

NOAA TECHNICAL MEMORANDUM NWS NHC 40

ANNUAL DATA AND VERIFICATION TABULATION
ATLANTIC TROPICAL CYCLONES 1987

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Miami, Florida
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INTRODUCTION

This is the Fourteenth report of an annual series prepared by the National Hurricane Center (NHC) to provide a source of summarized data on Atlantic tropical cyclones. It will not duplicate the narrative overview of the hurricane season or the description of individual storms, which will continue to be published in the Monthly Weather Review. In addition to data supplied by the National Weather Service, materials have been furnished by the NOAA Tropical Satellite and Analysis Center of NHC, and the CARCAH (Chief Aerial Reconnaissance Coordination, all Hurricanes). This report also includes Probability Forecasts issued with advisories on landfalling United States tropical storms and hurricanes (Appendix B).

OBJECTIVE FORECAST TECHNIQUES

The following tropical cyclone prediction models were used at the National Hurricane Center for forecasting motion on an operational basis:

1. NHC-67 (Miller, Hill, Chase, 1968). A stepwise screening regression model using predictors derived from the current and 24-hour old 1000, 700, and 500 mb data, including persistence during the early forecast periods.
2. SANBAR (Sanders and Burpee, 1968). A filtered barotropic model using input data derived from the 1000 to 100 mb pressure weighted winds. The model requires use of "bogus" data in data-void areas. The system was modified by Pike (1972) so that the initial wind field near the storm would conform to the current storm motion.
3. HURRAN (Hope and Neumann, 1970). An analog system using as a data base the tracks of all Atlantic tropical storms and hurricanes dating back to 1886.
4. CLIPER (Neumann, 1972). Stepwise multiple screening regression using the predictors derived from climatology and persistence.
5. NHC-72 (Neumann, Hope, Miller, 1972). A modified stepwise multiple screening regression system which combines the NHC-67 concept and CLIPER system into a single model.
6. NHC-73 (Neumann and Lawrence, 1973). Similar in concept to the NHC-72 except it also uses the "perfect prog" and MOS (model output statistics) methods to introduce NMC (National Meteorological Center) numerical prognostic data into the prediction equations.
7. NMC MFM MODEL (Hovermale, 1975). A ten-level baroclinic model which uses a moving fine mesh (MFM) grid nested within the coarser NMC fixed grid primitive equation (PE) model.

8. NHC-83 MODEL (Neumann, 1983). NHC-83 is a Statistical-Dynamical model. That is, it uses the output from a numerical model but in a statistical prediction framework. Some features of the NHC-83 model are: "perfect prog" through 84 hours, deep-layer-mean height fields, avoidance of predictors in deep tropics, graphical output and forecasts available to meet advisory deadlines.
9. BAM is the Beta and Advection Model and is a modification of the Pocket Hurricane Model (Holland, 1983). Tropical cyclone motion is determined by the application of a barotropic vorticity equation on a beta plane to large-scale flow fields taken from NMC analyses and primitive equation model forecasts.

In addition, operational forecasts of tropical cyclone intensity changes in knots at 12-hourly intervals out to 72 hours are generated by a program named SHIFOR (Statistical Hurricane Intensity Forecasts). Generation of the forecast equations was done by multiple screening regression technique using historical tropical cyclone data as input. Results over the past several years have shown that SHIFOR and official intensity forecasts have comparable skill scores.

The National Hurricane Center uses the above models as guidance in the formulation of its forecasts. The hurricane forecaster also makes extensive use of analysis and prognoses produced by NMC and TSAC (Tropical Satellite and Analysis Center) in Miami.

VERIFICATION

Verification statistics for the 1987 season are shown in Table 1. The initial position error in Table 1 is the difference between the operational initial position and that determined during post analysis (best track position). The forecast displacement error is the vector difference between the forecast displacement and the actual displacement computed from the best-track positions. Landfall prediction errors for the official forecasts are given in Table 2a and 2b. These are defined as the distance from the predicted landfall point, made 24 hours prior to actual landfall, to the actual landfall point. In cases where a storm either crossed an island or made landfall when predicted to remain offshore, the error was designated from the landfall point to the nearest point on the forecast track.

Tropical cyclone warning lead times for the United States landfalling storms are given in Table 3a. A summary of the warning lead times 1970-1987 for hurricanes only and for both tropical storms and hurricanes is given in Table 3b. The length of time between the issuance of the warnings and the time that the center crossed the coast, as determined from the "best track", was taken as the warning lead time. A more complete discussion of the verification of tropical cyclone warning lead times can be found in the 1977 Annual Data and Verification Tabulation (Lawrence, Herbert and Staff, 1979).

DATA SUMMARIES

A summary of the 1987 North Atlantic tropical cyclone statistics is given in Table 4. Tracks of the 1987 storms and hurricanes are shown in figure 1.

The best track, initial, and forecast positions for the 1987 systems are in Table 5, along with initial position and forecast errors, and average errors.

Table 6 lists all center fix positions and intensity evaluations used operationally at the National Hurricane Center during the 1987 season. Fixes are in chronological order, and include those obtained by aerial reconnaissance penetrations, satellite (Miami TSAC), and land-based radar. The legend precedes the initial table.

Supplementary Vortex Data Messages are given in Table 7. A diagram of the paths flown in obtaining these Data Messages is given in Figure 2. The symbolic code for interpreting the Data Messages is given in Appendix A.

Table 8 is an aerial reconnaissance summary for the 1987 season.

Graphs of the lowest central pressure versus time for the 1987 named tropical cyclones are shown in Figure 4.

Table 9 gives the probability forecasts issued for the 1987 land-falling United States storms and hurricanes.

ACKNOWLEDGEMENTS

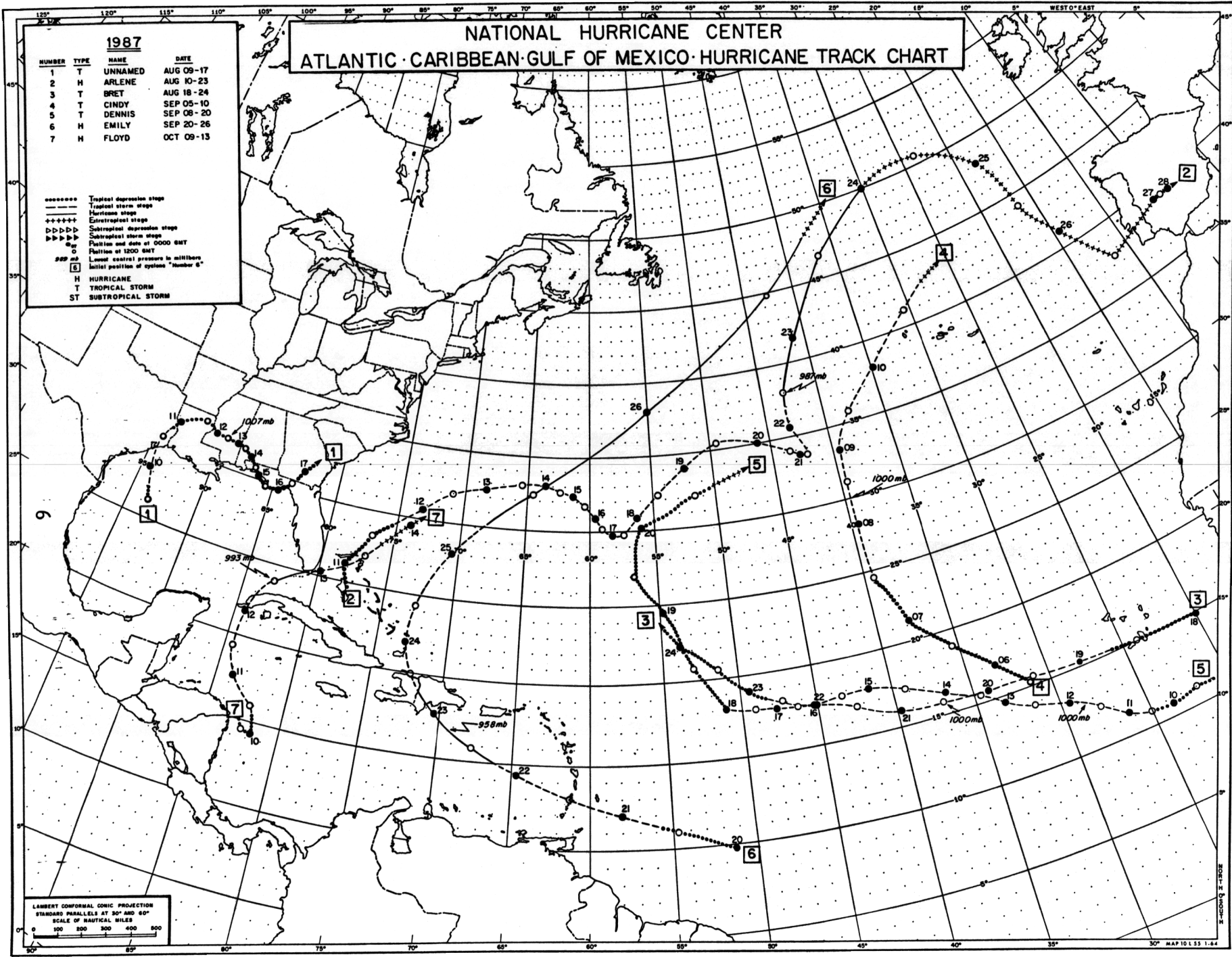
Main contributors were Miles Lawrence, who computed the verification statistics and Joan David, who drafted the track chart and pressure/time graphs.

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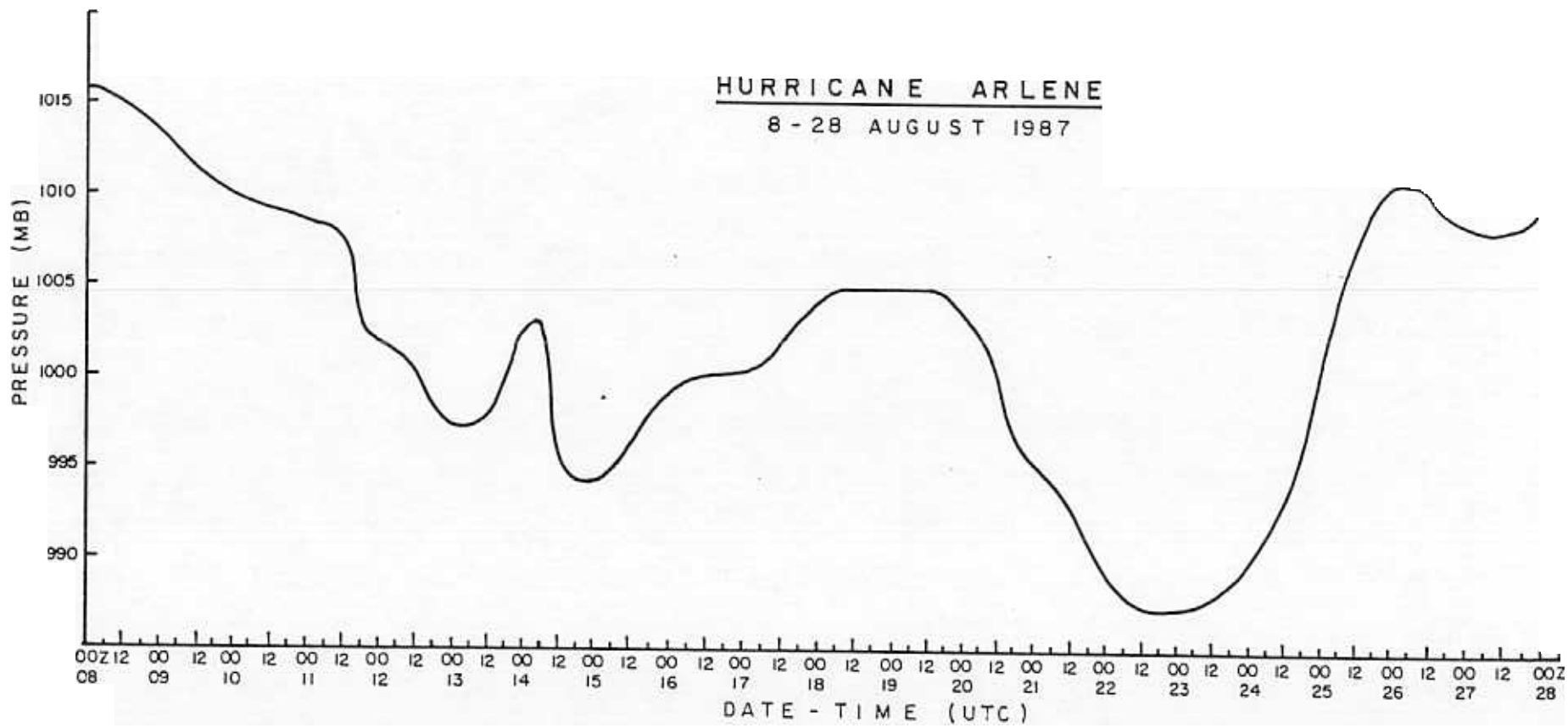


Figure 2. Lowest pressure vs. time, 1987 tropical cyclones.

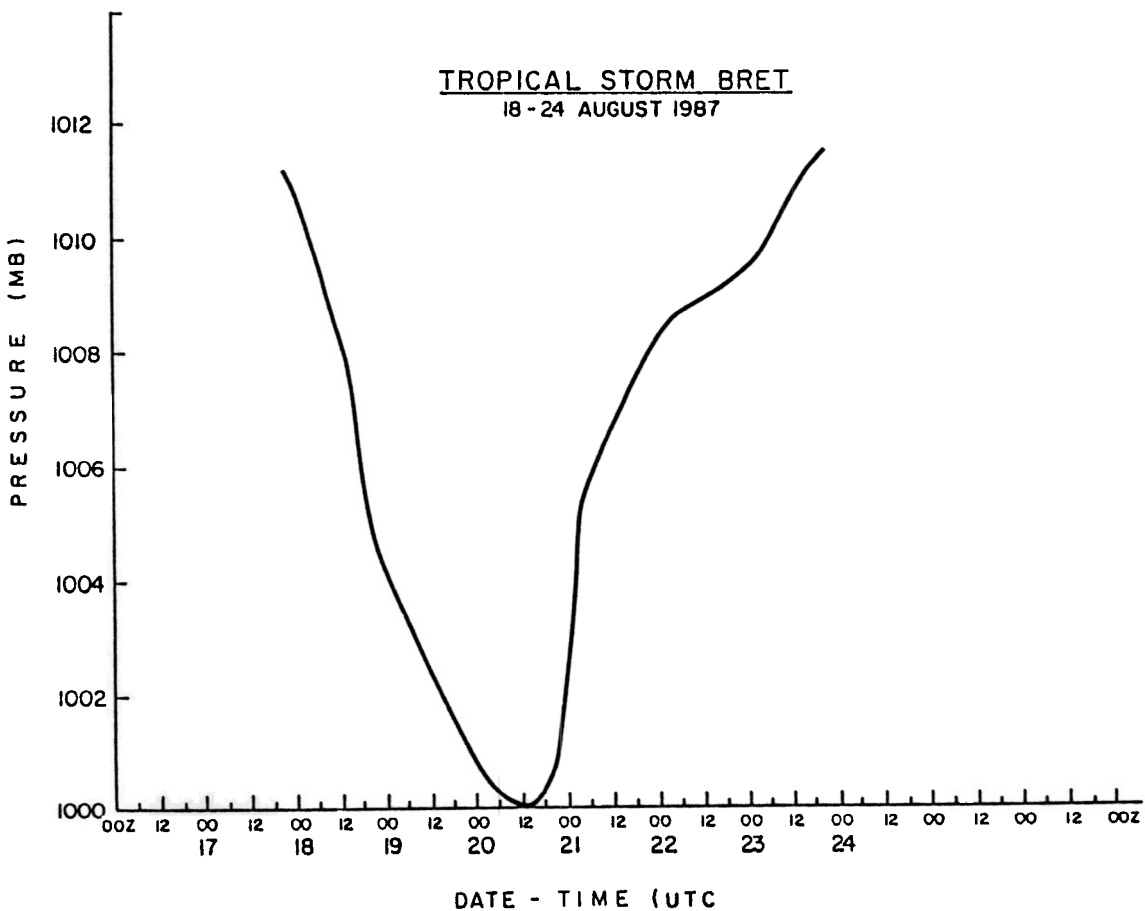
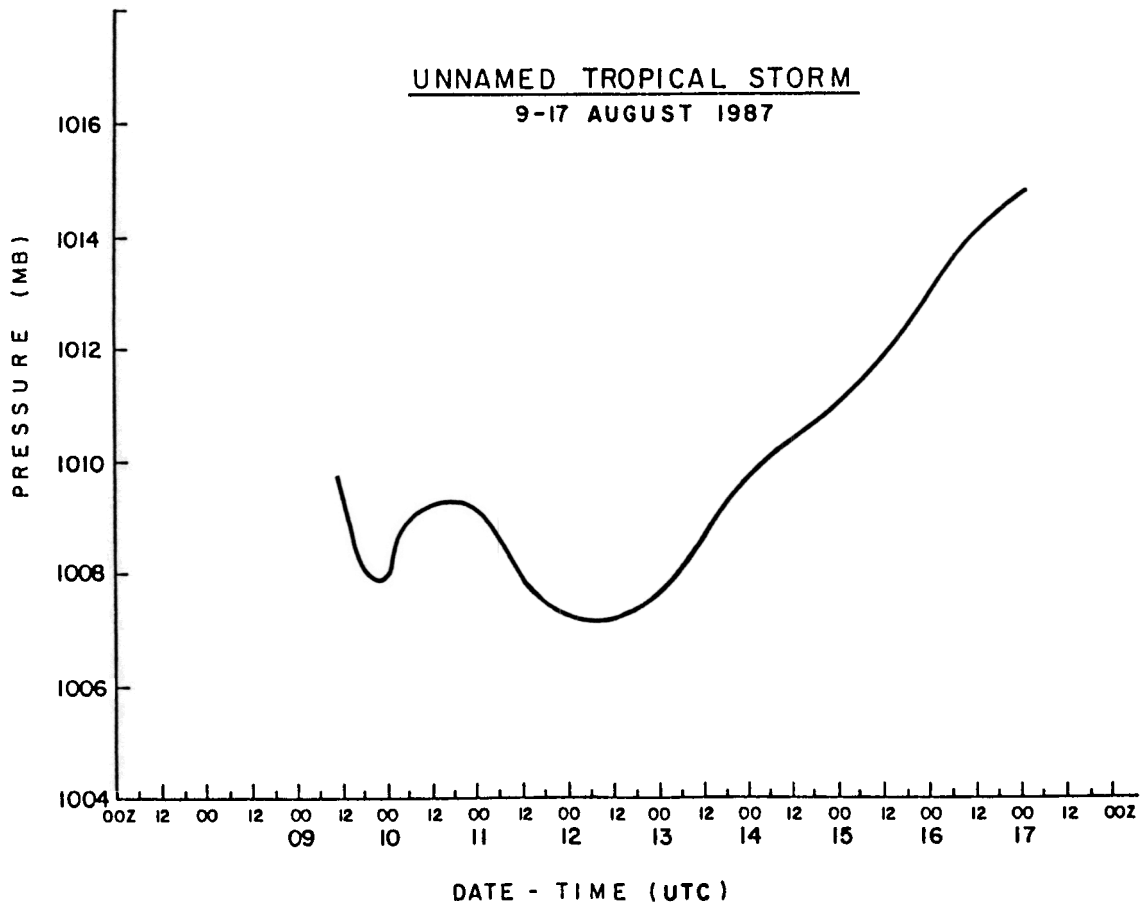


