

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE
ACTIVITY FROM SEPTEMBER 2 – SEPTEMBER 15, 2020**

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

(as of 2 September 2020)

By Philip J. Klotzbach¹, Michael M. Bell², and Jhordanne Jones³

In Memory of William M. Gray⁴

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 September 2 – September 15 are classified as the upper tercile, the 18 years with the least active ACE periods from September 2 – September 15 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 September 2 – September 15, 2020.

Parameter	Definition
Above-Normal	Upper Tercile (>34 ACE)
Normal	Middle Tercile (12–34 ACE)
Below-Normal	Lower Tercile (<12 ACE)

2 Forecast

We believe that the next two weeks will be characterized by above-normal TC activity (>34 ACE). Tropical Storm Nana is likely to generate 2-3 ACE before making landfall in Belize tomorrow, while Tropical Storm Omar will likely generate only minimal ACE before being sheared apart. The National Hurricane Center has two areas that they are currently monitoring for tropical cyclone (TC) development. While the various global models have varying solutions as to how intense these systems will get, each of these could generate low to moderate levels of ACE. The global models also highlight additional potential TC formation off of the west African coast in the 5-12-day period. The large-scale pattern looks to remain quite conducive for Atlantic hurricane formation and intensification.

The Madden-Julian Oscillation (MJO) is currently located in phase 3 over the Indian Ocean but is forecast to continue its eastward propagation towards the Maritime Continent at a somewhat weaker magnitude. The latest large-scale forecast from the ECMWF continues to indicate enhanced vertical motion over Africa and the Indian Ocean with suppressed vertical motion over the tropical Pacific, which typically favors Atlantic hurricane activity.

Figure 1 displays the formation locations of TCs from September 2 – September 15 for the years from 1966–2019 (e.g., the satellite era), along with the maximum intensities that these storms reached. Figure 2 displays the September 2 – September 15 forecast period with respect to climatology. This period typically marks the climatological peak of the Atlantic hurricane season. The primary threat formation area for major hurricanes in early- to mid-September is in the eastern and central tropical Atlantic.

