

COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 17–30, 2023

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

(as of 17 August 2023)

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In Memory of William M. Gray⁴

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 15th 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 1966–2022 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 57 years from 1966–2022, we include the 19 years with the most ACE from August 17–30 as the upper tercile, the 19 years with the least ACE as the bottom tercile, while the remaining 19 years are counted as the middle tercile.

Table 1: ACE forecast definition for TC activity for August 17–30, 2023.

| Parameter | Definition | Probability in Each Category |
|--------------|----------------------------|------------------------------|
| Above-Normal | Upper Tercile (>18 ACE) | 50% |
| Normal | Middle Tercile (6–18 ACE) | 40% |
| Below-Normal | Lower Tercile (<6 ACE) | 10% |

2 Forecast

We believe that the next two weeks have the highest probability to be characterized by activity at above-normal levels (>18 ACE), although we only slightly favor above-normal activity compared with normal activity. The National Hurricane Center is monitoring three areas for TC development over the next seven days. The Madden-Julian Oscillation (MJO) is currently weak but is forecast to potentially amplify into phases 1-2 in the next two weeks. These phases are typically associated with enhanced Atlantic TC activity.

Figure 1 displays the formation locations of TCs from August 17–30 for the years from 1966–2022, along with the maximum intensities that these storms reached. Figure 2 displays the August 17–30 forecast period with respect to climatology. This period typically marks the real ramp-up for Atlantic TC activity. The primary threat formation area for major hurricanes in late August is in the eastern and central tropical Atlantic.

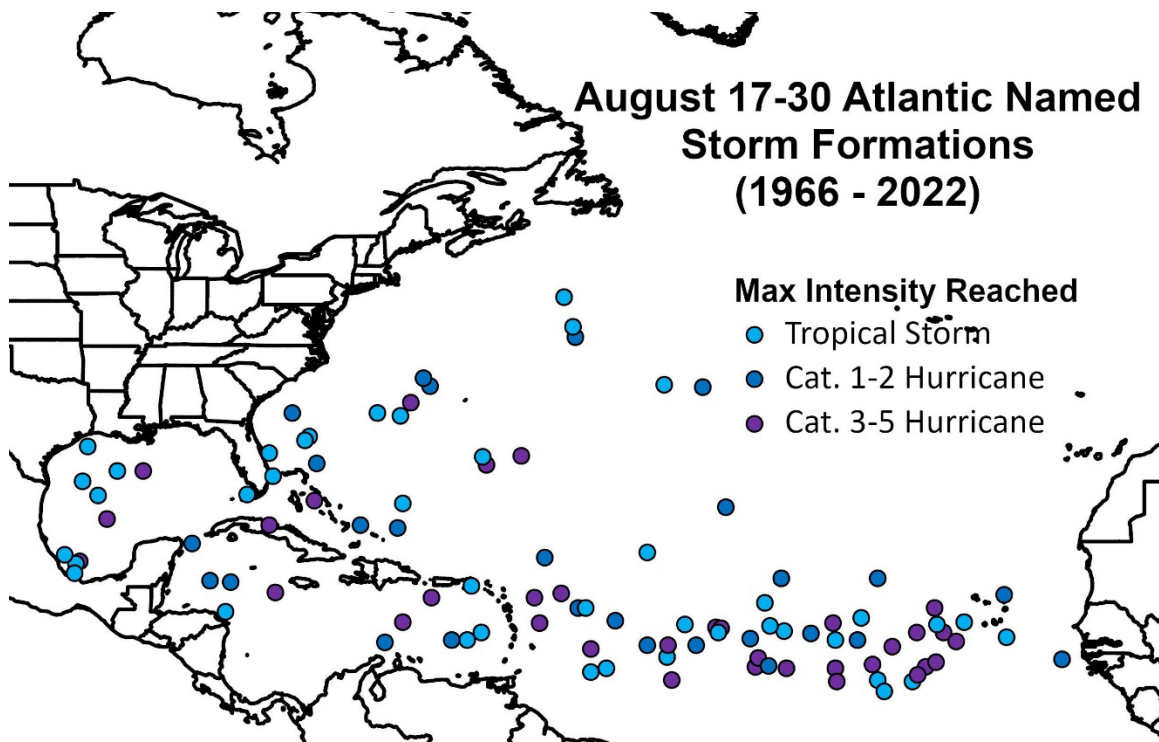


Figure 1: Atlantic named storm formations from August 17–30 during the years from 1966-2022 and the maximum intensity that these named storms reached.

