COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM SEPTEMBER 29 – OCTOBER 12, 2010

We expect that the next two weeks will be characterized by above-average amounts of activity (greater than 130 percent of climatology.) These new two-week forecasts have replaced the monthly forecasts that we have been issuing in recent years.

(as of 29 September 2010)

By Philip J. Klotzbach[1] and William M. Gray[2]

This forecast as well as past forecasts and verifications are available online at
http://hurricane.atmos.colostate.edu/Forecasts

Department of Atmospheric Science
Colorado State University
Fort Collins, CO 80523
Email: amie@atmos.colostate.edu

---

[1] Research Scientist
[2] Professor Emeritus of Atmospheric Science

1   Introduction

This is the second year that we have issued shorter-term forecasts of tropical cyclone (TC) activity starting in early August. We have decided to discontinue our individual monthly forecasts. 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 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 above-average amounts of activity (greater than 130 percent of climatology). The average ACE accrued during the period from 1950-2009 from September 29 – October 12 was 10.7 units, and consequently, our forecast for the next two weeks is for at least 13.9 ACE units to be generated.

The above-average forecast is due primarily to the heightened amount of activity being called for by most of the global models. Tropical Depression 16 is currently centered near Cuba and is likely to develop into a weak tropical storm. Most models develop another one or two systems in the northwest Caribbean over the next two weeks. The Madden-Julian Oscillation (MJO) remains quite weak. The weakness of the MJO during this year's August-September period has made issuing these two-week forecasts quite challenging.

Figure 1 displays the tracks that TCs 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. From a climatological perspective, the likelihood of storm formation in the eastern tropical

Atlantic drops considerably from earlier in September, with the focus of storm formation tending to shift westward towards the Caribbean.
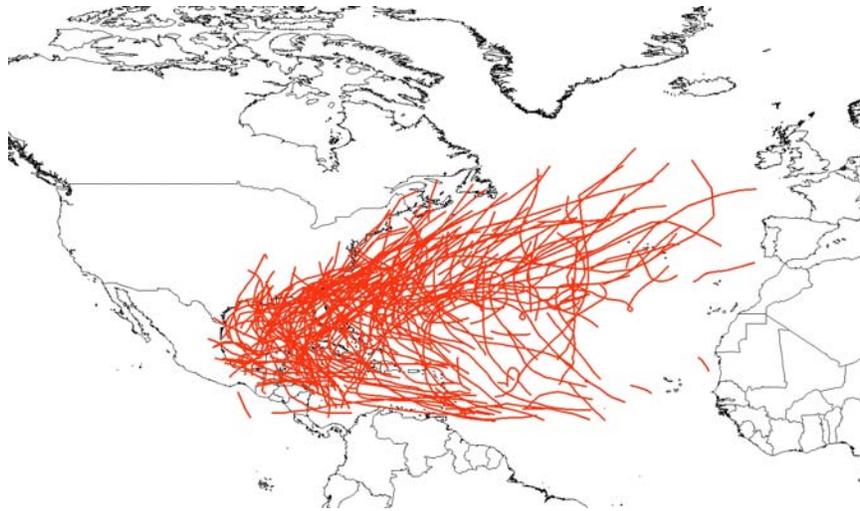

Figure 1: Tracks that named TCs have taken over the period from September 29 – October 12 for the years from 1950-2008.
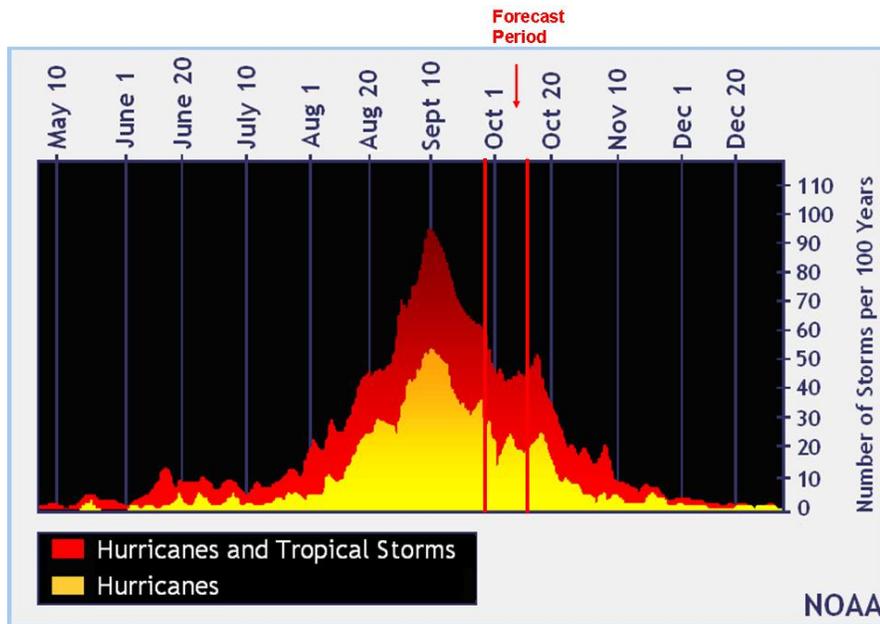

