COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 18–31, 2022

We believe that the most likely category for Atlantic hurricane activity in the next two weeks is normal (70%), with above-normal (15%) and below-normal (15%) being less likely.

(as of 18 August 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 (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 1966–2021 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 August 18–31 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 TC activity for August 18–31, 2022.

Parameter	Definition	Probability in Each Category
Above-Normal	Upper Tercile (>21 ACE)	15%
Normal	Middle Tercile (7–21 ACE)	70%
Below-Normal	Lower Tercile (<7 ACE)	15%

2 Forecast

We believe that the next two weeks have the highest probability to be characterized by activity at normal levels (7–21 ACE). The National Hurricane Center is currently monitoring an area located inland over Guatemala for potential development in the southwestern Gulf of Mexico. The Madden-Julian Oscillation (MJO) is currently weak but is forecast to potentially amplify into phases 1–3 in the next two weeks. These phases are typically associated with enhanced Atlantic tropical cyclone (TC) activity.

Figure 1 displays the formation locations of tropical cyclones from August 18–31 for the years from 1966–2021, along with the maximum intensities that these storms reached. Figure 2 displays the August 18–31 forecast period with respect to climatology. This period typically marks the real ramp-up for Atlantic tropical cyclone activity. The primary threat formation area for major hurricanes in late August is in the eastern and central tropical Atlantic.

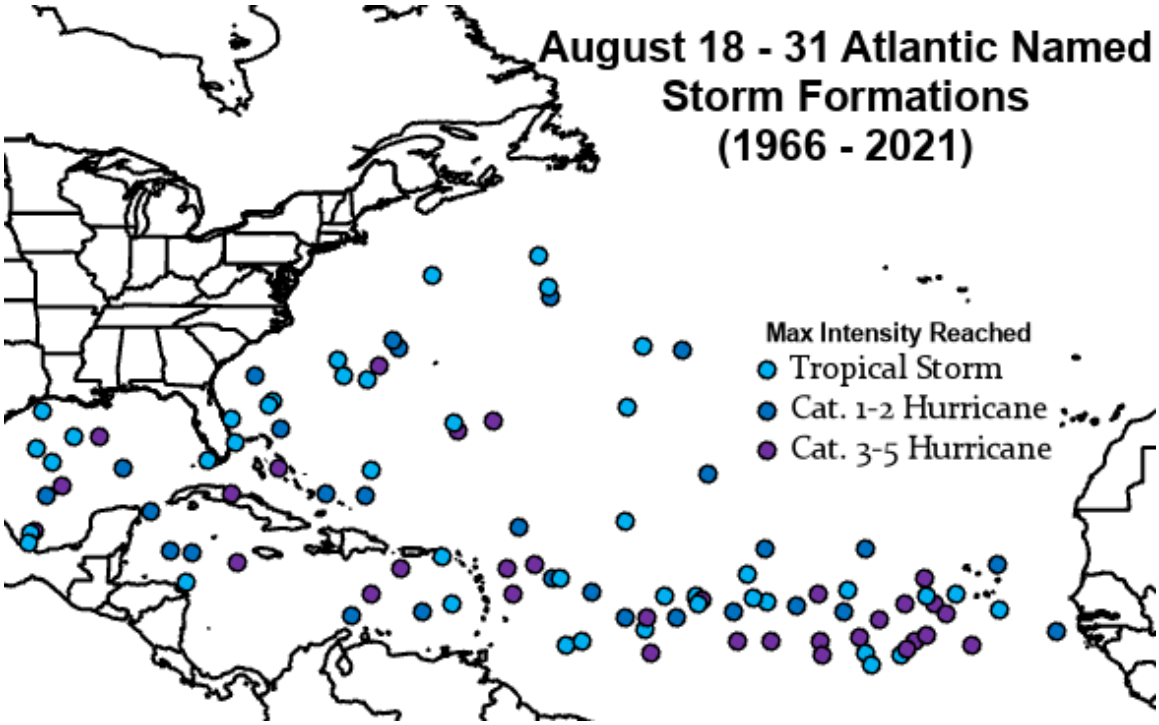

Figure 1: Atlantic named storm formations from August 18–31 during the years from 1966–2021 and the maximum intensity that these named storms reached.

