

NOAA Technical Memorandum NWS TPC 2

TROPICAL CYCLONE INTENSITY CLIMATOLOGY OF THE
NORTH ATLANTIC OCEAN, CARIBBEAN SEA, AND GULF OF MEXICO

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UNITED STATES
DEPARTMENT OF COMMERCE
William M. Daley, Secretary

National Oceanic and Atmospheric Administration
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National Weather Service
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PREFACE

This Technical Memorandum is Part 1 of a two part paper.

Part 1 takes the Atlantic Tropical Cyclone "Best-track"¹ Data File (BTDF) (1996), also known as the HURDAT (HURricane DATA file, Jarvinen et al., 1988) and uses the six-hourly data together with an extended version of the Saffir-Simpson Hurricane Scale (SSHS) (Simpson, 1974) to develop a ready reference for the maximum intensity of all tropical cyclones during the period 1886-1996.

Part 2 will make an attempt to document and correct some of the known deficiencies in the earlier (pre-1960) cases, and will contain a discussion expanding on the limitations of the wind speeds in the data set as given in Neumann et al. (1993) and Jarvinen et al. (1988).

¹ "Best-track" refers to tropical cyclone tracks as determined by the National Oceanic and Atmospheric Administration/National Weather Service/Tropical Prediction Center in post-analysis, in contrast to operational working tracks. Data not available in real-time may result in modifications to both track location and wind estimates prior to recording in this archive.

PART I

INTRODUCTION. The tropical cyclone charts for individual years as given in Neumann, et al. (1993) distinguish between tropical storm and hurricane intensity for the years 1886-1992 (and subtropical storms from 1967 on), but give no indication of the strength of the tropical storms or hurricanes. On the other hand, the Atlantic Tropical Cyclone Best-track Data File (BTDF) upon which the track charts are based, gives six-hourly positions and winds for the life of the storm. There is no ready reference which gives the intensity of each storm each year without having to consult a data printout or computer display, a resource which many people do not have.

The objective of this work is to develop a ready reference for the maximum intensity of all tropical cyclones during the period 1886-1996, not just landfalling United States hurricanes, as given in Jarrell, et al. (1992).

This has been done by using the BTDF file, updated through 1996, together with additional classifications of weak and strong tropical storms using an extended Saffir-Simpson Scale.

The result is a series of tables and figures presenting the data by years, months, regions, etc.

DATA SET. The BTDF is updated annually by the NOAA/NWS/Tropical Prediction Center. Many of the limitations of this data set are discussed in Jarvinen et al. (1988) and Neumann et al. (1993).

Of interest here are the wind speeds, and not the track locations. Among the limitations in wind speeds are estimates of tropical cyclone strength based upon satellite classification alone, and sparse data in the years prior to aerial reconnaissance. Other limitations are the various methods of measuring or estimating the sustained surface wind speed, such as different types of instrumentation over land, wind estimation from the state of the sea by observers aboard ships (and reconnaissance aircraft), and estimating surface winds from aerial reconnaissance data.

Part 2 of this Technical Memorandum will discuss some of these limitations in further detail when addressing specific storms or years in the record. The data presented in the tables and figures of Part 1 have taken the data, as is, without any attempt to correct some known deficiencies. It is believed that the overall climatology will not be significantly affected by any changes proposed in Part 2, although some individual storms/hurricanes might have a significant change.

PROCEDURE. The BTDF was examined for every year from 1886-1996. Each storm of each year was given a category based upon the SSHS. Table 1 shows the extended scale. For the extension, the authors have arbitrarily assigned a scale index number of minus one for a tropical storm with winds of less than 50 knots and zero for a tropical storm with winds of 50 knots or more. This was done in order to distinguish between weak (category minus one) and strong (category zero) tropical storms. Also note that 50 knots is currently used by the National Weather Service as the threshold for damaging winds.

Thus, tropical storms and hurricanes of all categories can be easily summarized as indicated earlier. For subtropical storms which never made the transition to tropical storm or hurricane, the index or category number was assigned in the same way, based upon the maximum sustained wind.

Recognizing the continuing uncertainties in the determination of the standard 33-foot (10-meters) wind above the surface, maximum sustained winds near the center of a tropical cyclone are estimated operationally in 5-kt increments. Refined after-the-fact estimates, as recorded in the BTDF, are also given in 5-kt increments. In the issuance of public advisories, however, these winds are first converted to miles-per-hour, then rounded to the nearest 5-mph. It is only in the case of 115-kt where this second rounding places the hurricane in a different category. Thus, 115 knots becomes 132.34 mph, which rounds down to 130 mph. According to Table 1, 115 kt is a category 4 hurricane, while 130 mph is a category 3 hurricane. In the present work, the BTDF wind estimates in knots are used in the assignment of category, without further rounding. Thus, a 115 kt hurricane is tabulated as a category 4 hurricane. This is noted here to aid future work, in which an apparent discrepancy might be noted with archived public advisories.

Therefore, the threshold wind speeds used in this study to assign Saffir/Simpson hurricane categories were: category 1 - 65 knots, category 2 - 85 knots, category 3 - 100 knots, category 4 - 115 knots, and category 5 - 140 knots.

Others using the BTDF and Hurricane Risk programs (Neumann, 1987), may choose to present the data in other ways. For example, Steven Wallace (1997) has classified tropical storms as a category zero and tropical depressions as a minus one in a different extended version of the SSHS, using the BTDF.

TABULATION. Table 2 shows the categorization of numbered storms/hurricanes in the Neumann et al. (1993) track book by the extended SSHS. This table is most useful for determining the maximum strength of any storm/hurricane in any given year.

Table 1. Extended Saffir/Simpson Hurricane Scale (winds only) used to categorize tropical cyclones in the Atlantic Best-Track Data File (BTDF).

EXTENDED SAFFIR/SIMPSON INTENSITY CATEGORIES				
CATEGORY	WIND SPEED			
	MILES PER HOUR		KNOTS	
-1	39	54	34	47
0	55	73	48	63
1	74	95	64	83
2	96	- 110	84	96
3	111	- 130	97	- 113
4	131	- 155	114	- 135
5		> 155		> 135

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Table 2. Numbered storms/hurricanes in Neumann et al. (1993) updated through 1996, categorized by the extended Saffir/Simpson scale.

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1996	-1	3	1	1	4	3	-1	4	3	0	-1	3	1								
1995	1	0	0	-1	1	4	0	2	2	-1	-1	4	3	1	4	0	3	0	1		
1994	0	0	1	0	0	2	1														
1993	-1	0	-1	-1	3	1	2	1													
1992	-1	4	2	2	0	0	1														
1991	-1	3	4	-1	0	-1	2	1													
1990	0	1	-1	2	-1	-1	3	0	2	1	1	1	0	1							
1989	-1	-1	1	2	2	1	4	5	0	1	0										
1988	-1	-1	-1	1	0	0	1	5	4	-1	4	0									
1987	-1	1	-1	-1	-1	3	1														
1986	-1	1	1	0	2	1															
1985	0	1	1	1	3	0	4	0	0	1	3										
1984	0	-1	-1	0	4	0	0	-1	1	0	2	1	1								
1983	3	1	1	0																	
1982	1	0	0	0	4	0															
1981	0	0	0	1	1	3	2	4	3	-1	1	0									
1980	5	2	1	0	1	3	1	0	2	2	1										
1979	0	1	-1	5	-1	4	2	1	1												
1978	-1	-1	-1	1	0	4	2	4	0	-1	-1	1									
1977	5	1	1	1	1	0															
1976	-1	-1	3	1	-1	2	3	-1	2	1											
1975	0	1	3	2	3	2	4	-1	0												
1974	0	-1	0	0	3	4	-1	0	2	1	-1										
1973	1	-1	1	0	0	3	1	0													
1972	0	1	2	0	1	0	-1														
1971	0	1	1	0	0	5	1	2	0	1	0	-1	0								
1970	1	0	3	0	0	3	0	-1	2	1											
1969	0	1	5	3	0	3	3	1	3	1	0	0	-1	2	2	0	1	1			
1968	1	1	0	1	0	1	0	1													
1967	1	5	2	1	0	1	-1	1													
1966	3	1	1	1	-1	3	0	-1	4	-1	1										
1965	-1	1	4	2	-1	1															
1964	0	-1	0	-1	4	4	3	-1	4	4	3	-1									
1963	2	3	0	1	1	2	4	2	-1												
1962	2	-1	0	2	3																
1961	3	4	5	3	4	-1	3	0	5	1	0										
1960	-1	2	0	1	5	5	-1														
1959	0	0	1	1	1	0	1	4	3	0	1										
1958	-1	0	5	3	3	1	0	4	4	1											
1957	0	4	0	4	-1	-1	1	0													
1956	0	1	3	-1	0	0	1	4													
1955	0	4	3	2	-1	2	1	3	3	5	0	3									
1954	1	-1	2	2	3	1	0	2	4	-1	1										
1953	0	2	0	4	3	3	0	3	1	-1	0	0	-1	-1							
1952	-1	2	3	3	1	2	4														
1951	3	0	4	3	5	3	0	2	1												
1950	4	3	3	5	3	4	2	0	2	3	3	0	1								

Table 2. Continued

1949	2	4	-1	3	-1	-1	0	2	1	4	2	0	0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										</
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Table 2. Continued

1899	1	3	3	3	-1	2											
1898	1	2	2	0	0	0	2	0	0								
1897	2	2	-1	-1	0												
1896	2	3	2	3	2	2											
1895	0	2	0	0	3	-1											
1894	0	2	3	3	2	2											
1893	2	2	3	2	2	3	2	2	3	2	0	0					
1892	-1	2	2	0	2	0	2	0	-1								
1891	2	2	2	2	2	2	-1	-1	2	2	0						
1890	2																
1889	2	-1	2	2	2	2	0	0	0								
1888	2	0	2	2	0	0	2	0	2								
1887	0	2	0	3	3	2	2	2	0	0	2	2	0	-1	2	2	0
1886	0	2	2	2	2	2	2	2	2	0							

Table 3 shows the sums of tropical storms and hurricanes of various strength categories for each year using the extended SSHS (Table 1). A major hurricane is here defined as a category 3, 4 or 5 on this scale. This table is probably most useful for obtaining the maximum and minimum number of any category and/or the rank of any category by year from maximum to minimum or vice-versa.

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Table 3. Sums of tropical storms (T) and hurricanes (H) of various strength categories using the extended Saffir/Simpson scale.

YEAR	-1	0	1	2	3	4	5	ALL (T+H)	T	H	MH (MAJOR)
1996	3	1	3		4	2		13	4	9	6
1995	3	5	4	2	2	3		19	8	11	5
1994		4	2	1				7	4	3	0
1993	3	1	2	1	1			8	4	4	1
1992	1	2	1	2		1		7	3	4	1
1991	3	1	1	1	1	1		8	4	4	2
1990	3	3	5	2	1			14	6	8	1
1989	2	2	3	2		1	1	11	4	7	2
1988	4	3	2			2	1	12	7	5	3
1987	4		2		1			7	4	3	1
1986	1	1	3	1				6	2	4	0
1985		4	4		2	1		11	4	7	3
1984	3	5	3	1		1		13	8	5	1
1983		1	2		1			4	1	3	1
1982		4	1			1		6	4	2	1
1981	1	4	3	1	2	1		12	5	7	3
1980		2	4	3	1		1	11	2	9	2
1979	2	1	3	1		1	1	9	3	6	2
1978	5	2	2	1		2		12	7	5	2
1977		1	4				1	6	1	5	1
1976	4		2	2	2			10	4	6	2
1975	1	2	1	2	2	1		9	3	6	3
1974	3	4	1	1	1	1		11	7	4	2
1973	1	3	3		1			8	4	4	1
1972	1	3	2	1				7	4	3	0
1971	1	6	4	1			1	13	7	6	1
1970	1	4	2	1	2			10	5	5	2
1969	1	5	5	2	4		1	18	6	12	5
1968		3	5					8	3	5	0
1967	1	1	4	1			1	8	2	6	1
1966	3	1	4		2	1		11	4	7	3
1965	2		2	1		1		6	2	4	1
1964	4	2			2	4		12	6	6	6
1963	1	1	2	3	1	1		9	2	7	2
1962	1	1		2	1			5	2	3	1
1961	1	2	1		3	2	2	11	3	8	7
1960	2	1	1	1			2	7	3	4	2
1959		4	5		1	1		11	4	7	2
1958	1	2	2		2	2	1	10	3	7	5
1957	2	3	1			2		8	5	3	2
1956	1	3	2		1	1		8	4	4	2
1955	1	2	1	2	4	1	1	12	3	9	6
1954	2	1	3	3	1	1		11	3	8	2
1953	3	5	1	1	3	1		14	8	6	4
1952	1		1	2	2	1		7	1	6	3
1951		2	2	1	3	1	1	10	2	8	5
1950		2	1	2	5	2	1	13	2	11	8

Tabl Continued

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Table 3. Continued

1899	1		1	1	3		6	1	5	3
1898		5	1	3			9			
1897	2	1		2			5	5	4	0
1896				4	2		6	3	2	0
1895	1	3		1	1		6	0	6	2
1894		1		3	2		6	4	2	1
1893		2		7	3		6	1	5	2
1892	2	3		4			12	2	10	3
1891	2	1		8			9	5	4	0
1890				1			11	3	8	0
1889	1	3		5			1	0	1	0
1888		4		5			9	4	5	0
1887	1	6		8	2		9	4	5	0
1886		2		8			17	7	10	2
							10	2	8	0

One example of information from this table is that the year 1955 is the only year thus far to have had at least one occurrence of each category (at maximum intensity) from minus one to category five. The active year of 1955 had one weak (-1) tropical storm, two strong (0) tropical storms, one category 1 hurricane, two category 2 hurricanes, four category 3 hurricanes, one category 4 hurricane, and one category 5 hurricane. The total of twelve named storms included nine hurricanes of which six were major hurricanes.

Figure 1 gives a graphical depiction of this information for named systems, hurricanes, and major (category 3 or greater) hurricanes.

