COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM SEPTEMBER 1 – SEPTEMBER 14, 2010

We expect that the next two weeks will be characterized by amounts of activity near (70 to 130 percent of) climatology. These new two-week forecasts have replaced the monthly forecasts that we have been issuing in recent years.

(as of 1 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 activity at average levels (70-130 percent of climatology). The average ACE accrued during the period from 1950-2009 from September 1 - September 14 was 28.4 units, and consequently, our forecast for the next two weeks is for between 19.9 and 36.9 ACE units to be generated.

The average forecast is due to a combination of factors. The primary factor is that most of the global models are not developing any new tropical cyclones after Earl and Fiona. We expect Earl to generate large amounts of ACE over the next couple of days, so we certainly expect to see ACE approach average levels over the two-week period. The MJO is predicted to remain weak over the next two weeks, so we are not utilizing this signal very much for this forecast.

Figure 1 displays the tracks that TCs have taken during the period from September 1 – September 14 for the years from 1950-2008. Figure 2 displays the September 1 – September 14 forecast period with respect to climatology. The September 1 – September 14 period includes the peak of the climatological Atlantic basin hurricane season, which falls on September 10.

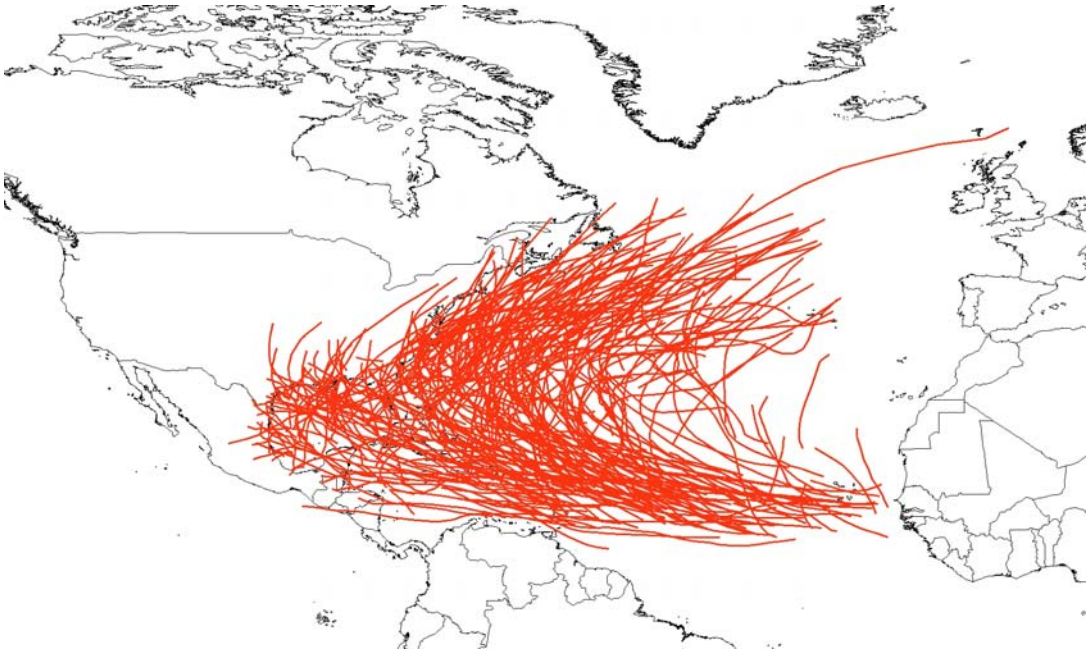

Figure 1: Tracks that named TCs have taken over the period from September 1 – September 14 for the years from 1950-2008.

