COLORADO STATE UNIVERSITY FORECAST OF ATLANTIC HURRICANE ACTIVITY FROM OCTOBER 13–26, 2022

We believe that the most likely category for Atlantic hurricane activity in the next two weeks is normal (90%), with above-normal (10%) and below-normal (<1%) being less likely.

(as of 13 October 2022)

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In Memory of William M. Gray[4]

This discussion as well as past forecasts and verifications are available online at http://tropical.colostate.edu

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1 Introduction

This is the 14th 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 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.

Our forecast definition of above-normal, normal, and below-normal Accumulated Cyclone Energy (ACE) periods is defined by ranking observed activity in the satellite era from 1966–2021 and defining above-normal, normal and below-normal two-week periods based on terciles. Since there are 56 years from 1966–2021, we include the 19 years with the most ACE from October 13–26 as the upper tercile, the 19 years with the least ACE as the bottom tercile and the remaining 18 years are counted as the middle tercile.

Table 1: ACE forecast definition for TC activity for October 13–26, 2022.

Parameter	Definition	Probability in Each Category
Above-Normal	Upper Tercile (>9 ACE)	10%
Normal	Middle Tercile (1–9 ACE)	90%
Below-Normal	Lower Tercile (<1 ACE)	<1%

2 Forecast

We believe that the next two weeks have the highest probability of being in the normal category (90%). Tropical Storm Karl is forecast to generate an additional ~2 ACE before dissipation. The National Hurricane Center gives a low chance (20%) for tropical cyclone development in the eastern Atlantic in the next five days. Global models are generally anemic with additional TC development during the next two weeks. The Madden-Julian oscillation (MJO) is forecast to stagnate in phase 6 over the next two weeks. Phase 6 is typically associated with quiet periods for Atlantic hurricane activity.

Figure 1 displays the formation locations of tropical cyclones from October 13–26 for the years from 1966–2021, along with the maximum intensities that these storms reached. Figure 2 displays the October 13–26 forecast period with respect to climatology. The primary threat area for major hurricane formations during mid- to late October is in the western Caribbean.

