May Forecast Update for Atlantic Hurricane Activity in 2003

Issued: 6th May 2003

by Drs Mark Saunders and Adam Lea
Benfield Hazard Research Centre, UCL (University College London), UK

Forecast Summary

TSR anticipates the 2003 Atlantic hurricane season will see above average activity both for basin numbers and for US and Caribbean landfall.

The TSR (Tropical Storm Risk) early May forecast update for Atlantic hurricane activity in 2003 continues to anticipate an above average season. The forecast spans the period from 1st June to 30th November 2003 and employs data through to the end of April 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 the Atlantic sea surface temperature anomaly to be near neutral and the trade wind anomaly to have a moderate enhancing effect on activity. Appendices give our predictions from previous months.

Atlantic ACE Index and System Numbers in 2003

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (±FE)	2003	158 (±70)	2.8 (±1.5)	7.0 (±2.0)	12.4 (±2.7)
10yr Climate Norm (±SD)	1993-2002	153 (±94)	3.0 (±1.9)	6.9 (±2.9)	12.1 (±3.6)
30yr Climate Norm (±SD)	1973-2002	100 (±72)	2.1 (±1.4)	5.7 (±2.4)	9.8 (±3.4)
Forecast Skill at this Lead	1988-2002	28%	41%	27%	29%

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 = $x10^4$ $knots^2$.
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 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 (±FE)	2003	139 (±62)	2.8(±1.5)	5.3 (±1.8)	9.1 (±2.4)
10yr Climate Norm (±SD)	1993-2002	134 (±88)	3.0 (±1.9)	5.2 (±2.9)	8.8 (±3.6)
30yr Climate Norm (±SD)	1973-2002	78 (±71)	1.9 (±1.5)	3.8 (±2.5)	6.5 (±3.6)
Forecast Skill at this Lead	1988-2002	30%	41%	42%	41%

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 (±FE)	2003	4.6 (±4.3)	1.7 (±1.0)	3.6 (±1.9)
Average (±SD)	1993-2002	4.5 (±4.7)	1.2 (±1.2)	3.8 (±2.1)
Average (±SD)	1973-2002	2.6 (±3.4)	1.2 (±1.3)	2.8 (±2.0)
Forecast Skill at this Lead	1988-2002	15%	30%	18%

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 = $x10^4$ $knots^2$.
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 (±FE)	2003	0.4 (±0.4)	0.7 (±0.7)	1.6 (±0.9)
10yr Climate Norm (±SD)	1993-2002	0.3 (±0.5)	0.7 (±0.8)	1.5 (±1.0)
30yr Climate Norm (±SD)	1973-2002	0.2 (±0.4)	0.4 (±0.6)	1.1 (±1.0)
Forecast Skill at this Lead	1988-2002	16%	28%	27%

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 moderate enhancing effect 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 neutral 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 0.48±0.58 ms^{-1} (up from 0.15±0.74 ms^{-1}) and 0.08±0.24 °C (up from 0.02±0.54 °C) respectively. The corresponding forecast skills for these predictors at this lead are 48% and 29%.

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 9th June 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 (±SD) (1993-2002)		153 (±94)	12.1 (±3.6)	6.9 (±2.9)	3.0 (±1.9)
Average Number (±SD) (1973-2002)		100 (±72)	9.8 (±3.4)	5.7 (±2.4)	2.1 (±1.4)
TSR Forecasts (±FE)	6 May 2003	158 (±70)	12.4 (±2.7)	7.0 (±2.0)	2.8 (±1.5)
	11 Apr 2003	128 (±85)	11.1 (±2.9)	6.1 (±2.4)	2.4 (±1.8)
	5 Mar 2003	166 (±87)	12.7 (±3.5)	7.1 (±2.7)	2.9 (±1.9)
	5 Feb 2003	180 (±90)	13.3 (±3.3)	7.6 (±2.7)	3.1 (±1.8)
	7 Jan 2003	156 (±90)	12.3 (±3.4)	6.9 (±2.8)	2.7 (±1.8)
	16 Dec 2002	-	12.4 (±3.5)	7.0 (±2.8)	2.8 (±1.8)
Gray Forecasts	4 Apr 2003		12	8	3
	6 Dec 2002		12	8	3
Meteorological Institute, Cuba Forecast	2 May 2003	-	10	6	-

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 (±SD) (1993-2002)		134 (±88)	8.8 (±3.6)	5.2 (±2.9)	3.0 (±1.9)
Average Number (±SD) (1973-2002)		78 (±71)	6.5 (±3.6)	3.8 (±2.5)	1.9 (±1.5)
TSR Forecasts (±FE)	5 May 2003	139 (±62)	9.1 (±2.4)	5.3 (±1.8)	2.8 (±1.5)
	11 Apr 2003	108 (±78)	7.8 (±3.0)	4.4 (±2.4)	2.4 (±1.8)
	5 Mar 2003	146 (±81)	9.4 (±3.4)	5.4 (±2.6)	2.9 (±1.9)
	5 Feb 2003	161 (±85)	10.0 (±3.4)	5.9 (±2.7)	3.1 (±1.8)
	7 Jan 2003	136 (±85)	9.0 (±3.5)	5.2 (±2.7)	2.7 (±1.8)
	16 Dec 2002	-	9.2 (±3.5)	5.3 (±2.7)	3.0 (±1.7)

3. US Landfalling ACE Index and Numbers

US Landfalling ACE Index and Numbers 2003				
		ACE Index	Named Tropical Storms	Hurricanes
Average Number (±SD) (1993-2002)		4.5 (±4.6)	3.8 (±2.1)	1.2 (±1.2)
Average Number (±SD) (1973-2002)		2.6 (±3.4)	2.8 (±2.0)	1.2 (±1.3)
TSR Forecasts (±FE)	6 May 2003	4.6 (±4.3)	3.6 (±1.9)	1.7 (±1.0)
	11 Apr 2003	3.6 (±4.6)	3.2 (±1.9)	1.4 (±1.1)
	5 Mar 2003	4.8 (±4.5)	3.7 (±1.9)	1.7 (±1.1)
	5 Feb 2003	5.2 (±4.6)	3.9 (±1.9)	1.8 (±1.1)
	7 Jan 2003	-	3.6 (±1.9)	1.6 (±1.1)
	16 Dec 2002	-	3.6 (±1.9)	1.7 (±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 (±FE)	6 May 2003	1.6 (±0.9)	0.7 (±0.7)	0.4 (±0
	11 Apr 2003	1.4 (±1.0)	0.6 (±0.7)	0.3 (±0.4)
	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)