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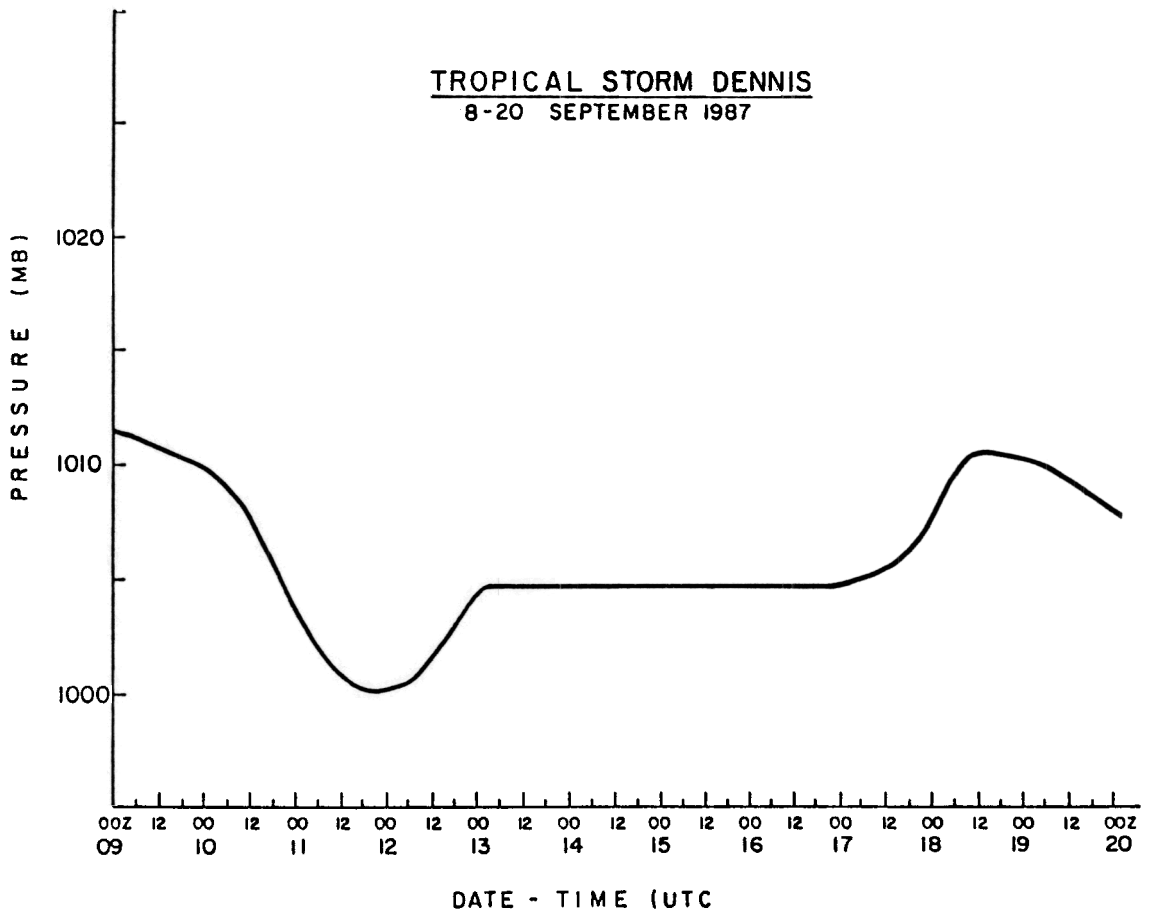
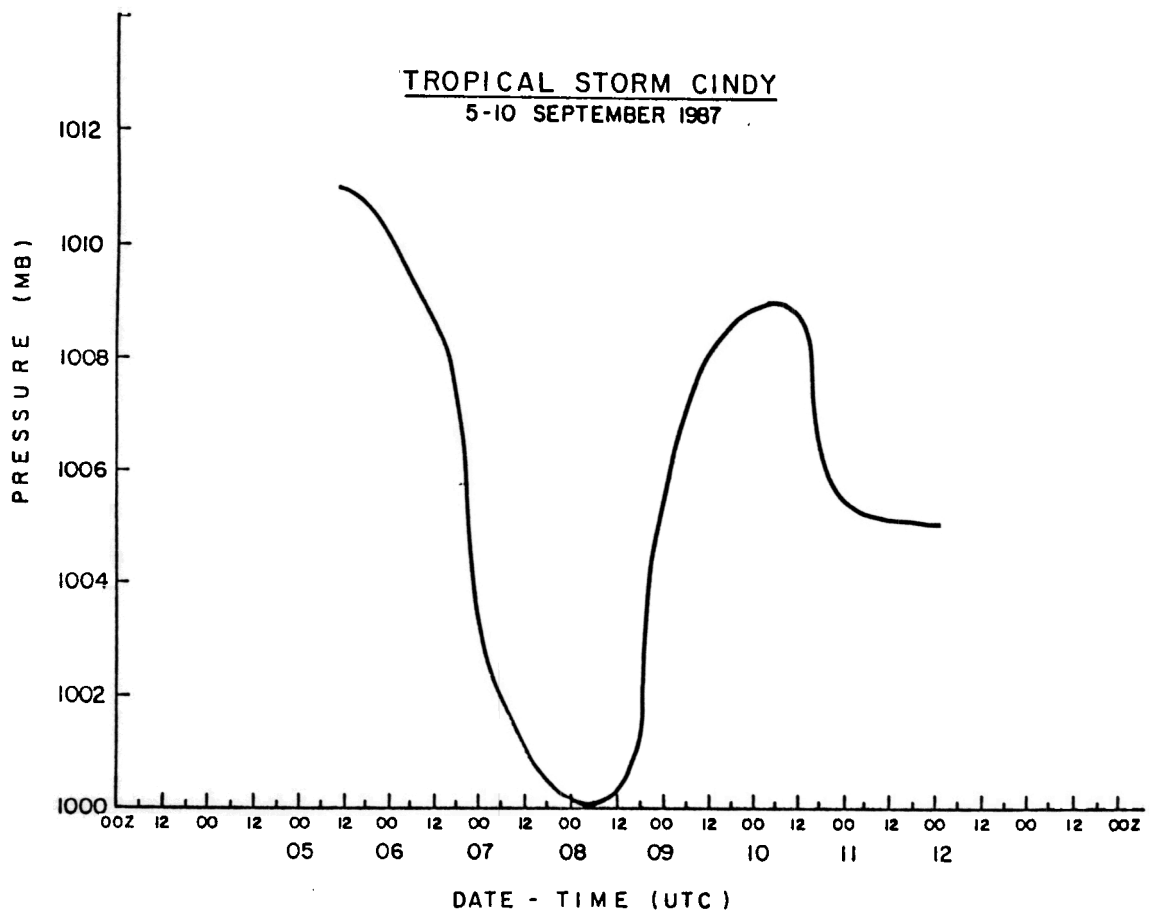


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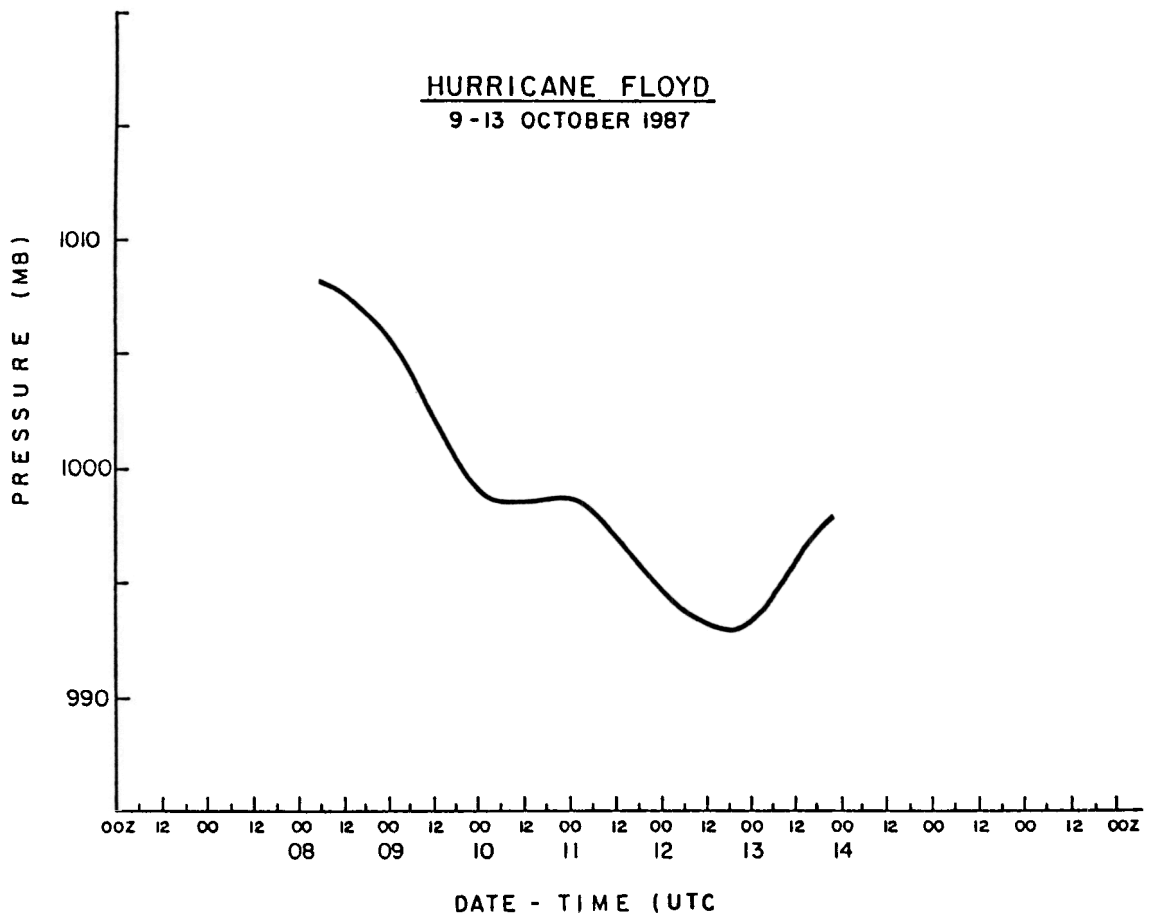
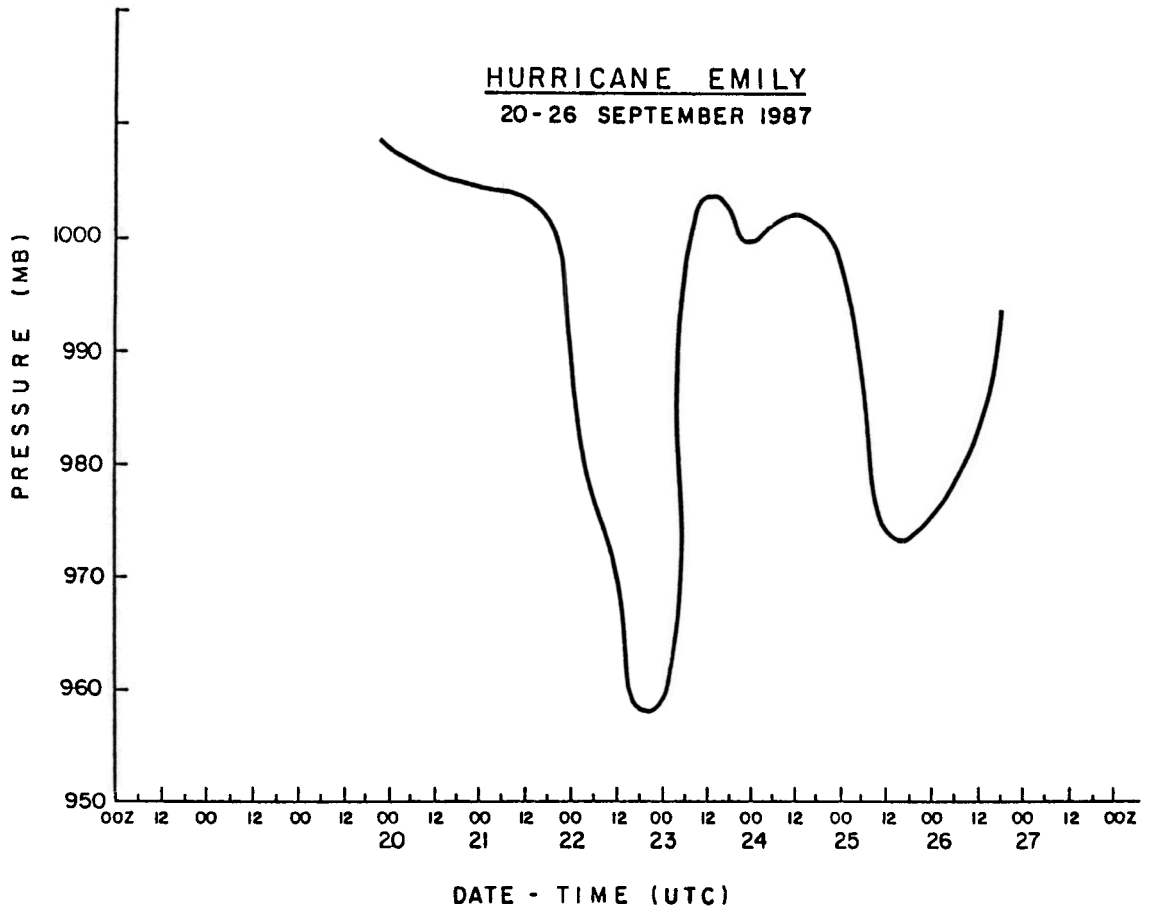
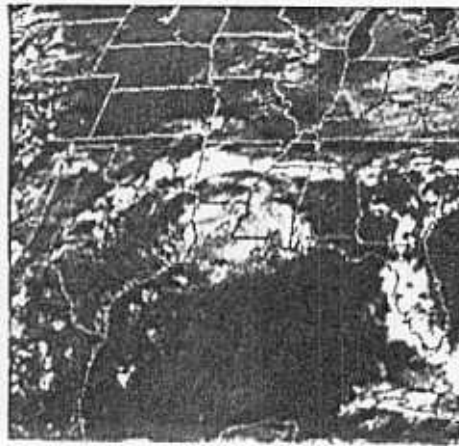


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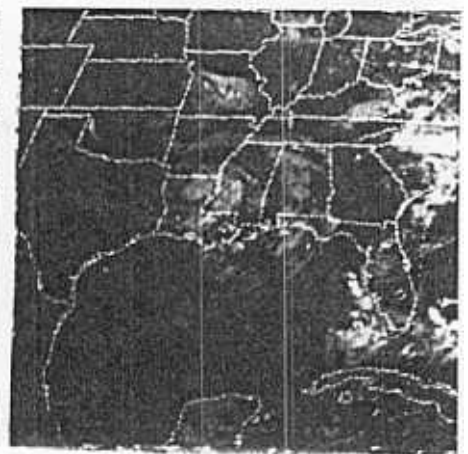
Figure 3. Daily satellite photographs of 1987 tropical cyclones



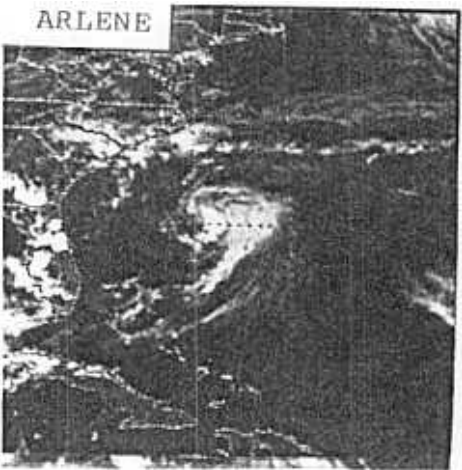
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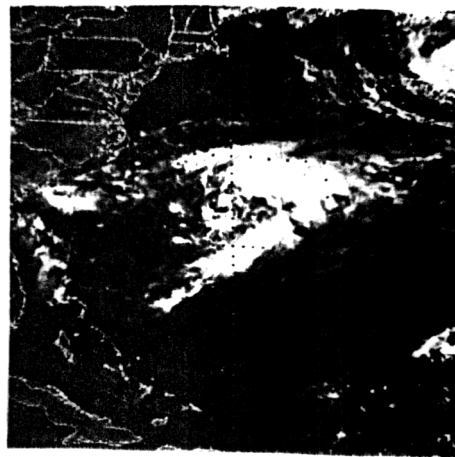
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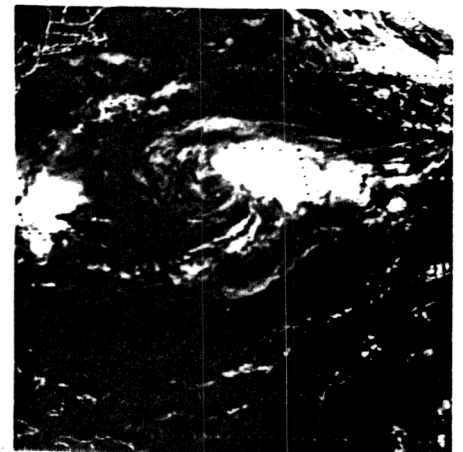
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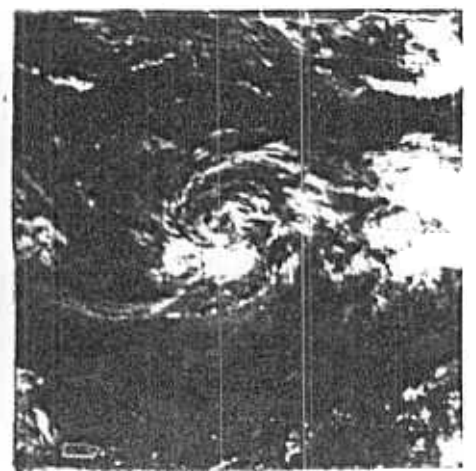
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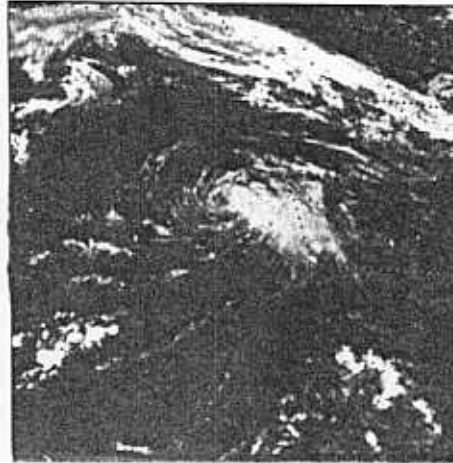