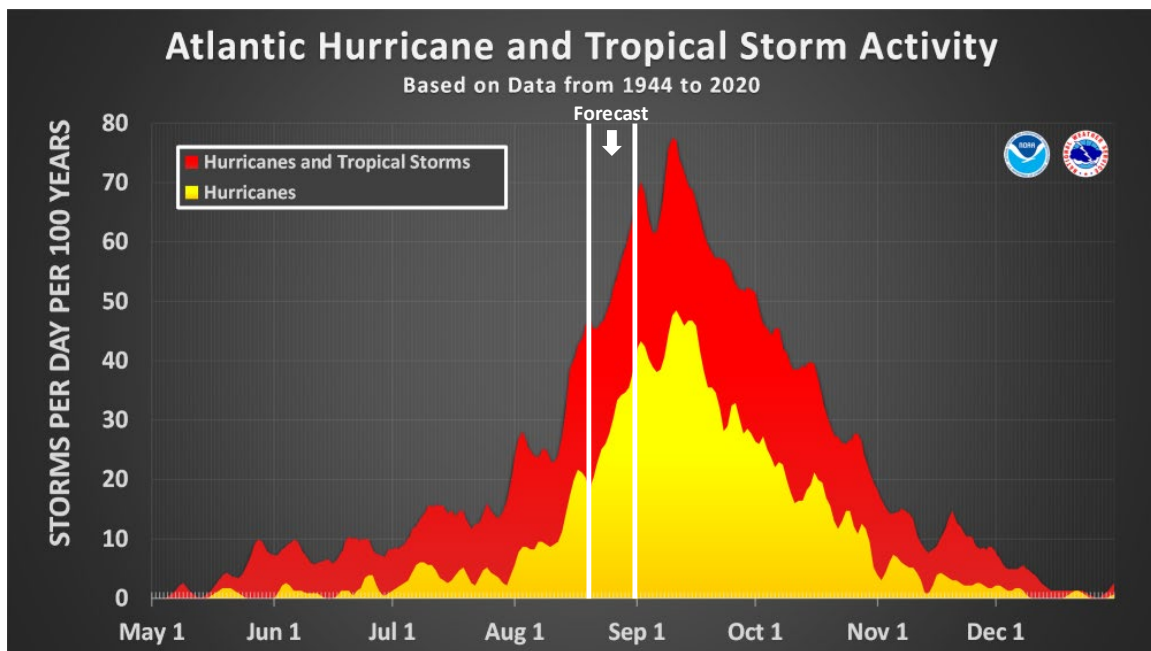


Figure 2: The current forecast period (August 17–30) with respect to climatology, delimited with white lines. Figure courtesy of NOAA.

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

1) Current Storm Activity

There are currently no active TCs in the Atlantic.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook is monitoring three areas for TC formation in the next seven days (Figure 3). The area in the eastern Atlantic (98L) is unlikely to generate much ACE, as it is forecast to recurve into an area of high shear in a few days. The potential Gulf system looks to be short-lived and consequently also generate little ACE. The central Atlantic system (99L) is a question mark. While some ensemble solutions intensify 99L to hurricane or major hurricane strength, most operational dynamical models (with the exception of the Canadian GEM model) either keep 99L relatively weak or dissipate it quickly. The uncertainty with 99L is one of the primary uncertainty sources with this outlook.

