July Forecast Update for North Atlantic Hurricane Activity in 2025

Issued: 8th July 2025

by Dr Adam Lea
EuroTempest Ltd, London, UK

TSR reduces its forecast and predicts North Atlantic hurricane activity in 2025 will see activity close to the 1991-2020 climate norm.

Summary: The TSR (Tropical Storm Risk) pre-season forecast update for North Atlantic hurricane activity in 2025 anticipates a season with activity close to the 1991-2020 climate norm. Although there remains uncertainty at this lead time, we consider that the more likely scenario is for tropical North Atlantic and Caribbean Sea waters to be warmer than normal by August-September 2025, and for neutral ENSO conditions to be present through summer and autumn 2025. The former factor is expected to have an enhancing influence on the upcoming Atlantic hurricane season, whereas the latter factor is expected to have a neutral influence. The forecast has decreased since the pre-season update in late May due to a number of potentially suppressing signals which are discussed in Section 2 below.

1. TSR July 2025 North Atlantic Seasonal Hurricane Forecasts

Further information on the TSR statistical prediction models and adjustments that are used to generate the forecasts below can be found in Section 2 of Supplementary Information.

1.1 Forecast North Atlantic ACE Index and System Numbers in 2025:

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast	2025	126	3	7	15
30-yr Climate Norm	1991-2020	122	3.2	7.2	14.4
10-yr Climate Norm	2015-2024	142	3.7	8.1	17.9
Forecast Skill at this Lead	2003-2024	20%	26%	29%	13%

The forecast tercile probabilities (1991-2020 data) for the 2025 North Atlantic hurricane season ACE index are as follows: a 30% probability of being upper tercile (>156)), a 55% likelihood of being middle tercile (75 to 156)) and a 15% chance of being lower tercile (<75)).

1.2 Forecast US ACE Index and US Landfalling Numbers in 2025:

		U.S. ACE Index	Hurricanes	Tropical Storms
TSR Forecast	2025	3.0	2	4
30-yr Climate Norm	1991-2020	2.7	1.6	3.8
10-yr Climate Norm	2015-2024	3.9	2.5	4.9
Forecast Skill at this Lead	2003-2024	0%	19%	18%

U.S. landfalling intense hurricanes are not forecast since we have no skill at any lead.

The forecast tercile probabilities (1991-2020 data) for the U.S. ACE index in 2025 are as follows: a 35% probability of being upper tercile (>3.19), a 42% likelihood of being middle tercile (1.18 to 3.19) and a 22% chance of being lower tercile (<1.18).

1.3 Forecast Probability of Exceedance Plots for the North Atlantic Hurricane Season in 2025:

See Section 3 in the Supplementary Information for the motivation behind the probability of exceedance charts. Figure 1 displays our pre-season forecast PoE plots for the 2025 North Atlantic hurricane season. The forecast PoE curves are computed using the method described in section 3 of Saunders et al. (2020) while the climatology PoE curves are computed directly from observations. The two forecast PoE plots specify the current chance that a given ACE index and/or hurricane total will be reached in 2025 and how these chances differ to climatology.
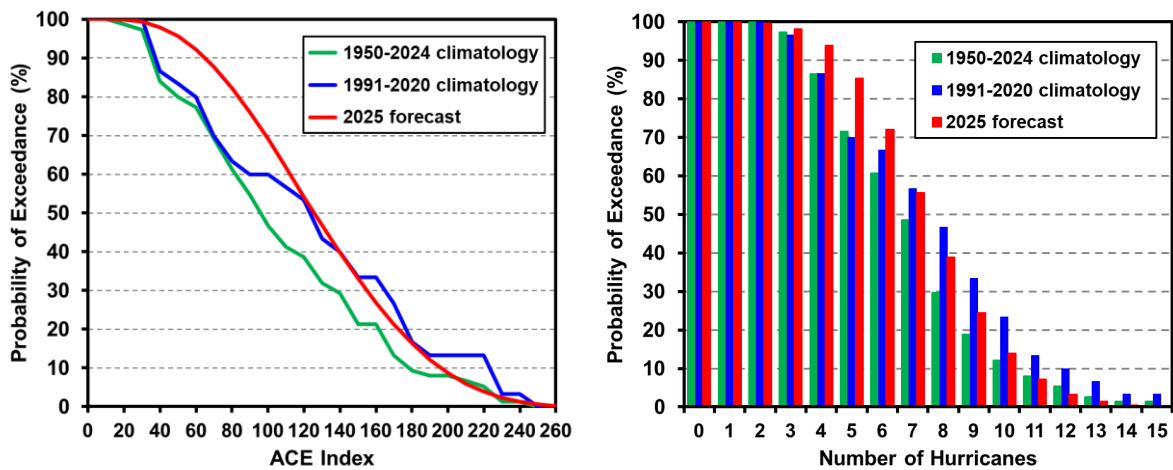