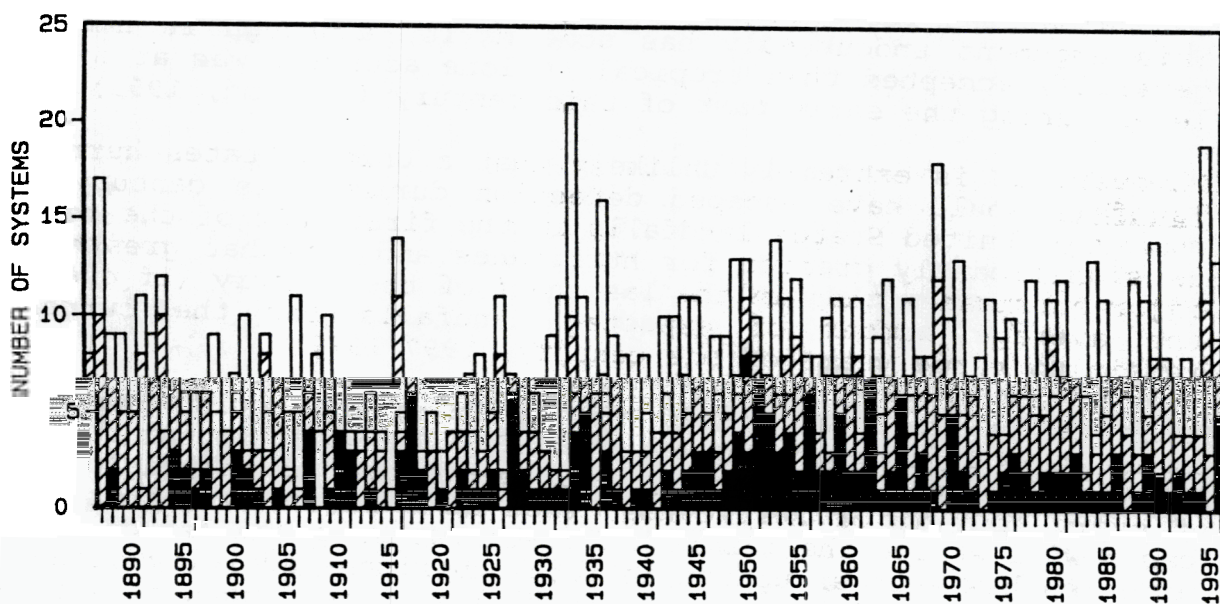


Figure 1. Bars depict number of named systems (open), hurricanes (hatched), and hurricanes category 3 or greater (solid), 1886-1996.

Also of interest are the interdecadal changes in the frequency of tropical storms and hurricanes. Table 4 gives decadal totals for each category, as well as for tropical storms, hurricanes, and major hurricanes.

It is frequently asked whether or not the total tropical cyclone activity in the North Atlantic basin has any relationship to the number of landfalls along the mainland United States coastline.

This question is addressed in Table 5, which gives a comparison of the decadal totals of hurricanes and major hurricanes for the entire North Atlantic basin, with subtotals for U.S. landfalls (landfall subtotals after Table 5, Hebert et al., 1997). It is interesting to note that the maximum number of landfalling United States hurricanes given in Table 5 (bolded) occurs in the decade of the forties, but when hurricane activity for the entire North Atlantic basin is considered, there are many more hurricanes in the decade of the fifties. The total number of major hurricanes for the entire basin is also much higher in the decade of the fifties. The number of major hurricanes making U.S. landfall also reaches a maximum during this decade.

What is particularly striking is the percentage of the total number of hurricanes and major hurricanes to strike the United States in the first fifty years of this century versus the ensuing forty-seven years. In the first fifty years (Table 5, bottom) the percent of both hurricanes and major hurricanes which formed in the North Atlantic basin and then struck the United States was slightly above 40%. In the following forty-seven years, the percent of both was 25%.

It can be argued that detection was poorer prior to 1950. Even though aerial reconnaissance was available in the forties, communications restrictions during World War II were in effect. This argument undoubtedly has some merit, although it has been generally accepted that tropical cyclone activity was at a lower level during the early part of this century (Neumann, 1993).

However, it is extremely unlikely that a United States hurricane landfall would have escaped detection during this century. The number of United States landfalls in the first half of the century is significantly greater for hurricanes and somewhat greater for major hurricanes than in the last half of the century (if one uses the average number of expected landfalls for the currently remaining three years of the century, 1997-1999).

Since it is far less likely that a hurricane would completely escape detection in the years since 1950, it would appear that: 1) An average of one out of every four hurricanes, as well as one out of every four major hurricanes, that form in the North Atlantic basin will strike the mainland United States! 2) The decade of the nineties has seen an upturn in total hurricane activity without a corresponding increase in U.S. landfalls. Depending upon activity during the remainder of the decade, this could result in the lowest number ever observed in any decade.

Table 4. Decadal totals of the number of tropical cyclones by category. Note that data for the 1880's and 1990's are not available for the full decade.

YEARS	-1	0	1	2	3	4	5	ALL (T+H)	T	H	MH (MAJOR)
1990-96	16	17	18	9	9	7	0	76	33	43	16
1980-89	15	26	27	8	7	7	3	93	41	52	17
1970-79	19	26	24	10	8	5	3	95	45	50	16
1960-69	16	17	24	10	13	9	6	95	33	62	28
1950-59	11	24	19	11	22	13	4	104	35	69	39
1940-49	27	16	16	13	11	9	1	93	43	50	21
1930-39	39	12	15	15	8	6	3	98	51	47	17
1920-29	14	6	9	13	7	8	1	58	20	38	16
1910-19	10	5	6	12	12	4		49	15	34	16
1900-09	23	16	4	18	6	7		74	39	35	13
1890-99	8	16	2	34	11			71	24	47	11
1886-89	2	15		26	2			45	17	28	2

Table 5. Decadal totals of the number of hurricanes and major hurricanes in the North Atlantic basin versus those which made landfall in the United States. Note that data for the 1990's are not available for the full decade.

YEARS	HURRICANES			MAJOR HURRICANES		
	ATLANTIC	U.S.	% ATLC.	ATLANTIC	U.S.	% ATLC.
1990-96	43	7	16	16	4	25
1980-89	52	16	31	17	6	35
1970-79	50	12	24	16	4	25
1960-69	62	15	24	28	6	21
1950-59	69	18	26	39	9	23
1940-49	50	23	46	21	8	38
1930-39	47	17	36	17	8	47
1920-29	38	15	39	16	5	31
1910-19	34	19	56	16	8	50
1900-09	35	16	46	13	6	46
1900-49	204	90	44	83	35	42
1950-96	276	68	25	116	29	25

Table 6 depicts the same information as Table 4, but broken down for the periods 1886-1899, 1900-1949, 1950-1996, and the entire period of record, 1886-1996. Of course, the data in Tables 2 and 3 from which these totals are derived can be used to stratify or sort tropical cyclone activity any way one chooses.

Table 6. Same as Table 4, but broken down for the periods 1886-1899, 1900-1949, 1950-1996, and the entire period of record, 1886-1996.

YEARS	-1	0	1	2	3	4	5	ALL (T+H)	T	H	MH (MAJOR)
1886-99	10	31	2	60	13	0	0	116	41	75	13
1900-49	113	55	50	71	44	34	5	372	168	204	83
1950-96	77	110	112	48	59	41	16	463	187	276	116
1900 -1996	190	165	162	119	103	75	21	835	355	480	199
1886 -1996	200	196	164	179	116	75	21	951	396	555	212

Another question of interest is: Which are the most intense hurricane(s) of record? Table 7 ranks all major hurricanes based upon the maximum sustained wind given in the BTDF. Together with the track book and/or the BTDF, the most intense hurricanes for various parts of the North Atlantic, Caribbean Sea, and Gulf of Mexico can be found.

Based upon the BTDF, only eight hurricanes have had sustained winds of 150 knots or more, with Hurricanes Camille in 1969 and Allen in 1980 the strongest at 165 knots. Fortunately, only eight of the twenty-one category five hurricanes struck any land mass with only two of them striking the United States mainland (H. Camille, 1969, and the Labor Day Hurricane of 1935). Atlantic category 5 hurricanes are also listed chronologically and discussed in Rappaport and McAdie (1991).

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year	no.	—	kts	category 3	category 4	category 5
1980	1	HU	185			GAMILE
1950	4	HU	180			ALLEN
1988	8	HU	180			DOG
1955	10	HU	150			GILBER
1981	3	HU	150			JANE
1977	1	HU	150			C
1979	4	HU	150			A
1928	4	HU	140			D
1932	4	HU	140			NOT
1935	2	HU	140			NOT
1938	4	HU	140			NOT
1947	4	HU	140			NOT
1951	5	HU	140			NOT
1955	3	HU	140			E
1980	5	HU	140			LEO
1980	6	HU	140			ONNA
1981	9	HU	140			THEL
1967	2	HU	140			ATTIE
1971	6	HU	140			ULAH
1989	8	HU	140			DITH
1957	4	HU	135			UGO
1964	5	HU	135			CARRIE
1965	3	HU	135			CLEO
1992	2	HU	135			BETSY
1912	6	HU	130			ANDREW
1922	2	HU	130			NOT NAMED
1926	6	HU	130			NOT NAMED
1930	2	HU	130			NOT NAMED
1933	18	HU	130			NOT NAMED
1949	2	HU	130			NOT NAMED
1952	7	HU	130			FOX
1953	4	HU	130			CAROL
1964	10	HU	130			HILDA
1966	9	HU	130			INEZ
1974	6	HU	130			CARMEN
1995	12	HU	130			LUIS
1995	15	HU	130			OPAL
1906	4	HU	125			NOT NAMED
1906	5	HU	125			NOT NAMED
1932	2	HU	125			NOT NAMED
1955	2	HU	125			CONNIE
1957	2	HU	125			AUDREY
1961	5	HU	125			ESTHER
1963	7	HU	125			FLORA
1964	9	HU	125			GLADYS
1985	7	HU	125			GLORIA
1988	9	HU	125			HELENE
1988	11	HU	125			JOAN
1989	7	HU	125			GABRIELLE
1996	5	HU	125			EDOUARD
1909	3	HU	120			NOT NAMED
1909	7	HU	120			NOT NAMED
1915	2	HU	120			NOT NAMED
1919	2	HU	120			NOT NAMED

year	no.	—	kts	category 3	category 4	category 5
1921	6	HU	120			NOT NAMED
1926	1	HU	120			NOT NAMED
1926	4	HU	120			NOT NAMED
1929	2	HU	120			NOT NAMED
1933	12	HU	120			NOT NAMED
1943	3	HU	120			NOT NAMED
1944	7	HU	120			NOT NAMED
1945	5	HU	120			NOT NAMED
1945	9	HU	120			NOT NAMED
1950	1	HU	120			ABLE
1950	6	HU	120			FOX
1954	9	HU	120			HAZEL
1956	8	HU	120			GRETA
1959	8	HU	120			GRACIE
1961	2	HU	120			BETSY
1975	7	HU	120			GLADYS
1978	6	HU	120			ELLA
1995	6	HU	120			FELIX
1996	8	HU	120			HORTENSE
1900	1	HU	115			NOT NAMED
1906	3	HU	115			NOT NAMED
1906	8	HU	115			NOT NAMED
1915	5	HU	115			NOT NAMED
1924	2	HU	115			NOT NAMED
1926	10	HU	115			NOT NAMED
1932	10	HU	115			NOT NAMED
1939	4	HU	115			NOT NAMED
1946	5	HU	115			NOT NAMED
1948	6	HU	115			NOT NAMED
1948	8	HU	115			NOT NAMED
1949	10	HU	115			NOT NAMED
1951	3	HU	115			CHARLIE
1958	8	HU	115			HELENE
1958	9	HU	115			ILSA
1964	6	HU	115			DORA
1978	8	HU	115			GRETA
1979	6	HU	115			FREDERIC
1981	8	HU	115			HARVEY
1982	5	HU	115			DEBBY
1984	5	HU	115			DIANA
1991	3	HU	115			CLAUDETTE
1916	4	HU	110			NOT NAMED
1931	5	HU	110			NOT NAMED
1933	11	HU	110			NOT NAMED
1949	4	HU	110			NOT NAMED
19	5	HU	110			EASY
1953	6	HU	110			EDNA
1953	8	HU	110			FLORENCE
1955	8	HU	110			HILDA
1958	4	HU	110			DAISY
1959	9	HU	110			HANNAH
1961	7	HU	110			FRANCES
1964	11	HU	110			ISELL
1966	1	HU	110			ALMA
1966	6	HU	110			FAITH

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year	no.	—	kts	category 3	category 4	category 5
1969	7	HU	110	GERDA		
1970	3	HU	110	CELIA		
1970	6	HU	110	ELLA		
1975	5	HU	110	ELOISE		
1985	5	HU	110	ELENA		
1987	6	HU	110	EMILY		
1887	4	HU	105	NOT NAMED		
1887	5	HU	105	NOT NAMED		
1893	3	HU	105	NOT NAMED		
1893	6	HU	105	NOT NAMED		
1893	9	HU	105	NOT NAMED		
1894	3	HU	105	NOT NAMED		
1894	4	HU	105	NOT NAMED		
1895	5	HU	105	NOT NAMED		
1896	2	HU	105	NOT NAMED		
1896	4	HU	105	NOT NAMED		
1899	2	HU	105	NOT NAMED		
1899	3	HU	105	NOT NAMED		
1899	4	HU	105	NOT NAMED		
1900	4	HU	105	NOT NAMED		
1901	5	HU	105	NOT NAMED		
1903	2	HU	105	NOT NAMED		
1908	4	HU	105	NOT NAMED		
1909	5	HU	105	NOT NAMED		
1909	9	HU	105	NOT NAMED		
1910	2	HU	105	NOT NAMED		
1910	3	HU	105	NOT NAMED		
1910	4	HU	105	NOT NAMED		
1915	3	HU	105	NOT NAMED		
1916	1	HU	105	NOT NAMED		
1916	2	HU	105	NOT NAMED		
1916	10	HU	105	NOT NAMED		
1916	12	HU	105	NOT NAMED		
1916	13	HU	105	NOT NAMED		
1917	2	HU	105	NOT NAMED		
1917	3	HU	105	NOT NAMED		
1921	3	HU	105	NOT NAMED		
1923	—	HU	105	NOT NAMED		
1924	7	HU	105	NOT NAMED		
1926	2	HU	105	NOT NAMED		
1926	8	HU	105	NOT NAMED		
1927	1	HU	105	NOT NAMED		
1927	4	HU	105	NOT NAMED		
1932	7	HU	105	NOT NAMED		
1932	8	HU	105	NOT NAMED		
1933	13	HU	105	NOT NAMED		
1935	1	HU	105	NOT NAMED		
1935	4	HU	105	NOT NAMED		
1935	3	HU	105	NOT NAMED		
1935	4	HU	105	NOT NAMED		
1935	5	HU	105	NOT NAMED		
1935	4	HU	105	NOT NAMED		
1944	4	HU	105	NOT NAMED		
1944	11	HU	105	NOT NAMED		
1947	9	HU	105	NOT NAMED		

year	no.	—	kts	category 3	category 4	category 5
1948	3	HU	105	NOT NAMED		
1948	7	HU	105	NOT NAMED		
1950	2	HU	105	BAKER		
1950	10	HU	105	JIG		
1950	11	HU	105	KING		
1952	3	HU	105	BAKER		
1952	4	HU	105	CHARLIE		
1954	5	HU	105	EDNA		
1955	3	HU	105	DIANE		
1955	9	HU	105	IONE		
1956	3	HU	105	BETSY		
1961	4	HU	105	DEBBIE		
1963	2	HU	105	BEULAH		
1969	4	HU	105	DEBBIE		
1976	3	HU	105	BELLE		
1981	9	HU	105	IRENE		
1985	11	HU	105	KATE		
1990	7	HU	105	GUSTAV		
1996	6	HU	105	FRAN		
1942	2	HU	100	NOT NAMED		
1945	1	HU	100	NOT NAMED		
1950	3	HU	100	CHARLIE		
1951	1	HU	100	ABLE		
1951	4	HU	100	DOG		
1951	6	HU	100	FOX		
1953	5	HU	100	DOLLY		
1955	12	HU	100	KATIE		
1958	5	HU	100	ELLA		
1961	1	HU	100	ANNA		
1962	5	HU	100	ELLA		
1964	7	HU	100	ETHEL		
1969	6	HU	100	FRANCELIA		
1969	9	HU	100	INGA		
1973	6	HU	100	ELLEN		
1974	5	HU	100	BECKY		
1975	3	HU	100	CAROLINE		
1976	7	HU	100	FRANCES		
1980	6	HU	100	FRANCES		
1981	6	HU	100	FLOYD		
1983	1	HU	100	ALICIA		
1991	2	HU	100	BOB		
1993	5	HU	100	EMILY		
1995	13	HU	100	MARILYN		
1995	17	HU	100	ROXANNE		
1996	2	HU	100	BERTHA		
1996	9	HU	100	ISIDORE		
1996	12	HU	100	LILI		

The question of where hurricanes in the North Atlantic basin during the period 1900-1996 reached major hurricane status can be answered by examination of Figure 2. The North Atlantic basin has been divided into six sub-basins: 1) Gulf of Mexico (G), 2) Caribbean Sea (C), 3-6) Atlantic areas A-1, A-2, A-3, A-4. These latter four sub-basins were chosen based upon the prevailing origins and tracks given in the track book, as well as a recognition that atmospheric/oceanic factors which might contribute to reaching major hurricane status are different in those areas, as well as the Gulf of Mexico and Caribbean Sea.