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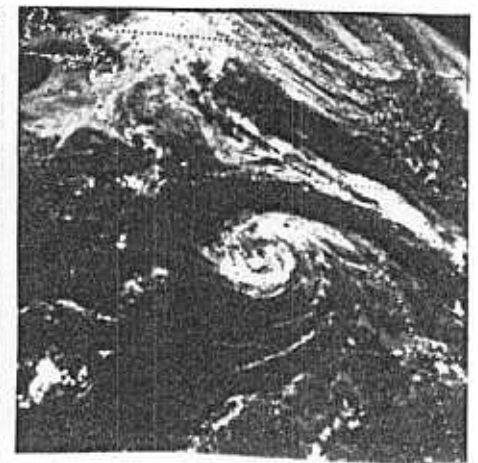
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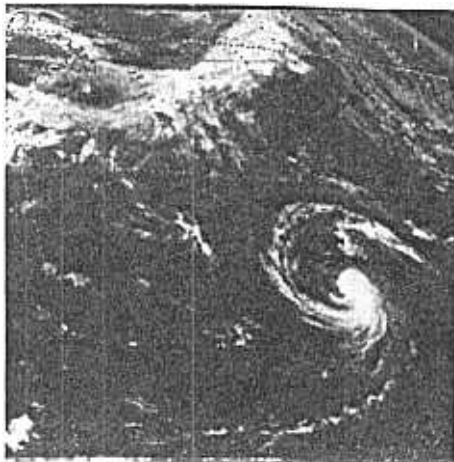
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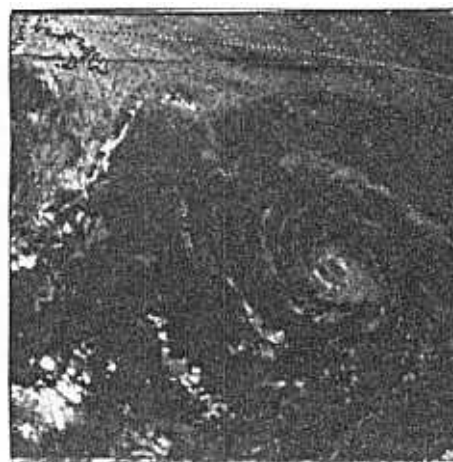
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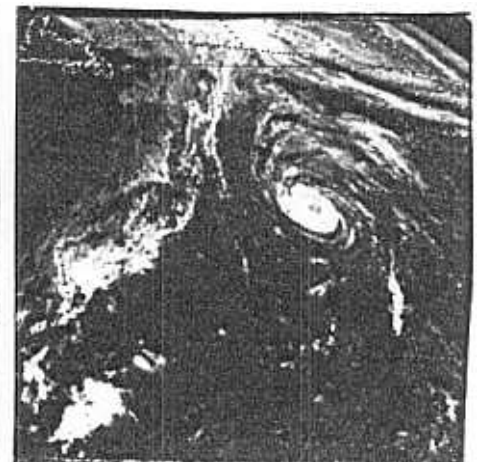
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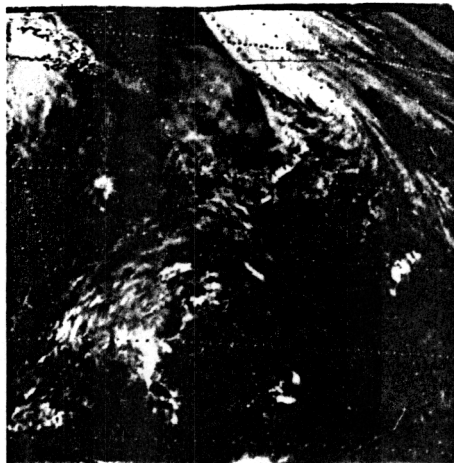
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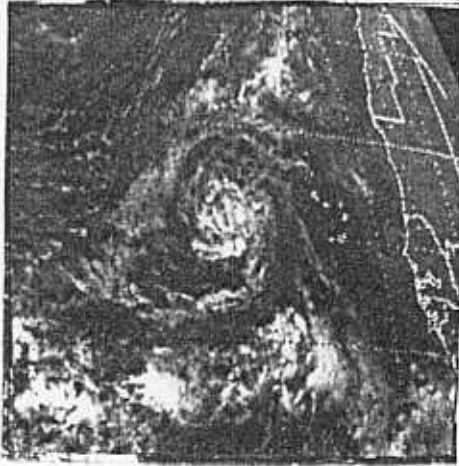
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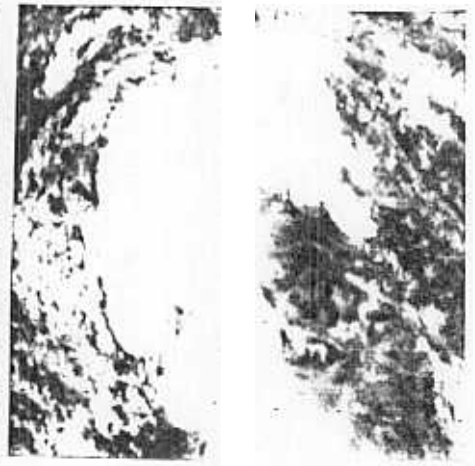
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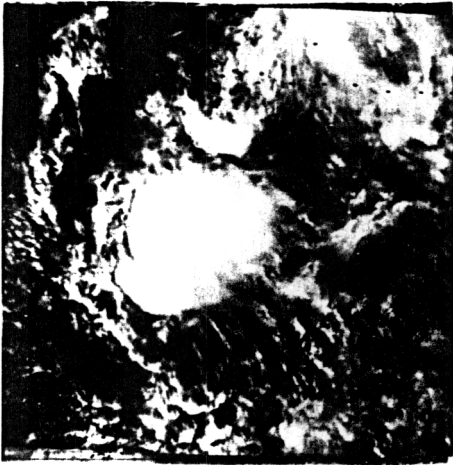
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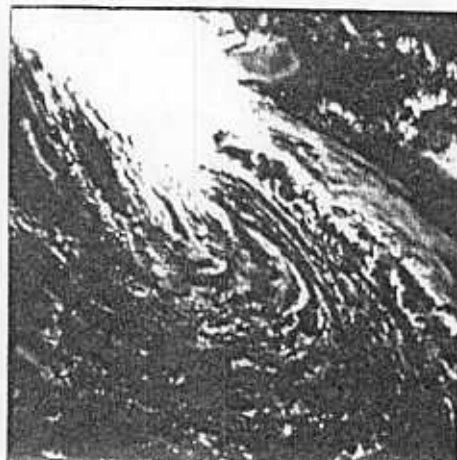
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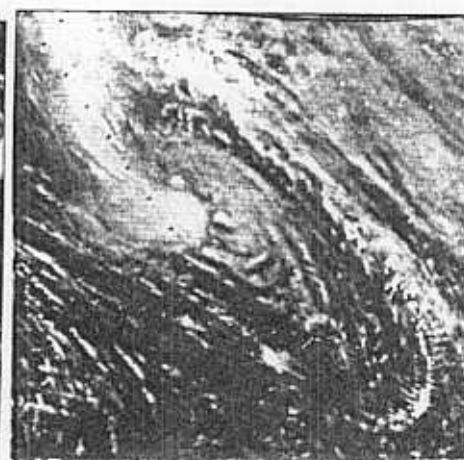
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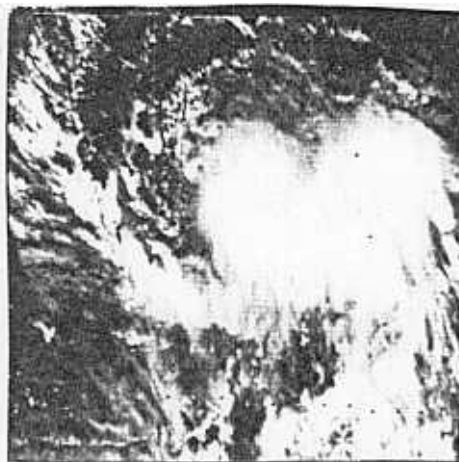


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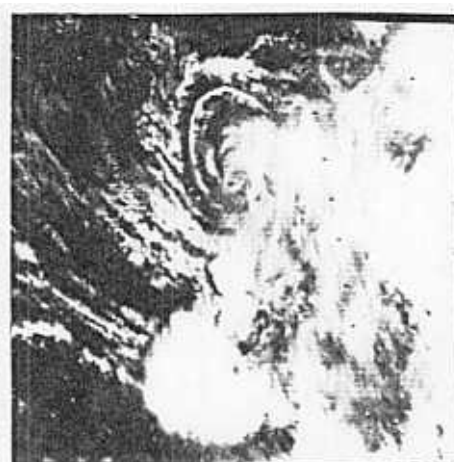
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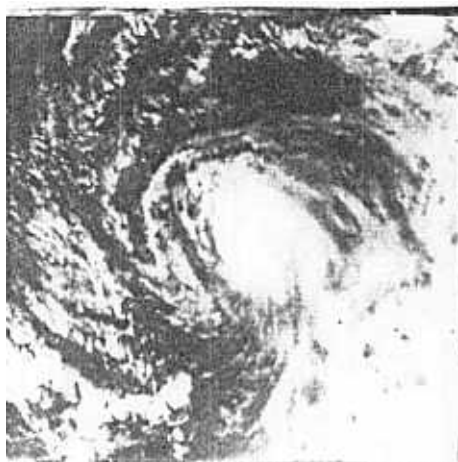
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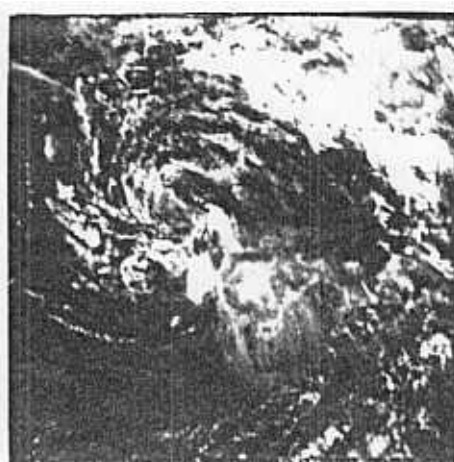
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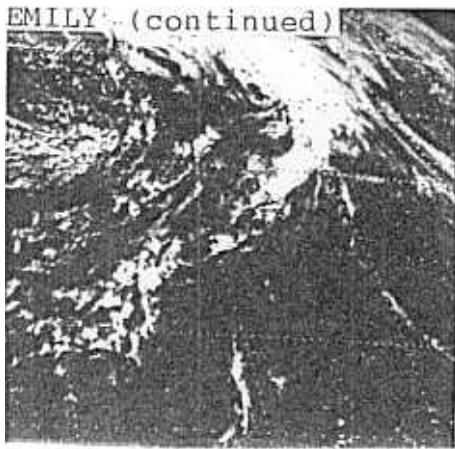


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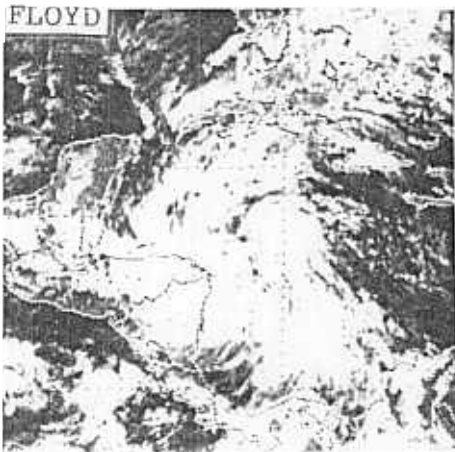


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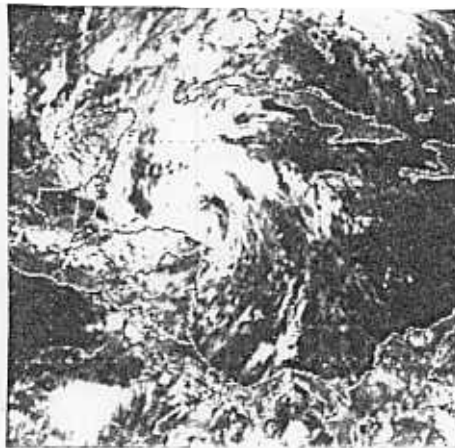
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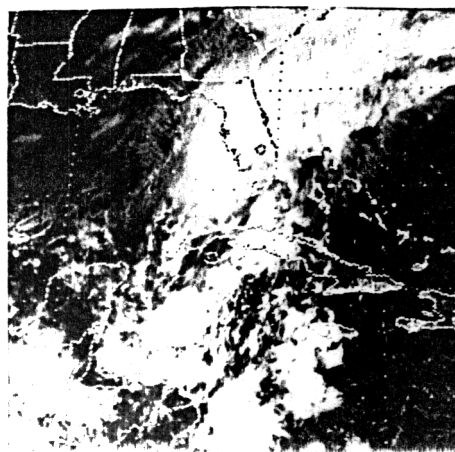
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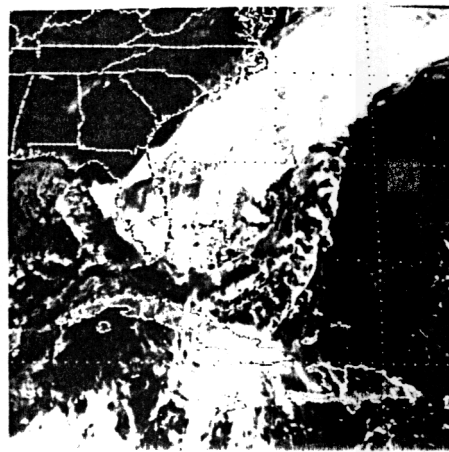
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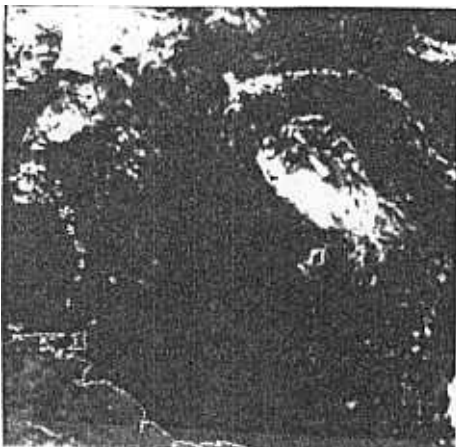


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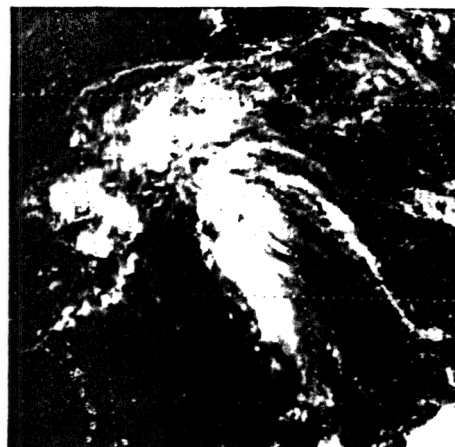
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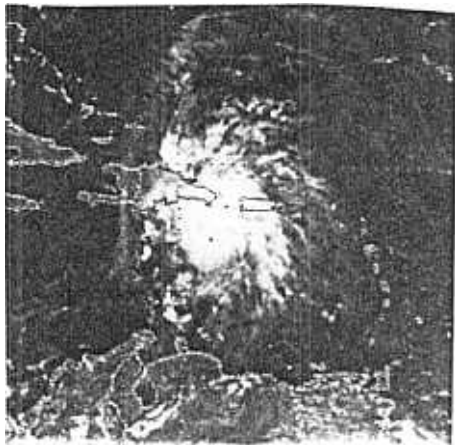
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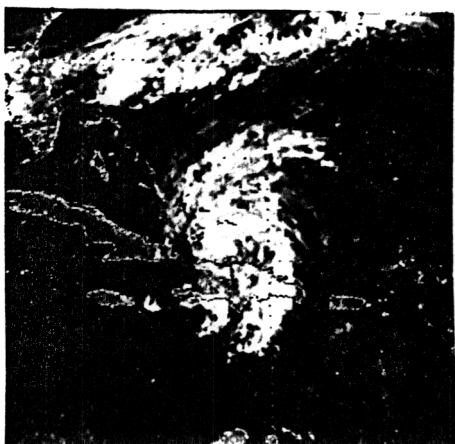
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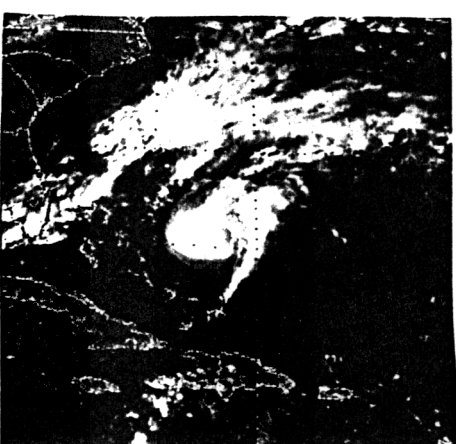
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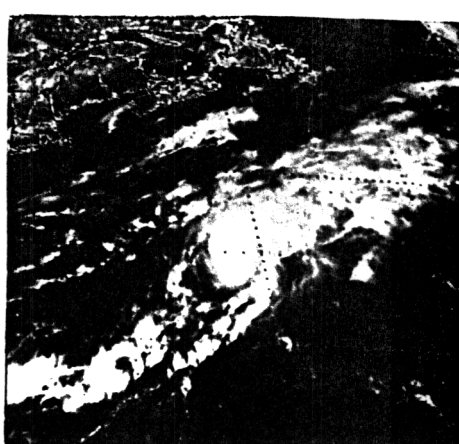
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Table 1. Verification of 1987 tropical storm and hurricane forecasts.

