

Minutes of the
43rd Interdepartmental Hurricane Conference

The 1988 Atlantic Hurricane Season

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There were seven tropical storms and five hurricanes in the Atlantic-Caribbean-Gulf of Mexico region during 1988. A list of names and other statistics are listed in Table 1 and storm tracks are shown in Figure 1. The total of twelve compares to the previous 50-year average of 9.4 tropical storms and hurricanes per year.

Debby, Florence, Gilbert and Joan were landfalling hurricanes and Beryl, Chris and Keith were landfalling tropical storms. Gilbert wreaked havoc across the northwest Caribbean Sea and the northwest Gulf of Mexico, killing 318 persons. Gilbert's international damage estimate is five billion dollars. Joan was also a killer with 184 deaths in the southern Caribbean and a two billion dollar damage estimate.

Hurricane Gilbert's sea level pressure dropped to a new record low value of 888 millibars on September 13th in the northwest Caribbean. This record is for the Atlantic basin and Western Hemisphere and there have been numerous typhoons in the western Pacific Ocean with lower pressures.

Official track forecast errors for 1988 are listed by storm in Table 2. The Official errors were very small this year, averaging almost forty percent less than the previous ten-year average.

Table 3 lists a homogeneous comparison of the errors of four track forecast models and the Official forecast. CLIPER, the climatology/persistence statistical model also had rather low errors, suggesting that this year's storm tracks were smooth and predictable.

The QLM, a primitive equation dynamical model, had larger errors than all of the other models at all time periods, while the NHC83 statistical/dynamical model had smaller errors than all of the others at all time periods except for the Official at 12 hours. SANBAR, the barotropic dynamical model had smaller errors than the Official at 48 hours. A homogeneous comparison (not shown) between the QLM and its predecessor, the MFM, showed that the MFM had larger errors at all time periods.

Table 1. 1988 Atlantic hurricane season statistics

number	name	class ¹	dates ²	maximum sustained wind (kt)	lowest press. (mb)	U.S. damage (\$millions)	deaths
1	Alberto	T	5-8 Aug	35			
2	Beryl	T	8-10 Aug	45	1001	3.0	1
3	Chris	T	21-29 Aug	45	1005	0.5	4
4	Debby	H	31 Aug-5 Sep	65	991		10
5	Ernesto	T	3-5 Sep	55			
6	Florence	H	7-11 Sep	70	982	2.5	1
7	unnamed	T	7-10 Sep	50			
8	Gilbert	H	8-19 Sep	160	888	50.0	318
9	Helene	H	19-30 Sep	125			
10	Isaac	T	28 Sep-1 Oct	40			
11	Joan	H	10-23 Oct	125	932		216
12	Keith	T	17-24 Nov	60	985	3.0	

¹ T: tropical storm, wind speed 34 - 63 kt.
H: hurricane, wind speed 64 kt or higher.

² Dates begin at 0000 UTC and include tropical depression stage.

Table 2. Official track forecast errors (average in n. mi.), Atlantic, 1988,

storm	forecast period (hours)					
	0	12	24	36	48	72
Alberto (no. of cases)	15 (2)	42 (2)	- (0)	- (0)	- (0)	- (0)
Beryl	17 (4)	57 (4)	97 (2)	- (0)	- (0)	- (0)
Chris	48 (1)	144 (1)	- (0)	- (0)	- (0)	- (0)
Debby	7 (2)	21 (2)	- (0)	- (0)	- (0)	- (0)
Ernesto	6 (4)	116 (4)	210 (2)	- (0)	- (0)	- (0)
Florence	6 (9)	35 (9)	88 (7)	137 (5)	146 (3)	- (0)
Gilbert	11 (30)	26 (30)	48 (28)	72 (26)	109 (24)	191 (20)
Helene	16 (39)	54 (39)	93 (36)	136 (35)	162 (33)	229 (29)
Isaac	62 (1)	71 (1)	- (0)	- (0)	- (0)	- (0)
Joan	10 (44)	23 (44)	50 (42)	82 (40)	126 (38)	221 (34)
Keith	11 (16)	51 (16)	98 (14)	139 (12)	232 (10)	452 (6)
total	12 (152)	40 (152)	72 (131)	104 (118)	143 (108)	233 (89)

Table 3. Track model forecast errors (average in nautical miles), Atlantic, 1988, homogeneous comparison.

model	forecast period (hours)					
	0	12	24	36	48	72
Official (number of cases)	9 (47)	31 (47)	59 (42)	96 (39)	135 (36)	217 (27)
CLIPER	10	34	66	104	147	247
NHC83	10	32	56	90	118	176
QLM	11	63	100	149	198	291
SANBAR	10	35	62	98	128	246

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Fig. 1. Tropical storm and hurricane tracks for 1988.