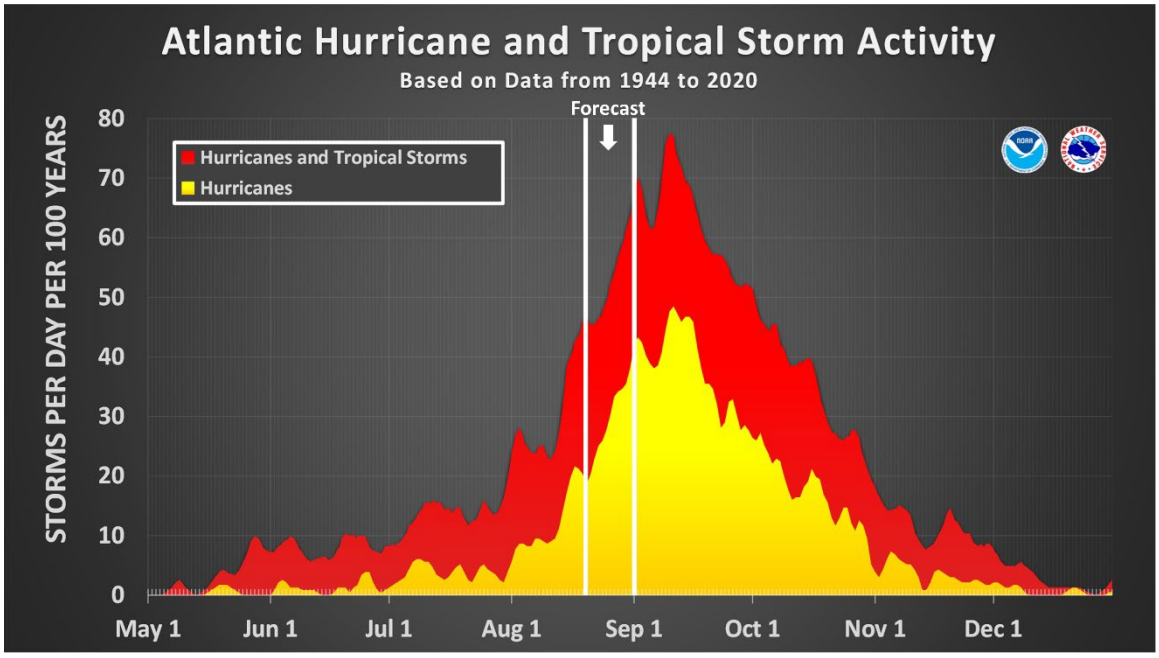

Figure 2: The current forecast period (August 18–31) with respect to climatology. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from August 18–31.

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 has one area that is highlighted for potential TC formation in the next five days. A tropical wave currently located over Guatemala is given a 30% chance of development in the southwestern Gulf of Mexico in the next five days (Figure 3). Any ACE generated by this system would likely be fairly limited.

