



March Forecast Update for Atlantic Hurricane Activity in 2003

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Forecast Summary

TSR anticipates the 2003 Atlantic hurricane season will see above average activity close to the 10 year climate norm but 30-40% above the 30 year norm.

The TSR (Tropical Storm Risk) early March forecast update for Atlantic hurricane activity in 2003 continues to anticipate an active season. The forecast spans the Atlantic season from 1st June to 30th November 2003 and employs data through to the end of February 2003. Our two predictors are the forecast July-September 2003 trade wind speed over the Caribbean and tropical North Atlantic and the forecast August-September 2003 sea surface temperature in the tropical North Atlantic. At present we anticipate both predictors having a small enhancing effect on activity although forecast skill at this lead is small. Appendices give our predictions from previous months.

Atlantic ACE Index and System Numbers in 2003

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (\pm FE)	2003	166 (\pm 87)	2.9(\pm 1.9)	7.1 (\pm 2.7)	12.7 (\pm 3.5)
10yr Climate Norm (\pm SD)	1993-2002	153 (\pm 94)	3.0(\pm 1.9)	6.9 (\pm 2.9)	12.1 (\pm 3.6)
30yr Climate Norm (\pm SD)	1973-2002	100 (\pm 72)	2.1 (\pm 1.4)	5.7 (\pm 2.4)	9.8 (\pm 3.4)
Forecast Skill at this Lead	1988-2002	12%	13%	8%	10%

Key: ACE Index = Accumulated Cyclone Energy Index = Sum of the Squares of 6-hourly Maximum Sustained Wind Speeds (in units of knots) for all Systems while they are at least Tropical Storm Strength.
ACE Unit = $\times 10^4$ knots².

Intense Hurricane = 1 Minute Sustained Wind > 95Kts = Hurricane Category 3 to 5
Hurricane = 1 Minute Sustained Wind > 63Kts = Hurricane Category 1 to 5
Tropical Storm = 1 Minute Sustained Wind > 33Kts
SD = Standard Deviation
FE (Forecast Error) = Standard Deviation of Errors in Replicated Real Time Forecasts 1993-2002
Forecast Skill = Percentage Improvement in Root Mean Square Error over Running 10-year Prior Climate Norm from Replicated Real Time Forecasts 1988-2002

ACE Index & Numbers Forming in the MDR, Caribbean Sea and Gulf of Mexico in 2003

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (\pm FE)	2003	146 (\pm 81)	2.9(\pm 1.9)	5.4 (\pm 2.6)	9.4 (\pm 3.4)
10yr Climate Norm (\pm SD)	1993-2002	134 (\pm 88)	3.0(\pm 1.9)	5.2 (\pm 2.9)	8.8 (\pm 3.6)
30yr Climate Norm (\pm SD)	1973-2002	78 (\pm 71)	1.9 (\pm 1.5)	3.8 (\pm 2.5)	6.5 (\pm 3.6)
Forecast Skill at this Lead	1988-2002	13%	14%	10%	8%

The Atlantic hurricane Main Development Region (MDR) is the region 10°N - 20°N, 20°W - 60°W between the Cape Verde Islands and the Caribbean. A storm is defined as having formed within this region if it reached at least tropical depression status while in the area.

USA Landfalling ACE Index and Numbers in 2003

		ACE Index	Hurricanes	Tropical Storms
TSR Forecast (\pm FE)	2003	4.8 (\pm 4.5)	1.7 (\pm 1.1)	3.7 (\pm 1.9)
Average (\pm SD)	1993-2002	4.5 (\pm 4.7)	1.2 (\pm 1.2)	3.8 (\pm 2.1)
Average (\pm SD)	1973-2002	2.6 (\pm 3.4)	1.2 (\pm 1.3)	2.8 (\pm 2.0)
Forecast Skill at this Lead	1988-2002	9%	3%	9.7%

Key: ACE Index = Accumulated Cyclone Energy Index = Sum of the Squares of hourly Maximum Sustained Wind Speeds (in units of knots) for all Systems while they are at least Tropical Storm Strength and over the USA Mainland (reduced by a factor of 6).
ACE Unit = $\times 10^4$ knots².

Landfall Strike Category = Maximum 1 Minute Sustained Wind of Storm Coming Within 30km of Land
USA Mainland = Brownsville (Texas) to Maine

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

Caribbean Lesser Antilles Landfalling Numbers in 2003

		Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (\pm FE)	2003	0.4 (\pm 0.4)	0.7 (\pm 0.8)	1.7 (\pm 1.0)
10yr Climate Norm (\pm SD)	1993-2002	0.3 (\pm 0.5)	0.7 (\pm 0.8)	1.5 (\pm 1.0)
30yr Climate Norm (\pm SD)	1973-2002	0.2 (\pm 0.4)	0.4 (\pm 0.6)	1.1 (\pm 1.0)
Forecast Skill at this Lead	1988-2002	1%	6%	0%

Key: Landfall Strike Category = Maximum 1 Minute Sustained Wind of Storm Coming Within 30km of Land
Lesser Antilles = Island Arc from Anguilla to Trinidad Inclusive

Key Predictors for 2003

The key factors behind our forecast for an above-average hurricane season in 2003 are the anticipated enhancing effects of July-September forecast 925mb U(east/west)-winds over the Caribbean Sea and tropical North Atlantic region (7.5°N - 17.5°N, 30°W - 100°W), and of August-September forecast sea surface temperature for the Atlantic MDR (10°N - 20°N, 20°W - 60°W). The current forecast anomalies (1973-2002 climatology) for these predictors are 0.53 ± 0.82 ms⁻¹ (down from 0.67 ± 0.79 ms⁻¹) and 0.14 ± 0.24 °C (down from 0.19 ± 0.25 °C) respectively. The corresponding forecast skills for these predictors at this lead are 13% and 18%.

