COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM SEPTEMBER 15–28, 2022

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 15 September 2022)

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In Memory of William M. Gray[4]

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 14th 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 1966–2021 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 56 years from 1966–2021, we include the 19 years with the most ACE from September 15–28 as the upper tercile, the 19 years with the least ACE as the bottom tercile and the remaining 18 years are counted as the middle tercile.

Table 1: ACE forecast definition for Atlantic tropical cyclone activity for September 15–28, 2022.

Parameter	Definition	Probability in Each Category
Above-Normal	Upper Tercile (>26 ACE)	50%
Normal	Middle Tercile (10–26 ACE)	40%
Below-Normal	Lower Tercile (<10 ACE)	10%

2 Forecast

We believe that the next two weeks have the highest probability of being in the above-normal category (>26 ACE). Tropical Storm Fiona has formed and is forecast to track northwestward over the next few days. While Fiona is not forecast to intensify much in the short-term, most global models intensity it to hurricane strength by next week. The National Hurricane Center is currently not monitoring any other areas for tropical cyclone development in the next five days. The Madden-Julian oscillation (MJO) is forecast to be weak over the next two weeks.

Figure 1 displays the formation locations of tropical cyclones from September 15–28 for the years from 1966–2021, along with the maximum intensities that these storms reached. Figure 2 displays the September 15–28 forecast period with respect to climatology. Although after the climatological peak of the Atlantic hurricane season, the tropical Atlantic generally remains quite active during this time. The primary threat formation area for major hurricanes in mid- to late September is in the eastern and central tropical Atlantic.
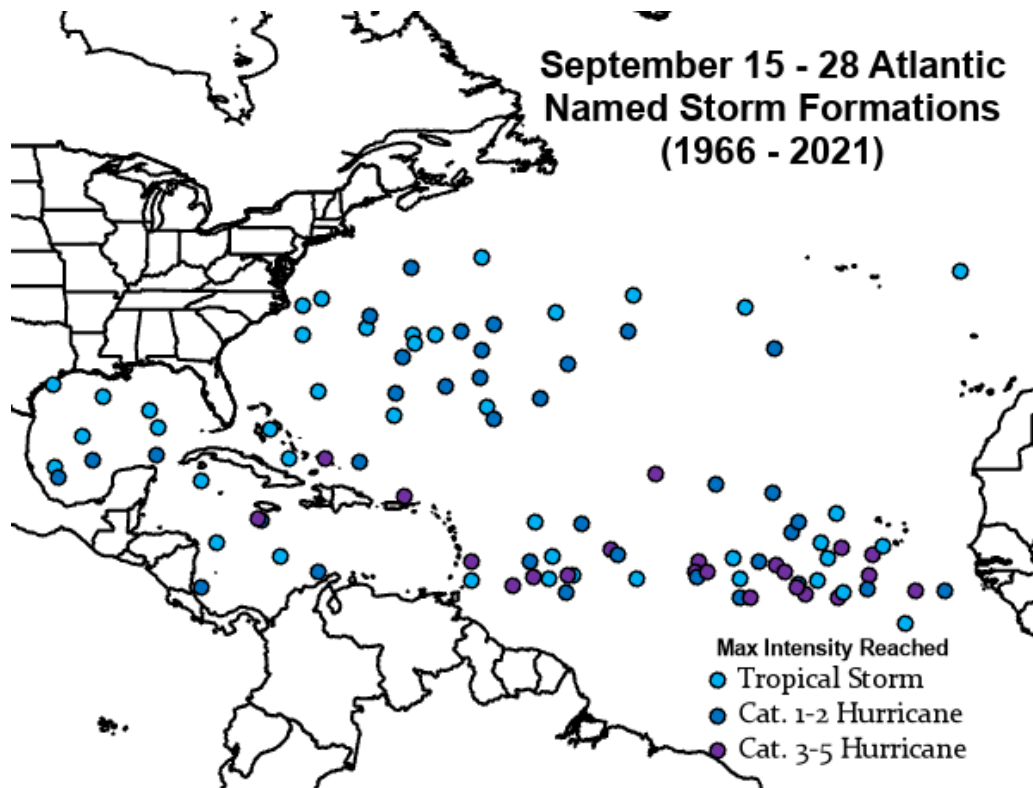
Figure 1: Atlantic named storm formations from September 15–28 during the years from 1966-2021 and the maximum intensity that these named storms reached.
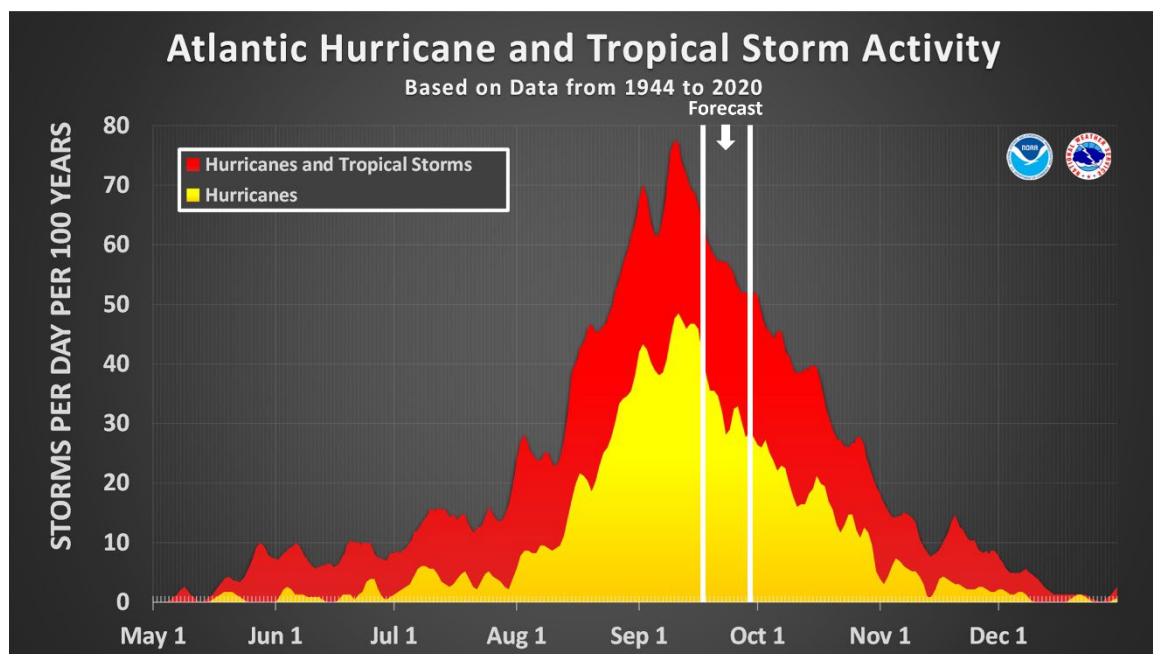

Figure 2: The current forecast period (September 15–28) with respect to climatology. Figure courtesy of NOAA.

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 15–28.

1) Current Storm Activity

Tropical Storm Fiona has formed in the central tropical Atlantic. While not forecast to intensify much in the short term, most global models indicate that it will become a hurricane at longer ranges, potentially generating significant amounts of ACE (~10-20) in the process. Fiona looks to last 8-12 days as a tropical cyclone based on the latest forecast model guidance.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook does not have any additional areas of tropical cyclone formation highlighted in the next five days.

