

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE  
ACTIVITY FROM SEPTEMBER 13-SEPTEMBER 26, 2018**

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

(as of 13 September 2018)

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In Memory of William M. Gray<sup>3</sup>

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 tenth 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 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 September 13–26 are classified as the upper tercile, the 17 years with the least active ACE periods 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 September 13-26, 2018

Parameter	Definition
Above-Normal	Upper Tercile ( $\geq 24$ ACE)
Normal	Middle Tercile (11–23 ACE)
Below-Normal	Lower Tercile ( $< 11$ ACE)

# 2 Forecast

We believe that the next two weeks will be characterized by activity at near-normal levels (11–23 ACE). We currently have four active tropical cyclones. We estimate that these four tropical cyclones will combine to generate  $\sim 15$  ACE. The primary question mark with these storms is how much ACE Isaac will generate. If Isaac, dissipates, it would generate very little ACE, but if it were to redevelop in the western Caribbean and track through the Gulf of Mexico, it would have the potential to generate more ACE than anticipated here. The current disturbance in the southern Gulf of Mexico is given a medium chance of development, but if it were to form, it would generate relatively little ACE. Another area of low pressure is anticipated to develop near Bermuda that could become either a tropical or sub-tropical TC next week. However, it is not expected to generate much ACE. No other areas are consistently developed by forecast models in the next ten days.

The Madden-Julian Oscillation (MJO) is forecast to be relatively weak in week one, and potentially amplify into phases 8-1 in week two. These phases tend to be associated with relatively active periods for Atlantic hurricane activity, but the latest

shear forecast from the Climate Forecast System (CFS) indicates above-normal shear in the tropical Atlantic and Caribbean. The lack of tropical cyclone development by the global models matches up well with this assessment.

Figure 1 displays the formation locations of TCs from September 13–26 for the years from 1966–2017 (e.g., the satellite era), along with the maximum intensities that these storms reached. Figure 2 displays the September 13–26 forecast period with respect to climatology. The hurricane season is quite active during this time period climatologically. The primary threat formation area for major hurricanes in mid-to-late September is in the tropical Atlantic east of the Leeward and Windward Islands.

