

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE  
ACTIVITY FROM SEPTEMBER 17–30, 2024**

We believe that the most likely category for Atlantic hurricane activity in the next two weeks is normal (50%), with below-normal (40%) and above-normal (10%) being less likely.

(as of 17 September 2024)

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In Memory of William M. Gray<sup>6</sup>

This discussion as well as past forecasts and verifications are available online at <http://tropical.colostate.edu>

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# 1 Introduction

This is the 16th year that we have issued shorter-term forecasts of tropical cyclone activity starting in early August. These two-week forecasts are based on a combination of observational and modeling tools. The primary tools that are used for this forecast are as follows: 1) current storm activity, 2) National Hurricane Center Tropical Weather Outlooks, 3) forecast output from global models, 4) the current and projected state of the Madden-Julian oscillation (MJO) and 5) the current seasonal forecast.

Our forecast definition of above-normal, normal, and below-normal Accumulated Cyclone Energy (ACE) periods is defined by ranking observed activity in the satellite era from 1966–2023 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 58 years from 1966–2023, we include the 19 years with the most ACE from September 17–30 as the upper tercile, the 19 years with the least ACE as the bottom tercile, while the remaining 20 years are counted as the middle tercile.

Table 1: ACE forecast definition and probabilistic forecast for tropical cyclone activity for September 17–30, 2024.

Parameter	Definition	Probability in Each Category
Above-Normal	Upper Tercile (>27 ACE)	10%
Normal	Middle Tercile (10–27 ACE)	50%
Below-Normal	Lower Tercile (<10 ACE)	40%

# 2 Forecast

We slightly favor normal activity (10–27 ACE) over below-normal activity (<10 ACE) over the next two weeks. While Gordon has recently been declared post-tropical, it does have some reformation potential in a few days when it distances itself from a non-tropical area of low pressure. At that point, it could generate a bit of ACE. The National Hurricane Center currently is not monitoring any additional areas for tropical cyclone formation in the next seven days. Global models have a robust signal for a tropical cyclone emerging from the western Caribbean in 8–12 days. This system could be strong and consequently generate moderate ACE, although ACE generation could be somewhat tempered due to a relatively short lifetime. Regardless of how much ACE the system generates, any development in the western Caribbean should be closely monitored for potential landfall impacts. Models also highlight potential tropical cyclone formation in the eastern and central Main Development Region later in the forecast period. The Madden-Julian Oscillation (MJO) is forecast to progress into the Western Hemisphere and potentially over Africa later in the forecast period, leading to more hurricane favorable large-scale conditions late in September.

Figure 1 displays the formation locations of tropical cyclones from September 17–30 for the years from 1966–2023, along with the maximum intensities that these

storms reached. Figure 2 displays the September 17–30 forecast period with respect to climatology. This period immediately follows the climatological peak of the season. The primary threat formation area for major hurricanes in mid- to late September is in the eastern and central tropical Atlantic.

