



AnuMS 2018 Atlantic Hurricane Season Forecast

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The *AnuMS (Antigua Met Service) is projecting that the 2018 Atlantic hurricane season to likely be near to above normal. This undated forecast is calling for a bit more activity than the [previous one issued in June](#). The forecast spans the full season – June 1 to November 30. It does not include Subtropical Storm Alberto, which formed in late May, but includes Hurricanes Chris and Beryl. In obtaining the forecast, data available through July 14, 2018 were used.

The reasons for a near to above normal season being likely are mainly due to the likely cooler than normal sea surface temperatures across the tropical North Atlantic (TNA) and the likely warm neutral or weak El Niño Southern Oscillation (ENSO) conditions across the tropical Pacific Ocean. A colder than usual TNA often translates into stronger than usual trade winds and higher than normal vertical wind shear – both very unfavourable for tropical cyclone formation and growth. Warm ENSOs inhibit hurricane activity and cold ENSOs do the opposite. Neutral ENSOs neither inhibit nor enhance. With a warm ENSO likely to kick in after the peak of the hurricane season – August to October, its inhibiting effect will not be as strong compared to if it were to kick in before August.

Our forecast calls for 12 named storms with 5 becoming hurricanes and 3 becoming major hurricanes. The Accumulated Cyclone Energy (ACE) is forecast to be 99. Further, there is a 70% likelihood/confidence of

- 8 to 15 named storms;
- 3 to 8 becoming hurricanes;
- 1 to 4 becoming major hurricanes and
- 51 to 167 ACE.

The seasonal activity is expected to fall within these ranges in 70% of seasons with similar SST patterns, across the tropical Pacific and Atlantic Oceans, and uncertainties to those expected this year. These ranges do not represent the total possible ranges of activity seen in past similar years. These expected ranges are centred near the 1981-2010 seasonal averages of 106 ACE, 12 named storms, 6 hurricanes and 3 major hurricanes. Most of the predicted activity is likely to occur during the peak of the season.

There is a 37% probability of an above normal season, 37% probability of a near normal season and a 26% probability of a below normal season, based on the ACE for the climate period 1981-2010. This forecast is to be taken as a guide and not as gospel. Notwithstanding, forecasts for the hurricane season from early July onwards, generally have better than moderate skill. The next forecast, due early August, is generally the most skilful, with normally the least uncertainty.

Looking back at the previous forecasts, it is clear the numbers declined through the June forecast and have now risen a bit – moving from an above normal season to near normal and now near to above normal (See Table 1 below). Please note that both the near normal and above normal categories are tied for the highest likelihood; hence, both outcomes have an equal chance of occurring.

2018 Forecasts for the Atlantic Hurricane Season				
Forecast Parameters and 1981-2010 Avg in [brackets]	Issued April 10, 2018	Issued May 10, 2018	Issued June 11, 2018	Issued July 15, 2018
ACE [105.6]	135 (70-200)	119 (63-190)	93 (48-153)	99 (51-167)
Named Storms [12]	15 (11-19)	13 (10-17)	11 (8-15)	12 (8-15)
Hurricanes [6]	7 (4-10)	6 (4-10)	5 (3-8)	5 (3-8)
Major Hurricanes [3]	4 (2-5)	3 (1-4)	2 (1-4)	3 (1-4)

Table 1: Forecast parameters with 70 percent confidence intervals in (parentheses).

2018 Forecasts for the Atlantic Hurricane Season				
Forecast Parameters and 1981-2010 Avg [in brackets]	Issued April 10, 2018	Issued May 10, 2018	Issued June 11, 2018	Issued July 15, 2018
ACE [105.6]	A 55, N 30, B 15	A 49, N 34, B 17	A 31, N 38, B 31	A 37, N 37, B 26
Named Storms [12]	A 65, N 26, B 9	A 53, N 35, B 12	A 33, N 42, B 25	A 34, N 44, B 22
Hurricanes [6]	A 39, N 46, B 15	A 39, N 32, B 29	A 26, N 35, B 39	A 26, N 36, B 38
Major Hurricanes [3]	A 60, N 25, B 15	A 40, N 36, B 24	A 29, N 38, B 33	A 35, N 36, B 29

Table 2: Forecast parameters expressed probabilistically. A - above normal; N - near normal and B - below normal.

Figures 1 and 2 shows there is good skill in forecasting the season, in this case, using the Climate Forecast System version 2 (CFSv2) sea surface temperatures (SSTs) to predict the ACE.

