CSU researchers continue to predict well above-average Atlantic hurricane season in August 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. Please contact Allison Sylte (Allison.Sylte@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. A full list of hurricane related story ideas and experts from CSU is available online.

Colorado State University hurricane researchers are continuing to call for an extremely active Atlantic hurricane season in 2024, with a total of 23 named storms expected. Of these 23 named storms, 12 are predicted to reach hurricane strength, while six of the 12 hurricanes are forecast to reach major hurricane strength (Category 3, 4 or 5) with sustained winds of 111 mph or greater. This forecast is the same as was issued in July for all forecast parameters, except for named storms, which has been reduced from 25 to 23. These forecast numbers do include Hurricanes Beryl and Debby, as well as Tropical Storms Alberto and Chris.

The updated August forecast takes newly-available data into consideration as the peak of the season approaches. While there is uncertainty with all seasonal outlooks, the forecast team has higher confidence than normal that this season will be extremely busy.

They cite very warm sea surface temperatures in the tropical Atlantic as the primary reason for the expectation for elevated activity. 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. Observed vertical wind shear during June and July was also well below normal. Lower-than-normal shear during the early part of the hurricane season typically correlates with continued below-average shear during the peak of the season from August to October.

Currently, the tropical Pacific is characterized by ENSO neutral conditions. Sea surface temperature anomalies across the eastern and central tropical Pacific are anticipated to cool over the next several months, with a potential transition to La Niña conditions in the next several weeks. 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. Even if La Niña conditions are not met, the CSU team anticipates cool ENSO neutral conditions, which when combined with the very warm Atlantic, would likely still favor a well above-normal Atlantic hurricane season.

The forecast for 12 hurricanes is tied with 2020 for the most hurricanes ever forecast for a CSU August outlook. In 2020, 14 hurricanes occurred. August forecasts have been issued by CSU since 1984.

How Colorado State University issues its seasonal hurricane forecasts

The team bases their forecast on two statistical models, 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: 1886, 1926, 1933, 1995, 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 August forecast.”

The team predicts that 2024 hurricane activity will be about 190% 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 $3.6 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. The utility of this metric is evidenced by Hurricane Beryl this year. Beryl generated 28 of its 35 ACE west of 60 degrees west, and it caused significant damage across portions of the Caribbean, Mexico and Texas.

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 for the remainder of the season:

- 56% for the entire U.S. coastline (full season average from 1880–2020 is 43%).
- 30% for the U.S. East Coast, including the Florida peninsula (full season average from 1880–2020 is 21%).
- 38% for the Gulf Coast from the Florida panhandle westward to Brownsville (full season average from 1880–2020 is 27%).
- 61% for tracking through the Caribbean (full season 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, Insurance Auto Auctions, Commodity Weather Group, Weatherboy 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	Issue Date 9 July 2024	Issue Date 6 August 2024	Observed Thru 5 August 2024	Remainder of Season Forecast
Named Storms (NS) (14.4)	23	23	25	23*	4	19
Named Storm Days (NSD) (69.4)	115	115	120	120	14	106
Hurricanes (H) (7.2)	11	11	12	12	2	10
Hurricane Days (HD) (27.0)	45	45	50	50	6.75	43.25
Major Hurricanes (MH) (3.2)	5	5	6	6	1	5
Major Hurricane Days (MHD) (7.4)	13	13	16	16	4.50	11.50
Accumulated Cyclone Energy (ACE) (123)	210	210	230	230	39	191
ACE West of 60°W (73)	125	125	140	140	32	108
Net Tropical Cyclone Activity (NTC) (135%)	220	220	240	240	43	197

*Total forecast includes Alberto, Beryl, Chris and Debby.