3**

**TROPICAL CYCLONE FREQUENCY OVER JAMAICA BY MONTH FOR 75+ AND 100+ MPH WINDS (SINCE 1842)**



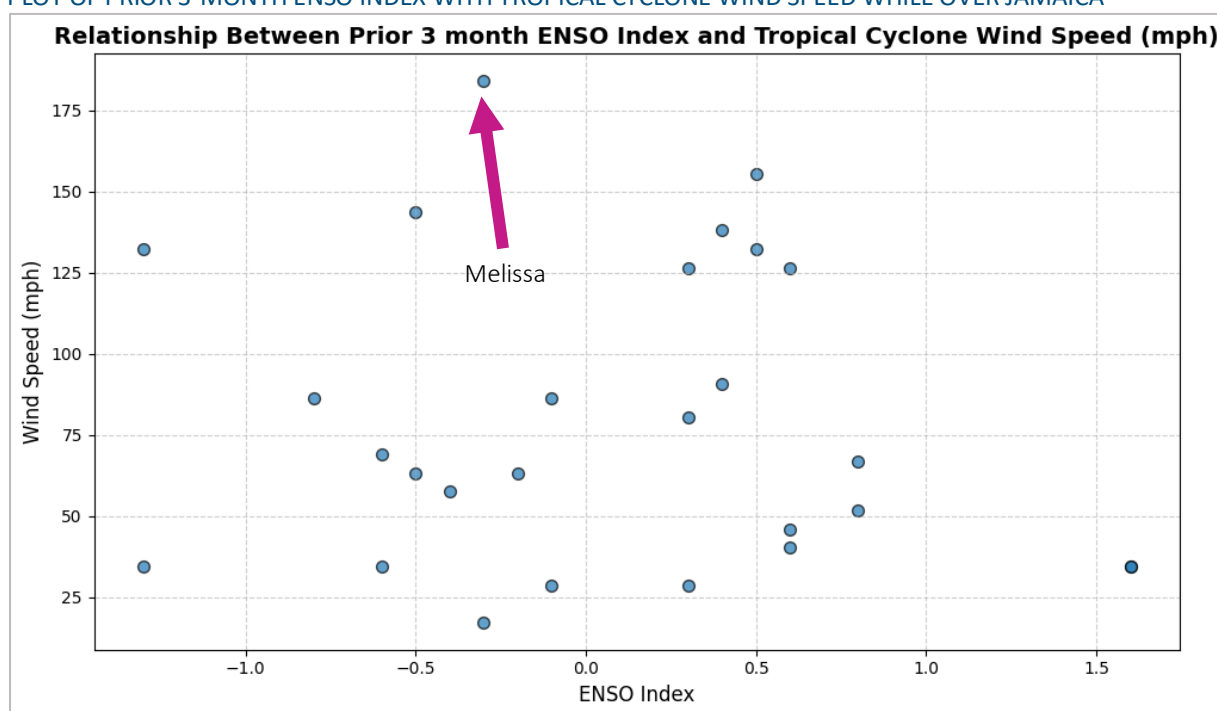
Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025

The El Niño–Southern Oscillation (ENSO) is a major, naturally occurring climate pattern defined by fluctuating sea surface temperatures and air pressure across the central and eastern equatorial Pacific Ocean. These fluctuations cycle irregularly between three phases: El Niño (warm), La Niña (cool), and Neutral. These phases significantly influence global weather, including seasonal Atlantic hurricane activity. There is an index named the Oceanic Niño Index (ONI), taken from the NOAA, which is used to determine the phase as being El Niño ( $> 0.5$ ) or La Niña ( $< -0.5$ ).<sup>5</sup> The index is based on the three-month running mean of ERSST.v5 SST anomalies in the Niño 3.4 region ( $5^{\circ}\text{N}$ – $5^{\circ}\text{S}$ ,  $120^{\circ}$ – $170^{\circ}\text{W}$ ), based on centered 30-year base periods updated every five years. Hurricane Melissa occurred during a Neutral phase.

As Figure 4 below shows, there does not seem to be a strong correlation between the ENSO phase and the strength of the tropical cyclone for Jamaica. Since this is just looking at the strength of winds as they go over Jamaica, it may not be indicative of a general trend for the Caribbean having stronger hurricanes during one phase in ENSO.