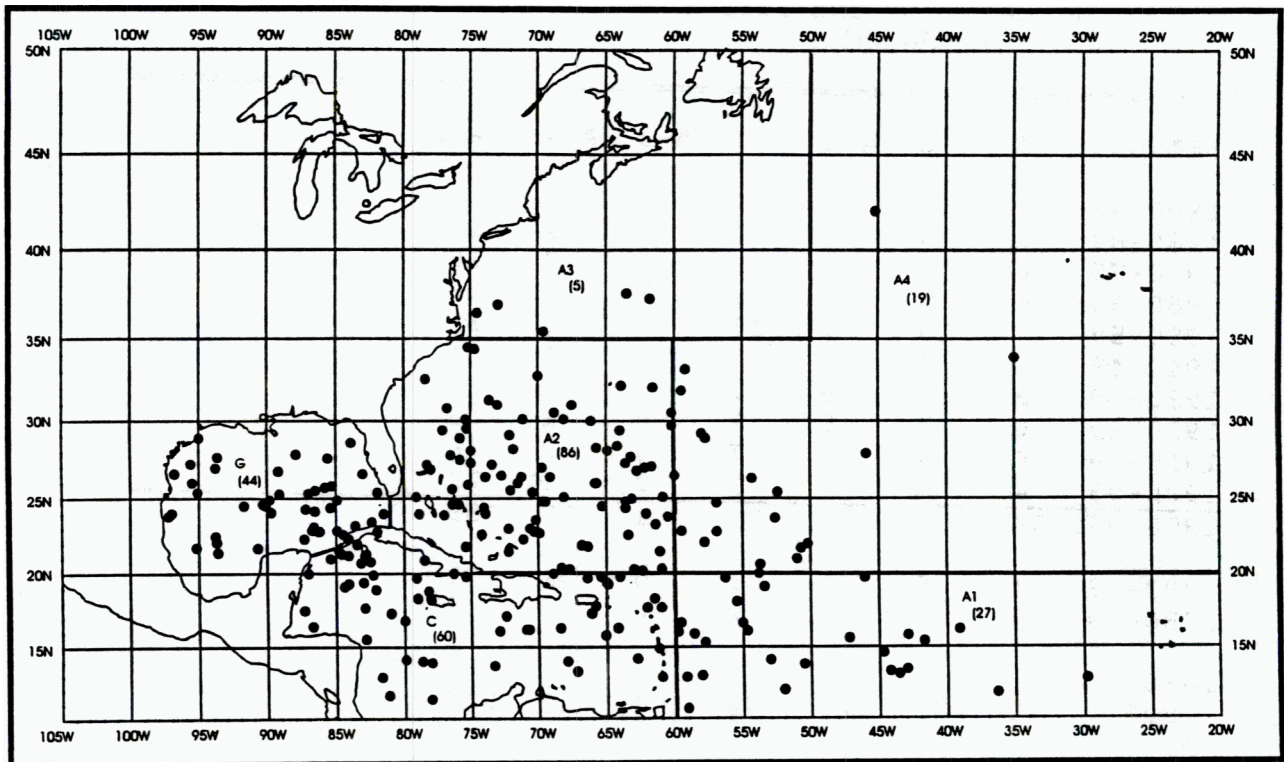


Figure 2. Solid circles indicate locations where hurricanes have attained sustained wind speeds of 100 kt, 1886-1996, as given in the Atlantic best-track file. If winds subsequently fall below, and again reach 100 kt, that position is also shown.

It is left to other studies to explore any physical relationships, but Figure 2 shows that a hurricane can reach major hurricane intensity almost anywhere in the North Atlantic basin when conditions are favorable.

The number of hurricanes reaching major hurricane intensity in each sub-basin is further stratified by decade in Table 8. Decadal variation is again evident. Note that the totals in Table 8 record only the first occurrence of 100 kt winds, or greater, and do not include subsequent re-intensification as shown in Fig. 2, thus accounting for the smaller sub-basin totals shown in the table. The noticeable lack of tropical cyclones reaching major hurricane intensity east of longitude 60 degrees West (A-1 and A-4) prior to 1950 certainly suggests an observational deficiency in those areas.

Table 8. Number of hurricanes to reach major hurricane intensity in each sub-basin shown in Figure 2, by decade. Note that data for the 1880's and 1990's are not available for the full decade.

YEARS	G	C	A-1	A-2	A-3	A-4	ALL
1990-96	1	2	3	7	1	2	16
1980-89	3	3	5	4	1	1	17
1970-79	6	3	1	3	1	2	16
1960-69	6	5	5	7	1	4	28
1950-59	3	10	6	15	0	5	39
1940-49	4	6	1	9	0	1	21
1930-39	3	6	1	7	0	0	17
1920-29	0	5	1	9	0	1	16
1910-19	4	5	0	7	0	0	16
1900-09	4	5	0	3	0	1	13
1890-99	1	5	1	3	0	1	11
1886-89	0	0	0	2	0	0	2
1886-							
1996	35	55	24	76	4	18	212

G = Gulf of Mexico

C = Caribbean Sea

A-1, A-2, A-3, A-4 Atlantic sub-basins

The next three tables - Tables 9, 10, and 11 - are adapted from Hebert et al. (1997), but are here expanded to include major hurricanes. Table 10 in this document, however, excludes U.S. landfalls as it did in Hebert et al. (1997).

Average number of occurrences is given in Table 9. Note that the frequently used average of two major hurricanes per year is quite valid, although the average for the past 50 years has been slightly higher, possibly because of aerial reconnaissance and satellite coverage.

Table 9. Average number of tropical cyclones which reached storm, hurricane, and major hurricane strength for various periods. Adapted from Hebert et al. (1997).

PERIOD	Number of years	AVERAGE NUMBER		
		Tropical Cyclones	Hurricanes	Major Hurricanes
1886-1996	111	8.6	5.0	1.9
1947-1996	50	9.9	5.9	2.5
1957-1996	40	9.7	5.6	2.2
1967-1996	30	9.9	5.6	1.8
1977-1996	20	9.8	5.5	1.9
1982-1996	15	9.7	5.3	1.9
1987-1996	10	10.6	5.8	2.2

(Includes subtropical storms after 1967)

Monthly variation in tropical cyclone activity appears in Table 10. Note for example that over fifty percent of all major hurricanes occur during the month of September, and that one of every two hurricanes in September is a major hurricane. By contrast, about thirty percent of August and October hurricanes become major hurricanes.

Table 10. Tropical cyclones, hurricanes, and major hurricanes in the Atlantic, Caribbean, and Gulf of Mexico 1886-1996 by month of origin. Adapted from Hebert et al. (1997).

MONTH	TROPICAL CYCLONES ¹		HURRICANES		MAJOR HURRICANES	
	Total	Average	Total	Average	Total	Average
JANUARY-APRIL	4	*	1	*	0	0.00
MAY	14	0.1	3	*	1	*
JUNE	60	0.5	24	0.2	3	*
JULY	74	0.7	38	0.3	6	0.07
AUGUST	234	2.1	161	1.5	45	0.46
SEPTEMBER	318	2.9	201	1.8	109	1.12
OCTOBER	196	1.8	100	0.9	31	0.32
NOVEMBER	45	0.4	24	0.2	4	*
DECEMBER	6	0.1	3	*	0	0.00
YEAR	951	8.6	555	5.0	199	2.05

¹ Includes subtropical storms after 1967. See Neumann et al. (1993) for details.

Less than 0.05

Years of maximum and minimum tropical cyclone activity appear in Table 11. Years of minimum activity are stratified to account for the effect of routine aerial reconnaissance, which began in 1944. This table shows that the greatest number of major hurricanes in one year was eight in 1950. The second most active year was 1961, with seven. Seventy percent of the years with the most hurricanes also had the most major hurricanes. Of course, there are many more years with no major hurricanes than with no hurricanes, although the preponderance of years prior to 1960 strongly suggests a detection problem because of lack of aerial reconnaissance and satellite information.

Table 11. Years of maximum and minimum tropical cyclone, hurricane, and major hurricane activity in the North Atlantic, Caribbean, and Gulf of Mexico, 1886-1996. Adapted from Hebert et al. (1997).

MAXIMUM ACTIVITY (1886-1996)					
TROPICAL CYCLONES ¹		HURRICANES		MAJOR HURRICANES	
Number	Years	Number	Years	Number	Years
21	1933	12	1969	8	1950
19	1995	11	1916, 1950, 1995	7	1961
18	1969	10	1887, 1893, 1933	6	1916, 1926, 1955,
17	1887	9	1955, 1980, 1996		1964, 1996
					1933, 1951, 1958,
					1969, 1995
MINIMUM ACTIVITY (1886-1943)					
TROPICAL CYCLONES ¹		HURRICANES		MAJOR HURRICANES	
Number	Years	Number	Years	Number	Years
1	1890, 1914	0	1907, 1914	0	1886,
2	1925, 1930	1	1890, 1905, 1919		1888-1892,
			1925		1897-1898,
		2	1895, 1897, 1904		1902,
			1917, 1922, 1930,		1904-1905,
			1931		1907, 1911,
					1913-1914,
					1918, 1920,
					1925, 1934,
					1937, 1940,
MINIMUM ACTIVITY (1944-1996)					
TROPICAL CYCLONES ¹		HURRICANES		MAJOR HURRICANES	
Number	Years	Number	Years	Number	Years
		2	1982	0	1968, 1972,
					1986, 1994

Notes

Includes subtropical storms after 1967

Another frequently asked question is: Are there hurricane cycles? Figures 3 through 12 show the plotted tracks of all category 4 and 5 hurricanes by decade. The portion of the track associated with a best-track wind speed of category 4 (115 kt) or greater is shown in bold.

Close examination of these plots will reveal one of the recognized deficiencies of this data set. That is, the six-hourly data often does not adequately describe the wind at landfall. This is simply because the time of landfall does not necessarily occur at 0, 6, 12 or 18 UTC. Taking Hurricane Hugo as an example (see Fig. 11, track number 10) the bolded portion of the track does not intersect the coastline, although winds at the time of landfall are estimated to have been of category 4 intensity. In examining the BTDF for Hugo, the final position associated with winds of category 4 or greater occurs at 0 UTC (winds of 120 kt). The next position at 6 UTC is inland, with winds of 85 kt. The data file in its present 6-hourly form does not contain the time of landfall, which would allow a more accurate depiction at landfall. In pointing out problems of this nature, it should be kept in mind that the original purpose of the data set was primarily to support a broad statistical analysis of tropical cyclone characteristics over the entire basin.

Each plotted track in Figs 3-12 is keyed to a table entry, found in the upper-right of each figure. These entries give the hurricane name (after 1949), the maximum wind attained and the accompanying central pressure, if known. Multiple entries for one hurricane indicate (as do the bold portion of the tracks) that the hurricane achieved category 4 intensity, or greater, then fell below the 115-kt threshold, and subsequently regained category 4 intensity. In cases where the duration of the maximum wind spreads over more than 6 hours, and is accompanied by two or more different pressures in the BTDF, the lowest pressure is listed in the table. Also note that dates are consistent with UTC, so that a day begins at 0 UTC (7 PM EST in the United States), rather than local midnight.

While the clustering of the tracks and the portions of the tracks associated with winds of category 4 or higher (Figs 3-12) is not as compelling as the depiction of landfalling major hurricanes by decades in Hebert et al. (Figs 1-10) (1997), there is here a sense of an ebb and flow of the category 4 and 5 hurricanes in relation to the the number of major hurricanes which were making landfall in the Gulf of Mexico versus the Florida peninsula and the Atlantic coast.

