**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM AUGUST 4 - 17, 2016**

We expect that the next two weeks will be characterized by below-average amounts (<70%) of activity relative to climatology.

(as of 4 August 2016)

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This forecast as well as past forecasts and verifications are available online at
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# 1 Introduction

This is the eighth 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 (NHC) 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 $10^4$ knots$^2$) 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 below-average levels (<70 percent of climatology). The average ACE accrued during the period from 1981-2010 from July 31 – August 13 was 6 units, and consequently, our forecast for the next two weeks is for 4 or fewer ACE units to be generated.

The below-average forecast is due to a combination of factors. Earl is likely to weaken significantly over Central America and should generate only minimal ACE before dissipating over Mexico. The National Hurricane Center does not have any other areas that it is investigating over the next five days. None of the reliable forecast model guidance develops any other tropical cyclones in the Atlantic during the next week.

The MJO is currently of a relatively weak magnitude, but is forecast to intensify in Phase 6 over the next two weeks. This phase is typically associated with below-normal TC activity in the Atlantic basin.

Figure 1 displays the tracks that tropical cyclones have taken during the period from August 4 - 17 for the years from 1950-2008. Figure 2 displays the August 4 – 17 period with respect to climatology. The August 4 – 17 period is prior to the most active portion of the hurricane season.
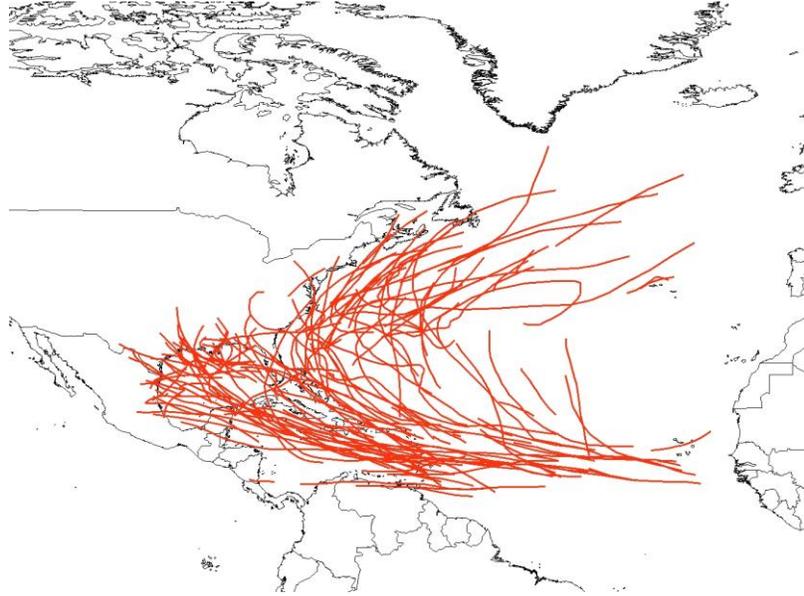
Figure 1: Tracks that named tropical cyclones have taken over the period from August 4 – 17 for the years from 1950-2008.
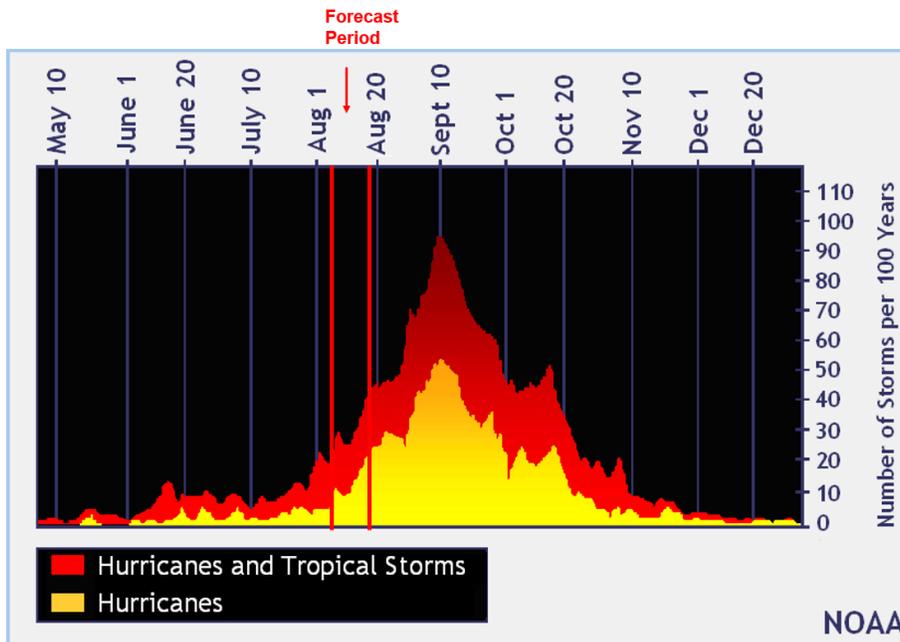


Figure 2: The current forecast period (August 4 - 17) with respect to climatology. Figure courtesy of NOAA.

