

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE
ACTIVITY FROM SEPTEMBER 3–16, 2024**

We believe that the most likely category for Atlantic hurricane activity in the next two weeks is below-normal (60%), with near-normal (30%) and above-normal (10%) being less likely.

(as of 3 September 2024)

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In Memory of William M. Gray⁶

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 (TC) 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 3–16 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 TC activity for September 3–16, 2024.

Parameter	Definition	Probability in Each Category
Above-Normal	Upper Tercile (>36 ACE)	10%
Normal	Middle Tercile (10–36 ACE)	30%
Below-Normal	Lower Tercile (<10 ACE)	60%

2 Forecast

While we still expect the 2024 Atlantic hurricane season to end up above average, we believe that the next two weeks are most likely to be characterized by activity in the below-normal category. There are no active tropical cyclones in the Atlantic. The National Hurricane Center currently is monitoring three areas for tropical cyclone development in the next seven days. The area in the eastern Atlantic would likely be a short-lived named storm if it were to form, while the system in the central Atlantic is likely to encounter very strong shear in a couple of days, limiting any chances of significant formation. The region in the Caribbean could generate moderate levels of ACE if it were to form and drift in the southern Gulf of Mexico.

With the exception of the western Caribbean and southern Gulf of Mexico, large-scale environmental conditions look relatively unfavorable for the next ~7 days but look to get more conducive for tropical cyclone activity towards the middle of September. Global model ensembles highlight the potential for a strong African easterly wave emerging off of the west African coast in 8–9 days. It is still too early to determine what this system’s future would be.

The Madden-Julian Oscillation (MJO) currently is located over the Maritime Continent and is forecast to move eastward towards the western Pacific and then the Western Hemisphere over the course of the two-week forecast period.

Figure 1 displays the formation locations of tropical cyclones from September 3–16 for the years from 1966–2023, along with the maximum intensities that these storms reached. Figure 2 displays the September 3–16 forecast period with respect to climatology. This period marks the climatological peak of the Atlantic hurricane season. The primary threat formation area for major hurricanes in early- to mid-September is in the eastern and central tropical Atlantic.