Further Information

Further information on the TSR forecast methodology, the TSR simulated real-time forecast skill 1987-2001 as a function of lead time, and on TSR in general, may be obtained from the 'Extended Range Forecast for Atlantic Hurricane Activity in 2002' document issued on the 23rd November 2001. Our next monthly forecast update for the 2003 Atlantic hurricane season will be issued on the 6th April 2003.

Appendix - Predictions from Previous Months

1. Atlantic ACE Index and System Numbers

Atlantic ACE Index and System Numbers 2003					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (\pm SD) (1993-2002)		153 (\pm 94)	12.1 (\pm 3.6)	6.9 (\pm 2.9)	3.0 (\pm 1.9)
Average Number (\pm SD) (1973-2002)		100 (\pm 72)	9.8 (\pm 3.4)	5.7 (\pm 2.4)	2.1 (\pm 1.4)
TSR Forecasts (\pm FE)	5 Mar 2003	166 (\pm 87)	12.7 (\pm 3.5)	7.1 (\pm 2.7)	2.9 (\pm 1.9)
	5 Feb 2003	180 (\pm 90)	13.3 (\pm 3.3)	7.6 (\pm 2.7)	3.1 (\pm 1.8)
	7 Jan 2003	156 (\pm 90)	12.3 (\pm 3.4)	6.9 (\pm 2.8)	2.7 (\pm 1.8)
	16 Dec 2002	-	12.4 (\pm 3.5)	7.0 (\pm 2.8)	2.8 (\pm 1.8)
Gray Forecast	6 Dec 2002		12	8	3

2. MDR, Caribbean Sea and Gulf of Mexico ACE Index and Numbers

MDR, Caribbean Sea and Gulf of Mexico ACE Index and Numbers 2003					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (\pm SD) (1993-2002)		134 (\pm 88)	8.8 (\pm 3.6)	5.2 (\pm 2.9)	3.0 (\pm 1.9)
Average Number (\pm SD) (1973-2002)		78 (\pm 71)	6.5 (\pm 3.6)	3.8 (\pm 2.5)	1.9 (\pm 1.5)
TSR Forecasts (\pm FE)	5 Mar 2003	146 (\pm 81)	9.4 (\pm 3.4)	5.4 (\pm 2.6)	2.9 (\pm 1.9)
	5 Feb 2003	161 (\pm 85)	10.0 (\pm 3.4)	5.9 (\pm 2.7)	3.1 (\pm 1.8)
	7 Jan 2003	136 (\pm 85)	9.0 (\pm 3.5)	5.2 (\pm 2.7)	2.7 (\pm 1.8)
	16 Dec 2002	-	9.2 (\pm 3.5)	5.3 (\pm 2.7)	3.0 (\pm 1.7)

3. US Landfalling ACE Index and Numbers

US Landfalling ACE Index and Numbers 2003				
		ACE Index	Named Tropical Storms	Hurricanes
Average Number (\pm SD) (1993-2002)		4.5 (\pm 4.6)	3.8 (\pm 2.1)	1.2 (\pm 1.2)
Average Number (\pm SD) (1973-2002)		2.6 (\pm 3.4)	2.8 (\pm 2.0)	1.2 (\pm 1.3)
TSR Forecasts (\pm FE)	5 Mar 2003	4.8 (\pm 4.5)	3.7 (\pm 1.9)	1.7 (\pm 1.1)
	5 Feb 2003	5.2 (\pm 4.6)	3.9 (\pm 1.9)	1.8 (\pm 1.1)
	7 Jan 2003	-	3.6 (\pm 1.9)	1.6 (\pm 1.1)
	16 Dec 2002	-	3.6 (\pm 1.9)	1.7 (\pm 1.1)

4. Lesser Antilles Landfalling Numbers

Lesser Antilles Landfalling Numbers 2003				
		Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (SD) (1993-2002)		1.6 (± 0.8)	0.7 (± 0.8)	0.3 (± 0.5)
Average Number (SD) (1973-2002)		1.1 (± 1.0)	0.4 (± 0.6)	0.2 (± 0.4)
TSR Forecasts ($\pm FE$)	5 Mar 2003	1.7 (± 1.0)	0.7 (± 0.8)	0.4 (± 0.4)
	5 Feb 2003	1.8 (± 1.0)	0.8 (± 0.8)	0.4 (± 0.4)
	7 Jan 2003	1.6 (± 1.0)	0.7 (± 0.8)	0.4 (± 0.4)
	16 Dec 2002	1.7 (± 0.8)	0.7 (± 0.7)	0.4 (± 0.4)