Figure 1. Forecast probability of exceedance (PoE) plots for the North Atlantic ACE index in 2025 (left panel) and for the number of North Atlantic hurricanes in 2025 (right panel). Each plot displays three sets of PoE data comprising the TSR forecast PoE curve issued pre-season and two climatology PoE curves.

2. Factors Influencing the July TSR Forecasts

Atlantic MDR SST: August-September sea surface temperatures in the tropical North Atlantic (region 10°N–20°N, 20°W–60°W) are forecast to be slightly warmer than the 1991-2020 climatology. We anticipate MDR sea surface temperatures to have a small enhancing effect on the 2025 Atlantic hurricane season.

Caribbean Sea SST: August-September sea surface temperatures in the Caribbean Sea are forecast to be slightly warmer than the 1991-2020 climatology. Sea surface temperature anomalies have dropped significantly over the last few weeks to near-neutral due to stronger-than-normal trade winds across the Caribbean. We anticipate a slight warming of sea surface temperatures due to an anticipated weakening of the trade wind speed.

Trade Wind Speed: The July-September forecast trade wind at 925mb height over the Caribbean Sea and tropical North Atlantic (region 7.5°N–17.5°N, 30°W–100°W) is forecast to be slightly weaker than the 1991-2020 climatology. We anticipate trade wind speed to have a small enhancing effect on the 2025 Atlantic hurricane season.

ENSO: Neutral ENSO conditions are currently present and are anticipated to continue through summer and autumn 2025. We do not anticipate ENSO having a significant effect on the 2025 Atlantic hurricane season; however, if cold-neutral conditions develop, this will likely have a small enhancing effect.

Atlantic Niña: Cold sea surface temperatures have developed in a region covering 10˚S-0˚, 30˚W-10˚E. This has been called an Atlantic Niña (analogous to the more widely known La Niña in the Pacific Ocean). Atlantic Niña conditions have been linked to higher-than-normal surface pressure anomalies, lower than normal precipitation anomalies, and subsidence across the tropical Atlantic and Caribbean, all of which act to suppress tropical cyclone formation. It is unclear as to whether or not this Niña pattern will persist through the peak hurricane season.

Dynamical Model Seasonal Forecasts: Overall, dynamical models are predicting neutral or suppressing conditions for hurricane activity in 2025. The available models are forecasting higher-than-normal sea level pressure across much of the Atlantic basin through summer and early autumn. Higher-than-normal sea level pressure implies more stable air and subsidence, conditions unfavourable for deep convection. Precipitation anomaly forecasts are mixed with a split between neutral or drier-than-normal conditions across parts of the Atlantic MDR and Caribbean, which would indicate slightly unfavourable conditions for deep convection. Models are in good agreement that sea surface temperatures are likely to be above-average across the basin through the upcoming season, which would be an enhancing factor for deep convection and tropical cyclone formation. The unfavourable conditions forecast by some of the available models are consistent with a persistent Atlantic Niña pattern.

Analogue Years:

Current SST Anomaly Pattern: The current spatial SST anomaly most closely matches 1975, 1999, 2000, 2001 and 2018. The mean ACE index over these five years was 122.

TSR hindcasts for MDR SST and trade wind anomalies: The TSR statistical model is predicting much less favourable conditions for trade wind speed and sea surface temperature in 2025 and is therefore predicting total hurricane activity considerably lower than in Section 1 above. The model has been largely discounted in favour of the other factors described above in Section 2, as we feel dropping the forecast by a large amount would be premature and there is still considerable uncertainty in some of the factors given in Section 2.