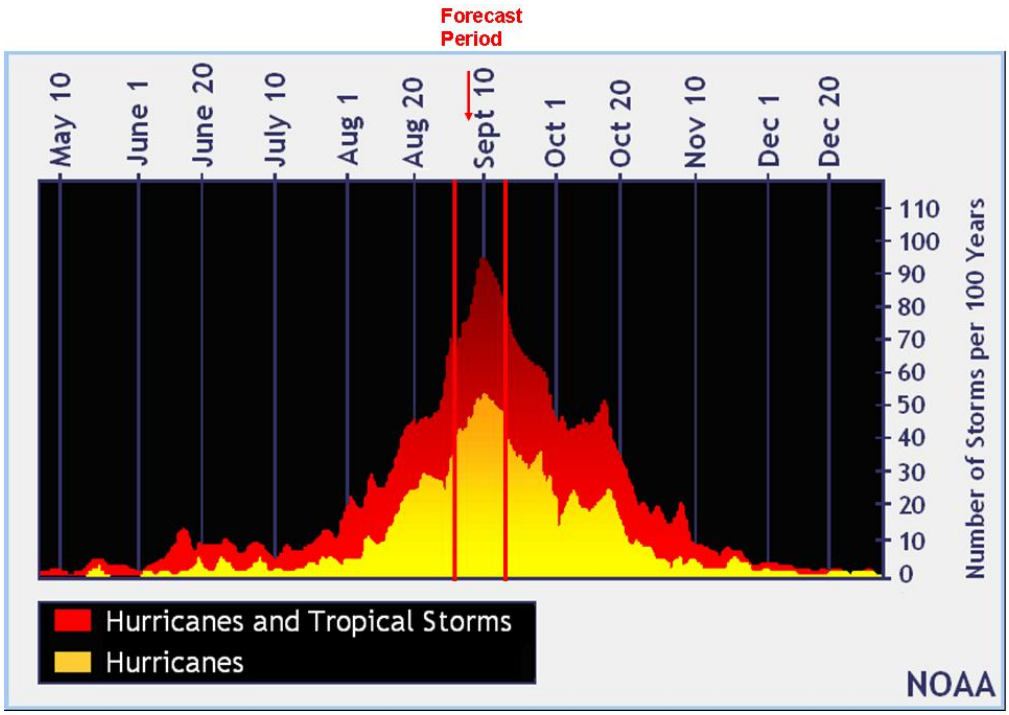

Figure 2: The current forecast period (September 1 – September 14) with respect to climatology. This forecast period includes the climatological peak of the hurricane season (September 10). Figure courtesy of NOAA.

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 1 – September 14.

1) Current Storm Activity

Hurricane Earl and Tropical Storm Fiona are currently tracking across the Atlantic. Based on the latest model forecasts as well as official forecasts from the National Hurricane Center, we estimate that these two storms will generate approximately 15 ACE units.

2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook sees one area in the eastern tropical Atlantic with a low chance of development over the next 48 hours.

3) Global Model Analysis

The global models are not enthusiastic about storm development over the next several days. The Canadian model develops the wave currently being discussed in the NHC's Tropical Weather Outlooks.

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.

