COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 19 – SEPTEMBER 1, 2020

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

(as of 19 August 2020)

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 12th year that we have issued shorter-term forecasts of tropical cyclone activity (TC) 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 19 – September 1 are classified as the upper tercile, the 18 years with the least active ACE periods from August 19 – September 1 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 19 – September 1, 2020.

Parameter	Definition
Above-Normal	Upper Tercile (>22 ACE)
Normal	Middle Tercile (7–22 ACE)
Below-Normal	Lower Tercile (<7 ACE)

2 Forecast

We believe that the next two weeks will be characterized by above-average TC activity (>22 ACE). The National Hurricane Center has three areas that they are currently monitoring for tropical cyclone (TC) development. While the various global and regional models have varying solutions as to how intense these systems will get, each of these has the potential to generate moderate levels of ACE. The large-scale pattern looks much more conducive for Atlantic hurricane formation over the next several weeks than it did over the past couple of weeks.

The Madden-Julian Oscillation (MJO) is currently located in phase 8 over the Western Hemisphere. As the MJO continues its eastward propagation, it will likely enhance TC formation chances over the Caribbean and tropical Atlantic. Historically, when the MJO enhances convection over Africa and the Indian Ocean, it reduces vertical wind shear over the Atlantic, thereby making conditions more favorable for TC formation and intensification.

Figure 1 displays the formation locations of tropical cyclones from August 19–September 1 for the years from 1966–2019 (e.g., the satellite era), along with the maximum intensities that these storms reached. Figure 2 displays the August 19–

September 1 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.

