COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM SEPTEMBER 15 – SEPTEMBER 28, 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 15 September 2010)

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

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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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Above-Average</td>
<td>Greater than 130% of Average ACE</td>
</tr>
<tr>
<td>Average</td>
<td>70% - 130% of Average ACE</td>
</tr>
<tr>
<td>Below-Average</td>
<td>Less than 70% of Average ACE</td>
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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 15 - September 28 was 22.1 units, and consequently, our forecast for the next two weeks is for at least 28.7 ACE units to be generated.

The above-average forecast is due to a combination of factors. The primary factor is that we expect a very large amount of ACE to be generated by Igor. Current forecasts of Igor’s intensity from the National Hurricane Center indicate that this hurricane alone could generate enough ACE to approach the above-average definition. Julia is also expected to generate several ACE units as it tracks northwest across the Atlantic. Newly formed Karl could also help contribute modest amounts of ACE for the next several days. In addition, several of the global models are developing the next tropical wave moving off of the coast of Africa. The MJO is predicted to remain weak over the next two weeks, so we continue to primarily rely on currently-existing tropical cyclones and global model forecasts for this outlook.

Figure 1 displays the tracks that TCs have taken during the period from September 15 – September 28 for the years from 1950-2008. Figure 2 displays the
September 15 – September 28 forecast period with respect to climatology. Although the climatological peak of the hurricane season has passed, large amounts of activity can still be experienced during this time period.

Figure 1: Tracks that named TCs have taken over the period from September 15 – September 28 for the years from 1950-2008.

Figure 2: The current forecast period (September 15 – September 28) 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 15 – September 28.

1) Current Storm Activity

Hurricane Igor will likely generate close to 20 ACE units by itself, and with help from Hurricane Julia and Tropical Storm Karl, we expect that storms currently on the map will allow ACE over the next two weeks to reach above-average levels.

2) National Hurricane Center Tropical Weather Outlook

There are currently no areas being watched for tropical development over the next 48 hours.

3) Global Model Analysis

The global models are fairly enthusiastic about developing the next wave off of the coast of Africa into a tropical cyclone. The GFS also hints at additional development possible in the 7-10 day timeframe.

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 5, 2010 through September 13, 2010.
Figure 4: GFS model forecasts for the MJO from September 14 to September 28. 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. The operational GFS is hinting at a possible amplification of the MJO in the Western Hemisphere towards the end of 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. Given the current very active Atlantic and forecast output from global models, we expect the next two weeks to have well above-average activity.

3 Upcoming Forecasts

The next two-week forecast after this one will be issued on September 29 for the September 29 – October 12 period. An additional two-week forecast will be issued on October 13.
The two-week forecast of tropical cyclone activity from September 1 – September 14 looked to verify quite well until Hurricane Igor’s rapid intensification over the past couple of days. Activity at average levels (70-130%) was predicted, while observed activity was just outside the average category (approximately 140%) during the two-week period, due in large part to Igor’s copious ACE generation. As was the case during the last part of the August, most of the activity that occurred was in the tropical Atlantic’s Main Development Region. It appears that, in general, low-level winds were very favorable for storm formation during the two-week period. For example, low-level horizontal divergence was below-average, indicating increased low-level convergence which helps increase the likelihood of storm formation and intensification.

Several storms contributed to ACE during the two-week period, with most of the ACE being generated by Hurricane Earl during the early part of the period and Hurricane Igor during the latter part of the period. 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: Horizontal divergence over the tropical Atlantic. Divergence values were below the long-term averages for the entire two-week period, indicating enhanced convergence over the tropical Atlantic. Figure courtesy of the Cooperative Institute for Research in the Atmosphere (CIRA).
Figure B: Propagation of the MJO over the period from August 5 – September 13.