

Thirty-three Years of Annual Atlantic Hurricane Season Outlooks

Comparison of Weather Research Center Cyclone Strike Index with Colorado State University's Hurricane Outlook

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When the Weather Research Center's Hasling - Freeman Cyclone Strike Index [WRC] Annual Atlantic Hurricane Outlook is compared to Colorado State University's Dr. Bill Gray's seasonal hurricane outlook [GRAY], and Climatology, WRC's outlook edges out both. In 1985, Jill F. Hasling and Dr. John C. Freeman developed a seasonal hurricane outlook model to forecast which section of the United States coast had the highest risk of experiencing the landfall of a tropical storm or hurricane. Thirty-three years of outlooks have been made from 1984 to 2016 and only four years 1984, 2006, 2010 and 2014 failed to have a landfall for the part of the coast with the highest risk of landfall in that season. So 29 out 33 years gives WRC outlook a 88% accuracy rate.

Around the same time, Professor Bill Gray at Colorado State University started making an Atlantic Hurricane Season Outlook which gave the total number of named storms, the number of hurricanes, the number of hurricane days and the number of tropical storm days. WRC's model was used to give secondary predictions of these parameters, so the author did a comparison between the two outlooks since 1984. Figure 1 shows the difference between the number of observed named storms in the Atlantic and the WRC Outlook and GRAY's Outlook. The red line in Figure 1 indicates the error which is the difference between the number of storms forecasted by the WRC's outlook and the actual number of Atlantic tropical cyclones [named storms] each year. The blue line is the GRAY outlook error. For example in Figure 1 for the year 1988, the WRC Outlook predicted 5 tropical cyclones and GRAY's April seasonal outlook predicted 7 named storms. WRC predicted had an error of 0 and GRAY had an error of +2. Out of the thirty-three years [1984 to 2016], WRC's Outlook for the total number of tropical cyclones was within one cyclone nine of the years. GRAY's outlook was within one cyclone eight of the years.

The same procedure was applied to the prediction of the number of hurricanes each year. The forecast error is plotted in Figure 2. This shows the difference between the number of observed hurricanes in the Atlantic and WRC Outlook and GRAY outlook. Out of the thirty-three years, the WRC outlook predicted the number of hurricanes within one hurricane for fourteen of the thirty three years. GRAY's outlook was within one hurricane twelve of the thirty-three years .

The number of hurricane days expected each year was also predicted. Figure 3 shows the difference between the actual number of hurricane days in the Atlantic and WRC Outlook and GRAY's Outlook. Out of the thirty-three years, the number of hurricane days predicted by the WRC was within five days twelve of the thirty-three years. For the GRAY outlook, nine of the thirty three years were within five days.

The same procedure to determine the error in the predicted of the number of tropical storm days was performed. Figure 4 shows the difference between the actual number of tropical storm days in the Atlantic and the WRC Outlook and GRAY Outlook. The actual number of tropical storm days within ten days was predicted by the WRC outlook fifteen the years. For the GRAY outlook, eleven of the years were within ten days. Table 1 gives a summary of these outlooks.