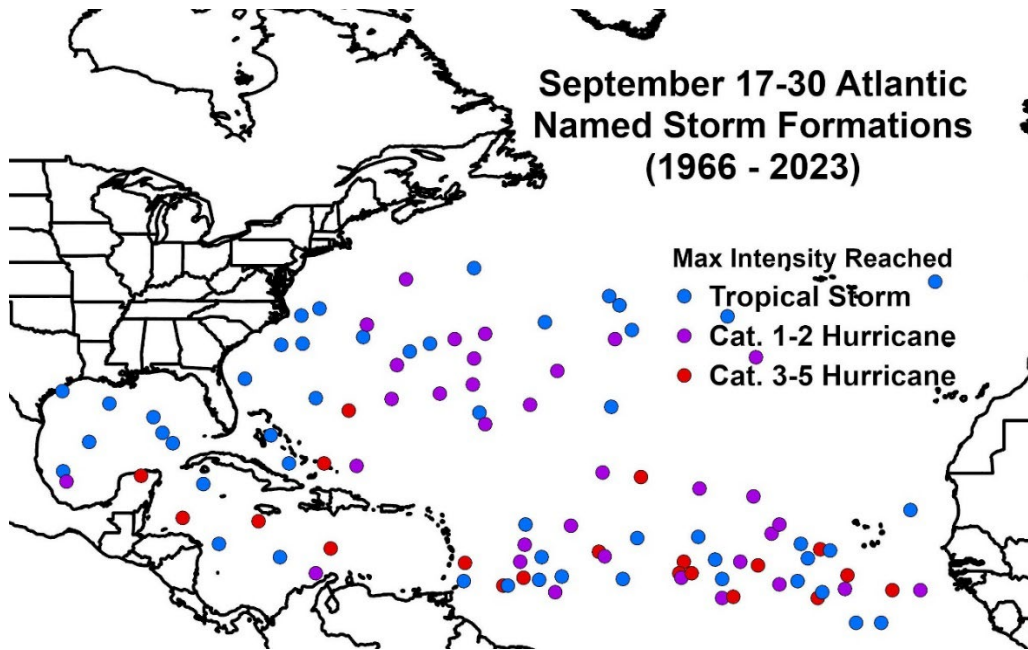


Figure 1: Atlantic named storm formations from September 17–30 from 1966–2023 and the maximum intensity that these named storms reached.

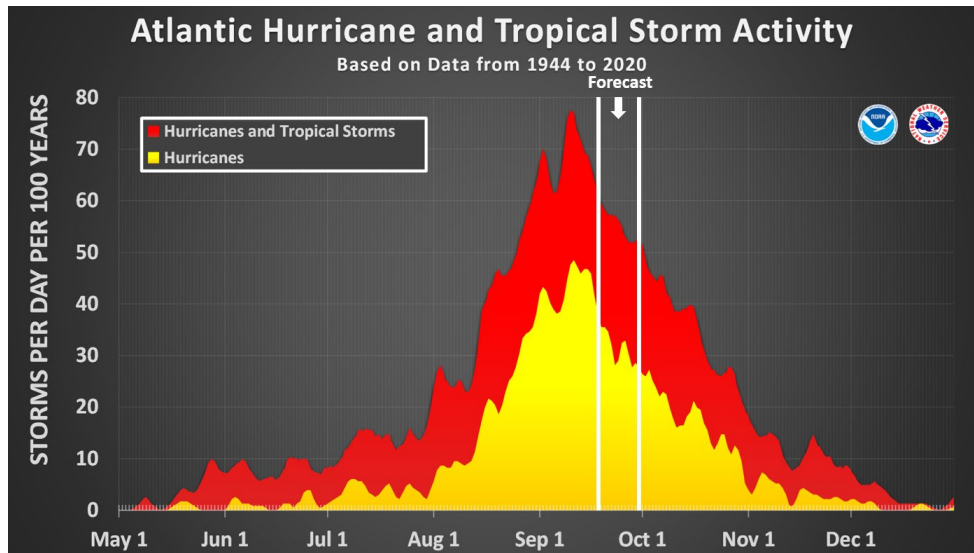


Figure 2: The current forecast period (September 17–30) with respect to climatology, delimited with white lines. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic tropical cyclone activity for the period from September 17–30.

### 1) Current Storm Activity

Gordon has just been declared post-tropical, however its remnants could regenerate in a few days as it moves into more tropical cyclone favorable large-scale conditions.

### 2) National Hurricane Center Tropical Weather Outlook

The latest National Hurricane Center Tropical Weather Outlook is not monitoring any additional areas for tropical cyclone formation in the next seven days (Figure 3).