3) Global Model Analysis

Both the ECMWF (Figure 3) and GFS (Figure 4) ensembles have some support for development of two additional areas in the next ten days. A tropical wave currently in the far eastern Atlantic and another tropical wave forecast to move off of the west coast of Africa in approximately one week both have some support for formation. While not seen in current deterministic model runs, the ensembles are also hinting at some potential for additional formation in the western Caribbean later in the period.
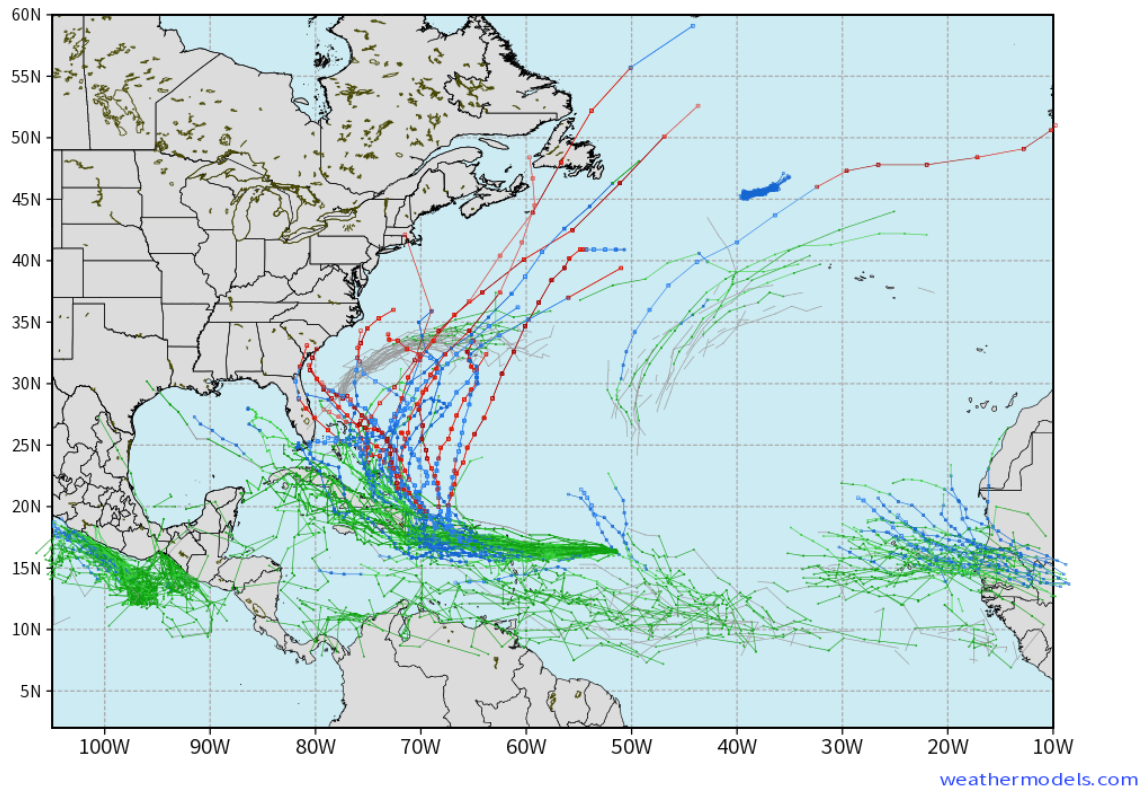
Figure 3: Cyclone locations from the ECMWF EPS ensemble for the next ten days. Figure courtesy of weathermodels.com.
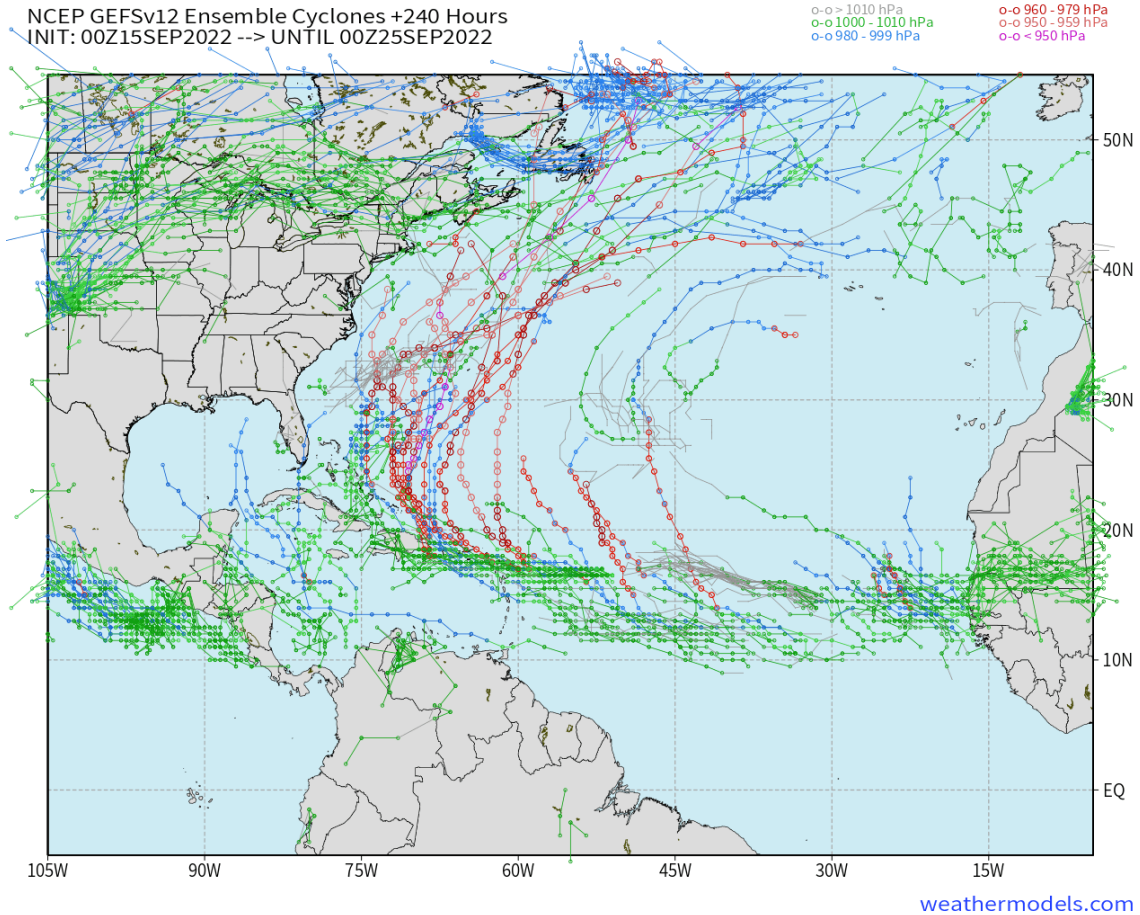
Figure 4: Cyclone locations from GEFS ensemble for the next ten days. Figure courtesy of weathermodels.com.