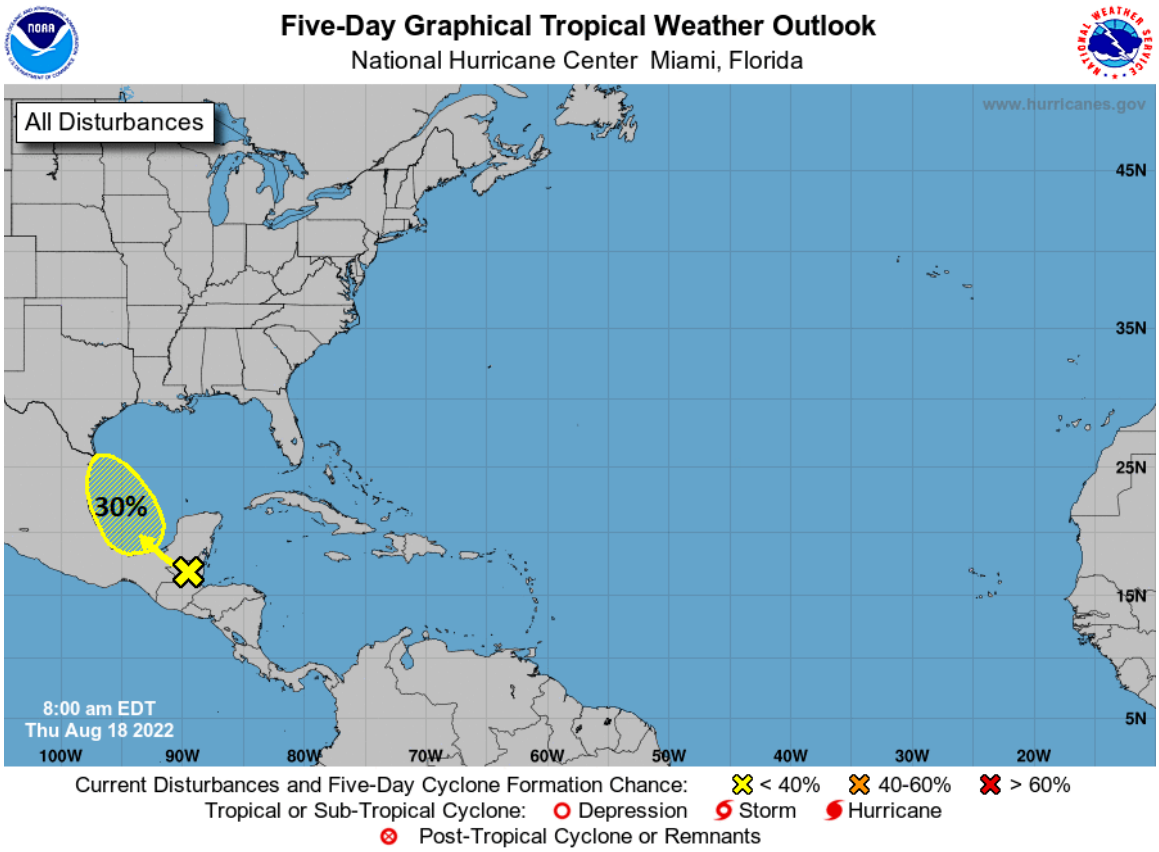

Figure 3: Latest tropical weather outlook from the National Hurricane Center, with five-day probabilities included.

3) Global Model Analysis

Both the ECMWF (Figure 4) and GFS (Figure 5) ensembles have some support for development of a tropical wave currently located in the eastern Atlantic. There is also potential for development in the Gulf of Mexico next week. Another tropical wave

forecast to emerge off of Africa in about one week also has some ensemble support. Lastly, the ECMWF model is also indicating the potential for a vigorous tropical wave emerging off of Africa in about 12 days.

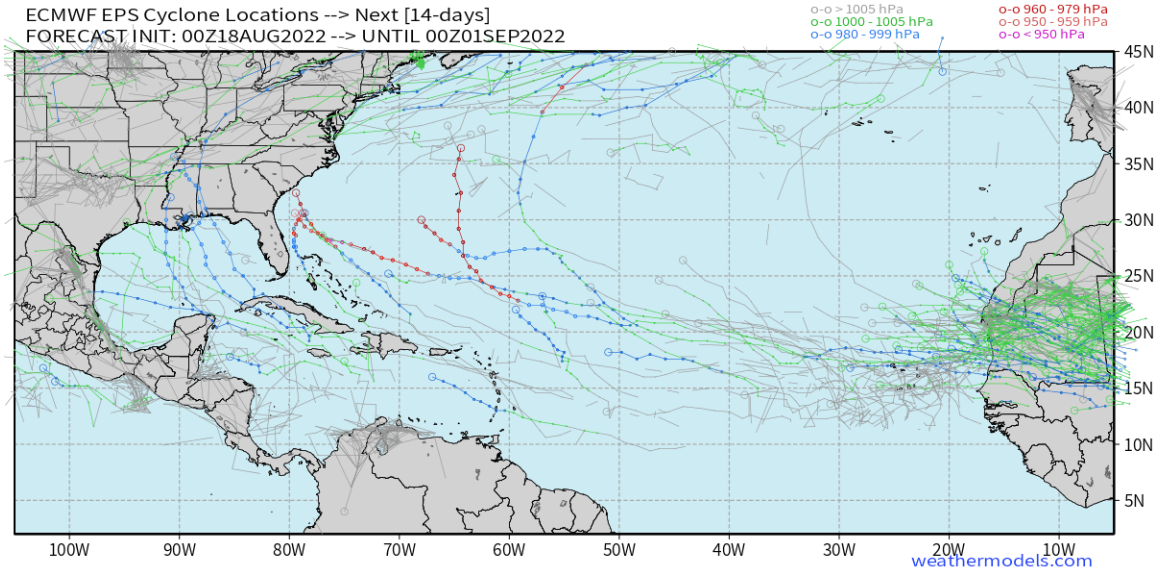

Figure 4: Cyclone locations from the ECMWF ensemble for the next two weeks. Figure courtesy of weathermodels.com

