August Forecast Update for Atlantic Hurricane Activity in 2005

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Forecast Summary

TSR anticipates activity will be exceptionally high and record-breaking at sea.

The TSR (Tropical Storm Risk) August forecast update for Atlantic hurricane activity in 2005 anticipates an exceptionally active season to high probability. Based on current and projected climate signals Atlantic basin activity is forecast to be record-breaking at 150% above-average and US landfalling tropical cyclone activity is forecast to be 90% above-average. It is a certain (100% likelihood) that Atlantic basin activity will be in the above-average tercile. US landfalling activity will be in the upper tercile to 85% probability. The forecast spans the period from 1st June to 30th November 2005 and employs data through to the end of July 2005. TSR's two predictors are the forecast July-September 2005 trade wind speed over the Caribbean and tropical North Atlantic, and the forecast August-September 2005 sea surface temperature in the tropical North Atlantic. The former influences cyclonic vorticity (the spinning up of storms) in the main hurricane track region, while the latter provides heat and moisture to power incipient storms in the main track region. TSR anticipates both predictors will have a strong enhancing effect on activity in 2005. Appendices list forecasts from prior months and from other groups.

Atlantic ACE Index and System Numbers in 2005

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (±FE)	2005	249 (±36)	6.6 (±1.2)	11.4 (±1.5)	22.1 (±2.3)
55yr Climate Norm (±SD)	1950-2004	98 (±57)	2.6 (±1.8)	6.0 (±2.4)	9.9 (±3.3)
Forecast Skill at this Lead	1985-2004	61%	48%	64%	54%

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 1985-2004.
Forecast Skill = Percentage Improvement in Mean Square Error over Running 10-year Prior Climate Norm from Replicated Real Time Forecasts 1985-2004.

There is a 100% probability that the 2005 Atlantic hurricane season ACE index will be above average (defined as an ACE index value in the upper tercile historically (>113)). The 55-year period 1950-2004 is used for climatology. If verified, the forecast values for the ACE Index and numbers of tropical storms would be the highest on record.

Key: Terciles = Data groupings of equal (33.3%) probability corresponding to the upper, middle and lower one-third of values historically (1950-2004).
Upper Tercile = ACE index value greater than 113.
Middle Tercile = ACE index value between 67 and 113.
Lower Tercile = ACE index value less than 67.

ACE Index & Numbers Forming in the MDR, Caribbean Sea and Gulf of Mexico in 2005

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (±FE)	2005	227 (±40)	6.5(±1.1)	9.9 (±1.3)	18.1 (±2.1)
55yr Climate Norm (±SD)	1950-2004	76 (±58)	2.3 (±1.8)	4.2 (±2.4)	6.9 (±3.2)
Forecast Skill at this Lead	1985-2004	57%	57%	76%	68%

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 Lesser Antilles. A storm is defined as having formed within this region if it reached at least tropical depression status while in the area.

There is a 100% probability that in 2005 the MDR, Caribbean Sea and Gulf of Mexico ACE index will be above average (defined as an ACE index value in the upper tercile historically (>91)), and a 0% chance it will be near-normal (defined as an ACE index value in the middle tercile historically (35 to 91) or below-normal (defined as an ACE index value in the lower tercile historically (<35)). The 55-year period 1950-2004 is used for climatology.

USA Landfalling ACE Index and Numbers in 2005

		ACE Index	Hurricanes	Tropical Storms
TSR Forecast (±FE)	2005	4.4 (±1.7)	3.4 (±1.5)	7.4 (±2.3)
Average (±SD)	1950-2004	2.3 (±2.1)	1.5 (±1.3)	3.1 (±2.0)
Forecast Skill at this Lead	1985-2004	34%	31%	2%

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 Directly Striking Land.

USA Mainland = Brownsville (Texas) to Maine.

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

There is an 85% probability that in 2005 the USA landfalling ACE index will be above average (defined as a USA ACE index value in the upper tercile historically (>2.63)), a 15% likelihood it will be near-normal (defined as a USA ACE index value in the middle tercile historically (1.14 to 2.63) and a 0% chance it will be below-normal (defined as a USA ACE index value in the lower tercile historically (<1.14)). The 55-year period 1950-2004 is used for climatology.

