

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE  
ACTIVITY FROM SEPTEMBER 29 – OCTOBER 12, 2017**

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

(as of 29 September 2017)

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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 ninth 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 (since 1966) 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 29 - October 12 are classified as the upper tercile, the 17 years with the least active ACE periods from September 29 - October 12 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 29 – October 12, 2017

Parameter	Definition
Above-Normal	Upper Tercile (>8 ACE)
Normal	Middle Tercile (3-8 ACE)
Below-Normal	Lower Tercile (<3 ACE)

# 2 Forecast

We believe that the next two weeks will be characterized by activity at above-normal levels (> 8 ACE). The above-normal forecast is due to several factors. Tropical Storms Lee and Maria are likely to combine for 2-3 ACE before becoming post-tropical. Invest 99L currently located near Cuba is being given a medium chance for TC development in the next few days. However, this system is unlikely to generate much ACE, as it looks to get slammed by very strong shear in a few days. NHC is now highlighting a potential additional area of development tracking towards the NW Caribbean and potentially developing in the next 5-7 days.

The Madden-Julian Oscillation (MJO) is forecast to remain weak over the next two weeks, with the MJO signal potentially amplifying over the Maritime Continent at the end of the two-week period. We continue to anticipate that the MJO will not play a major role in dictating Atlantic TC activity levels.

Figure 1 displays the tracks that tropical cyclones have taken during the period from September 29 – October 12 for the years from 1950-2008. Figure 2 displays the September 29 – October 12 forecast period with respect to climatology. The September

29 – October 12 period is after the climatological peak of the Atlantic hurricane season. Typically, intense TCs during this period tend to shift towards the Caribbean.

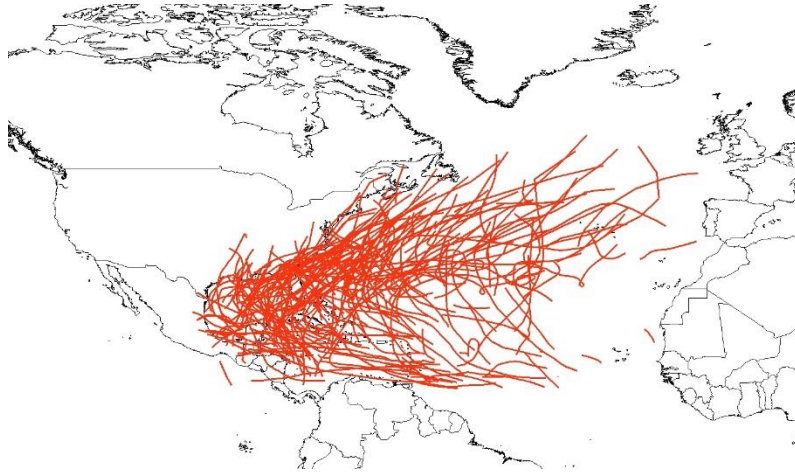


Figure 1: Tracks that named tropical cyclones have taken over the period from September 29 – October 12 for the years from 1950-2008.