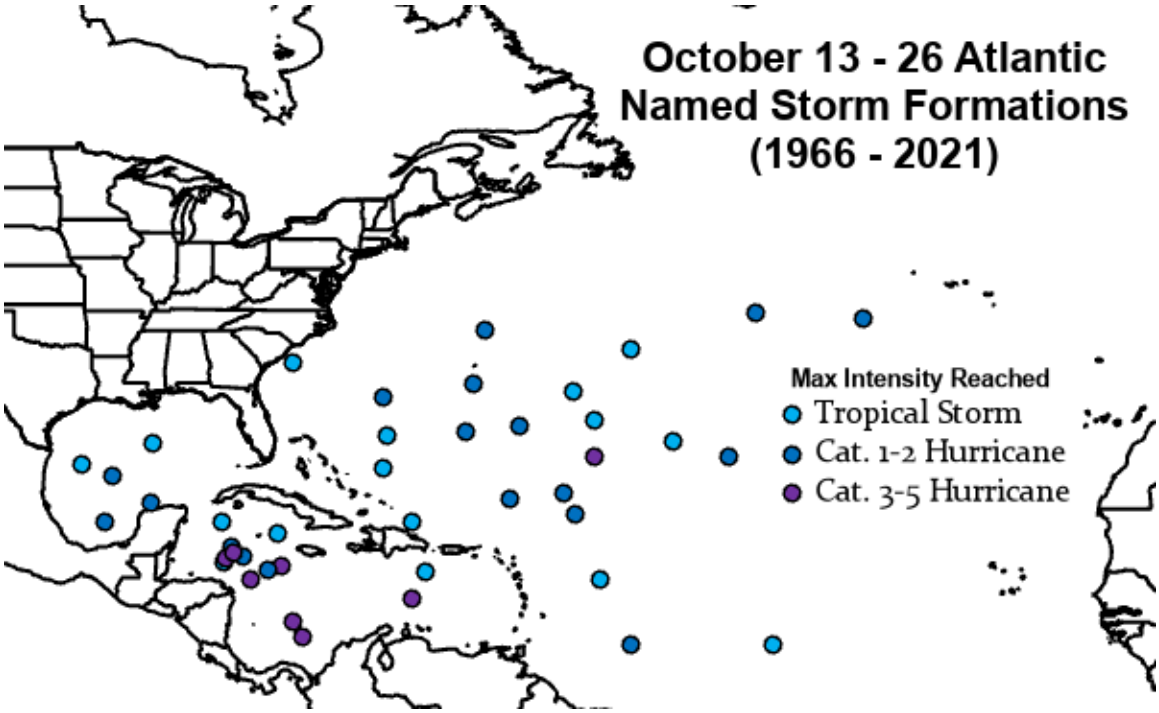

Figure 1: Atlantic named storm formations from October 13–26 during the years from 1966–2021 and the maximum intensity that these named storms reached.

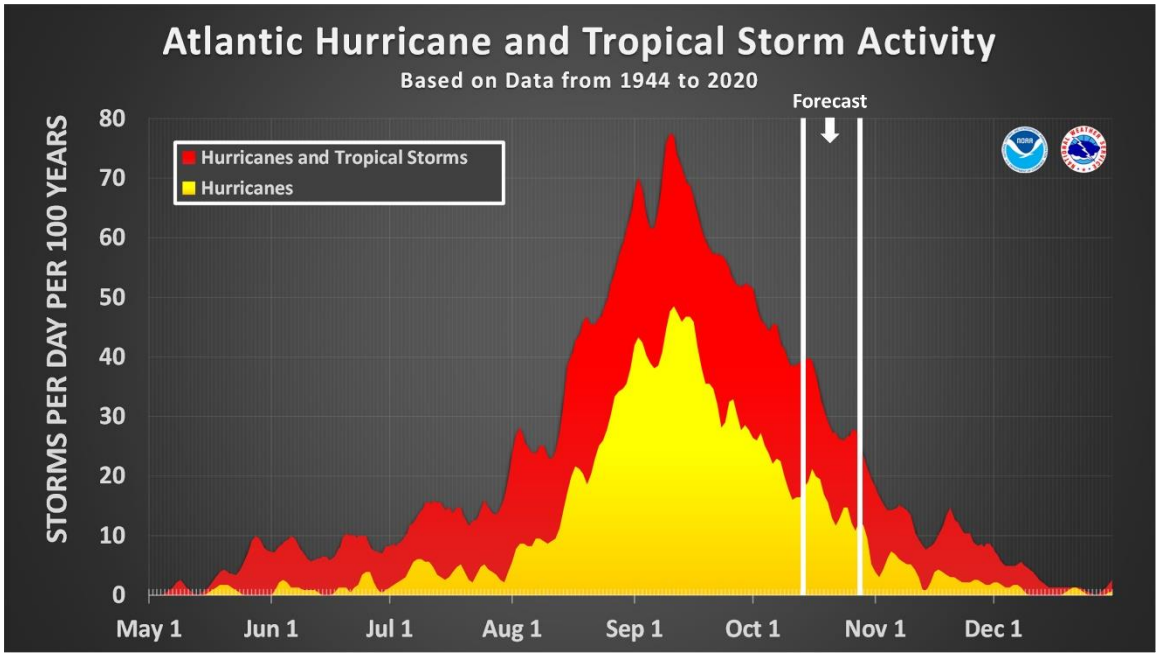

Figure 2: The current forecast period (October 13–26) with respect to climatology. Figure courtesy of NOAA.

We now examine how we believe each of the five factors discussed in the introduction will impact Atlantic TC activity for the period from October 13–26.

1) Current Storm Activity

Tropical Storm Karl is forecast to be a tropical storm for the next couple of days, likely generating ~2 ACE. Since the normal category only requires producing 1 ACE, we gave a very low probability to a below-normal two-week period. We note that our verification began at 0 UTC on October 13.

2) National Hurricane Center Tropical Weather Outlook

The National Hurricane Center is currently giving a 20% chance of tropical cyclone development for a tropical wave in the eastern Atlantic (Figure 3). Any ACE generated by this system will likely be limited, given strong upper-level westerly wind shear that should impact this system in a few days.

