



2018 Atlantic Hurricane Season Outlook: July 20, 2018

This seasonal forecast briefing is the second in this season's series, released as new information becomes available. In this briefing, we provide an update on how the season appears to be shaping up.

Current situation

Since our early season outlook, we saw an active July with Hurricanes Beryl and Chris. Hurricane Beryl developed from a pulse of energy tracking East to West across the tropical North Atlantic, known as a tropical wave. Environmental conditions allowed Beryl to attain category 1 wind speeds for a short while before decaying under unfavorable conditions. Yet Beryl's remnants persisted and put on a final show of energy, briefly becoming a subtropical storm near Bermuda. Hurricane Chris tapped into the warm waters of the Gulf-stream off the Eastern seaboard and rapidly intensified to a category 2 hurricane before zipping up to Newfoundland where it brought moderate rains and winds. Given the active start to the season, what levels of hurricane activity can we expect this year? There are currently no tropical disturbances to keep an eye on, but as the Atlantic follows its annual warming trend into the summer, what can we expect?

Forecasts

The most recently updated forecasts available from two of the major forecasting centers are summarized in **Table 1**. Since late May the developing El Niño has come into focus and is now more likely to materialize this summer than it was in late May. Cooler than normal waters also persist across the North Atlantic. This prompted Colorado State University (CSU) to reduce their early-season forecast activity by 30-50% with the reduction depending on the specific hurricane season metric.

CSU forecasts a corresponding reduction in U.S. landfall probability. They now call for a 39% chance of a major hurricane landfall anywhere along the U.S. coast, down from 51% likelihood in their late May forecast. Compare this to the average probability of 52%.

Tropical Storm Risk (TSR), on the other hand, were already predicting a very quiet season in late May and continue to do so in their July update. TSR's only change was to further reduce their Accumulated Cyclone Energy forecast which now stands at just 39% of normal. We shall have to wait until early August for an updated forecast from NOAA to determine whether the NOAA forecast also trends downward.

Table 1: Summary of the most recently released Atlantic seasonal hurricane forecasts for 2018 (as of July 20, 2018).

Data Source	Date Issued	# Named Storms (% of normal)	# Hurricanes (% of normal)	# Major Hurricanes (% of normal)	ACE ¹ (% of normal)
1981-2010 Median Value (Source CSU)		12.0	6.5	2.0	92
Average of 5 analog Years (Source CSU)	Jul 2 2018	9.0 (75%)	5.1 (78%)	1.3 (65%)	63 (68%)
Colorado State University ²	Jul 2 2018	11.0 (92%)	4.0 (62%)	1.0 (50%)	60 (65%)
Tropical Storm Risk ²	Jul 5 2018	9.0 (75%)	4.0 (62%)	1.0 (50%)	36 (39%)
Average of the all of the above		9.7 (81%)	4.4 (68%)	1.1 (55%)	53 (58%)

¹ Accumulated Cyclone Energy (ACE) is a combined measure of hurricane intensity, duration and frequency. ACE is calculated as the sum of the square of the maximum wind speed in each 6-hour period during the life of a tropical cyclone from the time it reaches tropical storm strength (wind speeds ≥ 65 kmph (39 mph)) in units of 10^4 ; $ACE = 10^4 \sum v^2_{max}$, where v is measured in knots.

² The CSU and TSR forecasts include named storm Alberto.

Analog years

An alternative view to forecast models is provided by hurricane activity in past years that had similar pre-season climate conditions and forecast conditions to this year. CSU uses this approach to qualitatively correct the output from their empirical forecast technique. CSU's selected analog years - 1986, 1990, 1994, 2009 and 2014 - are characterized by early-season neutral to weak El Niño conditions and cool North Atlantic sea surface temperatures. The average activity among these five analog years is shown in **Table 1** and indicates similar activity to their official forecast.

Climate signals: sea surface temperatures

The waters of the tropical North Atlantic continue to be cooler than normal (**Figure 1**). However, they are marginal for supporting hurricane development, as evidenced by Beryl's development to category 1 status over the central Atlantic in July.

Yet cool temperatures persist off the coast of Africa resulting in fairly stable conditions that will try to suppress any developing hurricanes. CSU note that stable conditions have persisted throughout the hurricane season so far. TSR assert that stronger than normal winds around the sub-tropical high-pressure system may continue to suppress ocean temperatures this season. However, waters continue to be warmer than normal in the Gulf of Mexico, potentially boosting any hurricanes that may enter the Gulf as we saw with Alberto in late May.

Of course, ocean temperatures are not the only factor controlling seasonal activity. The orientation of the winds across the North Atlantic is also critical and to examine that we need to look at ENSO.

