COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 5 - 18, 2021

We expect that the next two weeks will be characterized by above-normal amounts of hurricane activity.

(as of 5 August 2021)

By Philip J. Klotzbach[1], Michael M. Bell[2], and Jhordanne Jones[3]

In Memory of William M. Gray[4]

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

Department of Atmospheric Science
Colorado State University
Fort Collins, CO 80523
Email: philk@atmos.colostate.edu

[1] Research Scientist
[2] Associate Professor
[3] Graduate Research Assistant
[4] Professor Emeritus

1 Introduction

This is the 13th 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 1966-2019 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 54 years from 1966-2019, each tercile is composed of 18 years. The 18 years with the most active ACE periods from August 5 – 18 are classified as the upper tercile, the 18 years with the least active ACE periods from August 5 – 18 are classified as the lower tercile, while the remaining 18 years are classified as the middle tercile.

Table 1: ACE forecast definition for TC activity for August 5 – 18, 2021.

Parameter	Definition
Above-Normal	Upper Tercile (>6 ACE)
Normal	Middle Tercile (2–6 ACE)
Below-Normal	Lower Tercile (0–1 ACE)

2 Forecast

We believe that the next two weeks will be characterized by activity at above-normal levels (>6 ACE). The National Hurricane Center currently is monitoring two areas for tropical cyclone development in the next five days. The Madden-Julian Oscillation (MJO) is currently located in phase 8 but is forecast to amplify into phases 1-2 in the next two weeks. These two phases are typically associated with enhanced Atlantic tropical cyclone (TC) activity.

Figure 1 displays the formation locations of tropical cyclones from August 5–18 for the years from 1966–2019, along with the maximum intensities that these storms reached. Figure 2 displays the August 5–18 forecast period with respect to climatology. This period typically marks the beginning of the ramp-up for Atlantic tropical cyclone activity. The primary threat formation area for major hurricanes in early- to mid-August is in the tropical Atlantic east of the Lesser Antilles.

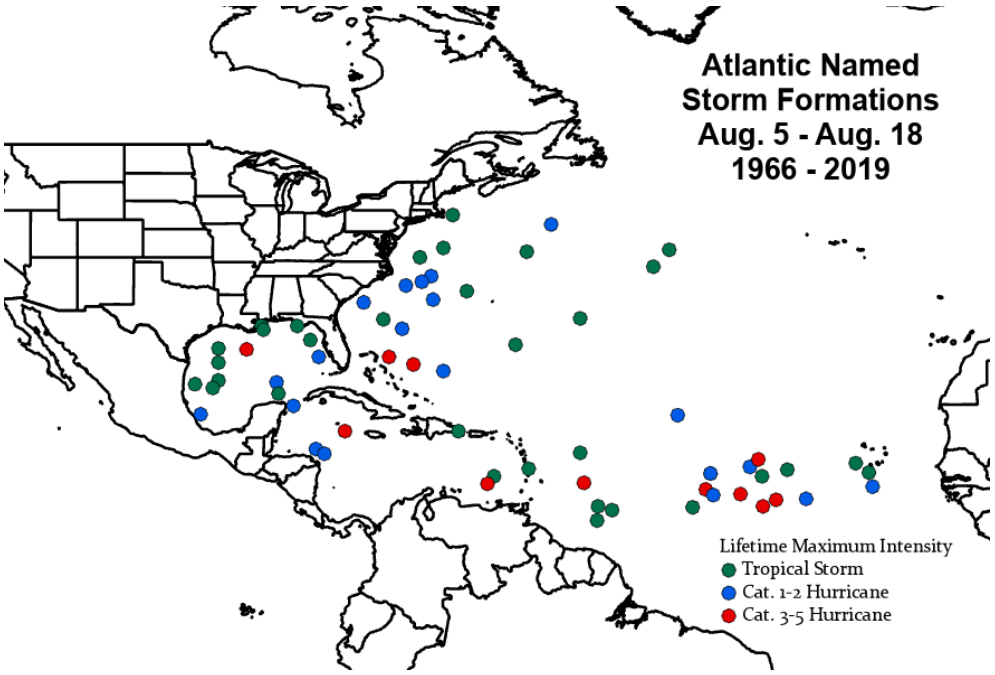

Figure 1: Atlantic named storm formations from August 5 – 18 during the years from 1966-2019 and the maximum intensity that these named storms reached.