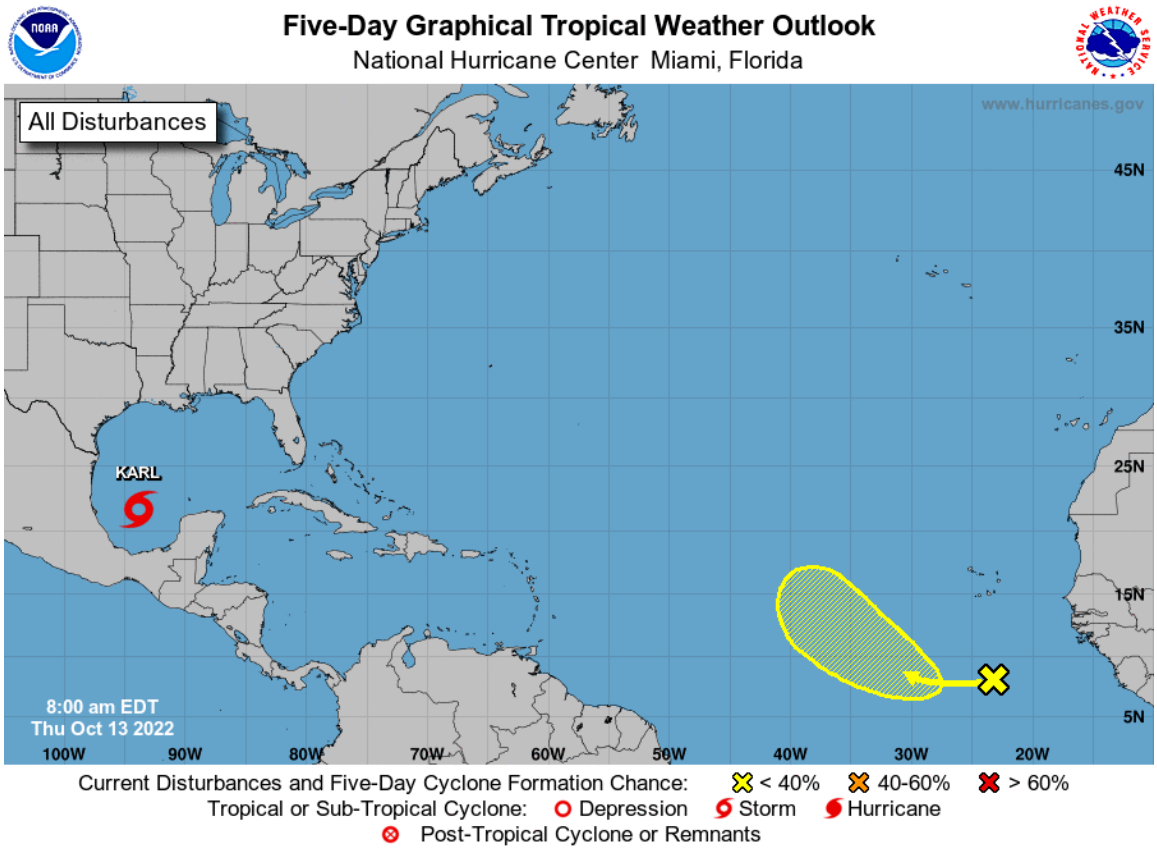

Figure 3: Latest tropical weather outlook from the National Hurricane Center.

3) Global Model Analysis

Neither the ECMWF (Figure 4) or GFS (Figure 5) ensembles have much support for any other significant tropical cyclone development in the next two weeks. This is likely due to anomalously strong vertical wind shear forecast across the entire tropical Atlantic and

Caribbean (Figure 6), due in part to the MJO favoring convective enhancement over the tropical Pacific (discussed in the next section).