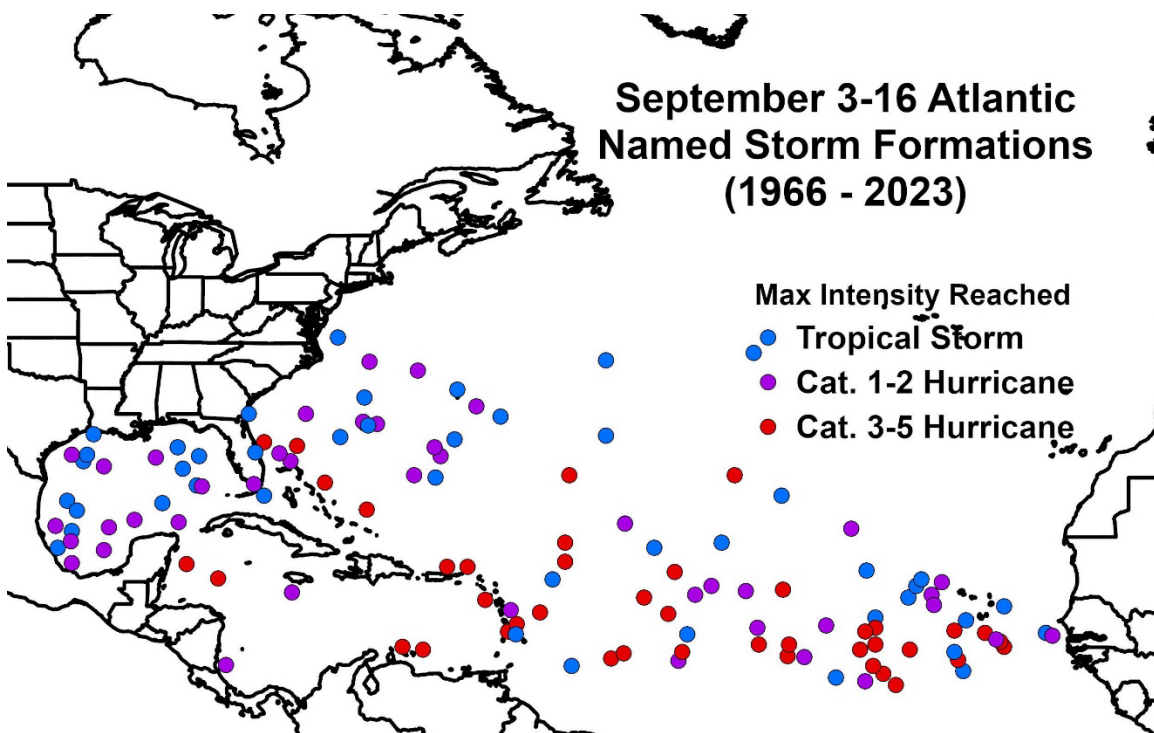


Figure 1: Atlantic named storm formations from September 3–16 from 1966–2023 and the maximum intensity that these named storms reached.

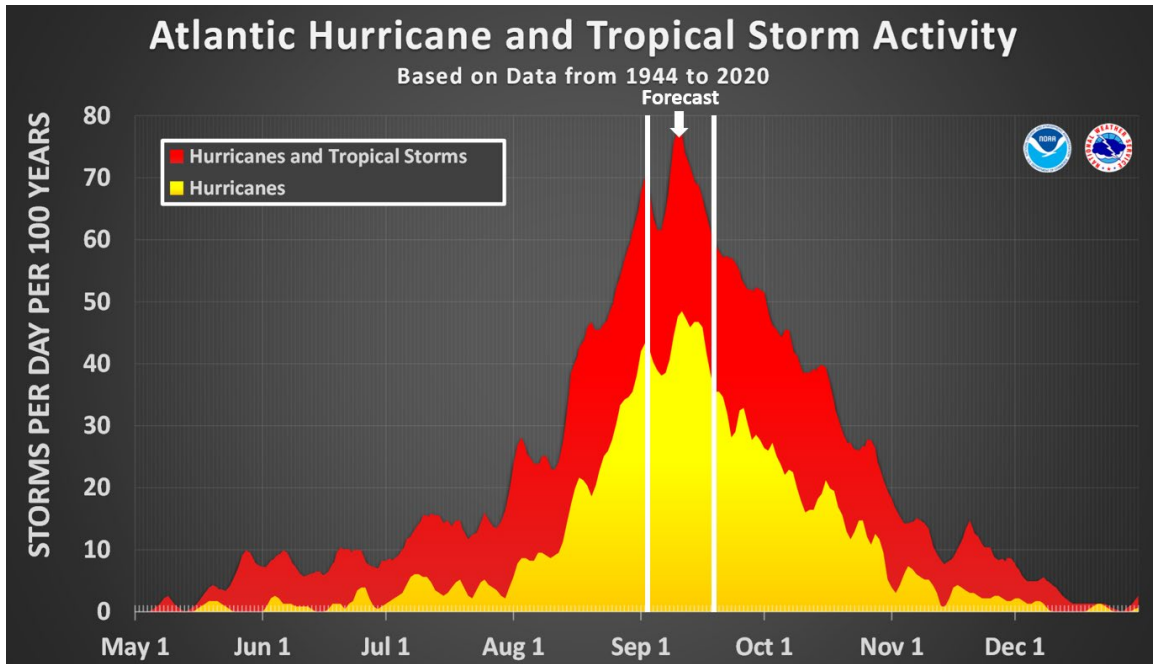


Figure 2: The current forecast period (September 3–16) with respect to climatology, delimited with white lines. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from September 3–16.

1) Current Storm Activity

There are currently no active tropical cyclones in the Atlantic.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook is monitoring three areas for potential TC formation (Figure 3). Both the areas in the eastern and central tropical Atlantic would likely only generate very small levels of ACE if they were to form given relatively unfavorable large-scale conditions. The Caribbean area could be a moderate ACE generator if it were to develop in either the western Caribbean or southern Gulf given relatively weak steering flow.