**Figure 4**

**PLOT OF PRIOR 3-MONTH ENSO INDEX WITH TROPICAL CYCLONE WIND SPEED WHILE OVER JAMAICA**



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025; ENSO index taken from [https://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ONI\\_v5.php](https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php) on 11/9/2025

<sup>5</sup> NOAA's Climate Prediction Center, Retrieved November 9, 2025, from [https://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ONI\\_v5.php](https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php)

## Contributing Factors to Hurricane Melissa's Strength

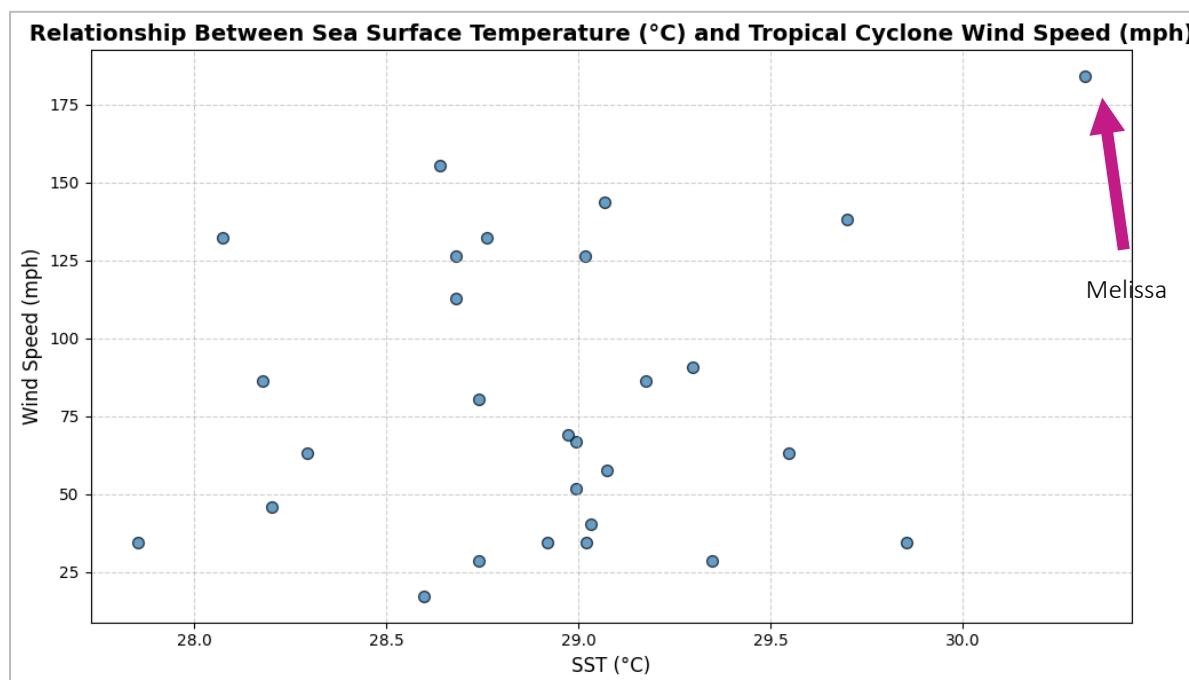
So far, we have seen that Hurricane Melissa was very unique for tropical cyclones that have gone through Jamaica in the last 180 years. But, in this section, we will see how Hurricane Melissa may have become as strong as it was.

First, we will consider the sea temperature as Hurricane Melissa came through the Caribbean. Warmer waters are key for the development of hurricanes, and we see that this was the case with this storm. By using ERA5 reanalysis data (provided by the European Centre for Medium-Range Weather Forecasts), we are able to compare the sea surface temperature for the box Southeast of Jamaica (16.5-17.5°N, 76-77°W on the 15th of the month) to the wind speed of the cyclones. Figure 5 shows how isolated Hurricane Melissa was from other tropical cyclones going through Jamaica in terms of sea surface temperature. Namely, we see that the ocean temperature was over 30°C. This is important to note as we move to a period of warmer ocean temperatures.