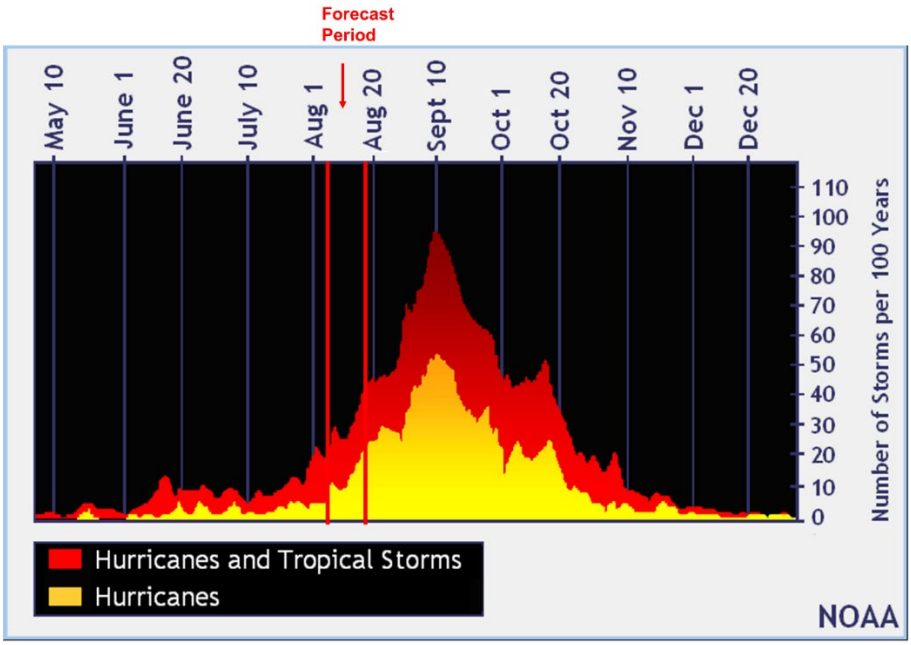

Figure 2: The current forecast period (August 5–18) with respect to climatology. Figure courtesy of NOAA.

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 5–18.

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 two areas that are highlighted for potential TC formation. A region in the central tropical Atlantic has a 20% chance of TC development in the next five days, while an area in the eastern tropical Atlantic has a 60% chance of TC development in the next five days (Figure 3).

