1996 NATIONAL HURRICANE CENTER FORECAST VERIFICATION

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Introduction

Every six hours, the National Hurricane Center issues a 72-hour track and intensity forecast for all tropical cyclones in the north Atlantic and east Pacific basins. Official forecasts are verified by comparison with the best-track, based on a post-storm analysis of all available track and intensity data. The best-track data used for verification excludes extratropical, subtropical and tropical depression stages. Climatology and persistence forecasts are used as standards for skill in comparing forecasts: the CLIPER model forecasts for track and the SHIFOR model forecasts for intensity.

Track forecast errors are the great circle distance between a forecast position and a best-track position for the same time. A tropical cyclone's intensity is defined as the maximum one-minute wind speed ten meters above the ground. This maximum speed can occur anywhere within the cyclone's circulation. Forecast and best-track intensities are rounded to the closest five knots. Intensity forecast errors are the absolute difference between the forecast wind speed and the best-track wind speed for the same time. Model objective track guidance is of two types, late or early. Late models require the completion of the Aviation Run of the MRF model and are run every twelve hours, three hours after synoptic time. Although they provide the best guidance, their forecasts arrive too late and too infrequent for the forecaster to use in the same six-hour cycle. Various strategies are used to provide the forecaster with more timely guidance derived from the late models. These are the early models and are available at any time. Table 1 defines the model and other abbreviations used in this report.

North Atlantic

The 1996 North Atlantic hurricane season had 13 tropical storms and hurricanes. This is more than the annual average of 10 but far less then the near record 19 spawned last year. There were 286 official forecasts issued for tropical storms and hurricanes, nearly 40 percent fewer than 1995. The average official forecast track errors by storm are listed in Table 2.1. Table 2.2 gives the average official and CLIPER track error for 1996 and for the previous ten-year average. While the 1996 official errors are lower than the ten-year average at all time periods, the errors at 48-hour (128 nm) and 72-hour (190 nm) periods are lowest since records began in 1970. The previous smallest errors occurred in 1988 and were 141 nm for 48-hour and 226 nm for 72-hour periods. The 1996 departures from the ten-year average error by forecast period are given in the latter portion of Table 2.2. Although the official forecast errors are low compared to their ten-

year average, this year's CLIPER errors were at least 10 percent lower than their ten-year average for all time periods, except 72 hours.

Table 3.1 and Table 3.2 are homogeneous comparisons of the late and early Atlantic track guidance models. Of the late models, the GFDL model had the smallest forecast errors at all time periods. Remarkably, the AVNO model's errors were also low, producing, for the first time since 1992, results comparable to other late guidance. The skill of the GFDL model is reflected in the GFDI forecasts of the early models as shown in Table 3.2. Still, the official forecast has error smaller than the guidance at the 48 and 72-hour forecast periods. The similarity of the error between the official forecast and GFDI model at corresponding time periods may indicate the reliance the forecasters have developed in this model.

The average official absolute wind speed errors by storm are listed in Table 4.1. Table 4.2 gives the average official and SHIFOR absolute wind speed errors for 1996 and the previous six-year average. From the departure portion of this Table, the official intensity forecast errors are larger than the corresponding six-year average for the 12 and 24-hour forecast periods, the same at the 36-hour, and smaller at the 48 and 72-hour forecast periods. Nevertheless, the 1996 official intensity forecasts must be viewed as being skillful because the 1996 average SHIFOR errors were at least 9 percent higher than their six-year average for all time periods.

Table 5 displays the absolute wind speed errors for the objective guidance from early and late models. The official forecast errors are smaller than all the guidance errors at all time periods.