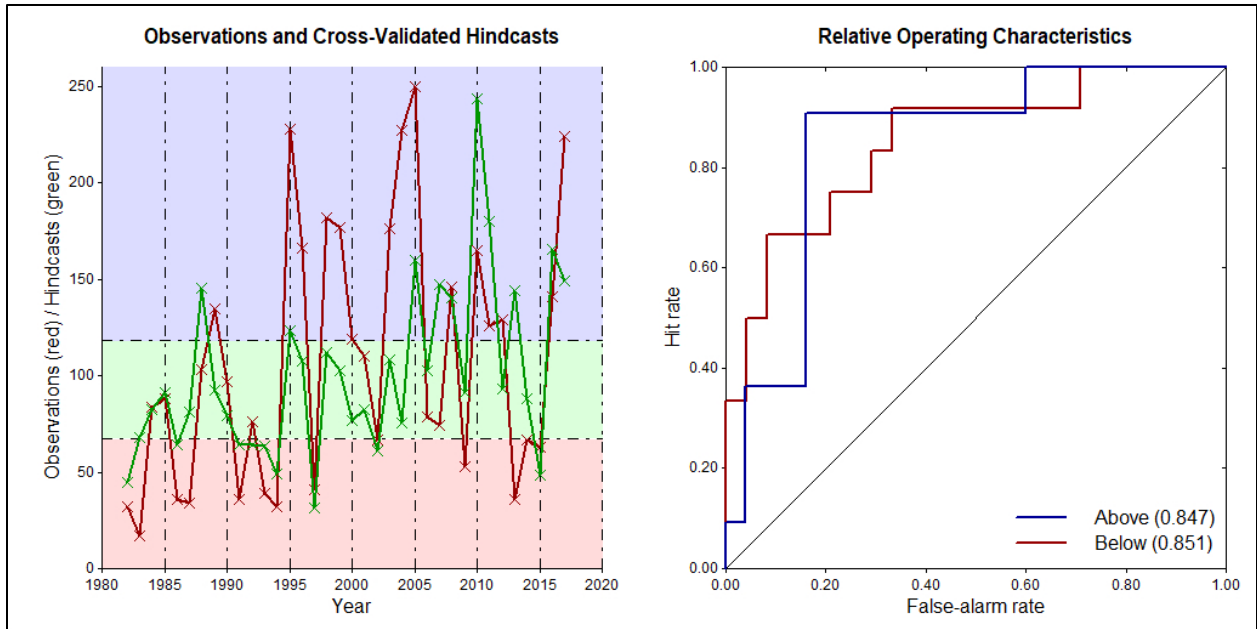


Figure 1a (left): Shows observed vs forecast ACE. The variance is a little over 29%, using CFSv2 mean SSTs for July to November. Figure 1b (right): The ROC diagram shows very high discrimination by the model in forecasting above and below normal ACE for the season using CFSv2 SSTs.

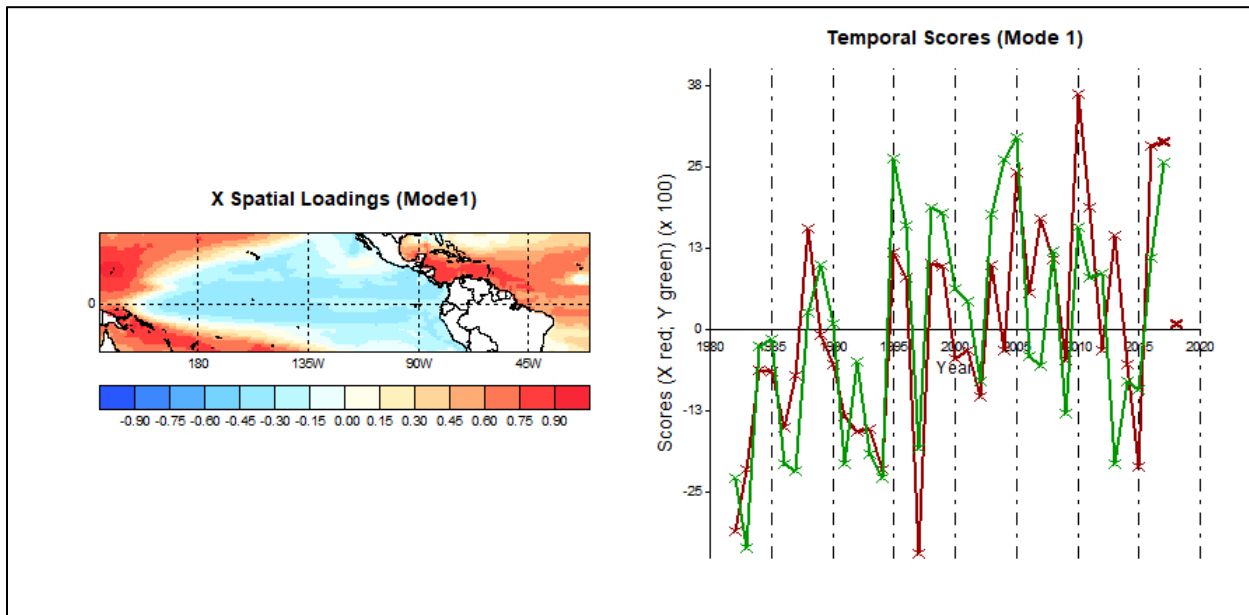


Figure 2: The X special loadings (mode 1) shows the most dominant pattern in SSTs correlation associated with above normal ACE. The canonical correlation for this pair of variable (SSTs and ACE) is over 0.70. From the temporal scores (mode 1), warm SSTs across the tropical Atlantic Ocean simultaneously with cold SSTs across the tropical Pacific Ocean tend to coincide with above normal ACE (or season). Obtained using CFSv2 mean SSTs for June-November 2018, initialized in early July.