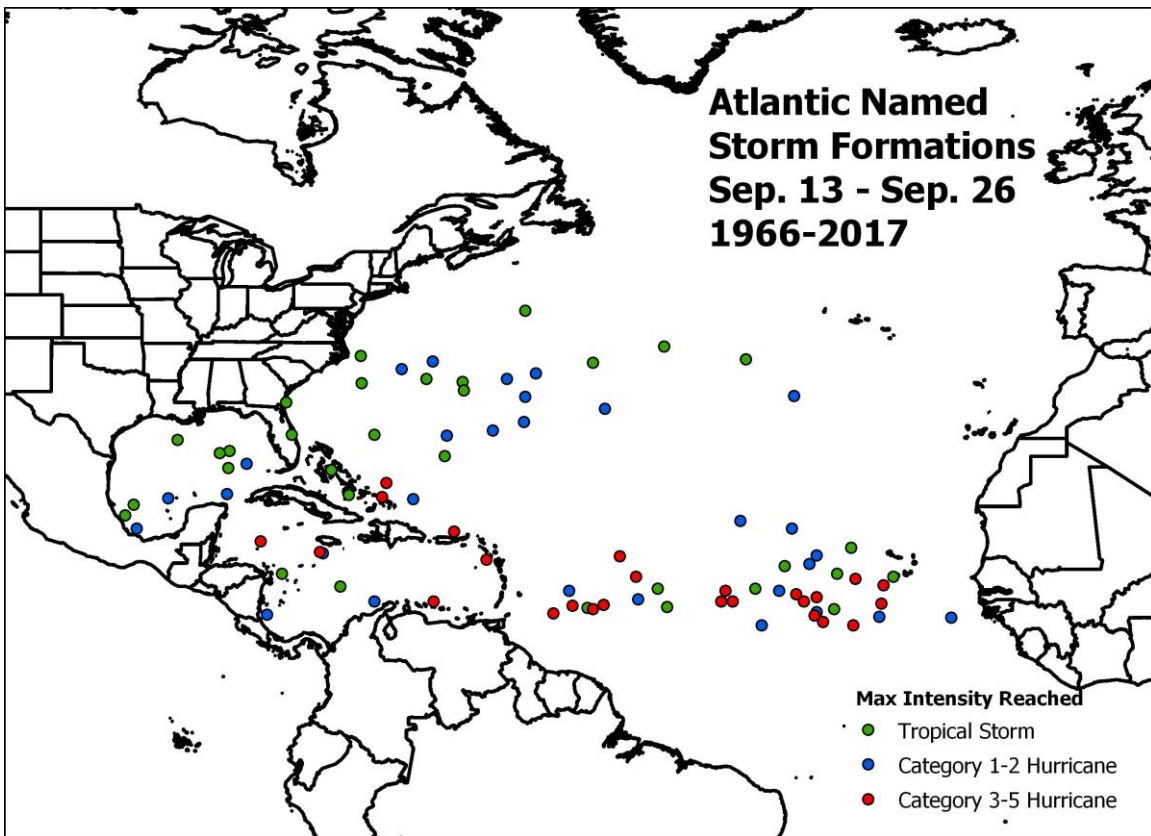


Figure 1: Atlantic named storm formations from September 13–September 26 from 1966-2017 and the maximum intensity that these named storms reached.

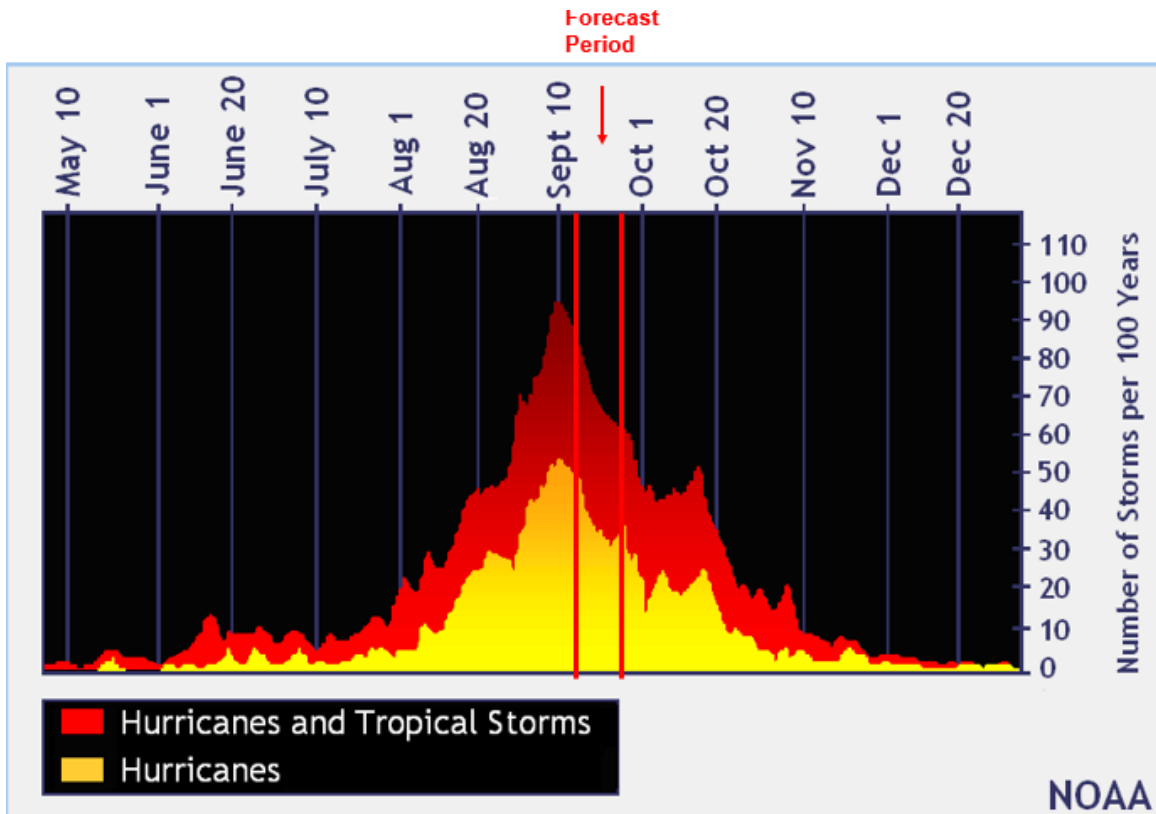


Figure 2: The current forecast period (September 13–26) with respect to climatology. Figure courtesy of NOAA.

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 13-26.