East Pacific

The 1996 East Pacific hurricane season had only 9 tropical storms and hurricanes, second in inactivity only to 1977 with 8. There were only 108 official forecasts issued for tropical storms and hurricanes in the basin this year, about 40 percent less than the past eight-year average. The average official forecast track errors by storm are listed in Table 6.1. Table 6.2 gives the average official and CLIPER track errors for 1996 and the previous eight years, 1988 to 1995. This year's error departures from the eight-year average error are given in the latter portion of the Table. Except at 72 hours, this year's CLIPER errors are large compared to their eight-year average error. The official forecast track errors are worse than their eight-year average at the 12 and 24-hour forecast periods but better than for the remainder. Nevertheless, like the Atlantic intensity errors, the 1996 east Pacific official track errors demonstrate real skill at all time periods compared to CLIPER.

Table 7.1 and Table 7.2 are homogeneous comparisons of various track guidance for the east Pacific late and early models, respectively. Surprisingly, except for CLIPER, all late models performed quite well but only the GFDL had smaller error than the official forecast at the 36-hour period. Not shown are the UKMET and NOGAPS forecasts, which were few and would have reduced the number of cases substantially. Table 7.2 shows that the official forecast has smaller errors than all the guidance models, indicating that the available guidance appears to be used to good advantage.

Table 8.1 gives the average official absolute wind speed errors by storm. The average official and SHIFOR absolute wind speed errors for 1996 and the previous six-year average are in Table 8.2. In the departure portion of the Table, the official intensity forecast error is larger than the corresponding six-year average at the 12 and 24-hour forecast periods and smaller at the 36, 48 and 72-hour forecast periods. The same is true for SHIFOR. This indicates that on average the 1996 official intensity forecasts were skillful in the early forecast periods and less

skillful in the latter periods against SHIFOR.

The absolute wind speed errors for the objective guidance from early and late models are given in Table 9. The official errors are smaller than the model guidance errors for all time periods. In the homogenous comparison, SHIFOR has the smallest absolute wind speed error, except at the 12-hour forecast period.

The preceding conclusions for the 1996 East Pacific hurricane season should be accepted cautiously. This is because there were a small number of tropical cyclones and because their best tracks and intensities were very different than the normal climatology, as indicated by the large average CLIPER and SHIFOR errors for this year.

Conclusions

1. The official 1996 track forecasts are better than the long-term average for both Atlantic and east Pacific basins.
2. The official 1996 Atlantic track forecast errors are the smallest on record at the 48 and 72-hour forecast periods.
3. The early objective track guidance appears to be used to good advantage for both basins by the forecasters.
4. The GFDL guidance model for the Atlantic basin produced the best track forecasts.
5. Forecasting intensity remains a difficult problem. New objective guidance techniques are needed to improve intensity forecasts for tropical cyclones.

TABLE 1

MODEL ABBREVIATIONS

(Click here for model descriptions)

OFCL	Official track or intensity forecasts
OFCI	Official Track Forecast Interpolated from the previous 6 hours
CLIP	CLImatology and PERsistence track model - CLIPER (Atl and Pac)
BAMD	Beta Advection Model Deep (Global)
BAMM	Beta Advection Model Medium (Global)
BAMS	Beta Advection Model Shallow (Global)
A90E	NHC90 Statistical-Dynamic Model...early version (Atl)
A90L	NHC90 Statistical-Dynamic Model...late version (Atl)
P91E	NHC91 Statistical-Dynamic Model...early version (Pac)
P91L	NHC91 Statistical-Dynamic Model...late version (Pac)
LBAR	A simplified version of VICBAR (Atl and Pac)
VBAR	VICtor Ooyama's BARotropic model - VICBAR (Atl)
GFDL	GFDL Model (Atl and Pac - track and intensity)[1]
GFDI	GFDL Interpolated Track and Intensity (6- and 12-hour)

AVNO MRF Model Aviation Run (Global)

UKM UKMET Model (Global)

NGPS Navy Operational Global Atmospheric Prediction System - NOGAPS

SHFR Statistical Hurricane Intensity Forecast Model - SHIFOR (Atl and Pac)

SHIP Statistical Hurricane Intensity Prediction Scheme - SHIPS (Atl and Pac)[1]

[1] Intensity forecasts from these models are considered experimental.