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 (36)

Table 2a. Landfall prediction errors for 1987 tropical storms and hurricanes

Following is a list of landfall prediction errors for tropical storms and hurricanes during 1987. Each error represents the distance (in nautical miles) from the predicted landfall point determined from the "Official" forecast issued 24 hours prior to the actual landfall point determined from the Best Track. Only tropical storms and hurricanes are included. In some cases the storm crossed an island when predicted to pass offshore. In such cases the perpendicular distance from the landfall point to the forecast track is taken as the landfall prediction error.

Storm Name	Category at Landfall	Date/Time (Z) of Landfall	Landfall Forecast Error (n.m.)	Location and remarks
Unnamed	Tropical Storm	8/10/0600Z	*	Between Galveston and Beaumont, TX.
	Hurricane	9/23/0300Z	100	Barahona, Dominican Republic.
		9/25/1145Z	200	Bermuda
	Hurricane	10/12/1600Z	80	Key West, FL.

* No landfall forecast made 24 hours prior to landfall.

Table 2b. Eighteen-year summary of errors (n.mi.) in the prediction of landfall points for Atlantic tropical storms and hurricanes during the period of 1970-1987.

	United States Landfalls	All Landfalls
1987 Mean 24 Hour Landfall Prediction Error (number of cases)	80 (01)	127 (04)
18 year average 1970-1987	54 (36)	60 (74)

Table 3a. Tropical cyclone warning lead time of 1987 United States Landfalling tropical storms and hurricanes.

Storm Name	Category at Landfall	Date/Time (Z) of Landfall	Location of landfall	Type and Time (Z) of Warnings Issued for Point of Landfall	Warning Lead Time (hours)
UNNAMED	Tropical Storm	8/10/0600Z	Between Galveston and Beaumont, TX.	Tropical storm warnings Matagorda, TX to Morgan City, LA 8/09/1700Z	13
ARLENE	(No U.S. Landfall)				
BRET	(No U.S. Landfall)				
CINDY	(No U.S. Landfall)				
DENNIS	(No U.S. Landfall)				
EMILY	(No U.S. Landfall)				
FLOYD	Hurricane	10/12/1600Z	Key West, FL.	Hurricane Warnings Florida Keys from Key Largo to Dry Tortugas northward on Florida west coast to south of Venice, FL. 10/11/2200Z	18
				Tropical storm warnings Florida east coast north of key Largo to Titusville, FL. 10/12/1200Z	12
				Hurricane warnings north of Key Largo to Stuart, FL. 10/12/1600z	8

19

Table 3b. Average warning lead times for all tropical storms and hurricanes and hurricanes alone, which made landfall on the mainland of the United States during 1987 and during the 18 year period of 1970-1987.

Average Lead Time (hours) (number of cases)	All Tropical Storms and Hurricanes		All Hurricanes	
	1987	1970-1987	1987	1970-1987
	23	45		

Table 4. Summary of the 1987 North Atlantic Tropical Cyclone Statistics

No.	Name	Class ¹	Dates ²	Maximum Sustained Wind (kn)	Lowest Pressure (mb)	U.S. Damage (\$ Millions)	Deaths ³
1	Unnamed	T	8/09-8/17	45	1007	7.5	
2	Arlene	H	8/10-8/28	65	987		
3	Bret	T	8/18-8/24	45	1000		
4	Cindy	T	9/05-9/10	45	1000		
5	Dennis	T	9/08-9/20	45	1000		
6	Emily	H	9/20-9/26	110	958		
7	Floyd	H	10/9-10/14	70	993	0.5	

¹T: Tropical Storm, winds speed 34-63 knots

H: Hurricane, wind speed 64 knots or greater

² Dates begin at 0000 UTC.

³ There were no deaths in the U.S. However, Emily killed three in the Dominican Republic and flooding in Jamaica from tropical depression number 14 killed six.

ab e 5b. cont nued.

VERIFICATION OF OFFICIAL MAX WIND FORECASTS

ERRORS(KTS) FOR STORM EMBL

2

FORECAST	MADE	FROM	0722113Z	DATA	-5.0	5.0	15.0	25.0	35.0	45.0
FORECAST	MADE	FROM	0722100Z	DATA	15.0	5.0	25.0	35.0	45.0	55.0
FORECAST	MADE	FROM	0722112Z	DATA	5.0	-25.0	-5.0	25.0	35.0	45.0
FORECAST	MADE	FROM	0722115Z	DATA	5.0	-25.0	-5.0	25.0	35.0	45.0
FORECAST	MADE	FROM	0722050Z	DATA	5.0	-35.0	15.0	25.0	35.0	45.0
FORECAST	MADE	FROM	0722122Z	DATA	5.0	5.0	25.0	35.0	45.0	55.0
FORECAST	MADE	FROM	0722030Z	DATA	10.0	-5.0	25.0	35.0	45.0	55.0
FORECAST	MADE	FROM	0722057Z	DATA	5.0	5.0	25.0	35.0	45.0	55.0
FORECAST	MADE	FROM	0722127Z	DATA	5.0	25.0	25.0	25.0	25.0	25.0
FORECAST	MADE	FROM	0722318Z	DATA	25.0	25.0	25.0	25.0	25.0	25.0
FORECAST	MADE	FROM	0722405Z	DATA	5.0	5.0	5.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722412Z	DATA	10.0	10.0	-15.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722515Z	DATA	-15.0	5.0	-5.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722500Z	DATA	-15.0	-25.0	-5.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722507Z	DATA	-15.0	-25.0	-5.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722512Z	DATA	5.0	5.0	5.0	5.0	5.0	5.0
FORECAST	MADE	FROM	0722530Z	DATA	5.0	10.0	10.0	10.0	10.0	10.0
FORECAST	MADE	FROM	0722512Z	DATA	5.0	10.0	10.0	10.0	10.0	10.0

4A: RM

MEAN ERRORS (KTS)

3.5 .4 -1.3 .3 5.0 15.3

4

STANDARD ERROR (KTS)
NUMBER OF CASES

0.2 15.2 24.1 .3 23.2 5.3
22 22 20 3 13 12

T

 44221013-32444444

VERIFICATION OF OFFICIAL MAX WIND FORECASTS

ERRORS(KTS) FOR STORM FLOYD

	INITIAL	12HR	24HR	36HR	48HR	72HR
FORECAST MADE FROM 101101Z DATA	-5.0					
FORECAST MADE FROM 101101Z DATA	10.0	12.0	5.0		-5.0	15.0
FORECAST MADE FROM 101106Z DATA	0.0	0.0	0.0			
FORECAST MADE FROM 101110Z DATA	0.0	0.0	-5.0		10.0	
FORECAST MADE FROM 101116Z DATA	0.0	0.0	0.0			
FORECAST MADE FROM 101200Z DATA	0.0	0.0	5.0			
FORECAST MADE FROM 101200Z DATA	0.0	0.0	0.0			
FORECAST MADE FROM 101212Z DATA	0.0	30.0	40.0			
FORECAST MADE FROM 101218Z DATA	0.0	15.0				
FORECAST MADE FROM 101300Z DATA	0.0	20.0				
FORECAST MADE FROM 101312Z DATA	0.0					

SUMMARY: STORM FLOYD

MEAN ERRORS (KTS)	2.3	6.4	7.2	.0	4.0	15.0
MEAN ABSOLUTE ERROR (KTS)	4.1	6.4	9.4	.0	8.0	15.0
STANDARD ERROR (KTS)	4.7	8.4	14.6	.0	10.8	0.0
NUMBER OF CASES	11	11	9	0	3	1

SUMMARY: ALL 6 STORMS

	INITIAL	12HR	24HR	36HR	48HR	72HR
MEAN ERRORS (KTS)	.7	.3	-1.5	.0	-1.7	-1.5
MEAN ABSOLUTE ERROR (KTS)	4.0	5.6	7.6	.0	10.1	12.5

LEGEND FOR TABLE 6

OBSERVATIONAL UNIT

Reconnaissance

AF = Air Force

NOAA = National Oceanographic and Atmospheric Administration

Satellite

GOES-7 = Geostationary Operational Environmental Satellite

Radar

National Weather Service Radar:

EYW-R = Key West, FL.

MIA-R = Miami, FL.

RESOLUTION

Reconnaissance

Navigational Accuracy/Meteorological Accuracy (NM). (Example 5/5).

Satellite

Classification confidence*, location and confidence**, visible or infrared resolution (km).

- * 1 =completely certain as to current intensity number used.
- 2 =tends to vary up and down by 1/2 T or S number.
- 3 =might vary up or down by one T or S number, or more.

- **1 =well defined eye with certain picture registration.
- 2 =well defined eye with uncertain picture registration.
- 3 =well defined circulation center with certain picture registration.
- 4 =well defined circulation center with uncertain picture registration.
- 5 =poorly defined circulation center with certain picture registration.
- 6 =poorly defined circulation center with uncertain picture registration.

(Example-1,1, Vsbl,1 = classification confidence 1, location confidence 1, visible picture with 1 kilometer resolution.)

(Example-2,5, IR 8 = classification confidence 2, location confidence 5, infrared picture with 8 kilometer resolution.)

Table 6. Center Fix positions and intensity evaluations for 1987 Tropical Cyclones.

CENTER FIXES

Unnamed Tropical Storm August 1987

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	LON. W.	SFC.	FLT LVL.			OUT	IN					
1	09	1800	27.4	94.4									GOES 7	2,5 VIS 1	
2	09	2313	27.4	93.7	30	30	1008		26	26			AF	3/6	457M
3	10	0133	27.8	94.4	15	19	1008		26	25			AF	3/6	457M
4	10	0327	28.0	94.8		10	1008		24	24			AF	3/6	457M
5	10	0621	29.6	94.5		33			21	20			AF	4/10	850MB

CENT FIXES

Hurricane - August 1987

FIX	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES (MB)	MIN.	TEMP. C		EYE C=CIR.DIA. E=ELJ	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon.	SFC.	FLT LVL.			OUT	IN					
1	10	1500	25.2	77.5	25								GOES 7	2,5 VIS 1	
2	10	1800	24.9	77.2	25								GOES 7	2,5 VIS 1	
3	11	0000	26.3	78.6	25								GOES 7	2,5 IR 8	
4	11	0600	26.7	77.5	25								GOES 7	2,5 IR 8	
5	11	1200	27.6	76.1	25								GOES 7	2,5 VIS 1	
6	11	1800	29.2	74.7	25								GOES 7	2,5 VIS 1	
7	11	2332	30.8	73.1		49	1002		24	25	C10	open south	AF	10/5	457M
8	12	0000	30.5	73.7	35		1005						GOES 7	2,5 IR 8	
9	12	0600	30.9	71.8	35		1005						GOES 7	2,5 IR 8	
10	12	1200	31.6	71.7	35		1005						GOES 7	2,3 VIS 1	
11	12	1215	31.9	71.6	30	29	1003		21	19			AF	4/5	
12	12	1415	32.0	70.7	20	20	1000		20	21			AF	4/7	
13	12	1800	32.0	70.1	35		1005						GOES 7	2,5 VIS 1	
14	13	0000	32.5	69.0	35		1005						GOES 7	2,3 IR 8	
15	13	0000	32.5	68.4	25	23	998		26	26			AF	3/6	
16	13	0301	32.3	67.6		43	998		24	25			AF	3/6	
17	13	0600	32.9	67.5	45		1000						GOES 7	2,5 IR 8	
18	13	1156	32.9	65.5	45	40	998		22	24			AF	8/3	457M
19	13	1200	32.9	65.2	45		1000						GOES 7	2,3 VIS 1	
20	13	1800	33.1	64.7	45		1000						GOES 7	2,3 VIS 1	
21	13	1800	33.0	64.8	40	38	999		20	23			AF	3/3	457M
22	13	2043	32.9	64.2	55	57	1002		20	22			AF	4/10	457M
23	14	0000	32.9	63.5	45		1000						GOES 7	2,3 IR 8	
24	14	0600	33.1	62.3	55		994						GOES 7	2,5 IR 8	
25	14	1200	32.9	62.0	55		994						GOES 7	2,3 VIS 1	
26	14	1800	32.7	61.5	55		994						GOES 7	2,3 VIS 1	
27	15	0000	32.7	61.5	55		994						GOES 7	2,3 IR 8	
28	15	0600	31.8	61.8	55		994						GOES 7	2,4 IR 8	
29	15	1200	30.9	60.6	55		994						GOES 7	2,3 VIS 8	
30	15	1800	31.3	59.9	45		1000						GOES 7	2,3 VIS 1	
31	16	0000	31.0	59.5	45		1000						GOES 7	3,5 IR 8	
32	16	0600	30.8	58.9	45		1000						GOES 7	2,5 IR 8	

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CENTER FIXES

Hurricane Arlene (continued).

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN.	MIN.	TEMP. C OUT IN	EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon. W.	SFC.	FLT LVL.	PRES. (MB)	700MB HT. (M)						
33	16	1200	30.2	58.8	45		1000					GOES 7	2,5 VIS 1	
34	16	1800	29.9	58.5	45		1000					GOES 7	2,3 VIS 1	
35	17	0000	29.5	57.7	45		1000					GOES 7	2,3 IR 8	
36	17	0600	29.5	57.0	45		1000					GOES 7	2,5 IR 8	
37	17	1200	30.0	57.5	45		1000					GOES 7	2,5 VIS 1	
38	17	1800	30.3	56.8	45		1000					GOES 7	2,3 VIS 1	
39	18	0000	31.3	56.8	35		1005					GOES 7	2,3 IR 8	
40	18	0600	31.6	56.1	35		1005					GOES 7	2,5 IR 8	
41	18	1200	32.3	55.0	35		1005					GOES 7	2,5 VIS 1	
42	18	1800	33.3	53.5	35		1005					GOES 7	2,5 VIS 1	
43	19	0000	34.0	52.3	35		1005					GOES 7	2,5 IR 8	
44	19	0600	34.8	50.7	35		1005					GOES 7	2,5 IR 8	
45	19	1200	35.5	48.8	30		1005					GOES 7	2,5 VIS 1	
46	19	1800	35.2	47.5	30		1005					GOES 7	2,5 VIS 1	
47	20	0000	34.6	46.3	35		1005					GOES 7	2,5 IR 8	
48	20	0600	34.5	44.7	35		1005					GOES 7	2,5 IR 8	
49	20	1200	33.8	43.0	45		1000					GOES 7	2,3 VIS 1	
50	20	1800	33.6	42.1	55		994					GOES 7	2,3 VIS 1	
51	21	0000	33.5	42.0	55		994					GOES 7	2,3 IR 8	
52	21	0600	33.7	42.5	55		994					GOES 7	2,3 IR 8	
53	21	1200	33.6	42.3	55		994					GOES 7	3,3 VIS 1	
54	21	1800	34.4	42.7	55		994					GOES 7	3,3 VIS 1	
55	22	0030	35.5	43.2	65		987					GOES 7	1,1 IR 8	
56	22	0600	36.5	43.1	65		987					GOES 7	2,1 IR 8	
57	22	1200	37.7	43.0	65		987					GOES 7	2,1 VIS 1	
58	22	1800	39.5	42.3	65		987					GOES 7	2,3 VIS 1	
59	23	0000	41.2	41.0	65		987					GOES 7	1,1 IR 8	
60	23	0600	43.7	39.2	65		987					GOES 7	2,1 IR 8	
61	23	1200	46.1	35.8	65		987					GOES 7	2,3 VIS 1	
62	23	1800	49.0	32.0								GOES 7	/,3 VIS 1	
63	24	0000	51.0	27.0								GOES 7	/,3 IR 8	

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CENTER FIXES

Tropical Storm Bret - August 1987

FLX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		EYE C=CIR. DIA. E=EL	CHARACTERISTICS	UNIT		ACFT.
			LAT. N.	Lon. W.	SFC.	FLT LVL.			OUT	IN					
1	17	1700	14.0	18.5	25								GOES 7	2,5 VIS 4	
2	18	0000	14.8	20.7	25								GOES 7	2,5 IR 8	
3	18	0600	14.8	22.4	25								GOES 7	2,5 IR 8	
4	18	1200	15.5	24.0	30		1009						GOES 7	2,5 VIS 1	
5	18	1800	15.1	25.7	30		1009						GOES 7	2,1 VIS 1	
6	19	0030	15.0	28.3	30		1009						GOES 7	2,5 IR 8	
7	19	0600	15.1	30.1	35		1005						GOES 7	2,5 IR 8	
8	19	1200	15.6	30.7	35		1005						GOES 7	2,5 VIS 1	
9	19	1800	15.1	31.7	35		1005						GOES 7	2,5 VIS 1	
10	20	0030	15.5	34.8	35		1005						GOES 7	2,3 IR 8	
11	20	0600	15.5	35.4	45		1000						GOES 7	2,5 IR 8	
12	20	1200	15.8	37.1	45		1000						GOES 7	2,5 VIS 1	
13	20	1800	16.0	38.3	45		1000						GOES 7	2,3 VIS 1	
14	21	0030	16.1	39.7	35		1005						GOES 7	2,3 IR 8	
15	21	0600	16.0	41.3	35		1005						GOES 7	2,3 IR 8	
16	21	1200	16.8	42.2	25								GOES 7	3,5 VIS 1	
17	21	1800	17.0	43.5	25								GOES 7	3,5 VIS 1	
18	22	0000	18.1	45.3	30		1009						GOES 7	2,5 IR 8	
19	22	0600	18.4	46.0	30		1009						GOES 7	2,5 IR 8	
20	22	1200	18.0	47.0	30		1009						GOES 7	2,5 VIS 1	
21	22	1800	17.6	48.5	30		1009						GOES 7	2,5 VIS 1	
22	23	0000	18.2	49.6	30		1009						GOES 7	2,5 IR 8	
23	23	0600	18.9	50.9	25								GOES 7	2,5 IR 8	
24	23	1200	19.8	51.3	25								GOES 7	2,5 VIS 1	
25	23	1800	21.5	51.5	25								GOES 7	2,5 VIS 1	
26	24	0000	22.1	53.7	25								GOES 7	2,5 IR 8	
27	24	0600	23.8	54.5	25								GOES 7	2,5 IR 8	

