

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE
ACTIVITY FROM OCTOBER 13 – OCTOBER 26, 2016**

We expect that the next two weeks will be characterized by above-average amounts (>130 percent) of hurricane activity relative to climatology.

(as of 13 October 2016)

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In Memory of William M. Gray²

This forecast as well as past forecasts and verifications are available online at <http://tropical.colostate.edu>

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1 Introduction

This is the eighth 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.

The metric that we are trying to predict with these two-week forecasts is the Accumulated Cyclone Energy (ACE) index, which is defined to be all of the named storm's maximum wind speeds (in 10^4 knots²) for each 6-hour period of its existence over the two-week period. These forecasts are too short in length to show significant skill for individual event parameters such as named storms and hurricanes. We issue forecasts for ACE using three categories as defined in Table 1.

Table 1: ACE forecast definition.

Parameter	Definition
Above-Average	Greater than 130% of Average ACE
Average	70% - 130% of Average ACE
Below-Average	Less than 70% of Average ACE

2 Forecast

We believe that the next two weeks will be characterized by activity at above-average levels (>130 percent of climatology). The average ACE accrued during the period from 1981-2010 from October 13 – October 26 was 7 units, and consequently, our forecast for the next two weeks is for more than 9 ACE units to be generated.

The above-average forecast is due to several factors. Hurricane Nicole is likely to generate several more ACE units prior to becoming post-tropical. There is some possibility that Nicole alone may generate nearly the ACE necessary to achieve the above-average ACE threshold.

The National Hurricane Center does not foresee any TC development over the next five days. However, both the GFS and ECMWF are hinting at potential development in the western Caribbean in about one week to ten days. Typically, TCs forming in this region during this time of year have the potential to intensify significantly and potentially generate considerable ACE in the process

The MJO remains fairly weak, and the ECMWF predicts continued weak MJO activity over the next two weeks.

Figure 1 displays the formation locations of tropical cyclones from October 13 – October 26 for the years from 1966-2015, along with the maximum intensities that these storms reached. Figure 2 displays the October 13 – October 26 forecast period with respect to climatology. This period typically marks the end of the active portion of the Atlantic hurricane season. The primary threat area for major hurricane activity during the late season is in the western Caribbean.

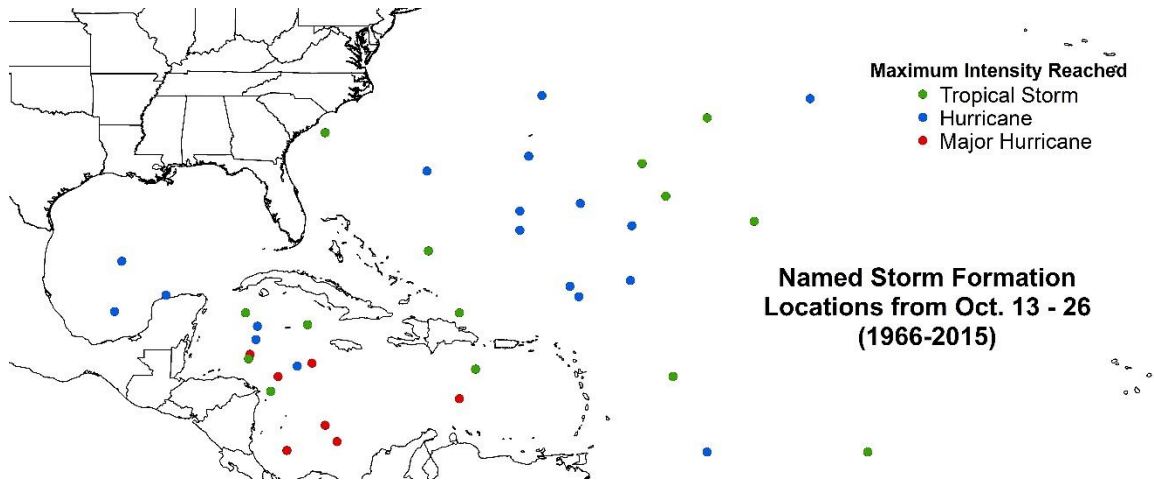


Figure 1: Formation location for all tropical cyclones that formed from October 13-26 in the Atlantic during the period from 1966-2015.