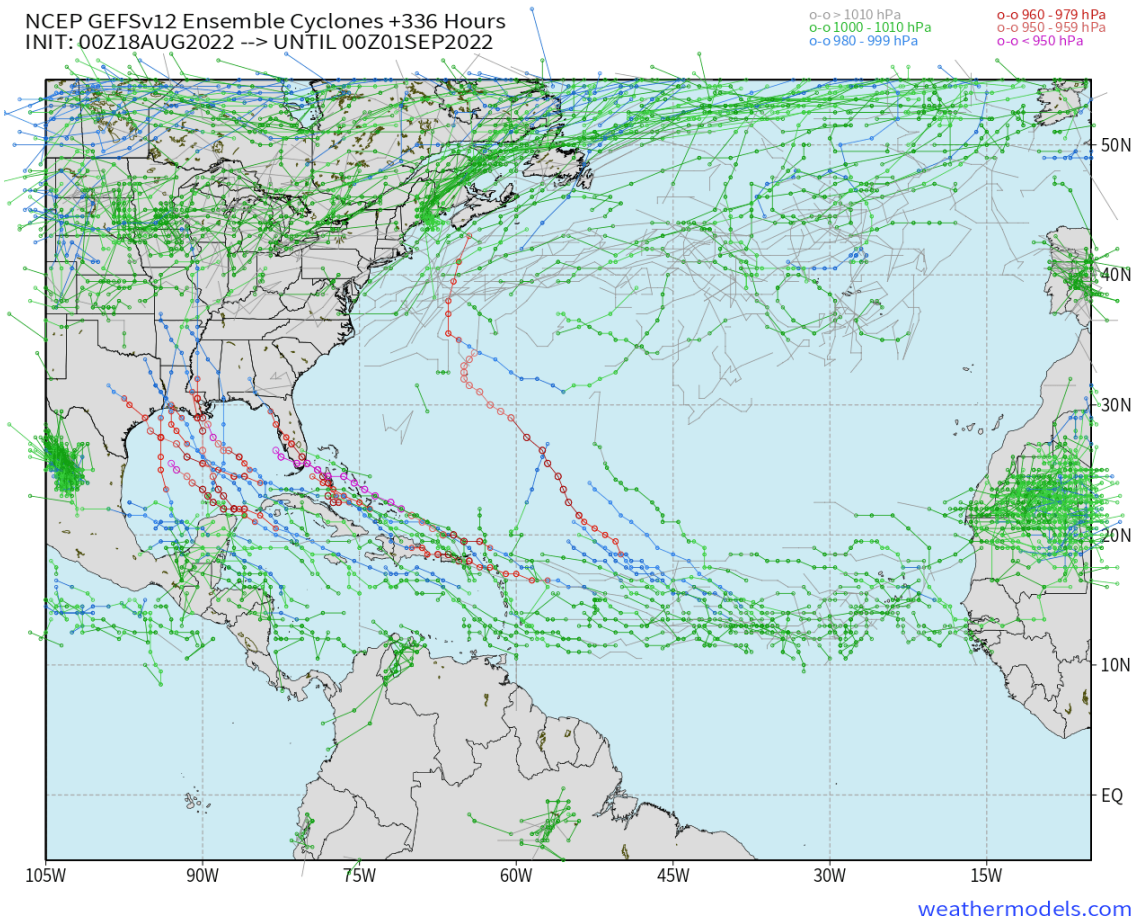

Figure 5: Cyclone locations from the GFS ensemble for the next two weeks. Figure courtesy of weathermodels.com

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 1–3 in the next two weeks (Figure 6). Table 2 summarizes the typical MJO impacts on Atlantic TC activity. Phases 1–3 are typically associated with more active periods for Atlantic hurricane activity.

The Climate Forecast System (CFS) model is generally predicting below-normal vertical wind shear across the tropical Atlantic and Caribbean over the next two weeks (Figure 7). Anomalously weak vertical wind shear is typically associated with phases 1–3. Weaker vertical wind shear is favorable for Atlantic TC formation and intensification.