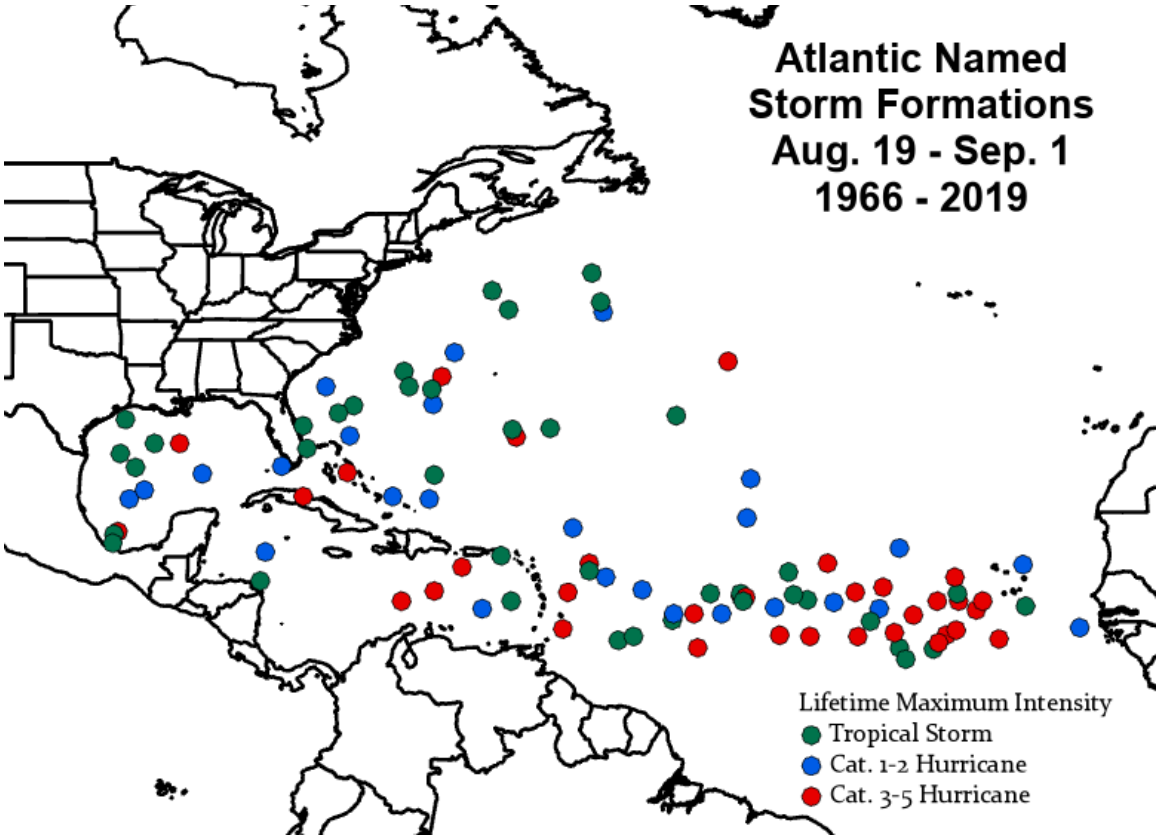

Figure 1: Atlantic named storm formations from August 19 – September 1 during the years from 1966-2019 and the maximum intensity that these named storms reached.

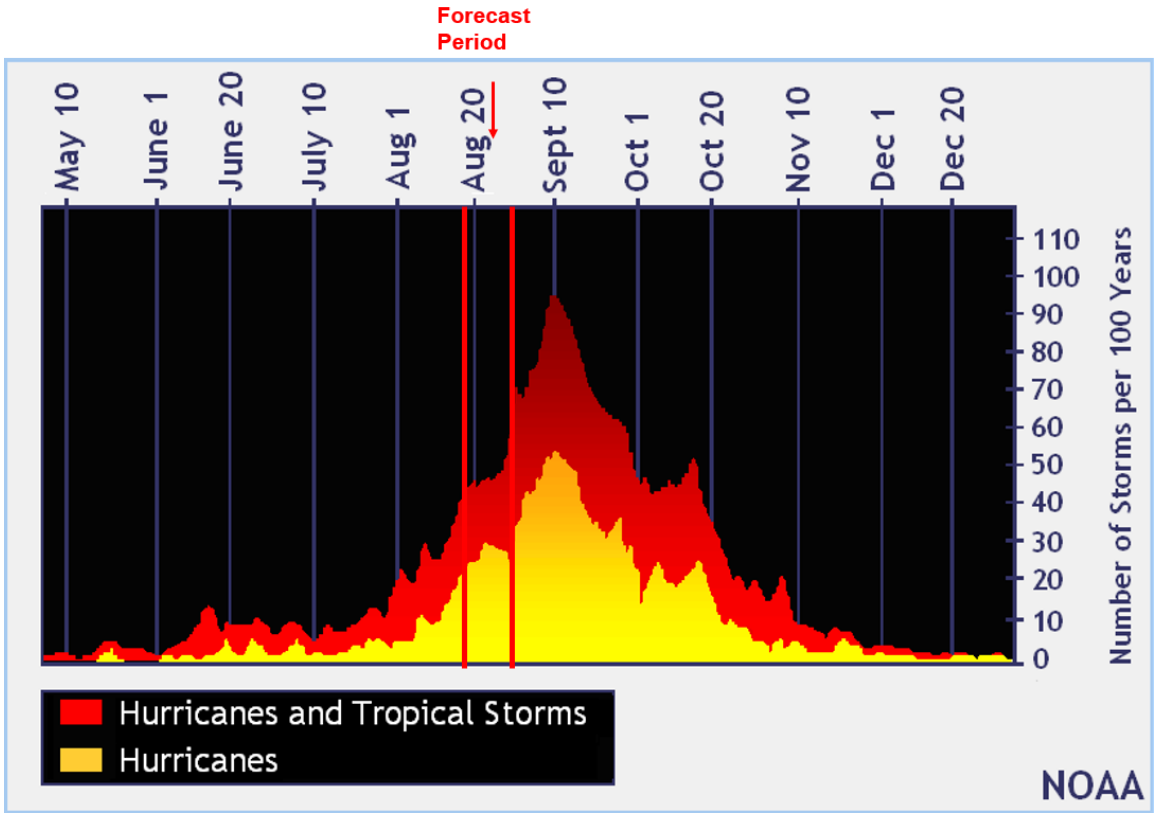

Figure 2: The current forecast period (August 19–September 1) with respect to climatology. Figure courtesy of NOAA.