### 1) Current Storm Activity

There are currently four active TCs in the Atlantic basin. We estimate these four TCs to generate the following ACE before dissipation:

Florence: 5-7 ACE

Helene: 2-4 ACE

Isaac: 0-2 ACE

Joyce: 1-2 ACE

The biggest question mark is Isaac. Right now, the storm is barely hanging on as a TC, and it could open up into a tropical wave at any point. However, when the system moves into the western Caribbean, it will encounter a more conducive environment for re-intensification. Given Isaac's fragile current state and the majority of the current model guidance, we are operating under the assumption that Isaac will generate relatively little ACE.

### 2) National Hurricane Center Tropical Weather Outlook

There are two other areas currently being monitored by NHC for possible TC development. If either of these areas formed, they would likely generate very little ACE.

### 3) Global Model Analysis

None of the reliable global models indicate additional TC development in the next ten days.

### 4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, has amplified in phase 8 recently. However, the MJO is forecast to diminish in week one. There is considerable spread as to where and if the MJO will reamplify beyond that point (Figure 3).

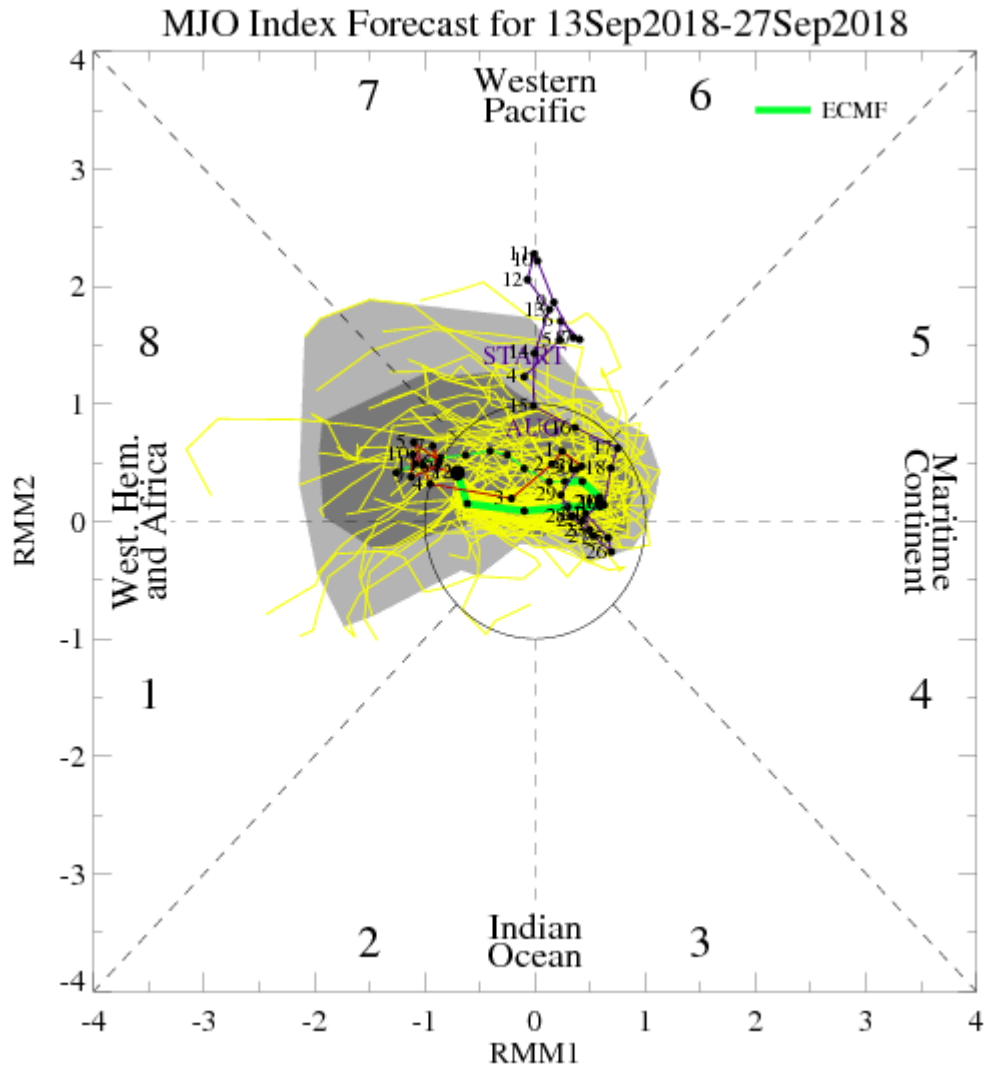


Figure 3: Predicted propagation of the MJO by the ECMWF model.