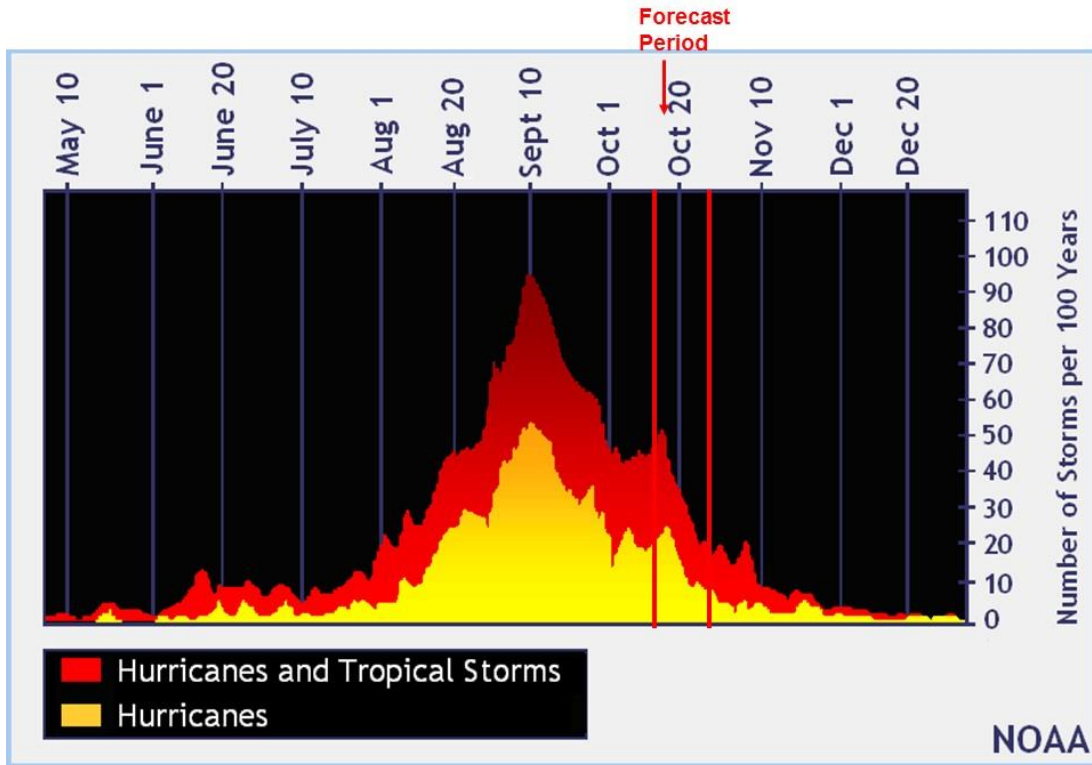


Figure 2: The current forecast period (October 13 – October 26) with respect to climatology. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from October 13 – October 26.

1) Current Storm Activity

Hurricane Nicole is currently active in the western Atlantic and is likely to generate several more ACE units before becoming post-tropical. There is the potential that Nicole along may generate enough ACE to reach the above-average threshold for the two-week period.

2) National Hurricane Center Tropical Weather Outlook

The National Hurricane Center does not foresee any TC development over the next five days.

3) Global Model Analysis

Both the GFS and ECMWF hint at TC development in the western Caribbean in about 7-10 days. Western Caribbean TCs at this time of year can potentially intensify significantly and generate considerable ACE.

4) Madden-Julian Oscillation

The ECMWF model indicates that the MJO index, as classified by the Wheeler-Hendon index, is likely to remain fairly weak over the next two weeks (Figure 3). Table 2 displays normalized TC activity generated when the MJO is in particular phases based on data from 1974-2007.