Seven-Day Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida

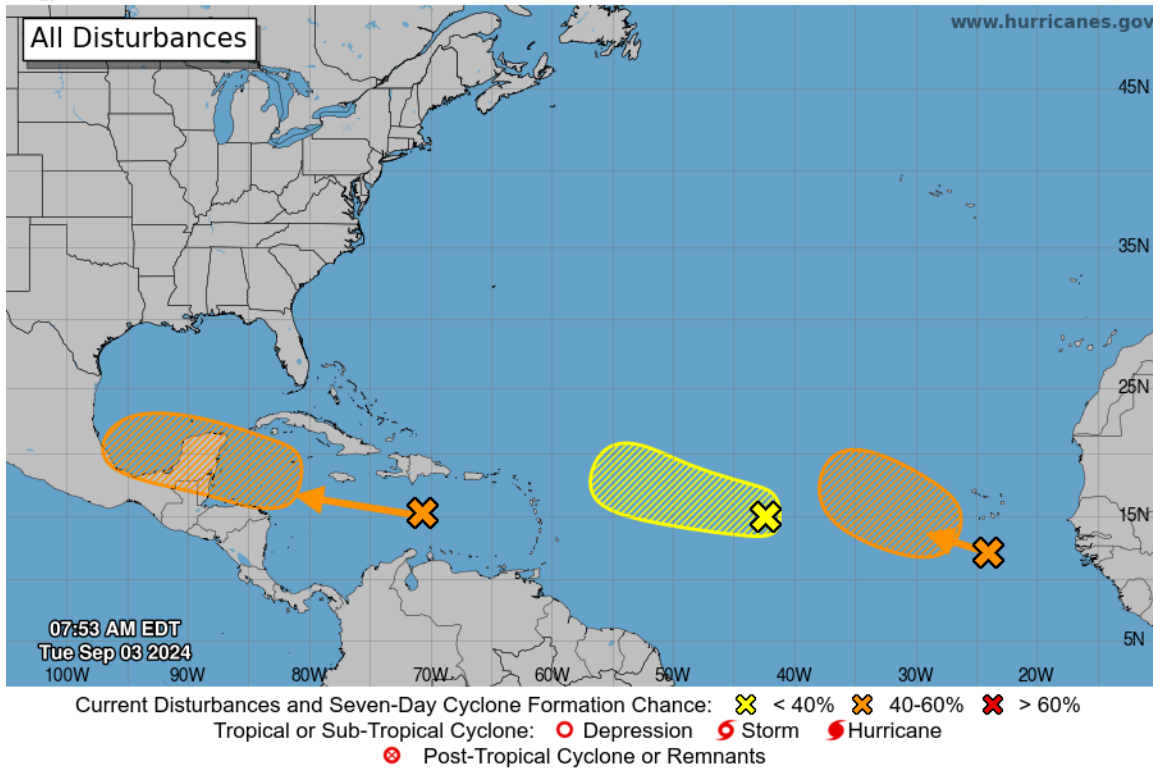


Figure 3: Current National Hurricane Center Atlantic Tropical Weather Outlook.

3) Global Model Analysis

The ECMWF EPS ensemble (Figure 4) is highlighting a robust African easterly wave emerging off of Africa in 8–9 days. While current vertical wind shear is relatively high across the Atlantic, it is forecast to weaken substantially by mid-September (Figure 5). The GEFS ensemble is much weaker with any African easterly wave development towards the middle of September (Figure 6).