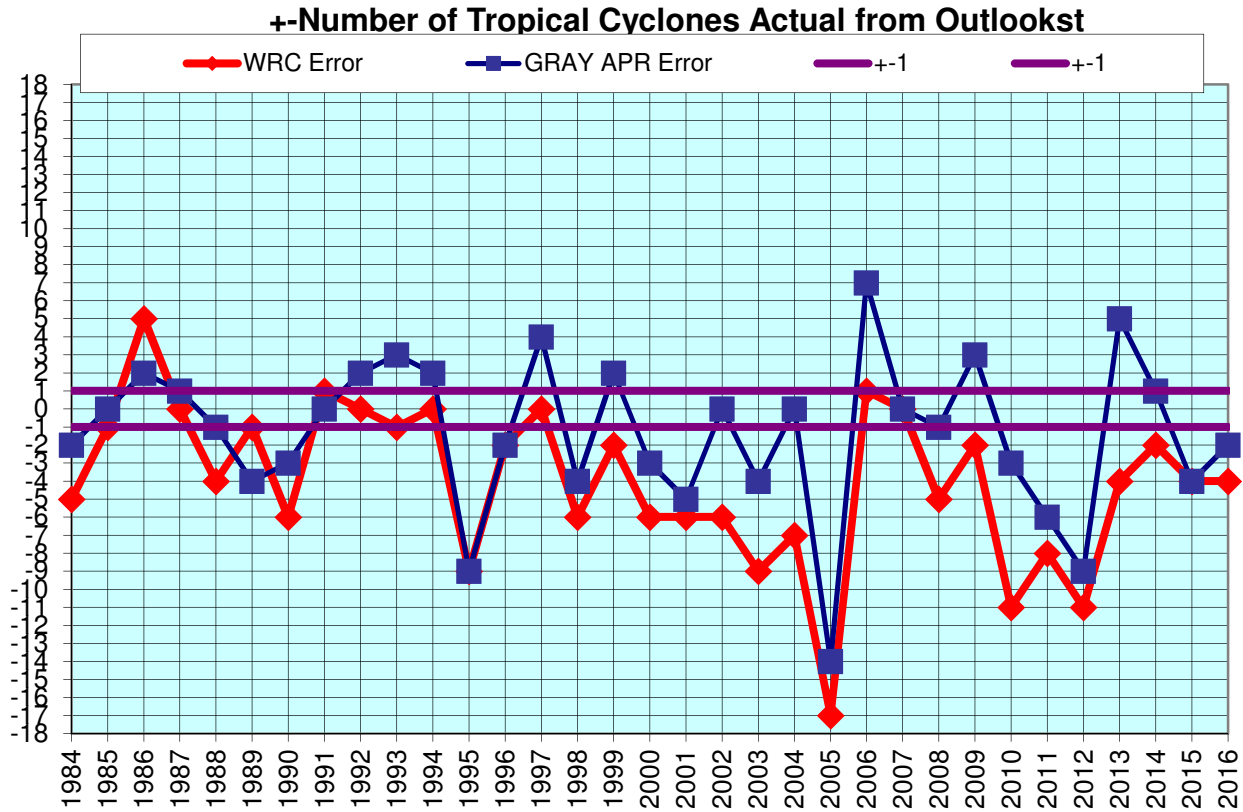


Figure 1: Difference plus or minus one between the number of actual tropical cyclones [named storms and hurricanes] for WRC's and GRAY's Outlook.