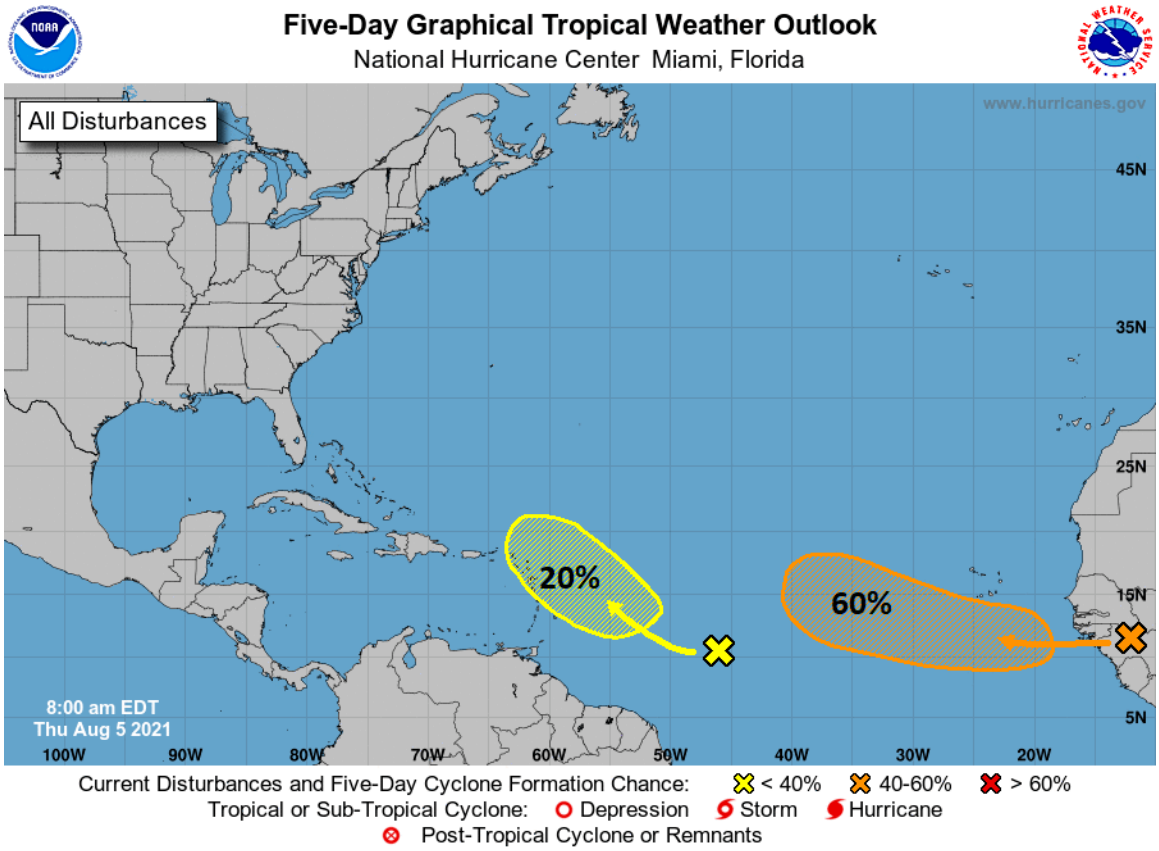

Figure 3: Latest tropical weather outlook from the National Hurricane Center.

3) Global Model Analysis

Both the ECMWF (Figure 4) and GFS (Figure 5) ensembles have some support for development of the two areas that the National Hurricane Center is currently monitoring, with increased support for the region about to emerge off of the west coast of Africa. The ECMWF model is also indicating the potential for another vigorous tropical wave emerging off of the west coast of Africa in 9-10 days.

