

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE
ACTIVITY FROM OCTOBER 11-OCTOBER 24, 2018**

We expect that the next two weeks will be characterized by above-normal amounts of hurricane activity, primarily due to currently active tropical cyclones, especially Leslie.

(as of 11 October 2018)

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In Memory of William M. Gray³

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 October 11–October 24 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 October 11–October 24.

Parameter	Definition
Above-Normal	Upper Tercile (>6 ACE)
Normal	Middle Tercile (1–6 ACE)
Below-Normal	Lower Tercile (0–1 ACE)

2 Forecast

We believe that the next two weeks will be characterized by activity at above-normal levels (>6 ACE). The primary reason why we are forecasting above-normal levels is due to currently-existing tropical cyclones, especially Hurricane Leslie. Leslie is currently a hurricane and is likely to remain a hurricane for the next couple of days. During this time, it will likely be able to generate enough ACE to achieve the above-normal ACE threshold, especially with Michael and Nadine also generating small amounts of ACE before dissipation. NHC currently has a 50% chance of TC development in the next five days in the western Caribbean, but models do not indicate that this area of low pressure will intensify too much. Global models also do not show any other consistent TC development in the next week.

The Madden-Julian Oscillation (MJO) is currently in phase 2 and is forecast to propagate into phase 3 and weaken over the next two weeks. Phase 2 is typically favorable for Atlantic hurricane formation.

Figure 1 displays the formation locations of TCs from October 11–October 24 for the years from 1966–2017 (e.g., the satellite era), along with the maximum intensities that these storms reached. Figure 2 displays the October 11–October 24 forecast period with respect to climatology. The hurricane season tends to be getting quieter during this time, but significant hurricanes can still form, especially in the western Caribbean.