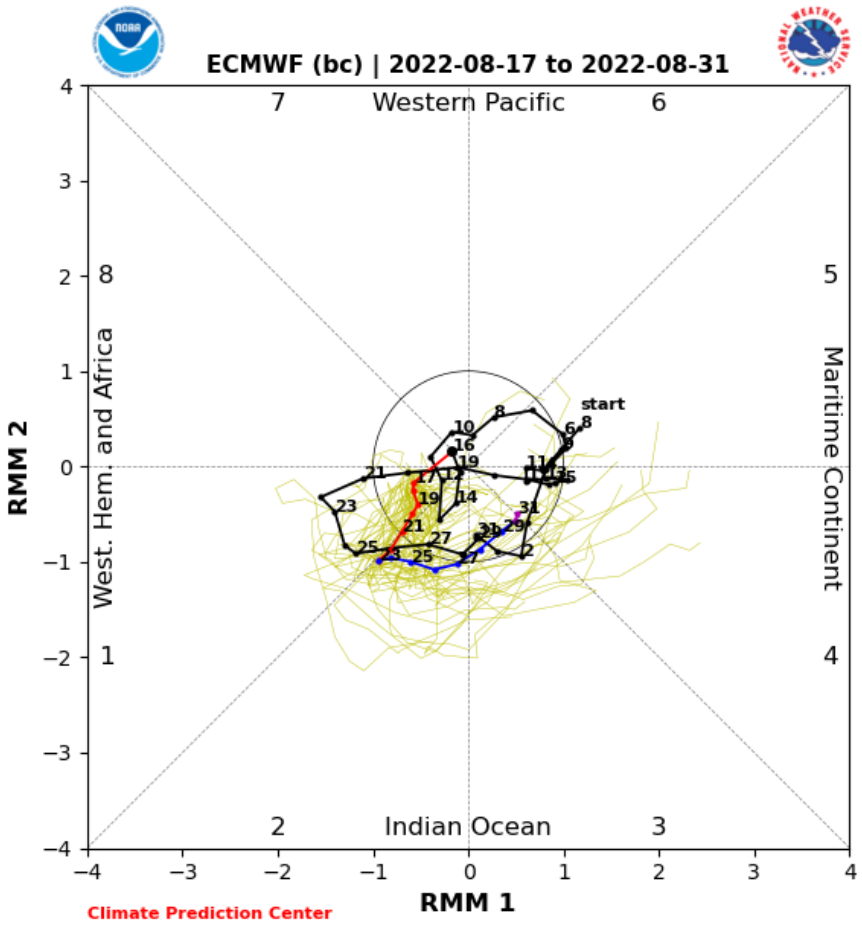

Figure 6: Predicted propagation of the MJO by the ECMWF model (bias-corrected). Figure courtesy of NOAA.

Table 2: Normalized values of named storms (NS), named storm days (NSD), hurricanes (H), hurricane days (HD), major hurricanes (MH), major hurricane days (MHD) and Accumulated Cyclone Energy (ACE) generated by all tropical cyclones forming in each phase of the MJO over the period from 1974-2007. Normalized values are calculated by dividing storm activity by the number of days spent in each phase and then multiplying by 100. This basically provides the level of TC activity that would be expected for 100 days given a particular MJO phase.

MJO Phase	NS	NSD	H	HD	MH	MHD	ACE
Phase 1	6.4	35.9	3.7	17.9	1.8	5.3	76.2
Phase 2	7.5	43.0	5.0	18.4	2.1	4.6	76.7
Phase 3	6.3	30.8	3.0	14.7	1.4	2.8	56.0
Phase 4	5.1	25.5	3.5	12.3	1.0	2.8	49.4
Phase 5	5.1	22.6	2.9	9.5	1.2	2.1	40.0
Phase 6	5.3	24.4	3.2	7.8	0.8	1.1	35.7
Phase 7	3.6	18.1	1.8	7.2	1.1	2.0	33.2
Phase 8	6.2	27.0	3.3	10.4	0.9	2.6	46.8
Phase 1-2	7.0	39.4	4.3	18.1	1.9	4.9	76.5
Phase 6-7	4.5	21.5	2.5	7.5	1.0	1.5	34.6
Phase 1-2 / Phase 6-7	1.6	1.8	1.7	2.4	2.0	3.2	2.2

