

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE
ACTIVITY FROM SEPTEMBER 30 – OCTOBER 13, 2020**

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

(as of 30 September 2020)

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In Memory of William M. Gray⁴

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 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 30 – October 13 are classified as the upper tercile, the 18 years with the least active ACE periods from September 30 – October 13 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 30 – October 13, 2020.

Parameter	Definition
Above-Normal	Upper Tercile (>9 ACE)
Normal	Middle Tercile (4–9 ACE)
Below-Normal	Lower Tercile (<4 ACE)

2 Forecast

We believe that the next two weeks will be characterized by above-normal TC activity (>9 ACE). While there are currently no active tropical cyclones (TCs) in the Atlantic, the National Hurricane Center is currently monitoring an area of low pressure that is forecast to develop in the western Caribbean and has a medium chance of becoming a TC in the next few days. While the various global models have varying solutions as to how intense this cyclone will get, this system could generate small to medium levels of ACE if it were to develop. The global models also highlight additional potential TC formation potential in the western Caribbean and even possibly in the eastern Atlantic (although less likely) in the next two weeks.

The Madden-Julian Oscillation (MJO) is currently located in phase 5 over the Maritime Continent and is forecast to effectively stall over the next two weeks, likely due to the background base state driven by La Niña conditions. The forecast large-scale circulation is generally favorable for Atlantic hurricane activity, with enhanced vertical motion over Africa and the Indian Ocean and suppressed vertical motion over the tropical Pacific, leading to reduced vertical wind shear in the Atlantic Main Development Region (MDR).

Figure 1 displays the formation locations of TCs from September 30 – October 13 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 30 – October 13 forecast period with respect to climatology. The primary threat area for major hurricane formations shifts farther to the west, with formations picking up considerably in the western Caribbean.