+Number of Hurricanes Observed versus WRC's and GRAY's Outlooks

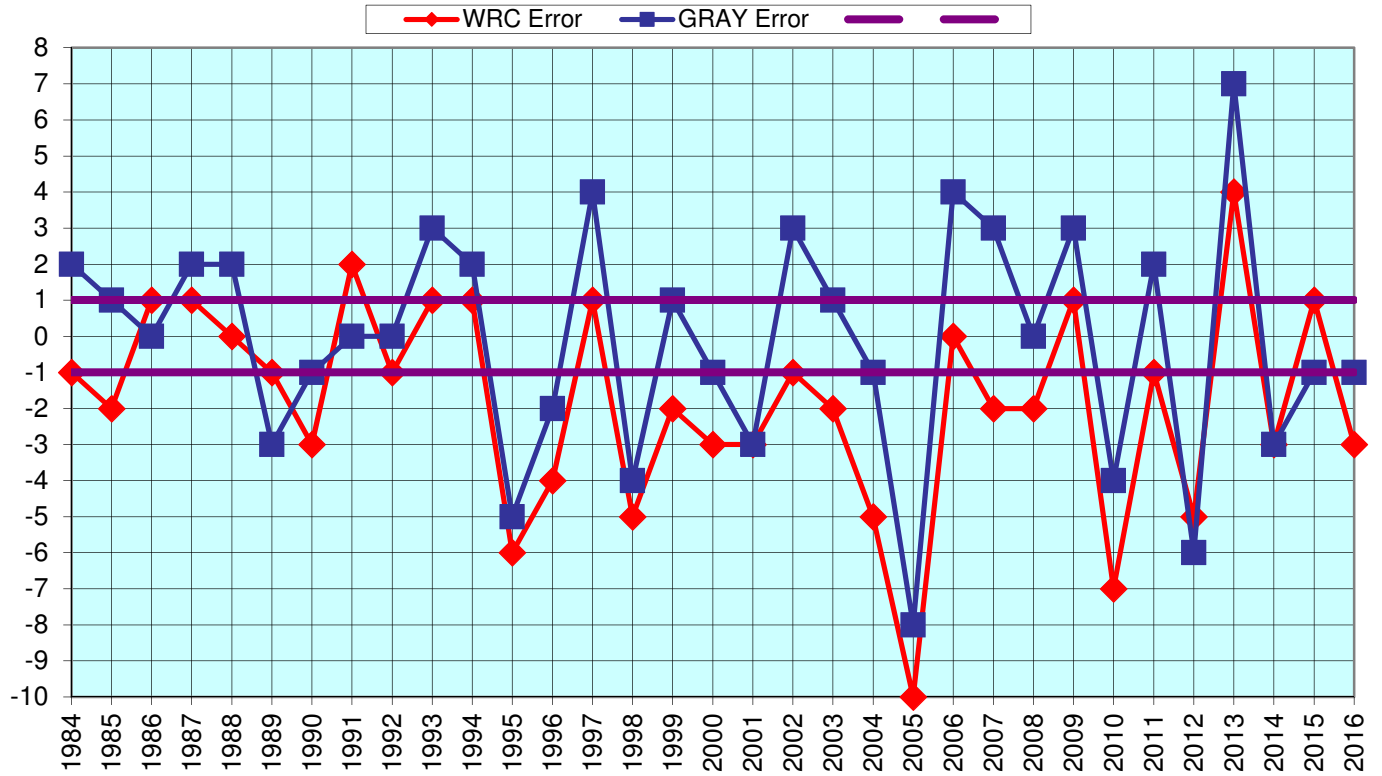


Figure 2: : Difference plus or minus one between the number of actual hurricanes for WRC's and GRAY's Outlook.