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CEN. FLXES

Tropical Storm Cindy - September 1987

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		C=CIR.	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	LONG. W.	SFC.	LVL.			OUT	IN					
1	04	1800	14.7	28.6	25								GOES 7	2,5 VIS 1	
2	05	0000	14.5	30.0	25								GOES 7	2,5 IR 8	
3	05	0600	14.7	30.4	25								GOES 7	2,5 IR 8	
4	05	1200	14.9	31.7	25								GOES 7	2,5 VIS 1	
5	05	1800	16.4	32.1	30		1009						GOES 7	2,5 VIS 1	
6	06	0000	17.2	33.0	30		1009						GOES 7	2,3 IR 8	
7	06	0600	17.9	34.5	30		1009						GOES 7	2,5 IR 8	
8	06	1200	19.0	35.3	30		1009						GOES 7	2,5 VIS 1	
9	06	1800	20.2	37.1	30		1009						GOES 7	2,5 VIS 1	
10	07	0000	22.0	37.5	30		1009						GOES 7	2,5 IR 8	
11	07	0600	23.1	37.8	30		1009						GOES 7	2,5 IR 8	
12	07	1200	24.6	39.3	35		1005						GOES 7	2,5 VIS 1	
13	07	1800	27.0	39.3	35		1005						GOES 7	2,5 VIS 1	
14	08	0000	28.9	39.5	45		1000						GOES 7	2,5 IR 8	
15	08	0600	30.5	39.5	45		1000						GOES 7	2,5 IR 8	
16	08	1200	31.1	39.8	45		1000						GOES 7	2,3 VIS 1	
17	08	1800	32.2	39.2	35		1005						GOES 7	2,3 VIS 1	
18	09	0000	33.5	39.4	35		1005						GOES 7	2,3 IR 8	
19	09	0600	34.5	39.2	35		1005						GOES 7	2,3 IR 8	
20	09	1200	35.7	37.9	30		1009						GOES 7	2,3 VIS 1	
21	09	1800	37.0	36.5	30		1009						GOES 7	2,3 VIS 1	
22	10	0000	38.1	34.9	30		1009						GOES 7	2,3 IR 8	
23	10	0600	39.8	32.4	30		1009						GOES 7	2,3 IR 8	
24	10	1200	40.8	30.3	30		1009						GOES 7	2,5 VIS 1	
25	10	1800	42.5	28.0	35		1005						GOES 7	2,5 VIS 1	
26	11	0000	44.0	24.8	35		1005						GOES 7	2,5 IR 8	
27	11	0400	45.2	20.7	35		1005						GOES 7	2,5 IR 8	

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CENTER FIXES

Tropical Storm Dennis - September 1987

FIX	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	EYE C=CIR.DIA. E=EI (MI.)	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	W.	SFC.	FLT LVL.							
1	08	1800	10.8	18.4	25						GOES 7	2,5 IR 4	
2	09	0000	09.9	19.0	25						GOES 7	2,5 IR 8	
3	09	0600	09.8	21.4	25						GOES 7	2,5 IR 8	
4	09	1200	10.9	22.6	25						GOES 7	2,5 VIS 1	
5	09	1800	11.0	23.0	30		1009				GOES 7	2,5 VIS 1	
6	10	0030	11.2	23.8	30		1009				GOES 7	2,5 IR 8	
7	10	0600	10.5	25.0	30		1009				GOES 7	2,5 IR 8	
8	10	1200	10.6	24.7	30		1009				GOES 7	2,5 VIS 1	
9	10	1800	10.8	25.7	35		1005				GOES 7	2,3 VIS 1	
10	11	0000	11.4	26.1	35		1005				GOES 7	2,5 IR 8	
11	11	0600	11.2	26.6	45		1000				GOES 7	2,5 IR 8	
12	11	1200	12.1	26.6	45		1000				GOES 7	2,3 VIS 1	
13	11	1800	12.9	28.5	45		1000				GOES 7	2,3 VIS 1	
14	12	0000	13.3	29.9	45		1000				GOES 7	2,5 IR 8	
15	12	0600	13.7	30.8	45		1000				GOES 7	2,5 IR 8	
16	12	1200	14.0	31.4	35		1005				GOES 7	2,3 VIS 1	
17	12	1800	14.1	32.5	35		1005				GOES 7	2,3 VIS 1	
18	13	0000	15.0	33.3	35		1005				GOES 7	2,5 IR 8	
19	13	0700	15.1	34.4	35		1005				GOES 7	2,5 IR 8	
20	13	1200	15.6	34.3	35		1005				GOES 7	2,3 VIS 1	
21	13	1800	15.9	35.4	35		1005				GOES 7	2,3 VIS 1	
22	14	0000	16.3	36.4	35		1005				GOES 7	2,3 IR 8	
23	14	0600	16.4	37.5	35		1005				GOES 7	2,3 IR 8	
24	14	1200	17.2	39.0	35		1005				GOES 7	2,3 VIS 2	
25	14	1800	17.7	40.5	35		1005				GOES 7	2,5 VIS 2	
26	15	0000	18.0	42.1	35		1005				GOES 7	2,5 IR 8	
27	15	0600	18.2	43.2	35		1005				GOES 7	2,5 IR 8	
28	15	1200	17.8	43.6	35		1005				GOES 7	2,5 VIS 2	
29	15	1800	17.5	44.5	35		1005				GOES 7	2,5 VIS 2	
30	16	0000	17.5	45.1	35		1005				GOES 7	2,5 IR 8	
31	16	0600	17.5	45.9	35		1005				GOES 7	2,5 IR 8	
32	16	1200	18.1	46.1	35		1005				GOES 7	2,5 VIS 1	

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CENTER FIXES

Tropical Storm Dennis (continued).

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C T IN	EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon. W.	SFC.	FLT LVL.								
33	16	1800	17.6	46.9	35		1005					GOES 7	2,3 VIS 1	
34	17	0000	17.6	48.1	35		1005					GOES 7	2,5 IR 8	
35	17	0600	17.9	49.1	35		1005					GOES 7	2,5 IR 8	
36	17	1200	18.3	49.1	35		1005					GOES 7	2,5 VIS 1	
37	17	1800	17.9	49.9	35		1005					GOES 7	2,5 VIS 1	
38	18	0000	18.1	50.9	30		1009					GOES 7	2,5 IR 8	
39	18	0600	18.1	52.0	30		1009					GOES 7	2,5 IR 8	
40	18	1200	21.3	53.4	35		1005					GOES 7	2,5 VIS 1	
41	18	1800	23.2	53.8	35		1005					GOES 7	2,5 VIS 1	
42	19	0000	25.0	55.7	35		1005					GOES 7	2,5 IR 8	
43	19	0600	26.0	55.0	30		1009					GOES 7	3,5 IR 8	
44	19	1200	27.3	57.8	30		1009					GOES 7	2,5 VIS 1	
45	19	1800	28.6	57.4	30		1009					GOES 7	2,5 VIS 1	
46	20	0000	30.1	56.7	25							GOES 7	3,5 IR 8	
47	20	0600	32.3	51.4	25							GOES 7	2,5 IR 8	
48	20	1200	32.1	52.1								GOES 7	-,5 VIS 1	
49	20	1800	32.9	49.5								GOES 7	-,5 VIS 1	

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---R FIXES

Hurricane Emily - September 1987

FIX	DATE	TIME (UTC)	POST		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C OUT	EYE C=CIR.DIA.	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	LONG.	SFC.	FLT LVL.								
1	19	1800	09.0	49.0								GOES	-,5 VIS 1	
2	20	0000	09.5	51.3	25							GOES	2,5 IR 8	
3	20	0600	10.5	53.5	25							GOES	2,3 IR 8	
4	20	1200	10.5	54.9	30		1009					GOES	2,3 VIS 1	
5	20	1800	10.5	56.4	30		1009					GOES	2,5 VIS 1	
6	20	2141	12.1	57.2	43	38	1005	27	26			AF	2/4	457M
7	21	0000	12.2	58.0	35							GOES	2,5 IR 8	
8	21	0019	12.4	57.8		16	1004	26	27			AF	4/3	457M
9	21	0600	12.6	59.5	45		1000					GOES	2,5 IR 8	
10	21	1200	13.1	61.3	45		1000					GOES	2,3 VIS 1	
11	21	1229	12.8	61.7	45	40	1004	25	26			AF	5/15	457M
12	21	1502	13.5	62.2	45	42	1004	24	25	C10	open nw	AF	4/4	457M
13	21	1701	13.5	62.8	50	49	1003	22	25	E30/15/08	open nw	AF	5/4	457M
14	21	1800	13.7	63.4	45		1000					GOES	2,3 VIS 1	
15	21	2308	14.3	64.4		65	993	26	27	E01/25/20	closed wall	AF	5/4	457M
16	22	0000	14.3	64.8	55		994					GOES	2,5 IR 8	
17	22	0150	14.5	65.3		94						AF		
18	22	0300	14.8	65.7	65		987					GOES	2,1 IR 8	
19	22	0400	14.9	65.8		61	986	13	15	C20	closed wall	AF	4/4	700MB
20	22	0558	15.2	66.4		86	980	12	16	C18	closed wall	AF	6/4	700MB
21	22	0630	15.1	66.8	65		987					GOES	2,1 IR 8	
22	22	0900	15.5	67.0	77		979					GOES	2,1 IR 8	
23	22	1200	16.0	67.8	90		970					GOES	2,5 VIS 1	
24	22	1218	15.9	67.8	75	56	972	09	17	C08	closed wall	AF	3/1	700MB
25	22	1423	16.2	68.3	75	59	970	10	20	C06	good wall	AF	3/1	700MB
26	22	1500	16.4	68.4	90		970					GOES	2,5 VIS 1	
27	22	1620	16.5	68.7	85	130	963	10	19	C15	closed wall	AF	7/5	700MB
28	22	1744	16.7	69.0	110	133	958	09	20	C15	closed wall	AF	7/5	700MB
29	22	1800	16.9	69.0	102		960					GOES	2,5 VIS 1	
30	22	2100	17.4	69.6	115		948					GOES	2,1 IR 8	
31	22	2227	17.5	69.8	100		960	11	24	C10	closed wall	AF	1/1	700MB
32	23	0000	17.9	70.1	115		948					GOES	2,1 IR 8	

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CENTER FIXES

Hurricane Emily (continued).

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES.			EYE (E-ELIP. (N.MI.))	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.	
			LAT. N.	LONG. W.	SFC.	700MB	(MB)	HT. (M)	1						2
33	23	0300	18.3	70.7								GOES 7	- , 3 IR 8		
34	23	0600	19.2	71.5								GOES 7	- , 5 IR 8		
35	23	1122	20.0	72.0	55	70	1004	3111	09	11	E17/25/22	closed wall	AF	2/6	700MB
36	23	1200	20.1	72.3	55		994						GOES 7	2, 3 VIS 1	
37	23	1404	20.3	72.5	55		1004	3116	11	13	C12	open e-s	AF	5/6	700MB
38	23	1500	20.6	72.5	55		994						GOES 7	2, 3 VIS 1	
39	23	1800	21.5	72.5	65		987						GOES 7	2, 3 VIS 1	
40	23	1802	20.9	72.7	40	48	1003	3109	11	12			AF	5/3	700MB
41	23	1917	21.1	72.8	40	24	1001	3104	11	12			AF	5/5	700MB
42	23	2025	21.6	72.8	40	40			-03	00	C20	open s	NOAA	7/13	500MB
43	23	2100	21.5	72.7	55		994						GOES 7	2, 5 VIS 1	
44	23	2107	21.4	72.8	48	24	1002	3094	09	11			AF	5/5	700MB
45	23	2307	21.9	72.7	40	15	1000	3090	08	12			AF	5/4	700MB
46	24	0000	22.3	72.8	55		994						GOES 7	2, 5 IR 8	
47	24	0300	22.9	73.1	55		994						GOES 7	2, 5 IR 8	
48	24	0557	23.1	73.9		41	1002		21	20			AF	4/4	850MB
49	24	0600	23.6	73.1	55		994						GOES 7	2, 5 IR 8	
50	24	0814	23.5	72.6		33	1002		19	19	C05	open ne	AF	4/4	850MB
51	24	0900	24.0	72.5	65		987						GOES 7	2, 1 IR 8	
52	24	1109	24.1	72.4	60	55	1001		21	22	C15	open se	AF	4/2	850MB
53	24	1200	24.6	72.5	65		987						GOES 7	2, 3 VIS 1	
54	24	1800	25.9	71.7	65		987						GOES 7	2, 3 VIS 1	
55	24	2005	26.5	71.7	75	50	1002		24	24	C30		AF	5/1	457M
56	24	2046	26.9	71.3	55	48							NOAA		500MB
57	24	2227	27.3	71.0	30	23	1000						AF		457M
58	24	2304	27.7	70.7	45	35	999		23	24	C35	p	AF	5/5	457M
59	25	0000	27.9	70.4	65		987						GOES 7	2, 3 IR 8	
60	25	0133	28.4	69.7		55			-15	-13	C25	open ne	NOAA	3/10	400MB
61	25	0600	30.1	67.6	65		987						GOES 7	2, 3 IR 8	
62	25	0601	30.0	67.8		75			24	26			AF	2/10	457
63	25	0821	30.9	66.6		94		2931	11	16	C18		AF	2/10	700MB

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CENTER FIXES

Hurricane Emily (continued).

FLX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)		TEMP. C		EYE C=CIR.DIA. E=ELIP.(N.MI.)	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon. W.	SFC.	FLT LVL.			OUT	IN					
64	25	0900	31.2	66.5	77		979								
65	25	1106	32.1	65.2		100	975	2870	13	16	C20	closed wall	GOES 7 AF	2,5 IR 8 1/10	700MB
66	25	1200	32.6	64.3	77		979						GOES 7	2,5 VIS 1	
67	25	1500	33.9	62.4	77		979						GOES 7	2,3 VIS 1	
68	25	1800	35.0	60.0	77		979						GOES 7	2,5 VIS 1	
69	26	0000	38.6	54.0	77		979						GOES 7	2,3 IR 8	
70	26	0600	41.1	49.2	77		979						GOES 7	3,5 IR 8	
71	26	1200	44.9	42.0	77		979						GOES 7	2,5 VIS 1	
72	26	1800	49.0	36.0	55		994						GOES 7	2,5 VIS 1	

CENTER FIXES

Hurricane Floyd - October 1987

NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTER- ISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon. W.	SFC.	FL/T LVL.			OUT	IN					
1	08	0000	17.6	82.7	25								GOES 7	2,5 IR 8	
2	08	1600	17.5	83.0	25								GOES 7	2,5 IR 8	
3	08	1230	16.2	82.0	30		1009						GOES 7	2,5 VIS 1	
4	08	1800	16.1	82.5	30		1009						GOES 7	2,5 VIS 1	
5	09	0000	15.6	82.6	30		1009						GOES 7	2,5 IR 8	
6	09	0600	15.5	82.5	30		1009						GOES 7	2,5 IR 8	
7	09	1230	15.8	82.5	35		1005						GOES 7	2,5 VIS 1	
8	09	1800	14.4	82.1	35		1005						GOES 7	2,5 VIS 1	
9	09	1934	14.1	81.8	30	26	1001		24	25			AF	5/3	457M
10	09	2140	14.1	81.7	15	16	1001						AF	5/3	457M
11	09	2301	14.1	81.7	30	29	999		25	25			AF	5/3	457M
12	10	0000	14.4	81.8	35		1005						GOES 7	2,5 IR 8	
13	10	0600	15.0	83.0	35		1005						GOES 7	2,5 IR 8	
14	10	0620	15.0	82.0		34	1002		25	24			AF	10/4	457M
15	10	0913	15.3	82.2		14	1001		23	24			AF	4/4	457M
16	10	1200	15.8	82.5	35		1005						GOES 7	2,5 VIS 1	
17	10	1800	17.0	83.3	45		1000						GOES 7	2,3 VIS 1	
18	10	1827	16.9	83.6	45	43	999		27	26			AF	3/3	457M
19	10	2036	17.4	83.6	30	31	999		28	27			AF	2/1	457M
20	10	2300	17.5	83.7	45	34	1000		25	24			AF	2/2	457M
21	11	0000	17.5	84.5	45		1000						GOES 7	2,5 IR 8	
22	11	0554	18.8	84.5		40	1001		24	23			AF	8/2	457M
23	11	0600	18.2	85.1	45		1000						GOES 7	2,3 IR 8	
24	11	1102	19.1	84.4		45	997		22	26			AF	10/1	457M
25	11	1200	19.2	84.7	55		004						GOES 7	2,3 VIS 1	
26	11	1500	19.9	84.7	55		994						GOES 7	2,3 VIS 1	
27	11	1800	20.5	84.6	55		994						GOES 7	2,3 VIS 1	
28	11	1814	20.5	84.4	38	40	997		26	26			AF	4/2	457M
29	11	2100	21.2	84.6	55		994						GOES 7	2,3 VIS 4	
30	12	0000	21.9	84.3	55		994						GOES 7	2,5 IR 8	
31	12		22.6	84.3	65		987						GOES 7	2,5 IR 8	
32	12	0600	23.3	84.2	65		987						GOES 7	2,5 IR 8	

CENTER FIXES

Hurricane Floyd (continued).

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	LONG. W.	SFC.	FLT LVL.			OUT	IN					
33	12	0810	23.6	83.6		72			23	23			AF	5/3	457M
34	12	0900	24.2	84.1	65								GOES 7	2/5 IR 8	
35	12	1017	24.1	83.2		45			24	24			AF	5/3	457M
36	12	1027	23.6	83.6								psbl cntr	EYW-R		
37	12	1119	23.9	83.0		67	995		18	20			NOAA	2/10	850MB
38	12	1200	24.5	82.5	65		987						GOES 7	2,3 VIS 1	
39	12	1218	23.9	82.8	85	65	994		21	20			NOAA	3/6	850MB
40	12	1223	24.3	82.4								poor fix	MIA-R		
41	12	1227	24.0	82.6								psbl cntr	EYW-R		
42	12	1252	24.3	82.5								poor fix	MIA-R		
43	12	1347	24.2	82.5	75	72			22	25			NOAA	3/10	457M
44	12	1456	25.3	81.4								poor fix	MIA-R		
45	12	1500	24.6	82.0	65								GOES 7	2,3 VIS 1	
46	12	1516	24.4	82.1	60	70			23	25			NOAA	3/8	457M
47	12	1532	24.1	81.9								psbl cntr	EYW-R		
48	12	1610	25.0	81.5							25		poor fix	MIA-R	
49	12	1626	24.5	81.9	75	71	994		21	25			NOAA	3/8	457M
50	12	1705	24.5	81.5								ctr ovr stn	EYW-R		
51	12	1730	24.5	81.3							35		EYW-R		
52	12	1753	24.8	81.3	75	65	994		20	24			NOAA	3/12	457M
53	12	1756	24.5	81.4							25		fair fix	MIA-R	
54	12	1800	24.6	81.5	65		984						GOES 7	2,3 VIS 1	
55	12	1805	24.6	80.8							40		EYW-R		
56	12	1830	24.5	81.2							20		EYW-R		
57	12	1834	24.6	81.1							45		poor fix	MIA-R	
58	12	1900	24.9	81.1							15		good fix	MIA-R	
59	12	1905	24.5	80.8							30		EYW-R		
60	12	1930	24.6	80.7									psbl	EYW-R	
61	12	1934	25.0	80.9							10		good	MIA-R	
62	12	2000	25.0	80.8							14		fair	MIA-R	
63	12	2025	25.1	81.1							12		poor	MIA-R	

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CENTER FIXES

Hurricane Floyd (continued).