4) Madden-Julian Oscillation/Large-Scale Circulation

The MJO, as measured by the Wheeler-Hendon index, is currently weak and is forecast to remain weak over the next two weeks (Figure 5). Overall, the forecast velocity potential pattern over the next two weeks of rising motion over Africa and the Indian Ocean and sinking motion over the central tropical Pacific is favorable for Atlantic hurricane activity (Figure 6), with the anomalous pattern getting more favorable from week one to week two.
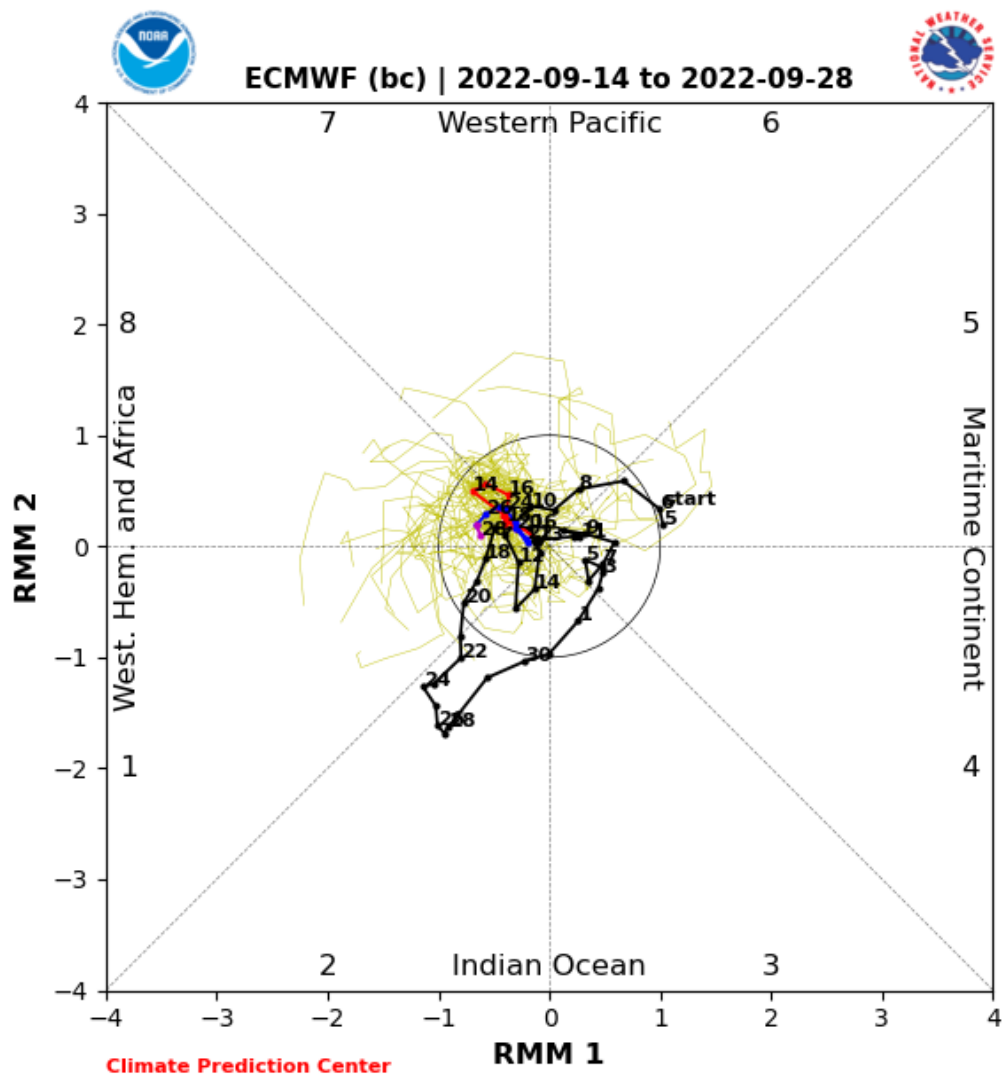
Figure 5: Predicted propagation of the MJO by the ECMWF model (bias-corrected). Figure courtesy of NOAA.
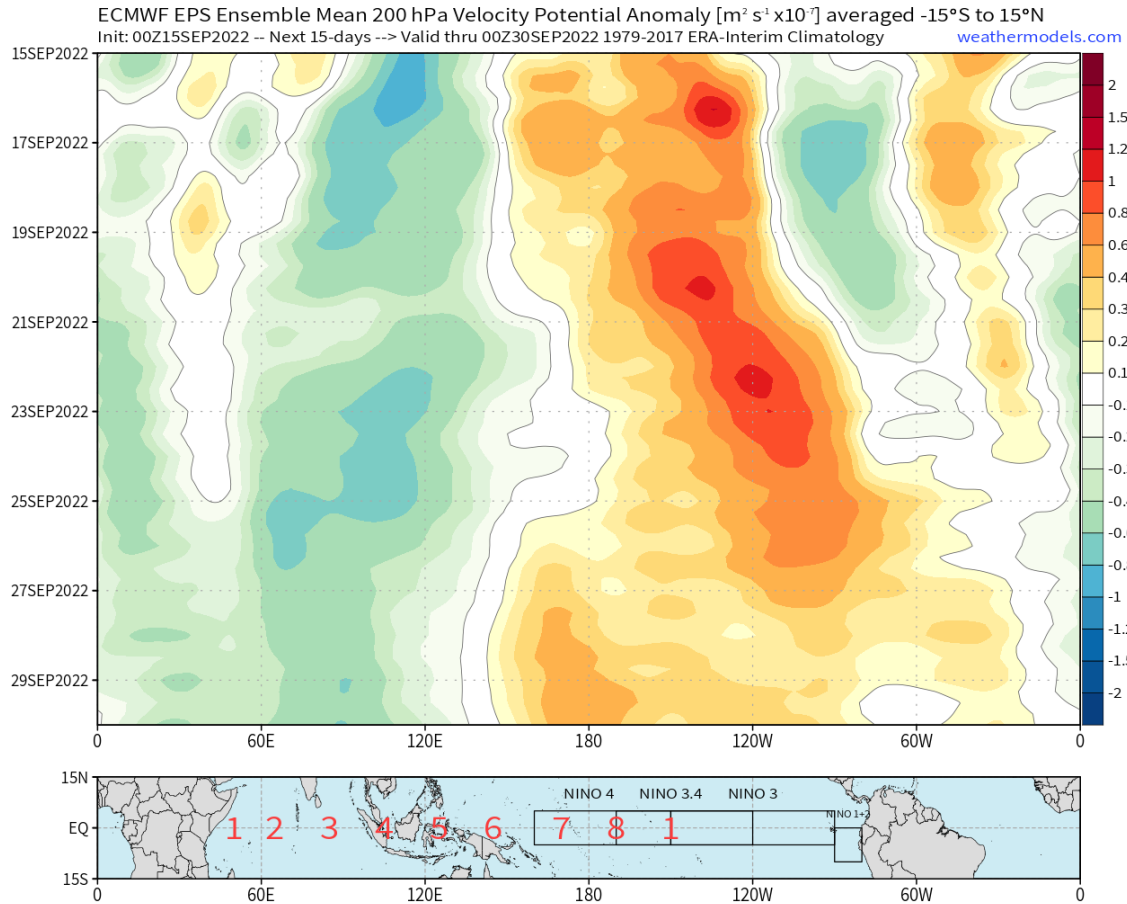
Figure 6: Forecast upper-level velocity potential pattern by the ECMWF model. Figure courtesy of weathermodels.com.

