COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 16–29, 2018

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

(as of 16 August 2018)

By Philip J. Klotzbach[1] and Michael M. Bell[2]

In Memory of William M. Gray[3]

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] Professor Emeritus of Atmospheric Science

1 Introduction

This is the tenth year that we have issued shorter-term forecasts of tropical cyclone 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 ACE periods has been changed to better fit, in our view, the observed historical distributions. Our ACE forecasts are now defined by ranking observed activity in the satellite era from 1966–2016 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 51 years from 1966–2016, each tercile is composed of 17 years. The 17 years with the most active ACE periods from August 16–29 are classified as the upper tercile, the 17 years with the least active ACE periods from August 16–29 are classified as the lower tercile, while the remaining 17 years are classified as the middle tercile.

Table 1: ACE forecast definition for TC activity for August 16–29, 2018

Parameter	Definition
Above-Normal	Upper Tercile (>21 ACE)
Normal	Middle Tercile (6–21 ACE)
Below-Normal	Lower Tercile (0–5 ACE)

2 Forecast

We believe that the next two weeks will be characterized by activity at below-normal levels (0–5 ACE). The National Hurricane Center has one area with a low probability of development over the next five days. None of the global models indicate significant tropical cyclone development in the next week. While vertical wind shear is predicted to be below-average in week one across most of the tropical Atlantic, vertical wind shear is predicted to strengthen across most of the basin in week two.

The Madden-Julian Oscillation (MJO) is forecast to be relatively weak in week one, with some potential amplification in phases 4 and 5 in week two. These phases tend to be associated with near-average periods for Atlantic hurricane activity but coupled with the unfavorable seasonal conditions are likely to yield below-average activity.

Figure 1 displays the formation locations of tropical cyclones from August 16–29 for the years from 1966–2017 (e.g., the satellite era), along with the maximum intensities that these storms reached. Figure 2 displays the August 16–29 forecast period with respect to climatology. The hurricane season begins to really ramp up during this time.

The primary threat formation area for major hurricanes in mid- to late August is in the tropical Atlantic east of the Lesser Antilles.

