Hurricanes: State of the Risk

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2025 Atlantic Hurricane Season: Lessons Learned

With no U.S. landfalls for the first time in a decade, the 2025 Atlantic hurricane season still generated deadly tropical storms and above-average days of major hurricane activity, underscoring the need for community preparedness.

Though the season produced fewer storms than expected, four of the five hurricanes reached Category 3 or higher. Three were Category 5 – only the second year on record that more than two Category 5 storms occurred in the Atlantic.

Inland impacts

Tropical Storm Chantal contributed to inland flooding, dumping up to 10 inches of heavy rainfall across multiple North Carolina counties where less than 1 percent of households were covered by flood insurance. Chantal contributed to $500 million in economic losses, according to Gallagher Re's *Natural Catastrophe and Climate Report: Q3 2025*. Much of Globe-Miami, Ariz. – struck by torrential rain from Category 2 Hurricane Priscilla in the Pacific, mere weeks after flash flooding killed at least three people – was also unprotected, highlighting a growing flood protection gap in areas once considered low-risk.

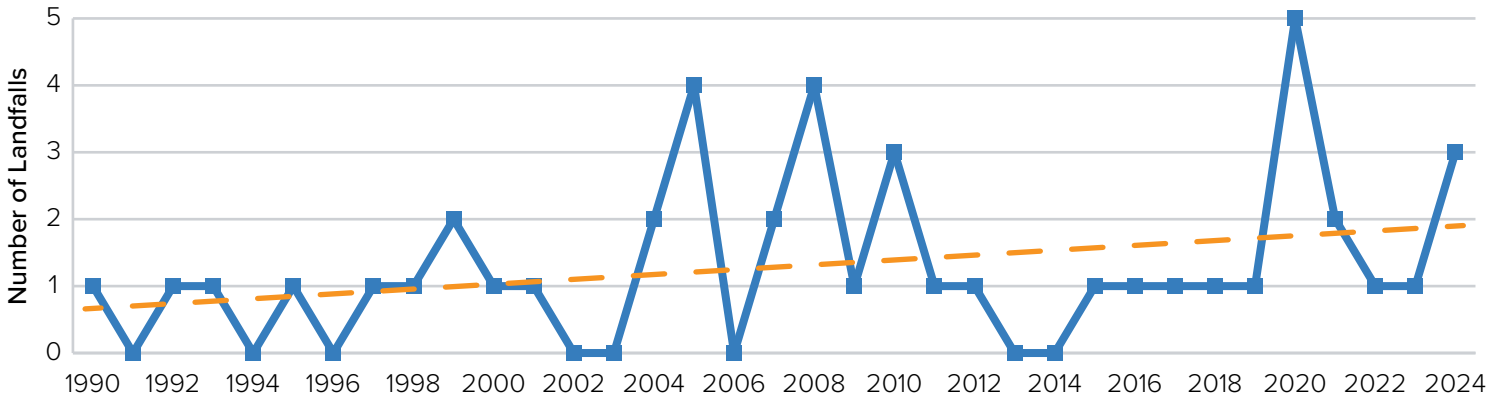
Such losses demonstrate the vigilance required for even minor storms, aligning with global reinsurer Munich Re's assessment of the season as "masking sharp regional shocks and a very narrow escape for some of the most insured coastlines." The firm projects insured losses from U.S. hurricanes could increase as ocean temperatures rise, raising the likelihood of intense storms and flooding.

Demographic shifts play a crucial role in their impact, however, with more people moving into harm's way and their homes being built bigger and more expensive than before. While flood-prone coastal areas in Florida, Texas, New York, and Louisiana lost more residents than they gained in 2024 – for the first time since 2019. This shift is a critical reminder to home and business owners about rising flood risks throughout the country and the importance preparing for storms and investing in resilience.

Rapid intensification trend

Warming oceans also contribute to "rapid intensification," or an increase in maximum sustained winds by at least 35 mph in a 24-hour period. Since 1980, over 80 percent of landfalling U.S. hurricanes – altogether costing at least $5 billion in damages – underwent rapid intensification at some point during their lifecycle, according to a 2025 American Geophysical Union (AGU) study.

Rapid Intensification Landfalls in the North Atlantic



Source: CSU analysis of National Hurricane Center data.

Dr. Phil Klotzbach – senior research scientist in the Department of Atmospheric Science at Colorado State University, Triple-I non-resident scholar, and a coauthor of the AGU study – notes evidence suggests "a pronounced increasing trend," particularly when evaluating North Atlantic hurricanes broadly.

> **"When you have a storm that intensifies in the day up to landfall, that's a challenge because people aren't necessarily as prepared as they should be," Klotzbach said, noting that "storms that strengthen as they approach the coast tend to weaken at a slower rate as they move inland."**

Hurricane Melissa – 2025's strongest and deadliest storm – showcased the toll from this mounting intensity. Claiming more than 100 lives across the Caribbean, Melissa rapidly intensified into a Category 5 hurricane before hitting Jamaica. Ranking among the fastest-intensifying Atlantic storms ever recorded – and the most powerful storm to make landfall in the hurricane-prone country's history – Melissa caused damage equivalent to roughly 40 percent of Jamaica's 2024 GDP.

Rapid intensification also characterized 2024 hurricanes Helene and Milton, with the latter's wind speed increasing by a staggering 90 mph in just over 24 hours. A year later, Hurricane Erin followed a similar trajectory, jumping from a Category 1 with 75 mph winds to a Category 5 with near-160 mph winds in just over a day. Though never making landfall, Erin wrought devastating flash flooding along Cape Verde and the U.S. East Coast, killing more than a dozen people.

Evolutions in forecasting

As advances in computing power and data collection have improved traditional tools in recent years, forecasters and insurers have built up their arsenal to combat the unpredictability of climate and weather risks. For example, while wind speeds traditionally have been used to predict storm damage, additional research co-authored by Klotzbach indicates that barometric pressure is both more accurate and easier to gauge in real time and in a wide range of conditions, "making it an ideal quantity for evaluating a hurricane's potential damage."

Barometric pressure provided the primary trigger for a $150 million parametric policy for Jamaica that paid out in full.

Forecasting rapid intensification, which demands more timely and accurate data, has benefited from the rising use of artificial intelligence models. One Google DeepMind model reportedly helped inform warnings before Melissa made landfall, offering the National Hurricane Center (NHC) "critical decision support" alongside its preexisting tools, said NOAA Administrator Neil Jacobs. Applying historical weather data to simulate Melissa's likely path and intensity, the AI model enabled NHC – for the first time in its history – to predict a storm would evolve into a Category 5 hurricane from the moment of its formation as a Category 1.

Displaying the kind of predictive power that can help insurers price risk and mitigate costly claims, these technologies also can inform conversations at all levels to encourage investment in resilience.

While 2025 proved much less destructive than it could have been in terms of hurricanes making landfall, history also proves it is much more a question of when than if. Therefore, communities must work together – across the economic ecosystem – to improve and incentivize resilience building; on coastlines as well as inland.

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- Jamaica Payout Spotlights Potential of Parametric
- Parametric Insurance Gains Traction Across U.S.
- CSU Sticks to Hurricane Season Forecast, Warns About Near-Term Activity
- "Active" Hurricane Season Still Expected, Despite Tweak to CSU Forecast
- Resilience Investments Paid Off in Florida During Hurricane Milton
- Hurricane Helene Highlights Inland Flood Protection Gap
- FEMA Highlights Role of Modern Roofs in Preventing Hurricane Damage