

**COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE  
ACTIVITY FROM AUGUST 17 – AUGUST 30, 2011**

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

(as of 17 August 2011)

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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 third year that we have issued shorter-term forecasts of tropical cyclone 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<sup>2</sup>) 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 (greater than 130 percent of climatology). The average ACE accrued during the period from 1950-2010 from August 17-August 30 was 15 units, and consequently, our forecast for the next two weeks is for greater than 19 ACE units to be generated.

The above-average forecast is due to several factors. While there are no currently active tropical cyclones in the Atlantic, the National Hurricane Center is monitoring an area in the eastern Caribbean for potential development. Several models develop this system into a hurricane once it reaches the western Caribbean. In addition, most global models develop a wave in the eastern Atlantic and indicate a long westward track associated with this system.

The MJO is currently weak, and it is expected to remain weak according to the latest discussion from the Climate Prediction Center. However, other sub-seasonal modes of tropical variability are expected to amplify over the next ten days, and are expected to reflect themselves in a favorable convective mode for tropical cyclone formation and intensification in the Atlantic (similar to MJO phases 1-2).

Figure 1 displays the tracks that tropical cyclones have taken during the period from August 17 - August 30 for the years from 1950-2008. Figure 2 displays the August 17 - August 30 forecast period with respect to climatology. The August 17 - August 30 period is just prior to the most active portion of the hurricane season.

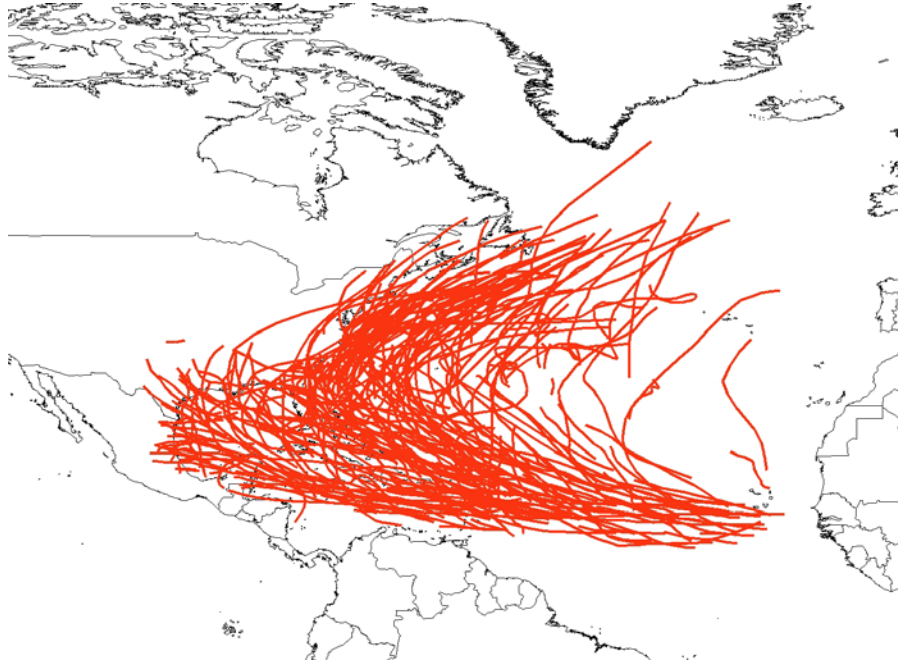


Figure 1: Tracks that named tropical cyclones have taken over the period from August 17 - August 30 for the years from 1950-2008.