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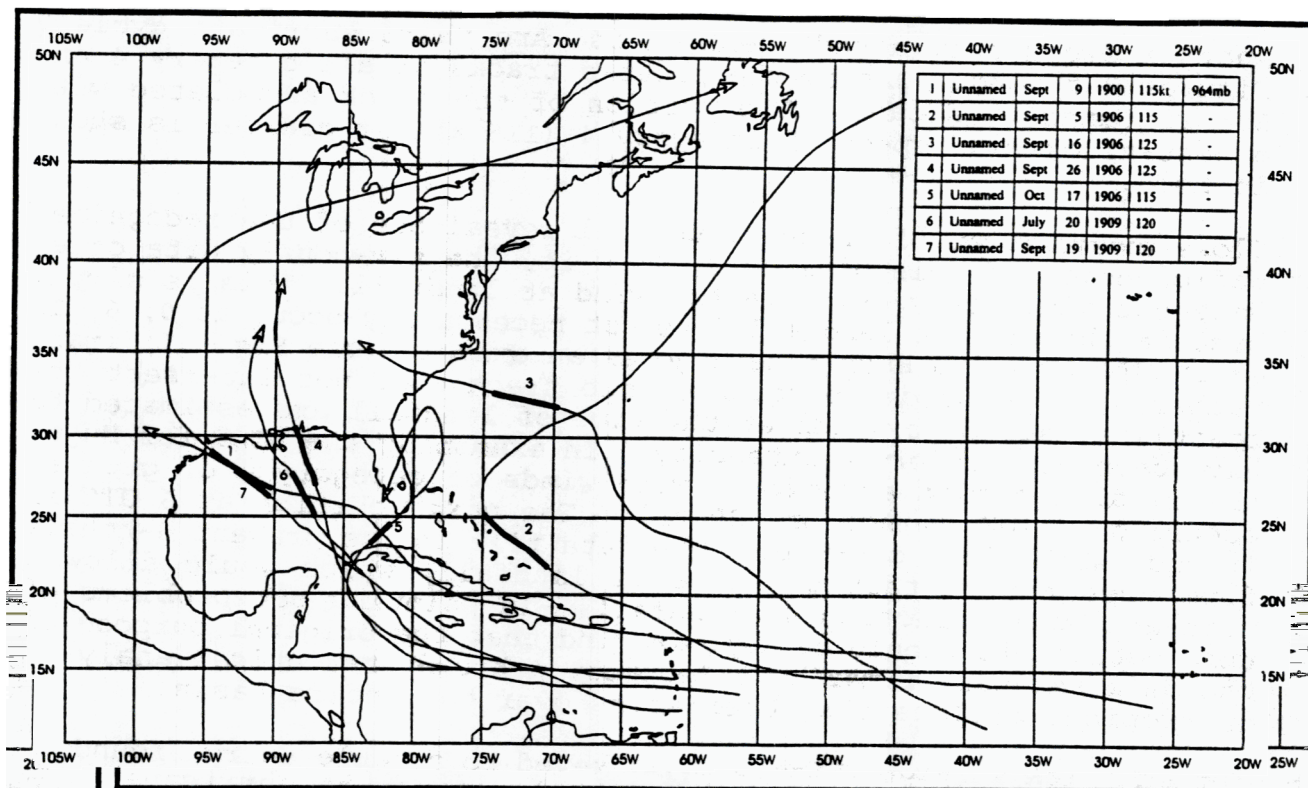


Figure 3. Hurricanes reaching at least category 4 intensity, 1900-1909. Bolded track segments indicate best-track wind speeds equal to or exceeding 115 kt.

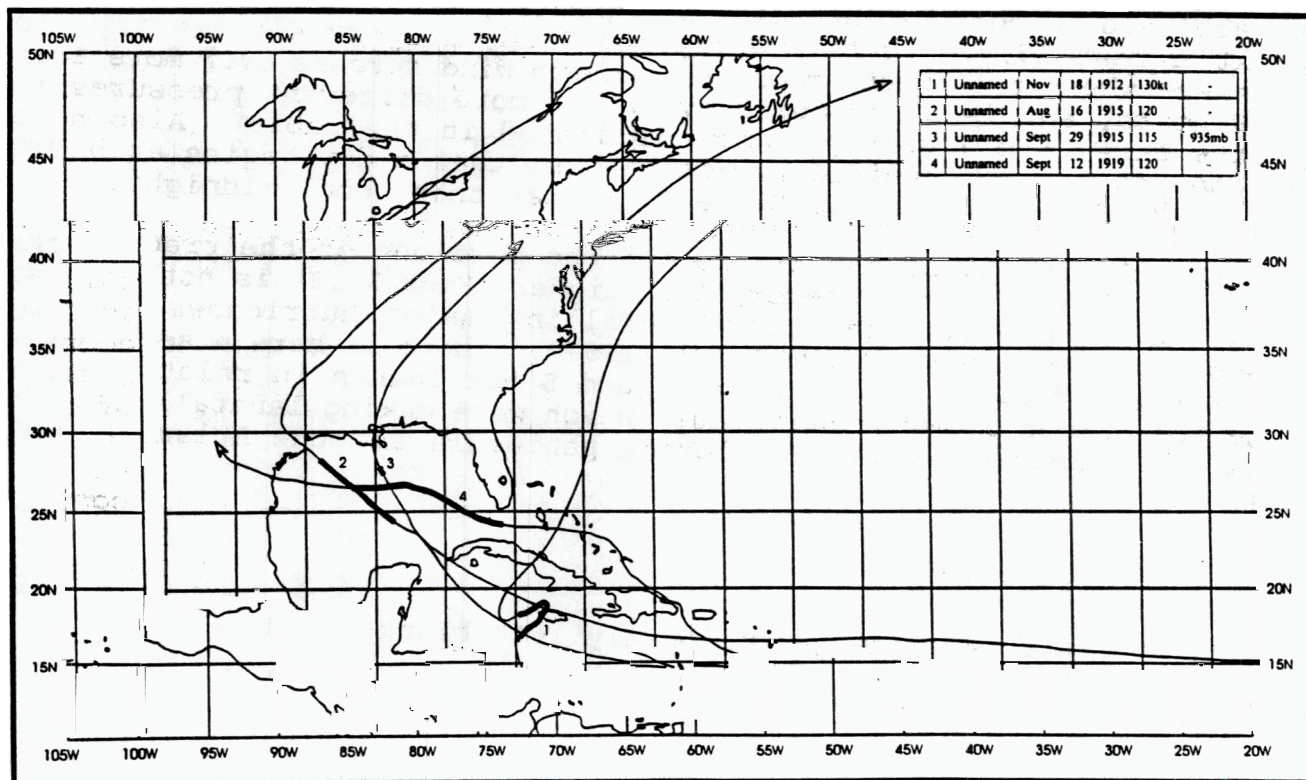


Figure 4. As in Fig. 3, but for the period 1910-1919.

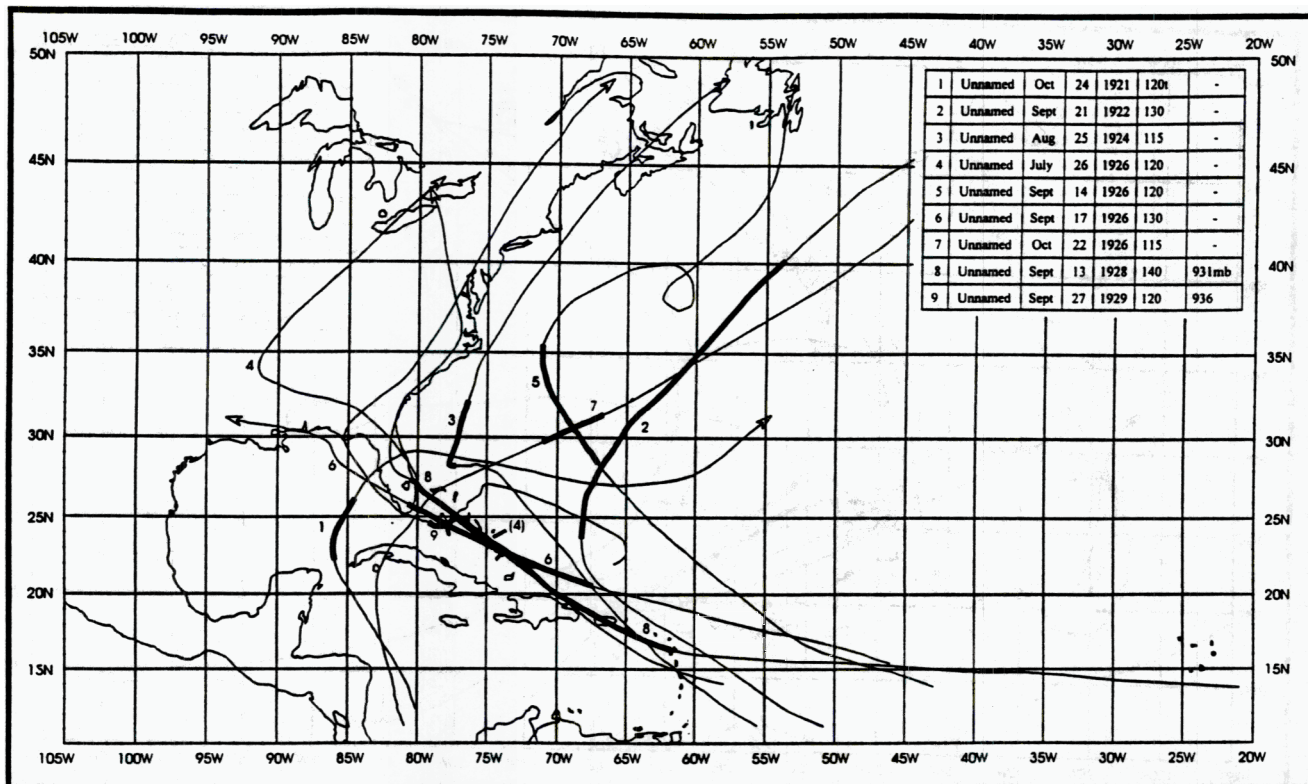


Figure 5. As in Fig. 3, but for the period 1920-1929. Note that bolded track of 1928 hurricane (labeled 8) obscures track of first hurricane of 1926 (labeled 4).