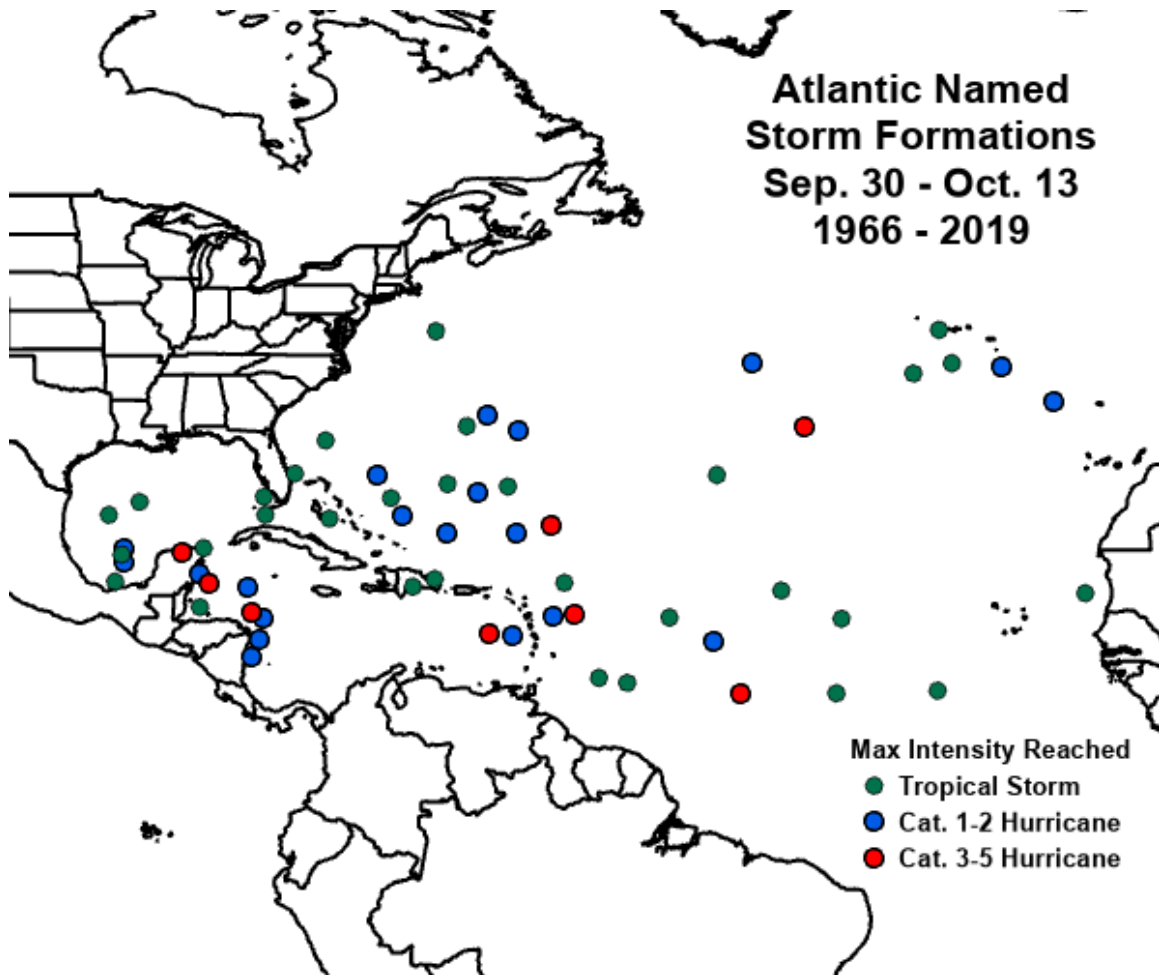


Figure 1: Atlantic named storm formations from September 30 – October 13 during the years from 1966 – 2019 and the maximum intensity that these named storms reached.