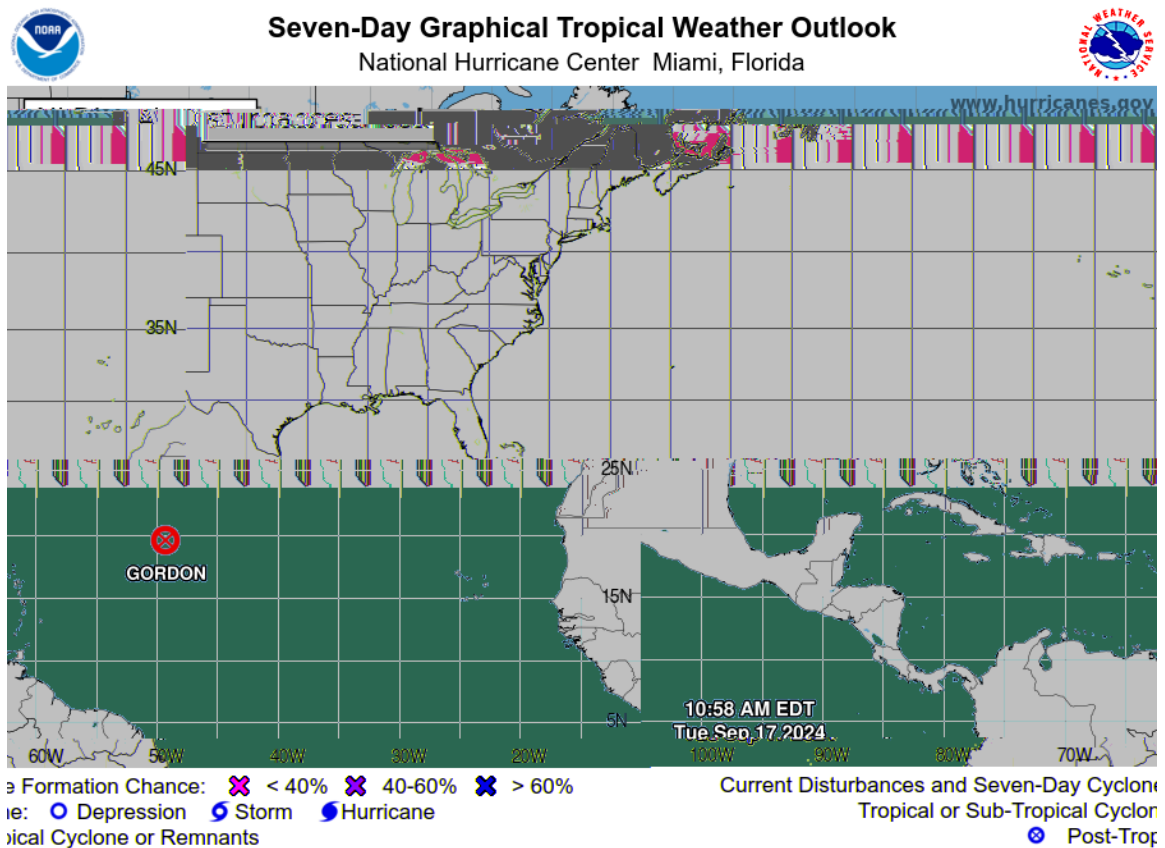


Figure 3: Current National Hurricane Center Atlantic Tropical Weather Outlook.

### 3) Global Model Analysis

The ECMWF EPS ensemble (Figure 4) and the GEFS ensemble (Figure 5) both are highlighting the potential for tropical cyclone formation in the western Caribbean during

the latter part of September. These ensembles also indicate that Gordon may redevelop in a few days.