In addition to the sea surface temperature, which may have strengthened the storm, Hurricane Melissa also moved through Jamaica at a very slow speed. This is captured with the speed of the eye of the storm, also provided by IBTrACS. Figure 6 shows that Hurricane Melissa, in addition to having the most punishing winds, was also one of the slowest storms to move out of the area, subjecting Jamaica to a sustained barrage of hurricane-force winds. The peak of these winds occurred just before landfall, as seen in Figure 7.

Figure 5

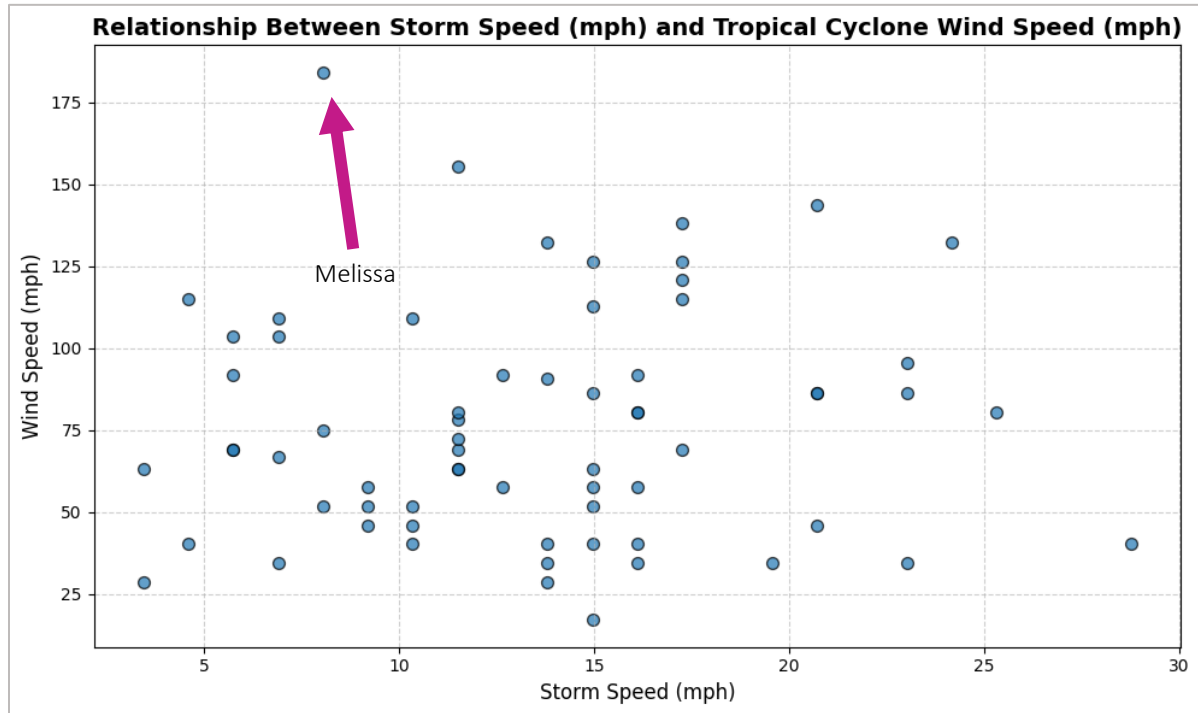
PLOT OF CARIBBEAN SEA SURFACE TEMPERATURE WITH TROPICAL CYCLONE WIND SPEED WHILE OVER JAMAICA



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025; Sea surface temperature taken from reanalysis ERA5 data on 11/10/2025