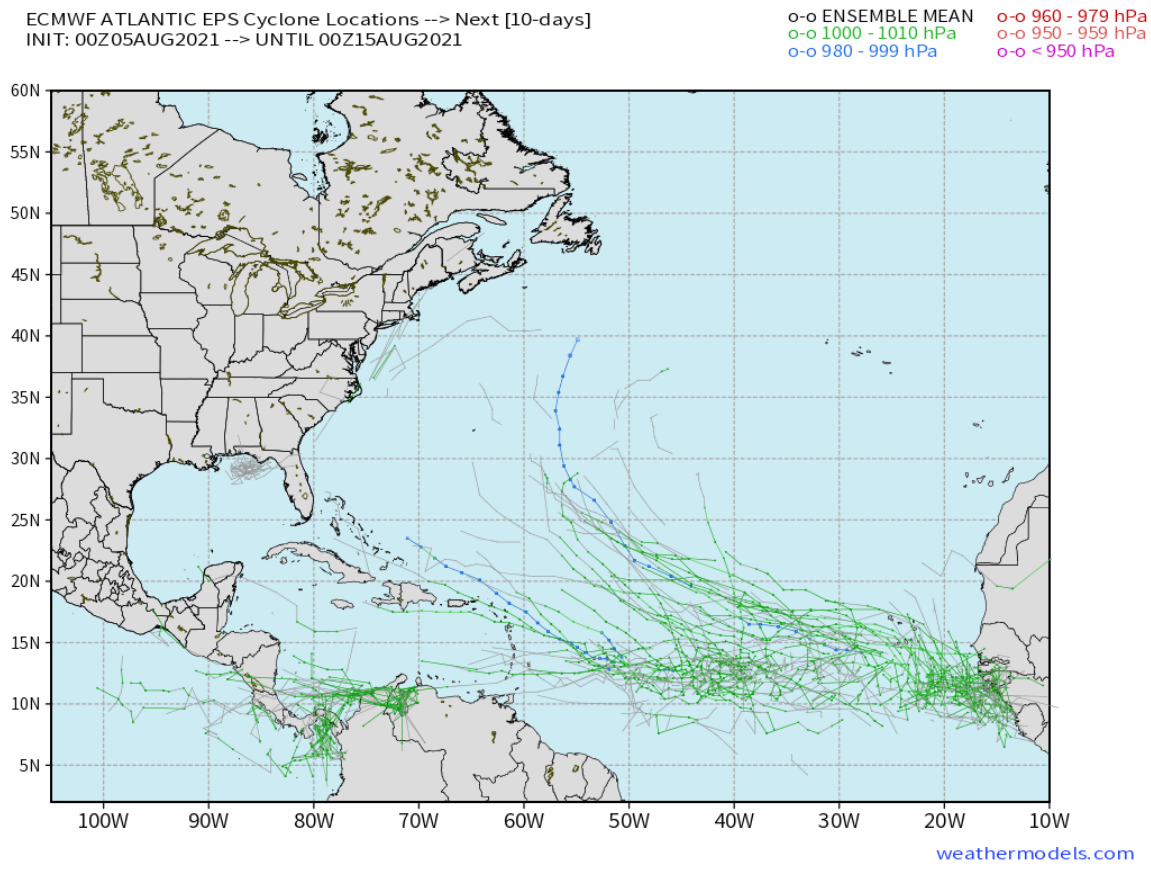

Figure 4: Cyclone locations from the ECMWF EPS ensemble for the next ten days. Figure courtesy of weathermodels.com