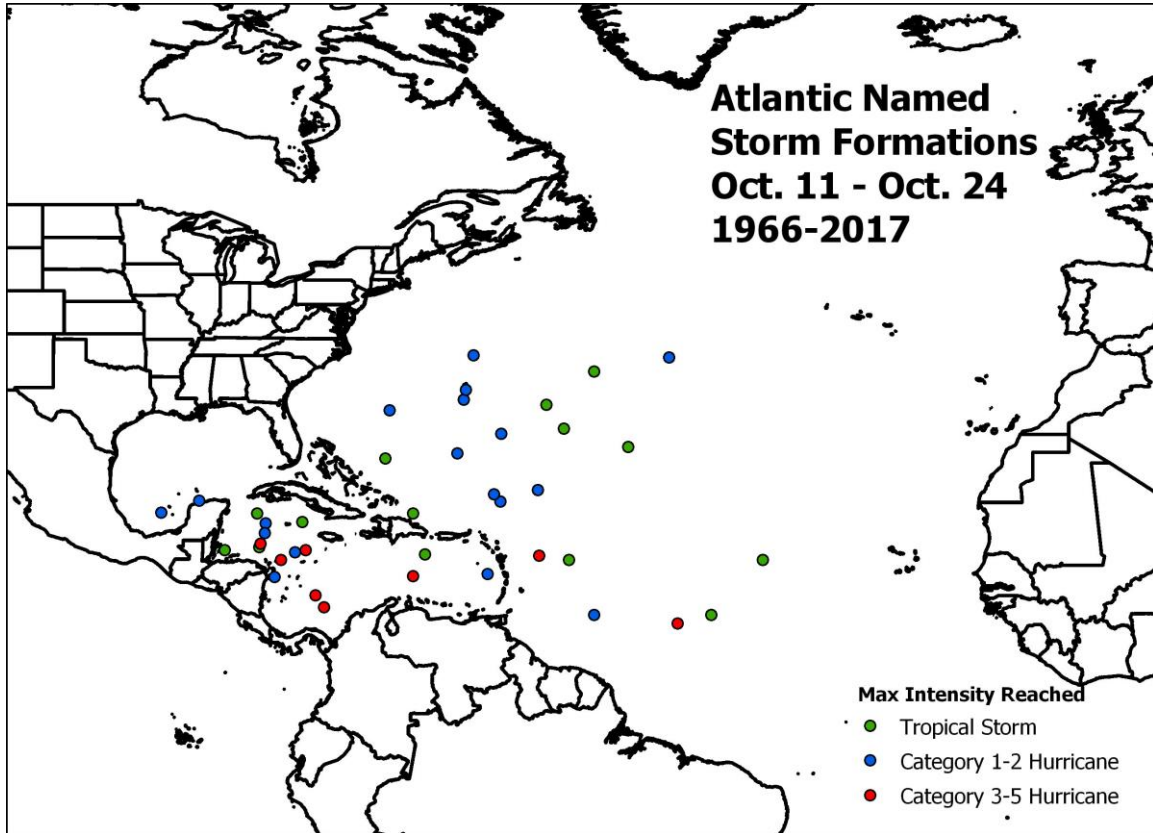


Figure 1: Atlantic named storm formations from October 11–October 24 from 1966–2017 and the maximum intensity that these named storms reached.

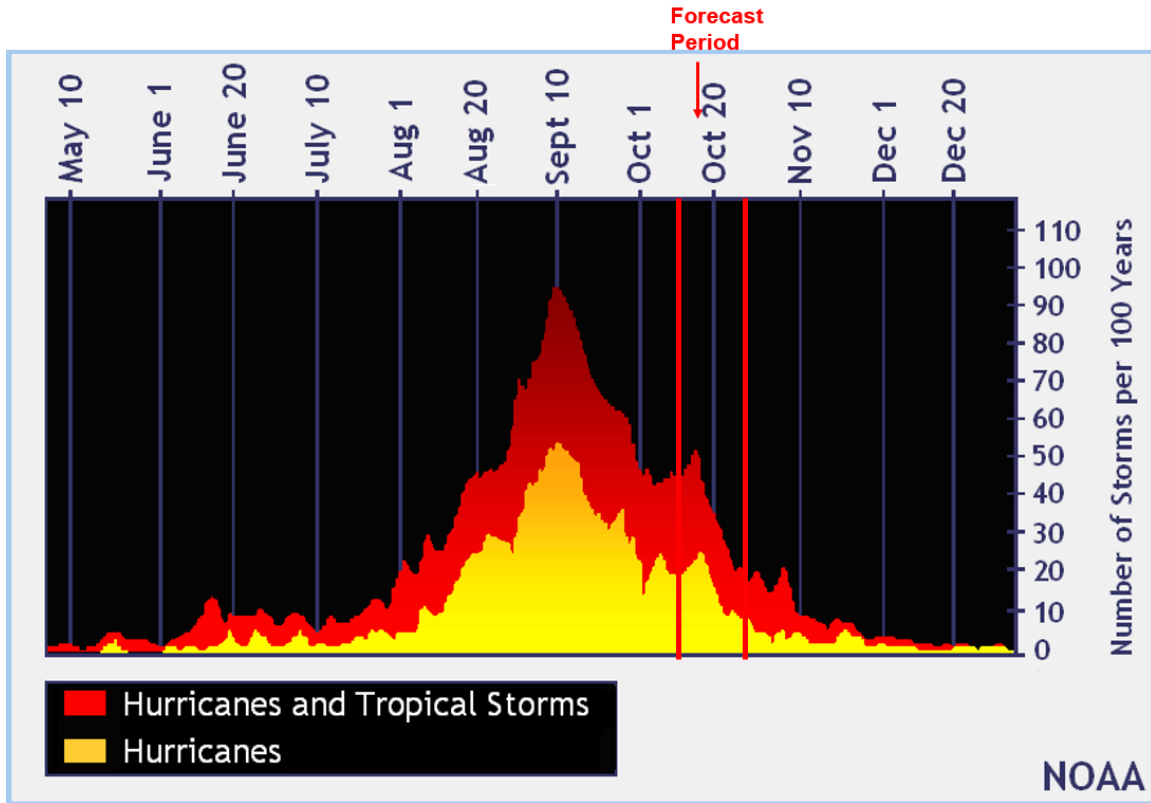


Figure 2: The current forecast period (October 11-October 24) with respect to climatology. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from October 11-October 24.

1) Current Storm Activity

Hurricane Leslie is likely to generate several ACE units before weakening and potentially dissipating in 4-5 days. Tropical Storm Michael and Nadine will also generate small amounts of ACE before becoming post-tropical/dissipating, respectively.