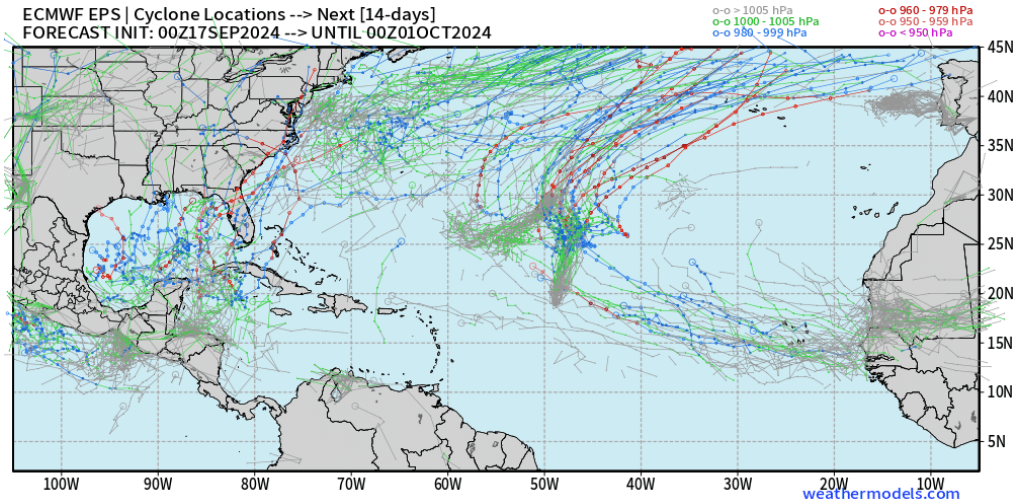


Figure 4: Cyclone locations from the ECMWF EPS ensemble for the next 14 days. Figure courtesy of weathermodels.com

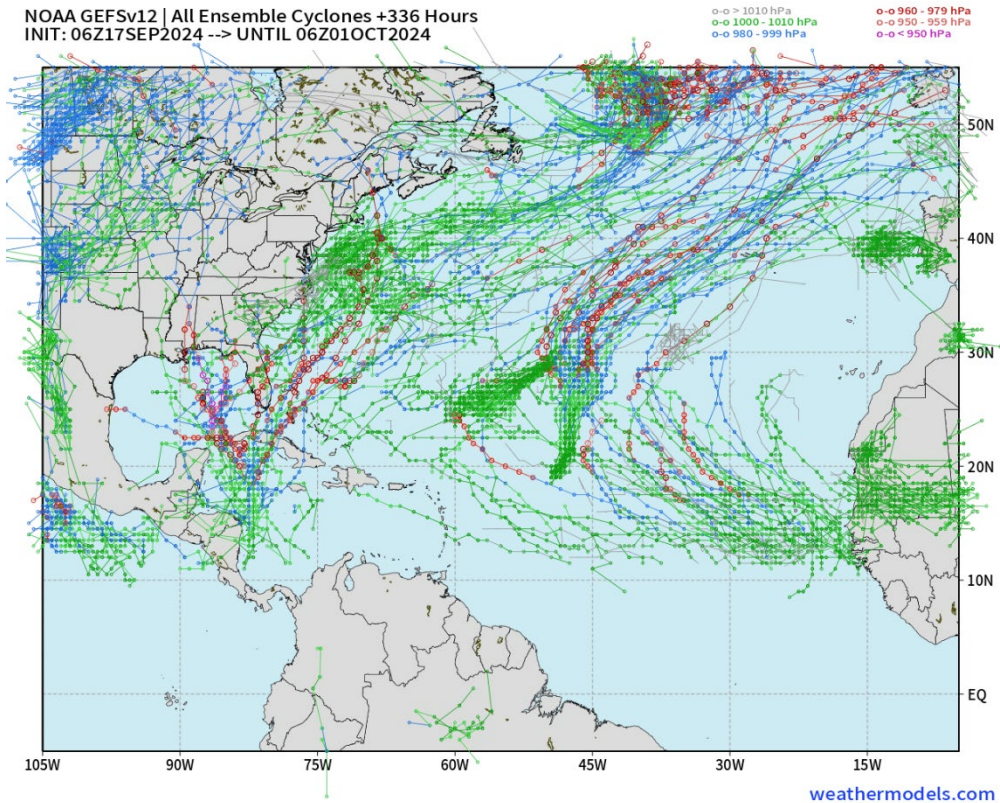


Figure 5: Cyclone locations from the GEFS ensemble for the next 14 days. Figure courtesy of weathermodels.com

#### 4) Madden-Julian Oscillation

The Madden-Julian oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 6 over the western Pacific. The MJO is forecast to propagate across the western Pacific and the Western Hemisphere, potentially reaching Africa by the end of the two-week period (Figure 7). While phases 6–7 typically suppress Atlantic hurricane activity, large-scale tropical conditions should become more favorable towards the end of the period. When the MJO index is located in phases 1–3, Atlantic tropical cyclone activity is typically favored due to reductions in vertical wind shear and increased rising motion over Africa.