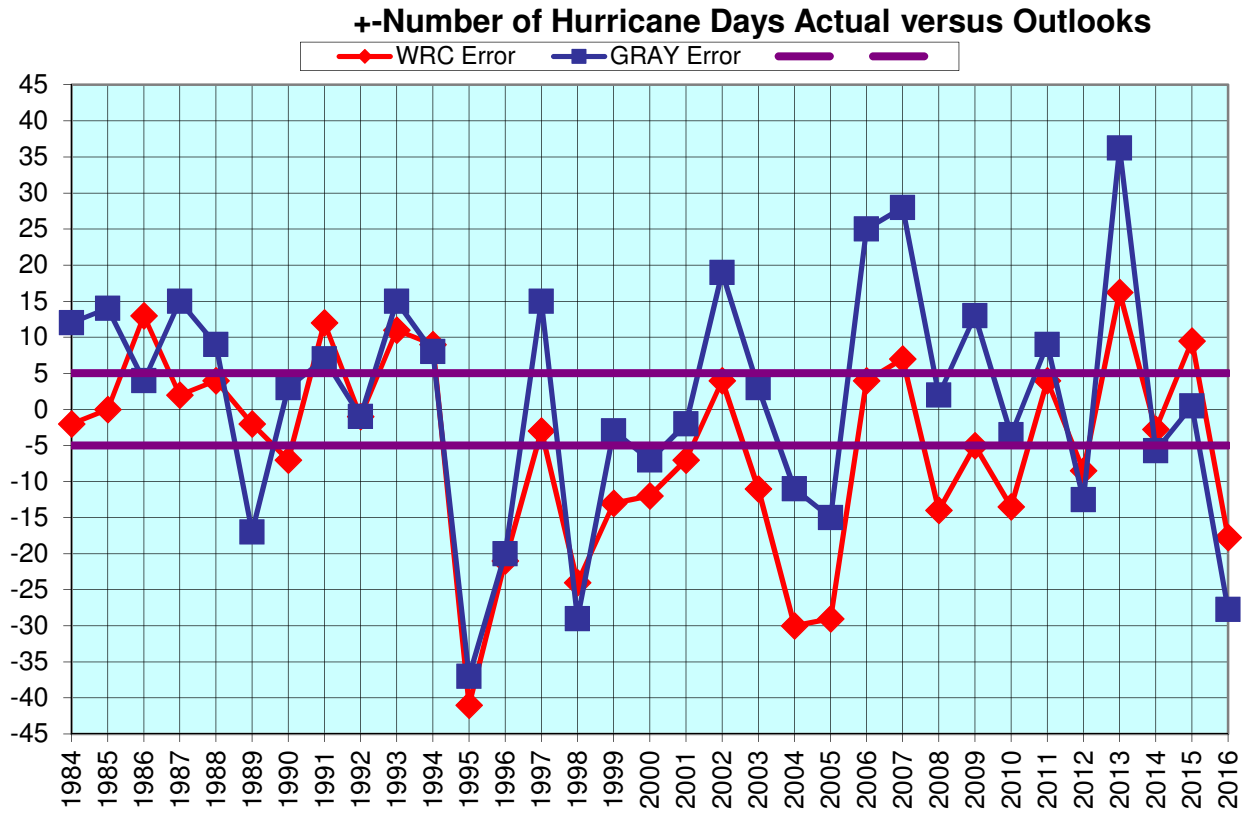


Figure 3: Difference plus or minus between the number of observed hurricane days, selected outlook