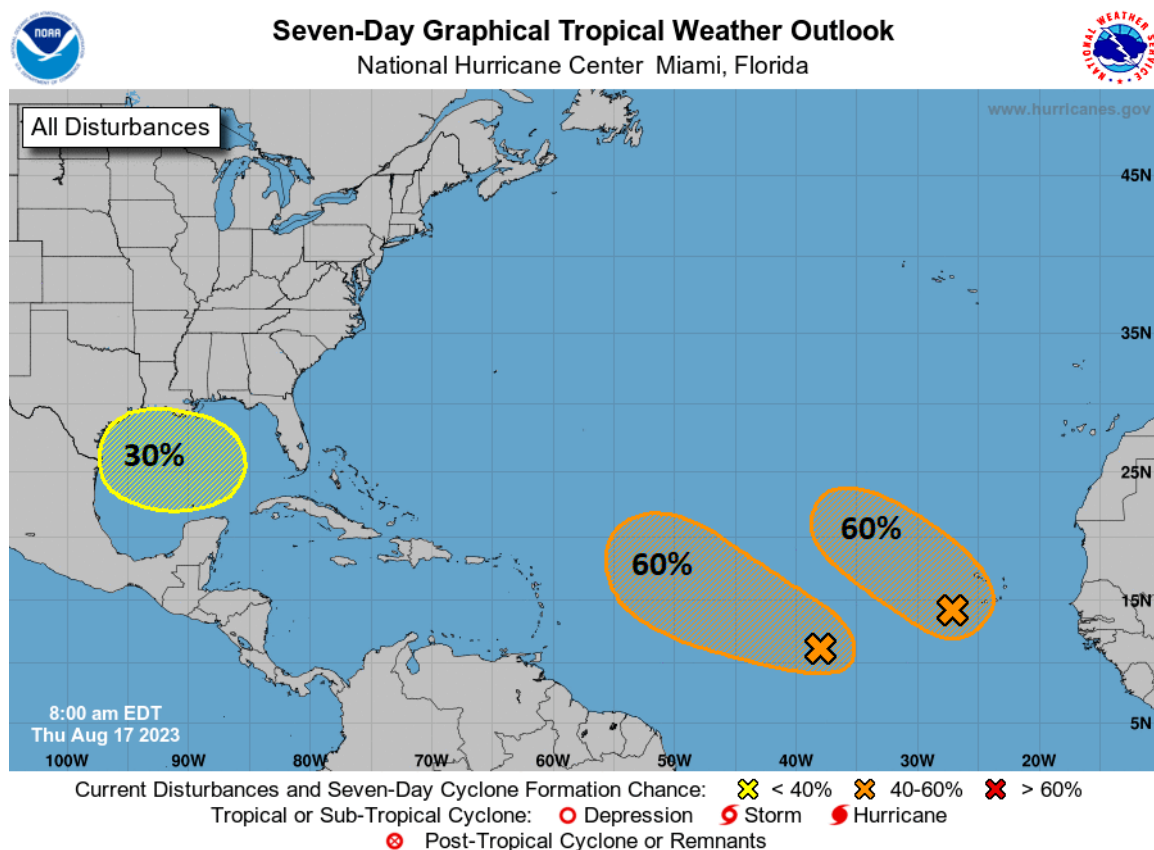


Figure 3: Current National Hurricane Center Tropical Weather Outlook with seven-day TC formation chances overlaid. Figure adapted from NOAA.

3) Global Model Analysis

The ECMWF (Figure 4) Ensemble Prediction System is quite aggressive for storm formation in the next two weeks, with several vigorous waves coming off Africa with some ensemble model support for development. Of perhaps more concern for land impacts, however, is a potential system developing in the western Caribbean or southern Gulf in ~10 days. The Global Ensemble Forecast System similarly highlights western Caribbean/Gulf activity in 10-14 days (Figure 5).