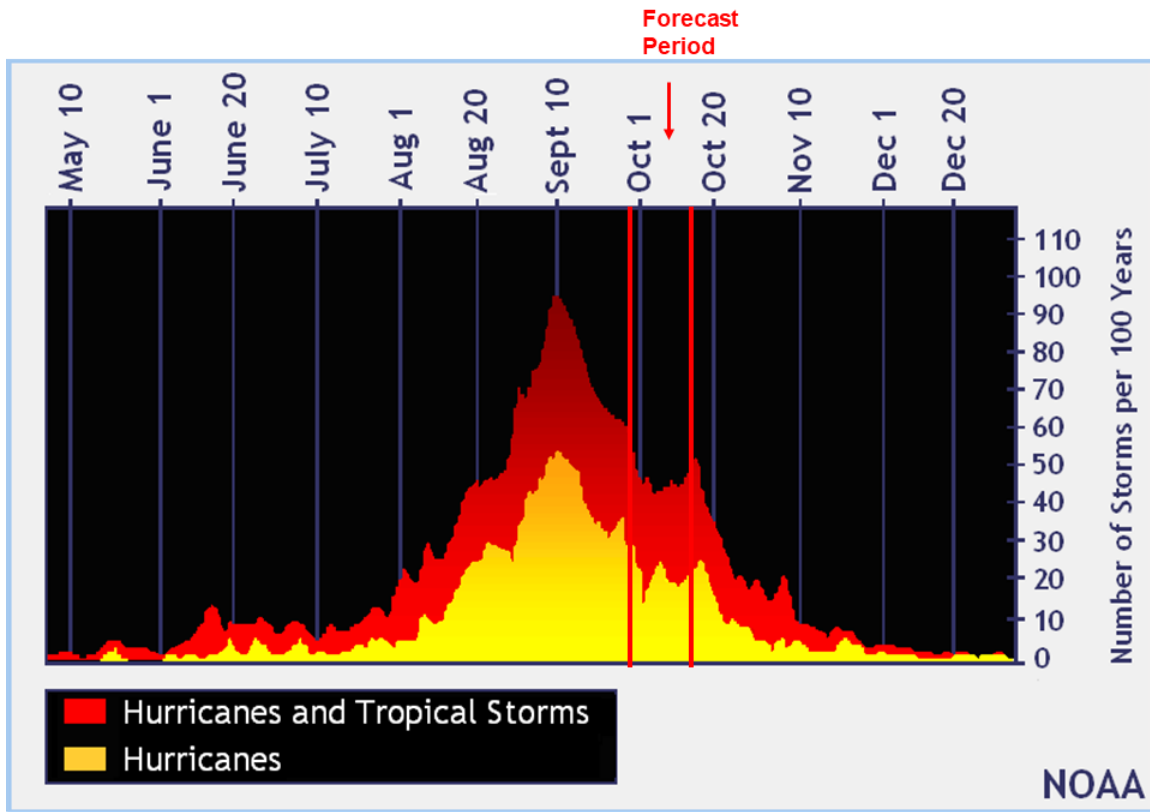


Figure 2: The current forecast period (September 30 – October 13) with respect to climatology. Figure courtesy of NOAA.

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 30 – October 13.

1) Current Storm Activity

There are currently no active tropical cyclones in the Atlantic basin.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook has one area with a medium chance of development in the next five days (Figure 3). This system has the potential to generate low to medium levels of ACE, especially if it can remain over water and not drift for too long over Central America. The models diverge in exactly how much land interaction the system will have.

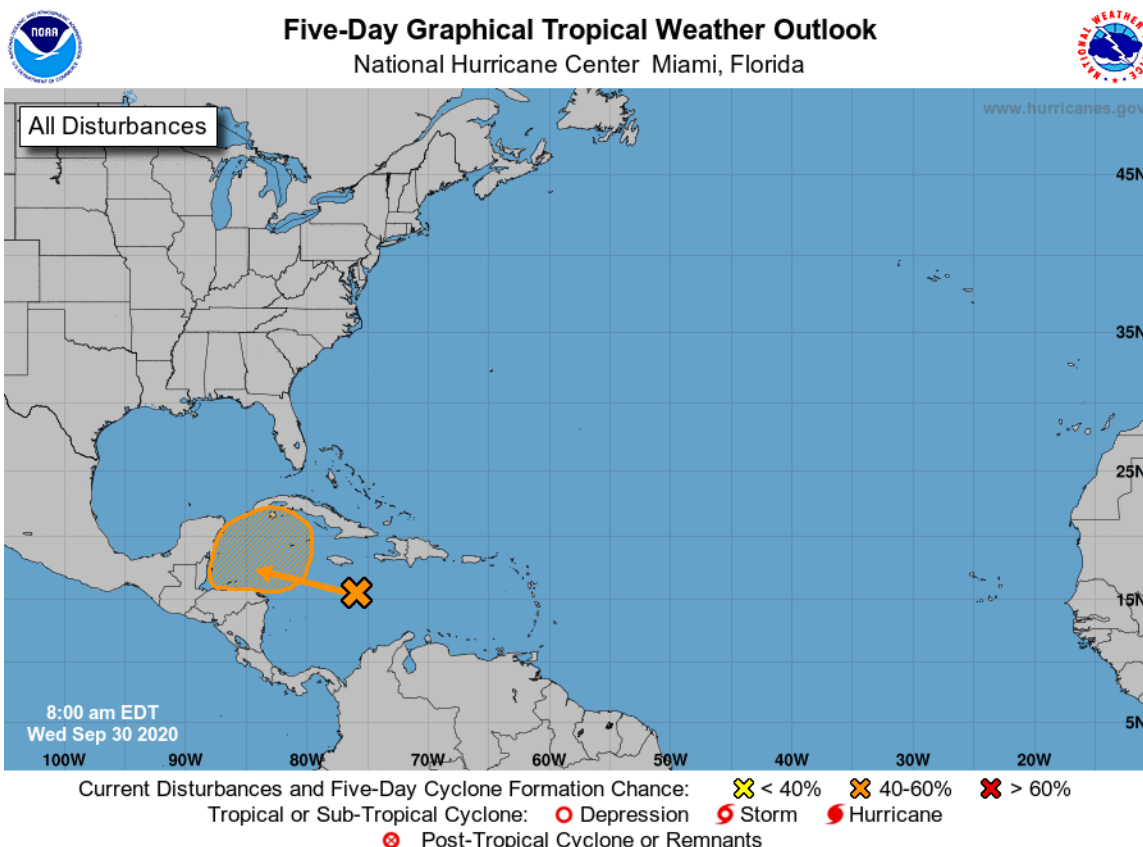


Figure 3: Recent five-day Tropical Weather Outlook from the National Hurricane Center.

