

1987 Atlantic Verification Statistics
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In 1987, The National Hurricane Center issued track and intensity forecasts for all tropical cyclones in the Atlantic, Caribbean and Gulf of Mexico. These forecasts covered a 72-hour period and were updated every six hours while a tropical cyclone was in progress.

Forecasts for all tropical storms and hurricanes were verified by comparison with a "best track" which is a post-analysis of all available track and intensity data. Table 1 lists the official average track forecast errors for 1987. The largest errors were made during Hurricane Emily as a result of Emily's rapid acceleration across the north Atlantic. Despite these large errors, the 1987 averages were from six to ten percent less than the previous ten-year averages at all forecast periods, except for the initial position error which was six percent higher than the previous ten years.

Table 2 lists the average 1987 errors for a selection of track guidance models. These models were not all run for all forecast situations and it is not appropriate to use these errors to compare models. In order to compare models, they must be run on the same homogeneous set of cases as given in Table 3, which is a comparison of the official forecast and four models. NHC83, a statistical-dynamical model, out-performed the other models in this comparison and was even somewhat better than the official forecast at 24 and 48 hours. BAM, a dynamical model, did quite poorly at 12 and 24 hours, but improved to a respectable level at 48 and 72 hours. This poor performance at the early forecast periods is due to the fact that BAM does not weigh initial motion very highly.

Homogeneous comparisons were also made for other models, but this severely reduced the number of cases. In particular, when the MFM was included, only 16 cases were available as shown in Table 4. This comparison shows that the MFM did quite poorly this year, in contrast to its outstanding performance at 48 and 72 hours in prior years.

Table 5 lists 1987 official wind speed errors. There was a slight negative bias beyond 12 hours and the mean absolute errors were much lower than the previous ten-year average at all time periods. A homogeneous comparison between the official forecasts and the SHIFOR model forecasts is given in Table 6. The SHIFOR errors had a positive bias and its mean absolute errors were almost twice as large as the official at 72 hours.

Table 1

1987 official average track forecast errors (nautical miles)					
storm	forecast period (hours)				
	0	12	24	48	72
Arlene (no. of cases)	20 (46)	55 (46)	114 (44)	238 (40)	310 (32)
Bret	27 (15)	47 (15)	70 (13)	126 (9)	187 (5)
Cindy	13 (11)	59 (11)	89 (9)	188 (5)	240 (1)
Dennis	20 (27)	52 (27)	86 (25)	143 (21)	227 (17)
Emily	17 (22)	60 (22)	156 (20)	352 (16)	660 (12)
Floyd	12 (11)	41 (11)	103 (9)	339 (5)	580 (1)
total	19 (132)	53 (132)	108 (120)	228 (96)	345 (68)
1987 range	0-65	0-167	11-657	15-908	11-1337
1977-1986 avg. (avg. no. of cases)	18 (126)	59 (122)	120 (108)	245 (76)	366 (54)
1987 departure from 1976-1985 avg.	+06%	-10%	-10%	-07%	-06%

Table 2

1987 average track forecast errors (nautical miles)					
all models all forecasts non-homogeneous					
model	forecast period (hours)				
	0	12	24	48	72
Official (no. of cases)	19 (132)	53 (132)	108 (120)	228 (96)	345 (68)
NHC72	19 (130)	57 (130)	121 (118)	277 (93)	404 (69)
CLIPER	19 (131)	58 (131)	124 (119)	290 (95)	448 (71)
NHC73	18 (35)	47 (35)	110 (32)	287 (27)	447 (23)
SANBAR	19 (41)	65 (41)	140 (37)	319 (26)	290 (14)
MFM	17 (16)	109 (16)	185 (14)	426 (11)	716 (8)
NHC83	20 (130)	53 (130)	96 (119)	208 (95)	348 (71)
BAM	17 (68)	77 (68)	157 (63)	251 (51)	427 (26)

Table 3



Table 4

1987 average track forecast errors (nautical miles)					
homogeneous comparison					
model	forecast period (hours)				
	0	12	24	48	72
Official		45	123	258	483
NHC72		56	145	365	640
CLIPER		56	132	384	749
NHC83		51	111	265	475
MFM		109	185	426	716
no. of cases		(16)	(14)	(11)	(8)

Table 5

1987 official maximum sustained wind speed forecast errors (knots)					
	forecast period (hours)				
	0	12	24	48	72
mean	+0.7	+0.3	-0.6	-0.9	-1.6
mean absolute	4.0	5.6	7.6	10.1	12.5
standard deviation	5.8	8.6	12.0	15.0	14.4
(no. of cases)	(132)	(132)	(119)	(96)	(67)
maximum error	+20	-30	-50	-55	-40
1977-1986					
mean absolute	5.6	8.8	12.6	17.0	20.2
(avg. no. of cases)	(126)	(121)	(106)	(74)	(52)
1987 mean absolute departure from 1977-1986 avg.					
	-29%	-36%	-40%	-41%	-38%
Mean absolute error by storm					
Arlene	3.7	5.0	5.6	9.5	15.3
(no. of cases)	(46)	(46)	(44)	(40)	(31)
Bret	2.7	3.0	5.8	11.7	12.0
	(15)	(15)	(13)	(9)	(5)
Cindy	4.1	2.7	5.0	1.0	0.0
	(11)	(11)	(8)	(5)	(1)
Dennis	1.9	2.2	2.4	4.3	5.6
	(27)	(27)	(25)	(21)	(17)
Emily	7.7	14.1	20.3	21.9	16.3
	(22)	(22)	(20)	(16)	(12)
Floyd	4.1	6.4	9.4	8.0	15.0
	(11)	(11)	(9)	(5)	(1)

Table 6

1987 average wind speed forecast errors (knots)					
homogeneous comparison					
model	forecast period (hours)				
	0	12	24	48	72
Official					
mean	+1.3	+0.1	-1.5	-4.8	-7.4
mean absolute	4.3	5.6	6.4	8.3	10.7
standard deviation	6.2	8.4	9.6	10.7	12.0
SHIFOR					
mean	+1.3	+1.1	+2.2	+7.0	+12.9
mean absolute	4.2	6.1	8.1	14.5	20.2
standard deviation	6.2	7.8	10.0	15.2	20.9
(No. of cases)	(101)	(101)	(87)	(60)	(38)

1987 average track forecast errors (nautical miles)					
homogeneous comparison					
forecast period (hours)					
model	0	12	24	48	72
Official		49	134	311	497
CLIPER	458	630		59	146
SANBAR	338	364		67	140
NHC83	296	385		53	119
BAM	260	346		52	213
(13)	(5)	no. of cases		(18)	(17)