2) National Hurricane Center Tropical Weather Outlook

The NHC currently gives a medium chance of development in the next five days to a disturbance in the western Caribbean. However, this system does not look to become particularly intense based on the latest model guidance.

3) Global Model Analysis

None of the reliable global models indicate additional significant TC development in the next week.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 2. The MJO is forecast to continue to propagate from phase 2 into phase 3 and then weaken over the next two weeks (Figure 3). In general, the MJO in phase 2 tends to be favorable for Atlantic hurricane activity, although vertical wind shear in week one is predicted to be heightened in the western Caribbean. The shear is forecast to relax in week two, however, potentially leading the way for additional western Caribbean TC development (Figure 4).

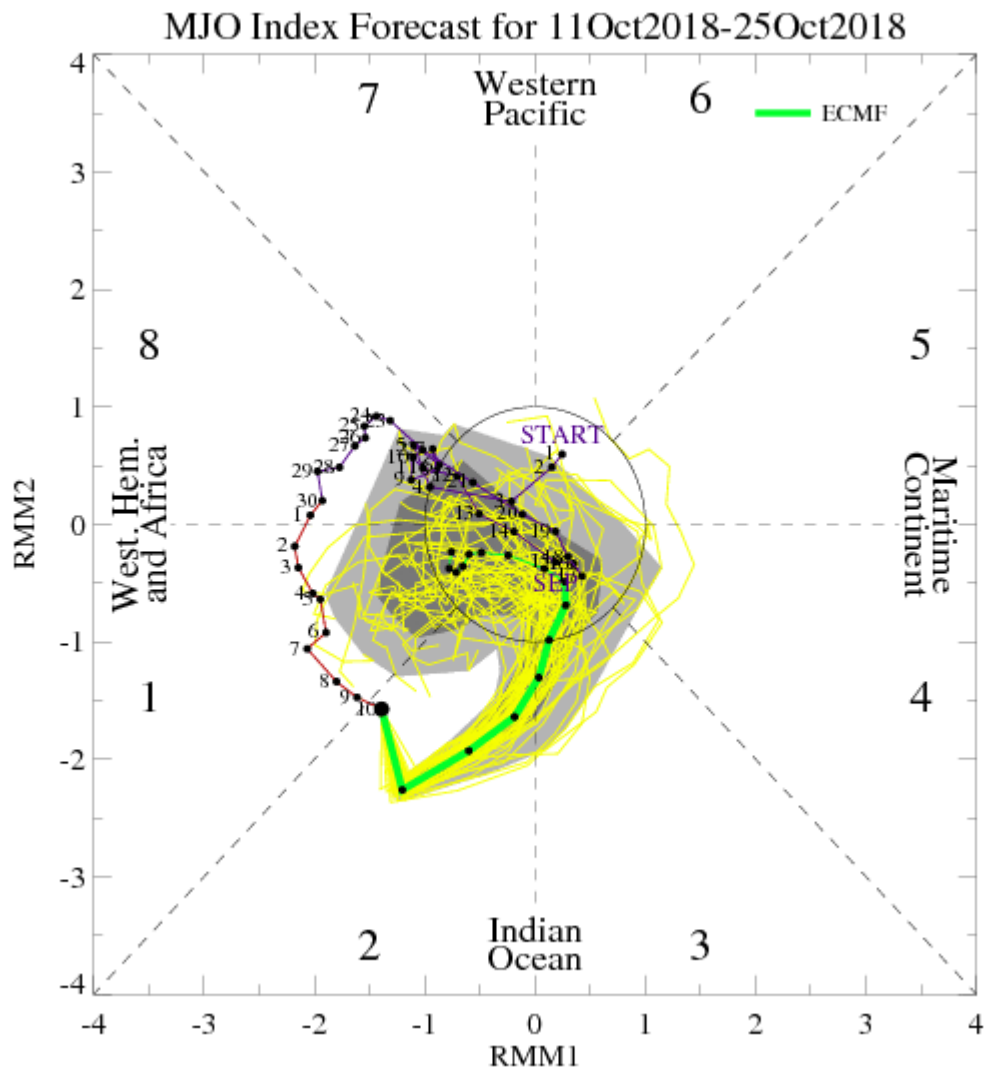


Figure 3: Predicted propagation of the MJO by the ECMWF model.