Caribbean Lesser Antilles Landfalling Numbers in 2005

		ACE Index	Intense Hurricanes	Hurricanes	Tropical Storms
TSR Forecast (±FE)	2005	5.4 (± 1.9)	0.6 (±0.4)	2.0 (±0.6)	3.2 (±0.7)
55yr Climate Norm (±SD)	1950-2004	1.4 (±2.1)	0.3 (±0.5)	0.5 (±0.7)	1.1 (±1.1)
Forecast Skill at this Lead	1985-2004	38%	29%	35%	51%

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 within the boxed region (10°N-18°N,60°W-63°W) (reduced by a factor of 6). ACE Unit = $x10^4$ $knots^2$.

Landfall Strike Category = Maximum 1 Minute Sustained Wind of Storm Directly Striking Land.

Lesser Antilles = Island Arc from Anguilla to Trinidad Inclusive.

Key Predictors for 2005

The key factors behind the TSR forecast for an exceptionally above-average hurricane season in 2005 are the anticipated strong enhancing effect of July-September forecast trade winds at 925mb height 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 (1975-2004 climatology) for these predictors are 1.44±0.41 ms^{-1} (up from last month's value of 0.83±0.54 ms^{-1}) and 0.57±0.13°C (similar to last month's value of 0.60±0.17°C). Only three hurricane seasons since 1950 (1995, 1955 and 1999) have had a trade wind speed anomaly higher than 1.44 ms^{-1}. The only year with an SST anomaly higher than 0.57°C is 2004 (where it was 0.58°C). The forecast skills (1985-2004) for these predictors at this lead are 77% and 84% respectively.

Further Information and Next Forecast

Further information about the TSR forecasts, verifications and hindcast skill as a function of lead time may be obtained from the TSR web site *http://tropicalstormrisk.com.* A summary of the 2005 Atlantic hurricane season and a verification of the TSR seasonal forecasts will be issued in December 2005.

Appendix - Predictions from Previous Months

1. Atlantic ACE Index and System Numbers

Atlantic ACE Index and System Numbers 2005					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (±SD) (1950-2004)		98 (±57)	9.9 (±3.3)	6.0 (±2.4)	2.6 (±1.8)
TSR Forecasts (±FE)	5 Aug 2005	249 (±36)	22.1 (±2.3)	11.4 (±1.5)	6.6 (±1.2)
	7 Jul 2005	190 (±42)	15.3 (±2.4)	8.8 (±1.9)	4.1 (±1.5)
	7 Jun 2005	159 (±42)	13.8 (±2.2)	7.8 (±1.9)	3.5 (±1.4)
	5 May 2005	158 (±44)	13.9 (±2.6)	7.8 (±2.1)	3.6 (±1.4)
	5 Apr 2005	155 (±50)	13.9 (±2.9)	7.8 (±2.1)	3.6 (±1.5)
	7 Mar 2005	156 (±52)	14.0 (±3.2)	7.9 (±2.3)	3.6 (±1.6)
	9 Feb 2005	151 (±53)	13.6 (±3.3)	7.7 (±2.3)	3.5 (±1.6)
	5 Jan 2005	157 (±56)	13.9 (±3.5)	7.8 (±2.4)	3.6 (±1.6)
	10 Dec 2004	145 (±56)	13.4 (±3.6)	7.5 (±2.5)	3.4 (±1.6)
Gray Forecasts	5 Aug 2005	-	20	10	6
	31 May 2005	-	15	8	4
	1 Apr 2005	-	13	7	3
	3 Dec 2004	-	11	6	3
NOAA Forecasts	2 Aug 2005	158-236	18-21	9-11	5-7
	16 May 2005	105-166	12-15	7-9	3-5
Meteorological Institute, Cuba Forecasts	1 Aug 2005	-	20	9	-
	2 May 2005	-	13	7	-