The Climate Forecast System is generally forecasting favorable wind shear patterns over the Atlantic for the next two weeks, with below-normal shear predominately being forecast for the tropical Atlantic during this time (Figure 7). We also note that the Climate Forecast System is forecasting hurricane favorable lower- and upper-level winds over the Caribbean, which is one of the reasons that we are highlighting this region as another area of possible formation as climatological tropical cyclone genesis shifts west towards this region.
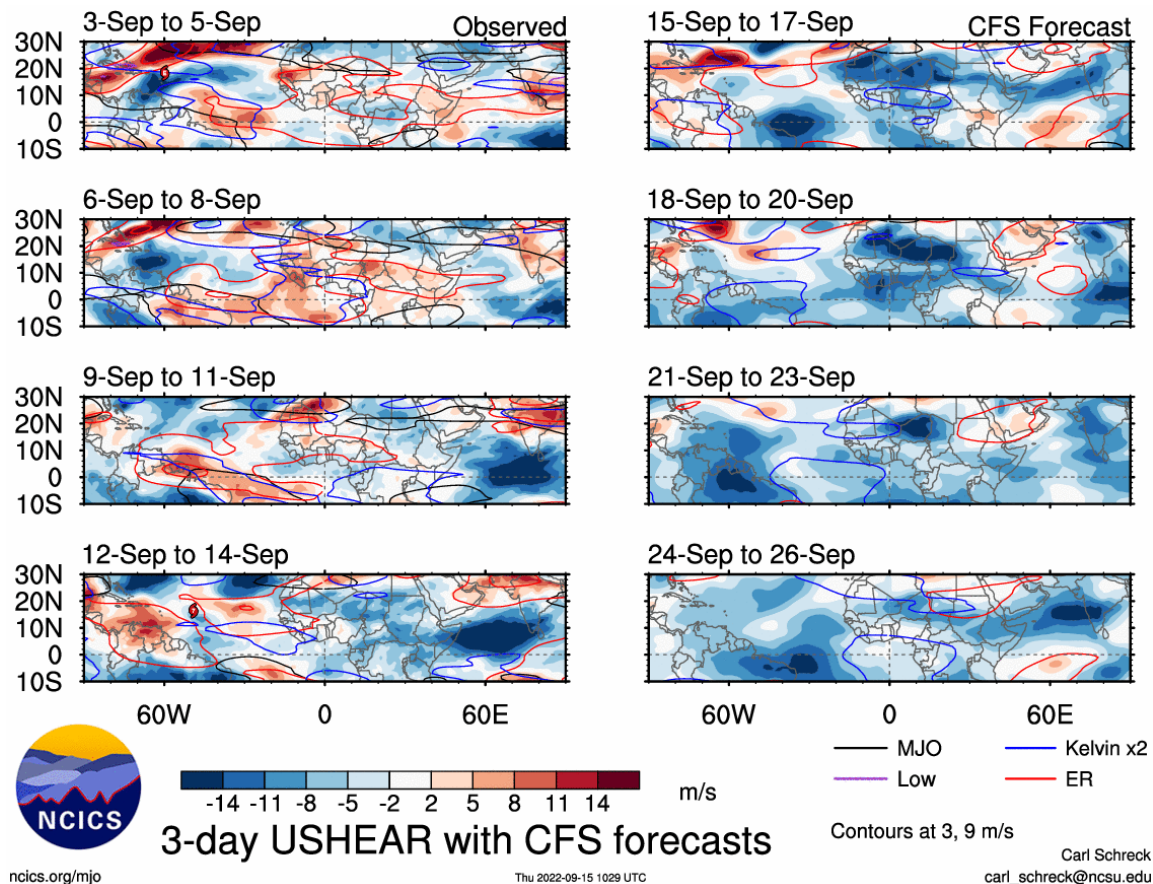
Figure 7: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through September 26. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

While the most recent seasonal forecast called for an above-average season, the odds of reaching above-average seem quite unlikely at this time. However, large-scale atmospheric conditions do look to favor heightened activity over the next two weeks.

3   Upcoming Forecasts

The next two-week forecast will be issued on September 29 for the September 29–October 12 period. The final two-week forecast of 2022 will be issued on October 13.

VERIFICATION OF SEPTEMBER 1–14 FORECAST

The two-week forecast of tropical cyclone activity from September 1–14 verified in the normal category (12–32 ACE). A total of 27 ACE was observed during the two-week period. Danielle and Earl contributed approximately equally to the ACE that was generated during the two-week period. We note that ACE is verified in Greenwich Mean Time, so Fiona's ACE all counts towards the current two-week period.

Table 3 displays the percentage chance that we gave for each category being reached and observed ACE. We assigned the highest probability to the normal category – the category that ended up verifying.

Table 3: ACE forecast for tropical cyclone activity for September 1–14, the probability assigned for each category being reached and observed ACE.

ACE Category	Definition	Probability in each Category	Observed ACE
Above-Normal	Upper Tercile (>32 ACE)	25%	
Normal	Middle Tercile (12–32 ACE)	70%	27
Below-Normal	Lower Tercile (<12 ACE)	5%	