TABLE 2.1

NORTH ATLANTIC
1996 OFFICIAL AVERAGE TRACK FORECAST ERRORS (NM) BY STORM

FORECAST ERRORS (NM) FOR AL0196 ARTHUR

	00	12	24	36	48	72
OFCL	9.4	33.6	52.3			
#CASES	4	4	2	0	0	0

FORECAST ERRORS (NM) FOR AL0296 BERTHA

	00	12	24	36	48	72
OFCL	9.4	46.9	83.9	104.8	132.6	195.2
#CASES	34	34	32	30	28	24

FORECAST ERRORS (NM) FOR AL0396 CESAR

	00	12	24	36	48	72
OFCL	14.4	56.2	109.4	149.7	175.6	141.6
#CASES	12	12	10	8	6	2

FORECAST ERRORS (NM) FOR AL0496 DOLLY

	00	12	24	36	48	72
OFCL	10.0	40.8	53.6	94.2	137.4	182.1
#CASES	13	11	9	7	6	5

FORECAST ERRORS (NM) FOR AL0596 EDOUARD

	00	12	24	36	48	72
OFCL	5.3	25.7	46.0	66.4	84.6	118.3
#CASES	46	46	44	42	40	36

FORECAST ERRORS (NM) FOR AL0696 FRAN

	00	12	24	36	48	72
OFCL	10.8	35.5	66.7	102.6	137.1	185.3
#CASES	39	39	37	35	33	29

FORECAST ERRORS (NM) FOR AL0796 GUSTAV

	00	12	24	36	48	72
OFCL	17.6	44.5	64.5	86.0	122.4	157.4
#CASES	16	16	14	12	10	6

FORECAST ERRORS (NM) FOR AL0896 HORTENSE

	00	12	24	36	48	72
OFCL	10.5	42.0	67.3	103.8	129.1	243.5
#CASES	32	32	30	28	26	22

FORECAST ERRORS (NM) FOR AL0996 ISIDORE

	00	12	24	36	48	72
OFCL	13.8	44.2	74.5	100.5	125.5	202.5
#CASES	23	23	21	19	17	13

FORECAST ERRORS (NM) FOR AL1096 JOSEPHINE

	00	12	24	36	48	72
OFCL	9.2	45.8	109.5			
#CASES	4	4	2	0	0	0

FORECAST ERRORS (NM) FOR AL1196 KYLE

	00	12	24	36	48	72
OFCL	6.0	37.8				
#CASES	1	1	0	0	0	0

FORECAST ERRORS (NM) FOR AL1296 LILI

	00	12	24	36	48	72
OFCL	7.3	57.7	88.9	119.0	143.0	201.0
#CASES	42	42	40	38	36	32

FORECAST ERRORS (NM) FOR AL1396 MARCO

	00	12	24	36	48	72
OFCL	14.9	44.8	83.6	117.0	162.8	274.9
#CASES	24	22	19	17	15	14

TABLE 2.2

NORTH ATLANTIC
1996 OFFICIAL AND CLIPER AVERAGE TRACK ERRORS FOR A HOMOGENEOUS SAMPLE

PERIOD	00	12	24	36	48	72	(hr)
OFCL	10.2	42.4	72.0	100.6	128.1	189.8	(nm)
CLIP	10.2	48.1	95.9	153.9	213.7	340.0	(nm)
#CASES	290	286	260	236	217	183	

1986 - 1995 OFFICIAL AND CLIPER AVERAGE TRACK ERRORS FOR A HOMOGENEOUS SAMPLE

PERIOD	00	12	24	36	48	72	(hr)
OFCL	14.2	49.0	93.4	136.2	181.1	273.0	(nm)