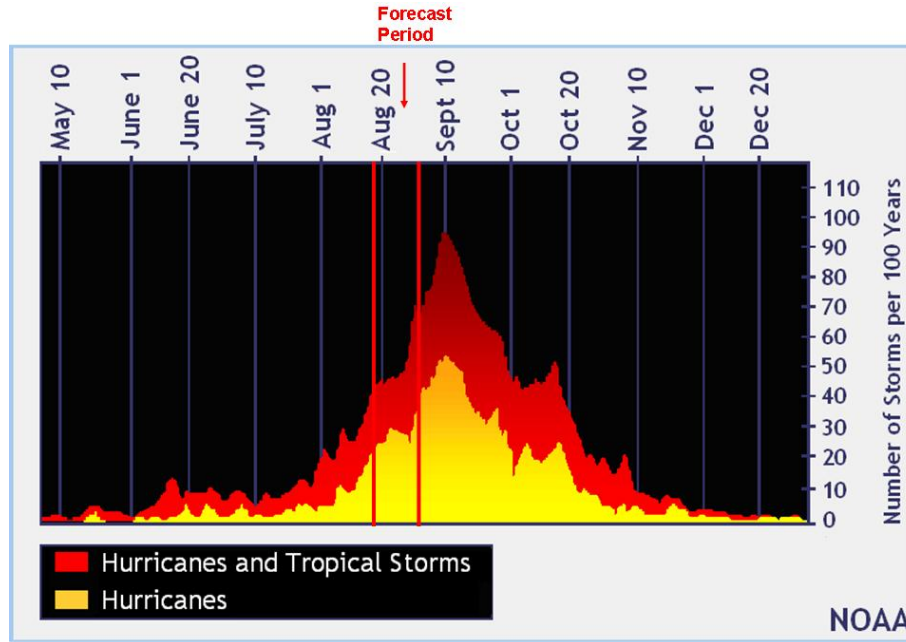


Figure 2: The current forecast period (August 17 – August 30) with respect to climatology. Figure courtesy of NOAA.

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 17 – August 30.

#### 1) Current Storm Activity

There are no systems currently active in the tropical Atlantic.

#### 2) National Hurricane Center Tropical Weather Outlook

The latest NHC Tropical Weather Outlook foresees a 20% chance for a tropical cyclone developing in the next 48 hours from a vigorous wave in the eastern Caribbean.

#### 3) Global Model Analysis

Both the GFS and ECMWF develop a tropical wave in the eastern Atlantic into a tropical cyclone over the next seven days. They also indicate that additional TC development may occur during week two of this forecast.

#### 4) Madden-Julian Oscillation

The Madden-Julian Oscillation is currently weak (Figure 3). The Climate Prediction Center’s outlook for the next 7-10 days is that the MJO will likely remain weak; however, other sub-seasonal tropical variability that reflects itself on MJO phase diagrams will likely amplify and provide convective and wind patterns generally

associated with MJO Phases 1 and 2, which are typically associated with active portions of the Atlantic hurricane season. Both the ensemble Global Forecast System (GFS) (Figure 4) and European Centre for Medium-Range Weather Forecasts (ECMWF) (Figure 5) models indicate convective and wind patterns typically associated with MJO Phases 1 and 2 are likely over the next two weeks. Table 2 displays the levels of TC activity observed over the Atlantic basin given various MJO phases over the period from 1974-2007. Note the generally high levels of TC activity experienced in the Atlantic when the MJO is located in Phases 1 and 2.