Figure 2: The current forecast period (September 29 – October 12) with respect to climatology. Figure courtesy of NOAA.

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

Tropical Depression 16 is currently located near Cuba and is predicted to become a weak tropical storm before merging with a mid-latitude front.

2) National Hurricane Center Tropical Weather Outlook

The National Hurricane Center gives one area in the central tropical Atlantic a low probability of development over the next 48 hours.

3) Global Model Analysis

The global models indicate that the northwest Caribbean is likely to be a hotbed of activity over the next two weeks. Most models develop one or two more systems out of the same area that just spawned Tropical Depression 16. The models also hint that something may form in the sub-tropical Atlantic in about 5-7 days.

4) Madden-Julian Oscillation

The Madden-Julian Oscillation is currently very weak (Figure 3). Both the statistical models as well as the dynamical models tend to indicate that the MJO should remain weak. The Global Forecast System (GFS) predicts a continuation of weak MJO activity over the next two weeks (Figure 4). Also, the latest discussion from the Climate Prediction Center indicates that the MJO will likely be fairly weak over the next two weeks.
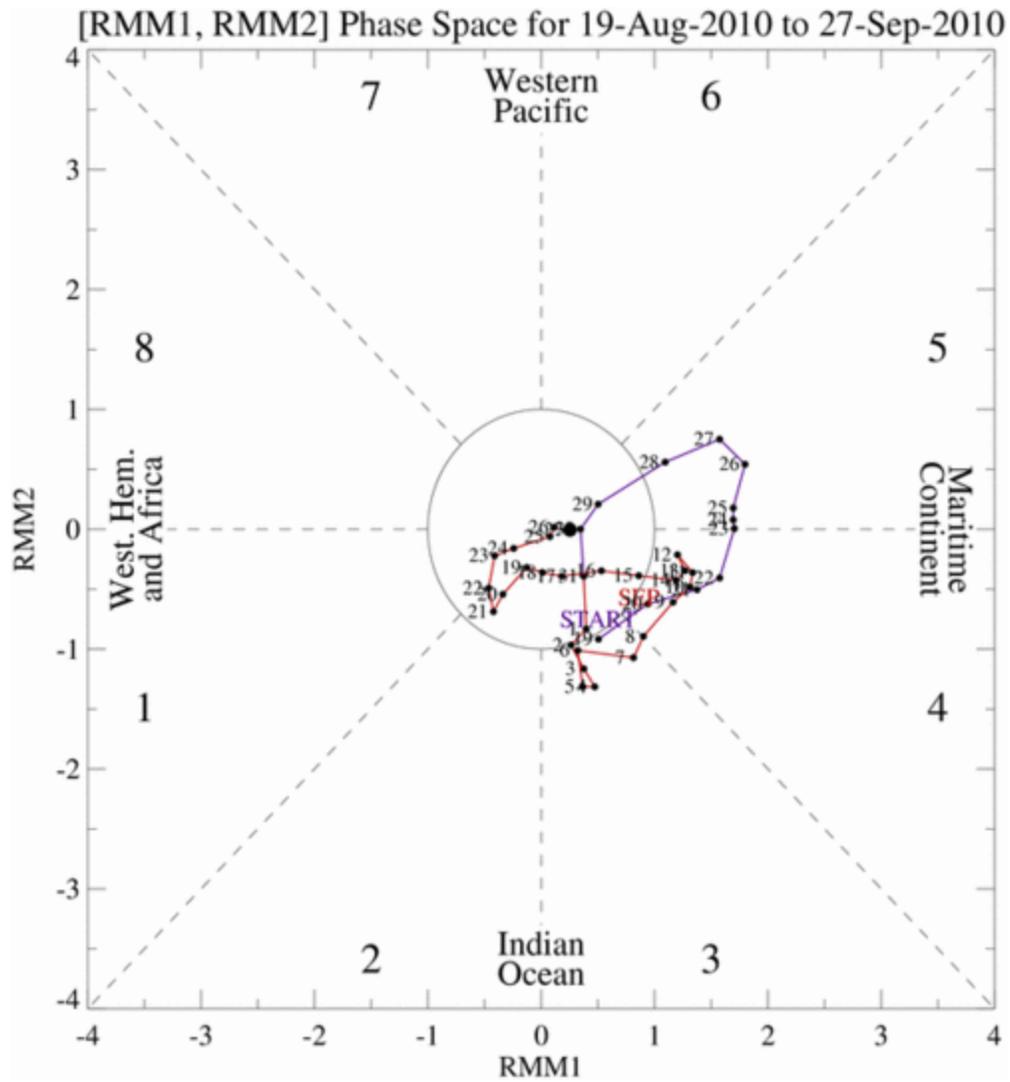
Figure 3: Estimated position of the MJO from August 19, 2010 through September 27, 2010. Figure courtesy of the Climate Prediction Center.
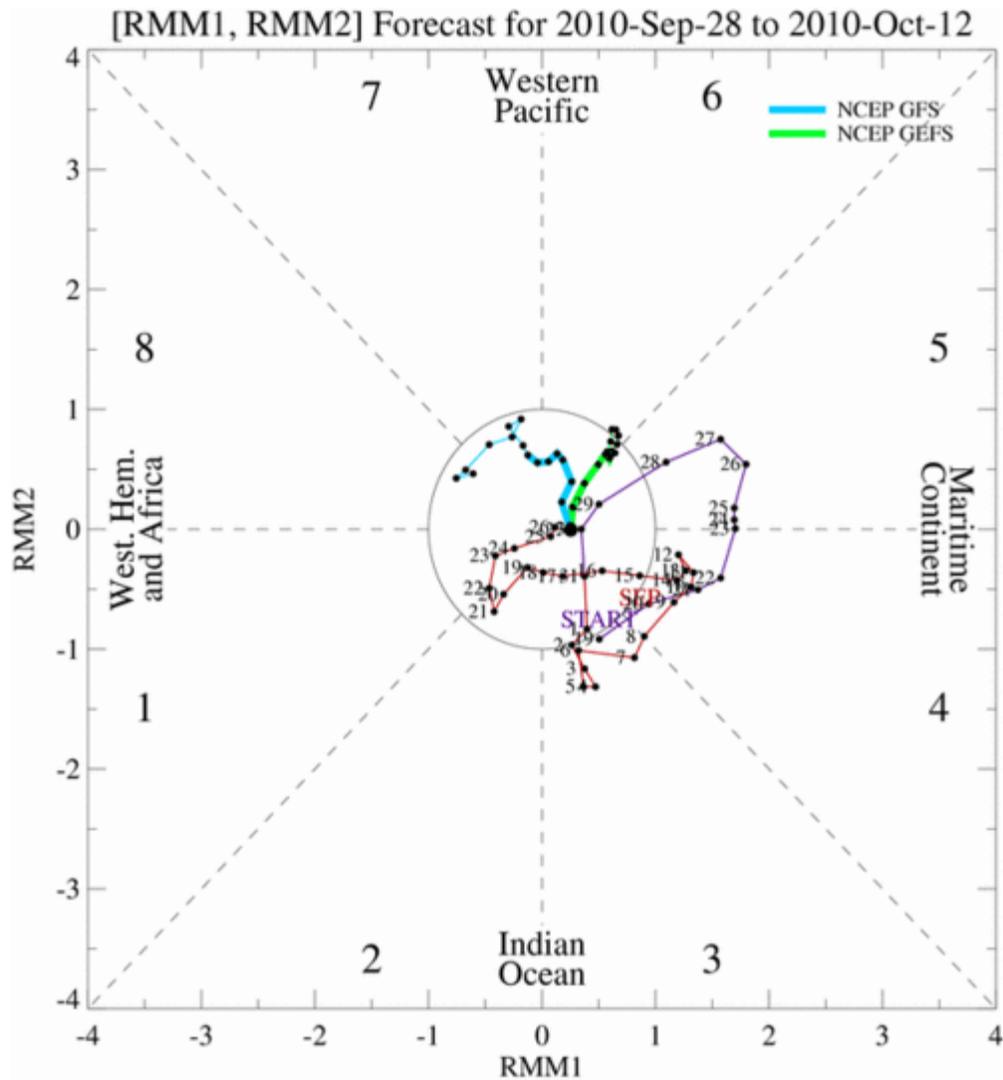
Figure 4: GFS model forecasts for the MJO from September 28 to October 12. The model is forecasting an MJO index generally in the center of the circle, indicating that the MJO will likely be of a weak magnitude throughout the period. Figure courtesy of the Climate Prediction Center.