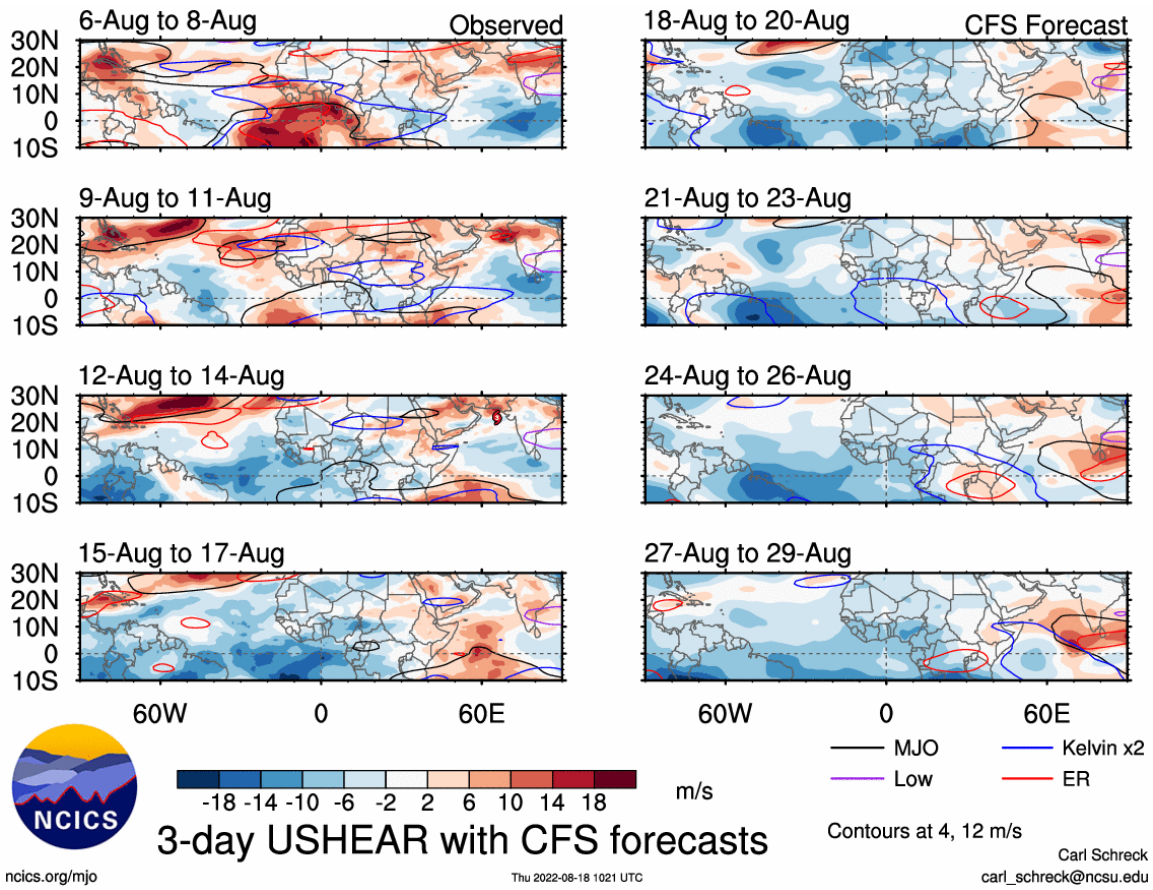

Figure 7: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through August 29. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

The most recent seasonal forecast calls for an above-average season. The next two weeks look most likely to have average activity.

3 Upcoming Forecasts

The next two-week forecast will be issued on September 1 for the September 1–14 period. Additional two-week forecasts will be issued on September 15, September 29, and October 13.

VERIFICATION OF AUGUST 4–17 FORECAST

No tropical cyclone activity occurred during the two-week period from August 4–17. We had assigned a 50% probability of normal activity, with a 40% chance of below-normal 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 being reached and observed ACE.

Table 3: ACE forecast for TC activity for August 4–17, 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)	10%	
Normal	Middle Tercile (2–5 ACE)	50%	
Below-Normal	Lower Tercile (<2 ACE)	40%	0