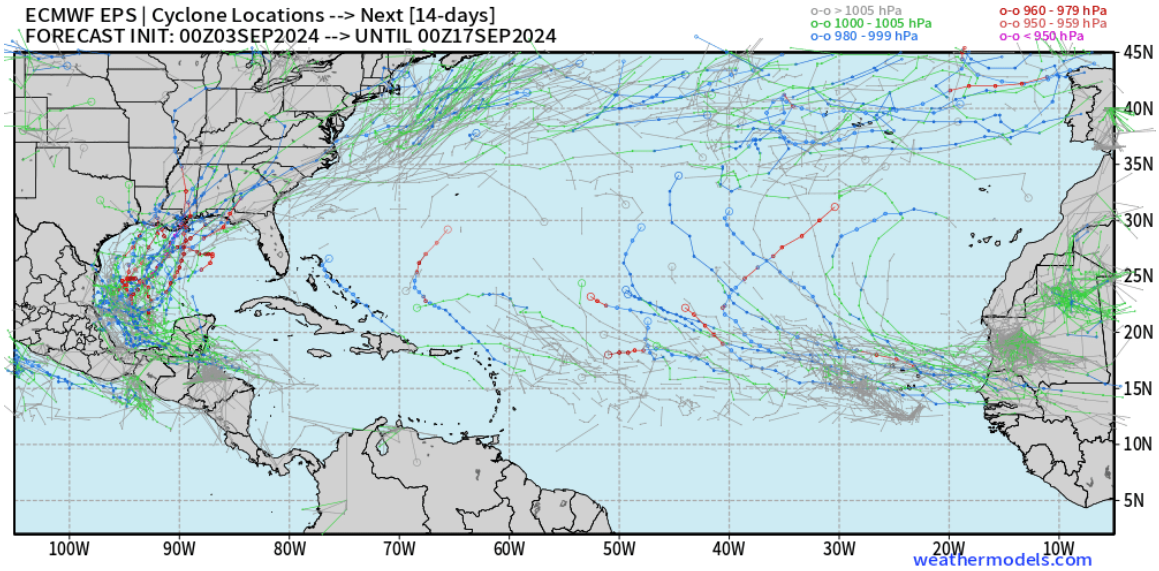


Figure 4: Cyclone locations from the ECMWF EPS ensemble for the next 14 days. Figure courtesy of weathermodels.com

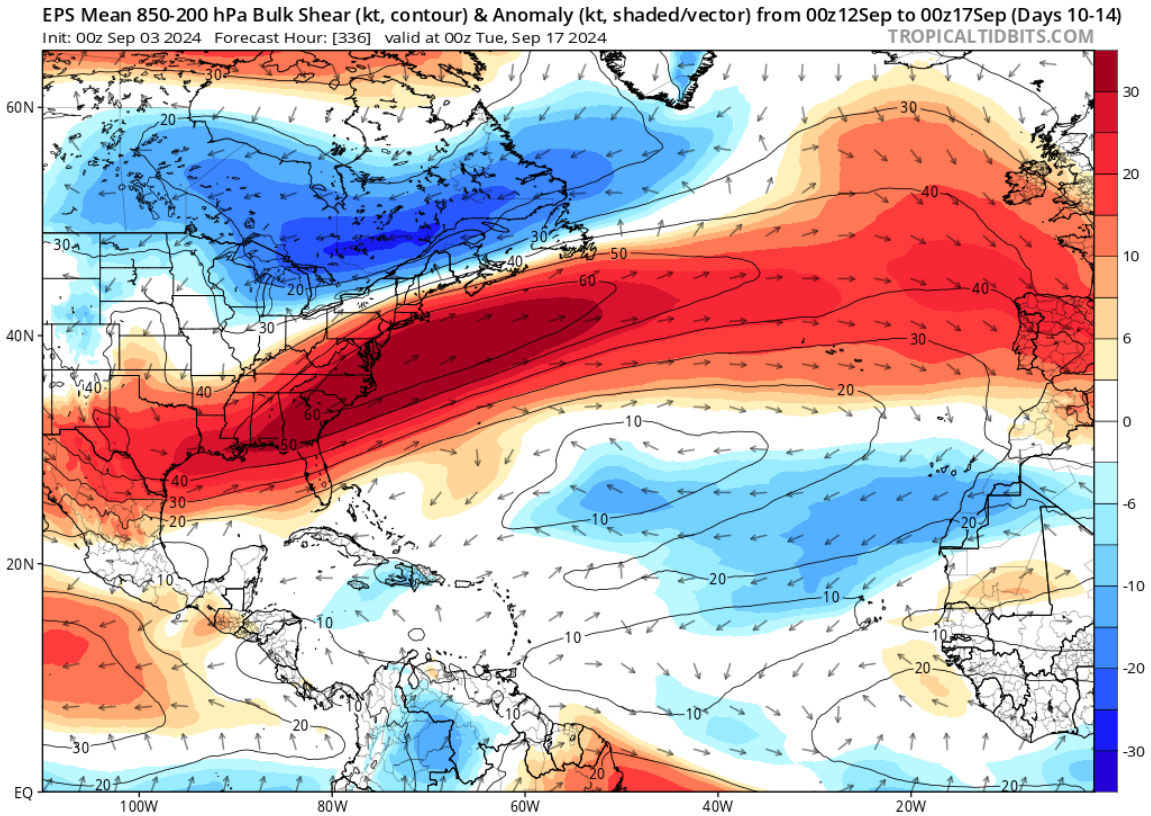


Figure 5: Forecast vertical wind shear anomalies from September 12–16 from the ECMWF EPS.