Figure 6

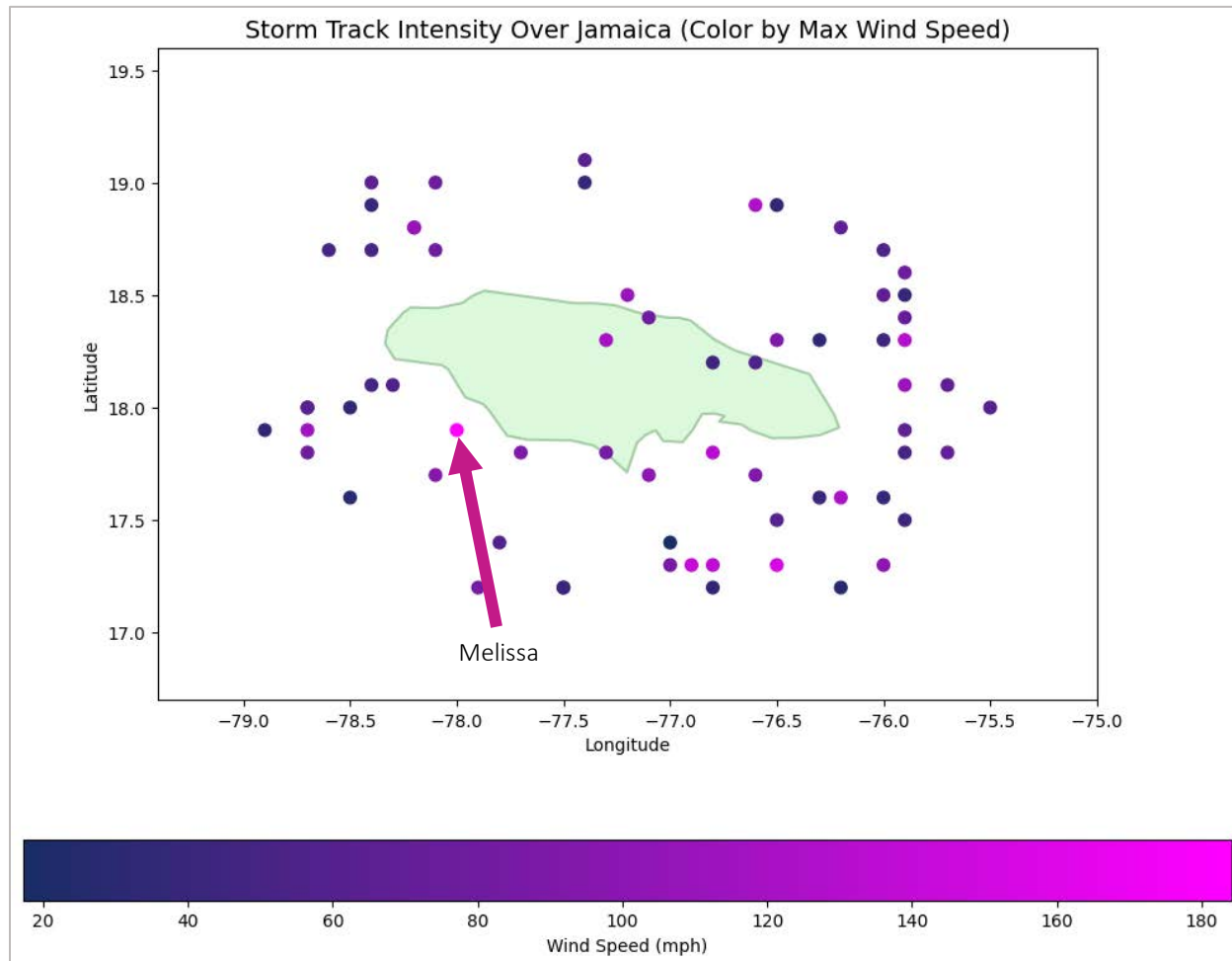
PLOT OF SPEED OF THE EYE OF THE STORM WITH TROPICAL CYCLONE WIND SPEED WHILE OVER JAMAICA



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025

Figure 7

PLOT OF TROPICAL CYCLONE WIND SPEED WHILE OVER JAMAICA AND THE GEOGRAPHIC POSITION OF THE EYE



Data source: Storm wind speeds, timings, and locations taken from IBTrACS: <https://www.ncei.noaa.gov/data/international-best-track-archive-for-climate-stewardship-ibtracs/v04r01/access/netcdf/IBTrACS.ALL.v04r01.nc> on 11/4/2025

## Exposure and Vulnerability Factors

Hazard factors such as the hurricane's staggering wind speeds and its lethargic forward motion, combined with Jamaica's confluence of exposure and vulnerability factors, made Hurricane Melissa catastrophic.