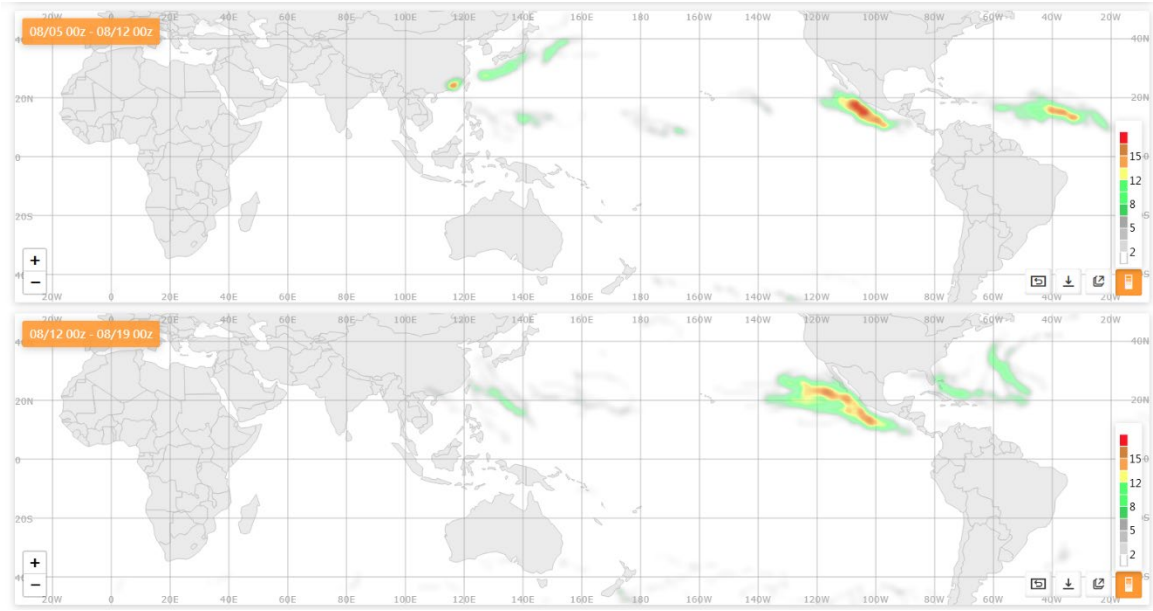

Figure 5: Track density from the GEFS ensemble for the next two weeks. Figure courtesy of the Central Weather Bureau.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 8 over the Maritime Continent. The MJO is forecast to amplify into phases 1-2 in the next two weeks (Figure 6). Table 2 summarizes the typical MJO impacts on Atlantic TC activity. Phases 1-2 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 1-2. Weaker vertical wind shear is favorable for Atlantic TC formation and intensification.

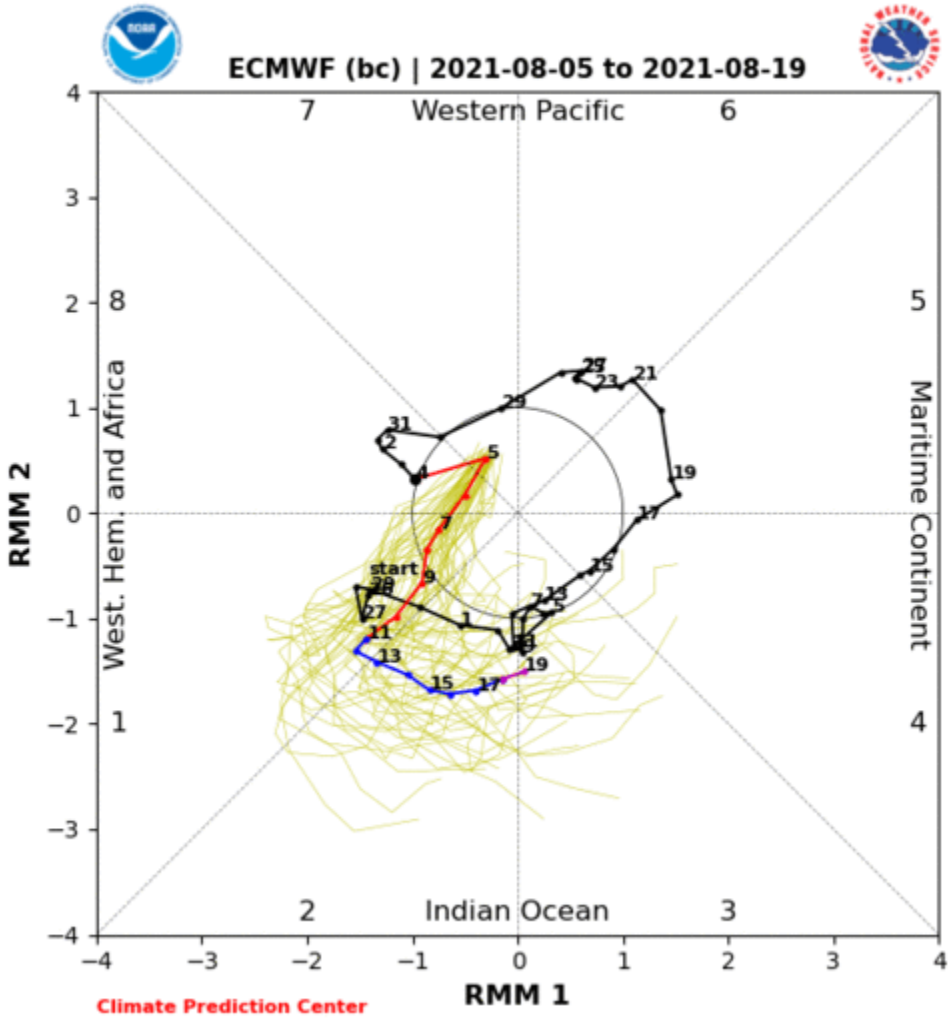

Figure 6: Predicted propagation of the MJO by the ECMWF model (bias-corrected). Figure courtesy of NOAA.