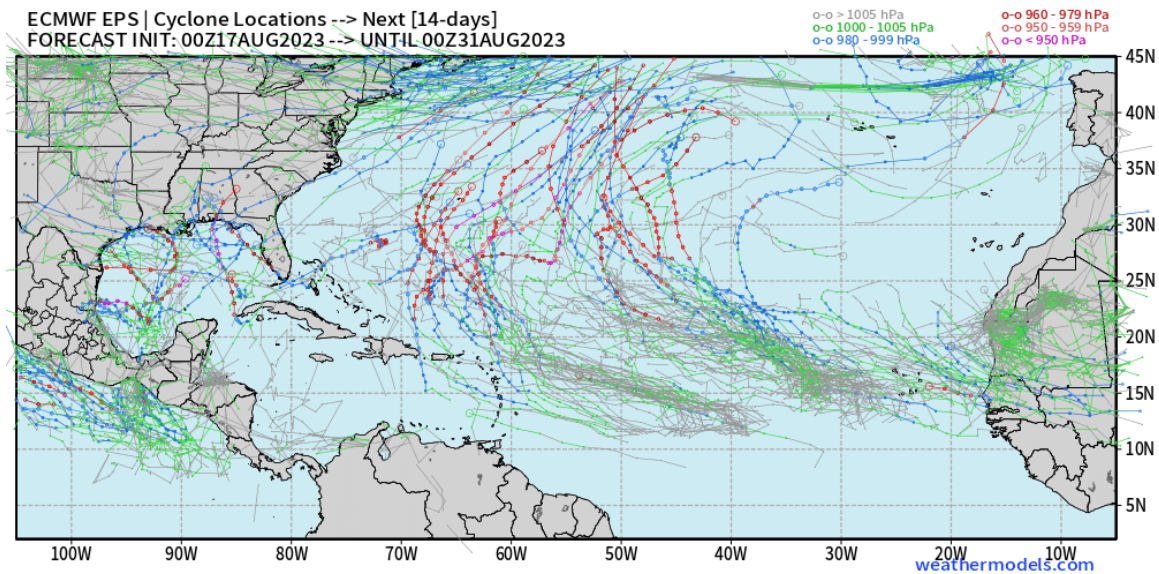


Figure 4: Cyclone locations from the ECMWF EPS ensemble for the next 14 days. Figure courtesy of weathermodels.com.