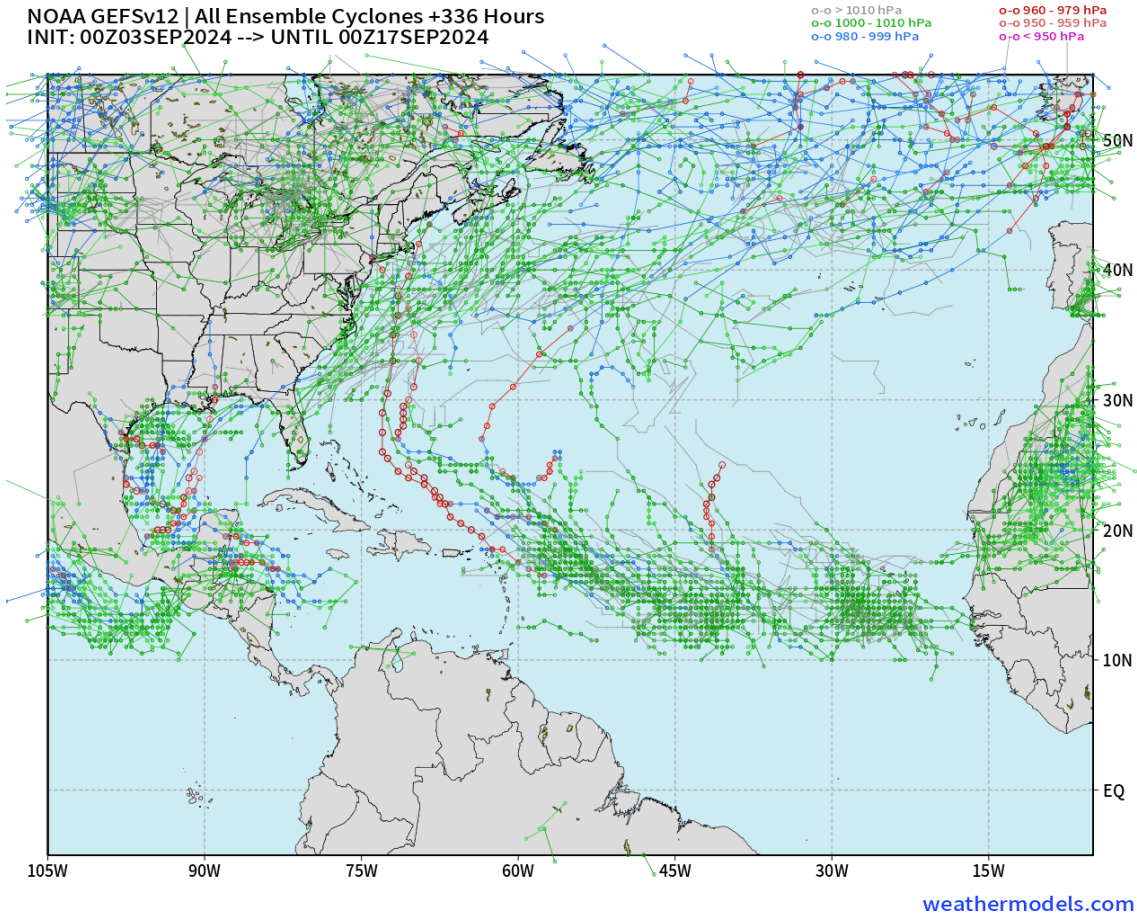


Figure 6: Cyclone locations from the GEFS ensemble for the next 14 days. Figure courtesy of weathermodels.com

4) Madden-Julian Oscillation

The Madden-Julian oscillation (MJO), as measured by the Wheeler-Hendon index, is currently located over the Maritime Continent. The MJO is forecast to propagate eastward across the western Pacific and into the Western Hemisphere over the next two weeks (Figure 7). These phases are typically relatively unfavorable for Atlantic hurricane activity, although vertical wind shear does look to become much more favorable towards the end of the two-week period.