FIX NO.	DATE	TIME (UTC)	POSITION		MAX WIND (KT)		MIN. PRES. (MB)	MIN. 700MB HT. (M)	TEMP. C		EYE C=CIR.DIA. E=ELIP. (N.MI.)	CHARACTERISTICS	OBS. UNIT	RESOLUTION	ACFT. ALT.
			LAT. N.	Lon. W.	SFC.	FLT LVL.			OUT	IN					
64	12	2100	25.0	81.9								poor fix	MIA-R		
65	12	2100	25.4	80.4	55		994						GOES 7	3,5 VIS 1	
66	12	2137	25.1	80.5	48	62	993						NOAA	2/5	457M
67	12	2341	25.2	80.1	60	65	995		23	24			NOAA	2/5	457M
68	13	0000	25.7	79.7	55		994						GOES 7	3,5 IR 8	
69	13	0106	25.4	79.6		48	996						NOAA	2/5	457M
70	13	0250	25.7	79.2		58	997		23	23			NOAA	5/5	457M
71	13	0300	27.4	78.3	55		994						GOES 7	3,4 IR 8	
72	13	0624	26.1	78.3		25	995		24	24			AF	3/3	457M
73	13	0830	26.4	77.5		11	995		24	25			AF	3/5	457M
74	13	1100	26.8	77.2		42	996		24	24			AF	5/5	457M
75	13	1200	26.8	76.6	35		1005						GOES 7	2,3 VIS 1	
76	13	1500	27.6	76.1	35		1005						GOES 7	2,3 VIS 1	
77	13	1745	28.1	75.4	40	40	997		25	25			AF	2/5	457M
78	13	1800	28.1	75.0	35		1005						GOES 7	2,3 VIS 1	

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APPENDIX A.
Code for supplementary vortex data message.

SUPPLEMENTARY VORTEX DATA MESSAGE

MANOP HEADING (completed by monitors only)

UR _____ 12 _____

MISSION IDENTIFIER AND OBSERVATION NUMBER (completed by flight meteorologist and monitor)

AF _____

SUPPLEMENTARY VORTEX DATA MESSAGE

(L _o L _o L _o)	(L _o L _o L _o L _o)	(iHHH)	(TTT _d T _d)	(ddfff)
01	1	1	1	
02	2	2	2	
03		3	3	
04	4	4	4	
05	5	5	5	
06	6	6	6	
07	7		7	

LEGEND

01 INDICATOR FOR DATA COLLECTED APPROXIMATELY 105 NM FROM STORM CENTER (INBOUND) OR APPROXIMATELY 15 NM FROM CENTER (OUTBOUND)

OTHER INDICATORS (02/2, 03/3...) FOR DATA AT APPROXIMATELY 15 NM INTERVALS INBOUND OR OUTBOUND FROM STORM CENTER. INDICATORS MAY BE EXPANDED BEYOND 07 (08, 09...) AS NECESSARY AT APPROXIMATELY 15 NM INTERVALS.

MF = INDICATOR FOR MAXIMUM FLIGHT LEVEL WIND OBSERVED

fff = SPEED OF WIND IN KNOTS

dd = TRUE DIRECTION OF FLIGHT LEVEL WIND SPEED IN TENS OF DEGREES

TTT_d T_d = TEMP/DEWPOINT IN DEGREES CELSIUS: ADD 50 FOR NEGATIVE VALUES

iHHH = PRESSURE HEIGHT DATA IN RECCO FORMAT

L_o L_o L_o = LATITUDE IN DEGREES/TENTHS

L_o L_o L_o L_o = LONGITUDE IN DEGREES/TENTHS

/ = DATA UNKNOWN/UNOBTAINABLE

(L_o L_o L_o) (L_o L_o L_o L_o) (fff)
MF M MF

OBS 01 AT: OBS AT Z OBS 01 SFC WND:

(L _o L _o L _o)	(L _o L _o L _o L _o)	(iHHH)	(TTT _d T _d)	(ddfff)
01	1	1	1	
02	2	2	2	
03	3	3	3	
04	4	4	4	
05	5	5	5	
06	6	6	6	
07	7	7	7	

(L_o L_o L_o) (L_o L_o L_o L_o) (fff)
MF M MF

OBS 01 AT: OBS AT Z OBS 07 SFC WND:

REMARKS (end of message)

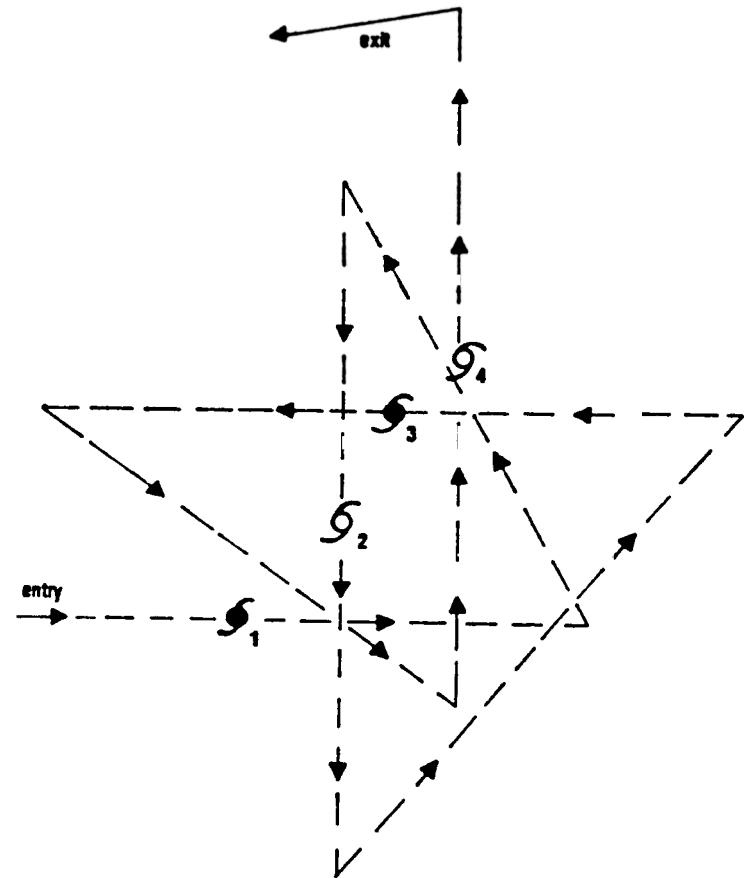
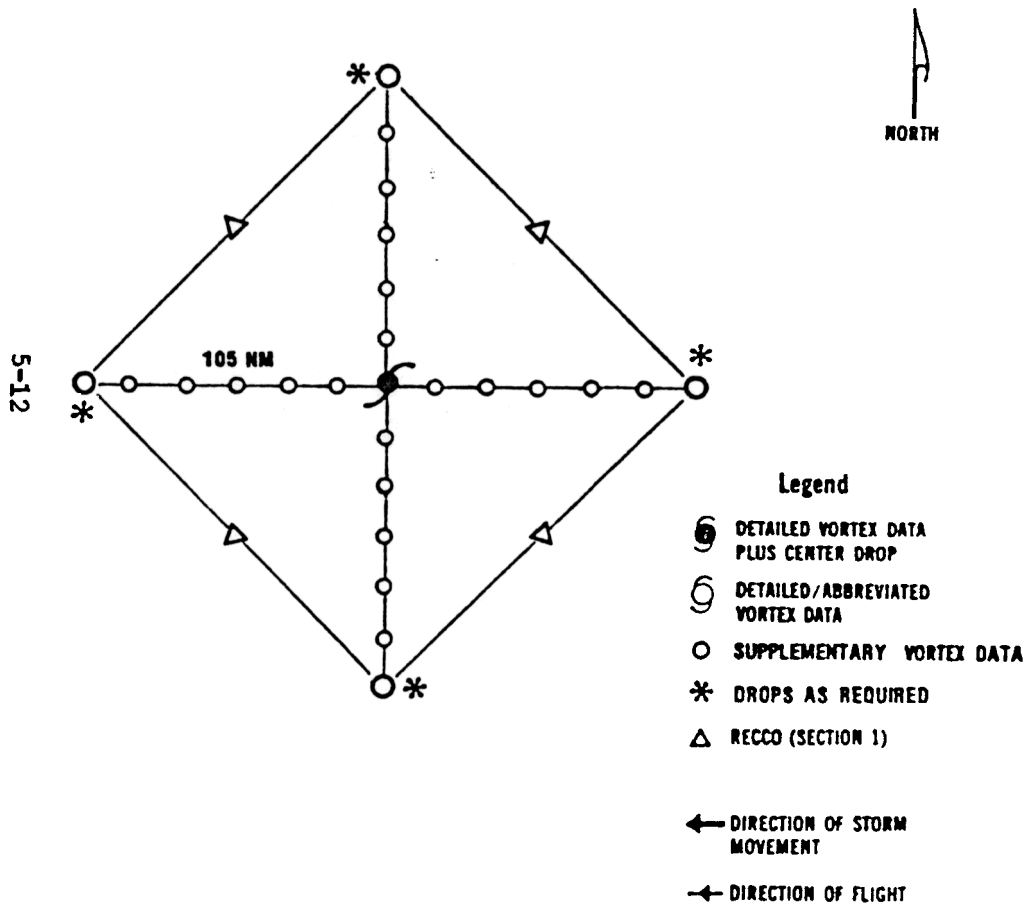
PREPARED BY:

TRANSMISSION TIME

SAMPLE MESSAGE

URNT 12 KMIA 241703
AF 966 0411 FREDERIC OB 14
SUPPLEMENTARY VORTEX DATA MESSAGE
01178 10899 13107 10908 36027
02177 20895 23100 20908 35042
03178 30891 33092 30807 36052
04177 40887 43023 40907 35070
05178 50883 53070 50908 36086
06178 60880 63000 61010 35108
07178 70877 73882 71211 35120
*1F178 M0877 MF120
OBS 01 AT 1530Z OBS 07 AT 1600Z
OBS 01 SFC WND 36025
01177 10872 13000 11010 18120
02178 20868 23070 21009 17098
03178 30862 23088 30909 18080
04177 40858 43093 40908 17050
05177 50854 53102 50908 17048
06178 60850 63108 60905 18031
07177 70844 73114 70902 18025
MF177 M0872 MF120
OBS 01 AT 1630Z OBS 07 AT 1700Z
OBS 07 SFC WIND 16025
REMARKS HEAVY RAIN OUTBOUND

RECOMMENDED PATTERN "A" EXECUTION



APPENDIX B.

Flight pattern "A" flown in obtaining Supplementary Vortex Data Messages.

Table 7. Supplementary vortex data messages, 1987 tropical cyclones

ZCZC WBC815
 URNT14 KNIA 100213
 AF967 0102A CYCLONE OB 14 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01257 10938 10009 12623 18015
 02260 20938 20009 22723 16011
 03263 30937 30010 32622 15011
 04264 40937 40009 42622 19019
 05267 50938 50009 52622 18016
 06269 60938 60009 62622 18012
 07272 70940 70009 72623 99005
 08274 80941 80008 82522 99005
 09276 90942 90008 92522 18008
 MF267 M0938 MF016
 OBS 01 AT 0054Z OBS 09 AT 0128Z
 OBS 01 SFC WND 99005
 01280 10944 10008 12522 99005
 02282 20944 20008 22522 99005
 03286 30943 30009 32421 99005
 04288 40943 40009 42421 99005
 05290 50943 50009 52421 07011
 MF290 M0943 MF011
 OBS 01 AT 0148Z OBS 05 AT 0207Z
 OBS 07 SFC WND /////
 REMARKS 278 944 008;

ZCZC WBC809
 URNT14 KNIA 100045
 AF967 0102A CYCLONE OB 12 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01275 10940 10008 12522 99005
 02274 20943 20009 22522 99005
 03276 30945 30009 42522 04010
 04274 40946 40009 42522 02008
 05273 50951 50009 52522 06010
 06273 60954 60009 62522 04016
 07273 70956 70009 72622 02014
 MF273 M0954 MF016
 OBS 01 AT 2336Z OBS 07 AT 0004Z
 OBS 01 SFC WND 99005
 REMARKS 274 937 009;

ZCZC WBC846
 URNT14 KHR 100920
 AF 968 0202A CYCLONE OB 04
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01285 10912 12533 12013 22022
 02286 20919 22533 22015 22022
 03286 30923 32529 32016 19026
 04286 40924 42526 42113 22033
 05287 50927 52524 52114 20019
 06288 60929 62517 62113 20020
 07288 70932 72517 72116 22019
 08290 80935 82517 82016 20017
 09291 90938 92511 92017 20019
 10292 00941 02504 02113 99005
 MF286 M0924 MF033
 OBS 01 AT 0521Z OBS 10 AT 0559Z
 OBS 01 SFC WND /////
 01295 10942 12501 12112 22019
 02295 20940 22501 22016 22032
 03295 30938 32500 32113 19040
 04295 40934 42504 42014 20028
 05292 50931 52510 52015 19032
 06294 60927 62522 62017 20034
 07294 70924 72519 72015 20030
 MF295 M0938 MF040
 OBS 01 AT 0650Z OBS 07 AT 0718Z
 OBS 07 SFC WND /////
 REMARKS 296 945 008
 LN OF MDT TSTMS AT 93.4W EXTDG NWSE
 OBS 01 OUTBOUND EXTRAP SLP 1007MB
 LAST RPRT OBS 0103 TO KNIA
 OBS 04 TO KHR;

Table 7. continued.

URNT14 KNIA 131335
 AF985 0403A ARLENE 08 05 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01330 10687 10008 12221 01031
 02330 20677 20007 22221 36033
 03330 30675 30006 32221 36030
 04330 40672 40005 42221 01036
 05329 50669 50005 52221 35032
 06329 60666 60004 62221 01037
 07328 70664 70002 72222 02040
 08327 80660 80000 82222 35039
 09327 90657 90998 92422 33024
 MF328 M0664 MF040
 OBS 01 AT 1105Z OBS 09 AT 1145Z OBS 01 SFC WND 02030
 01330 10653 10000 12423 02007
 02330 20652 20998 22423 28008
 03330 30649 30999 32423 13012
 04330 40646 40999 42423 17021
 05329 50643 50001 52323 14034
 06329 60640 60002 62322 14031
 07329 70636 70005 72423 11030
 MF329 M0643 MF034
 OBS 01 AT 1218Z OBS 07 AT 1248Z OBS 07 SFC WND 15030
 REMARKS 329 655 998;

URNT14 KNIA 121414
 AF968 0203A ARLENE 08 07 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01312 10730 12487 11015 31025
 02313 20728 22477 21914 30023
 03313 30725 32471 31913 31029
 04313 40722 42464 41915 31021
 05316 50718 52457 52115 31015
 MF313 M0725 MF029
 OBS 01 AT 1127Z OBS 05 AT 1147Z OBS 01 SFC WND 31010
 01318 10713 12442 12015 18013
 02319 20710 22452 21919 20017
 03319 30708 32461 31915 19030
 04320 40705 42467 41914 21022
 05320 50702 52473 52015 21022
 06321 60698 62479 61915 21034
 07320 70696 72482 71915 21038
 MF320 M0696 MF038
 OBS 01 AT 1239Z OBS 07 AT 1306Z OBS 07 SFC WND 31035
 REMARKS: 319 716 003;

URNT14 KNIA 130119
 AF964 0303A ARLENE 08 08 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01308 10694 10006 12622 28023
 02310 20694 20006 22622 29023
 03313 30694 30005 32521 29023
 04315 40693 40006 42421 33022
 05318 50690 50003 52421 29017
 06320 60688 60002 62521 30023
 07322 70686 70000 72523 34022
 08324 80683 80998 82623 06021
 MF320 M0688 MF023
 OBS 01 AT 2258Z OBS 08 AT 2353Z OBS 01 SFC WND 29020
 01327 10685 10001 12522 04026
 02328 20684 20004 22422 04026
 03332 30685 30004 32321 05034
 04334 40685 40006 42321 07023
 05337 50685 50007 52221 05024
 06339 60685 60008 62320 07026
 07342 70684 70008 72320 04030
 MF332 M0685 MF034
 OBS 01 AT 0019Z OBS 07 AT 0055Z OBS 07 SFC WND // // // //
 REMARKS 325 684 998;

Table 7. continued.