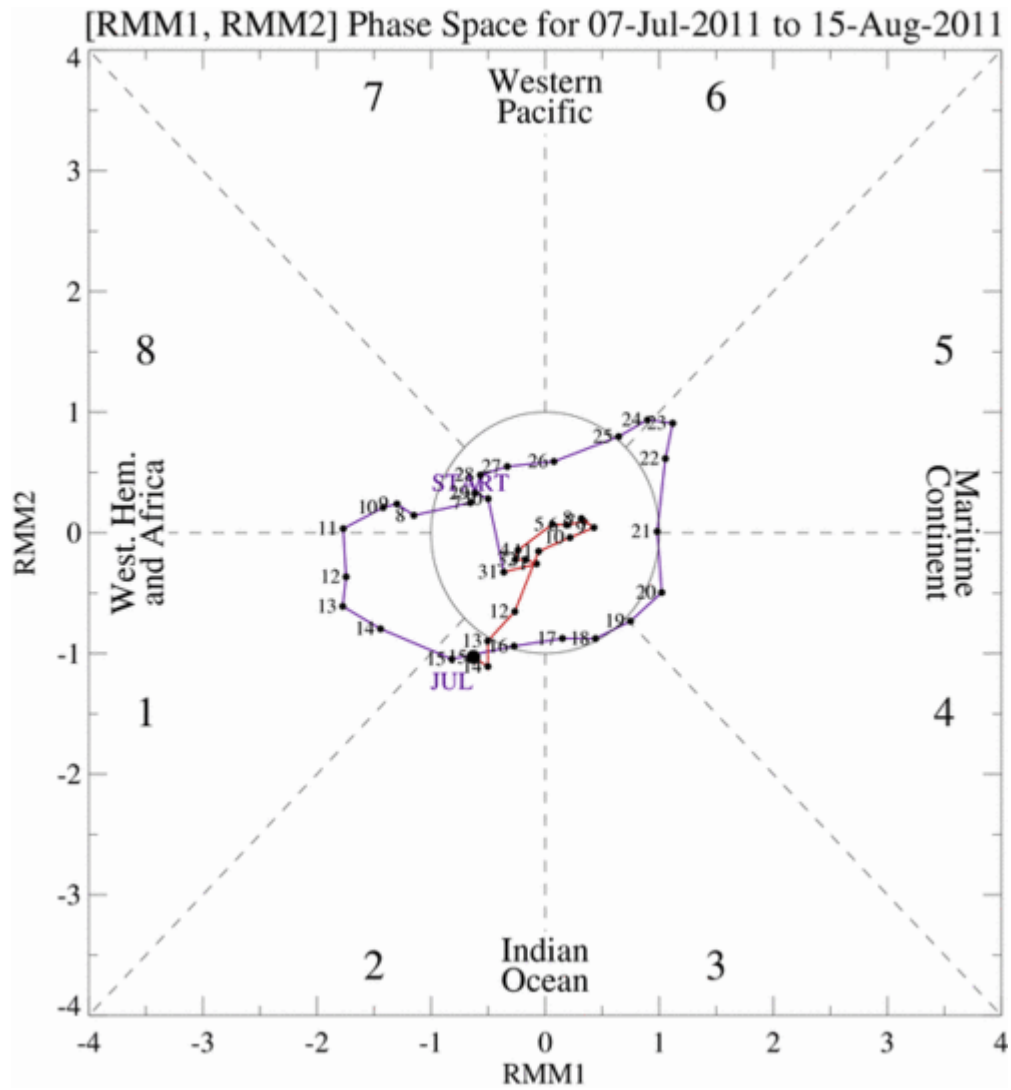


Figure 3: Estimated position of the MJO from July 7, 2011 through August 15, 2011.