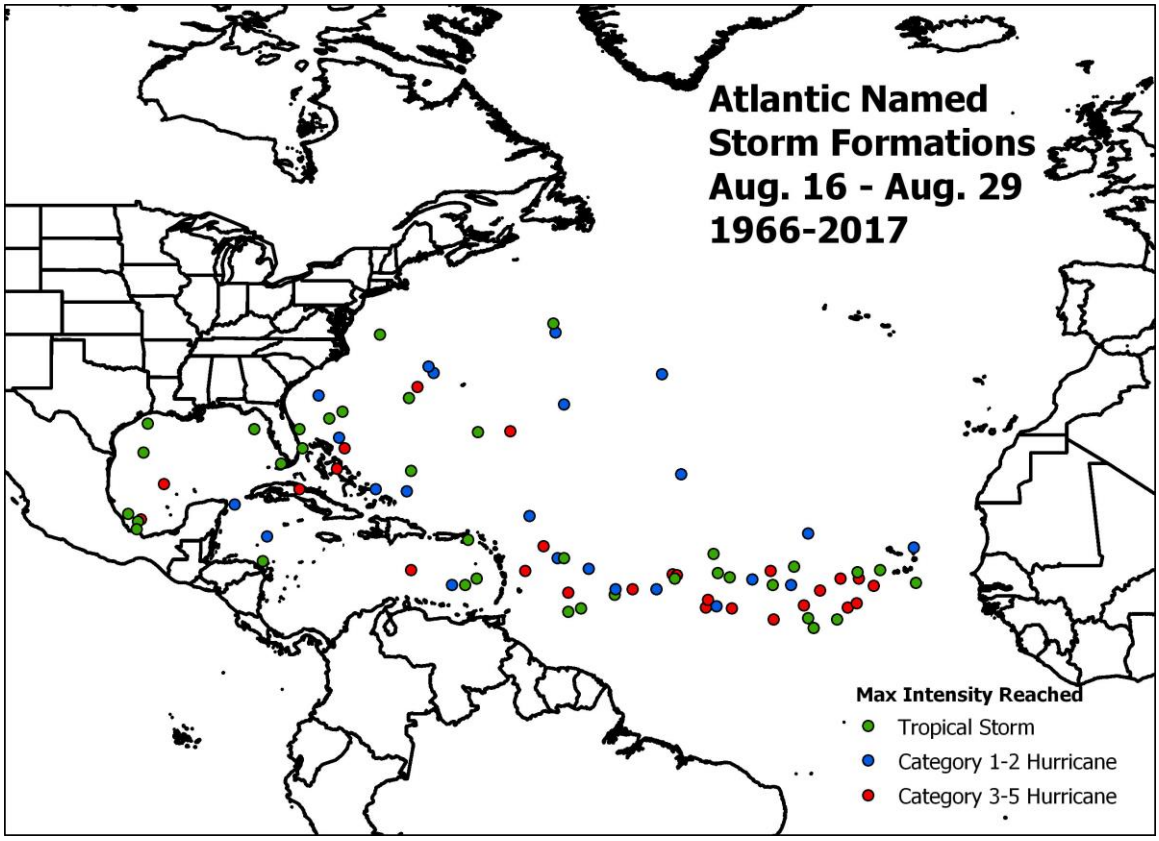

Figure 1: Atlantic named storm formations from August 16–29 during the years from 1966-2017 and the maximum intensity that these named storms reached.

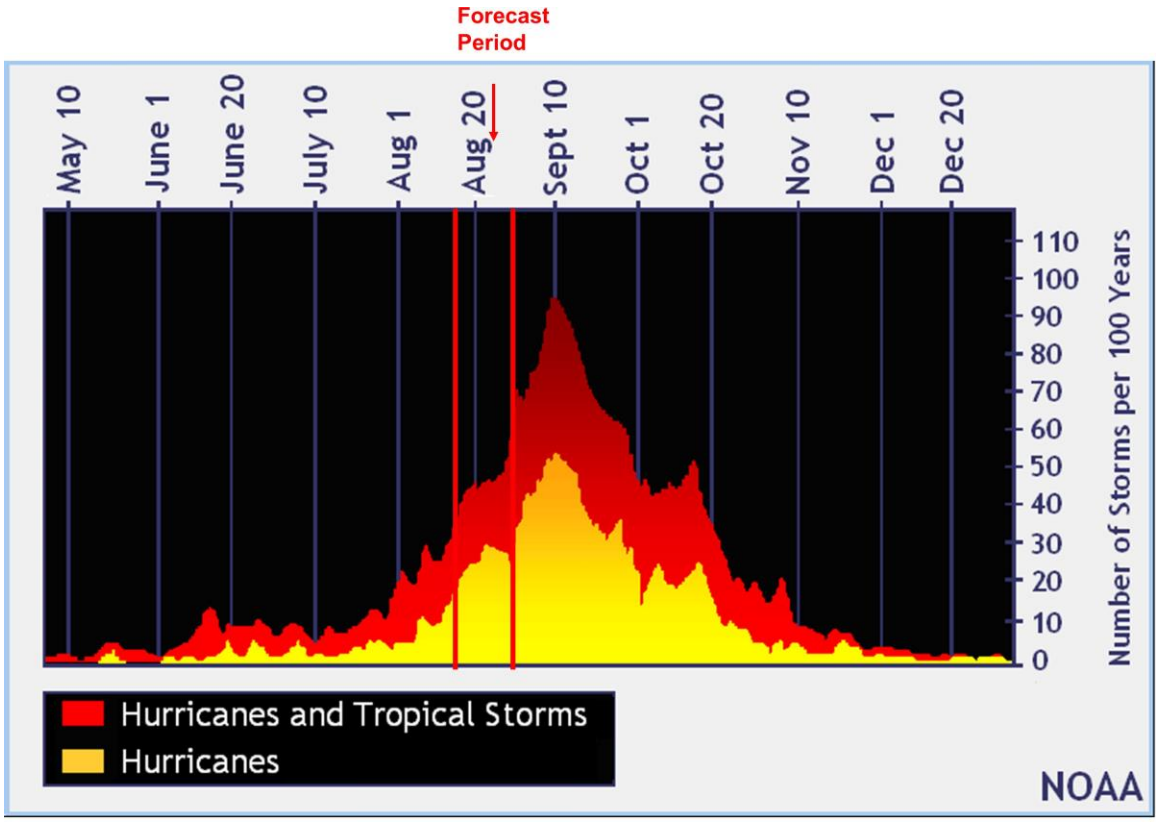

Figure 2: The current forecast period (August 16–29) with respect to climatology. Figure courtesy of NOAA.