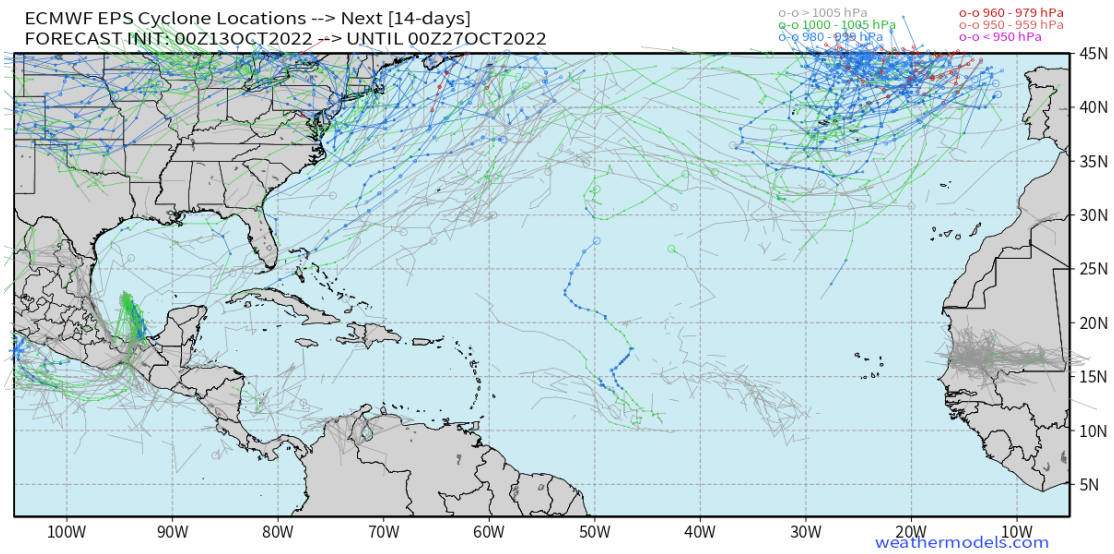

Figure 4: Cyclone locations from the ECMWF EPS ensemble for the next two weeks. Figure courtesy of weathermodels.com

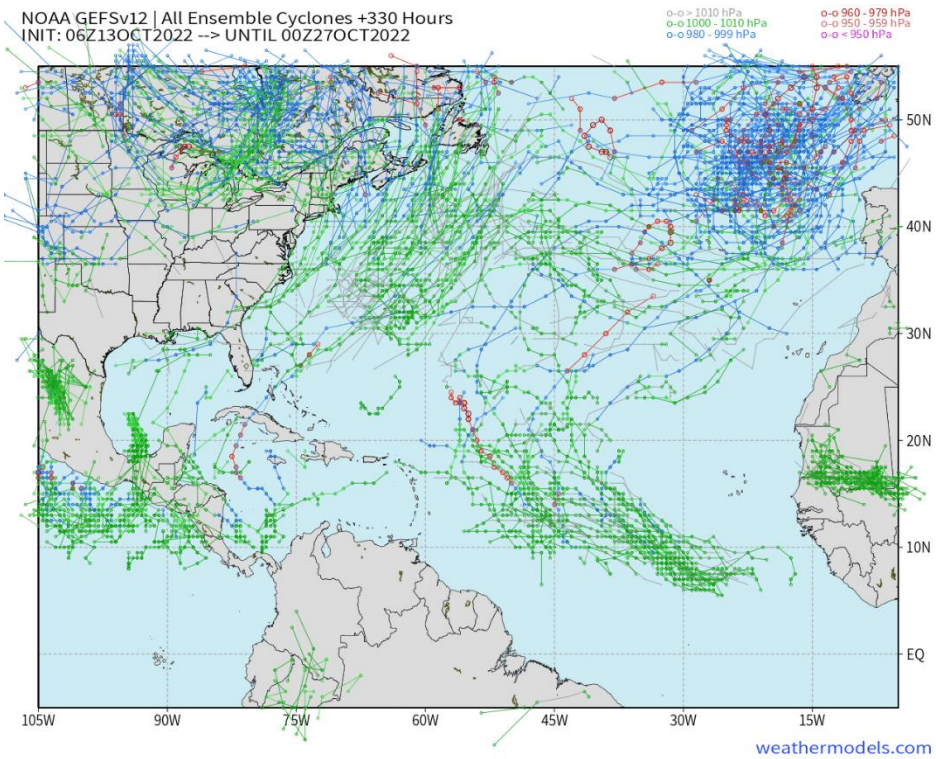

Figure 5: Cyclone locations from the GEFS ensemble for the next two weeks. Figure courtesy of weathermodels.com.