CLIP	14.2	57.0	115.3	178.8	242.3	353.0	(nm)
#CASES	1677	1668	1482	1312	1153	880	

1996 OFFICAL AND CLIPER AVERAGE TRACK ERROR DEPARTURE FROM THE 1986 - 1995 OFFICAL AND CLIPER AVERAGE TRACK ERROR

PERIOD	00	12	24	36	48	72	(hr)
OFCL DEPARTURE	-28	-13	-23	-26	-29	-30	(%)
CLIP DEPARTURE	-28	-16	-17	-14	-12	-04	(%)

TABLE 3.1

NORTH ATLANTIC
1996 AVERAGE MODEL TRACK ERROR (NM) FOR A HOMOGENEOUS SAMPLE (LATE*)

	00	12	24	36	48	72
OFCL	10.9	43.1	73.7	107.8	141.2	226.8
CLIP	10.9	48.9	99.4	169.7	241.7	402.1
A90L	10.9	45.1	81.0	128.5	174.5	250.1
GFDL	10.9	40.8	65.5	93.1	117.2	166.0
VBAR	10.9	40.9	72.0	105.7	146.3	321.2
AVNO	10.9	55.9	97.6	137.5	170.8	218.5
UKM	10.9	55.7	94.5	144.6	171.0	247.5
NGPS	10.9	56.4	81.7	111.7	137.8	223.2
#CASES	61	61	60	55	48	36

* Although CLIPER is an early model, it is included here for reference.

TABLE 3.2

NORTH ATLANTIC
1996 AVERAGE MODEL TRACK ERRORS (NM) FOR A HOMOGENEOUS SAMPLE (EARLY)

	00	12	24	36	48	72
OFCL	10.1	41.6	70.6	98.7	124.8	186.3
CLIP	10.1	48.1	96.5	154.8	214.6	340.6
A90E	10.1	43.6	79.2	122.5	164.6	256.2
BAMD	10.1	44.5	82.0	123.3	173.4	287.3
BAMM	10.1	47.2	85.8	122.9	161.9	236.0
BAMS	10.1	58.6	108.9	157.4	205.2	299.5
LBAR	10.1	40.1	72.6	109.3	159.6	296.7
OFCI	10.1	43.0	74.2	103.6	132.3	208.4