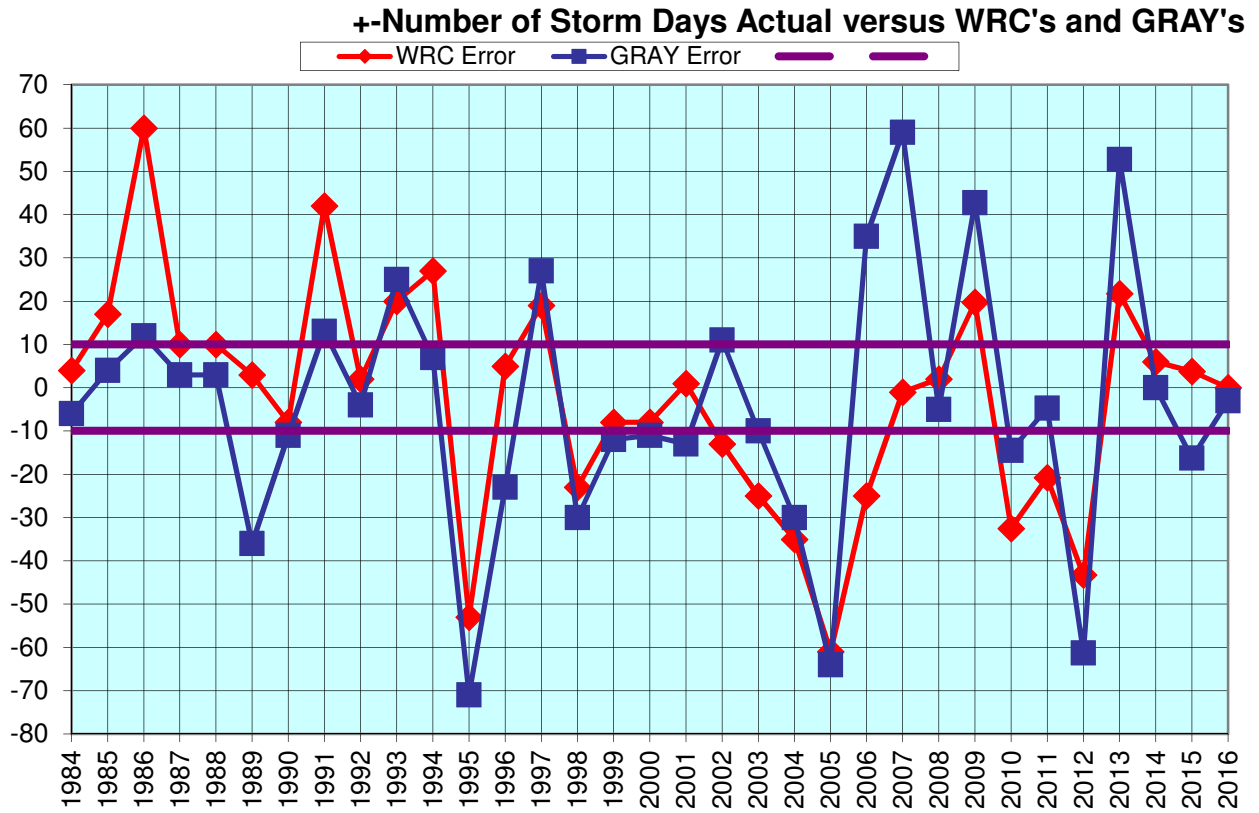


Figure 4: Difference plus or minus ten days between the number of actual tropical storm days and WRC's and GRAY's outlook

Table 1: Summary of Outlook Comparisons 1984 to 2016 [33 Years]

	WRC OUTLOOK	GRAY OUTLOOK	CLIMATOLOGY
Number of Named Storms in Atlantic within 1 storm	10 Years	9 Years	4 Years
Number of Hurricanes in Atlantic within 1 storm	14 Years	12 Years	9 Years
Number of Named Hurricane Days in Atlantic within 5 days	12 Years	11 Years	7 Years
Number of Tropical Storm Days in Atlantic within 10 Days	14 Years	12 Years	7 Years

In 2000, NOAA started making Annual Atlantic Hurricane Outlooks. Also at that time with better observing techniques, it seems that the number of observed storms increased. So the decision was made to increase the total number of named tropical storms by 3 storms each year and the number of hurricanes by one after 2000. This would change the numbers for the WRC's CSI outlook by the following, see Table 2.

Table 2: Corrected WRC Outlook to Increase Named Storms and Hurricanes after 1999

	WRC OUTLOOK	GRAY OUTLOOK
Number of Named Storms in Atlantic within 1 storm	13 Years	9 Years
Number of Hurricanes in Atlantic within 1 storm	15 Years	12 Years

WRC's Outlook was developed to predict which section of the United States coast line had the highest risk of experiencing a landfall of a tropical storm or hurricane each year. Below is the outlook from 2017 to 2039. When using this outlook, remember that it states which section of the coast has the highest risk, each year each section of the coast has a risk of experiencing landfall of a tropical cyclone.

Year	Coast	No. of Cyclones	No, Hurricanes	Hurricane Days	Tropical Storm Days
2017	Texas 70% W. Florida 70%	13	6	25	73
2018	Louisiana to Alabama 75%	13	5	14	30
2019	Louisiana to Alabama 75%	13	5	14	30
2020	Georgia to N. Carolina 90%	14	6	28	88
2021	Louisiana to Alabama 70%	10	5	11	52
2022	W. Florida 90%	11	6	29	62
2023	Louisiana to Alabama 90% W. Florida 90%	13	7	34	74
2024	Georgia to N. Carolina 60% Louisiana to Alabama 60% W. Florida 60%	11	6	24	63
2025	Louisiana to Alabama 70% W. Florida 70%	12	7	24	69
2026	W. Florida 80%	9	4	19	46
2027	NE Coast 70% Georgia to N. Carolina 70%	10	6	25	55
2028	W. Florida 70%	10	5	20	60
2029	Texas 70% W. Florida 70%	13	6	25	73
2030	Georgia to N. Carolina 90%	14	6	28	88
2031	Louisiana to Alabama 70%	10	5	11	52
2032	W. Florida 90%	11	6	29	62
2033	Louisiana to Alabama 90% W. Florida 90%	13	7	34	74
2034	Georgia to N. Carolina 60% Louisiana to Alabama 60% W. Florida 60%	11	6	24	63
2035	Louisiana to Alabama 70% W. Florida 70%	12	7	24	69
2036	W. Florida 80%	9	4	19	46
2037	NE Coast 70% Georgia to N. Carolina 70%	10	6	25	55
2038	W. Florida 70%	10	5	20	60
2039	Texas 70% W. Florida 70%	13	6	25	73