Researchers maintain prediction for above-average Atlantic hurricane season for 2025

By MarComm Staff

Note to reporters: *The CSU team will issue forecast updates on July 9 and Aug. 6, and all information including this release and future updates will be stored at tropical.colostate.edu. Multimedia assets including video interview clips and other imagery are available by request. Please contact Jennifer Dimas (Jennifer.Dimas@colostate.edu) or Joshua Rhoten (Joshua.Rhoten@colostate.edu) for English and Spanish media inquiries and if you would like to be included in future news release sends.*

Colorado State University hurricane researchers are maintaining their forecast for an above-average 2025 Atlantic hurricane season. CSU's Tropical Cyclones, Radar, Atmospheric Modeling, and Software (TC-RAMS) team within the Department of Atmospheric Science cites above-average subtropical eastern Atlantic Ocean and Caribbean Sea surface temperatures as a primary factor for their prediction of nine total hurricanes this year.

When the waters in the eastern subtropical Atlantic are warmer than normal in the late spring, they tend to force a weaker subtropical high and weaker associated winds blowing across the tropical Atlantic. These conditions are anticipated to lead to a continuation of above-average water temperatures across most of the tropical Atlantic for the peak of the 2025 hurricane season. A warm Atlantic favors an above-average season, since a hurricane's fuel source is warm ocean water. Additionally, a warm Atlantic leads to lower atmospheric pressure and a more unstable atmosphere. Both conditions favor hurricane formation.

The tropical Pacific is currently characterized by El Niño-Southern Oscillation (ENSO) neutral conditions. There remains some uncertainty as to what the phase of ENSO will be during the peak of the Atlantic hurricane season from August to October. However, the odds of El Niño are quite low (13% per the latest NOAA outlook). El Niño – a recurring climate pattern – tends to increase upper-level westerly winds across the Caribbean into the tropical Atlantic. These increased upper-level winds result in increased vertical wind shear, reducing the odds of Atlantic hurricane formation. The absence of these unfavorable conditions, as anticipated this year, is generally associated with upper-level wind conditions that are conducive for hurricane development across the tropical Atlantic.

While the June forecast has historically exhibited higher levels of skill than the April forecast, researchers caution that there is more uncertainty with the June forecast this year than last year, given that the primary climate signals (e.g., Atlantic and Pacific sea surface temperature anomalies) are somewhat weaker than they were last year at this time. While the odds of El Niño this hurricane season are low, they are still considerably higher than they were for last year's hurricane season.

Colorado State University team predicts 17 named storms and nine hurricanes in 2025

The CSU team is predicting 17 named storms during the Atlantic hurricane season, which began on June 1 and runs through Nov. 30. Of those 17 storms, researchers forecast nine to become hurricanes and four to reach major hurricane strength (Saffir/Simpson Category 3, 4 or 5) with sustained winds of 111 miles per hour or greater.

The team bases its forecasts on a statistical model, as well as four models that simulate recent history and predictions of the state of the atmosphere during the coming hurricane season. These models were developed at the European Centre for Medium-Range Weather Forecasts, the UK Met Office, the Japan Meteorological Agency and the Centro Euro-Mediterraneo sui Cambiamenti Climatici. The methods rely heavily on 25 to 40 years of historical hurricane seasons and evaluate conditions that include variables such as Atlantic sea surface temperatures, sea level pressures, vertical wind shear levels, the ENSO phenomenon and other factors.

The team also takes into account analog years from the historical record. “So far, the 2025 hurricane season is exhibiting characteristics similar to 1996, 1999, 2008, 2011, and 2021,” said Phil Klotzbach, a senior research scientist in the Department of Atmospheric Science at CSU and lead author of the report.

“Our analog seasons had anywhere from above-average to hyperactive Atlantic hurricane activity,” said Klotzbach. “While the average of our analog seasons had above-average levels of activity, the relatively large spread in observed activity in our analog years highlights the uncertainty associated with this outlook.”

The team predicts that 2025 hurricane activity will be about 125% of the average season from 1991–2020. By comparison, 2024’s hurricane activity was about 130% of the average season. The most significant hurricanes of the 2024 Atlantic hurricane season were Hurricanes Helene and Milton, which combined to cause over 250 fatalities and more than $120 billion in damage in the southeastern United States.

In addition to the various hurricane metrics that CSU has used for many years, the forecast team introduced a new metric in 2023. Accumulated Cyclone Energy (ACE) occurring west of 60 degrees west longitude is an integrated metric accounting for storm frequency, intensity and duration in the western half of the Atlantic basin. ACE generated west of 60 degrees west correlates better with landfalling storms in the Atlantic basin than basinwide ACE, since virtually all hurricane-prone landmasses in the Atlantic Ocean are located west of 60 degrees west.

Generally, a slightly lower percentage of basinwide ACE occurs west of 60 degrees west in El Niño years relative to La Niña years. Since the team anticipates neutral ENSO as the most likely outcome for 2025, the percentage of basinwide ACE occurring west of 60 degrees west is predicted to be slightly above the long-term average in 2025.

This is the 42nd year that CSU has issued an Atlantic forecast. The late Professor Bill Gray originated the seasonal forecasts at CSU and launched the report in 1984. He continued to author them until his death in 2016. The authors of this year's forecast are Phil Klotzbach, Professor Michael Bell and Research Scientist Levi Silvers. The TC-RAMS Team is part of the Department of Atmospheric Science in the Walter Scott, Jr. College of Engineering at CSU and is one of the top-ranked atmospheric science programs in the world.

The CSU forecast is intended to provide a useful estimate of activity in the Atlantic during the upcoming season – not an exact measure.

As always, the researchers caution coastal residents to take proper precautions.

"It takes only one storm near you to make this an active season for you," said Michael Bell.

Hurricane landfalling probability included in 2025 report

The report also includes the following probability of major hurricanes making landfall in 2025:

- 51% for the entire U.S. coastline (average from 1880–2020 is 43%).
- 26% for the U.S. East Coast, including the Florida peninsula (average from 1880–2020 is 21%).
- 33% for the Gulf Coast from the Florida panhandle westward to Brownsville, Texas (average from 1880–2020 is 27%).
- 56% for the Caribbean (average from 1880–2020 is 47%).

The forecast team also provides probabilities of named storms, hurricanes and major hurricanes tracking within 50 miles of each county or parish along the Gulf and U.S. East Coast, as well as hurricane-prone coastal states, Mexican states, Canadian provinces and countries in Central America and the Caribbean. These probabilities for regions and countries are adjusted based on the current seasonal forecast.

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ATLANTIC BASIN SEASONAL HURRICANE FORECAST FOR 2025

Forecast Parameter and 1991–2020 Average (in parentheses)	Issue Date 3 April 2025	Issue Date 11 June 2025
Named Storms (14.4)	17	17
Named Storm Days (69.4)	85	85
Hurricanes (7.2)	9	9
Hurricane Days (27.0)	35	35
Major Hurricanes (3.2)	4	4
Major Hurricane Days (7.4)	9	9
Accumulated Cyclone Energy Index (123)	155	155
ACE West of 60°W (73)	93	93
Net Tropical Cyclone Activity (135%)	165	165