CSU researchers continue to predict well above-average Atlantic hurricane season in June update to forecast

By CSU Tropical Climate and Weather Team and MarComm Staff

Note to reporters: The full forecast is available at tropical.colostate.edu. The CSU team will also issue forecast updates on July 9 and Aug. 6. Please contact Jennifer Dimas (Jennifer.Dimas@colostate.edu) and 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 prediction from early spring for an extremely active Atlantic hurricane season in 2024 with their June forecast update issued today.

The updated forecast still predicts 23 named storms, of which 11 reach hurricane strength during the season, which runs from June 1 to Nov. 30. CSU researchers predict that five of the 11 hurricanes reach major hurricane strength (Category 3, 4 or 5) with sustained winds of 111 mph or greater. Landfall probabilities discussed in the report remain unchanged from the initial outlook issued on April 4. The team will issue additional forecasts on July 9 and Aug. 6.

The updated June forecast takes newly available data into consideration as the season commences. Uncertainty remains in the forecast, however, as the atmosphere-ocean system can sometimes change dramatically between this month and the peak of the Atlantic hurricane season, which runs from August–October.

The team again cites very warm sea surface temperatures in the tropical and eastern subtropical Atlantic as a primary factor for their active season prediction.

When waters in the eastern and central tropical and subtropical Atlantic are much warmer than normal in the late spring/early summer, it tends to force a weaker subtropical high and associated weaker winds blowing across the tropical Atlantic. These conditions will likely maintain the well-above-average water temperatures in the tropical Atlantic for the peak of the 2024 Atlantic hurricane season. A very warm Atlantic favors an above-average season because warm ocean water serves as a fuel source for hurricanes. In addition, a warm Atlantic leads to lower atmospheric pressure and a more unstable atmosphere. Both conditions favor hurricanes.

El Niño conditions are weakening quickly across the tropical Pacific and are likely to transition to La Niña conditions by the peak of the Atlantic hurricane season. La Niña tends to weaken upper-level westerly winds across the Caribbean and the tropical Atlantic. These decreased upper-level winds result in reduced vertical wind shear, favoring Atlantic hurricane formation and intensification.

Given the combined hurricane-favorable signals of an extremely warm Atlantic and the absence of El Niño, the forecast team has higher-than-normal confidence in this outlook that the 2024 Atlantic hurricane season will be very active.

This is the highest predicted number of hurricanes that CSU has ever issued in a June outlook. The prior high was for 10 hurricanes in 2010 (when 12 were observed) and in 2022 (when eight were observed). June forecasts have been issued by CSU since 1984.

How Colorado State University issues its hurricane forecasts

The team bases its forecasts on a statistical model, as well as four models that use a combination of statistical information and model predictions of large-scale conditions from the European Centre for Medium-Range Weather Forecasts, the UK Met Office, the Japan Meteorological Agency, and the Centro Euro-Mediterraneo sui Cambiamenti Climatici. These models use 25–45 years of historical hurricane seasons and evaluate conditions including: Atlantic sea surface temperatures, sea level pressures, vertical wind shear levels (the change in wind direction and speed with height in the atmosphere), El Niño (warming of waters in the central and eastern tropical Pacific), and other factors.

So far, the 2024 hurricane season is exhibiting atmospheric and oceanic conditions that are similar to 1878, 1926, 1998, 2005, 2010 and 2020.

“Our analog seasons were all very active Atlantic hurricane seasons,” said Phil Klotzbach, senior research scientist in the Department of Atmospheric Science at CSU and lead author of the report. “This highlights the somewhat higher level of confidence that exists with this outlook relative to our typical early June outlook.”

The team predicts that 2024 hurricane activity will be about 170% of the average season from 1991–2020. By comparison, 2023’s hurricane activity was about 120% of the average season. The most significant hurricane of the 2023 Atlantic hurricane season was Hurricane Idalia. Idalia made landfall at Category 3 intensity in the Big Bend region of Florida, causing $3.5 billion of damage and resulting in eight direct fatalities.

In addition to the various hurricane metrics that CSU has used for many years, the forecast team introduced a new metric last year. 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 La Niña as the most likely outcome in 2024, the percentage of basinwide ACE occurring west of 60 degrees west is predicted to be higher than last year.

This is the 41st year that CSU has issued an Atlantic basin seasonal hurricane forecast. Professor Emeritus 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, Alex DesRosiers, and Research Scientist Levi Silvers. The CSU Tropical Weather and Climate 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 best 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," Bell said.

Hurricane landfalling probability included in 2024 report

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

- 62% for the entire U.S. coastline (average from 1880–2020 is 43%).
- 34% for the U.S. East Coast, including the Florida peninsula (average from 1880–2020 is 21%).
- 42% for the Gulf Coast from the Florida panhandle westward to Brownsville (average from 1880–2020 is 27%).
- 66% 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.

Funding for this year's report has been provided by Gallagher Re, Ironshore Insurance, the Insurance Information Institute, Weatherboy, Insurance Auto Auctions and a grant from the G. Unger Vetlesen Foundation.

ATLANTIC BASIN SEASONAL HURRICANE FORECAST FOR 2024

Forecast Parameter and 1991–2020 Average (in parentheses)	Issue Date 4 April 2024	Issue Date 11 June 2024
Named Storms (14.4)	23	23
Named Storm Days (69.4)	115	115
Hurricanes (7.2)	11	11
Hurricane Days (27.0)	45	45
Major Hurricanes (3.2)	5	5
Major Hurricane Days (7.4)	13	13
Accumulated Cyclone Energy Index (123)	210	210
ACE West of 60°W (73)	125	125
Net Tropical Cyclone Activity (135%)	220	220