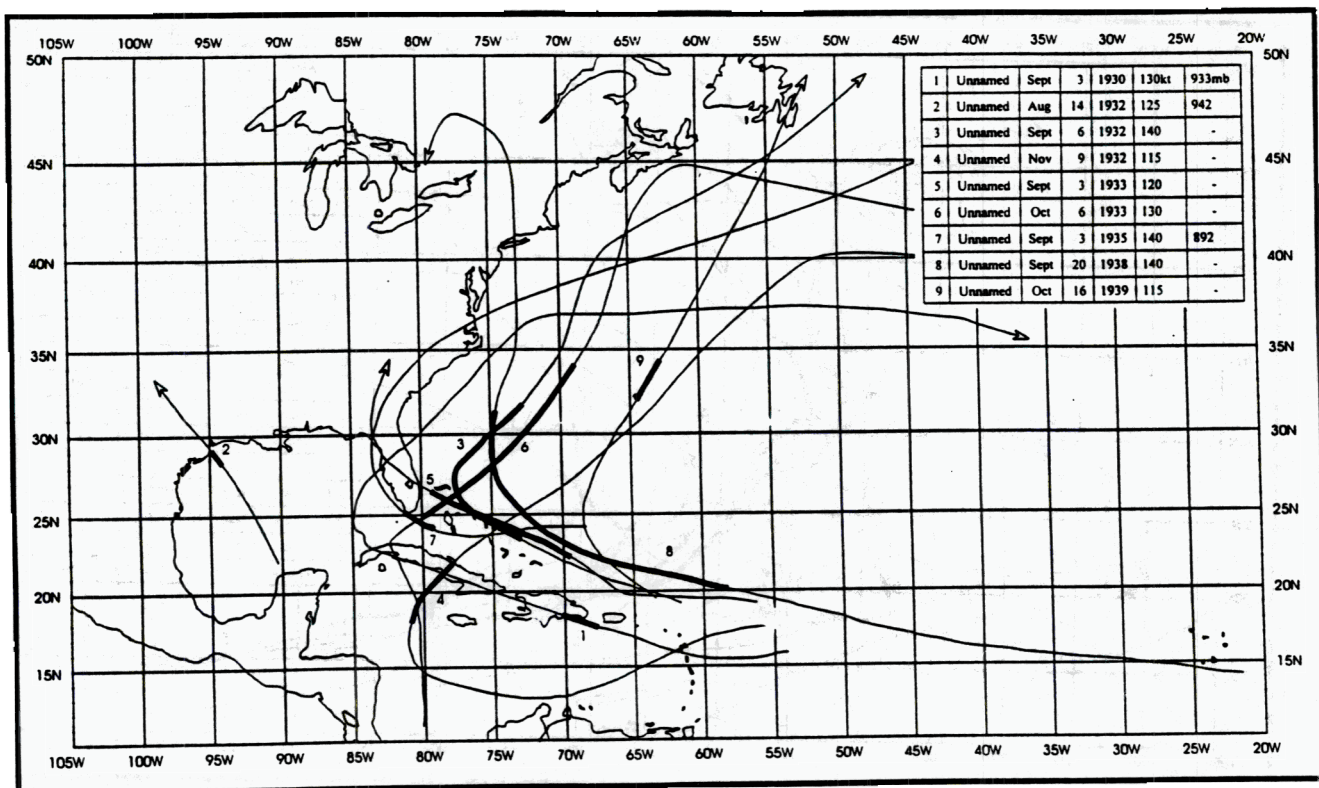


Figure 6. As in Fig. 3, but for the period 1930-1939

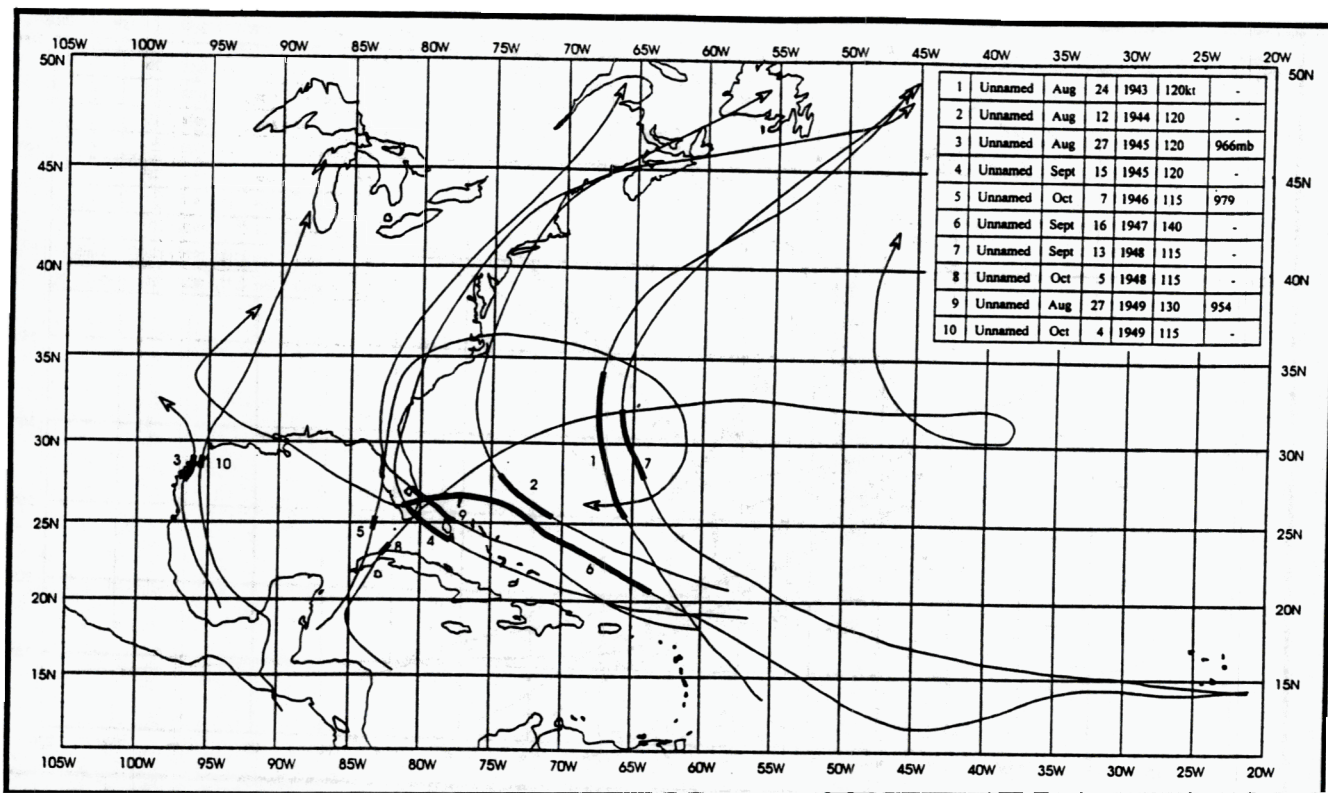


Figure 7. As in Fig. 3, but for the period 1940-1949

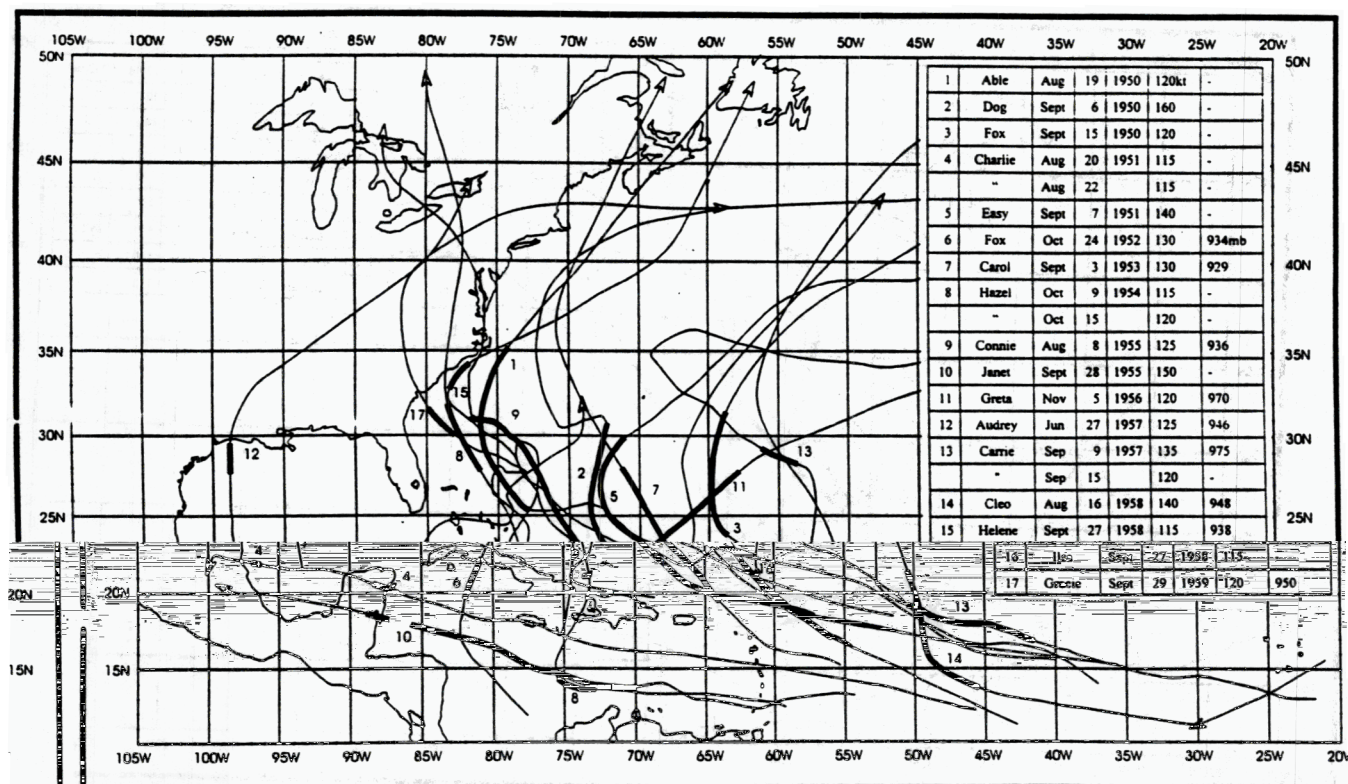


Figure 8. As in Fig 3, but for the period 1950-1959

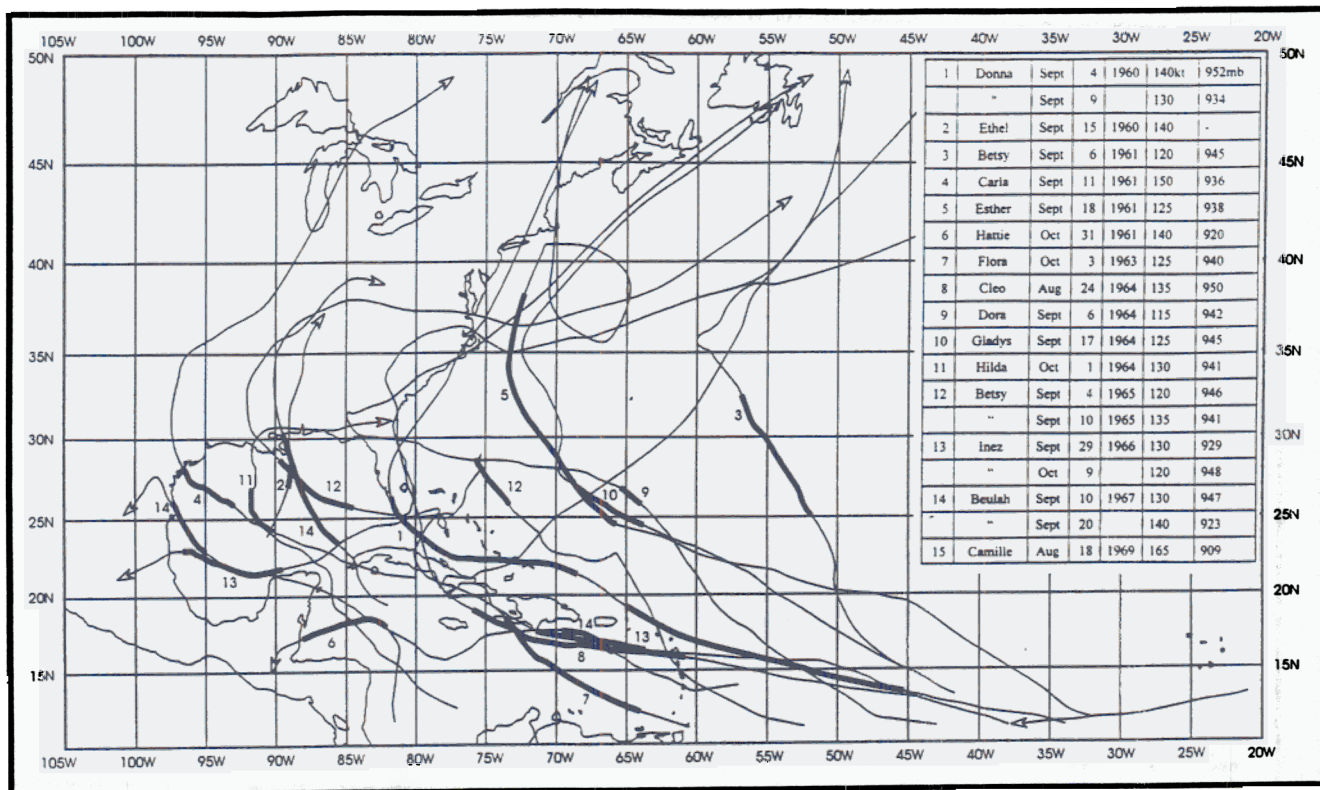


Figure As Fig but for the period 1960 1969

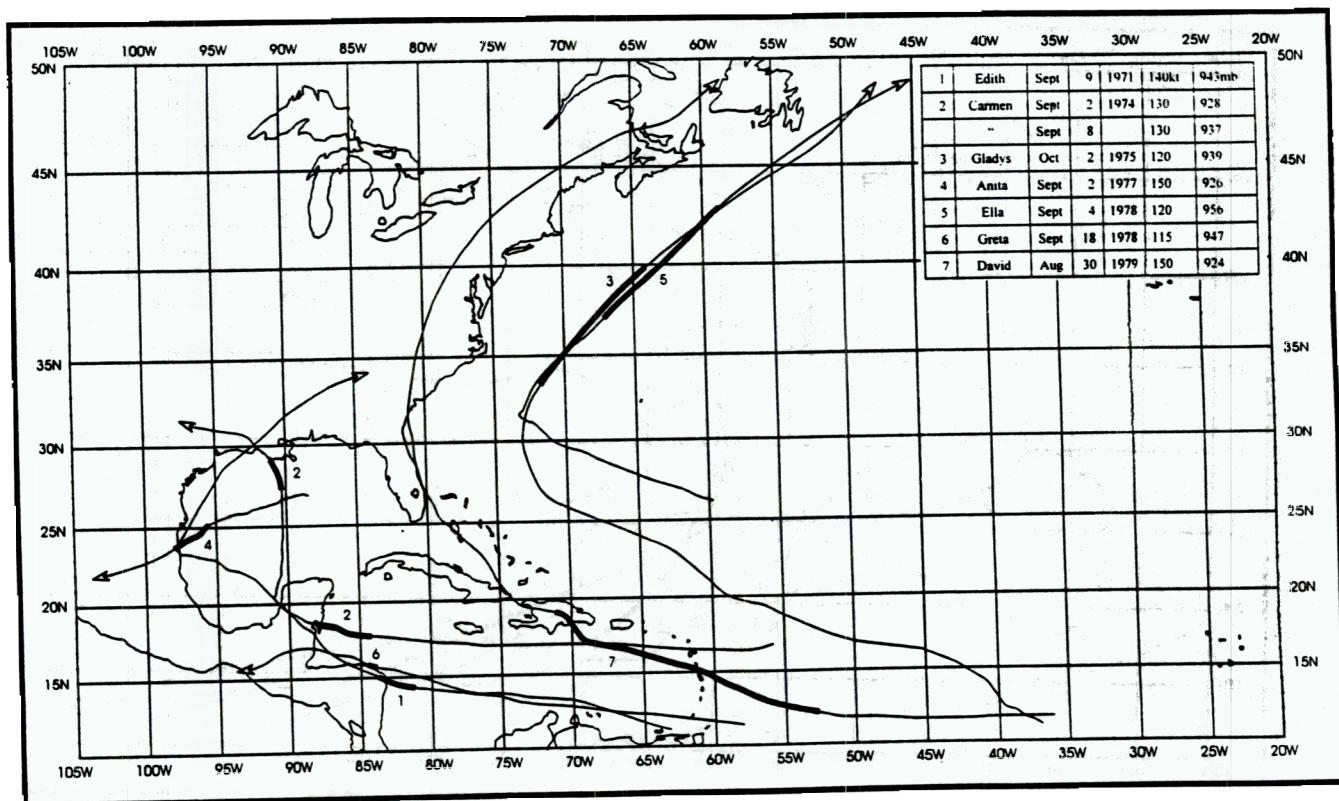


Figure Fig but for the period 1970

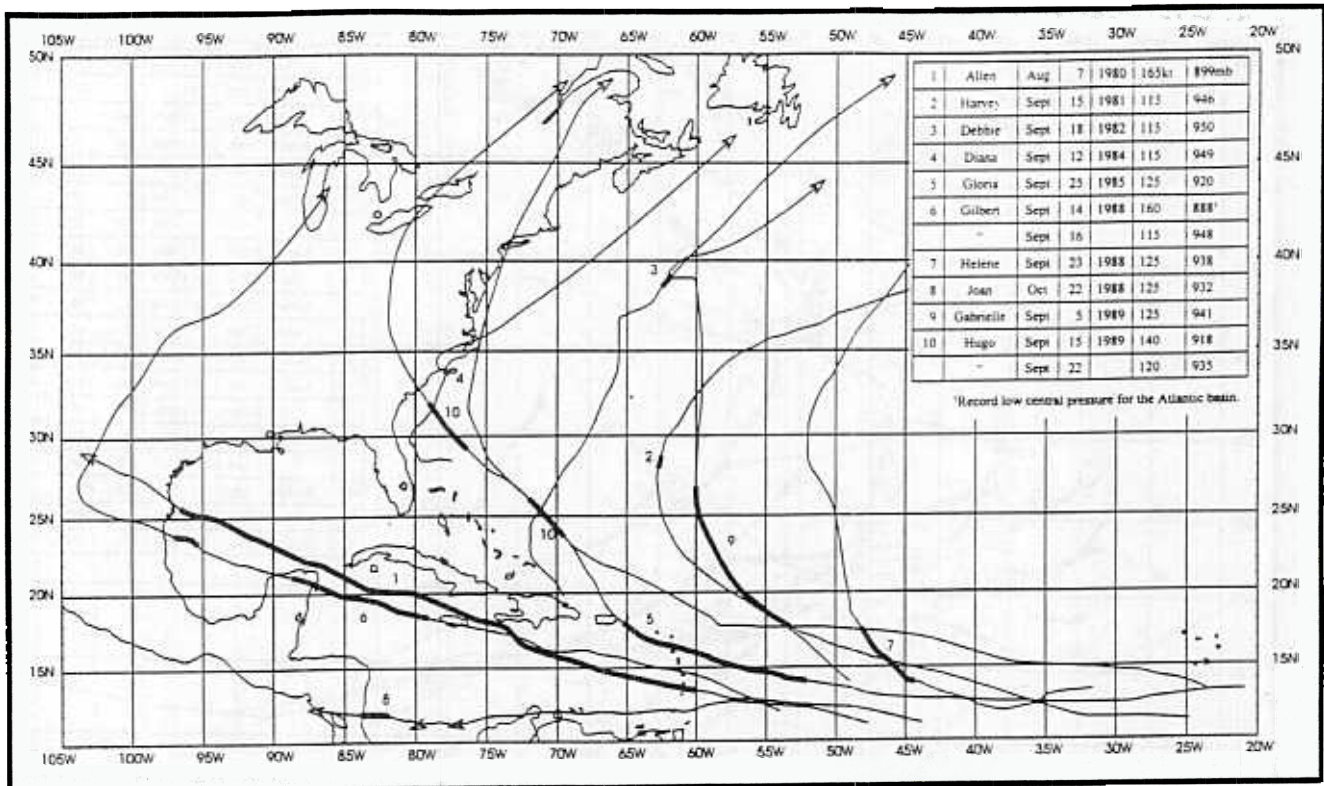


Figure 11. As in Fig. 3, but for the period 1980-1989

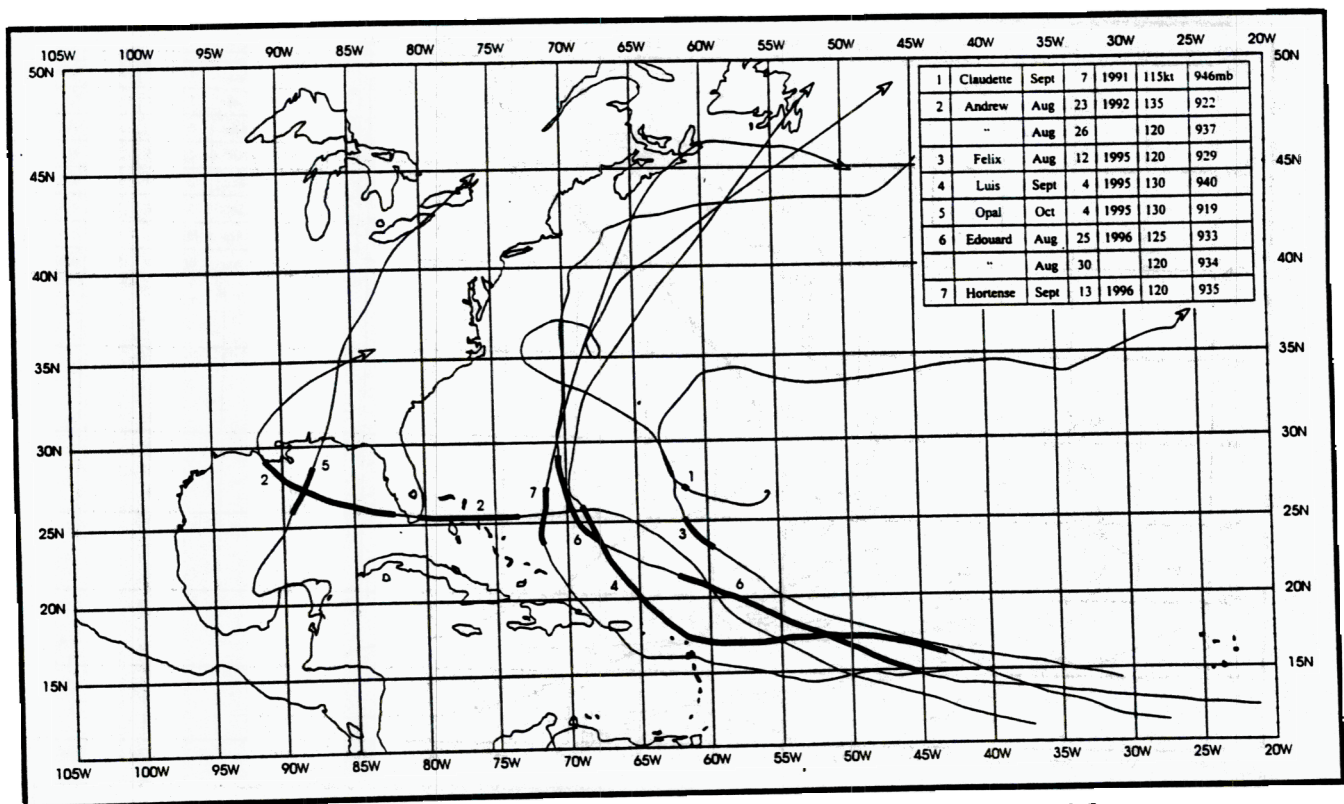


Figure 12. As in Fig. 3, but for the period 1990-1996.

Table 12 provides a further stratification by year of occurrence, and is analogous to Table 14 in Hebert et al. (1997). Major hurricanes and hurricanes of all categories are shown by individual years in each decade.

Table 12. Major hurricanes and all hurricanes by individual years
Adapted from Hebert et al. (1997).

Major Hurricanes											
Decade	00	01	02	03	04	05	06	07	08	09	Total
1900-09	2	1		1			4			4	13
1910-19	3		1			3	6	2	1	1	16
1920-29		2	1	1	2		6	2	1	1	16
1930-39	1	1	4	5		3	1		1	1	17
1940-49		2	1	2	3	3	1	2	4	3	21
1950-59	8	5	3	4	2	6	2	2	5	2	39
1960-69	2	7	1	2	6	1	3	1		5	28
1970-79	2	1		1	2	3	2	1	2	2	16
1980-89	2	3	1	1	1	3		1	3	2	17
TOTAL	20	22	12	17	16	22	25	11	17	21	183

All Hurricanes											
Decade	00	01	02	03	04	05	06	07	08	09	Total
			3	8	2	1	6				
			4	3		4	11	2			
			2	3	5	1	8	4			
			6	10	6	5	7	3			
			4	5	7	5	3	5			
			6	6	8	9	4	3			
			3	7	6	4	7	6			
			3	4	4	6	6	5			
			2	3	5	7	4	3			
TOTAL	45	45	33	49	43	42	56	31	43	50	437

Figures 3 through 12 certainly suggest the existence of a cyclical migration of hurricane and major hurricane activity, and during preferred periods. Table 12 is also suggestive of preferred periods. The authors do not propose a physical mechanism for these spatial and temporal shifts, but merely point them out.

It should be stressed that even during relatively quiet years, devastating hurricanes can and do occur. A general lack of activity should never be taken as an excuse for failure to prepare.

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Appendix A

Appendix A is provided as a condensed chronological reference for North Atlantic tropical cyclones, by category. Wind speed in knots is the maximum given in the BTDF.

Taking the first year of record (1886) as an example, of the 10 tropical cyclones occurring during 1886, the first system of that year reached tropical storm intensity (TS) with maximum winds of 50 knots (category 0).

Atlantic tropical cyclones were not named until 1950. The phonetic alphabet was used for the first three years, 1950-52. In 1953, the practice of using female names was adopted, as had been done in the Western Pacific during World War II (Neumann, et al., 1993). This was modified to include both male and female names, on an alternating basis, in 1979.

As noted earlier, identification of subtropical systems began in 1967. Note that for 1972 and 1973 only, the phonetic alphabet was again used to name subtropical systems. All other years use 'subtrop1', 'subtrop2', etc. For years in which the count of subtropical systems appears to be discontinuous (e.g. 1976) it is because the intervening system (subtrop2) became tropical and was named.

For category 4 or 5 hurricanes (rightmost columns), refer to Figs. 3 through 12 for track plot.

Atlantic Tropical Cyclones by Category, 1886-1996

[illegible]

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1891	5	HU	85				NOT NAMED			
1891	6	HU	85				NOT NAMED			
1891	7	TS	45	NOT NAMED						
1891	8	TS	45	NOT NAMED						
1891	9	HU	85				NOT NAMED			
1891	10	HU	85				NOT NAMED			
			50		NOT NAMED					
—	—	—	—	—	—	—	—	—	—	—
1892	1	TS	45	NOT NAMED						
1892	2	HU	85				NOT NAMED			
1892	3	HU	85				NOT NAMED			
1892	4	TS	50		NOT NAMED					
1892	5	HU	85				NOT NAMED			
1892	6	TS	50		NOT NAMED					
1892	7	HU	85				NOT NAMED			
1892	8	TS	50		NOT NAMED					
			45	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1893	1	HU	85				NOT NAMED			
1893	2	HU	85				NOT NAMED			
1893	3	HU	105					NOT NAMED		
1893	4	HU	85				NOT NAMED			
1893	5	HU	85				NOT NAMED			
1893	6	HU	105					NOT NAMED		
1893	7	HU	85				NOT NAMED			
1893	8	HU	85				NOT NAMED			