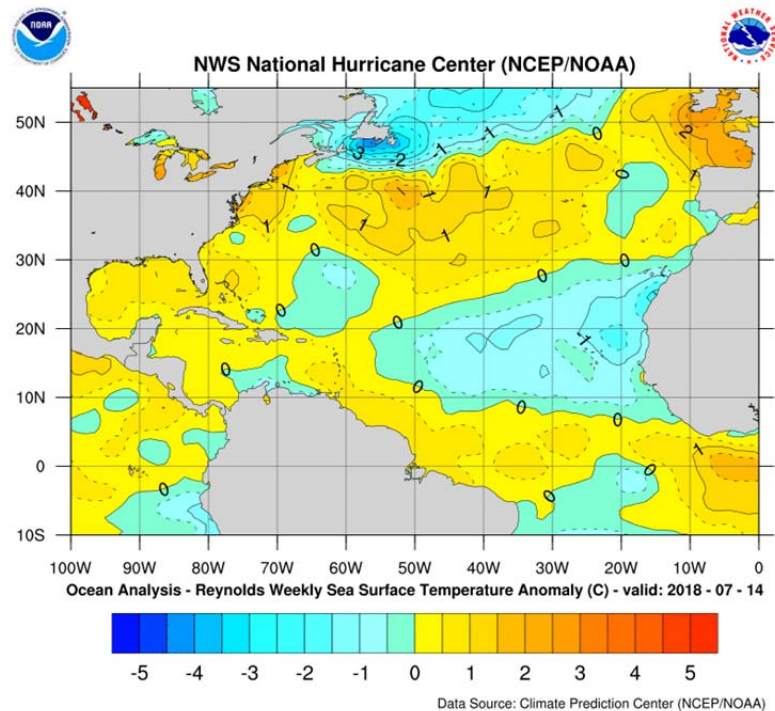


Figure 1: Departure of weekly average sea surface temperature from a long-term average (°C) on July 14 2018. (Source : https://www.nhc.noaa.gov/tafb/atl_anom.gif: NCEP/NOAA).

Climate signals: El Niño

The cooling and warming of the equatorial Pacific associated with ENSO exerts the strongest known control on Atlantic hurricane activity by driving an overturning of the tropical atmosphere; air rises over warm waters and sinks over cool waters.

The outlook for ENSO is very different this year than in 2017. Whereas 2017 saw a rapidly developing La Niña, this year's prediction is for a 98% likelihood of El Niño or neutral conditions (**Figure 2**). The odds for El Niño during the peak of the hurricane season have also increased since our previous briefing in early June and now stand at 55%. A large amount of heat lurks below the surface across the equatorial Pacific, primed for the development of El Niño. Indeed, the past 4 weeks have seen a slight warming trend, towards El Niño. If El Niño becomes established, environmental winds aloft over the tropical North Atlantic will increase and may put a brake on hurricane activity.

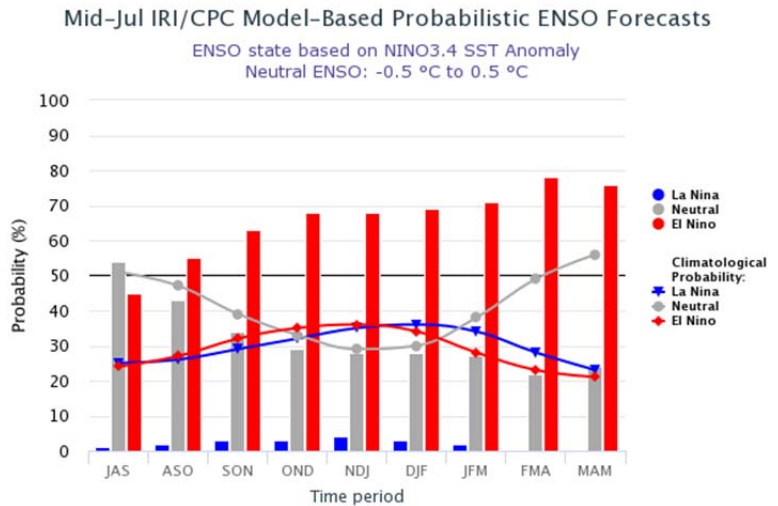


Figure 2: The official CPC/IRI ENSO probability forecast, based on a consensus of forecasters using human judgment and model output. Source: International Research Institute for Climate and Society. Published July 19, 2018.

Climate signals: AMO

Our previous briefing discussed the possibility of a shift to the cool phase of the Atlantic Multi-decadal Oscillation (AMO). Historical hurricane activity has been lower than normal in the cool phase of the AMO. One indicator of the AMO is cool sea surface temperatures in the far North Atlantic. Figure 1 shows cooler than normal temperatures at about 55 degrees North, and these have persisted since the Spring. The past 5 years have seen similar cool temperatures in Spring and early Summer but then these cool temperatures disappear for the hurricane seasons. We shall continue to monitor this region for similar patterns to previous years. El Niño provides more robust guidance for this year's seasonal forecast, and we therefore look first to El Niño before AMO.

Confidence

Despite being closer to the peak of the hurricane season, CSU and TSR are quick to note there is still considerable uncertainty in these forecasts. In particular, the warm waters off the Eastern seaboard may support a higher than usual number of so-called sub-tropical developments. However, these forecasts are far more reliable than the early Spring outlooks due to the enhanced predictability of ENSO and inertia of the current Atlantic temperatures. Forecasts issued in early July are proven to be skillful at differentiating between active and inactive seasons.

Summary

The two major forecasting centers that provided an early July update have decreased their outlooks to well below normal activity for 2018. Some uncertainties remain about the strength of the developing El Niño and its influence on suppressing the hurricane season. However, a major hurricane landfall in the US remains a possibility, despite forecasts for a generally inactive season.

Next briefing and additional advice

This briefing will be updated in August to include the latest round of seasonal forecasts. These forecasts will offer moderate-to-good confidence as the environmental conditions for the peak of the hurricane season come into focus.

The Willis Re Analytics Team will report on all tropical storms and hurricanes in the North Atlantic and the Gulf of Mexico. This includes briefings and updates to our clients during hurricane events. These will contain the latest information from the **National Hurricane Center**, commentary on likely tracks and intensities and, when available, updates and modeling guidance from the catastrophe modeling companies.

Forecast information sources

Klotzbach, P. J. and M. M. Bell: "Forecast of Atlantic Seasonal Hurricane Activity and Landfall Strike Probability for 2018", Jul 2, 2018, Department of Atmospheric Science, Colorado State University, Fort Collins CO, U.S.

Saunders, M. and A. Lea: "July Forecast Update for North Atlantic Hurricane Activity in 2018", July 5, 2018, Department of Space and Climate Physics, University College London, London, UK

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