The physiography and population distribution of Jamaica significantly heighten its exposure to severe storms. According to the data from the Government of Jamaica, about 70% of the population resides in coastal areas. As a low-lying island nation, much of its landmass is inherently exposed to storms. Vulnerability is further amplified in poorer communities that have historically settled along riverbanks and gullies, where limited access to affordable housing or secure land titles continues to place residents at risk.<sup>6</sup>

<sup>6</sup> Hagan, Rachel and Poynting, Mark. What makes Melissa such a dangerous storm? BBC News. October 28, 2025. <https://www.bbc.com/news/articles/cp3d71q32w5o> (accessed Nov 05, 2025)



Additionally, the island's architectural characteristics also contribute to its susceptibility. Construction practices in Jamaica are often informal, with minimal professional oversight. About 70% of residential buildings in Jamaica are dominated by masonry construction, while roughly 30% consists of wood-framed structures, and roofs are typically low-pitched or flat. Under these conditions, a Category 5 hurricane, like Melissa, would be expected to cause extensive damage and, in many cases, near total destruction in the landfall area.<sup>7</sup>

Moreover, modern architectural trends have reduced resilience; the shift from traditional jalousie windows with adjustable slats to fixed glass raise internal pressure and increase the chance of walls or roofs falling during storms. Rapid urban development has created further challenges, with high-rise structures increasingly built in runoff regions of the city, resulting in flooding in districts that historically did not experience such impacts.<sup>8</sup>

**Jamaica** experienced devastating damage, with torrential rainfall triggering deadly flash floods and landslides that left entire communities isolated.<sup>9</sup> The Government of Jamaica confirmed 45 deaths, with St. Elizabeth and Westmoreland identified as the hardest-hit parishes. More than 1.6 million people were affected by Hurricane Melissa, and preliminary losses in the agriculture and fisheries sectors are estimated to exceed US\$124.5 million (J\$20 billion).<sup>10</sup> Electricity remained out for much of the island, with roughly a third of Jamaica's 2.8 million residents facing prolonged power outages.<sup>11</sup> As floodwater and mud inundated homes, many people were left trying to salvage whatever belongings they could. The demand for essential aid – including clean water, food, and electricity – continued to rise.<sup>12</sup>

In **Haiti**, the Directorate of Civil Protection reported a total of 43 fatalities. Approximately 16,000 people were affected, and more than 11,900 homes sustained damage as a result of Hurricane Melissa. Road infrastructure also suffered extensive impacts, with the Ministry of Public Works undertaking debris clearance and repair operations.<sup>13</sup>

Preliminary estimates indicate that approximately 1.8 million people were affected in the **Dominican Republic**, and one fatality was reported. Intense rain-induced flooding and landslides severely disrupted the water supply and essential services. The loss of access to safe water, combined with widespread power outages, increased the risk of waterborne diseases, while ongoing soil saturation and additional forecasted rainbands maintained an elevated threat of renewed flooding and landslides.<sup>14,15</sup>

<sup>7</sup> Verisk Estimates Insured Losses for Hurricane Melissa Will Range Between USD \$2.2 Billion to USD \$4.2 Billion. November 3, 2025. <https://www.verisk.com/company/newsroom/verisk-estimates-insured-losses-for-hurricane-melissa-will-range-between-usd-2.2-billion-to-usd-4.2-billion/> (accessed Nov 05, 2025)

<sup>8</sup> Hagan, Rachel and Poynting, Mark. What makes Melissa such a dangerous storm? BBC News. October 28, 2025. <https://www.bbc.com/news/articles/cp3d71q32w5o> (accessed Nov 05, 2025)

<sup>9</sup> Jamaica: Hurricane Melissa - Situation Report No. 1 (as of 31 October). United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). November 12, 2025. <https://www.unocha.org/publications/report/jamaica/jamaica-hurricane-melissa-situation-report-no-1-31-october> (accessed Nov 15, 2025)

<sup>10</sup> Jamaica: Hurricane Melissa - Situation Report No. 4 (as of 11 November). United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). November 12, 2025. <https://www.unocha.org/publications/report/jamaica/jamaica-hurricane-melissa-situation-report-no-4-11-november> (accessed Nov 15, 2025)