1893	9	HU	105					NOT NAMED		
1893	10	HU	85				NOT NAMED			
1893	11	TS	50		NOT NAMED					
1893	12	TS	50		NOT NAMED					
—	—	—	—	—	—	—	—	—	—	—
1894	1	TS	50		NOT NAMED					
1894	2	HU	85				NOT NAMED			
1894	3	HU	105					NOT NAMED		
1894	4	HU	105					NOT NAMED		
1894	5	HU	85				NOT NAMED			
1894	6	HU	85				NOT NAMED			
—	—	—	—	—	—	—	—	—	—	—
1895	1	TS	50		NOT NAMED					
1895	2	HU	85				NOT NAMED			
1895	3	TS	50		NOT NAMED					
1895	4	TS	50		NOT NAMED					
1895	5	HU	105					NOT NAMED		
1895	6	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1896	1	HU	85				NOT NAMED			
1896	2	HU	105					NOT NAMED		
1896	3	HU	85				NOT NAMED			
1896	4	HU	105					NOT NAMED		
1896	5	HU	85				NOT NAMED			
1896	6	HU	85				NOT NAMED			
—	—	—	—	—	—	—	—	—	—	—
1897	1	HU	85				NOT NAMED			
1897	2	HU	85				NOT NAMED			
1897	3	TS	40	NOT NAMED						

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	Kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1897	4	TS	40	NOT NAMED						
1897	5	TS	55		NOT NAMED					
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1898	1	HU	70			NOT NAMED				
1898	2	HU	85				NOT NAMED			
1898	3	HU	85				NOT NAMED			
1898	4	TS	50		NOT NAMED					
1898	5	TS	50		NOT NAMED					
1898	6	TS	50		NOT NAMED					
1898	7	HU	95				NOT NAMED			
1898	8	TS	50		NOT NAMED					
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1899	1	HU	70			NOT NAMED				
1899	2	HU	105					NOT NAMED		
1899	3	HU	105					NOT NAMED		
1899	4	HU	105					NOT NAMED		
1899	5	TS	40	NOT NAMED						
1899	6	HU	85				NOT NAMED			
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1900	1	HU	115						NOT NAMED	
1900	2	HU	85				NOT NAMED			
1900	3	TS	45	NOT NAMED						
1900	4	HU	105					NOT NAMED		
1900	5	TS	60		NOT NAMED					
1900	6	TS	40	NOT NAMED						
1900	7	TS	45	NOT NAMED						
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1901	1	TS		NOT NAMED						
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1901	5	HU			NOT NAMED					
1901	6	TS	50				NOT NAMED			
1901	7	TS	40	NOT NAMED						
1901	8	TS	45	NOT NAMED						
1901	9	TS	45	NOT NAMED						
1901	10	TS	50		NOT NAMED					
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1902	1	TS	45	NOT NAMED						
1902	2	HU	80			NOT NAMED				
1902	3	HU	85				NOT NAMED			
1902	4	HU	85				NOT NAMED			
1902	5	TS	50		NOT NAMED					
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1903	1	HU	90				NOT NAMED			
1903	2	HU	105					NOT NAMED		
1903	3	HU	85				NOT NAMED			
1903	4	HU	85				NOT NAMED			
1903	5	TS	50		NOT NAMED					
1903	6	HU	85				NOT NAMED			
1903	7	HU	85				NOT NAMED			
1903	8	HU	85				NOT NAMED			
1903	9	HU	85				NOT NAMED			
---	---	---	---	-----	-----	-----	-----	-----	-----	-----

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1904	1	TS	60		NOT NAMED					
1904	2	HU	85				NOT NAMED			
1904	3	HU	65			NOT NAMED				
1904	4	TS	45	NOT NAMED						
1904	5	TS	45	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1905	1	TS	50		NOT NAMED					
1905	2	TS	50		NOT NAMED					
1905	3	TS	45	NOT NAMED						
1905	4	HU	70			NOT NAMED				
1905	5	TS	45	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1906	1	TS	45	NOT NAMED						
1906	2	HU	90				NOT NAMED			
1906	3	HU	115						NOT NAMED	
1906	4	HU	125						NOT NAMED	
1906	5	HU	125						NOT NAMED	
1906	6	TS	60		NOT NAMED					
1906	7	HU	85				NOT NAMED			
1906	8	HU	115						NOT NAMED	
1906	9	TS	35	NOT NAMED						
1906	10	TS	45	NOT NAMED						
1906	11	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1907	1	TS	50		NOT NAMED					
1907	2	TS	50		NOT NAMED					
1907	3	TS	45	NOT NAMED	ED					
1907	4	TS	45	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1908	1	HU	85				NOT NAMED			
1908	2	HU	85				NOT NAMED			
1908	3	TS	45	NOT NAMED						
1908	4	HU	105					NOT NAMED		
1908	5	TS	60		NOT NAMED					
1908	6	HU	85				NOT NAMED			
1908	7	HU	70			NOT NAMED				
1908	8	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1909	1	TS	50							
1909	2	TS	45		NOT NAMED					
1909	3	HU	120							NOT NAM
1909	4	TS	50		NOT NAMED					
1909	5	HU	105					NOT NAMED		
1909	6	TS	45	NOT NAMED						
1909	7	HU	120						NOT NAMED	
1909	8	TS	45	NOT NAMED						
1909	9	HU	105					NOT NAMED		
1909	10	TS	50		NOT NAMED					
—	—	—	—	—	—	—	—	—	—	—
1910	1	TS	50		NOT NAMED					
1910	2	HU	105					NOT NAMED		
1910	3	HU	105					NOT NAMED		
1910	4	HU	105					NOT NAMED		
—	—	—	—	—	—	—	—	—	—	—
1911	1	HU	70							