3) Global Model Analysis

Both the GFS and ECMWF ensembles have some support for development of the system in the western Caribbean. They also both indicate that there is the potential for additional storm formation in the western Caribbean as well as potentially in the eastern tropical Atlantic in the next two weeks. While it would be very late climatologically to get a TC formation in the eastern Atlantic, it would not be unprecedented.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 5 over the Maritime Continent. The MJO is forecast to stagnate in phase 5 over the next two weeks, likely 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 generally favors upward motion over Africa and the Indian Ocean, with suppressed vertical motion over the tropical Pacific (Figure 5).

The Climate Forecast System (CFS) model is generally predicting below-normal shear across most of the tropical Atlantic and Caribbean, especially during week two (Figure 6).

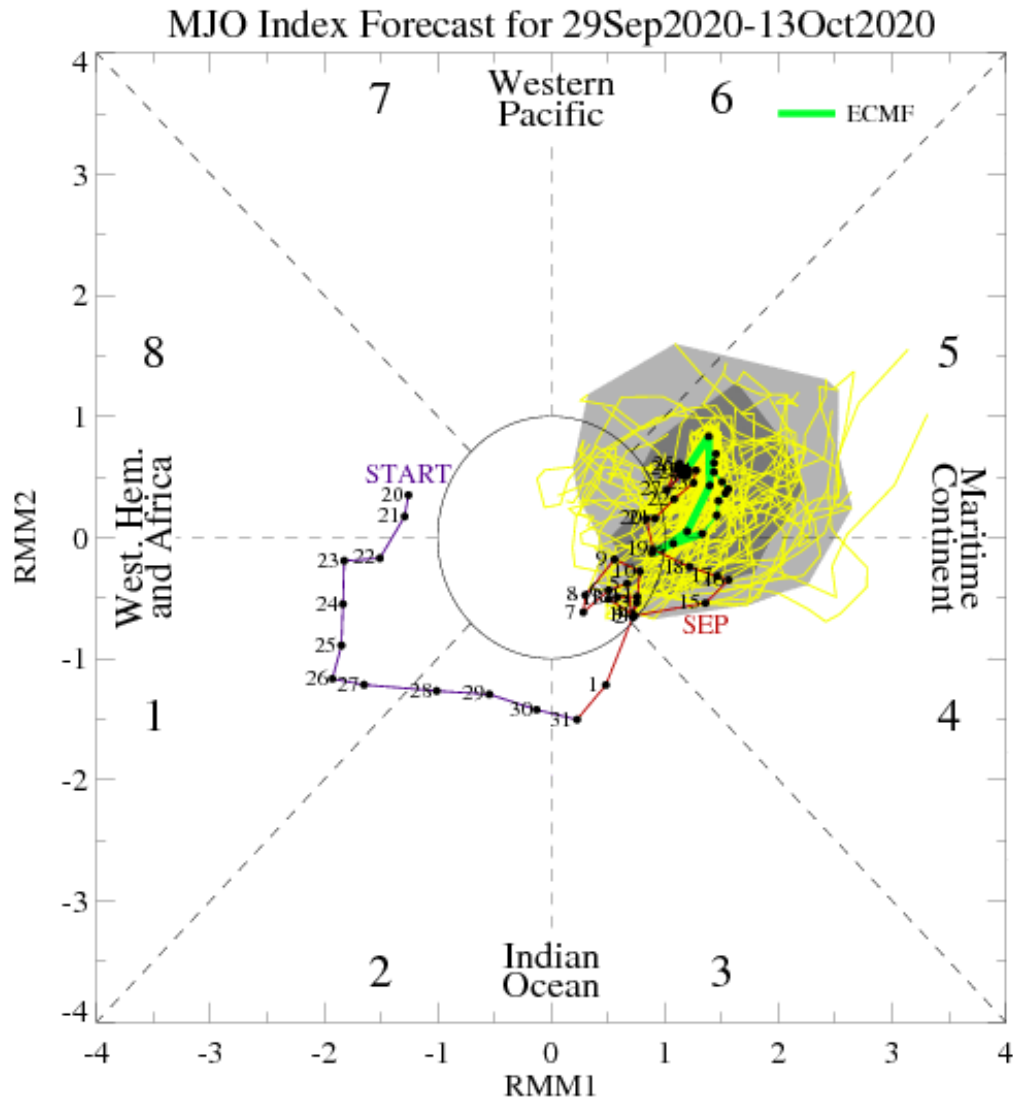


Figure 4: Predicted propagation of the MJO by the ECMWF model. Figure courtesy of NOAA.

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

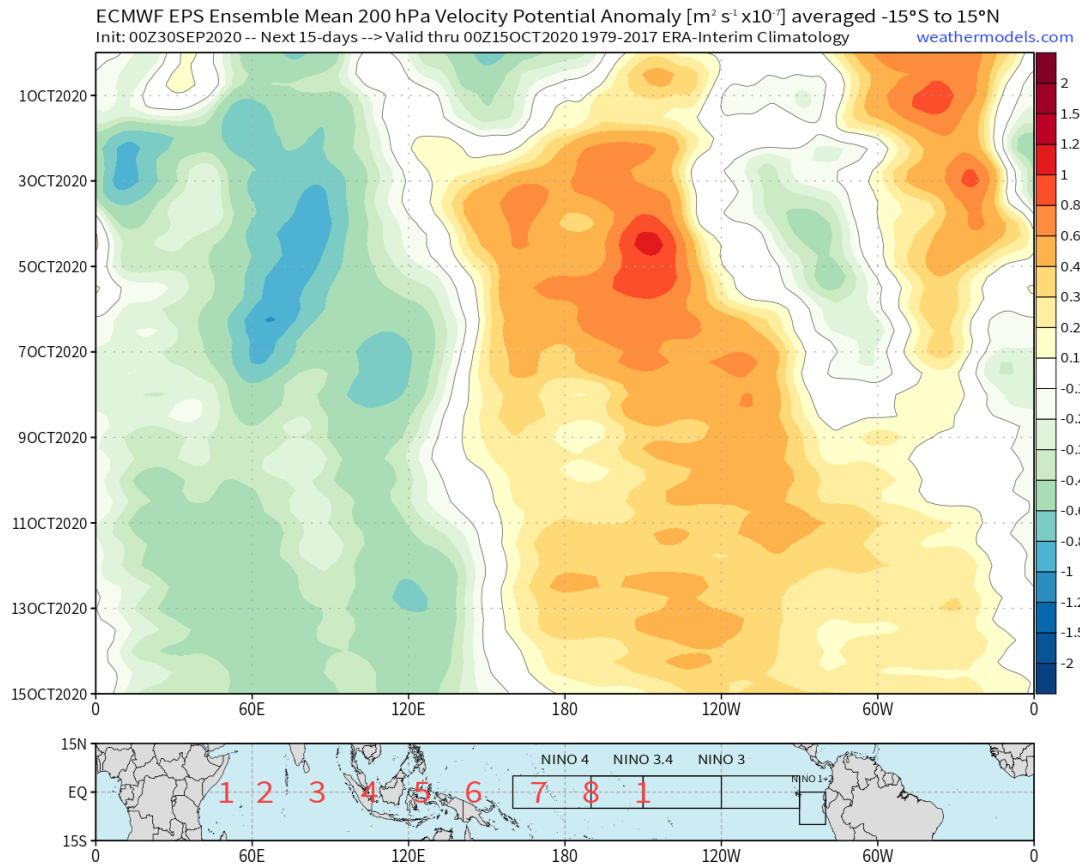


Figure 5: Ensemble mean forecast from the ECMWF model for 200 hPa velocity potential anomalies over the next 15 days.