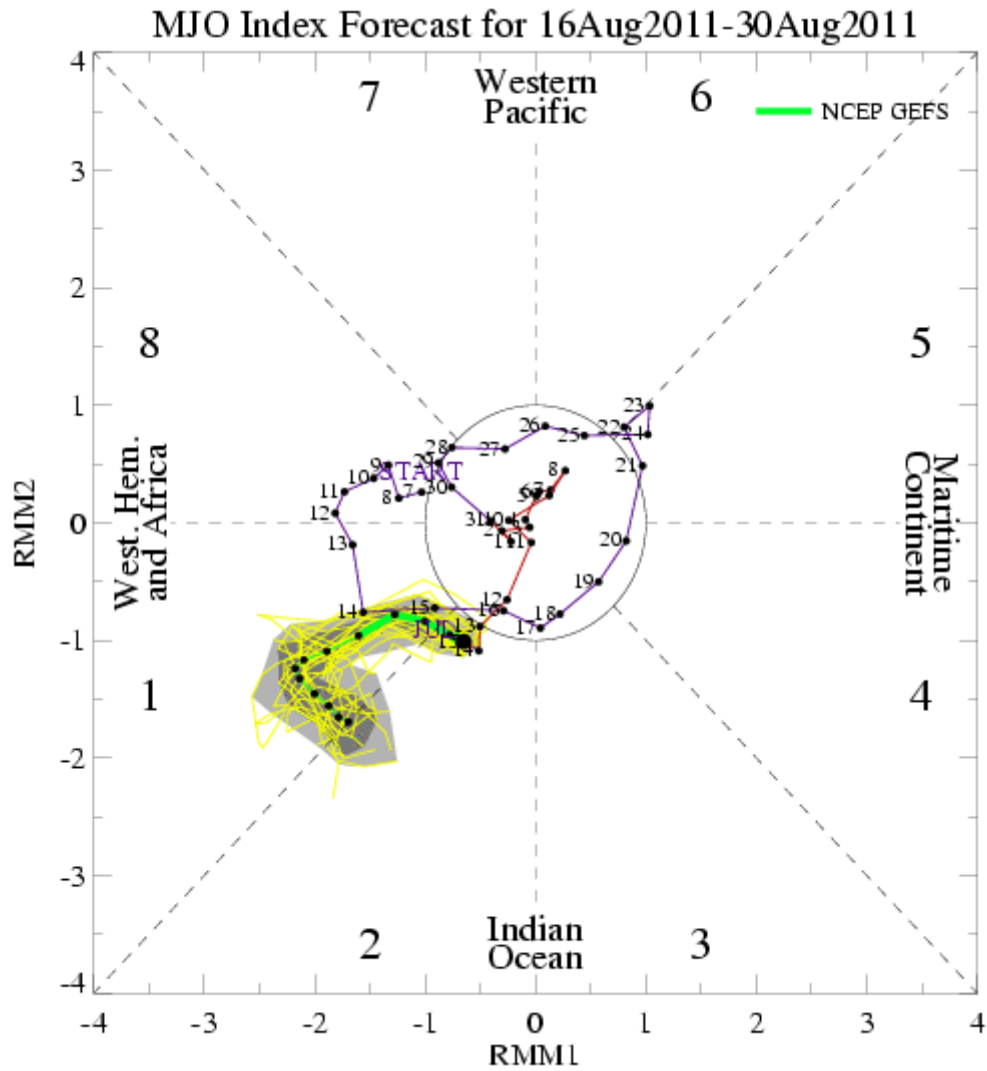


Figure 4: GFS model forecast for the MJO from August 16 through August 30.

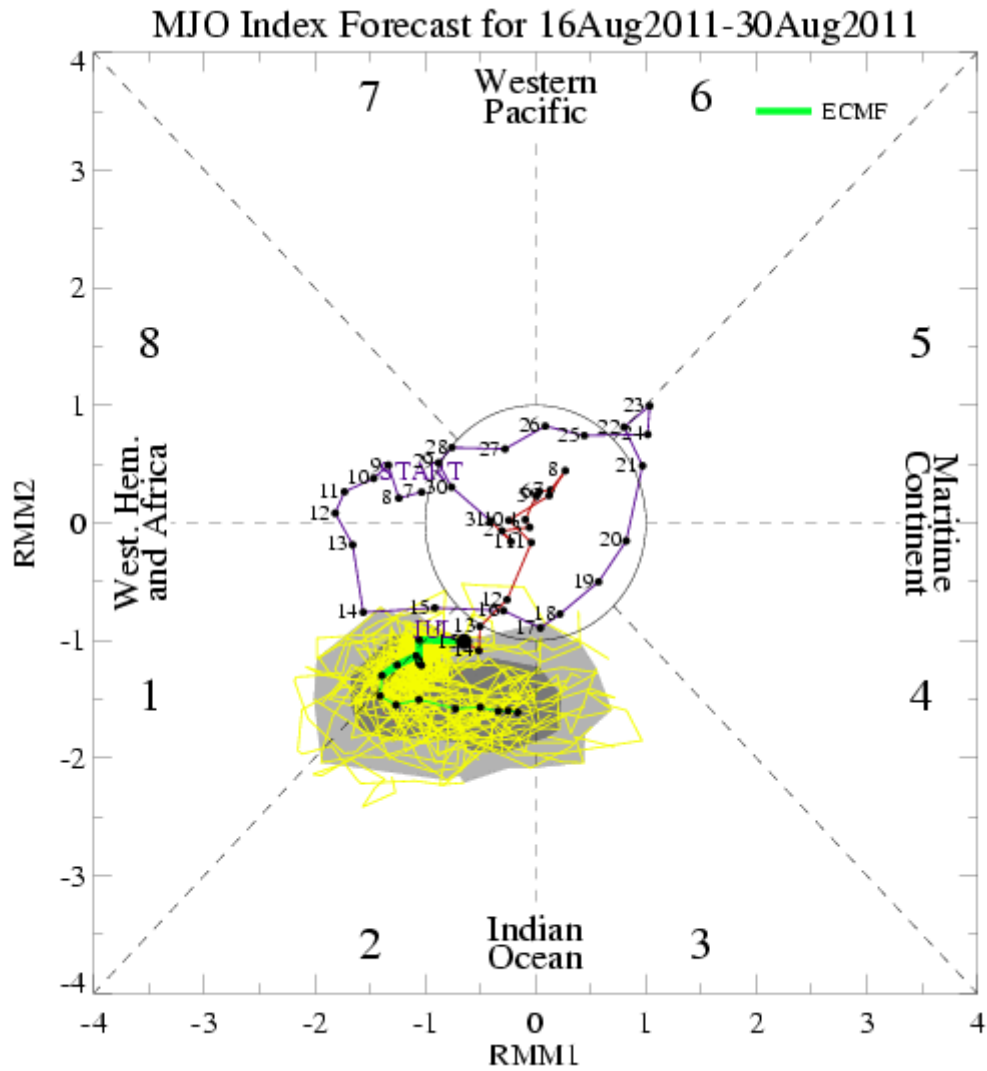


Figure 5: ECMWF model forecast for the MJO from August 16 through August 30.