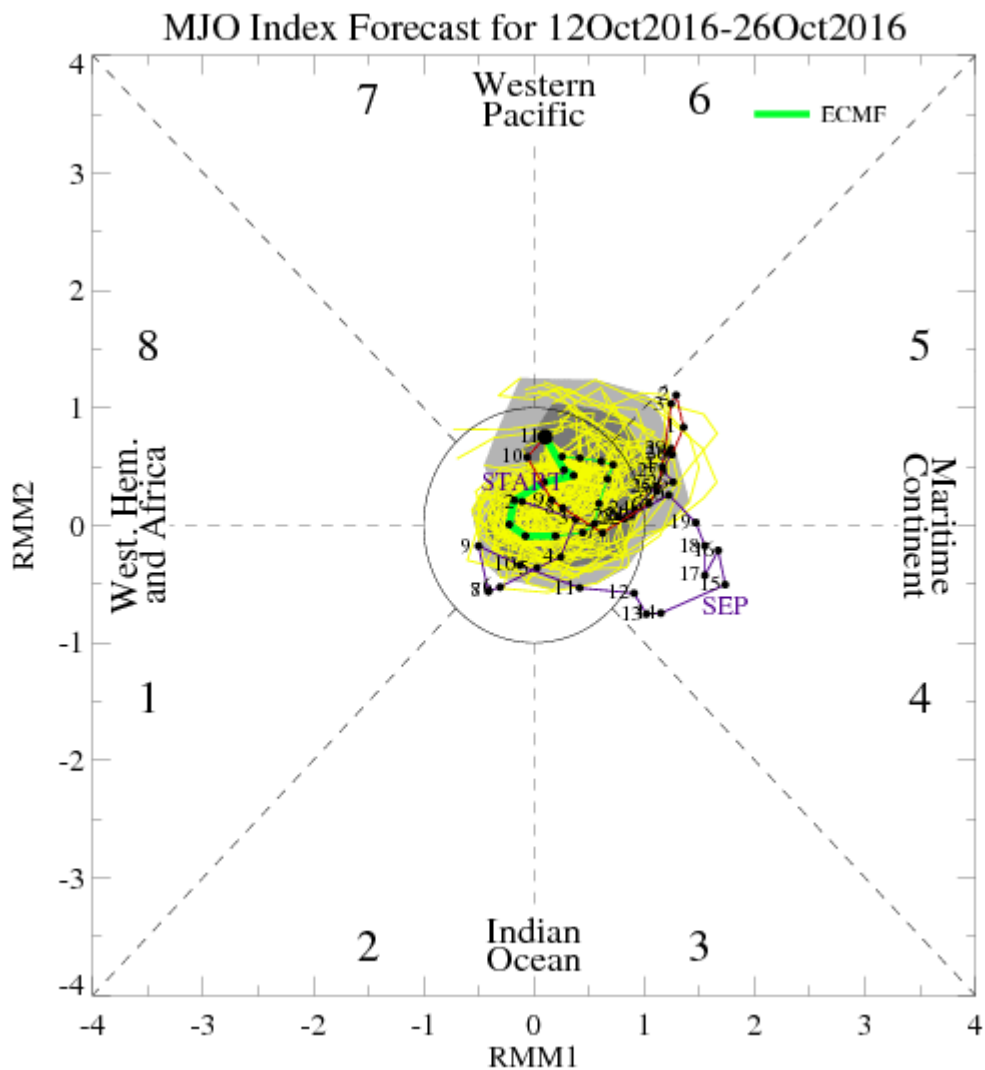


Figure 4: Forecast position of the MJO from October 12, 2016 to October 26, 2016 by the ECMWF model.

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 Atlantic TC season was fairly quiet through most of September and has picked up dramatically in late September through mid-October with Hurricane Matthew cutting a path of damage and devastation from the Caribbean through the Bahamas to the southeast U.S. The next two weeks look to continue the recent trend of heightened Atlantic hurricane activity.

VERIFICATION OF SEPTEMBER 29 – OCTOBER 12, 2016 FORECAST

The two-week forecast of tropical cyclone activity from September 29 – October 12, 2016 correctly verified in the above-average category. 13 ACE units were required to verify in the above-average category, and an amazing 60 ACE units were generated. 60 ACE during the previous two weeks was the second most on record for the Atlantic basin, trailing only 1893.