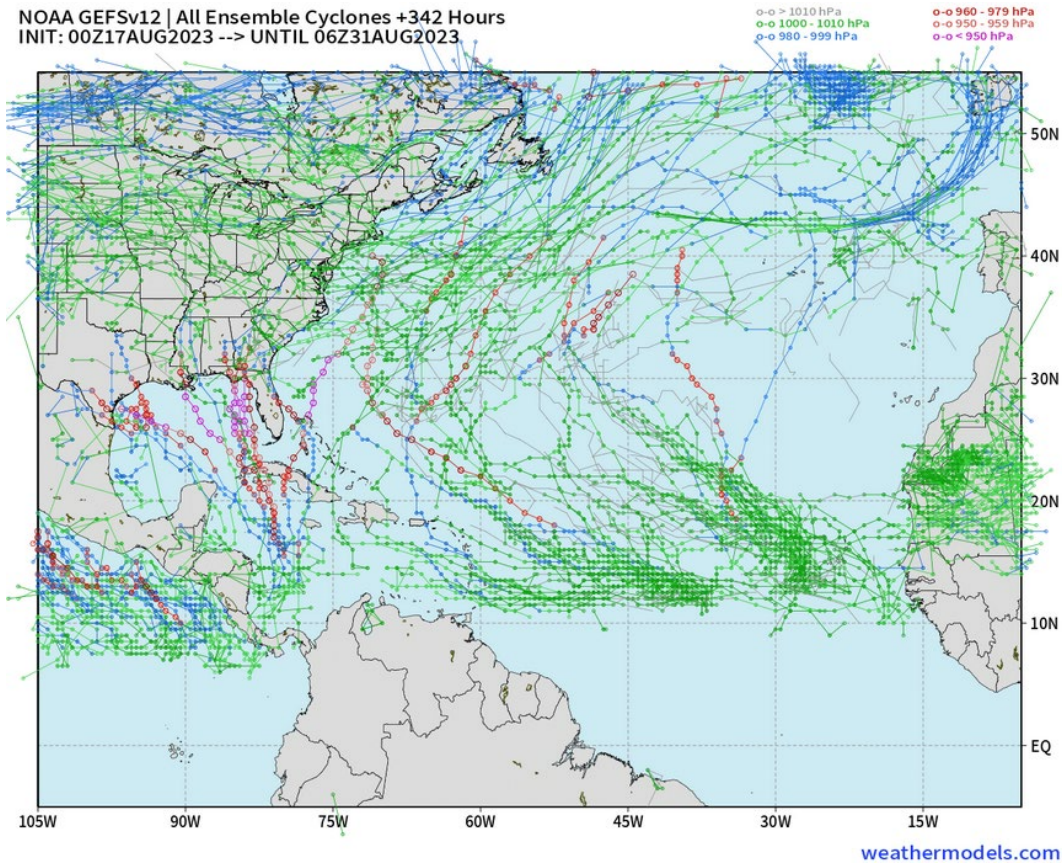


Figure 5: Track forecasts from the Global Ensemble Forecast System for the next 14 days. Figure courtesy of weathermodels.com

4) Madden-Julian Oscillation

The Madden-Julian oscillation (MJO), as measured by the Wheeler-Hendon index, is currently weak. The MJO is forecast to potentially amplify into phases 1-2 in the next two weeks (Figure 6). Associated with this potential amplification is anomalous upward vertical motion over Africa/Indian Ocean and suppressed vertical motion over the eastern tropical Pacific (Figure 7). This pattern typically results in reduced vertical wind shear across the Atlantic Main Development Region, similar to what is being forecast for days 10-14 from the ECMWF Ensemble Prediction System (Figure 8).

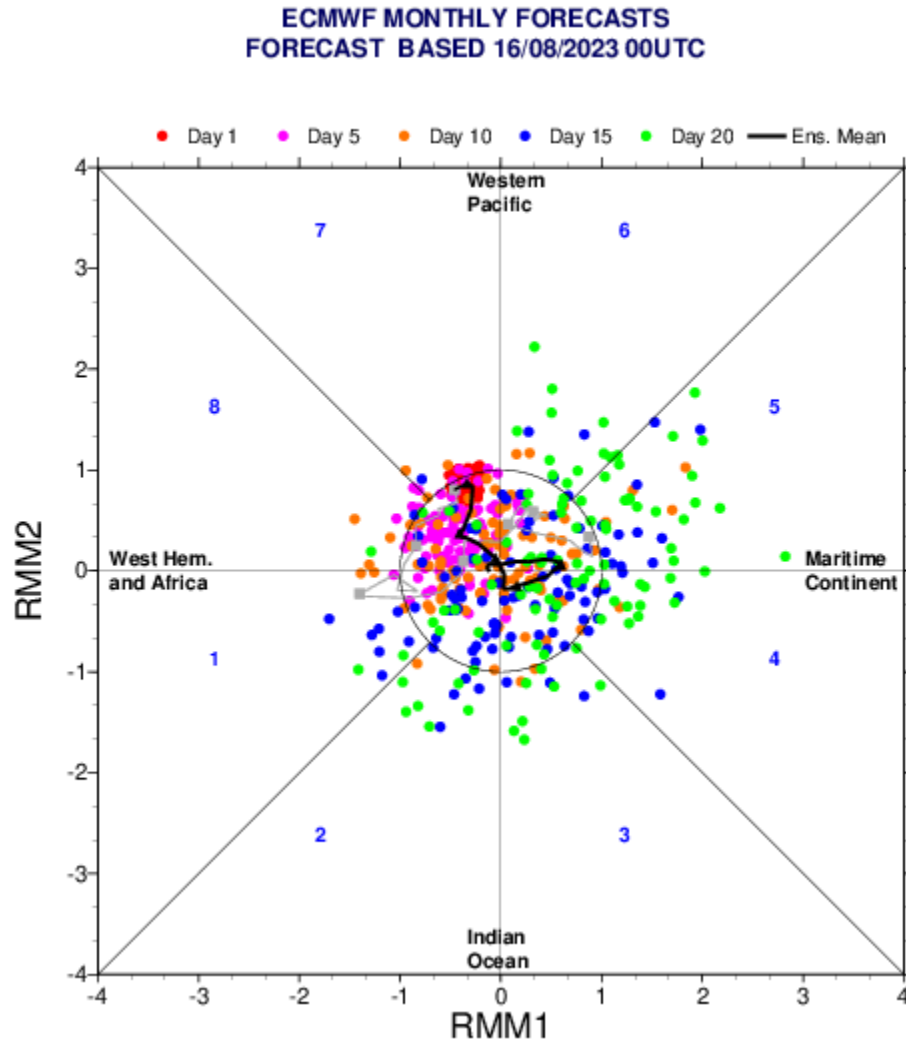


Figure 6: Predicted propagation of the MJO by the ECMWF Ensemble Prediction System. Figure courtesy of ECMWF.