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 /<br>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 well above-average season. We utilize the seasonal forecast as a baseline for our two-week forecasts. Since the global models are somewhat aggressive with storm formation, we believe that an above-average two-week period for ACE generation is the most likely scenario.

## 3 Upcoming Forecasts

The next two-week forecast will be issued on August 31 for the August 31 – September 13 period. Additional two-week forecasts will be issued on September 14, September 28 and October 12.

## VERIFICATION OF AUGUST 3 – AUGUST 16, 2011 FORECAST

The two-week forecast of tropical cyclone activity from August 3 – August 16 verified slightly outside our predicted level. Activity at average levels was predicted (5-9 ACE units), while observed activity was at somewhat below-average levels (4 ACE units). The primary reason why we believe activity was reduced during the two-week period was due to increased vertical stability (Figure A). A similar stable period (with an associated quiet period in Atlantic TC activity) was observed during the early to middle part of August in 2010. Following this quiet period, the remainder of the 2010 Atlantic hurricane season was very active.

Three systems contributed to ACE during the August 3 – August 16 period. Tropical Storms Emily, Franklin and Gert were all weak, short-lived systems.

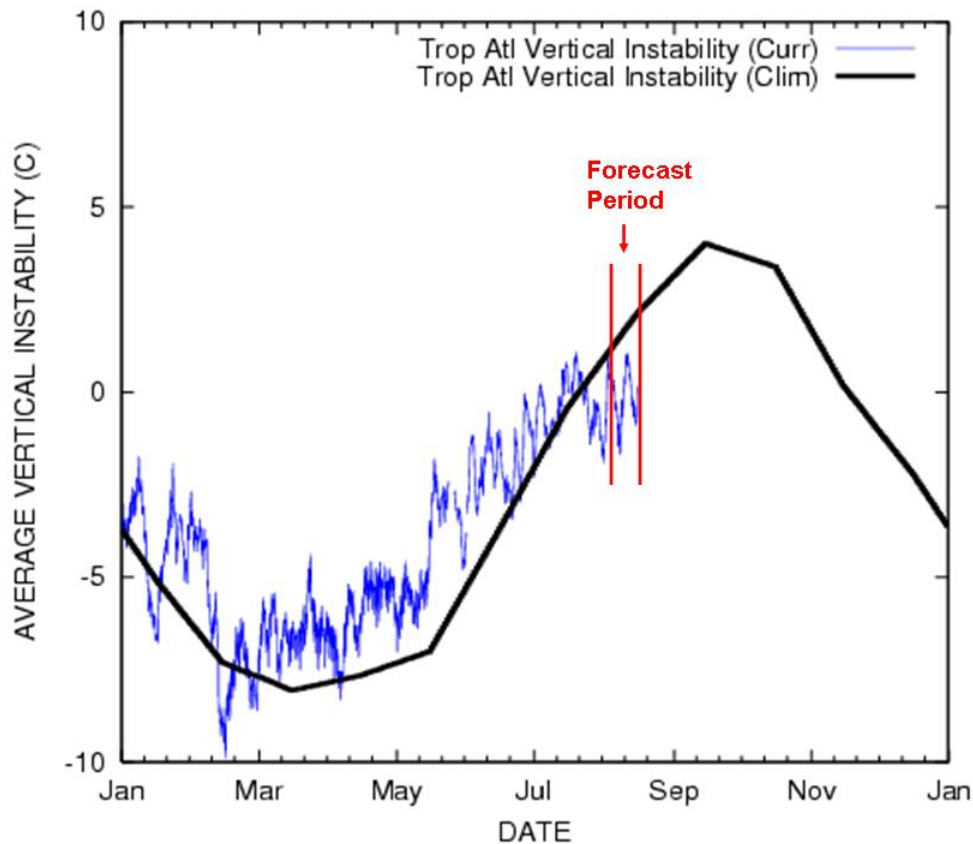


Figure A: Vertical instability over the tropical Atlantic. Note the below-average conditions during the past two weeks, indicating subsidence and a stable atmosphere. These conditions are not conducive for tropical cyclone formation. Figure courtesy of the Cooperative Institute for Research in the Atmosphere (CIRA).