



# Summary of 2013 Atlantic Tropical Cyclone Season and Verification of Authors' Seasonal Forecasts

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## Summary

The 2013 North Atlantic hurricane season was exceptionally quiet with an ACE index just 30% of the 1950-2012 climate norm. All forecasts failed to predict the lack of activity in 2013.

## Features of the 2013 Atlantic Season

- Featured 13 tropical storms, only two hurricanes, no major hurricane and an ACE index of only 31. This is the quietest season for ACE since 1983 and the quietest for hurricanes since 1982.
- The U.S. has now gone eight years without a major hurricane landfall. This is unprecedented in hurricane records back to 1900.
- Hurricane Humberto became the second latest forming first hurricane of the year (after Gustav in 2002), when it reached hurricane strength early on September 11<sup>th</sup>.

**Individual Storm and Loss Summary 2013**

No.	Name	Dates	Peak 1-min Sustained Wind (kts)	Minimum Pressure (mb)	Hurricane Category	Category at US Landfall	Estimated US Insured Loss (US \$bn)
1	Andrea	5-7 Jun	55	992	-	TS	minimal
2	Barry	17-20 Jun	40	1003	-	-	-
3	Chantal	7-10 Jul	55	1003	-	-	-
4	Dorian	23 Jul-3 Aug	50	1002	-	-	-
5	Erin	15-18 Aug	40	1006	-	-	-
6	Fernand	25-26 Aug	50	1001	-	-	-
7	Gabrielle	4-13 Sep	55	1003	-	-	-
8	Humberto	8-19 Sep	80	979	1	-	-
9	Ingrid	12-16 Sep	75	983	1	-	-
10	Jerry	29 Sep-Oct 3	45	1005	-	-	-
11	Karen	3-6 Oct	55	998	-	-	-
12	Lorenzo	21-24 Oct	45	1000	-	-	-
13	Melissa	18-21 Nov	55	980	-	-	-

## Verification of Forecasts

All forecasts over-predicted total Atlantic hurricane activity in 2013. The TSR forecasts arguably performed better than the forecasts from other institutions but were still a complete bust. It is surprising that the 2013 Atlantic hurricane season was so inactive given that ENSO was neutral and sea surface temperatures in the tropical north Atlantic were warmer than normal. Research is currently underway in collaboration with CSU, NOAA, UCAR and the University of Miami to better establish the environmental factors which suppressed Atlantic hurricane activity in 2013.

U.S. and Lesser Antilles landfalling activity was well below the long term climatology. Forecasts over-predicted U.S. landfalling activity and to a lesser extent over-predicted Lesser Antilles landfalling activity at all leads. This over-prediction is consistent with a significant over-prediction of total Atlantic basin activity in 2013.

<b>Atlantic ACE Index and System Numbers 2013</b>					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number ( $\pm$ SD) (1950-2012)		103 ( $\pm$ 59)	10.8 ( $\pm$ 4.4)	6.3 ( $\pm$ 2.7)	2.7 ( $\pm$ 1.9)
Actual Number 2013		31	13	2	0
TSR Forecasts ( $\pm$ SD)	6 Aug 2013	121 ( $\pm$ 38)	14.8 ( $\pm$ 2.9)	6.9 ( $\pm$ 1.8)	3.0 ( $\pm$ 1.2)
	5 Jul 2013	112 ( $\pm$ 44)	14.5 ( $\pm$ 3.4)	6.7 ( $\pm$ 2.2)	3.1 ( $\pm$ 1.4)
	4 Jun 2013	134 ( $\pm$ 47)	15.6 ( $\pm$ 3.6)	7.7 ( $\pm$ 2.4)	3.5 ( $\pm$ 1.5)
	24 May 2013	130 ( $\pm$ 51)	15.3 ( $\pm$ 3.9)	7.5 ( $\pm$ 2.7)	3.4 ( $\pm$ 1.5)
	5 Apr 2013	131 ( $\pm$ 55)	15.2 ( $\pm$ 4.1)	7.5 ( $\pm$ 2.8)	3.4 ( $\pm$ 1.6)
	5 Dec 2012	134 ( $\pm$ 56)	15.4 ( $\pm$ 4.3)	7.7 ( $\pm$ 2.9)	3.4 ( $\pm$ 1.6)
CSU Forecasts	2 Aug 2013	150	18	8	3
	3 Jun 2013	165	18	9	4
	10 Apr 2013	165	18	9	4
NOAA Forecast	23 May 2013	111-190	13-20	7-11	3-6
	8 Aug 2013	111-176	13-19	6-9	3-5
UK Met Office Forecast	15 May 2013	130 ( $\pm$ 54)	14 ( $\pm$ 4)	9 ( $\pm$ 5)	-
Institute of Meteorology, Cuba	1 Aug 2013	-	18	9	-
	4 May 2013	-	17	9	-