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 19–September 1.

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 three areas in the tropical Atlantic and Caribbean with a chance of development in the next five days, with two of these having a high chance of development (Figure 3). The global and regional models vary considerably with how much intensification these systems may undergo, but each of these could generate moderate levels of ACE depending on their exact track.

3) Global Model Analysis

Both the GFS and ECMWF ensembles have some support for development of all three disturbances currently highlighted in the most recent tropical weather outlook from NHC.

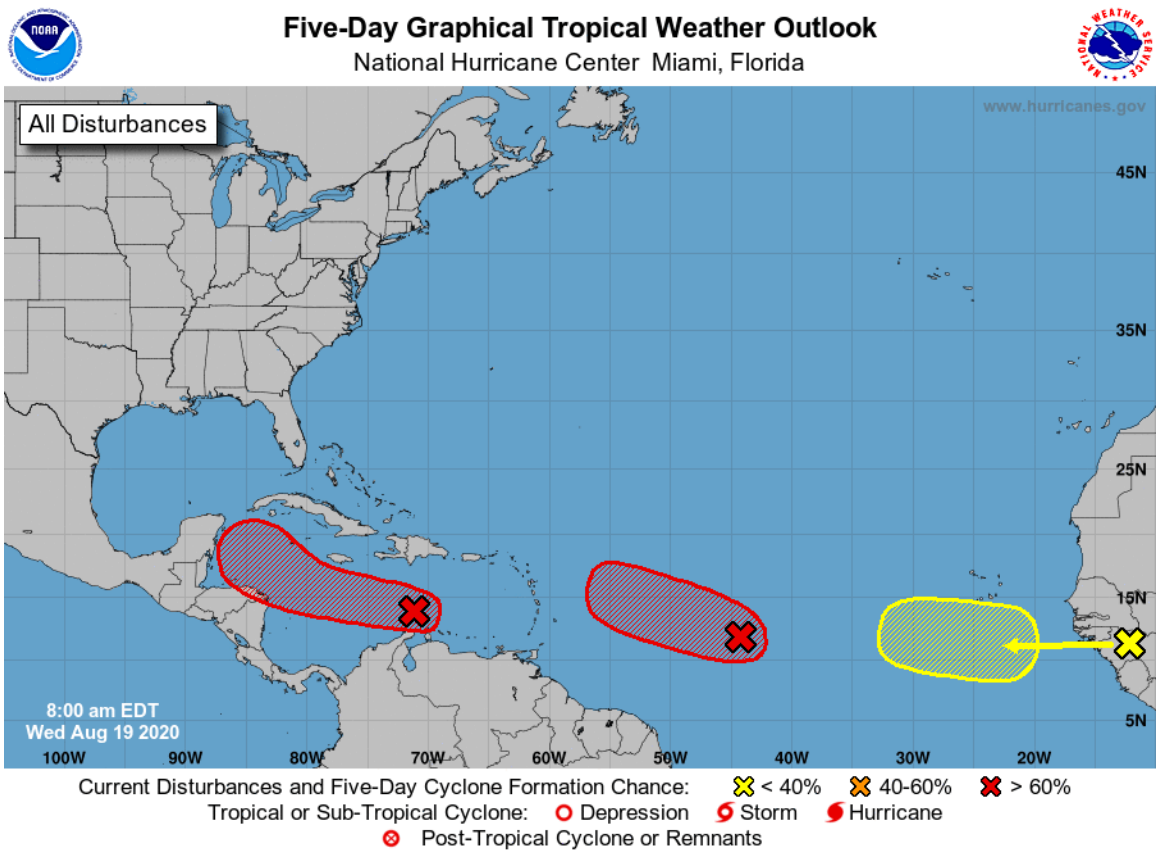

Figure 3: Current five-day Tropical Weather Outlook from the National Hurricane Center. The areas highlighted in red have a high chance of TC formation in the next five days.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 8 over the Western Hemisphere. The MJO is forecast to propagate into phase 1 and 2 over the next two weeks (Figure 4). Table 2 summarizes the typical MJO impacts on Atlantic TC activity. In general, phases 1 and 2 of the MJO are associated with active periods for Atlantic hurricane activity. In addition, the upper-level velocity potential field favors upward motion over Africa and the Indian Ocean, with suppressed vertical motion over the tropical Pacific (Figure 5). This large-scale setup reduces vertical wind shear over the tropical Atlantic and Caribbean.