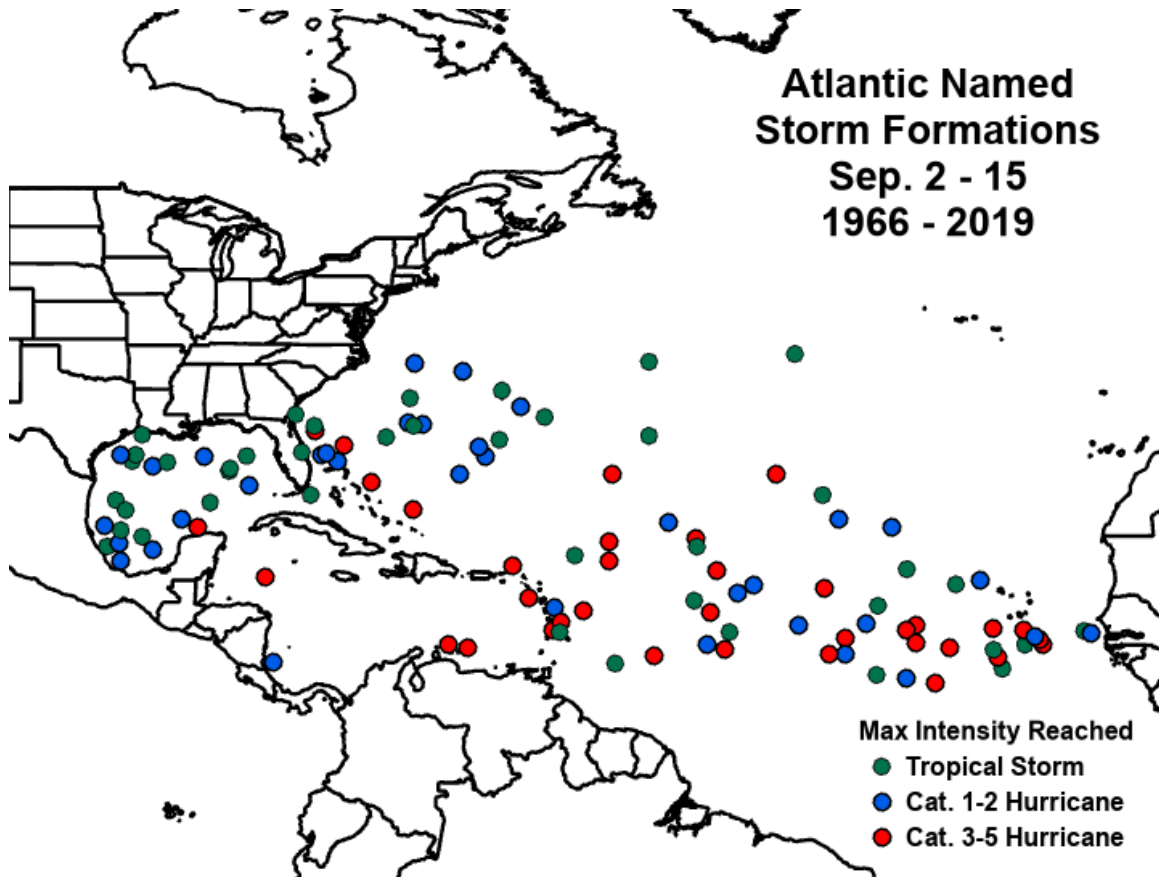


Figure 1: Atlantic named storm formations from September 2 – September 15 during the years from 1966-2019 and the maximum intensity that these named storms reached.