While large-scale subsidence over the Atlantic/Africa will likely suppress Atlantic tropical cyclone activity over the next week, vertical wind shear is likely to remain favorable for Atlantic hurricane formation. The EPS is predicting below-normal vertical wind shear across the tropical Atlantic over the next several weeks (Figure 8). This reduction in shear should likely lead to a more active Atlantic towards the end of the period.



ECMWF MONTHLY FORECASTS  
FORECAST BASED 16/09/2024 00UTC

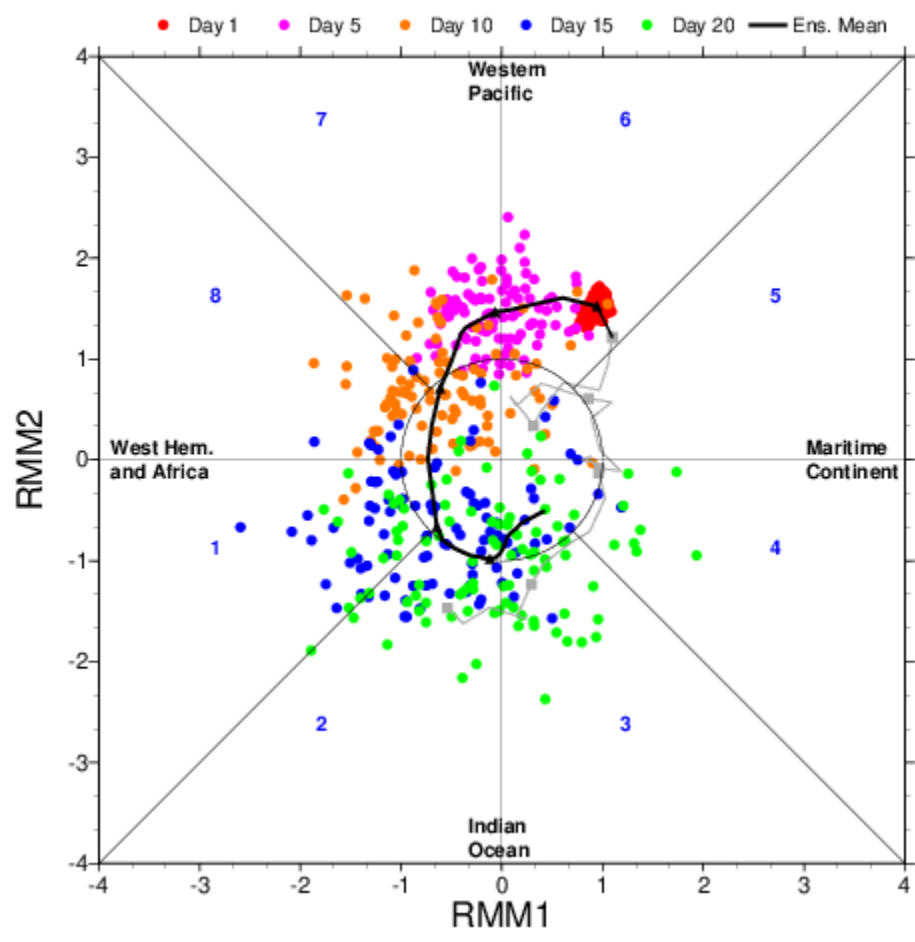


Figure 7: Predicted propagation of the MJO by the EPS. Figure courtesy of ECMWF.