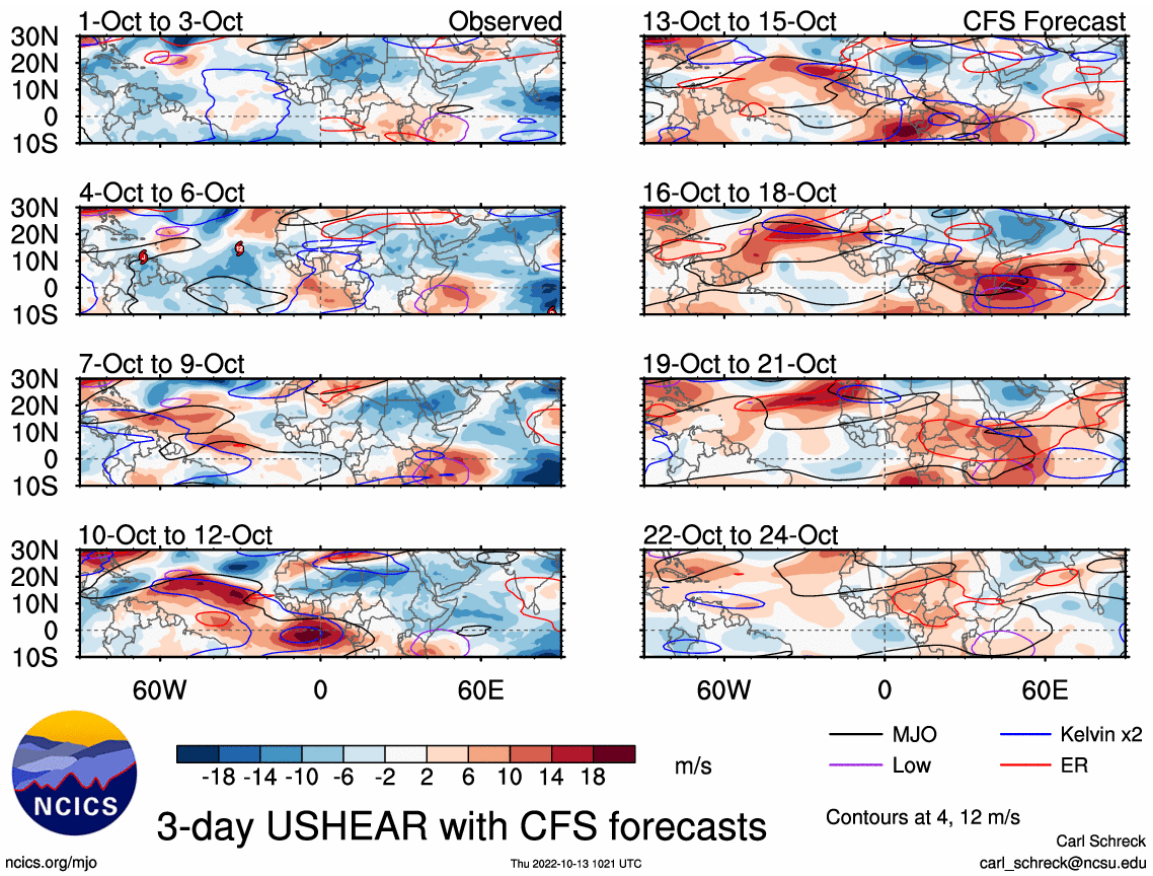

Figure 6: Observed and predicted anomalous 200 minus 850 hPa vertical wind shear from the Climate Forecast System through October 24. Figure courtesy of Carl Schreck.

4) Madden-Julian Oscillation

The Madden-Julian oscillation (MJO), as measured by the Wheeler-Hendon index, is currently in phase 6 over the Maritime Continent. The MJO is forecast to stagnate in phase 6 by the ECMWF over the next two weeks (Figure 7). Phase 6 is typically associated with quieter periods for Atlantic hurricane activity.