3. Confidence and Uncertainties

There is moderate confidence that the 2025 Atlantic hurricane activity season will be close to the 1991-2020 climatology, although some uncertainties remain. Contributions to uncertainty due to other factors are described below:

Atlantic MDR SST: There is moderate confidence that sea surface temperatures in the tropical Atlantic will be warmer than the 1991-2020 climatology. Sea surface temperature anomalies have decreased significantly over the last few weeks due to a combination of stronger-than-normal trade winds and anomalous northerly winds across the eastern sub-tropical Atlantic, both of which have had a suppressing effect on sea surface temperatures across the MDR. Trade winds have recently weakened and sea surface temperature anomalies have risen slightly; however, MDR sea surface temperatures are currently only slightly above the 1991-2020 climatology. There are indications from at least one dynamical model that trade winds may weaken as we progress through July, so sea surface temperature

anomalies may continue to increase. Seasonal dynamical model forecasts are consistent in predicting warmer-than-average sea surface temperature anomalies across the Atlantic basin.

Caribbean SST: Sea surface temperatures in the Caribbean Sea are currently slightly warmer than the 1991-2020 climatology and have dropped significantly over the last few weeks due to stronger-than-normal trade winds. There are indications from seasonal dynamical model forecasts that Caribbean Sea surface temperatures are likely to be warmer than average through the season. There is moderate confidence that sea surface temperatures in the Caribbean Sea will be warmer than normal through the season.

ENSO: There is good confidence for neutral ENSO conditions to be in place through summer and autumn implying ENSO is unlikely to be a significant factor in 2025. The IRI suite of models continue to predict a range of conditions from warm-neutral to cold-neutral conditions. Where ENSO conditions fall within this range will likely have some influence on the 2025 Atlantic hurricane season, with cold-neutral conditions leading to slightly more favourable atmospheric conditions for hurricane formation/intensification.

Trade Wind Speed: There is reasonable confidence that the Atlantic and Caribbean Sea trade wind speed will be slightly weaker than the 1991-2020 climatology through the upcoming summer and early autumn. Trade wind speed is influenced by Caribbean Sea surface temperature anomalies and the ENSO state, with the warmer-than-average Caribbean Sea surface temperatures expected to contribute to weaker trade winds, in addition to one available forecast model which predicts a weakening of trade wind speed through July.

Global Model Seasonal Predictions: Overall, the available seasonal forecast models are predicting factors such as sea level pressure and precipitation anomalies will either be neutral or unfavourable for hurricane activity; however, occasional periods of high and low hurricane activity cannot be ruled out due to intra-seasonal variability. The available models are consistent in predicting warmer-than-average sea surface temperatures across the Caribbean Sea and much of the tropical and sub-tropical Atlantic to a high probability which is an enhancing influence on hurricane activity.

Intra-seasonal factors: Other factors which are impossible to predict, such as the strength and frequency of Saharan air outbreaks, and the frequency of tropical upper tropospheric troughs (TUTT) across the tropical Atlantic (both of which inhibit hurricane activity), are not accounted for. In addition, for a given set of climate factors, a spread in hurricane activity levels can still ensue.

Skill: Historically, the skill of the July forecast for North Atlantic hurricane activity is moderate (see section 4a in the Supplementary Information.

4. Forecast Archive and Next Forecast,

The archive of all the TSR publicly released North Atlantic seasonal hurricane forecasts (from 1998 to 2024) may be viewed at *https://www.tropicalstormrisk.com/for_hurr.html*. The final TSR forecast update for the 2025 North Atlantic hurricane season will be issued on Tuesday 5th August.

5. List of Predictions Issued for the 2025 North Atlantic Hurricane Season

1. Atlantic ACE Index and System Numbers:

Atlantic ACE Index and System Numbers 2025		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (1991-2020)		122	14.4	7.2	3.2
Average Number (2015-2024)		142	17.9	8.1	3.7
TSR Forecasts	8th July 2025	126	15	7	3
	23 May 2025	146	16	8	4
	7 April 2025	120	14	7	3
	10 December 2024	129	15	7	3
CSU Forecast	11 June 2025	155	17	9	4
	3 April 2025	155	17	9	4
NOAA Forecast	22 May 2025	-	13-19	6-10	3-5
UK Met Office	21 May 2025	154	16	9	4

2. U.S. ACE Index and US Landfalling Numbers:

US Landfalling Numbers 2025		ACE Index	Tropical Storms	Hurricanes
Average Number (1991-2020)		2.7	3.8	1.6
Average Number (2015-2024)		3.9	4.9	2.5
TSR Forecast	8th July 2025	3.0	4	2
	23 May 2025	3.6	5	3
	7 April 2025	2.4	4	2