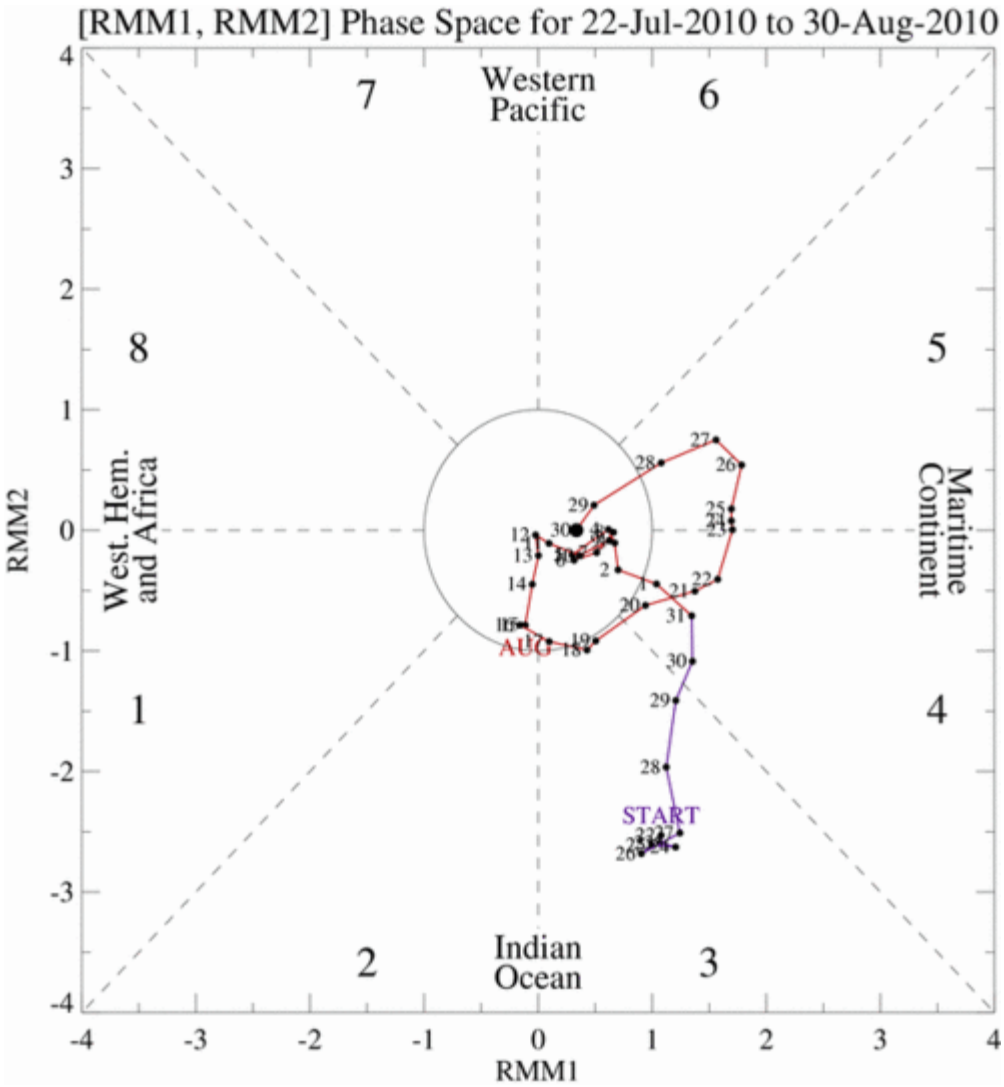

Figure 3: Estimated position of the MJO from July 22, 2010 through August 30, 2010.