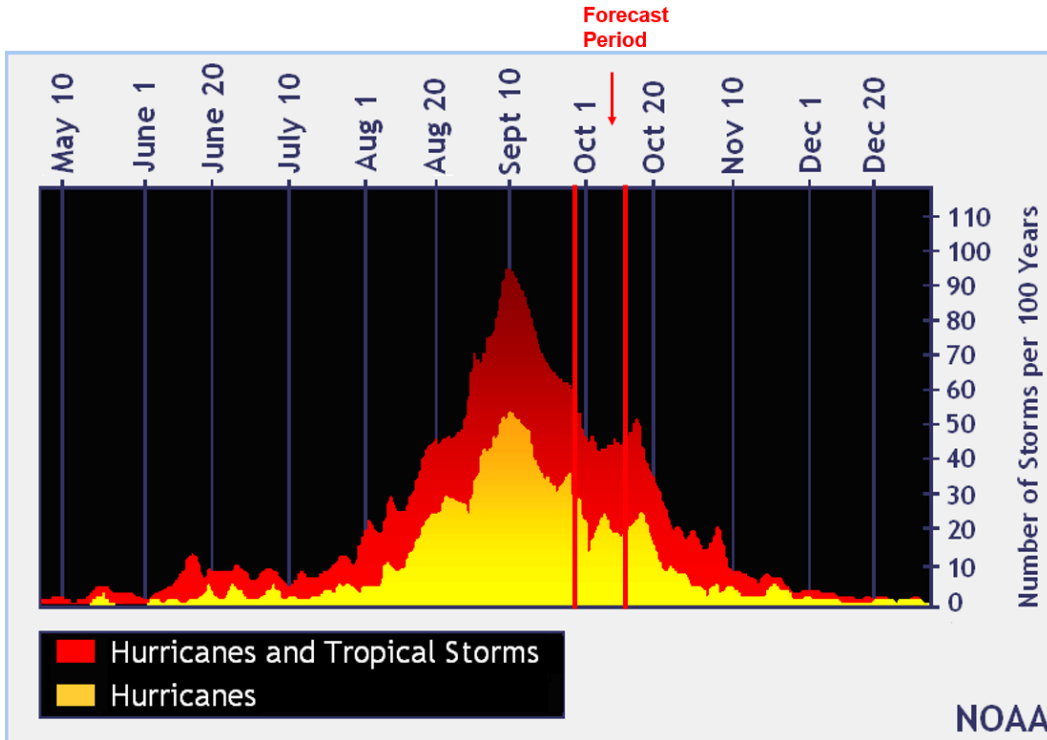


Figure 2: The current forecast period (September 29 – October 12) with respect to climatology. Figure courtesy of NOAA.

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 29 – October 12.

#### 1) Current Storm Activity

Both Maria and Lee are likely to go post-tropical in the next one to two days. Before doing so, however, we estimate that they will combine to generate 2-3 additional ACE.

#### 2) National Hurricane Center Tropical Weather Outlook

Invest 99L is given a medium chance of developing into a TC in the next few days by the National Hurricane Center. However, any ACE that would be generated by this system, should it develop, would be minimal due to unfavorable upper-level winds impinging on the storm early next week. NHC is also highlighting a potential area for TC development in the NW Caribbean in the next 5-7 days. It is too early to have a good idea how much ACE such a system would generate, but the western Caribbean is a common hotspot for TC formation during the month of October.

#### 3) Global Model Analysis

No other areas are consistently developed by the global models besides the areas noted in the Tropical Weather Outlooks.

#### 4) Madden-Julian Oscillation

The Madden-Julian Oscillation remains weak. The ECMWF continues to forecast a relatively weak MJO, with any signal currently residing in Phases 6-7 (Figure 3). The ECMWF is calling for a potential amplification of the MJO in the Maritime Continent in week two. Table 2 displays ACE generated in various MJO phases. The Climate Forecast System (CFS) is calling for a continuation of upper-level easterly anomalies across the tropical Atlantic and Caribbean (Figure 4). These upper-level easterly anomalies counteract the prevailing upper-level westerlies and thereby reduce vertical wind shear across the tropical Atlantic and Caribbean, consequently generating conditions more conducive for Atlantic hurricane formation and intensification.