GFDI	10.1	40.7	67.2	96.3	127.3	200.3
#CASES	270	267	242	219	204	172

TABLE 4.1

NORTH ATLANTIC
1996 OFFICIAL AVERAGE ABSOLUTE WIND SPEED FORECAST ERROR (KT) BY STORM

FORECAST ERRORS (KT) FOR AL0196 ARTHUR

	00	12	24	36	48	72
OFCL	3.8	3.8	.0			
#CASES	4	4	2	0	0	0

FORECAST ERRORS (KT) FOR AL0296 BERTHA

	00	12	24	36	48	72
OFCL	4.6	10.7	13.0	15.0	15.2	15.4
#CASES	34	34	32	30	28	24

FORECAST ERRORS (KT) FOR AL0396 CESAR

	00	12	24	36	48	72
OFCL	5.0	7.5	10.5	14.4	13.3	2.5
#CASES	12	12	10	8	6	2

FORECAST ERRORS (KT) FOR AL0496 DOLLY

	00	12	24	36	48	72
OFCL	5.0	8.2	7.8	11.4	19.2	13.0
#CASES	13	11	9	7	6	5

FORECAST ERRORS (KT) FOR AL0596 EDOUARD

	00	12	24	36	48	72
OFCL	3.0	6.1	9.3	13.5	16.9	21.1
#CASES	46	46	44	42	40	36

FORECAST ERRORS (KT) FOR AL0696 FRAN

	00	12	24	36	48	72
OFCL	4.5	5.1	9.9	10.9	10.9	9.3
#CASES	39	39	37	35	33	29

FORECAST ERRORS (KT) FOR AL0796 GUSTAV

	00	12	24	36	48	72
OFCL	.9	3.1	5.4	9.2	14.5	21.7
#CASES	16	16	14	12	10	6

FORECAST ERRORS (KT) FOR AL0896 HORTENSE

	00	12	24	36	48	72
OFCL	5.3	8.4	12.0	15.0	18.7	25.5

#CASES	32	32	30	28	26	22

FORECAST ERRORS (KT) FOR AL0996 ISIDORE

	00	12	24	36	48	72
OFCL	2.4	4.3	8.3	12.1	17.6	26.9
#CASES	23	23	21	19	17	13

FORECAST ERRORS (KT) FOR AL1096 JOSEPHINE

	00	12	24	36	48	72
OFCL	3.8	11.3	15.0			
#CASES	4	4	2	0	0	0

FORECAST ERRORS (KT) FOR AL1196 KYLE

	00	12	24	36	48	72
OFCL	15.0	15.0				
CASES	1	1	0	0	0	0

FORECAST ERRORS (KT) FOR AL1296 LILI

	00	12	24	36	48	72
OFCL	2.4	4.9	9.9	14.2	17.5	20.6
CASES	42	42	40	38	36	32

FORECAST ERRORS (KT) FOR AL1396 MARCO

	00	12	24	36	48	72
OFCL	8.3	13.0	16.1	10.6	10.0	10.0
#CASES	24	22	19	17	15	14

TABLE 4.2

NORTH ATLANTIC
1996 AVERAGE ABSOLUTE WIND SPEED ERROR FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)
OFCL	4.1	7.0	10.4	13.0	15.5	18.1	(kt)
SHFR	4.1	9.1	12.6	15.1	18.2	21.8	(kt)
#CASES	290	286	260	236	217	183	

1990 - 19965AVERAGE ABSOLUTE WIND SPEED ABSOLUTE ERROR FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)
OFCL	3.4	6.6	10.3	13.0	15.7	19.3	(kt)
SHFR	3.4	8.2	11.6	13.9	15.9	17.7	(kt)
#CASES	1083	1075	951	844	739	569	

1996 OFFICIAL AND SHIFOR AVERAGE ABSOLUTE WIND SPEED ERROR DEPARTURE FROM THE 1990 - 1995 OFFICIAL AND SHIFOR AVERAGE ABSOLUTE WIND SPEED ERROR

PERIOD	00	12	24	36	48	72	(hr)
OFCL DEPARTURE	+20	+06	+01	00	-01	-06	(%)
SHFR DEPARTURE	+20	+11	+09	+09	+14	+23	(%)

TABLE 5

NORTH ATLANTIC
1996 AVERAGE MODEL ABSOLUTE WIND SPEED ERROR (KT) FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72
OFCL	3.8	7.6	10.9	13.1	15.5	18.8
SHFR	3.8	9.0	12.1	14.4	17.1	21.4
SHIP	3.8	9.0	11.8	13.6	16.5	21.0
GFDI	3.8	9.5	12.1	14.9	17.5	18.9
GFDL	3.8	17.5	17.7	17.3	17.7	18.7
#CASES	128	126	116	107	99	80