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 4 – 17.

1) Current Storm Activity

Earl has made landfall in Belize and is likely to weaken significantly over Central America. It should generate only minimal ACE before dissipating over Mexico.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook does not have any areas of potential TC development in the next five days.

3) Global Model Analysis

None of the reliable global models develop any significant TCs in the Atlantic basin over the next week.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation (MJO), as measured by the Wheeler-Hendon diagram is currently of relatively weak magnitude. However, the MJO is forecast to intensify into Phase 6 over the next two weeks. This phase is associated with convective enhancement over the tropical Pacific and convective suppression over the Indian Ocean (Figure 3) and is typically associated with increased vertical wind shear over the Atlantic basin. Atlantic hurricane activity tends to be suppressed when the MJO is in Phase 6 (Table 2).
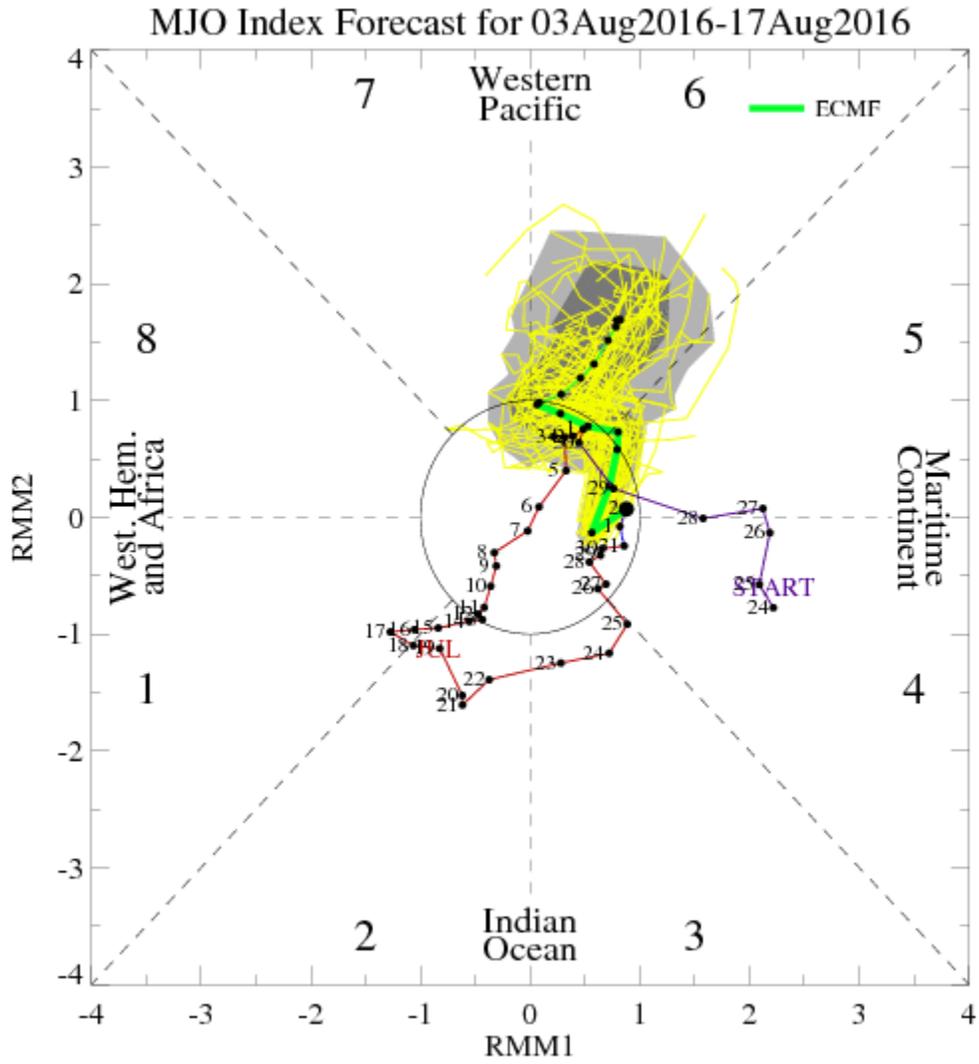
Figure 3: Predicted propagation of the MJO by the ECMWF model.

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 most recent seasonal forecast calls for a near-average season. We believe that the next two weeks will have below-average activity, however, due largely to unfavorable MJO conditions.

# 3 Upcoming Forecasts

The next two-week forecast will be issued on August 18 for the August 18 – August 31 period. Additional two-week forecasts will be issued on September 1, September 15, September 29 and October 13.