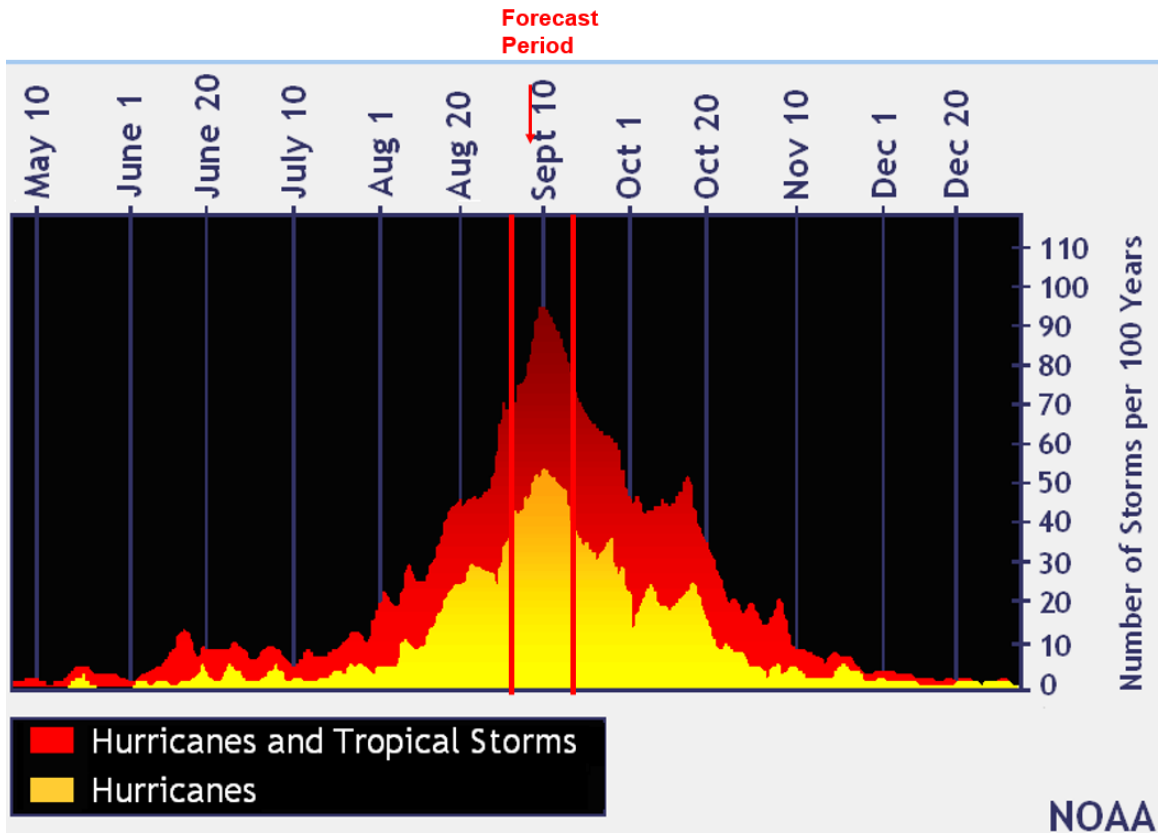


Figure 2: The current forecast period (September 2 – September 15) with respect to climatology. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from September 2 – September 15.

1) Current Storm Activity

Tropical Storm Nana is forecast to reach hurricane strength as it approaches Belize and should make landfall in Belize tomorrow. We estimate ACE generated by Nana at 2-3. Tropical Storm Omar will likely generate minimal ACE (<1 ACE) before being sheared apart.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook has two areas in the tropical Atlantic with a 30% (yellow highlighted region) and 60% (orange highlighted region) chance of TC development in the next five days (Figure 3). The global models vary considerably with how much intensification these systems may undergo, but each of these could generate low to moderate levels of ACE depending on their exact track.

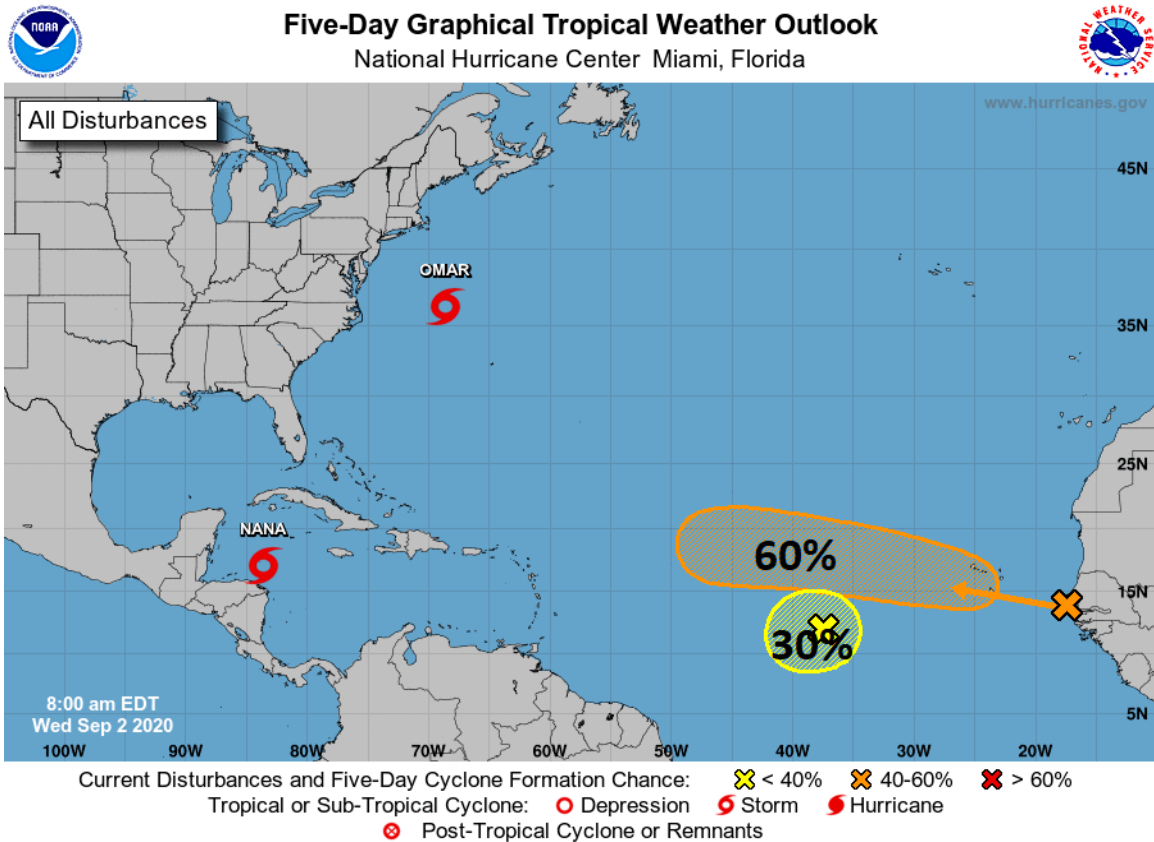


Figure 3: Current five-day Tropical Weather Outlook from the National Hurricane Center. Probabilities in this plot are chances for TC formation in the next 5 days.