<b>MDR, Caribbean Sea and Gulf of Mexico ACE Index and Numbers 2013</b>					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number ( $\pm$ SD) (1950-2012)		81 ( $\pm$ 58)	7.4 ( $\pm$ 3.5)	4.4 ( $\pm$ 2.5)	2.4 ( $\pm$ 1.8)
Actual Number 2013		27	10	2	0
TSR Forecast ( $\pm$ SD)	6 Aug 2013	96 ( $\pm$ 41)	10.0 ( $\pm$ 2.4)	5.0 ( $\pm$ 1.5)	2.6 ( $\pm$ 1.1)
	4 Jul 2013	88 ( $\pm$ 42)	9.2 ( $\pm$ 2.4)	4.8 ( $\pm$ 1.7)	2.7 ( $\pm$ 1.3)
	4 Jun 2013	110 ( $\pm$ 43)	10.3 ( $\pm$ 2.6)	5.8 ( $\pm$ 1.9)	3.1 ( $\pm$ 1.3)
	24 May 2013	106 ( $\pm$ 48)	10.0 ( $\pm$ 3.0)	5.6 ( $\pm$ 2.2)	3.0 ( $\pm$ 1.4)
	5 Apr 2013	72 ( $\pm$ 52)	7.4 ( $\pm$ 3.3)	3.9 ( $\pm$ 2.4)	2.3 ( $\pm$ 1.5)

<b>US Landfalling Numbers 2013</b>				
		ACE Index	Named Tropical Storms	Hurricanes
Average Number ( $\pm$ SD) (1950-2012)		2.4 ( $\pm$ 2.2)	3.1 ( $\pm$ 2.0)	1.5 ( $\pm$ 1.4)
Actual Number 2013		0.5	1	0
TSR Forecasts ( $\pm$ SD)	6 Aug 2013	2.9 ( $\pm$ 1.8)	4.0 ( $\pm$ 2.1)	1.8 ( $\pm$ 1.5)
	4 Jul 2013	2.8 ( $\pm$ 2.0)	4.1 ( $\pm$ 2.1)	1.8 ( $\pm$ 1.5)
	4 Jun 2013	3.3 ( $\pm$ 2.0)	4.5 ( $\pm$ 2.2)	2.0 ( $\pm$ 1.5)
	24 May 2013	3.2 ( $\pm$ 2.0)	4.4 ( $\pm$ 2.1)	2.0 ( $\pm$ 1.5)
	5 Apr 2013	3.2 ( $\pm$ 2.1)	4.4 ( $\pm$ 2.2)	1.9 ( $\pm$ 1.5)
	5 Dec 2012	3.2 ( $\pm$ 2.1)	4.5 ( $\pm$ 2.2)	2.0 ( $\pm$ 1.5)

<b>Lesser Antilles Landfalling Numbers 2013</b>					
		ACE Index	Named Tropical Storms	Hurricanes	Intense Hurricanes
Average Number ( $\pm$ SD) (1950-2012)		1.3 ( $\pm$ 2.0)	1.1 ( $\pm$ 1.0)	0.5 ( $\pm$ 0.7)	0.2 ( $\pm$ 0.5)
Actual Number 2013		0.4	1	0	0
TSR Forecast ( $\pm$ SD)	6 Aug 2013	1.6 ( $\pm$ 1.7)	1.4 ( $\pm$ 0.8)	0.6 ( $\pm$ 0.5)	0.3 ( $\pm$ 0.3)
	4 Jul 2013	1.4 ( $\pm$ 1.8)	1.4 ( $\pm$ 0.9)	0.6 ( $\pm$ 0.6)	0.3 ( $\pm$ 0.3)
	4 Jun 2013	1.8 ( $\pm$ 1.8)	1.6 ( $\pm$ 0.9)	0.6 ( $\pm$ 0.6)	0.3 ( $\pm$ 0.4)
	24 May 2013	1.8 ( $\pm$ 1.9)	1.5 ( $\pm$ 1.0)	0.6 ( $\pm$ 0.6)	0.3 ( $\pm$ 0.4)
	5 Apr 2013	1.8 ( $\pm$ 2.0)	1.5 ( $\pm$ 1.0)	0.6 ( $\pm$ 0.6)	0.3 ( $\pm$ 0.4)

### Forecasts for 2014

Further TSR outlooks for 2014 North Atlantic hurricane activity are being issued on the 7<sup>th</sup> April 2014, 27<sup>th</sup> May 2014, 5<sup>th</sup> June 2014, 7<sup>th</sup> July 2014 and 6<sup>th</sup> August 2014.