

April Forecast Update for North Atlantic Hurricane Activity in 2025

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by Dr Adam Lea
EuroTempest Ltd, London, UK

TSR continues to predict North Atlantic hurricane activity in 2025 will be close to the 1991-2020 30-year norm.

Summary: The TSR (Tropical Storm Risk) April forecast update for North Atlantic hurricane activity in 2025 anticipates a season with activity close to the 1991-2020 climate norm. Although there is significant uncertainty at this lead time, we consider that the more likely scenario is for tropical North Atlantic and Caribbean Sea waters to be near or slightly above normal by August-September 2025, and for neutral ENSO conditions to be present through summer and autumn 2025. These two factors are both expected to have a neutral influence on the upcoming Atlantic hurricane season.

1. TSR April 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	120	3	7	14
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	0%	0%	0%	0%

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 47% likelihood of being middle tercile (75 to 156) and a 24% 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	2.4	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%	10%	0%

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 US ACE index in 2025 are as follows: a 37% probability of being upper tercile (>3.19), a 38% likelihood of being middle tercile (1.18 to 3.19) and a 25% 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 motivation behind probability of exceedance charts. Figure 1 displays our April 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.

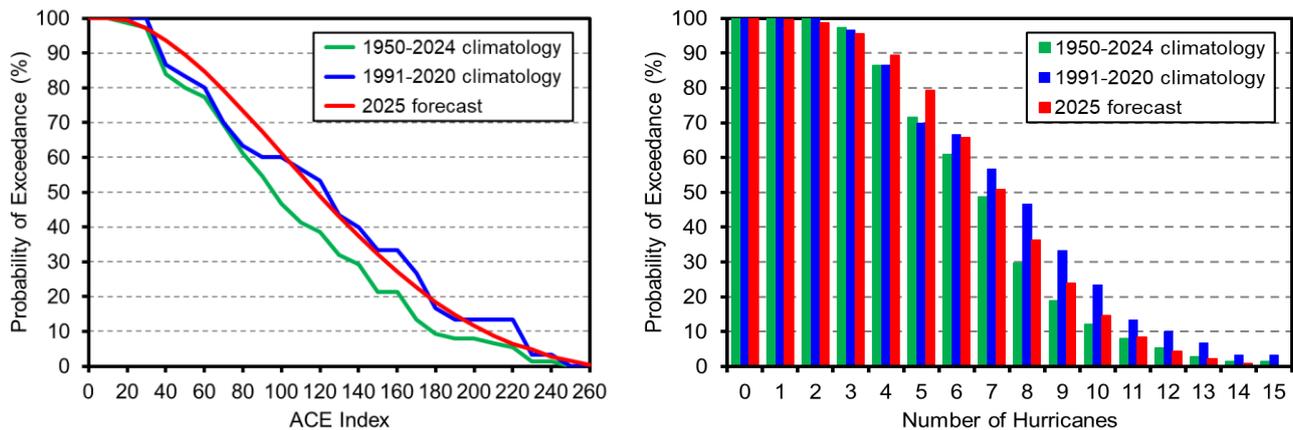


Figure 1. Forecast probability of exceedance (PoE) plots for the North Atlantic ACE index in 2025 (left panel) and for the number of North Atlantic hurricanes in 2025 (right panel). Each plot displays three sets of PoE data comprising the TSR forecast PoE curve issued early April and two climatology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

2. Factors Influencing the April 2025 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 close to the 1991-2020 climatology. We anticipate MDR sea surface temperatures to have a neutral 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 close to the 1991-2020 climatology. We anticipate trade wind speed to have a neutral 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.

Analogue Years:

Current sea surface temperature pattern: The current sea surface temperature pattern globally is similar to 1971, 1999, 2001 and 2012. The ACE indices for these years ranged from 97 to 177 and the mean ACE index is 129. For landfalling activity and impacts, 1999 and 2012 were notable, particularly the

latter due to hurricane Sandy which took an anomalous track and made landfall near New York shortly after transitioning into an extra-tropical cyclone. Note that 1971 and 1999 were La Niña years so although the current overall SST pattern in those years is similar to this year, La Niña conditions are not currently anticipated to develop; therefore, a hyperactive season like 1999 with an ACE index of 177 is not anticipated.

TSR hindcasts for MDR SST and trade wind anomalies: Years where the TSR early April hindcasts for MDR ACE and Caribbean/North Atlantic trade wind anomalies were most similar to 2025 are 1962, 1980, 1981 and 2008, all of which were ENSO-neutral through summer and autumn. The ACE index for these years ranges from 36 to 149 with a mean ACE index of 108. For landfalling activity, only 2008 was notable for impacts, largely due to hurricane Ike which impacted Cuba and Texas.

The analogue years imply that a season with high impacts is no more likely than normal in 2025 given that the majority of analogue years above weren't notable in terms of overall activity and landfalling impacts; however, it only takes one storm to make a season deadly or destructive; therefore, the possibility of a highly impactful season in 2025 cannot be ruled out.

3. Confidence and Uncertainties

There is moderate confidence that the 2025 Atlantic hurricane activity season will be near-normal based on the 1991-2020 climatology although significant uncertainties remain. Contributions to uncertainty due to other factors are described below:

Atlantic MDR SST: There is limited confidence that sea surface temperatures in the tropical Atlantic will be close to the 1991-2020 climatology. Sea surface temperature anomalies in the MDR have decreased over the last three months and are currently near-normal. The reason for this decrease is not currently understood and is largely confined to the eastern portion of the MDR. Cooler sea surface temperatures across the eastern tropical and sub-tropical Atlantic tend to result in below-average sea surface temperature anomalies across the MDR during August-September; however, MDR sea surface temperatures through summer and early autumn can be influenced by the spring NAO during neutral ENSO years (see Spring NAO below).

ENSO: There is reasonable 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 are predicting a range of conditions from warm-neutral to cold-neutral conditions, with only one model predicting weak El Niño 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. Note that summer/autumn ENSO conditions tend to be difficult to predict at this lead time due to the spring predictability barrier (ENSO forecast skill is significantly reduced during Spring).

Trade Wind Speed: There is reasonable confidence that the Atlantic and Caribbean Sea trade wind speed will be close to 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. Both conditions are currently most likely to be in a state that has only a small influence on the trade wind speed at this lead time.

Spring NAO: The sign of the April to June NAO has an inverse correlation with upcoming Atlantic hurricane activity i.e. a positive spring NAO tends to be followed by a less active Atlantic hurricane season through enhancement of trade wind speed leading to cooling of tropical Atlantic SSTs. With

neutral ENSO conditions anticipated this year, the spring NAO may have an impact on the 2025 Atlantic hurricane season; however, we have no way of predicting the April-June NAO, thus the spring NAO represents an uncertainty in the 2025 Atlantic hurricane forecast.

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 early April forecast for North Atlantic hurricane activity is low (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 next TSR forecast update for the 2025 North Atlantic hurricane season will be a pre-season forecast issued on the 23rd May.

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	7 April 2025	120	14	7	3
	10 December 2024	129	15	7	3
CSU Forecast	3 April 2025	155	17	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	7 April 2025	2.4	4	2