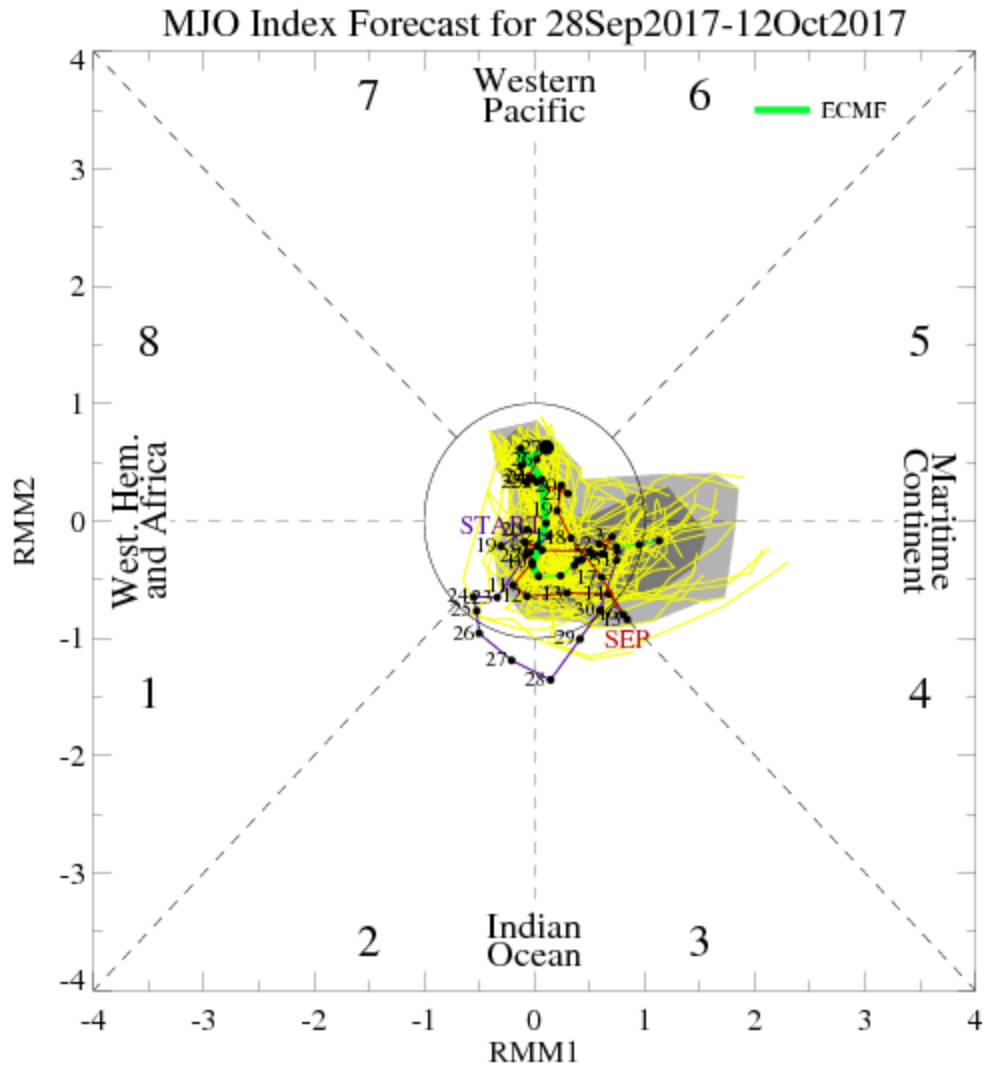


Figure 3: ECMWF forecast of the MJO from September 28, 2017 – October 12, 2017.