The Climate Forecast System (CFS) model is generally predicting below-normal shear across the eastern tropical Atlantic and Caribbean over the next two weeks, with slightly elevated shear across the central tropical Atlantic (Figure 6).

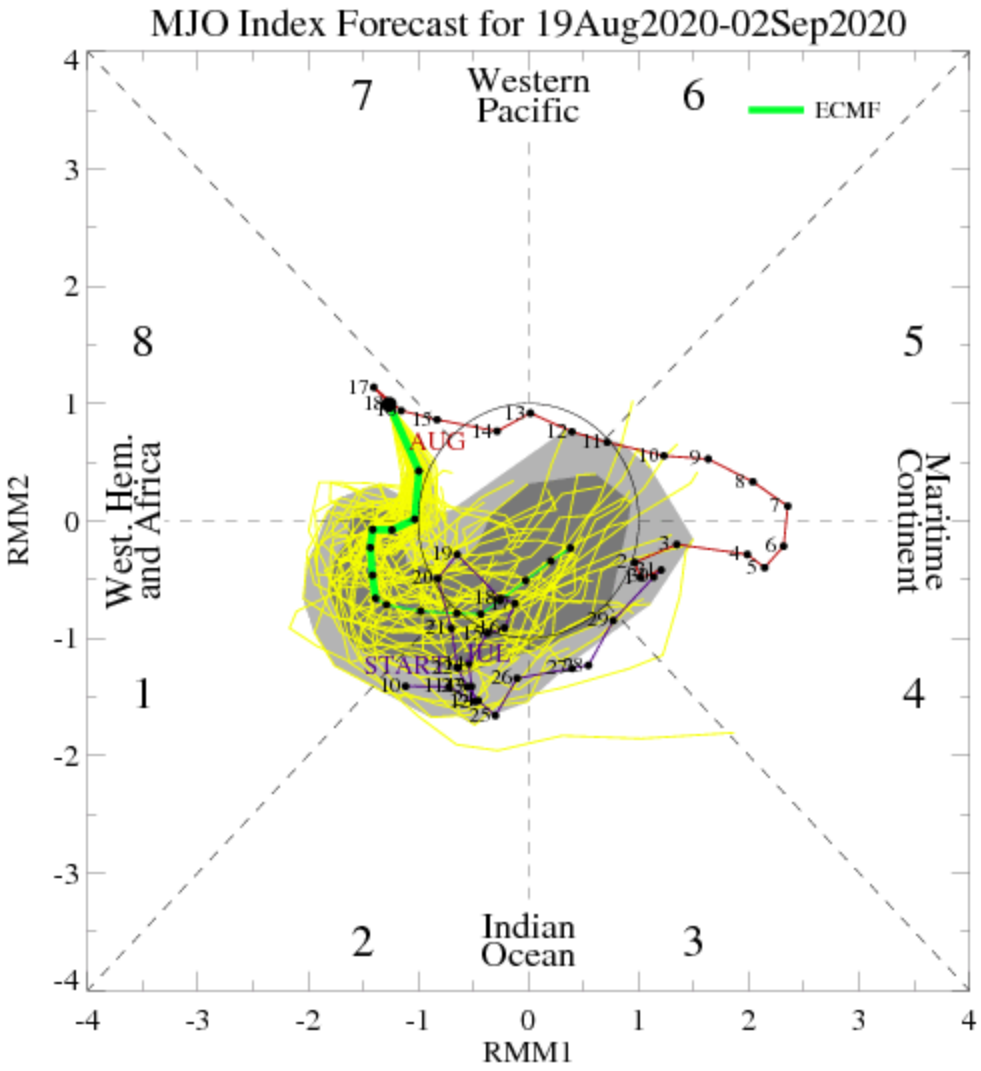

Figure 4: Predicted propagation of the MJO by the ECMWF model. Figure courtesy of NOAA.