ZCZC WBC891
 URNT14 KNIA 240700 COR
 AF966 1012A EMILY OB 07 COR KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01223 10719 12510 11914 20034
 02227 20721 22498 21816 21036
 03229 30722 32495 31715 20039
 04230 40722 42492 41814 19029
 05232 50724 52479 51914 17041
 06232 60726 62445 62017 17032
 MF232 M0724 MF041
 OBS 01 AT 0415Z OBS 06 AT 0533Z OBS 01 SFC WND
 01233 10729 12452 12017 11018
 02235 20728 22476 21816 10033
 03238 30729 32485 31717 09022
 04241 40729 42500 41717 09024
 05243 50729 52510 51715 10024
 06246 60729 62509 61714 12025
 07248 70729 72518 71615 11014
 MF235 M0728 MF033
 OBS 01 AT 0611Z OBS 07 AT 0639Z OBS 07 SFC WND
 REMARKS 231 729 424;

URNT14 KNIA 230005
 AF963 0612A EMILY OB 08 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01173 10717 13154 11004 04014
 02172 20715 23151 21103 09012
 03173 30713 33151 30903 25019
 04173 40711 43151 40906 04016
 05173 50707 53139 51106 01020
 06174 60703 33121 61007 02035
 07175 70701 73103 71110 34025
 MF171 M0703 MF035
 OBS 01 AT 2152Z OBS 07 AT 2219Z
 OBS 01 SFC WND 07020
 01175 10696 13076 10808 04014
 02175 20693 23122 20906 15050
 03175 30691 33142 30906 17036
 04175 40688 43155 40906 14043
 05175 50685 53159 51006 14235
 06175 60683 63170 61007 15031
 07175 70681 73170 70909 15031
 MF176 M0697 MF110
 OBS 01 AT 2250Z OBS 07 AT 2325Z
 OBS 07 SFC WND 04014
 REMARKS 175 698 960;

ZCZC WBC491
 URNT14 KNIA 220719
 AF968 0312A EMILY OB 12 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01149 10677 13162 11105 01024
 02149 20674 23160 21105 04030
 03149 30672 33145 31107 04040
 04149 40669 43139 41206 34025
 05150 50667 53120 51208 35030
 06150 60665 63048 61009 34086
 MF150 M0665 MF086
 OBS 01 AT 0510Z OBS 06 AT 0532Z
 OBS 01 SFC WND 04014
 01154 10664 13048 10908 09072
 02157 20664 23124 21108 11052
 03160 30664 33141 31008 10045
 04162 40664 43151 41008 10043
 05165 50664 53152 51107 10020
 06167 60664 63161 61106 10033
 07170 70664 73167 71105 10032
 MF153 M0665 MF102
 OBS 01 AT 0623Z OBS 07 AT 0648Z
 OBS 07 SFC WND 04014
 REMARKS 152 664 925
 EXTRAPOLATED SLP FROM 1500 FT 980MB
 LAST REPORT OBS 01 THRU 12 TO KNIA, ETA TAPA 22/0740Z;

ZCZC WBC473
 URNT14 KNIA 220245 COR
 AF968 0312A EMILY OB 06 COR KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01144 10631 10012 12622 14026
 02144 20634 20012 22622 13039
 03144 30636 30012 32622 15035
 04144 40638 40011 42622 15040
 05144 50640 50011 52522 15041
 06145 60642 60010 62522 15041
 07144 70646 70008 72522 16055
 MF145 M0647 MF094
 OBS 01 AT 0100Z OBS 07 AT 0126Z
 OBS 01 SFC WND 04014
 01145 10655 13083 11010 02040
 02145 20658 23135 21009 01041
 03145 30660 33149 31107 02028
 04145 40663 43162 41107 03034
 05145 50665 53157 51205 02033
 06145 60667 63165 61208 03028
 07145 70670 73169 71206 04026
 MF145 M0654 MF060
 OBS 01 AT 0214Z OBS 07 AT 0238Z
 OBS 07 SFC WND 04014
 REMARKS 145 652 023 HEAVY RAIN OUTBOUND
 COR'D FOR MISSION I.D. AND REMARKS;

ZCZC WBC296
 URNT14 KNIA 210145
 AF968 0112A EMILY OB 11 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01122 10593 10010 12520 02020
 02122 20590 20009 22620 01010
 03122 30588 30010 32522 99005
 04122 40585 40009 42621 99005
 05122 50583 50008 52522 99005
 06122 60581 60007 62622 99005
 07123 70579 70006 72623 05016
 MF123 M0593 MF020
 OBS 01 AT 2327Z OBS 07 AT 2355Z OBS 07 SFC WND 04014
 01126 10578 10007 12522 14049
 02129 20578 20008 22523 14065
 03131 30578 30009 32623 13065
 04133 40578 40010 42522 13052
 05136 50578 50011 52522 13044
 06138 60578 60012 62621 13047
 07141 70578 70012 72622 12039
 MF130 M0578 MF067
 OBS 01 AT 0048Z OBS 07 AT 0114Z
 OBS 07 SFC WND 04014
 REMARKS 124 578 004;

Table 7. continued.

URNT14 KNIA 251235
 AF968 1412A EMILY OB 17 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01303 10655 13123 11007 25046
 02304 20655 23117 21006 25054
 03306 30655 33111 31007 25062
 04308 40655 43103 41205 25063
 05310 50654 53077 51007 26075
 06312 60653 63056 61106 25073
 07315 70653 73983 71309 24100
 MF315 M0653 MF100
 OBS 01 AT 1007Z OBS 07 AT 1026Z
 OBS 01 SFC WND //

ZCZC NBC158
 URNT14 KNIA 250941
 AF968 1412A EMILY OB 12 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01325 10672 13098 10906 21019
 02323 20672 23102 21006 24017
 03321 30672 33098 31006 99005
 04318 40672 43094 40908 26012
 05316 50672 53077 50808 99005
 06314 60672 63074 61107 99005
 07312 70672 73065 71008 09012
 MF325 M0672 MF019
 OBS 01 AT 0731Z OBS 07 AT 0756Z
 OBS 01 SFC WND //

01310 10669 13061 10907 99005
 02310 20671 23085 20806 30048
 03310 30674 33094 31008 29038
 04309 40678 43102 41005 06043
 MF310 M0671 MF048
 OBS 01 AT 0900Z OBS 04 AT 0920Z
 OBS 04 SFC WND //

REMARKS 309 666 981
 WND 220/94 KTS AT 30.7N 66.6W, HV PRECIP OUTBD TO W
 DOPPLER ATTENUATED IN EYENALL, PEAK INRS WND 65 TO 75 KTS
 OUTBD TO WEST:

URNT14 KNIA 250730
 AF968 1412A EMILY OB 07 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01291 10693 10008 12421 29033
 02293 20692 20008 22321 29023
 03296 30691 30006 32321 31021
 04298 40689 40005 42420 30020
 05298 50686 50005 52320 32032
 06299 60682 60991 62121 33075
 07299 70679 70985 72623 21019
 MF299 M0682 MF075
 OBS 01 AT 0515Z OBS 07 AT 0547Z
 OBS 01 SFC WND //

01302 10673 10988 12323 17068
 02302 20673 21111 21111 17092
 03302 30668 33095 30908 21081
 04301 40664 43116 40905 20063
 05301 50660 53128 51007 21063
 06300 60658 63134 61006 20065
 MF302 M0673 MF092
 OBS 01 AT 0623Z OBS 06 AT 0648Z
 OBS 07 SFC WND //

REMARKS 300 678 985
 SUSTAINED WIND TURB OUTBOUND LOW LEVEL
 WIND TURB/HEAVY PRECIP/OCNL LTNG BOTH
 ST ELMO'S FIRE 90 NM TO 100 NM EAST

ZCZC NBC912
 URNT14 KNIA 241215 COR
 AF866 1012A EMILY OB 13 COR KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01218 10728 12522 11715 24011
 02221 20729 22519 21715 25009
 03222 30729 32519 31716 24011
 04225 40728 42111 41111 24015
 05228 50727 52509 51715 24022
 06230 60727 62497 61813 24026
 07233 70727 72494 71914 26024
 MF241 M0720 MF060
 OBS 01 AT 0952Z OBS 07 AT 1017Z OBS 01 SFC WND //

01243 10726 12431 12019 09024
 02244 20727 22454 21716 06040
 03246 30728 32479 31816 08029
 04249 40729 42500 41716 07014
 05251 50729 52500 52015 04015
 06252 60729 62503 61815 12032
 07256 70730 72509 71715 12033
 MF244 M0727 MF040
 OBS 01 AT 1122Z OBS 07 AT 1147Z OBS 07 SFC WND 09020
 REMARKS 241 724 427 SLP OB 01 INBOUND 1015MB
 SLP OB 07 OUTBOUND 1014MB:

ZCZC NBC997
 URNT14 KNIA 240925
 AF866 1012A EMILY OB 10 KNIA
 SUPPLEMENTARY VORTEX DATA MESSAGE
 01231 10748 12512 11713 31015
 02230 20745 22509 21811 31017
 03231 30743 32504 31715 31010
 04231 40740 42501 41714 29015
 05232 50737 52498 51714 34016
 06238 60735 62492 61913 34012
 07235 70732 72480 71714 32021
 MF235 M0732 MF021
 OBS 01 AT 0726Z OBS 07 AT 0754Z OBS 01 SFC WND //

01236 10723 12452 12115 18043
 02236 20721 22477 21818 19037
 03235 30717 32497 31815 19031
 04234 40714 42507 41715 20030
 05234 50712 52510 51715 19035
 06234 60710 62510 61815 19028
 MF236 M0723 MF043
 OBS 01 AT 0829Z OBS 06 AT 0855Z OBS 06 SFC WND //

REMARKS 235 726 422 NUMEROUS TRW OUTBOUND:

Table 7. continued.

URNT14 KMIA 131800 MF036 1213H FLOYD UD UD KMIA

SUPPLEMENTARY VORTEX DATA MESSAGE

01284 10774 10006 12217 02030
02283 20771 20005 22218 01030
03282 30768 30004 32220 01037
04281 40765 40003 42220 01036
05280 50763 50002 52321 01030
06279 60760 60001 62320 36029
07279 70757 70999 72519 35031
MF281 M0765 MF036
OBS 01 AT 1704Z OBS 07 AT 1727Z OBS 01 SFC WND 01035
01284 10753 10998 12624 36011
02286 20754 20000 22321 02029
03287 30755 30000 32321 03031
04290 40755 40001 42220 03039
05293 50755 50002 52220 02031
06294 60754 60002 62219 02038
07298 70754 70002 72119 02040
MF297 M0754 MF042
OBS 01 AT 1806Z OBS 07 AT 1838Z OBS 07 SFC WND 03050
REMARKS 281 754 997

URNT14 KMIA 131204 COR
AF866 1113A FLOYD OB 09 COR KMIA
SUPPLEMENTARY VORTEX DATA MESSAGE

01250 10775 10001 12221 28030
02255 20772 20999 22323 26024
03257 30772 30998 32423 25025
04260 40771 40998 42423 24031
05262 50770 50998 52423 23030
06265 60768 60997 62423 20042
07268 70768 70997 72423 19026
08268 80770 80997 82424 19014
MF265 M0768 MF042
OBS 01 AT 0958Z OBS 08 AT 1031Z OBS 01 SFC WND ////
01267 10770 10996 12423 26010
02266 20766 20999 22422 23032
03265 30763 30999 32423 21038
04263 40759 40001 42422 22031
05259 50754 50002 52422 23031
06258 60755 60002 62422 24034
MF265 M0763 MF038
OBS 01 AT 1121Z OBS 06 AT 1149Z OBS 06 SFC WND 21035
REMARKS 268 772 996 LAST REPORT OBS 01 THRU 09 TO KMIA
ETA KBIX 13/1315Z

URNT14 KMIA 130945 COR
AF866 1113A FLOYD OB 06 COR KMIA
SUPPLEMENTARY VORTEX DATA MESSAGE

01277 10775 10999 12420 36010
02275 20776 20998 22420 33010
03273 30776 30997 32321 05011
04270 40776 40998 42321 02010
05268 50776 50996 52322 06011
06265 60777 60995 62323 26006
MF268 M0776 MF011
OBS 01 AT 0803Z OBS 06 AT 0825Z OBS 01 SFC WND ////
01264 10777 10996 12323 35014
02264 20781 20997 22322 36021
03264 30784 30999 32120 36025
04262 40786 40000 42220 33033
05261 50789 50000 52120 32028
06261 60791 60002 62120 33016
07263 70794 70002 72120 35026
MF262 M0786 MF033
OBS 01 AT 0850Z OBS 07 AT 0921Z OBS 07 SFC WND ////
REMARKS 264 775 995-
MI ARPT CLOUDY 71 NW14

URNT14 KMIA 110710
AF963 0613A FLOYD OB 04 KMIA
SUPPLEMENTARY VORTEX DATA MESSAGE

01202 10848 10006 12322 04024
02199 20848 20006 22322 03032
03198 30849 30006 32322 03031
04195 40846 40004 42322 04040
05193 50845 50003 52423 08028
06190 60845 60002 62423 12028
MF195 M0846 MF040
OBS 01 AT 0510Z OBS 06 AT 0536Z
OBS 01 SFC WND ////
01185 10844 10001 12522 32016
02183 20844 20002 22222 33025
03180 30844 30002 32323 32020
04177 40844 40004 42323 31024
05175 50844 50004 52322 30012
06172 60844 60004 62222 23022
07169 70843 70005 72222 25018
MF183 M0844 MF025
OBS 01 AT 0619Z OBS 07 AT 0646Z
OBS 07 SFC WND ////

URNT14 KMIA 110935
AF963 0613A FLOYD OB 07 KMIA
SUPPLEMENTARY VORTEX DATA MESSAGE

01193 10838 10003 12323 17034
02193 20832 20002 22423 16036
03193 30835 30002 32423 18031
04193 40838 40001 42424 16033
05192 50840 50000 52323 15028
06190 60843 60999 62424 12019
MF193 M0832 MF036
OBS 01 AT 0739Z OBS 06 AT 0801Z
OBS 01 SFC WND ////
01189 10847 10999 12423 33025
02189 20849 20000 22323 34035
03189 30852 30002 32222 34036
04189 40855 40002 42323 35026
05189 50858 50003 52323 34023
06189 60860 60003 62222 34022
07189 70862 70004 72323 32015
MF189 M0852 MF036
OBS 01 AT 0853Z OBS 07 AT 0922Z
OBS 07 SFC WND ////

NNNN

ZCZC WBC985

SXXX5 KMIA 111712

AF968 0713A FLOYD KMIA

1534 06165 08895 05607 0125 004 012 093 251 013
1535 06173 08892 05616 0083 003 013 095 253 013
1536 06181 08888 05621 0140 006 014 097 245 014
1537 06189 08885 05623 0115 010 014 097 235 015
1538 06197 08881 05627 0096 014 015 097 235 015
1539 06205 08878 05627 0126 019 015 097 233 016
1540 06213 08875 05625 0083 021 016 091 235 016
1541 06221 08872 05625 0116 022 016 089 245 017
1542 06230 08869 05629 0186 033 013 087 253 015
1543 06238 08867 05627 0153 037 012 087 259 013
1544 06246 08864 05625 0107 034 012 083 265 013
1545 06254 08861 05624 0103 033 013 083 269 014
1546 06262 08858 05625 0149 040 013 083 273 014
1547 06270 08856 05626 0026 045 013 083 275 014
1548 06278 08853 05625 0106 044 013 081 279 014
1549 06286 08851 05622 0086 033 015 081 281 016
1550 06294 08848 05623 0119 034 015 081 283 015
1551 06302 08845 05622 0101 034 017 081 285 017
1552 06310 08842 05625 0148 038 016 079 287 017
1553 06318 08840 05625 0059 049 015 075 289 015
MTNOB 02 KBIX SFNDS:

ZCZC WBC836

URNT14 KMIA 102222

AF968 0513A FLOYD OB 14 KMIA

SUPPLEMENTARY VORTEX DATA MESSAGE

01172 10819 10006 12522 16023
02171 20821 20005 22522 15023
03170 30824 30005 32523 17019
04170 40827 40004 42623 20019
05171 50829 50003 52522 21020
06172 60831 60003 62522 19017
07172 70834 70000 72823 22017
MF172 M0832 MF031
OBS 01 AT 1953Z OBS 07 AT 2025Z
OBS 01 SFC WND 17025
01174 10839 10001 12623 03018
02174 20843 20002 22624 01018
03174 30844 30004 32524 36022
04174 40847 40004 42522 36019
05175 50849 50005 52522 01025
06174 60852 60005 62522 01022
07174 70854 70006 72522 01018
MF175 M0849 MF025
OBS 01 AT 2111Z OBS 07 AT 2140Z
OBS 07 SFC WND 02025
REMARKS 174 836 999-

Table 8. Tropical Cyclone Reconnaissance Summary for 1987.

	Atlantic	Eastern Pacific	Central Pacific
1. Requirements Levied			
TDs, TStorms, Hurricanes	<u>125</u>	<u>0</u>	<u>7</u>
Invests	<u>61</u>	<u>0</u>	<u>0</u>
Total Levied	<u>186</u>	<u>0</u>	<u>7</u>
Requirements Cancelled	<u>93</u>	<u>0</u>	<u>2</u>
TOTAL REQUIREMENTS	<u>93</u>	<u>0</u>	<u>5</u>
2. Requirements Accomplished (Fixes/Invests)			
53rd WRS	<u>43/6</u>	<u>0</u>	<u>5/0</u>
815th TAS	<u>22/4</u>	<u>0</u>	<u>0/0</u>
NOAA/OAO	<u>16/1</u>	<u>0</u>	<u>0/0</u>
TOTAL ACCOMPLISHMENTS	<u>81/11</u>	<u>0</u>	<u>5/0</u>
Missed: NOAA3 01XXA INVEST 5 Sep; Late: AF967 0813A FLOYD; Early: AF963 0413A CYCLONE			
3. Missions Flown			
53rd WRS	<u>29/6</u>	<u>0</u>	<u>4/0</u>
815th TAS	<u>18/4</u>	<u>0</u>	<u>0/0</u>
NOAA/OAO	<u>9/1</u>	<u>0</u>	<u>0/0</u>
TOTAL FLOWN	<u>56/11</u>	<u>0</u>	<u>4/0</u>
4. Flying Time			
		(Deployment Time 72.1 hrs)	
53rd WRS	<u>402.5 hrs</u>	<u>0</u>	<u>38.1 hrs</u>
815th TAS	<u>259.9 hrs</u>	<u>0</u>	<u>0</u>
NOAA/OAO	<u>72.6 hrs</u>	<u>0</u>	<u>0</u>
TOTAL TIME	<u>735.0 hrs</u>	<u>0</u>	<u>110.2 hrs</u>
GRAND TOTAL 1987: <u>845.2 hrs</u>			
5. Observations: Horizontal			
	<u>904</u>	Vertical	<u>46</u>

Table 9. Probability forecasts for 1987 landfalling U.S. tropical cyclones.