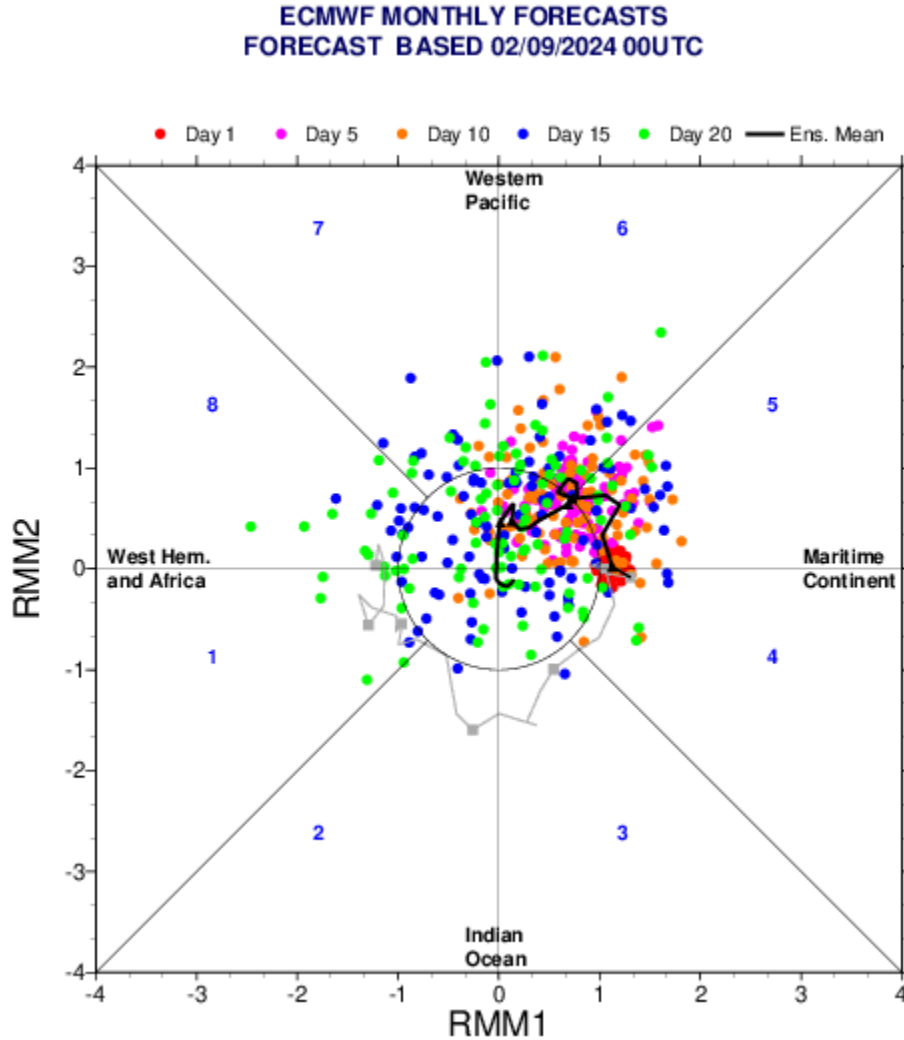


Figure 7: Predicted propagation of the MJO by the EPS. Figure courtesy of ECMWF.

5) Seasonal Forecast

The most recent seasonal forecast called for a well above-average season. While the season got off to a very fast start with three hurricanes by 14 August, the season has tailed off dramatically over the past couple of weeks. This lack of activity will be discussed in detail in a note on our website by the end of today (3 September).

3 Upcoming Forecasts

The next two-week forecast will be issued on September 17 for the September 17–30 period. Additional two-week forecasts will be issued on October 1 and October 15.

VERIFICATION OF AUGUST 20 – SEPTEMBER 2 FORECAST

The only ACE generated during the two-week period was 1 ACE by Ernesto on August 20. We had assigned a 55% chance of normal activity, with a 25% chance of below-normal and a 20% chance of above-normal activity during the two-week period.

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

Table 3: ACE forecast for TC activity for August 20–September 2, the probability assigned for each category being reached and observed ACE.

ACE Category	Definition	Probability in each Category	Observed ACE
Above Normal	Upper Tercile (>22 ACE)	20%	
Normal	Middle Tercile (7–22 ACE)	55%	
Below Normal	Lower Tercile (<7 ACE)	25%	1