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

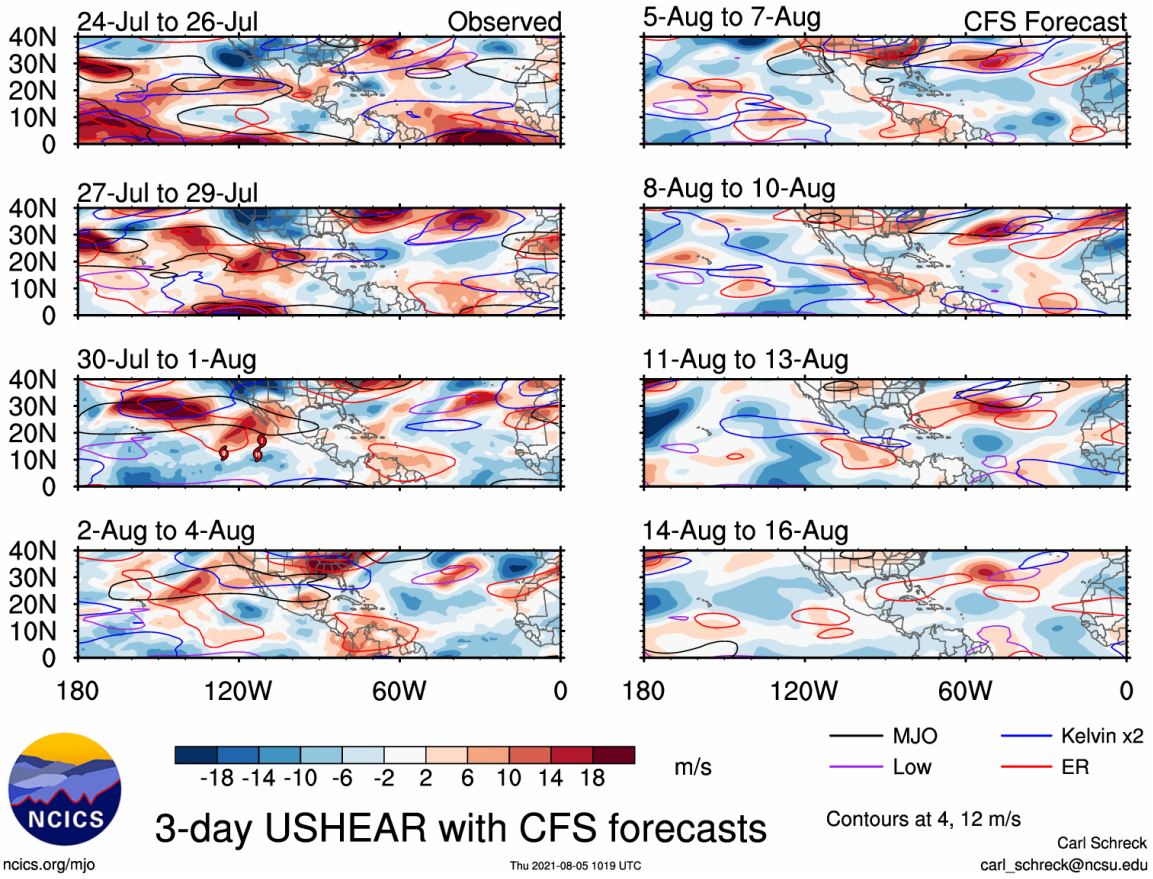

Figure 7: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through August 16. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

The most recent seasonal forecast calls for an above-average season. The next two weeks look to be in line with the above-average seasonal forecast.

3 Upcoming Forecasts

The next two-week forecast will be issued on August 19 for the August 19 – September 1 period. Additional two-week forecasts will be issued on September 2, September 16, September 30, and October 14.