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 16–29.

1) Current Storm Activity

Subtropical Storm Ernesto is likely to dissipate in about 24 hours. It is forecast to generate very little ACE before dissipation.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook has one area of low formation in the next five days. This area is likely to dissipate by the time it reaches the eastern Caribbean however, due to strong shear.

3) Global Model Analysis

None of the reliable global models indicate any other significant TC development in the next week. There are some hints of potential TC development beyond that time, but the signal is fairly weak.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently of relatively weak magnitude. The MJO is forecast to remain weak during week one, with potentially some amplification in week two in phases 4-5 (Figure 3). The sub-seasonal signal should be slightly more conducive for Atlantic TC activity than it has been over the past two weeks, when the subseasonal signal was concentrated in phases 6-7, which are typically not conducive for Atlantic hurricane activity (Table 2).

In response to this more favorable MJO as well as an eastward-propagating atmospheric Kelvin wave, the Climate Forecast System (CFS) model predicts below-normal vertical wind shear across the Caribbean and the tropical Atlantic over the next week (Figure 4). Despite this window of below-normal shear, TC development looks unlikely. In week two, vertical wind shear looks to anomalously strengthen across most of the basin.

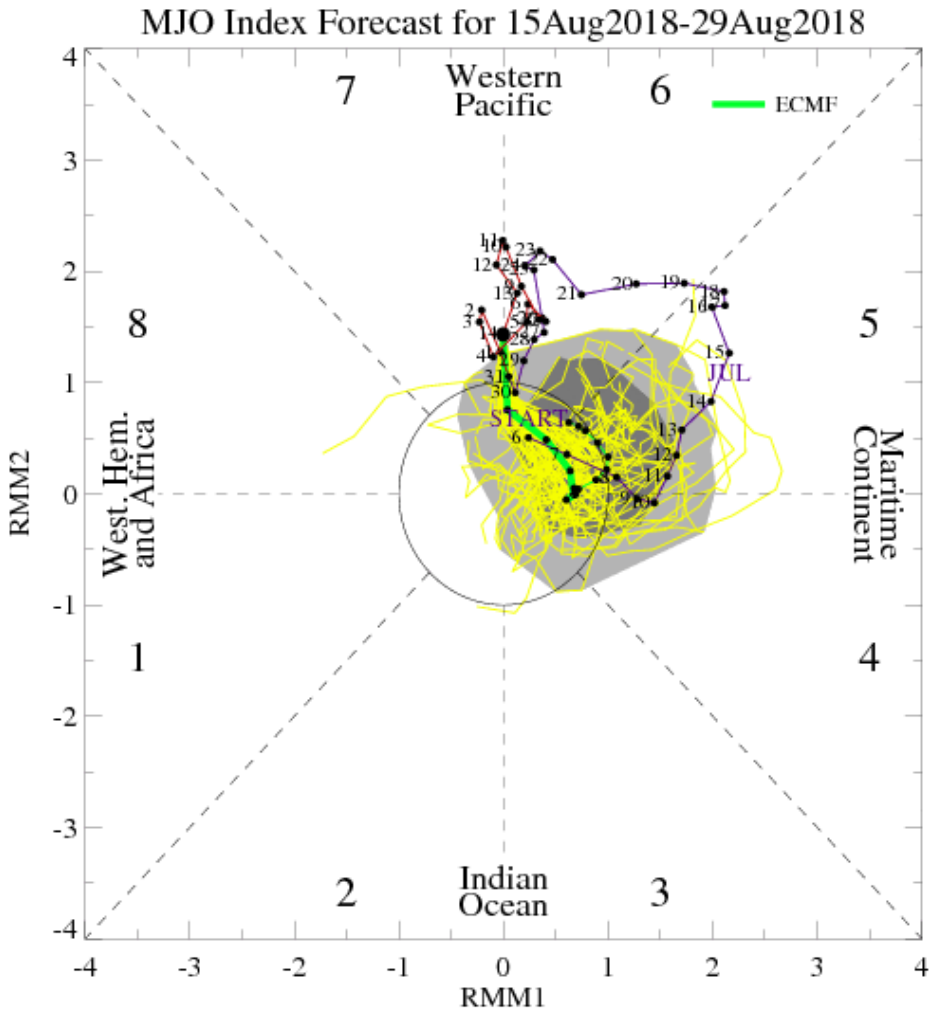

Figure 3: Predicted propagation of the MJO by the ECMWF model.