TABLE 6.1

EAST PACIFIC
1996 OFFICIAL AVERAGE TRACK FORECAST ERRORS (NM) BY STORM

FORECAST ERRORS (NM) FOR EP0196 UNNAMED

	00	12	24	36	48	72
OFCL	30.2	49.0				
#CASES	2	2	0	0	0	0

FORECAST ERRORS (NM) FOR EP0396 ALMA

	00	12	24	36	48	72
OFCL	5.8	34.4	65.3	89.6	111.8	129.6
#CASES	18	18	16	14	12	8

FORECAST ERRORS (NM) FOR EP0496 BORIS

	00	12	24	36	48	72
OFCL	11.3	27.6	59.1	101.4		
#CASES	6	6	4	2	0	0

FORECAST ERRORS (NM) FOR EP0596 CRISTINA

	00	12	24	36	48	72
OFCL	10.8	59.8	118.2	158.7		
#CASES	5	5	3	1	0	0

FORECAST ERRORS (NM) FOR EP0796 DOUGLAS

	00	12	24	36	48	72
OFCL	8.9	30.3	60.8	79.9	87.7	82.9
#CASES	26	26	24	22	20	16

FORECAST ERRORS (NM) FOR EP0896 ELIDA

	00	12	24	36	48	72
OFCL	13.6	34.9	61.9	95.3	135.5	175.2
#CASES	11	11	9	7	5	1

FORECAST ERRORS (NM) FOR EP0996 FAUSTO

	00	12	24	36	48	72
OFCL	14.2	29.3	47.5	55.1	86.6	292.9
#CASES	14	14	12	10	8	4

FORECAST ERRORS (NM) FOR EP1096 GENEVIEVE

	00	12	24	36	48	72
OFCL	34.9	72.0	145.9	231.9	283.5	
#CASES	15	15	11	7	4	0

FORECAST ERRORS (NM) FOR EP1196 HERNAN

	00	12	24	36	48	72
OFCL	20.4	66.3	111.8	143.8	176.1	252.4
#CASES	11	11	9	7	5	1

TABLE 6.2

EAST PACIFIC
1996 OFFICIAL AND CLIPER AVERAGE TRACK ERRORS FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)
OFCL	14.9	42.4	77.7	103.2	120.0	132.1	(nm)
CLIP	14.9	47.9	91.0	136.6	172.9	226.8	(nm)
#CASES	108	108	88	70	54	30	

EAST PACIFIC
1988 - 1995 OFFICIAL AND CLIPER AVERAGE TRACK ERRORS FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)

OFCL	12.8	38.6	71.1	105.3	138.7	195.8	(nm)
CLIP	12.8	40.9	76.8	116.7	156.6	225.6	(nm)
#CASES	2185	2180	1970	1752	1553	1198	

1996 OFFICIAL AND CLIPER AVERAGE ERROR DEPARTURE FROM THE 1988 - 1995 OFFICIAL AND CLIPER AVERAGE TRACK ERROR

PERIOD	00	12	24	36	48	72	(hr)
OFCL DEPARTURE	+16	+10	+08	-02	-13	-33	(%)
CLIP DEPARTURE	+16	+17	+18	+17	+10	+01	(%)

TABLE 7.1

EAST PACIFIC
1996 AVERAGE MODEL TRACK ERROR (NM) FOR A HOMOGENEOUS SAMPLE (LATE*)

	00	12	24	36	48	72
OFCL	17.4	44.2	80.6	110.5	124.4	143.3
CLIP	17.4	52.1	99.6	156.9	184.3	227.1
P91L	17.4	50.7	90.6	125.3	147.0	147.3
GFDL	17.4	59.0	94.1	108.7	145.7	158.2
AVNO	17.4	61.6	92.9	124.7	151.8	148.4
#CASES	42	42	32	21	17	7

* Although CLIPER is an early model, it is included here for reference.

TABLE 7.2

EAST PACIFIC
1996 AVERAGE MODEL TRACK ERRORS (NM) FOR A HOMOGENEOUS SAMPLE (EARLY)

	00	12	24	36	48	72
OFCL	14.5	44.2	83.5	110.0	121.8	135.6
CLIP	14.5	51.0	98.2	151.1	188.0	214.1
P91E	14.5	50.0	87.2	120.0	149.2	152.9
BAMD	14.5	52.1	93.7	125.6	144.4	152.8
BAMM	14.5	51.7	92.1	128.2	154.7	179.3
BAMS	14.5	52.0	94.2	139.5	169.5	198.9
LBAR	14.5	47.5	86.8	122.0	156.1	206.6
OFCI	14.5	50.6	86.7	113.1	132.1	146.5
GFDI	14.5	60.8	103.5	131.6	147.8	190.2
#CASES	81	81	63	46	34	13