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1920	3	HU	70			NOT NAMED				
1920	4	HU	70			NOT NAMED				
—	—	—	—	—	—	—	—	—	—	—
1921	1	HU	85				NOT NAMED			
1921	2	HU	70			NOT NAMED				
1921	3	HU	105					NOT NAMED		
1921	4	TS	60		NOT NAMED					
1921	5	TS	50		NOT NAMED					
1921	6	HU	120						NOT NAMED	
—	—	—	—	—	—	—	—	—	—	—
1922	1	TS	45	NOT NAMED						
1922	2	HU	130						NOT NAMED	
1922	3	TS	45	NOT NAMED						
1922	4	HU	85				NOT NAMED			
—	—	—	—	—	—	—	—	—	—	—
1923	1	HU	90				NOT NAMED			
1923	2	HU	105					NOT NAMED		
		HU	85				NOT NAMED			
1923	4	TS	40	NOT NAMED						
1923	5	TS	45	NOT NAMED						
1923	6	TS	45	NOT NAMED						
1923	7	TS	45	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1924	1	TS	40	NOT NAMED						
1924	2	HU	115						NOT NAMED	
1924	3	HU	90				NOT NAMED			
1924	4	HU	70			NOT NAMED				
1924	5	TS	45	NOT NAMED						
1924	6	TS	50		NOT NAMED					
	7	HU	105					NOT NAMED		
1924	8	HU	85				NOT NAMED			
—	—	—	—	—	—	—	—	—	—	—
1925	1	TS	40	NOT NAMED						
1925	2	HU	85				NOT NAMED			
—	—	—	—	—	—	—	—	—	—	—
1926	1	HU	120						NOT NAMED	
1926	2	HU	105					NOT NAMED		
1926	3	HU	90				NOT NAMED			
1926	4	HU	120						NOT NAMED	
1926	5	HU	90				NOT NAMED			
1926	6	HU	130						NOT NAMED	
1926	7	TS	40	NOT NAMED						
1926	8	HU	105					NOT NAMED		
1926	9	TS	35	NOT NAMED						
1926	10	HU	115						NOT NAMED	
1926	11	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1927	1	HU	105					NOT NAMED		
1927	2	HU	90				NOT NAMED			
1927	3	HU	70			NOT NAMED				
1927	4	HU	105					NOT NAMED		
1927	5	TS	50		NOT NAMED					
1927	6	TS	40	NOT NAMED						
1927	7	TS	40	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1928	1	HU	85				NOT NAMED			
1928	2	HU	70			NOT NAMED				
1928	3	TS	50		NOT NAMED					
1928	4	HU	140							NOT NAMED
1928	5	TS	50		NOT NAMED					
1928	6	HU	70			NOT NAMED				
---	---	---	---	---	---	---	---	---	---	---
1929	1	HU	75			NOT NAMED				
1929	2	HU	120						NOT NAMED	
1929	3	HU	80			NOT NAMED				
---	---	---	---	---	---	---	---	---	---	---
1930	1	HU	95				NOT NAMED			
1930	2	HU	130						NOT NAMED	
---	---	---	---	---	---	---	---	---	---	---
1931	1	TS	40	NOT NAMED						
1931	2	TS	50		NOT NAMED					
1931	3	TS	50		NOT NAMED					
1931	4	TS	35	NOT NAMED						
1931	5	HU	110					NOT NAMED		
1931	6	HU	85				NOT NAMED			
1931	7	TS	35	NOT NAMED						
1931	8	TS	40	NOT NAMED						
1931	9	TS	40	NOT NAMED						
---	---	---	---	---	---	---	---	---	---	---
1932	1	TS	45	NOT NAMED						
1932	2	HU	125						NOT NAMED	
1932	3	HU	70			NOT NAMED				
1932	4	HU	140							NOT NAMED
1932	5	TS	45	NOT NAMED						
1932	6	TS	35	NOT NAMED						
1932	7	HU	105					NOT NAMED		
1932	8	TS	45	NOT NAMED						
1932	9	TS	45	NOT NAMED						
1932	10	HU	115						NOT NAMED	
1932	11	HU	85				NOT NAMED			
---	---	---	---	---	---	---	---	---	---	---
1933	1	TS	40	NOT NAMED						
1933	2	HU	90				NOT NAMED			
1933	3	TS	45	NOT NAMED						
1933	4	TS	40	NOT NAMED						
1933	5	HU	80			NOT NAMED				
1933	6	TS	50		NOT NAMED					
1933	7	TS	35							
1933	8	HU	105					NOT NAMED		
1933	9	TS	45	NOT NAMED						
1933	10	TS	35	NOT NAMED						
1933	11	HU	110					NOT NAMED		
1933	12	HU	120						NOT NAMED	
1933	13	HU	105					NOT NAMED		
1933	14	HU	75			NOT NAMED				
1933	15	HU	95				NOT NAMED			
1933	16	TS	40	NOT NAMED						
1933	17	TS	35	NOT NAMED						
1933	18	HU	130						NOT NAMED	
1933	19	HU	85				NOT NAMED			

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1933	20	TS	60		NOT NAMED					
1933	21	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1934	1	TS	50		NOT NAMED					
1934	2	HU	70			NOT NAMED				
1934	3	HU	65			NOT NAMED				
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
1934	6	HU	85				NOT NAMED			
1934	7	TS	40	NOT NAMED						
1934	8	HU	85				NOT NAMED			
1934	9	TS	50		NOT NAMED					
1934	10	TS	40	NOT NAMED						
1934	11	HU	75			NOT NAMED				
—	—	—	—	—	—	—	—	—	—	—
1935	1	HU	105					NOT NAMED		
1935	2	HU	140							NOT NAMED
1935	3	TS	40	NOT NAMED						
1935	4	HU	105					NOT NAMED		
1935	5	HU	75			NOT NAMED				
1935	6	HU	70			NOT NAMED				
—	—	—	—	—	—	—	—	—	—	—
1936	1	TS	40	NOT NAMED						
1936	2	TS	35	NOT NAMED						
1936	3	HU	70			NOT NAMED				
1936	4	TS	40	NOT NAMED						
1936	5	HU	80			NOT NAMED				
1936	6	TS	40	NOT NAMED						
1936	7	TS	35	NOT NAMED						
1936	8	HU	70			NOT NAMED				
1936	9	TS	45	NOT NAMED						
1936	10	HU	70			NOT NAMED				
1936	11	HU	95				NOT NAMED			
1936	12	TS	35	NOT NAMED						
1936	13	HU	105					NOT NAMED		
1936	14	TS	40	NOT NAMED						
1936	15	HU	95				NOT NAMED			
1936	16	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1937	1	TS	60		NOT NAMED					
1937	2	TS	50		NOT NAMED					
1937	3	TS	50		NOT NAMED					
1937	4	HU	85				NOT NAMED			
1937	5	HU	95				NOT NAMED			
1937	6	TS	40	NOT NAMED						
1937	7	HU	85				NOT NAMED			
1937	8	TS	40	NOT NAMED						
1937	9	TS	35	NOT NAMED						
—	—	—	—	—	—	—	—	—	—	—
1938	1	TS	60		NOT NAMED					
1938	2	HU	85				NOT NAMED			
1938	3	HU	85				NOT NAMED			
1938	4	HU	140							NOT NAMED
1938	5	TS	50		NOT NAMED					
1938	6	TS	40	NOT NAMED						

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1938	7	TS	40	NOT NAMED						
1938	8	TS	60		NOT NAMED					
---	---	---	---	---	---	---	---	---	---	---
1939	1	TS	45	NOT NAMED						
1939	2	HU	70			NOT NAMED				
1939	3	TS	40	NOT NAMED						
1939	4	HU	115						NOT NAMED	
1939	5	HU	80			NOT NAMED				
---	---	---	---	---	---	---	---	---	---	---
1940	1	TS	50		NOT NAMED					
1940	2	HU	70			NOT NAMED				
1940	3	HU	80			NOT NAMED				
1940	4	HU	70			NOT NAMED				
1940	5	HU	85				NOT NAMED			
1940	6	TS	40	NOT NAMED						
1940	7	TS	45	NOT NAMED						
1940	8	TS	40	NOT NAMED						
---	---	---	---	---	---	---	---	---	---	---
1941	1	TS	40	NOT NAMED						
1941	2	HU	80			NOT NAMED				
1941	3	HU	70			NOT NAMED				
1941	4	HU	105					NOT NAMED		
1941	5	HU	105					NOT NAMED		
1941	6	TS	45	NOT NAMED						
---	---	---	---	---	---	---	---	---	---	---
1942	1	HU	70			NOT NAMED				
1942	2	HU	100					NOT NAMED		
1942	3	HU	95				NOT NAMED			
1942	4	TS	45	NOT NAMED						
1942	5	TS	45	NOT NAMED						
1942	6	TS	45	NOT NAMED						
1942	7	TS	50		NOT NAMED					
1942	8	TS	35	NOT NAMED						
1942	9	TS	45	NOT NAMED						
1942	10	HU	85				NOT NAMED			
---	---	---	---	---	---	---	---	---	---	---
1943	1	HU	75			NOT NAMED				
1943	2	TS	50		NOT NAMED					
1943	3	HU	120						NOT NAMED	
1943	4	HU	105					NOT NAMED		
1943	5	TS	45	NOT NAMED						
1943	6	HU	85				NOT NAMED			
1943	7	TS	50		NOT NAMED					
1943	8	TS	60		NOT NAMED					
1943	9	HU	95				NOT NAMED			
1943	10	TS	40	NOT NAMED						
---	---	---	---	---	---	---	---	---	---	---
1944	1	HU	80			NOT NAMED				
---	---	---	---		NOT NAMED					
1944	3	HU	80			NOT NAMED				
1944	4	HU	105					NOT NAMED		
1944	5	TS	50		NOT NAMED					
1944	6	TS	45	NOT NAMED						
1944	7	HU	120						NOT NAMED	
---	---	---	---			NOT NAMED				

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1944	9	HU	85				NOT NAMED			
1944	10	TS	40	NOT NAMED						
1944	11	HU	105					NOT NAMED		
---	---	---	---	---	---	---	---	---	---	---
1945	1	HU	100					NOT NAMED		
	2	TS	45	NOT NAMED						
		TS	50		NOT NAMED					
1945	4	TS	60		NOT NAMED					
1945	5	HU	120						NOT NAMED	
1945	6	TS	50		NOT NAMED					
1945	7	TS	35	NOT NAMED						
1945	8	TS	50		NOT NAMED					
	9	HU	120						NOT NAMED	
	10	HU	85				NOT NAMED			
			85				NOT NAMED			
---	---	---	---	---	---	---	---	---	---	---
1946	1	TS	35	NOT NAMED						
1946	2	HU	70			NOT NAMED				
1946	3	TS	35	NOT NAMED						
1946	4	HU	85				NOT NAMED			
1946	5	HU	115						NOT NAMED	
1946	6	TS	40	NOT NAMED						
---	---	---	---	---	---	---	---	---	---	---
1947	1	TS	40	NOT NAMED						
1947	2	HU	95				NOT NAMED			
1947	3	HU	70			NOT NAMED				
1947	4	HU	140							NOT NAMED
1947	5	TS	40	NOT NAMED						
1947	6	TS	50		NOT NAMED					
1947	7	TS	45	NOT NAMED						
1947	8	HU	75			NOT NAMED				
1947	9	HU	105					NOT NAMED		
---	---	---	---	---	---	---	---	---	---	---
1948	1	TS	45	NOT NAMED						
1948	2	TS	35	NOT NAMED						
1948	3	HU	105					NOT NAMED		
1948	4	TS	50		NOT NAMED					
1948	5	HU	70			NOT NAMED				
1948	6	HU	115						NOT NAMED	
1948	7	HU	105					NOT NAMED		
1948	8	HU	115						NOT NAMED	
1948	9	HU	70			NOT NAMED				
---	---	---	---	---	---	---	---	---	---	---
1949	1	HU	95				NOT NAMED			
1949	2	HU	130						NOT NAMED	
1949	3	TS	45	NOT NAMED						
1949	4	HU	110					NOT NAMED		
1949	5	TS	40	NOT NAMED						
1949	6	TS	40	NOT NAMED						
1949	7	TS	50		NOT NAMED					
1949	8	HU	85				NOT NAMED			
1949	9	HU	70			NOT NAMED				
1949	10	HU	115						NOT NAMED	
1949	11	HU	90				NOT NAMED			
1949	12	TS	50		NOT NAMED					

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1949	13	TS	50		NOT NAMED					
1950	1	HU	120						ABLE	
1950	2	HU	105					BAKER		
1950	3	HU	100					CHARLIE		
1950	4	HU	160							DOG
1950	5	HU	110					EASY		
1950	6	HU	120						FOX	
1950	7	HU	95			GEORGE				
1950	8	TS	50		HOW					
1950	9	HU	95			ITEM				
1950	10	HU	105					JIG		
1950	11	HU	105					KING		
1950	12	TS	60		NOT NAMED					
1950	13	HU	80			LOVE				
1951	1	HU	100					ABLE		
1951	2	TS	50		BAKER					
1951	3	HU	115						CHARLIE	
1951	4	HU	100					DOG		
1951	5	HU	140							EASY
1951	6	HU	100					FOX		
1951	7	TS	50		GEORGE					
1951	8	HU	95				HOW			
1951	9	HU	70			ITEM				
1951	10	HU	70			JIG				
1952	1	TS	45	NOT NAMED						
1952	2	HU	90				ABLE			
1952	3	HU	105					BAKER		
1952	4	HU	105					CHARLIE		
1952	5	HU	75			DOG				
1952	6	HU	95				EASY			
1952	7	HU	130						FOX	
1953	1	TS	60		ALICE					
1953	2	HU	95				BARBARA			
1953	3	TS	50		NOT NAMED					
1953	4	HU	130						CAROL	
1953	5	HU	100					DOLLY		
1953	6	HU	110					EDNA		
1953	7	TS	60		NOT NAMED					
1953	8	HU	110					FLORENCE		
1953	9	HU	70			GAIL				
1953	10	TS	40	NOT NAMED						
1953	11	TS	60		NOT NAMED					
1953	12	TS	60		HAZEL					
1953	13	TS	45	NOT NAMED						
1953	14	TS	35	NOT NAMED						
1954	1	HU	70			ALICE				
1954	2	TS	40	BARBARA						
1954	3	HU	85				CAROL			
1954	4	HU	85				DOLLY			
1954	5	HU	105					EDNA		

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1954	6	HU	65			FLORENCE				
1954	7	TS	60		GILDA					
1954	8	HU	85				NOT NAMED			
1954	9	HU	120						HAZEL	
1954	10	TS	45	NOT NAMED						
1954	11	HU	70			ALICE LICE				
1955	1	TS			60	BRENDA				
1955	2	HU	125							CON
1955	3	HU	105						DIANE	
		HU	85					EDITH		
1955	5	TS	40		NOT NAMED					
1955	6	HU	90					FLORA		
1955	7	HU	80			GLADYS				
1955	8	HU	110					HILDA		
1955	9	HU	105					IONE		
1955	10	HU	150							
1955	11	TS	55		NOT NAMED					
1955	12	HU	100					KATIE		
1956	1	TS	50		NOT NAMED					
1956	2	HU	70			ANNA				
1956	3	HU	105					BETSY		
1956	4	TS	45	CARLA						
1956	5	TS	60		DORA					
1956	6	TS	60							
1956	7	HU	80			FLOSSY				
1956	8	HU	120							
1957	1	TS	55		NOT NAMED					
1957	2	HU	125					AUDREY		
1957	3	TS	60		BERTHA					
1957	4	HU	135					CARRIE		
1957	5	TS	35	DEBBIE						
1957				6	TS					
				1		FRIEDA				
				1		NOT NAMED				
1958	1	TS	45	ALMA						
1958	2	TS	50		BECKY					
1958	3	HU	140						CLEO	
1958	4	HU	110					DAISY		
1958	5	HU	100					ELLA		
1958	6	HU	80			FIFI				
1958	7	TS	60		GERDA					
1958	8	HU	115					HELENE		
1958	9	HU	115					ILSA		
1958	10	HU	80			JANICE				