5) Seasonal Forecast

The most recent seasonal forecast calls for a well above-average season. We utilize the seasonal forecast as a baseline for our two-week forecasts. Since the global models indicate continued heightened levels of activity, we believe that the next two weeks will be characterized by above-average activity.

3   Upcoming Forecasts

The final two-week forecast for the 2010 season will be issued on October 13 for the October 13-26 period.

VERIFICATION OF SEPTEMBER 15 – SEPTEMBER 28, 2010 FORECAST

The two-week forecast of tropical cyclone activity from September 15 – September 28 verified quite well. This forecast was relatively straightforward, since Igor, Julia and Karl were all present at the start of the forecast period, and Igor was expected to generate large levels of ACE given its location and track forecast on September 14. Activity at above-average levels (>130%) was predicted, while observed activity was about 220% of the average during the period, due in large part to Igor's copious ACE generation. The Main Development Region (MDR) continued to be the primary focus for TC activity. Eight named storms have formed in the MDR so far this year, trailing only 1933 (11) and 1995 (9) for storms forming in the MDR in a single season. Tropical Atlantic vertical shear was very low over the past two weeks, which is a likely reason for why storms continued to form and track through this area (Figure A).

The primary contributor to ACE during the two week period was Igor, with Julia, Karl and Lisa also contributing significant ACE quantities. Matthew generated only a small amount of ACE before making landfall in Nicaragua. The Madden-Julian Oscillation was of a fairly weak magnitude throughout the period and likely did not play much of a role in modulating TC activity (Figure B).
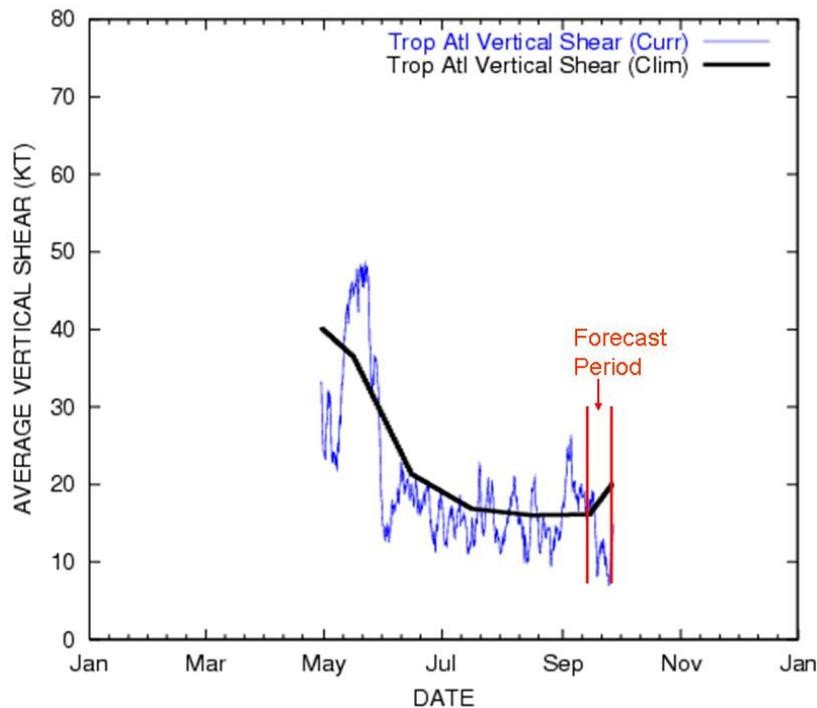

