August Forecast Update for North Atlantic Hurricane Activity in 2025

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TSR raises its forecast and predicts North Atlantic hurricane activity in 2025 will see activity around 15% above the 1991-2020 climate norm.

Summary: The TSR (Tropical Storm Risk) August forecast update for North Atlantic hurricane activity in 2025 anticipates a season with activity around 15% above 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 cold-neutral ENSO conditions to be present through summer and autumn 2025. Both factors are expected to have a moderate enhancing influence on the upcoming Atlantic hurricane season. The forecast has increased since the early July update due to a number of additional factors likely to be more favourable for hurricane activity through the season than previously thought, 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	144	3	8	16
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	32%	45%	49%	56%

The forecast tercile probabilities (1991-2020 data) for the 2025 North Atlantic hurricane season ACE index are as follows: a 35% probability of being upper tercile (>156)), a 55% likelihood of being middle tercile (75 to 156)) and only a 10% 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	2.5	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	28%	49%	49%

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 24% probability of being upper tercile (>3.19), a 48% likelihood of being middle tercile (1.18 to 3.19) and a 28% 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.

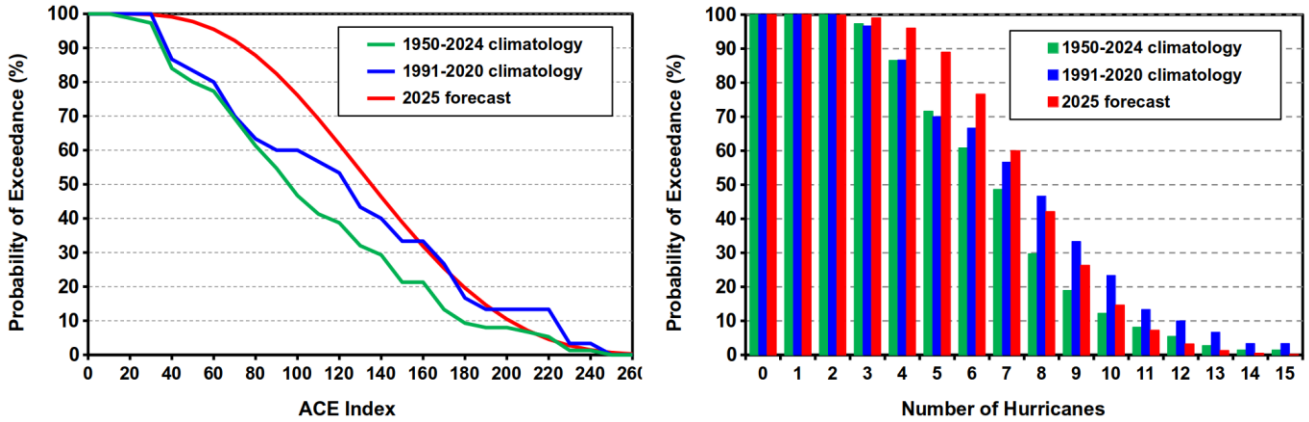

Figure 1. Forecast probability of exceedance (PoE) plots for the North Atlantic ACE index in 2025 (left panel) and for the number of North Atlantic hurricanes in 2025 (right panel). Each plot displays three sets of PoE data comprising the TSR forecast PoE curve issued pre-season and two climatology PoE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

2. Factors Influencing the August 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 warmer than the 1991-2020 climatology. We anticipate MDR sea surface temperatures to have a moderate enhancing effect on the 2025 Atlantic hurricane season.

Caribbean Sea SST: August-September sea surface temperatures in the Caribbean Sea are forecast to be warmer than the 1991-2020 climatology. Sea surface temperature anomalies have increased over the last few weeks due to a significant weakening of the trade wind speed over the Caribbean Sea and tropical Atlantic. We anticipate Caribbean Sea sea surface temperatures to have a moderate enhancing effect on the 2025 Atlantic hurricane season.

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 weaker than the 1991-2020 climatology. We anticipate trade wind speed to have a small to moderate enhancing effect on the 2025 Atlantic hurricane season.

ENSO: Cold-neutral ENSO conditions have developed and are anticipated to continue through summer and autumn 2025. We anticipate these cold-neutral conditions will have a small enhancing effect on the 2025 Atlantic hurricane season.