TABLE 8.1

EAST PACIFIC
1996 OFFICIAL AVERAGE ABSOLUTE WIND SPEED FORECAST ERROR (KT) BY STORM

FORECAST ERRORS (KT) FOR EP0196 UNNAMED

	00	12	24	36	48	72
OFCL	12.5	2.5				
#CASES	2	2	0	0	0	0

FORECAST ERRORS (KT) FOR EP0396 ALMA

	00	12	24	36	48	72
OFCL	1.9	8.6	13.1	11.4	17.1	19.4
#CASES	18	18	16	14	12	8

FORECAST ERRORS (KT) FOR EP0496 BORIS

	00	12	24	36	48	72
OFCL	4.2	11.7	20.0	15.0		
#CASES	6	6	4	2	0	0

FORECAST ERRORS (KT) FOR EP0596 CRISTINA

	00	12	24	36	48	72
OFCL	.0	4.0	8.3	15.0		
#CASES	5	5	3	1	0	0

FORECAST ERRORS (KT) FOR EP0796 DOUGLAS

	00	12	24	36	48	72
OFCL	4.8	7.3	12.7	17.7	19.5	19.4
#CASES	26	26	24	22	20	16

FORECAST ERRORS (KT) FOR EP0896 ELIDA

	00	12	24	36	48	72
OFCL	2.7	5.9	10.0	10.0	13.0	30.0
#CASES	11	11	9	7	5	1

FORECAST ERRORS (KT) FOR EP0996 FAUSTO

	00	12	24	36	48	72
OFCL	2.9	10.4	20.0	16.5	16.9	11.3
#CASES	14	14	12	10	8	4

FORECAST ERRORS (KT) FOR EP1096 GENEVIEVE

	00	12	24	36	48	72
OFCL	2.0	4.0	8.6	15.7	23.8	
#CASES	15	15	11	7	4	0

FORECAST ERRORS (KT) FOR EP1196 HERNAN

	00	12	24	36	48	72
OFCL	4.1	9.5	12.2	13.6	12.0	30.0
#CASES	11	11	9	7	5	1

TABLE 8.2

EAST PACIFIC
1996 AVERAGE ABSOLUTE WIND SPEED ERROR FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)
OFCL	3.3	7.5	13.1	14.8	17.6	19.0	(kt)
SHFR	3.3	9.3	13.7	16.1	16.1	18.5	(kt)
#CASES	108	108	88	70	54	30	

1990 - 1995 AVERAGE ABSOLUTE WIND SPEED ABSOLUTE ERROR FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72	(hr)
OFCL	3.0	7.0	11.9	15.9	18.5	21.5	(kt)
SHFR	3.0	7.8	13.0	17.1	20.1	23.6	(kt)
#CASES	1801	1797	1636	1478	1319	1032	

1996 OFFICIAL AND SHIFOR AVERAGE ABSOLUTE WIND SPEED ERROR DEPARTURE FROM THE 1988 - 1995 OFFICIAL AND SHIFOR AVERAGE ABSOLUTE WIND SPEED ERROR

PERIOD	00	12	24	36	48	72	(hr)
OFCL DEPARTURE	+10	+07	+10	-07	-05	-12	(%)
SHFR DEPARTURE	+10	+20	+05	-06	-20	-22	(%)

TABLE 9

EAST PACIFIC
1996 AVERAGE MODEL INTENSITY ABSOLUTE ERRORS (KT) FOR A HOMOGENEOUS SAMPLE

	00	12	24	36	48	72
OFCL	2.9	7.1	14.5	15.6	15.8	9.0
SHFR	2.9	8.0	13.4	13.8	10.8	5.8
SHIP	2.9	7.5	13.8	13.9	13.7	9.8
GFDI	2.9	10.1	18.0	20.5	26.5	18.4
GFDL	2.9	20.1	23.5	22.4	17.0	13.4

#CASES	26	26	21	17	13	5