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

MDR, Caribbean Sea and Gulf of Mexico ACE Index and Numbers 2005					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (±SD) (1950-2004)		76 (±58)	6.9 (±3.2)	4.2 (±2.4)	2.3 (±1.8)
TSR Forecasts (±FE)	5 Aug 2005	227 (±40)	18.1 (±2.1)	9.9 (±1.3)	6.5 (±1.1)
	7 Jul 2005	172 (±44)	11.5 (±2.2)	7.0 (±1.8)	4.0 (±1.4)
	7 Jun 2005	141 (±43)	10.0 (±2.3)	6.0 (±1.9)	3.4 (±1.3)
	5 May 2005	140 (±45)	10.1 (±2.7)	6.0 (±2.0)	3.5 (±1.3)
	5 Apr 2005	138 (±51)	10.1 (±3.1)	6.0 (±2.2)	3.5 (±1.5)
	7 Mar 2005	138 (±55)	10.2 (±3.5)	6.1 (±2.4)	3.5 (±1.5)
	9 Feb 2005	133 (±56)	9.8 (±3.6)	5.9 (±2.4)	3.4 (±1.5)
	5 Jan 2005	139 (±59)	10.1 (±3.7)	6.0 (±2.5)	3.5 (±1.6)
	10 Dec 2004	128 (±59)	9.6 (±3.8)	5.7 (±2.6)	3.3 (±1.6)

3. US ACE Index and Landfalling Numbers

US Landfalling Numbers 2005				
		ACE Index	Named Tropical Storms	Hurricanes
Average Number (±SD) (1950-2004)		2.3 (±2.1)	3.1 (±2.0)	1.5 (±1.3)
TSR Forecasts (±FE)	5 Aug 2005	4.4 (±1.7)	7.4 (±2.3)	3.4 (±1.5)
	7 Jul 2005	4.3 (±1.9)	5.7 (±2.1)	2.2 (±1.5)
	7 Jun 2005	3.6 (±1.9)	4.2 (±2.1)	2.0 (±1.6)
	5 May 2005	3.6 (±1.8)	4.2 (±2.0)	2.0 (±1.5)
	5 Apr 2005	3.6 (±1.8)	4.3 (±2.0)	2.0 (±1.6)
	7 Mar 2005	3.6 (±1.9)	4.3 (±2.1)	2.0 (±1.6)
	9 Feb 2005	3.5 (±1.9)	4.2 (±2.2)	2.0 (±1.6)
	5 Jan 2005	3.6 (±2.0)	4.3 (±1.9)	2.0 (±1.7)
	10 Dec 2004	3.4 (±2.0)	4.1 (±2.2)	1.9 (±1.7)

4. Lesser Antilles ACE Index and Landfalling Numbers

Lesser Antilles Landfalling Numbers 2005					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number (SD) (1950-2004)		1.4 (±2.1)	1.1 (±1.1)	0.5 (±0.7)	0.3 (±0.5)
TSR Forecasts (±FE)	5 Aug 2005	5.4 (±1.9)	3.2 (±0.7)	2.0 (±0.6)	0.6 (±0.4)
	7 Jul 2005	3.5 (±2.1)	2.1 (±0.9)	0.9 (±0.6)	0.5 (±0.4)
	7 Jun 2005	2.9 (±2.0)	1.8 (±0.9)	0.8 (±0.6)	0.4 (±0.4)
	5 May 2005	2.8 (±2.2)	1.8 (±0.9)	0.8 (±0.6)	0.4 (±0.4)
	5 Apr 2005	2.8 (±2.3)	1.8 (±1.0)	0.8 (±0.6)	0.4 (±0.4)
	7 Mar 2005	2.8 (±2.4)	1.8 (±1.0)	0.8 (±0.6)	0.4 (±0.4)
	9 Feb 2005	2.7 (±2.4)	1.8 (±1.0)	0.7 (±0.6)	0.4 (±0.4)
	5 Jan 2005	2.8 (±2.4)	1.8 (±1.0)	0.8 (±0.6)	0.4 (±0.4)
	10 Dec 2004	2.6 (±2.4)	1.7 (±1.0)	0.7 (±0.6)	0.4 (±0.4)