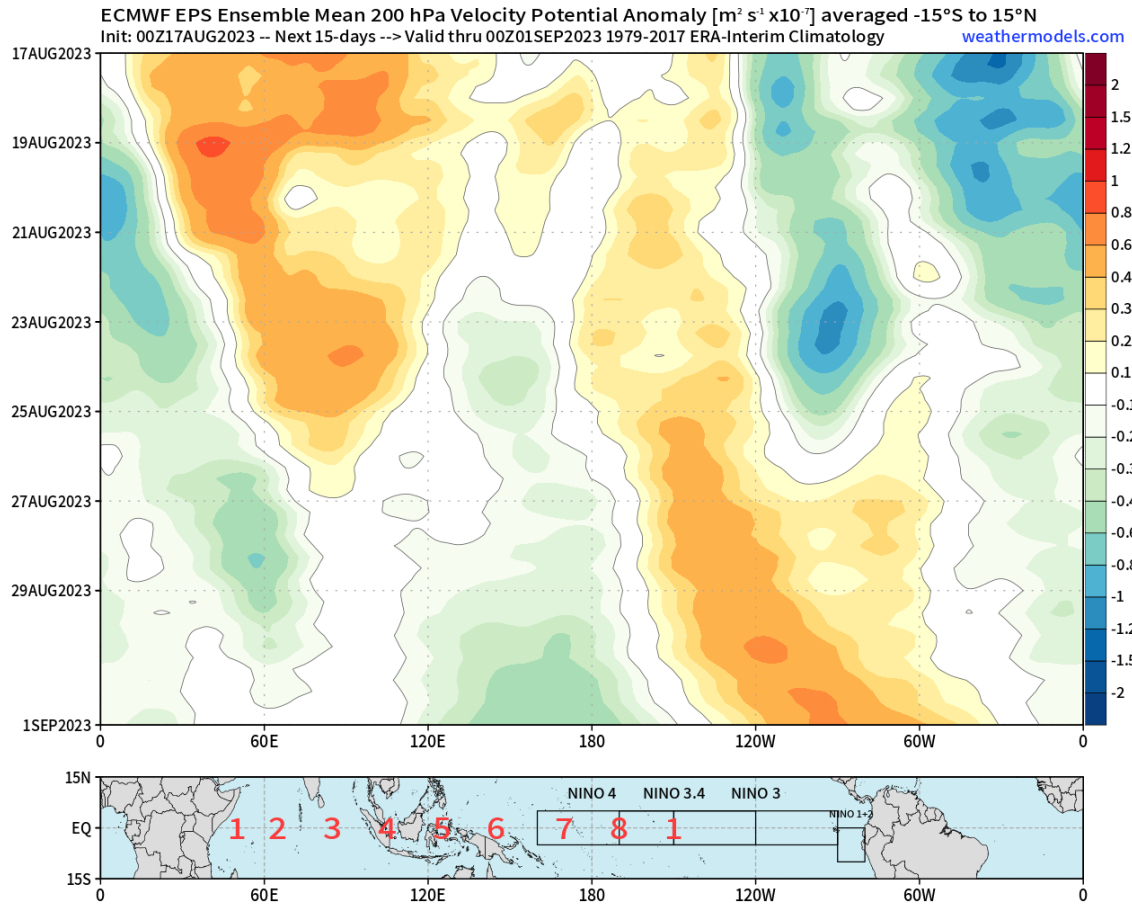


Figure 7: Forecast upper-level velocity potential anomalies by the ECMWF Ensemble Prediction System. Negative upper-level velocity potential anomalies are associated with upward vertical motion. Figure courtesy of weathermodels.com.