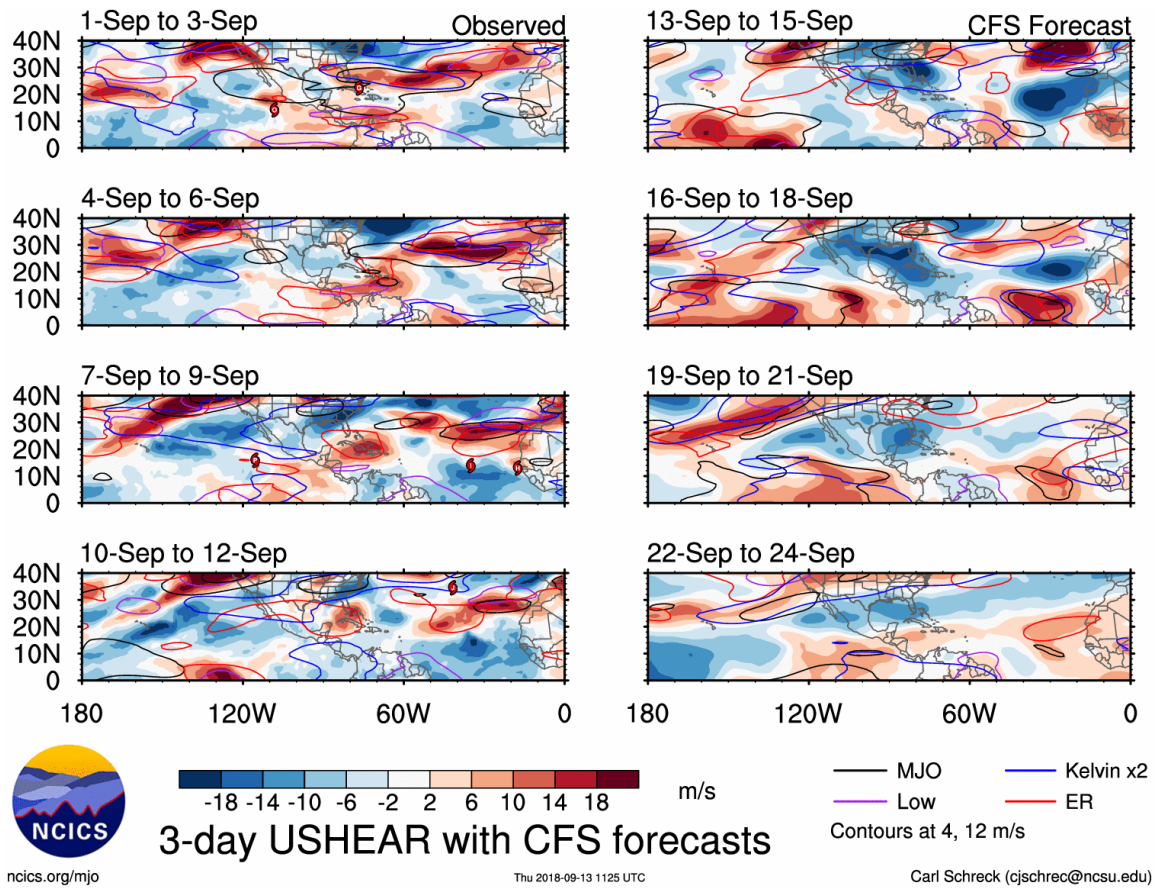


Figure 4: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through September 24. Figure courtesy of Carl Schreck.

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 had a recent flurry of activity in early to mid-September, but the next two weeks look to be relatively quiet once the current storms dissipate.

## 3 Upcoming Forecasts

The next two-week forecast will be issued on September 27 for the September 27–October 10 period. An additional two-week forecast will be issued on October 11.



## **VERIFICATION OF AUGUST 30–SEPTEMBER 12, 2018 FORECAST**

The two-week forecast of tropical cyclone activity from August 30-September 12, 2018 did not verify. We predicted near-average activity (14-25 ACE), and a total of 54 ACE were observed. We had several TCs (Florence, Gordon, Helene, Isaac and Joyce) contributing to ACE during this time, with Florence being by far the largest contributor.