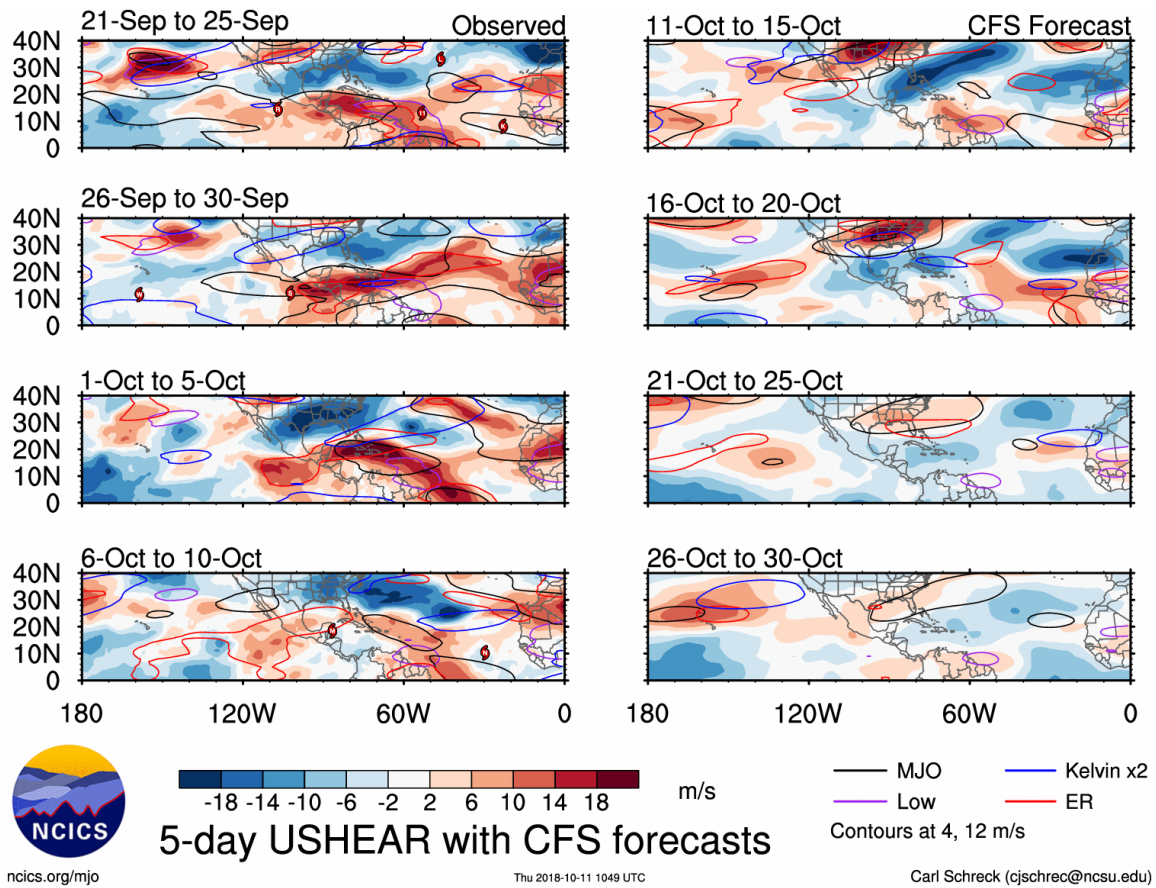


Figure 4: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through October 15. Figure courtesy of Carl Schreck.

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 seasonal forecast issued by CSU in early August called for a below-average season. The forecast for the next two weeks calls for above-normal activity, however, primarily due to Leslie.

3 Upcoming Forecasts

This is the final two-week forecast for the 2018 Atlantic hurricane season.

VERIFICATION OF SEPTEMBER 27-OCTOBER 11, 2018 FORECAST

The two-week forecast of tropical cyclone activity from September 27-October 11, 2018 correctly verified in the above-average category. We predicted above-average activity (>11 ACE), and a total of 28 ACE were observed. The primary ACE generators for this two-week period were Leslie (16 ACE) and Michael (11 ACE).