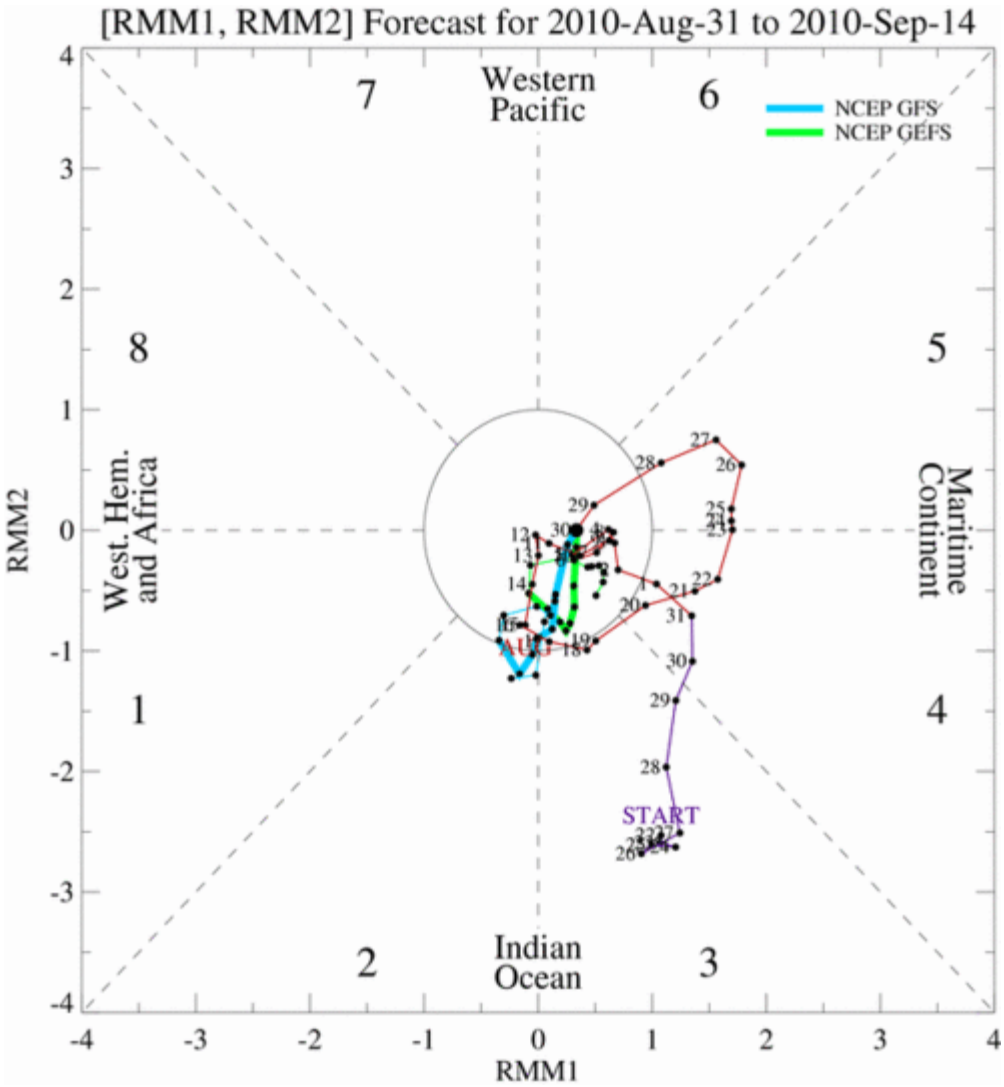

Figure 4: GFS model forecasts for the MJO from August 31 through September 14. The model is forecasting an MJO index generally in the center of the circle, indicating that the MJO will likely be of a weak magnitude throughout the period.

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 MJO is predicted to be weak over the next two weeks, and forecast models are not calling for much additional storm development over the next two weeks, we believe the next two weeks should have activity at near-average levels.

3 Upcoming Forecasts

The next two-week forecast after this one will be issued on September 15 for the September 15 – September 28 period. Additional two-week forecasts will be issued on September 29 and October 13.

VERIFICATION OF AUGUST 18 – AUGUST 31, 2010 FORECAST

The two-week forecast of tropical cyclone activity from August 18 – August 31 verified quite well. Activity at above-average levels (>130%) was predicted, while observed activity was very high (approximately 250%) during the two-week period. Most of the activity that occurred was in the tropical Atlantic's Main Development Region. The primary reason why we believe activity was enhanced during the two-week period was due to reduced amounts of vertical wind shear over the tropical Atlantic (Figure A). The reduced levels of vertical shear across the Main Development Region are typically what would be expected given the anomalously warm tropical Atlantic combined with moderate La Niña conditions in the tropical Pacific.

Significant amounts of ACE were generated by both Hurricanes Danielle and Earl. Tropical Storm Fiona also formed towards the end of the two-week period Our forecast was for an above-average ACE value of 19 or more units (>130% of climatology), while an ACE of 36 units (250%) occurred. 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).