CHANCES OF THE CENTER OF THE UNNAMED TROPICAL STORM PASSING WITHIN 65 MILES OF THE LISTED LOCATION BY DATE AND TIME (CDT) INDICATED. PROBABILITIES IN PERCENT. (August 1987)

<u>Advisory Date/Time</u> <u>Probability Time</u>	<u>9/Noon</u> <u>12/7 AM</u>	<u>9/5 PM</u> <u>12/1 PM</u>	<u>9/11 PM</u> <u>12/7 PM</u>
New Iberia, LA	6	3	
Port Arthur, TX	28	27	44
Galveston, TX	40	44	83
Freeport, TX	44	55	78
Port O Connor, TX	37	49	34
Corpus Christi, TX	16	21	
Brownsville, TX	3	2	
28 N 93 W	30	27	45
28 N 95 W	64	78	89
27 N 96 W	43	51	3

Chances of the center of Tropical Storm Arlene passing within 65 miles of listed locations by date and time (EDT) indicated; probabilities in percent. (August 1987)

<u>ADVISORY DATE/TIME</u> <u>PROBABILITY TIME</u>	<u>11/7PM</u> <u>14/2PM</u>	<u>11/1030PM</u> <u>14/8PM</u>	<u>12/6AM</u> <u>15/2AM</u>	<u>12/NOON</u> <u>15/8AM</u>	<u>12/6PM</u> <u>15/2PM</u>	<u>12/1030PM</u> <u>15/8PM</u>	<u>13/6AM</u> <u>16/2AM</u>
Bermuda	32	21	24	20	24	42	58
32.0N 68.0W	16						
33.0N 63.0W	19						
33.0N 67.0W		32		34			
33.5N 62.0W		16					
32.5N 66.0W			31		34		
32.5N 63.0W			18				
33.0N 64.0W				18			
32.5N 68.0W					68		
32.5N 64.0W						34	
32.0N 61.0W						18	
32.8N 63.0W							34
32.5N 61.5W							23

Table 9 Chances of the center of Tropical Storm Emily passing within 65 miles of
 (cont'd) listed locations by date and time indicated; probabilities in percent.
 (September 1987)

ADVISORY DATE/TIME	21/MID	22/6AM	22/9AM	22/NOON	22/6PM	22/MID	23/6AM	23/NOON
PROBABILITY TIME	24/8PM	25/2AM	25/2AM	25/8AM	25/2PM	25/8PM	26/2AM	26/8AM
MARATHON, FL	4	6	6	7	7	7	4	2
MIAMI, FL	3	6	6	8	7	8	6	3
WEST PALM BEACH, FL	3	5	5	7	7	8	6	4
FORT PIERCE, FL	2	4	4	6	6	7	6	3
COCOA BEACH, FL	—	3	3	5	5	6	5	3
DAYTONA BEACH, FL	—	2	2	4	4	5	4	2
KEY WEST, FL	3	5	5	2	6	6	3	—
MARCO ISLAND, FL	2	4	4	7	5	6	3	2
FORT MYERS, FL	2	4	4	6	5	5	3	—
VENICE, FL	—	3	3	4	4	4	2	—
TAMPA, FL	—	2	2	3	3	4	2	—
CEDAR KEY, FL	—	—	—	2	2	3	2	—
JACKSONVILLE, FL	—	—	—	—	2	3	2	—
SAVANNAH, GA	—	—	—	—	—	2	2	—
CHARLESTON, SC	—	—	—	—	—	2	2	—
MYRTLE BEACH, SC	—	—	—	—	—	2	2	2
WILMINGTON, NC	—	—	—	—	—	2	3	2
MOREHEAD CITY, NC	—	—	—	—	—	2	3	3
CAPE HATTERAS, NC	—	—	—	—	—	2	3	3

ADVISORY DATE/TIME	24/6PM	24/1030PM	25/330AM	25/6AM
PROBABILITY TIME	27/2PM	27/8PM	27/8PM	28/2AM
CAPE RACE, NFLD	2	—	3	
HIBERNIA OIL FIELD	3	3	4	

Table 9 Chances of the center of Tropical Storm Emily passing within 65 miles of
 (cont'd) listed locations by date and time indicated; probabilities in percent.
 (September 1987)

ADVISORY DATE/TIME	20/NOON	20/6PM	20/1030PM	21/6AM	21/NOON	21/6PM	21/MID	22/6AM
PROBABILITY TIME	23/8AM	23/2PM	23/8PM	24/2AM	24/8AM	24/2PM	24/8PM	25/2AM
SKPG 12.5N 71.7W	8	9	9	11	11	10	3	
TNCC 12.2N 69.0W	11	12	12	13	13	8	--	--
SVMG 11.0N 64.0W	16	18	12	5	2	--	--	--
TTPP 10.6W 61.4W	21	19	8	--	--	--	--	--
TTPT 11.2N 60.8W	30	32	25	3	--	--	--	--
TGPY 12.0N 61.8W	28	38	41	40	41	--	--	--
TBPB 13.1N 59.5W	40	62	93	98	--	--	--	--
TVSV 13.1N 61.2W	31	46	66	89	99	--	--	--
TLPL 13.8N 61.0W	26	41	56	84	75	--	--	--
TFFF 14.6N 61.0W	19	26	38	47	3	--	--	--
TDPR 15.3N 61.4W	15	17	23	18	--	--	--	--
TKPK 17.3N 62.7W	10	10	11	7	--	--	--	--
TNOM 18.1N 63.1W	8	9	10	7	2	--	--	--
TISX 17.7N 64.8W	9	10	12	12	5	3	--	--
TIST 18.3N 65.0W	8	9	11	10	5	3	--	--
TJPS 18.0N 66.6W	8	9	12	13	10	7	4	--
MDSD 18.5W 69.7W	6	7	9	13	15	15	18	40
MDCB 17.6N 71.4W	5	6	9	13	18	20	34	54
MTPP 18.6N 72.4W	3	4	7	11	15	16	22	42
MTCA 18.3N 73.8W	3	4	6	10	14	16	21	28
TJSJ 18.4N 66.1W	8	9	11	12	8	6	3	--
MDPP 19.8N 70.7W	3	4	7	10	13	13	15	24
MBJT 21.5N 71.2W	2	2	4	7	10	10	12	16
TFFR 16.3N 61.5W	--	12	12	5	--	--	--	--
TAPA 17.1N 61.8W	--	10	10	5	--	--	--	--
MKJP 17.9N 76.8W	--	2	4	7	10	12	13	12
MUGM 20.0N 75.1W	--	2	4	7	10	12	15	21
MKJS 18.5N 77.9W	--	--	3	5	9	10	11	11
MYMM 22.4N 73.0W	--	--	3	5	8	9	12	16
MWCG 19.3N 81.4W	--	--	--	2	4	5	6	6
MUCM 21.4N 77.9W	--	--	--	3	6	7	10	13
MNPC 14.1N 83.4W	--	--	--	2	3	--	--	--
SKSP 12.6N 81.7W	--	--	--	2	3	--	2	--
MYSM 24.1N 74.5W	--	--	--	2	4	6	9	13
MYEG 23.5N 75.8W	--	--	--	2	5	6	9	13
MUCF 22.1N 80.5W	--	--	--	--	3	4	6	8
MUSN 21.6N 82.6W	--	--	--	--	2	3	4	5
MNBL 12.0N 83.9W	--	--	--	--	2	--	--	--
MYAK 24.1N 77.6W	--	--	--	--	3	4	7	11
MYNN 25.1N 77.5W	--	--	--	--	2	3	6	10
MUHA 23.0N 82.4W	--	--	--	--	--	2	4	5
MNPC 14.1N 83.4W	--	--	--	--	--	2	2	--
MHNJ 16.5N 85.9W	--	--	--	--	--	--	2	--
MYGF 26.6N 78.7W	--	--	--	--	--	--	3	6
MUAN 21.9N 85.0W	--	--	--	--	--	--	2	3

Table 9 Chances of the center of Tropical Storm Emily passing within 65 miles of listed locations by date and time indicated; probabilities in percent. (September 1987)

ADVISORY DATE/TIME	22/9AM	22/NOON	22/6PM	22/MID	23/6AM	23/NOON	23/6PM	23/MID
PROBABILITY TIME	25/2AM	25/8AM	25/2PM	25/8PM	26/2AM	26/8AM	26/2PM	26/8PM
TJPS 18.0N 66.6W	3	--	--	--	--	--	--	--
MDSO 18.5W 69.7W	52	63	82	93	--	--	--	--
MDCB 17.6N 71.4W	48	65	61	60	--	--	--	--
MTPP 18.6N 72.4W	38	55	51	58	35	--	--	--
MTCA 18.3N 73.8W	22	25	17	11	--	--	--	--
TJSJ 18.4N 66.1W	--	--	--	--	--	--	--	--
MDPP 19.8N 70.7W	34	44	53	65	86	--	--	--
MBJT 21.5N 71.2W	19	21	24	29	28	17	34	10
TFFR 16.3N 61.5W	--	--	--	--	--	--	--	--
TAPA 17.1N 61.8W	--	--	--	--	--	--	--	--
MKJP 17.9N 76.8W	11	8	5	3	--	--	--	--
MUGM 20.0N 75.1W	19	24	20	18	7	6	--	--
MKJS 18.5N 77.9W	10	8	6	3	--	--	--	--
MYMM 22.4N 73.0W	18	23	24	33	58	60	84	74
MWCG 19.3N 81.4W	6	5	4	2	--	--	--	--
MUCM 21.4N 77.9W	12	14	12	10	5	3	--	--
MNPC 14.1N 83.4W	--	--	--	--	--	--	--	--
SKSP 12.6N-81.7W	--	--	--	--	--	--	--	--
MYSM 24.1N 74.5W	13	17	18	21	38	47	30	9
MYEG 23.5N 75.8W	13	18	17	20	30	35	8	2
MUCF 22.1N 80.5W	8	9	7	6	3	--	--	--
MUSN 21.6N 82.6W	5	5	4	3	--	--	--	--
MNBL 12.0N 83.9W	--	--	--	--	--	--	--	--
MYAK 24.1N 77.6W	11	14	13	14	13	11	3	--
MYNN 25.1N 77.5W	10	12	12	14	15	13	3	--
MUHA 23.0N 82.4W	5	6	5	4	2	--	--	--
MNPC 14.1N 83.4W	--	--	--	--	--	--	--	--
MHNJ 16.5N 85.9W	--	--	--	--	--	--	--	--
MYGF 26.6N 78.7W	6	9	9	10	10	8	2	--
MUAN 21.9N 85.0W	3	3	2	2	--	--	--	--
BERMUDA		2	2	4	7	9	12	14
ADVISORY DATE/TIME	24/6AM	24/NOON	24/6PM	24/1030PM	25/330AM	25/6AM		
PROBABILITY TIME	27/2AM	27/8AM	27/2PM	27/8PM	27/8PM	28/2AM		
MYMM 22.4N 73.0W	34	--	--					
MYSM 24.1N 74.5W	9	--	--					
BERMUDA	17	22	28	43	53	75		

Table 9 (cont'd) Chances of the center of Hurricane Floyd, October 1987, passing within 65 miles of the listed locations by the date and time (AST) indicated with probabilities in percent (Caribbean area).

Advisory Date/Time 09/6PM 10/MID 10/6AM 10/NOON 10/6PM 11/MID 11/6AM 11/NOON 11/6PM 12/MID 12/6AM

Probability Thru: 12/2PM 12/8PM 13/2AM 13/8AM 13/2PM 13/8PM 14/2AM 14/8AM 14/2PM 14/8PM 15/2AM

MTCA 183N 738W	2	2	x	x	x	x	x	x	x	x	x	x
MKJP 179N 768W	4	4	3	x	x	x	x	x	x	x	x	x
MKJS 185N 814W	7	6	5	2	x	x	x	x	x	x	x	x
MWCG 193N 814W	13	13	14	15	7	6	4	4	x	x	x	x
MUGM 200N 751W	3	3	2	x	x	x	x	x	x	x	x	x
MUCM 214N 719W	6	6	6	5	3	4	3	4	2	x	x	x
MUCF 221N 805W	8	x	9	10	9	9	8	9	6	4	2	2
MUSN 216N 826W	10	x	11	16	14	14	13	22	32	10	2	2
MUHA 230N 824W	7	7	9	x	x	13	15	19	42	49	53	53
MNPC 141N 834W	x	31	24	2	x	x	x	x	x	x	x	x
MNBL 120N 839W	x	7	4	x	x	x	x	x	x	x	x	x
SKSP 126N 817W	x	11	3	x	x	x	x	x	x	x	x	x
MRLM 100N 831W	x	2	x	x	x	x	x	x	x	x	x	x
MYMM 224N 730W	x	2	2	x	x	x	x	x	x	x	x	x
MYSM 241N 741W	x	2	2	2	2	2	2	x	4	3	2	2
MYEG 235N 758W	x	3	3	3	3	x	2	x	x	x	2	2
MYAK 241N 776W	x	x	4	5	5	x	x	x	4	3	5	5
MYNN 251N 775W	x	x	4	5	5	x	x	x	8	x	9	9
MYGF 266N 787W	x	x	3	5	6	x	x	10	10	17	22	22
MMVR 192N 961W	x	x	2	2	2	x	x	x	16	x	x	x
MFMR 185N 926W	x	x	6	6	5	5	x	2	x	x	x	x
MMMD 210N 897W	x	x	8	11	13	15	x	7	x	x	x	x
MUAN 219N 850W	x	9	11	18	22	23	45	47	79	40	3	3
MMCZ 205N 869W	x	10	x	18	30	35	34	24	2	x	x	x
MZBZ 175N 883W	x	12	x	11	10	10	4	3	x	x	x	x
MGPB 157N 886W	x	11	x	7	5	5	x	x	x	x	x	x
MHNJ 165N 859W	x	18	20	13	7	6	2	2	x	x	x	x

x - Means 2 percent or less or not issued.

Table 9 Chances of the center of Hurricane Floyd, October 1987, passing within 65 miles of the (cont'd) listed locations by the date and time (EDT) indicated (probabilities in percent).

Advisory Date/Time	09/6PM	10/MID	10/6AM	10/NOON	10/6PM	11/MID	11/6AM	11/NOON	11/6PM	12/MID
Probability Thru:	12/2PM	12/8PM	13/2AM	13/8AM	13/2PM	13/8PM	14/2AM	14/8AM	14/2PM	14/8PM
Bermuda	x	x	x	x	x	x	x	x	2	3
Marathon FL	5	5	6	9	10	10	12	14	27	29
Miami FL	3	3	4	7	8	9	11	13	21	24
West Palm Bch FL	2	2	3	6	7	8	10	12	20	24
Ft. Pierce FL	2	2	3	5	7	7	10	12	20	23
Cocoa Beach FL	x	x	x	4	6	7	10	11	19	22
Daytona Beach FL	x	x	x	3	5	6	8	10		18
Jacksonville FL	x	x	x	2	3	4	6	8	13	14
Savannah GA	x	x	x	x	2	2	2	5	10	10
Charleston SC	x	x	x	x	x	2	3	4	9	10
Myrtle Beach SC	x	x	x	x	x	x	2	3	8	9
Wilmington NC	x	x	x	x	x	x	2	2	7	9
Morehead City NC	x	x	x	x	x	x	x	2	6	9
Cape Hatteras NC	x	x	x	x	x	x	x	2	6	8
Norfolk VA	x	x	x	x	x	x	x	x	3	6
Ocean City MD	x	x	x	x	x	x	x	x	2	4
Key West FL	5	5	6	10	11	11	14	16	36	40
Marco Island FL	3	3	4	8	9	10	13	15	32	37
Fort Myers FL	3	3	4	7	9	9	13	14	29	34
Venice FL	2	2	3	6	8	9	13	14	26	30
Tampa FL	x	x	2	5	7	8	11	12	20	22
Cedar Key FL	x	x	x	3	5	6	9	10	15	15
St Marks FL	x	x	x	2	3	4	6	7	10	9
Apalachicola FL	x	x	x	2	4	5	7	8	9	8
Panama City FL	x	x	x	2	3	4	6	7	8	6
Gulf 29N 85W	x	x	x	3	5	6	8	9	11	9
Gulf 29N 87W	x	x	x	3	4	5	7	7	6	4
Gulf 28N 89W	x	x	x	2	4	5	6	6	4	2
Gulf 28N 91W	x	x	x	2	3	3	4	4	2	x
Gulf 28N 93W	x	x	x	x	2	2	2	2	x	x
Gulf 25N 96W	x	x	x	x	x	2	x	x	x	x
Pensacola FL	x	x	x	x	2	3	4	5	5	3
Mobile AL	x	x	x	x	2	2	3	4	3	2
Gulfport MS	x	x	x	x	2	2	2	2	3	2
Buras LA	x	x	x	x	2	3	4	4	3	x
New Orleans LA	x	x	x	x	2	2	2	3	2	x
New Iberia LA	x	x	x	x	x	x	2	2	x	x

Table 9 (cont'd) Chances of the center of Hurricane Floyd, October 1987, passing within 65 miles of the listed locations by the date and time (EDT) indicated (probabilities in percent).

Advisory Date/Time	12/6AM	12/12N	12/6PM	13/MID	13/6AM
Probability Thru:	15/2AM	15/8AM	15/2PM	15/8PM	16/2AM
Tampa FL	25	6	x	x	x
Venice FL	36	8	x	x	x
Fort Myers FL	46	20	x	x	x
Marco Island FL	53	41	x	x	x
Key West FL	58	88	x	x	x
Marathon FL	42	80	96	x	x
Miami FL	35	56	75	x	x
West Palm Bch FL	35	39	48	x	x
Ft. Pierce FL	33	25	22	x	x
Cocoa Beach FL	29	16	11	x	x
Daytona Beach FL	21	9	6	3	x
Jacksonville FL	13	6	5	3	x
Savannah GA	11	6	6	4	2
Charleston SC	11	7	7	5	2
Myrtle Beach SC	11	7	8	7	3
Wilmington NC	11	8	9	8	4
Morehead City NC	11	9	10	10	6
Cape Hatteras NC	10	9	11	11	8
Norfolk VA	8	6	8	8	6
Ocean City MD	6	6	8	8	6
Atlantic City NJ	5	4	7	16	15
New York NY	4	4	6	6	5
Montauk Point NY	4	4	6	6	6
Providence RI	3	3	5	6	6
Nantucket MA	4	4	6	7	7
Hyannis MA	3	4	6	6	7
Boston MA	2	3	5	5	5
Bar Harbor ME	x	2	3	3	5
Portland ME	2	2	3	3	4
Eastport ME	x	x	3	3	5
St Johns NB	x	x	x	3	5
Moncton NB	x	x	x	2	4
Yarmouth NS	2	2	x	4	6
Halifax NS	x	2	x	x	6
Sable Island NS	x	2	x	x	7
Sydney NS	x	x	x	x	5
Eddy Point NS	x	x	x	x	6
Pix Basques NFLD	x	x	x	x	3
Burgeo NLFD	x	x	x	x	4
Ile St Pierre NLFD	x	x	x	x	4
Cape Race NLFD	x	x	x	x	4
Hibernia Oil Fld	x	x	x	x	3
MYSM 241N 745W	x	6	x	x	x
MYEG 235N 758W	x	5	x	x	x
MYAK 241N 776W	x	18	x	x	x
MYNN 251N 775W	x	30	38	51	58
MYGF 266N 787W	x	41	60	70	78
Bermuda	4	7	6	6	8

x - Means 2 percent or less or not issued.