3) Global Model Analysis

Both the GFS and ECMWF ensembles have some support for development of these two disturbances as highlighted by NHC. In addition, a vigorous easterly wave looks to emerge off of the coast of West Africa in about five days and potentially develop into a TC shortly thereafter. Longer-range model guidance also highlights other vigorous easterly waves emerging off of Africa in the 7-12-day range.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 3 over the Indian Ocean. The MJO is forecast to propagate into phase 4 and then weaken over the next two weeks, potentially due to the longer-term trend towards La Niña conditions (Figure 4). Table 2 summarizes the typical MJO impacts on Atlantic TC activity. 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).

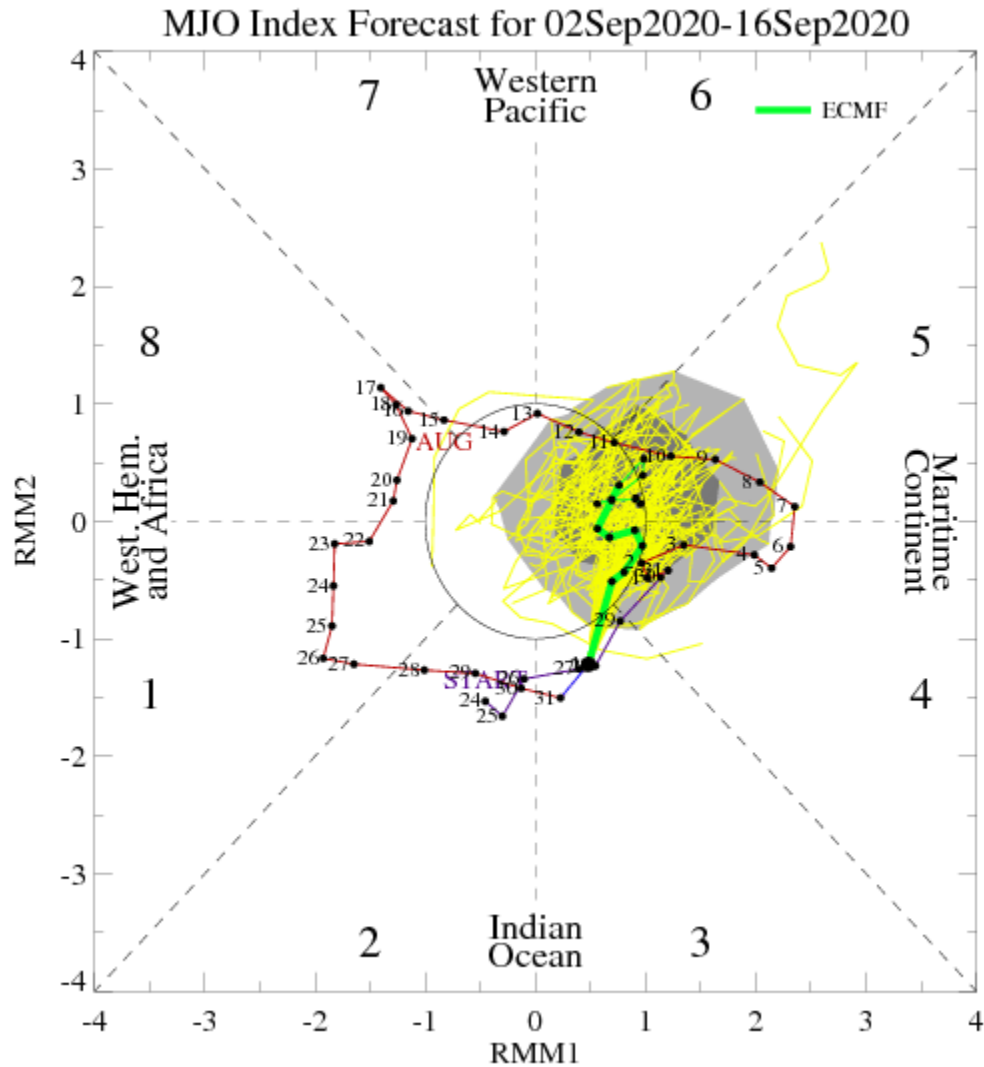


Figure 4: Predicted propagation of the MJO by the ECMWF model. Figure courtesy of NOAA.

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

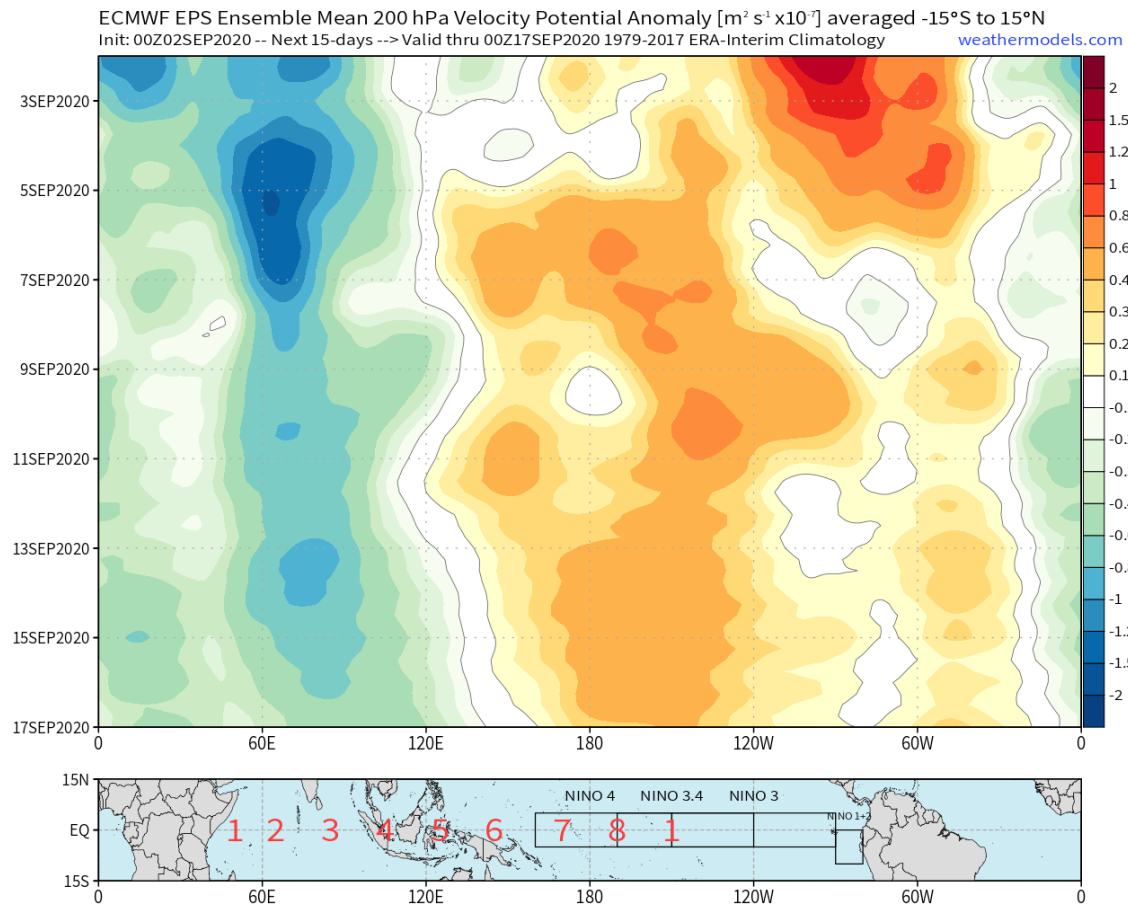


Figure 5: Ensemble mean forecast from the ECMWF model for 200 hPa velocity potential anomalies over the next 15 days.