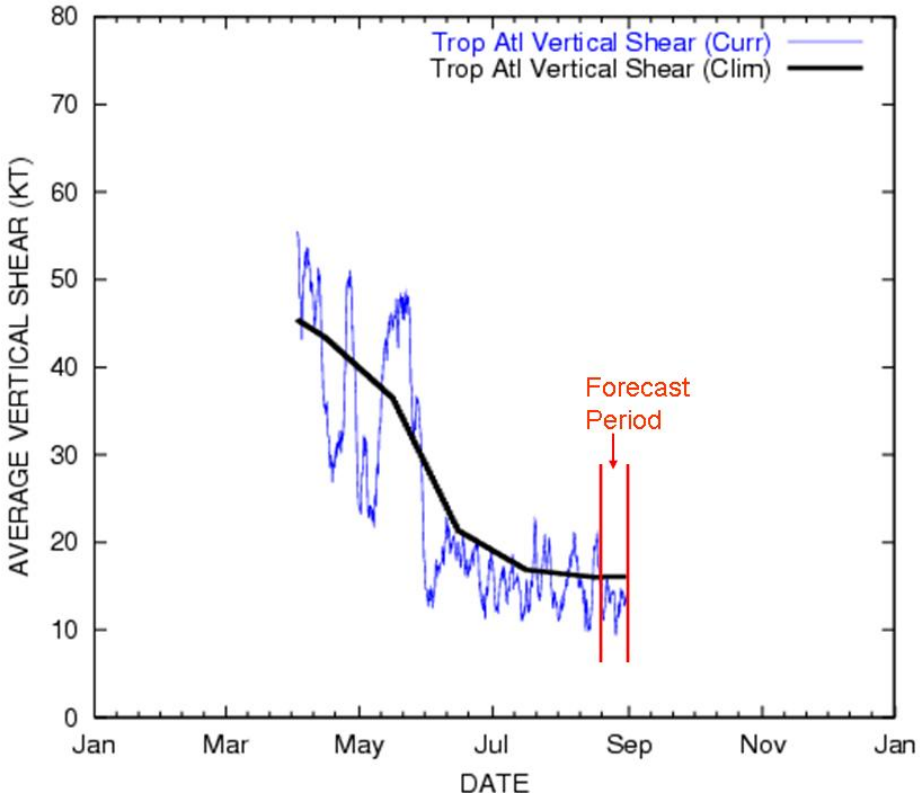

Figure A: Vertical shear over the tropical Atlantic. Shear values were below the long-term averages for the entire two-week period. Figure courtesy of the Cooperative Institute for Research in the Atmosphere (CIRA).

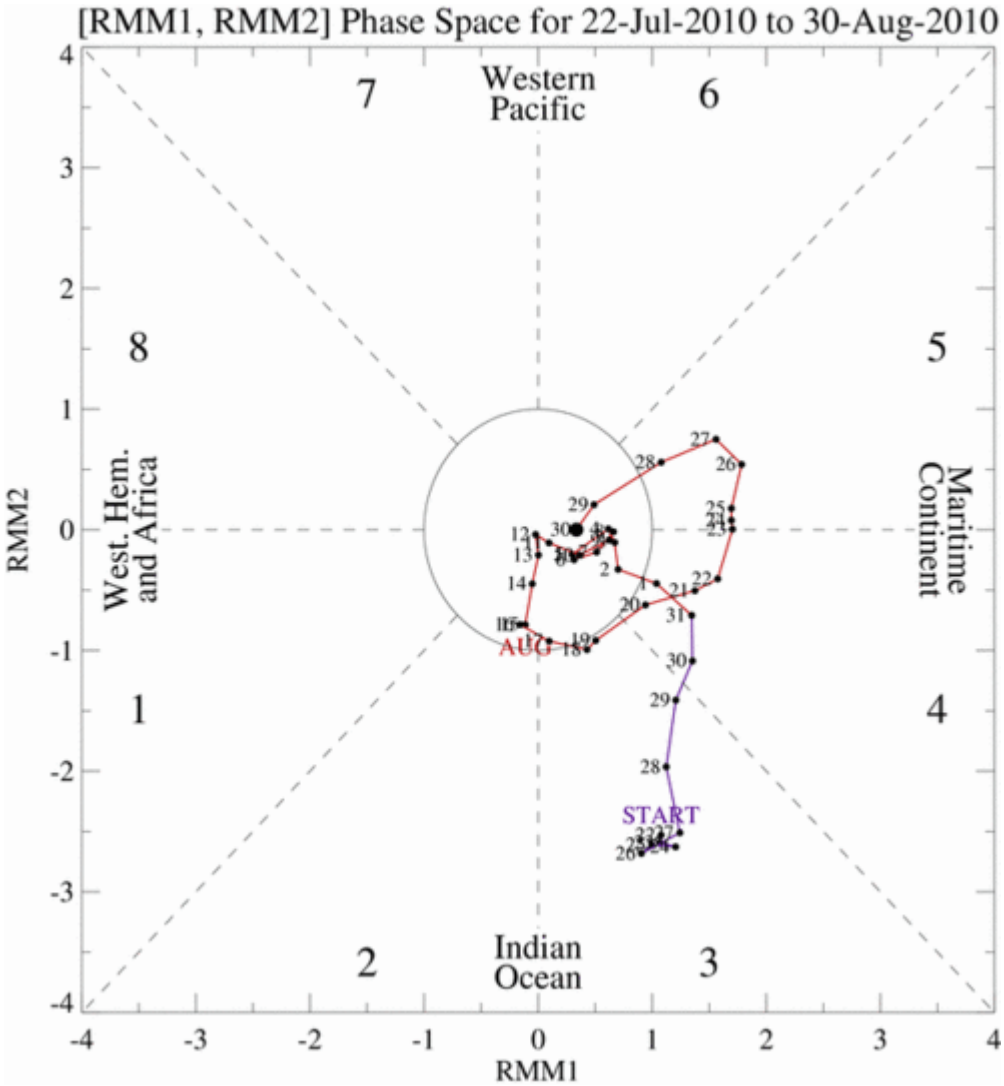

Figure B: Propagation of the MJO over the period from July 22 – August 30. The MJO has been on a weakening trend over the past few days.