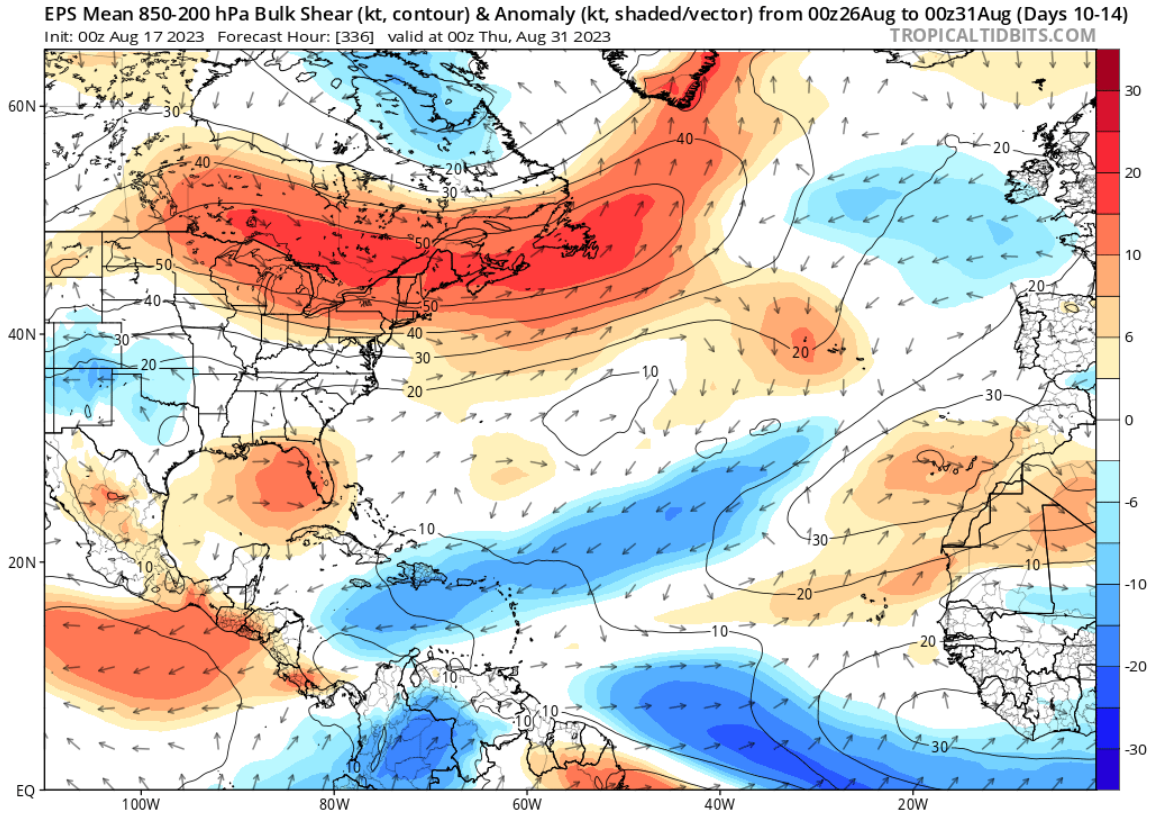


Figure 8: Predicted 10-14 vertical wind shear across the Atlantic from the ECMWF Ensemble Prediction System. Figure courtesy of Tropical Tidbits.

5) Seasonal Forecast

The most recent seasonal forecast calls for an above-average season. We slightly favor above-average ACE as the most likely outcome for the next two weeks.

3 Upcoming Forecasts

The next two-week forecast will be issued on August 31 for the August 31–September 13 period. Additional two-week forecasts will be issued on September 14, September 28, and October 12.

VERIFICATION OF AUGUST 3–16 FORECAST

No TC activity occurred during the two-week period from August 3–16. We had assigned a 50% probability of normal activity, with a 30% 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 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 (>5 ACE) | 20% | 0 |
| Normal | Middle Tercile ($2-5$ ACE) | 50% | |
| Below Normal | Lower Tercile (<2 ACE) | 30% | |