<sup>11</sup> Rawnsley, Jessica and Pomeroy, Gabriella. 'We are all terrified', say locals in path of Hurricane Melissa. BBC News. October 29, 2025. <https://www.bbc.com/news/articles/c2drjx9r0l8o> (accessed Nov 05, 2025)

<sup>12</sup> Grant, Will and Davis, Nick and Drenon, Brandon. Hurricane death toll rises as Jamaica aid effort struggles. BBC News. October 31, 2025. <https://www.bbc.com/news/articles/clylqpyg8pjo> (accessed Nov 05, 2025)

<sup>13</sup> Haiti: Tropical Storm Melissa - Flash Update No.5 (as of 10 November 2025). United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). November 12, 2025. <https://www.unocha.org/publications/report/haiti/haiti-tropical-storm-melissa-flash-update-no5-10-november-2025> (accessed Nov 15, 2025)

<sup>14</sup> Dominican Republic: Hurricane Melissa - DREF Operation (MDRDO019). International Federation of Red Cross (IFRC). November 13, 2025. <https://reliefweb.int/report/dominican-republic/dominican-republic-hurricane-melissa-dref-operation-mdrdo019> (accessed Nov 15, 2025)

<sup>15</sup> Li, David and Cusumano, Anthony. Hurricane Melissa death toll rises to 67 as insured losses in Jamaica could top \$4 billion. NBC News. November 4, 2025. <https://www.nbcnews.com/weather/hurricanes/hurricane-melissa-death-toll-rises-63-economic-impact-top-4-billion-rcna241639> (accessed Nov 05, 2025)

No fatalities were reported in **Cuba**. However, Santiago de Cuba – the country’s second most populated city – remained affected with problems such as power outages for 60% of the province, water supply and telecommunication crises, along with damages to crops and houses. Moreover, 30% of Cuba’s population suffered from arboviral diseases such as dengue, Chikungunya or Oropouche.<sup>16</sup>

## Damage and Losses

As Hurricane Melissa dissipates, Jamaica is once again facing widespread damage less than a year after Hurricane Beryl. Homes, farms, businesses, and major infrastructure have all been affected. Early indications from Moody’s RMS™ Event Response<sup>17</sup> suggest that total economic losses may exceed Jamaica’s 2024 GDP of US\$19.93 billion<sup>18</sup>, pointing to significant pressure on an already fragile economy. Power outages, communication failures, and interruptions to tourism and agriculture will deepen the impact.<sup>19</sup>

Estimates from KCC, Verisk, and Moody’s RMS place insured losses between US\$2.4 and US\$5 billion, driven mainly by severe wind damage<sup>20</sup>. Commercial properties - especially hotels, resorts, and large multi-unit buildings - are expected to account for much of the insured loss, with business interruption playing a major role. Flooding and storm surge appear to have added only a small portion.

Both rural and urban areas were hit, but western parishes absorbed some of the heaviest damage, including tourism-dependent towns and less-insured rural communities. The storm exposed persistent gaps in residential insurance coverage and highlighted the broader recovery challenges for small island economies. With tourism making up about 35% of the national GDP, prolonged disruptions to the sector remain a major concern.<sup>21</sup>

## Disaster Risk Financing Strategy

In the face of devastation of this magnitude, Jamaica’s ability to access immediate liquidity reflects the foresight behind its multi-layered disaster risk financing strategy, a rarity among small developing island states. Figure 8 lists Jamaica’s multi-layered approach to disaster risk financing.