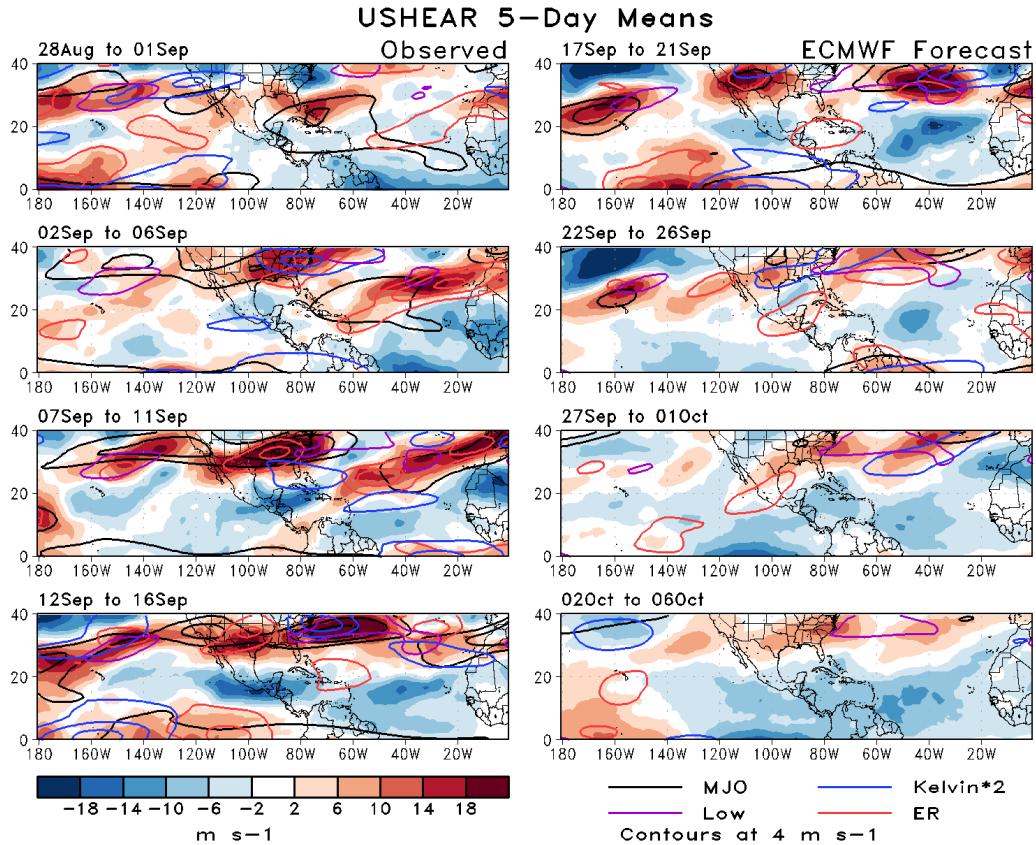


Figure 8: Observed and predicted zonal wind shear by the ECMWF ensemble for the next 20 days. Vertical wind shear is generally forecast to be below normal (e.g., easterly anomalies) across the Atlantic MDR during this time.

### 3 Upcoming Forecasts

The next two-week forecast will be issued on October 1 for the October 1–14 period. An additional two-week forecast will be issued on October 15.



## VERIFICATION OF SEPTEMBER 3–16 FORECAST

The two-week period from September 3–16 verified in the below-normal category (6 ACE). Francine generated ~5 ACE during the two-week period, while Gordon generated the remaining ~1 ACE. We had assigned a 60% probability of below-normal activity, with a 30% chance of normal activity and a 10% chance of above-normal activity during the two-week period.

Table 3 displays the percentage chance that we gave for each category and observed ACE.

Table 3: ACE forecast for tropical cyclone activity for September 3–16, the probability assigned for each category being reached and observed ACE.

ACE Category	Definition	Probability in each Category	Observed ACE
Above Normal	Upper Tercile (>36 ACE)	10%	6
Normal	Middle Tercile (10–36 ACE)	30%	
Below Normal	Lower Tercile (<10 ACE)	60%	