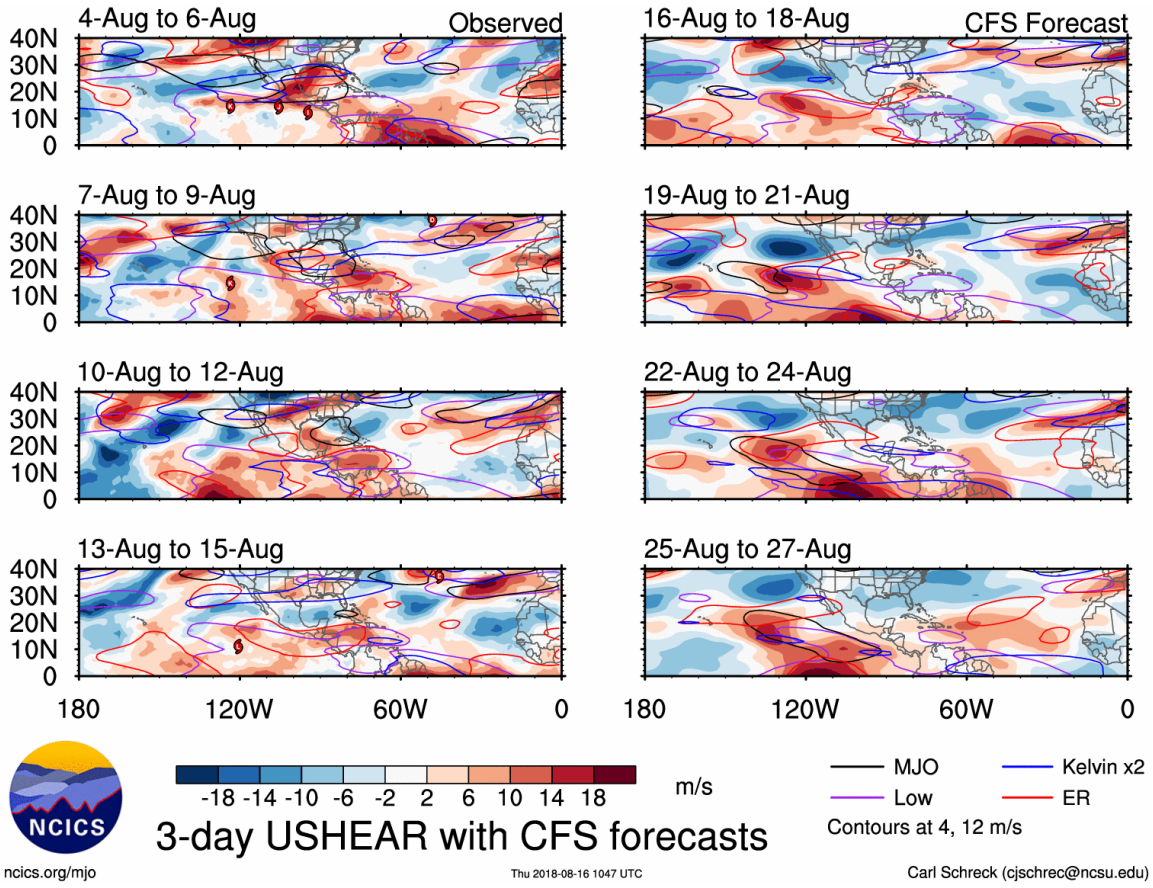

Figure 4: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through August 27. Figure courtesy of Carl Schreck.

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

5) Seasonal Forecast

The most recent seasonal forecast calls for a below-average season. We believe that the next two weeks will be in keeping with this seasonal forecast.

3 Upcoming Forecasts

The next two-week forecast will be issued on August 30 for the August 30–September 12 period. Additional two-week forecasts will be issued on September 13, September 27, and October 11.

VERIFICATION OF AUGUST 2–15, 2018 FORECAST

The two-week forecast of tropical cyclone activity from August 2–15, 2018 correctly verified in the below-normal category. Less than 2 ACE units were required to correctly verify in the below-normal category, and 1.8 ACE was observed. The ACE that was observed during the two-week period was generated by Tropical Storm Debby and Subtropical Storm Ernesto.