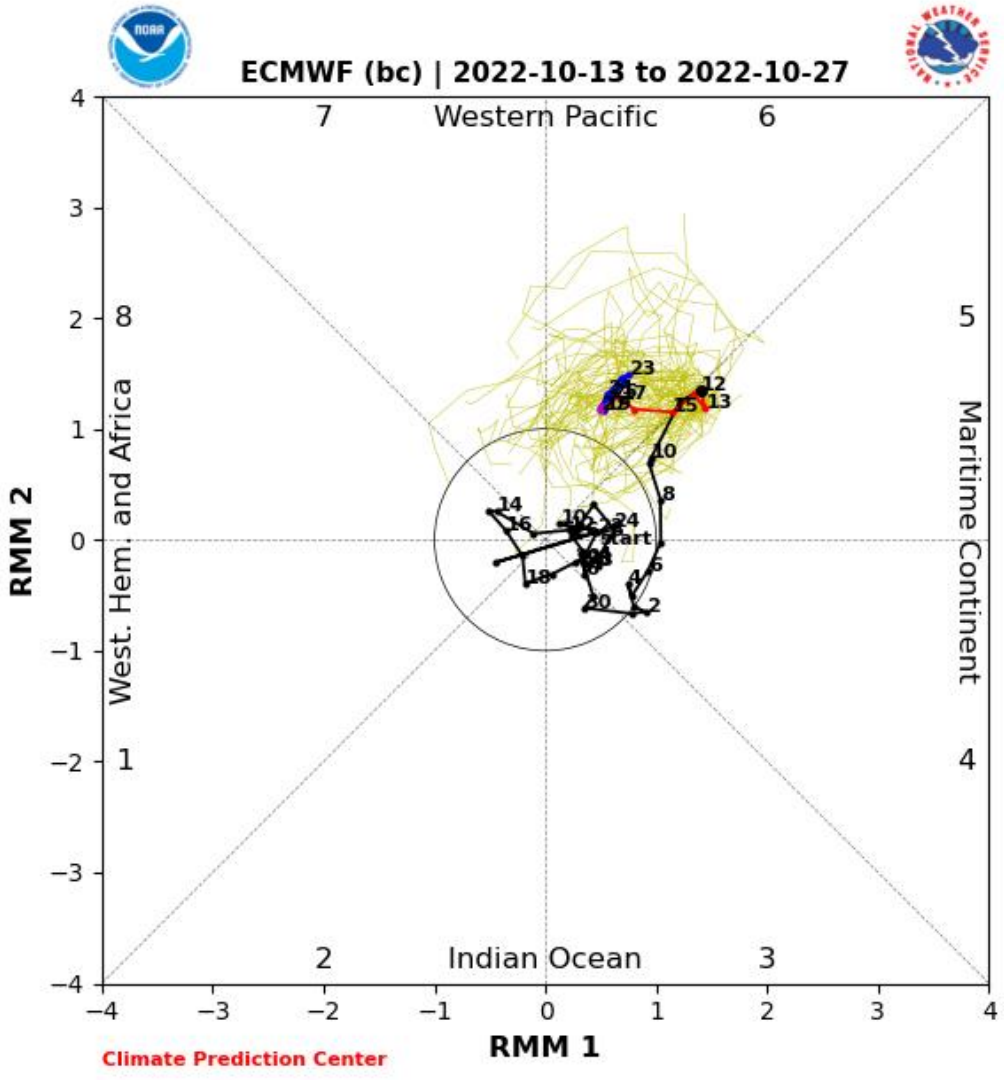

Figure 7: Predicted propagation of the MJO by the ECMWF model (bias-corrected). Figure courtesy of NOAA.

We do note that following a prevailing wavenumber one pattern associated with La Niña over the past few weeks, the overall tropical convective pattern over the next two weeks is forecast by ECMWF (and other models) to be more of a wavenumber two pattern, with enhanced convection near 120°E and 90°W, and suppressed convection near the International Date Line and Prime Meridian (Figure 8). As the enhanced convection shifts slightly to the east over the two weeks, shear conditions may become more favorable for Caribbean tropical cyclone development late this month.