---

<sup>16</sup> Cuba, Hurricane Melissa: Flash Update No. 7 (As of 14 November 2025). United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). November 15, 2025. <https://reliefweb.int/report/cuba/cuba-hurricane-melissa-flash-update-no-7-14-november-2025> (accessed Nov 15, 2025)

<sup>17</sup> Moody’s RMS Event Response estimates insured losses from Hurricane Melissa to range between US\$3 billion and US\$5 billion, Nov 06, 2025 <https://www.moody.com/web/en/us/insights/insurance/moodys-rms-event-response-hurricane-melissa-insured-loss-estimate.html> (accessed: Nov 18, 2025)

<sup>18</sup> The Global Economy.com, Jamaica GDP, current U.S. dollars - data, chart | TheGlobalEconomy.com (accessed: Nov 18, 2025)

<sup>19</sup> Economic losses could exceed Jamaica’s GDP, Jamaica Observer, Nov 09, 2025, <https://www.jamaicaobserver.com/2025/11/09/economic-losses-exceed-jamaicas-gdp/> (accessed: Nov 18, 2025)

<sup>20</sup> Evans, Steve, Moody’s RMS estimates hurricane Melissa insured loss between \$3bn and \$5bn, ARTEMIS, [www.artemis.bm](http://www.artemis.bm), Nov 07, 2025 <https://www.artemis.bm/news/moodys-rms-estimates-hurricane-melissa-insured-loss-between-3bn-and-5bn/> (accessed: Nov 18, 2025)

<sup>21</sup> Araullo, Kenneth, Reinsurers to shoulder most losses from Hurricane Melissa in Jamaica – AM Best, Reinsurance Business, [www.insurancebusinessmag.com](http://www.insurancebusinessmag.com), Oct 29, 2025, <https://www.insurancebusinessmag.com/reinsurance/news/breaking-news/reinsurers-to-shoulder-most-losses-from-hurricane-melissa-in-jamaica-am-best-554653.aspx> (accessed: Nov 18, 2025)

Figure 8

JAMAICA'S MULTI-LAYERED DISASTER RISK FINANCING STRATEGY<sup>22,23,24,25</sup>

Self-Funded Reserves	<ul style="list-style-type: none"> <li>• National Contingency Fund - Capitalized at about US\$31.62 million (J\$5 billion) at the beginning of the 2024/25 financial year, to cover the retained risk, which is high frequency and low severity in nature.</li> <li>• National Disaster Fund: Capitalized at US\$6.32 million (J\$1 billion) for 2024/25 financial year. In addition, serves as a repository for all payouts.</li> </ul>
Catstrophe Bond Coverage (US\$150 million)	<ul style="list-style-type: none"> <li>• Issuer and Manager: World Bank's International Bank for Reconstruction and Development (IBRD)</li> <li>• Issued in 2021 and Renewed in 2024</li> <li>• Lead Manager: Aon Securities and Swiss Re Capital Markets</li> <li>• Risk Modeler and Calculation Agent: AIR Worldwide</li> <li>• Peril: Jamaica Named Storm</li> <li>• Risk Period: 3.67 years (four hurricane season 2024-2027)</li> <li>• Trigger Type: Parametric CAT-in-a-grid, based on the path and central pressure (max 969mb)</li> <li>• Payout Structure: Stepwise linear sliding scale with payout rates of 30%, 70%, 100% of principal</li> <li>• <b>Policy Payouts: 100% of principal - US\$150million</b></li> <li>• Risk Margin: 7.00% p.a</li> </ul>
CCRIF SPC - Parametric Insurance	<ul style="list-style-type: none"> <li>• Offered by Caribbean Catastrophe Risk Insurance Facility with the Segregated Portfolio Company (CCRIF SPC).</li> <li>• Rapid payout to governments within 14 days of catastrophic event.</li> <li>• Encompasses three policies - The tropical cyclone policy, the excess rainfall policy and an earthquake policy.</li> <li>• CCRIF uses modelled loss estimation based on real-time meteorological parameters.</li> <li>• Tropical Cyclone: Meteorological parameters - wind speed intensity, central pressure, and storm track data.</li> <li>• Excess rainfall policy parameters: Rainfall measurements exceed predefined thresholds based on satellite and ground sensor rainfall data in critical geographic zones.</li> <li>• <b>Tropical cyclone policy payouts US\$70.8 million</b></li> <li>• <b>The Excess rainfall policy payout US\$21.1 million</b></li> </ul>
Contingency Credit Facility	<ul style="list-style-type: none"> <li>• Contingency facility with the Inter-American Development Bank (IDB), essentially a standby loan allowing to drawdown in excess of US\$300 million, supporting humanitarian response and recovery.</li> </ul>