Atlantic Niña: The cold sea surface temperatures which had developed in a region covering 10˚S-0˚, 30˚W-10˚E (Atlantic Niña region) prior to the early July forecast update have warmed significantly. It is unlikely this will have a significant impact on the peak hurricane season.

Dynamical Model Seasonal Forecasts: Overall, signals from the available seasonal and monthly forecast are mixed; however, they are predicting more favourable conditions compared to forecasts issued in early July. Sea surface temperature anomalies across the basin are forecast to be warmer than average although there is disagreement in the magnitude of the anomalies. Precipitation anomaly forecasts are somewhat mixed through the season; however, most of the available models are predicting neutral or wetter than average conditions across much of the tropical Atlantic and Caribbean from August through October. On the other hand, sea level pressure anomalies are forecast to be higher than normal through August which implies a more stable atmosphere and less favourable conditions for tropical cyclone formation; however, there are indications of below-normal sea level pressure anomalies developing across much of the basin through autumn.

Current and Forecast Tropical Cyclone Activity: There is currently one active tropical storm (Dexter) which is forecast to become extra-tropical over the next 12-24 hours. The National Hurricane Center is monitoring two areas of interest, one near the Carolina's coast and another south-west of the Cape Verde islands which have a 30% and 60% chance of tropical cyclone genesis over the next week respectively. There are signals from some of the available models of the potential for the formation of a hurricane across the western Atlantic and/or Caribbean Sea during the middle of August; however, the variance between different models and different model runs is high.

Analogue Years:

Current SST Anomaly Pattern: The current spatial SST anomaly most closely matches 1971, 2001, 2010, 2011 and 2013. The mean ACE index over these five years was 107; however, the variance in total activity across these years is high, ranging from an ACE index of 36 (2013) to 165 (2010). 2013 was a very anomalous year and it is not anticipated the 2025 north Atlantic hurricane season will see activity as low as was observed in that year, given that four storms have formed to-date and overall conditions appear favourable for an active season.

3. Confidence and Uncertainties

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

Atlantic MDR and Caribbean Sea SST: Sea surface temperatures across the tropical Atlantic and Caribbean Sea have warmed over the last month due to a weakening of the trade winds. There is good consensus across the available seasonal dynamical models that sea surface temperatures will continue to be warmer than average across these regions through the hurricane season. There is good confidence that sea surface temperatures will be warmer than average and therefore enhancing for hurricane activity.

ENSO: The International Research Institute for Climate and Society (IRI) multi-model ensemble continues to predict neutral ENSO conditions through the rest summer and autumn to high probability. There has been a general shift in the forecast models towards cold-neutral conditions through the rest of this year with a low probability of La Niña developing through the Autumn. Cold-neutral conditions are likely to have a small enhancing effect on hurricane activity, particularly late season activity. If

weak La Niña conditions develop through autumn, this is likely to have a moderate enhancing effect on late season hurricane activity.

Trade Wind Speed: There is moderate confidence that trade wind speed will be weaker than normal and have an enhancing effect on hurricane activity. Trade winds have weakened through July and with warm Caribbean Sea SST's and cold-neutral ENSO conditions, a continuation of below average trade wind speed strength is likely. There is uncertainty on the magnitude of the trade wind anomaly through the hurricane season and therefore the level of enhancement on the hurricane season.

Global Model Seasonal Predictions: Forecasts of parameters such as mean sea level pressure anomaly and precipitation anomalies across the north Atlantic hurricane basin from the available dynamical seasonal models are somewhat mixed, although they are generally more favourable than they were in early July. Precipitation anomalies are likely to be either neutral or enhancing through the hurricane season. There is some variance in the forecasts of monthly sea level pressure (SLP) anomaly between models and months, and confidence is generally low for seasonal forecasts of SLP; however, in general there are indications for higher-than-normal sea level pressure anomalies through August and a trend towards lower-than normal sea level pressure anomalies through autumn

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 August forecast for North Atlantic hurricane activity is good (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*. This is the final TSR forecast update for the 2025 North Atlantic hurricane season. A verification of the 2025 North Atlantic hurricane season and an extended range forecast for the 2026 hurricane season will be issued in early December.

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	7th August 2025	144	16	8	3
	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 Forecasts	7th August 2025	2.5	4	2
	8th July 2025	3.0	4	2
	23 May 2025	3.6	5	3
	7 April 2025	2.4	4	2