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

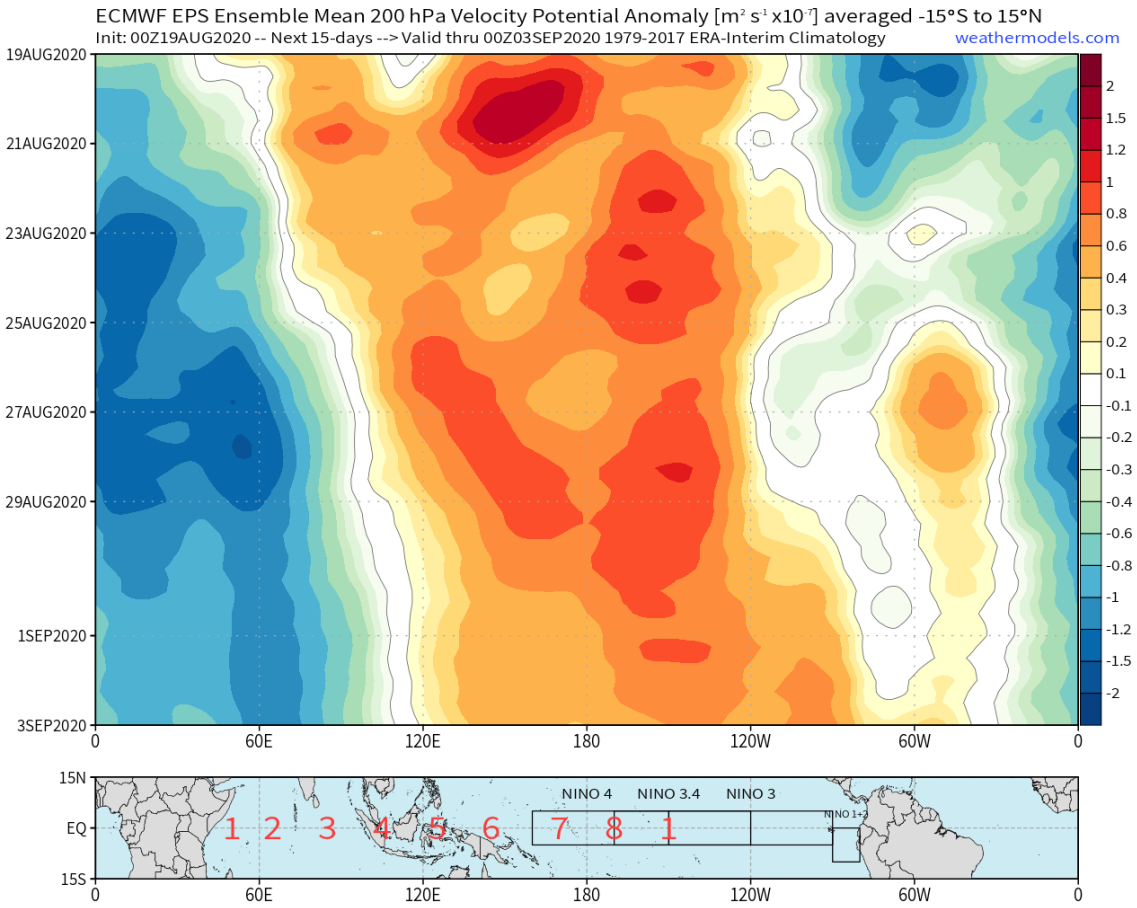

Figure 5: Ensemble mean forecast from the ECMWF model for 200 hPa velocity potential anomalies over the next 15 days.