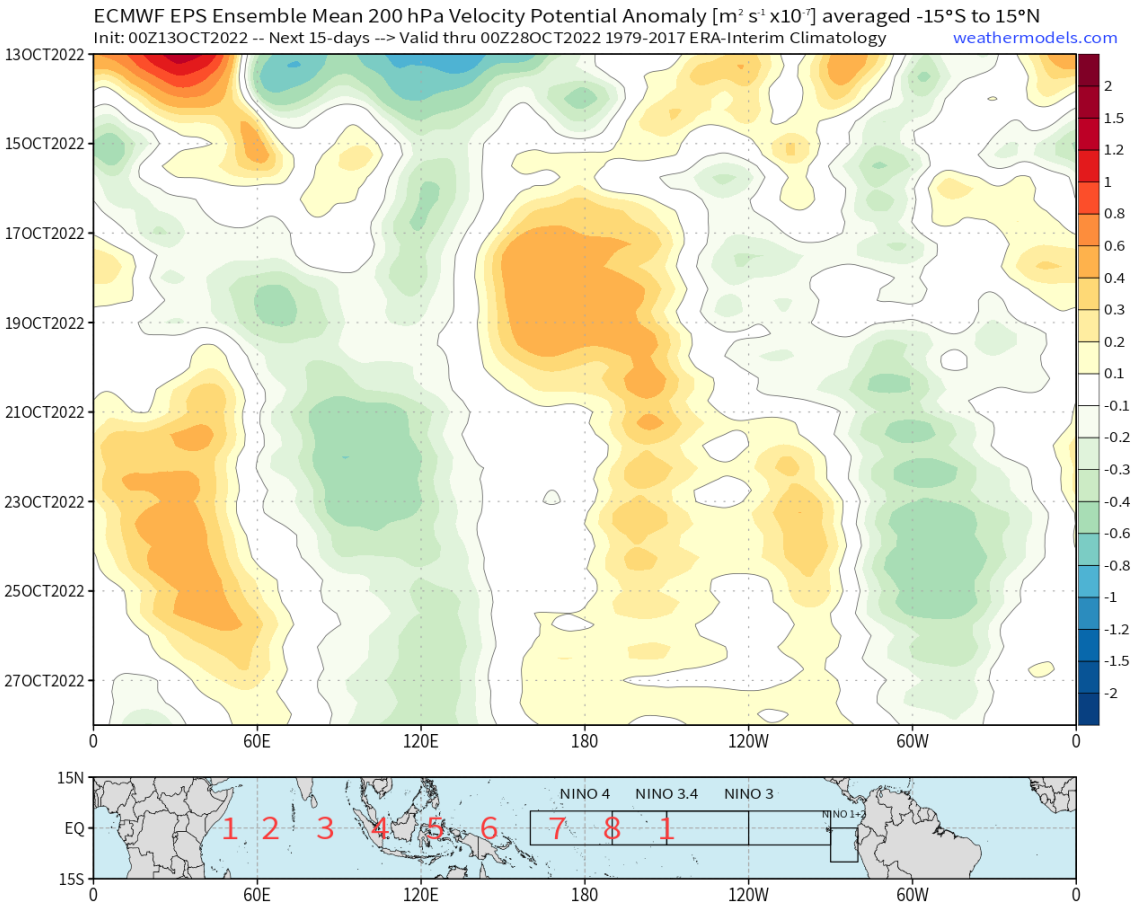

Figure 8: Forecast 200-hPa velocity potential anomalies for the next 15 days by the ECMWF EPS ensemble mean.

5) Seasonal Forecast

The 2022 Atlantic hurricane season has been slightly below normal to date. Extensive discussion of why the 2022 season ended up less active than forecast will be available with our forecast verification issued in late November.

3 Upcoming Forecasts

This is the final two-week forecast for the 2022 Atlantic hurricane season. All two-week forecasts will be fully verified with the 2022 Atlantic hurricane season forecast verification that will be issued in late November.

VERIFICATION OF SEPTEMBER 29–OCTOBER 12 FORECAST

The two-week forecast of tropical cyclone activity from September 29–October 12 verified in the normal category (4–12 ACE). A total of 8 ACE was observed during the two-week period. We assigned a probability of 40% to the normal ACE category. We assigned the highest probability to the above-normal category (55%), given what appeared to be relatively favorable large-scale conditions, and that models were quite aggressive for development of what would become Tropical Depression 12. Tropical Depression 12 generated no ACE, as it never reached tropical storm strength. Hurricane Ian generated the most ACE during the two week period (~4 ACE), while Hurricane Julia generated ~3 ACE, and Tropical Storm Karl produced ~1 ACE.

Table 3 displays the percentage chance that we gave for each category being reached and observed ACE.

Table 3: ACE forecast for TC activity for September 29–October 12, the probability assigned for each category being reached and observed ACE.

ACE Category	Definition	Probability in each Category	Observed ACE
Above-Normal	Upper Tercile (>12 ACE)	55%	
Normal	Middle Tercile (4–12 ACE)	40%	8
Below-Normal	Lower Tercile (<4 ACE)	5%	