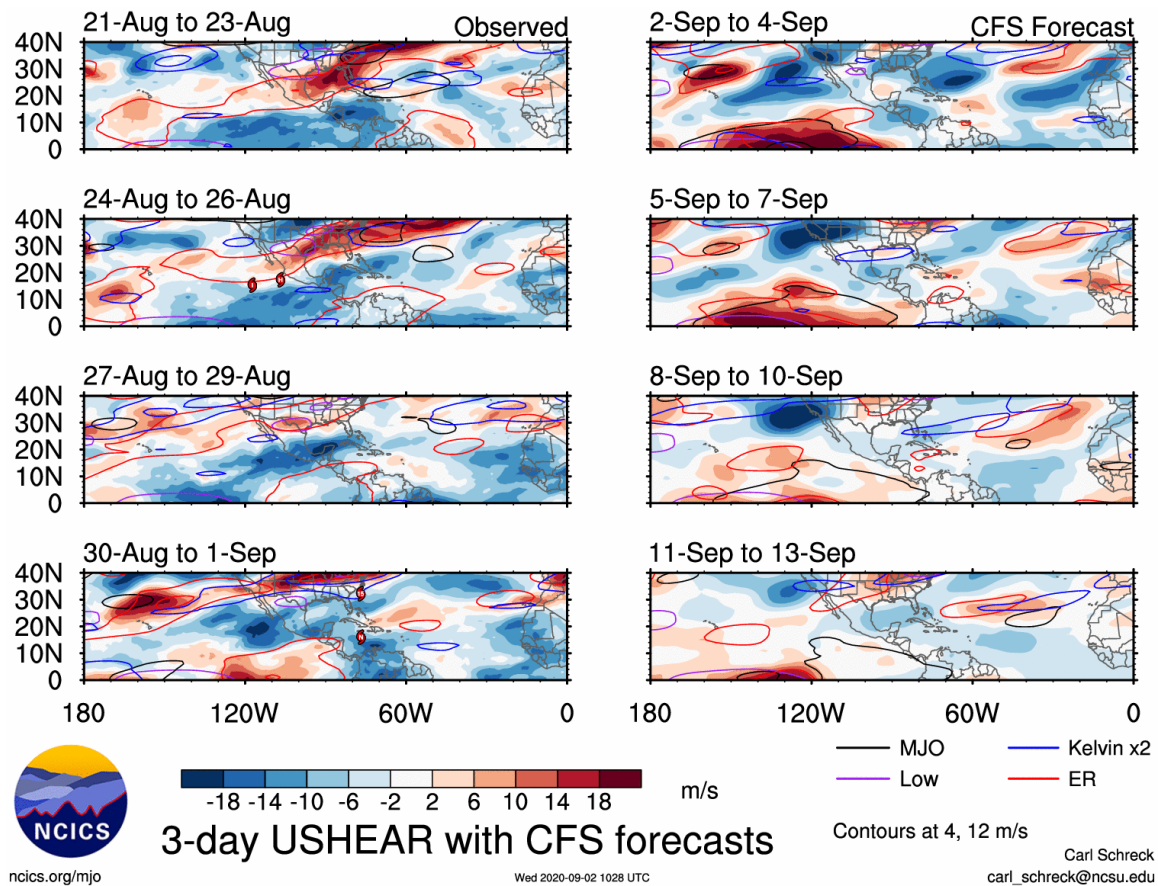


Figure 6: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through September 13. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

The most recent seasonal forecast calls for a very 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 16 for the September 16– 29 period. Additional two-week forecasts will be issued on September 30 and October 14.

VERIFICATION OF AUGUST 19–SEPTEMBER 1, 2020 FORECAST

The two-week forecast of tropical cyclone activity from August 19–September 1, 2020 verified in the normal category (~17 ACE), while above-normal ACE was predicted (>22 ACE). Hurricane Laura generated most of the ACE (12.8 ACE) that occurred during the two-week period, with Marco (3.4 ACE), Nana (0.5 ACE) and Omar (0.1 ACE) generating lower levels of ACE.