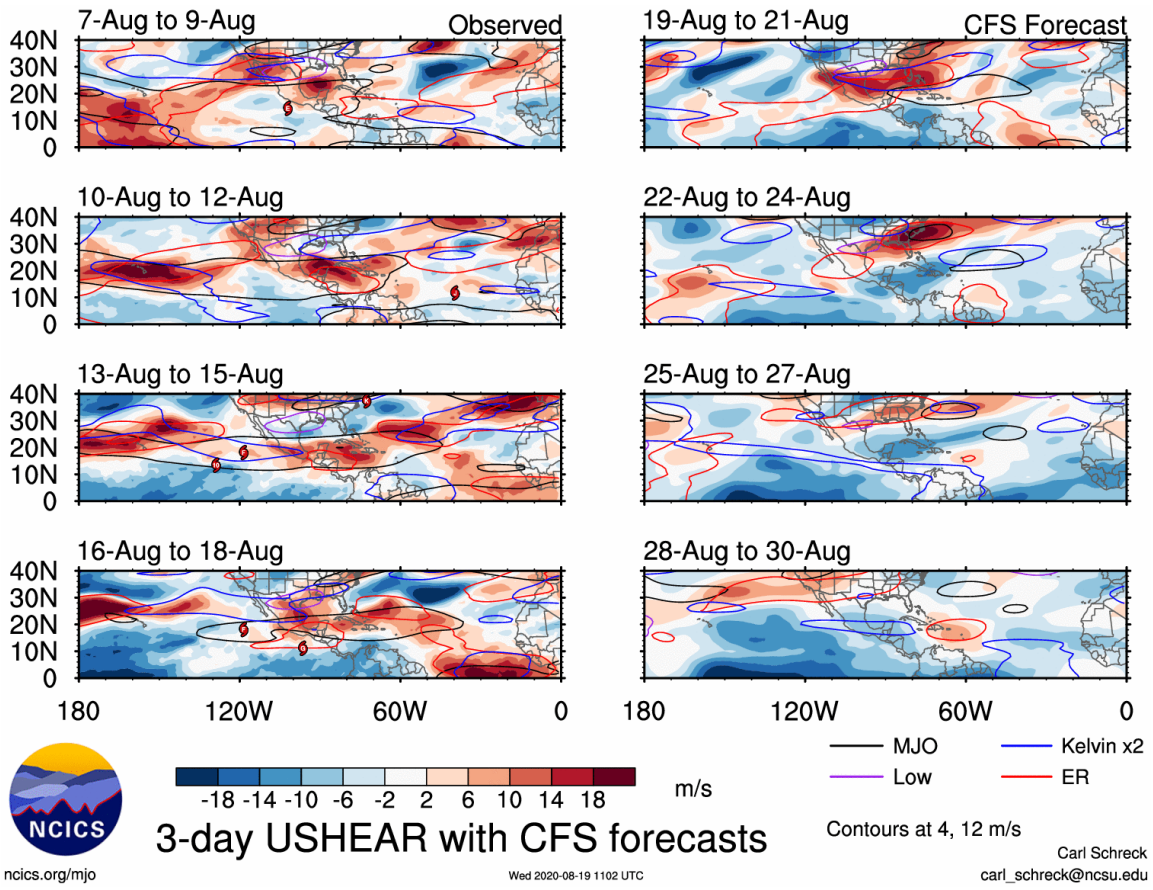

Figure 6: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through August 30. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

The most recent seasonal forecast calls for an extremely active season. The next two weeks look like they should generate above-normal activity.

3 Upcoming Forecasts

The next two-week forecast will be issued on September 2 for the September 2 – September 15 period. Additional two-week forecasts will be issued on September 16, September 30, and October 14.

VERIFICATION OF AUGUST 5–18, 2020 FORECAST

The two-week forecast of tropical cyclone activity from August 5–18, 2020 correctly verified in the normal category. 2-6 ACE were forecast, and 3 ACE were observed. Josephine and Kyle generated the limited ACE that was observed during the two-week period.