Methodology

This forecast was obtained with the use of the Climate Predictability Tool ([CPT](#)) version 15.5.10, 2017 by Simon J. Mason and Michael K. Tippett. The software was view in canonical correlation analysis (CCA) mode. Input explanatory (X) files used were NOAA NCDC ERSSTv4 mean SSTs for: June 1971-2018; April to June 1971-2018 and NOAA NCEP EMC CFSv2 ensemble mean SSTs for July to November 1982-2018, initialized July 1, 2018. The X domain used was 20°S to 30°N and 140°E to 20°W. The response (Y) variables were ACE values, named storms, hurricanes and major hurricanes for the Atlantic Basin (including the Caribbean Sea and the Gulf of Mexico) for the period 1971 to 2017.

The CPT settings used were:

- X modes: maximum was 8 and the minimum was 1
- Training period: 1971-2017, 47 years.
- Climatological period – 1981-2010
- Transformation setting: Gamma distribution
- Confidence level: 70%
- Missing value replacement: best near-neighbor
- Target season: June to November
- All other settings are by default

Results

Three sets of forecasts were produced and the final forecast issued is the simple arithmetic mean of the three. The individual results are listed below.

Forecast Parameters	SSTs			Ensemble Mean Forecast
	Jun 1971-2018	Apr to Jun 1971-2018	Jul to Nov 1982-2018	
ACE	95 (45-160)	107 (57-166)	96 (52-175)	99 (52-167)
Named Storms	12 (8-15)	12 (8-15)	12 (9-16)	12 (8-15)
Hurricanes	5 (3-8)	6 (3-8)	5 (3-8)	5 (3-8)
Major Hurricanes	3 (1-4)	3 (1-4)	2 (1-4)	3 (1-4)

Table 3: Forecast parameters with 70 percent confidence intervals in (parentheses).

Forecast Parameters	SSTs			Ensemble Mean Forecast
	May 1971-2018	Mar to May 1971-2018	Jun to Nov 1982-2018	
ACE	A 27, N 38, B 35	A 36, N 37, B 27	A 30, N 40, B 30	A 31, N 38, B 31
Named Storms	A 24, N 41, B 35	A 37, N 43, B 20	A 37, N 43, B 20	A 33, N 42, B 25
Hurricanes	A 23, N 33, B 44	A 27, N 36, B 37	A 28, N 36, B 36	A 26, N 35, B 39
Major Hurricanes	A 23, N 39, B38	A 31, N 39, B 30	A 33, N 36, B 31	A 29, N 38, B 33

Table 4: Forecast parameters expressed probabilistically. A for above normal; N for near normal and B for below normal.

Definitions and acronyms

Accumulated Cyclone Energy (ACE) – A measure of a named storm’s potential for wind and storm surge destruction defined as the sum of the square of a named storm’s maximum wind speed (in 10^4 knots²) for each 6-hour period of its existence. The 1981-2010 average value of this parameter is 106 for the Atlantic basin.

Atlantic Basin – The area including the entire North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

El Niño – A 12-18-month period during which anomalously warm sea surface temperatures occur in the eastern half of the equatorial Pacific. Moderate or strong El Niño events occur irregularly, about once every 3-7 years on average.

ERSSTv4 – Extended Reconstructed Sea Surface Temperature version four.

CFSv2 – Climate Forecast System version 2.

EMC – Environmental Modeling Center of the United States.

Hurricane (H) – A tropical cyclone with sustained low-level winds of 74 miles per hour (33 ms⁻¹ or 64 knots) or greater.

Major Hurricane (MH) – A hurricane which reaches a sustained low-level wind of at least 111 mph (96 knots or 50 ms⁻¹) at some point in its lifetime. This constitutes a category 3 or higher on the Saffir/Simpson scale.

Named Storm (NS) – A hurricane, a tropical storm or a sub-tropical storm.

NCDC – National Climate Data Center of the United States

NCEP – National Centers for Environmental Prediction of the United States.

NOAA – National Oceanic Atmospheric Administration of the United States.

Saffir/Simpson Hurricane Wind Scale – A measurement scale ranging from 1 to 5 of hurricane wind intensity. One is a weak hurricane; whereas, five is the most intense hurricane. Tropical North Atlantic (TNA) index – A measure of sea surface temperatures in the area from 5.5-23.5°N, 57.5-15°W.

SSTs – Sea surface temperatures.

Tropical Cyclone (TC) – A large-scale circular flow occurring within the tropics and subtropics which has its strongest winds at low levels; including hurricanes, tropical storms and other weaker rotating vortices.

Tropical Storm (TS) – A tropical cyclone with maximum sustained winds between 39 mph (18 ms⁻¹ or 34 knots) and 73 mph (32 ms⁻¹ or 63 knots).

Vertical Wind Shear – The difference in horizontal wind between 200 mb (approximately 40,000 feet or 12 km) and 850 mb (approximately 5000 feet or 1.6 km).

AnuMS will issue its next Atlantic Hurricane Season Forecast around June 10, 2018.

**Not to be mistaken for the ABMS*