Figure A: Vertical shear over the tropical Atlantic. Vertical shear values were lower than average for most of the past two weeks, indicating conditions that were favorable for tropical cyclone formation and intensification. Figure courtesy of the Cooperative Institute for Research in the Atmosphere (CIRA).
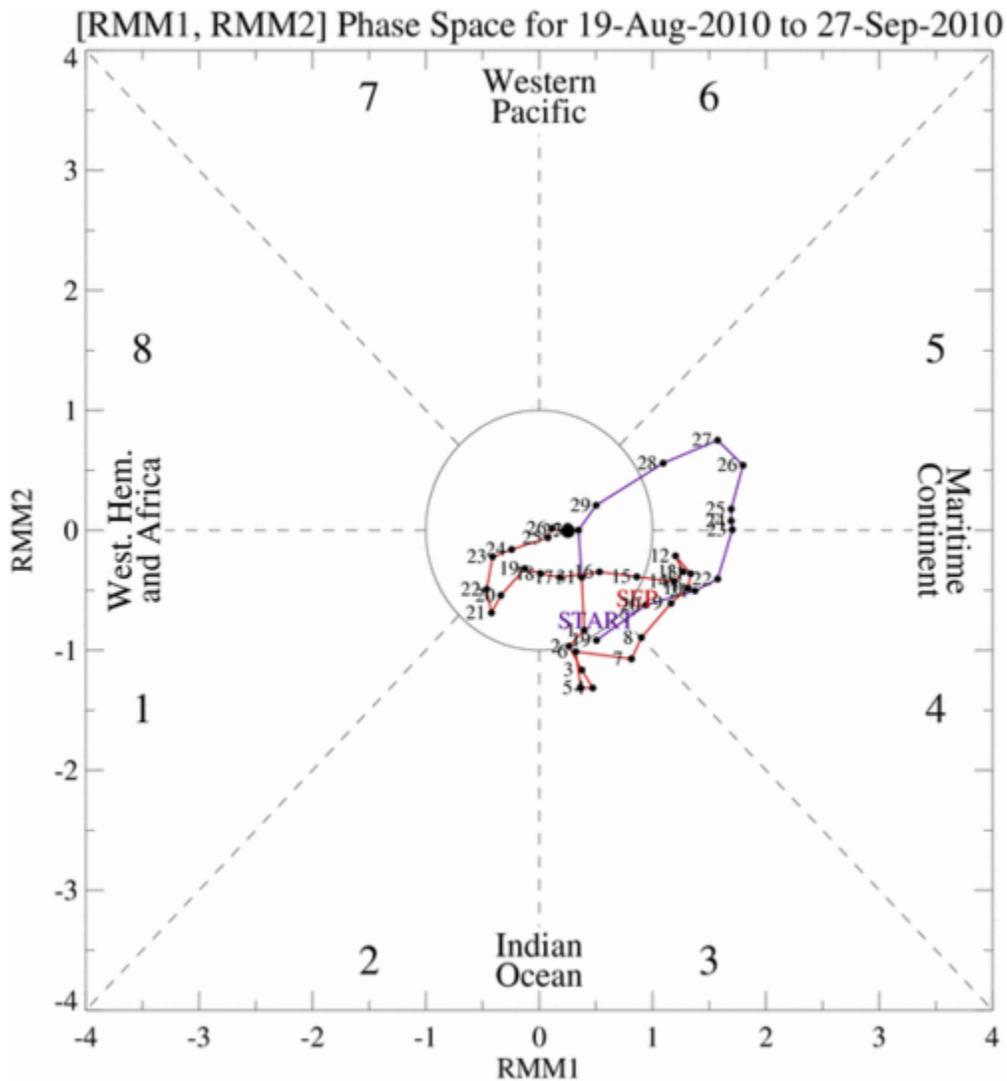
Figure B: Propagation of the MJO over the period from August 19 – September 27.
Figure courtesy of the Climate Prediction Center.