<sup>22</sup> Patterson, Chris, Gov't Looking to Develop Additional Disaster Risk Financing Instrument for Jamaica, Jamaica Information Services, jis.gov.jm, October 28, 2024, <https://jis.gov.jm/govt-looking-to-develop-additional-disaster-risk-financing-instrument-for-jamaica/> (accessed: Nov 18, 2025)

<sup>23</sup> World Bank Catastrophe Bond Renews \$150 Million Hurricane Coverage for Jamaica, Case Study Jamaica 2024-Cat-Bond.pdf, The World Bank Treasury, thedocs.worldbank.org, <https://thedocs.worldbank.org/en/doc/401877c87631461af8ad227793affc5f-0340012025/original/Case-Study-Jamaica-2024-Cat-Bond.pdf> (accessed: Nov 18, 2025)

<sup>24</sup> The Evolution of CCRIF's Parametric Insurance Models, CCRIF SPC, The Caribbean Catastrophe Risk Insurance Facility, www.ccrif.org, February 2023, [https://www.ccrif.org/sites/default/files/publications/technical-materials/CCRIFSPC\\_TheEvolutionofCCRIF-Models-February2023.pdf](https://www.ccrif.org/sites/default/files/publications/technical-materials/CCRIFSPC_TheEvolutionofCCRIF-Models-February2023.pdf) (accessed: Nov 18, 2025)

<sup>25</sup> Exchange Rates.com, October 28, 2024, <https://www.exchange-rates.org/exchange-rate-history/jmd-usd-2024> (accessed: Nov 18, 2025)

## Conclusion

Hurricane Melissa underscores the critical need for actuaries to continue to validate and manage the risks associated with hurricanes in the Caribbean, as well as the critical role of insurance in national recovery. The historical record clearly shows that, while overall storm frequency peaks in August, Jamaica has consistently sustained high-intensity events far exceeding the historical mean, regardless of short-term climate drivers like the ENSO cycle. Insurers and reinsurers may need to reexamine whether their catastrophe models realistically capture the observed frequency of major (100+ mph) wind events during the August-October peak, as well as the amplified risk when there is multi-hour exposure posed by slower, high-intensity storms moving at 8–15 mph. Furthermore, the notable clustering of high-end events since 2000 strongly suggests that the Caribbean's hurricane risk will likely evolve as the climate continues to change. As climate change amplifies these extremes, accurate modeling and capital adequacy become increasingly essential.

At the same time, Melissa highlights how disaster-risk financing and international reinsurance capacity provide Jamaica with vital liquidity for rapid response and recovery. Strengthened public-private collaboration, climate adaptation planning, and resilient infrastructure investments will be central to managing the region's escalating risk profile.



**Give us your feedback!**

Take a short survey on this report.

[Click Here](#)



## About The Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research bringing together tried and true practices and future-focused approaches to address societal challenges and your business needs. The Institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

Representing the thousands of actuaries who help conduct critical research, the SOA Research Institute provides clarity and solutions on risks and societal challenges. The Institute connects actuaries, academics, employers, the insurance industry, regulators, research partners, foundations and research institutions, sponsors and non-governmental organizations, building an effective network which provides support, knowledge and expertise regarding the management of risk to benefit the industry and the public.

Managed by experienced actuaries and research experts from a broad range of industries, the SOA Research Institute creates, funds, develops and distributes research to elevate actuaries as leaders in measuring and managing risk. These efforts include studies, essay collections, webcasts, research papers, survey reports, and original research on topics impacting society.

Harnessing its peer-reviewed research, leading-edge technologies, new data tools and innovative practices, the Institute seeks to understand the underlying causes of risk and the possible outcomes. The Institute develops objective research spanning a variety of topics with its [strategic research programs](#): aging and retirement; actuarial innovation and technology; mortality and longevity; diversity, equity and inclusion; health care cost trends; and catastrophe and climate risk. The Institute has a large volume of [topical research available](#), including an expanding collection of international and market-specific research, experience studies, models and timely research.

Society of Actuaries Research Institute  
8770 W Bryn Mawr Ave, Suite 1000  
Chicago, IL 60631  
[www.SOA.org](http://www.SOA.org)