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

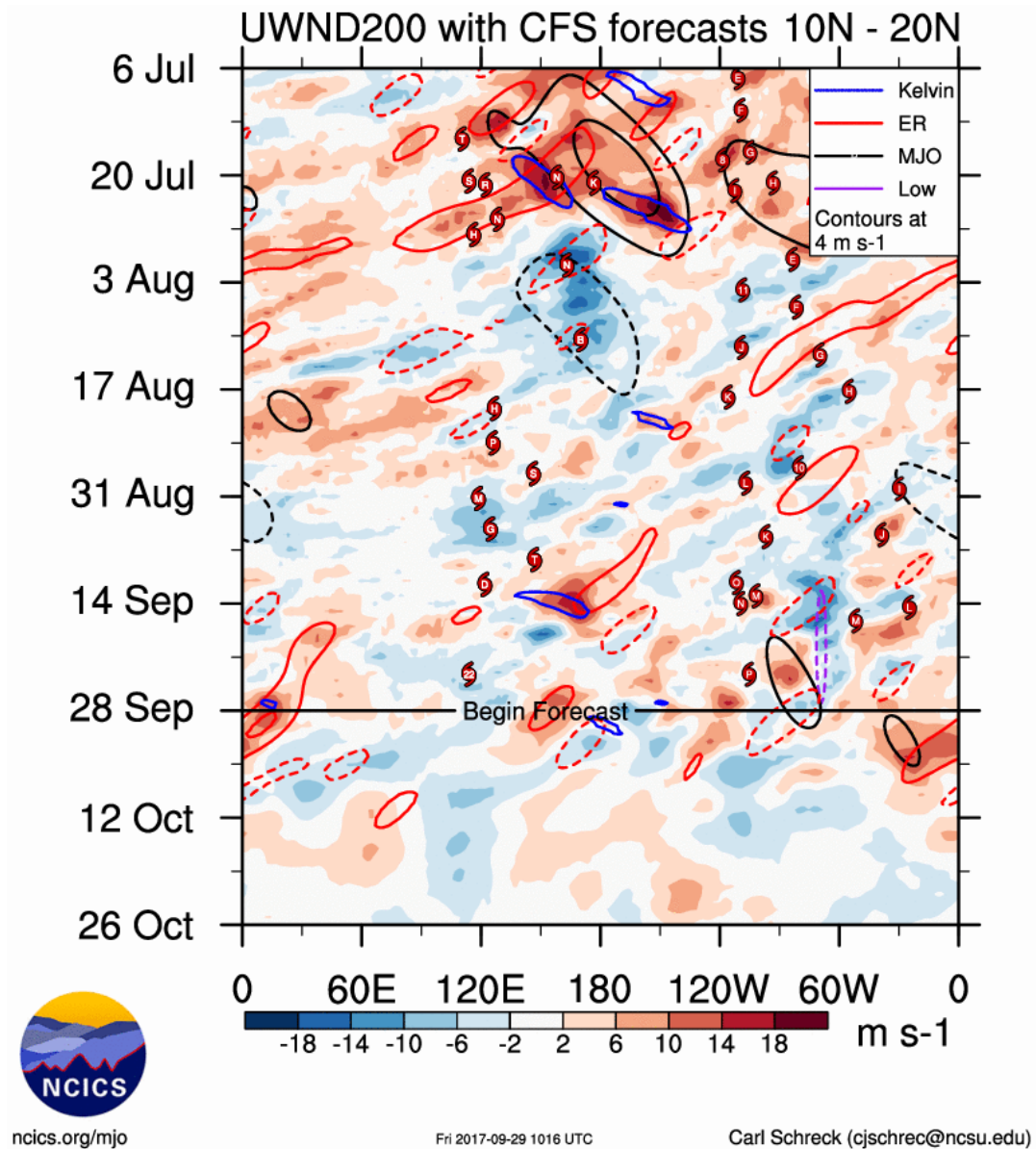


Figure 4: Observed and CFS predicted 200-mb zonal winds from 10-20°N. Figure courtesy of Carl Schreck.

### 5) Seasonal Forecast

The Atlantic is currently experiencing one of the most active Atlantic hurricane seasons on record, and we anticipate a continuation of above-normal activity for the next two weeks.

## 3 Upcoming Forecasts

A final forecast will be issued on October 13 for the October 13 – 26 period.

## **VERIFICATION OF SEPTEMBER 15 – SEPTEMBER 28, 2017 FORECAST**

The two-week period from September 15 – 28 was one of the most active September 15 – 28 periods on record. Hurricane Jose, Lee and Maria all generated considerable levels of ACE. 70 ACE were generated during the past two weeks. Only 1998 with 73 ACE generated more ACE during the September 15 – 28 period for the Atlantic basin. Our above-normal forecast (>25 ACE) for the past two weeks correctly verified.