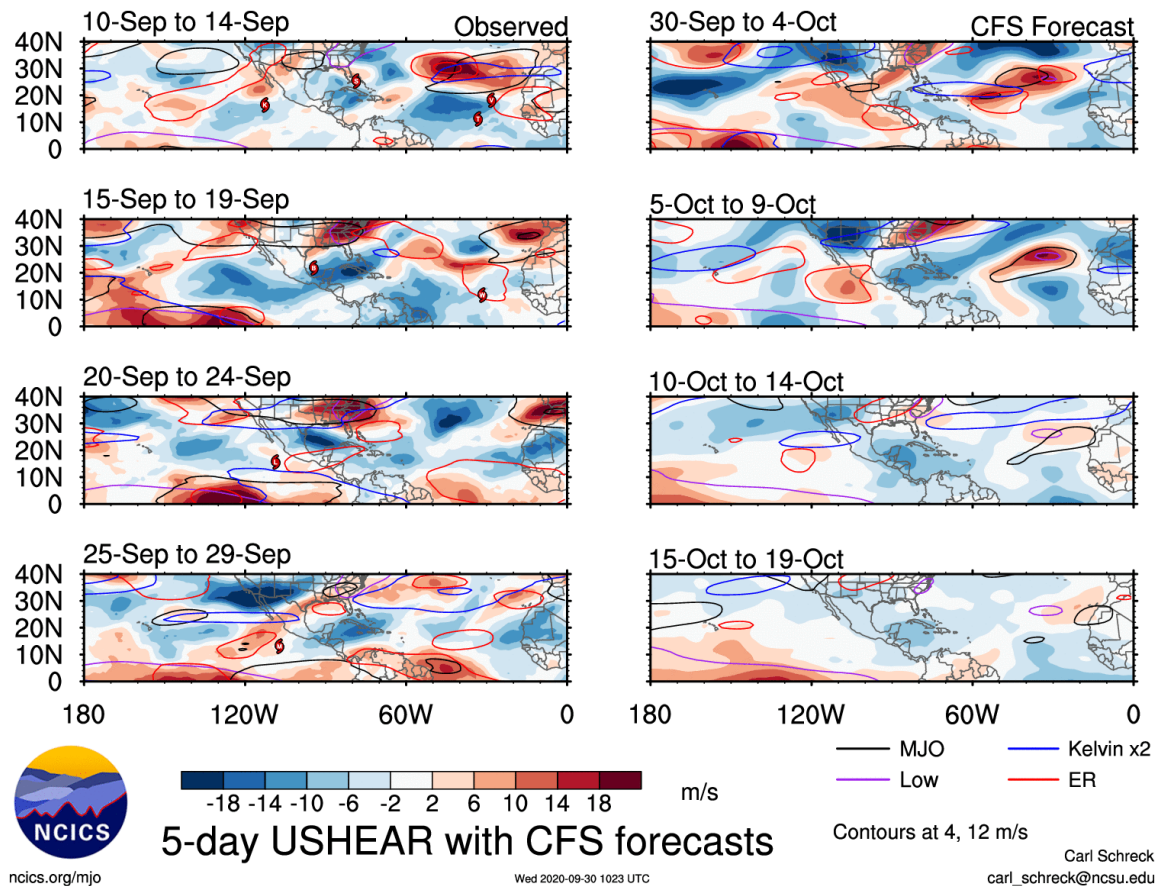


Figure 6: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through October 19. Figure courtesy of Carl Schreck.

5) Seasonal Forecast

The most recent seasonal forecast calls for a very active season. We believe that the next two weeks should generate above-normal TC activity.

3 Upcoming Forecasts

A final two-week forecast will be issued on October 14 for the period between October 14 – 27.

VERIFICATION OF SEPTEMBER 16 – SEPTEMBER 29, 2020 FORECAST

The two-week forecast of tropical cyclone activity from September 16 – 29, 2020 correctly verified in the above-normal category (>23 ACE). A total of 36 ACE was observed during the two-week period. All of this ACE was generated between September 16 – 22. Teddy generated the most ACE during the two-week period (25.8), followed by Beta (3.3), Sally (2.6), Paulette (2.3), Vicky (0.9), Wilfred (0.8) and Alpha (0.4).