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1959	7	HU	65			FLORA				
1959	8	HU	120						GRACIE	
1959	9	HU	110					HANNAH		
1959	10	TS	50		IRENE					
1959	11	HU	70			JUDITH				
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1960	1	TS	40	NOT NAMED						
1960	2	HU	85				ABBY			
1960	3	TS	50		BRENDA					
1960	4	HU	80			CLEO				
1960	5	HU	140							DONNA
1960	6	HU	140							ETHEL
1960	7	TS	40	FLORENCE						
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1961	1	HU	100					ANNA		
1961	2	HU	120						BETSY	
1961	3	HU	150							CARLA
1961	4	HU	105					DEBBIE		
1961	5	HU	125						ESTHER	
1961	6	TS	35	NOT NAMED						
1961	7	HU	110					FRANCES		
1961	8	TS	60		GERDA					
1961	9	HU	140							HATTIE
1961	10	HU	70			JENNY				
1961	11	TS	60		INGA					
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1962	1	HU	85				ALMA			
1962	2	TS	35	BECKY						
1962	3	TS	60		CELIA					
1962	4	HU	95				DAISY			
1962	5	HU	100					ELLA		
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1963	1	HU	90				ARLENE			
1963	2	HU	105					BEULAH		
1963	3	TS	50		NOT NAMED					
1963	4	HU	70			CINDY				
1963	5	HU	65			DEBRA				
1963	6	HU	85				EDITH			
1963	7	HU	125						FLORA	
1963	8	HU	95				GINNY			
1963	9	TS	45	HELENA						
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1964	1	TS	50		NOT NAMED					
1964	2	TS	45	NOT NAMED						
1964	3	TS	55		ABBY					
1964	4	TS	45	BRENDA						
1964	5	HU	135						CLEO	
1964	6	HU	115						DORA	
1964	7	HU	100					ETHEL		
1964	8	TS	40	FLORENCE						
1964	9	HU	125						GLADYS	
1964	10	HU	130						HILDA	
1964	11	HU	110					ISBELL		
1964	12	TS	35	NOT NAMED						
---	---	---	---	-----	-----	-----	-----	-----	-----	-----

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1965	1	TS	45	NOT NAMED						
1965	2	HU	80			ANNA				
1965	3	HU	135						BETSY	
1965	4	HU	85				CAROL			
1965	5	TS	45	DEBBIE						
1965	6	HU	70			ELENA				
—	—	—	—	—	—	—	—	—	—	—
1966	1	HU	110					ALMA		
1966	2	HU	65							
1966	3	HU	70			CELIA				
						DOROTHY				
1966	5	TS	45	ELLA						
1966	6	HU	110					FAITH		
1966	7	TS	50		GRETA					
1966	8	TS	45	HALLIE						
1966	9	HU	130						INEZ	
1966	10	TS	45	JUDITH						
1966	11	HU	70			LOIS				
—	—	—	—	—	—	—	—	—	—	—
1967	1	HU	75			ARLENE				
1967	2	HU	140							BEULAH
1967	3	HU	95				CHLOE			
1967	4	HU	75			DORIA				
1967	5	TS	50		EDITH					
1967	6	HU	75			FERN				
1967	7	TS	45	GINGER						
1967	8	HU	80			HEIDI				
—	—	—	—	—	—	—	—	—	—	—
1968		HU	65			ABBY				
1968	2	HU	65			BRENDA				
1968	3	TS	60		CANDY					
1968	4	HU	70			DOLLY				
1968	5	TS	55		EDNA					
1968	6	HU	70			SUBTROP 1				
1968	7	TS	50		FRANCES					
1968	8	HU	75			GLADYS				
—	—	—	—	—	—	—	—	—	—	—
1969	1	TS	60		ANNA					
1969	2	HU	75			BLANCHE				
1969	3	HU	165							CAMILLE
1969	4	HU	105					DEBBIE		
1969	5	TS	50		EVE					
1969	6	HU	100					FRANCELIA		
1969	7	HU	110					GERDA		
1969	8	HU	75			HOLLY				
1969	9	HU	100					INGA		
1969	10	HU	65			NOT NAMED				
1969	11	TS	60		NOT NAMED					
1969	12	TS	50		SUBTROP 1					
1969	13	TS	40	JENNY						
1969	14	HU	90				KARA			
1969	15	HU	90				LAURIE			
1969	16	TS	60		NOT NAMED					
1969	17	HU	65			NOT NAMED				
1969	18	HU	80			MARTHA				

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1970	1	HU	70			ALMA				
1970	2	TS	55		BECKY					
1970	3	HU	110					CELIA		
1970	4	TS	60		NOT NAMED					
1970	5	TS	60		DOROTHY					
1970	6	HU	110					ELLA		
1970	7	TS	60		FELICE					
1970	8	TS	45	GRETA						
1970	9	HU	90				NOT NAMED			
1970	10	HU	65			NOT NAMED				
1971	1	TS	55		ARLENE					
1971	2	HU	75			NOT NAMED				
1971	3	HU	75			BETH				
1971	4	TS	55		CHLOE					
1971	5	TS	55		DORIA					
1971	6	HU	140							EDITH
1971	7	HU	80			FERN				
1971	8	HU	95				GINGER			
1971	9	TS	55		HEIDI					
1971	10	HU	70			IRENE				
1971	11	TS	55		JANICE					
1971	12	TS	45	KRISTY						
1971	13	TS	60		LAURA					
1972	1	TS	60		ALPHA					
1972	2	HU	75			AGNES				
1972	3	HU	90				BETTY			
1972	4	TS	60		CARRIE					
1972	5	HU	70			DAWN				
1972	6	TS	55		CHARLIE					
1972	7	TS	40	DELTA						
1973	1	HU	80			ALICE				
1973	2	TS	40	ALFA						
1973	3	HU	80			BRENDA				
1973	4	TS	60		CHRISTINE					
1973	5	TS	60		DELIA					
1973	6	HU	100					ELLEN		
1973	7	HU	70			FRAN				
1973	8	TS	60		GILDA					
1974	1	TS	55		SUBTROP 1					
1974	2	TS	45	SUBTROP 2						
1974	3	TS	50		SUBTROP 3					
1974	4	TS	55		ALMA					
1974	5	HU	100					BECKY		
1974	6	HU	130						CARMEN	
1974	7	TS	45	DOLLY						
1974	8	TS	60		ELAINE					
1974	9	HU	95				FIFI			
1974	10	HU	65			GERTRUDE				
1974	11	TS	45	SUBTROP 4						

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1975	1	TS	60		AMY					
1975	2	HU	75			BLANCHE				
1975	3	HU	100					CAROLINE		
1975	4	HU	95				DORIS			
1975	5	HU	110					ELOISE		
1975	6	HU	90				FAYE			
1975	7	HU	120						GLADYS	
				HALLIE						
					SUBTROP 2					
1976	1	TS	45	SUBTROP 1						
1976	2	TS	40	ANNA						
1976	3	HU	105					BELLE		
1976	4	HU	80			CANDICE				
1976	5	TS	45	DOTTIE						
1976	6	HU	90				EMMY			
1976	7	HU	100					FRANCES		
1976	8	TS	40	SUBTROP 3						
1976	9	HU	90				GLORIA			
1976	10	HU	65			HOLLY				
1977	1	HU	150							ANITA
1977	2	HU	65			BABE				
1977	3	HU	65			CLARA				
1977	4	HU	75			DOROTHY				
1977	5	HU	70			EVELYN				
1977	6	TS	50		FRIEDA					
1978	1	TS	40	SUBTROP 1						
1978	2	TS	45	AMELIA						
1978	3	TS	45	BESS						
1978	4	HU	80			CORA				
1978	5	TS	50		DEBRA					
1978	6	HU	120						ELLA	
1978	7	HU	85				FLOSSIE			
1978	8	HU	115						GRETA	
1978	9	TS	55		HOPE					
1978	10	TS	45	IRMA						
1978	11	TS	45	JULIET						
1978	12	HU	70			KENDRA				
1979	1	TS	50		ANA					
1979	2	HU	65			BOB				
1979	3	TS	45	CLAUDETTE						
1979	4	HU	150							DAVID
1979	5	TS	35	ELENA						
1979	6	HU	115						FREDERIC	
1979	7	HU	85				GLORIA			
1979	8	HU	75			HENRI				
1979	9	HU	65			SUBTROP 1				
1980	1	HU	165							ALLEN
1980	2	HU	85				BONNIE			
1980	3	HU	70			CHARLEY				
1980	4	TS	50		DANIELLE					

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1980	5	HU	65			EARL				
1980	6	HU	100					FRANCES		
1980	7	HU	70			GEORGES				
1980	8	TS	60		HERMINE					
1980	9	HU	90				IVAN			
1980	10	HU	85				JEANNE			
1980	11	HU	75			KARL				
—	—	—	—	—	—	—	—	—	—	—
1981	1	TS	50		ARLENE					
1981	2	TS	60		BRET					
1981	3	TS	50		CINDY					
1981	4	HU	70			DENNIS				
1981	5	HU	80			EMILY				
1981	6	HU	100					FLOYD		
1981	7	HU	90				GERT			
1981	8	HU	115						HARVEY	
1981	9	HU	105					IRENE		
1981	10	TS	45	JOSE						
1981	11	HU	75			KATRINA				
1981	12	TS	60		SUBTROP 3					
—	—	—	—	—	—	—	—	—	—	—
1982	1	HU	75			ALBERTO				
1982	2	TS	60		SUBTROP 1					
1982	3	TS	63		BERYL					
1982	4	TS	55		CHRIS					
1982	5	HU	115						DEBBY	
1982	6	TS	60		ERNESTO					
—	—	—	—	—	—	—	—	—	—	—
1983	1	HU	100					ALICIA		
1983	2	HU	70			BARRY				
1983	3	HU	65			CHANTAL				
1983	4	TS	55		DEAN					
—	—	—	—	—	—	—	—	—	—	—
1984	1	TS	50		SUBTROP 1					
1984	2	TS	45	ARTHUR						
1984	3	TS	35	BERTHA						
1984	4	TS	50		CESAR					
1984	5	HU	115						DIANA	
1984	6	TS	55		EDOUARD					
1984	7	TS	55		FRAN					
1984	8	TS	45	GUSTAV						
1984	9	HU	65			HORTENSE				
1984	10	TS	50		ISIDORE					
1984	11	HU	90				JOSEPHINE			
1984	12	HU	80			KLAUS				
1984	13	HU	70			LILI				
—	—	—	—	—	—	—	—	—	—	—
1985	1	TS	60		ANA					
1985	2	HU	65			BOB				
1985	3	HU	75			CLAUDETTE				
1985	4	HU	80			DANNY				
1985	5	HU	110					ELENA		
1985	6	TS	55		FABIAN					
1985	7	HU	125						GLORIA	
1985	8	TS	50		HENRI					

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	---	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1985	9	TS	60		ISABEL					
1985	10	HU	75			JUAN				
1985	11	HU	105					KATE		
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1986	1	TS	45	ANDREW						
1986	2	HU	75			BONNIE				
1986	3	HU	70			CHARLEY				
1986	4	TS	50		DANIELLE					
1986	5	HU	90				EARL			
1986	6	HU	75			FRANCES				
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1987	1	TS	40	NOT NAMED						
1987	2	HU	65			ARLENE				
1987	3	TS	45	BRET						
1987	4	TS	45	CINDY						
1987	5	TS	45	DENNIS						
1987	6	HU	110					EMILY		
1987	7	HU	65			FLOYD				
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1988	1	TS	35	ALBERTO						
1988	2	TS	45	BERYL						
1988	3	TS	45	CHRIS						
1988	4	HU	65			DEBBY				
1988	5	TS	55		ERNESTO					
1988	6	TS	50		NOT NAMED					
1988	7	HU	70			FLORENCE				
1988	8	HU	160							GILBERT
1988	9	HU	125						HELENE	
1988	10	TS	40	ISAAC						
1988	11	HU	125						JOAN	
1988	12	TS	60		KEITH					
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1989	1	TS	45	ALLISON						
1989	2	TS	45	BARRY						
1989	3	HU	70			CHANTAL				
1989	4	HU	90				DEAN			
1989	5	HU	90				ERIN			
1989	6	HU	75			FELIX				
1989	7	HU	125						GABRIELLE	
1989	8	HU	140							HUGO
1989	9	TS	60		IRIS					
1989	10	HU	75			JERRY				
1989	11	TS	50		KAREN					
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1990	1	TS	60		ARTHUR					
1990	2	HU	70			BERTHA				
1990	3	TS	45	CESAR						
1990	4	HU	85				DIRIA			
1990	5	TS	40	EDOUARD						
1990	6	TS	35	FRAN						
1990	7	HU	105					GUSTAV		
1990	8	TS	55		HORTENSE					
1990	9	HU	85				ISIDORE			
1990	10	HU	75			JOSEPHINE				
1990	11	HU	70			KLAUS				

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1990	12	HU	65			LILI				
1990	13	TS	55		MARCO					
1990	14	HU	75			NANA				
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1991	1	TS	45	ANA						
1991	2	HU	100					BOB		
1991	3	HU	115						CLAUDETTE	
1991	4	TS	45	DANNY						
1991	5	TS	50		ERIKA					
	3	TS	40	FABIAN						
		HU	85				GRACE			
1991	8	HU	65			UNNAMED				
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1992	1	TS		SUBTROP						
1992									ANDREW	
		HU	95				BONNIE CHARLEY			
1992	5	TS	55		DANIELLE					
1992	6	TS	55		EARL					
1992	7	HU	75			FRANCES				
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1993	1	TS	35	ARLENE						
1993	2	TS	50		BRET					
1993	3	TS	40	CINDY						
1993	4	TS	45	DENNIS						
1993	5	HU	100					EMILY		
1993	6	HU	65			FLOYD				
1993	7	HU	85				GERT			
1993	8	HU	65			HARVEY				
---	---	---	---	-----	-----	-----	-----	-----	-----	-----
1994	1	TS	55							
1994	2	TS	50							
1994	3	HU	70			CHRIS				
1994	4	TS	60		DEBBY					
1994	5	TS	50		ERNESTO					
1994	6	HU	95				FLORENCE			
1994	7	HU	75			GORDON				
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1995	1	HU	65							
1995	2	TS	60		BARRY					
1995	3	TS	60		CHANTAL					
1995	4	TS	40	DEAN						
1995	5	HU	80			ERIN				
1995	6	HU	120						FELIX	
1995	7	TS	60		GABRIELLE					
1995	8	HU	95				HUMBERTO			
1995	9	HU	95				IRIS			
1995	10	TS	35	JERRY						
1995	11	TS	45	KAREN						
1995	12	HU	130						LUIS	
1995	13	HU	100					MARILYN		
1995	14	HU	65			NOEL				
1995	15	HU	130						OPAL	
1995	16	TS	50		PABLO					
1995	17	HU	100					ROXANNE		

Atlantic Tropical Cyclones by Category, 1886-1996

year	no.	—	kts	category -1	category 0	category 1	category 2	category 3	category 4	category 5
1995	18	TS	55		SEBASTIEN					
1995	19	HU	75			TANYA				
—	—	—	—	—	—	—	—	—	—	—
1996	1	TS	40	ARTHUR						
1996	2	HU	100					BERTHA		
1996	3	HU	70			CESAR				
1996	4	HU	70			DOLLY				
1996	5	HU	125						EDOUARD	
1996	6	HU	105					FRAN		
1996	7	TS	40	GUSTAV						
1996	8	HU	120						HORTENSE	
1996	9	HU	100					ISIDORE		
1996	10	TS	60		JOSEPHINE					
1996	11	TS	45	KYLE						
1996	12	HU	100					LILI		
1996	13	HU	65			MARCO				