PRELIMINARY REPORT

HURRICANE FREDERIC

Aug. 29 - Sept. 14, 1979

(NOTE: THIS REPORT HAS BEEN EXPEDITED BECAUSE OF THE LARGE DEMAND FOR INFORMATION ON FREDERIC. WHILE MOST OF THE INFORMATION WILL STAND AS WRITTEN, MINOR CHANGES TO THE TRACK AND STATISTICS MAY BE MADE BEFORE THE FINAL VERSION APPEARS IN THE MONTHLY WEATHER REVIEW. A FOLLOW-UP REPORT WITH MORE COMPLETE METEOROLOGICAL DATA WILL BE MADE AND DISSEMINATED PRIOR TO THE END OF THE HURRICANE SEASON. PAUL HEBERT)

1. CHRONOLOGY

The tropical wave from which Frederic developed left the west African coast late on August 27th with little to distinguish it from most other waves. By midday on August 28, however, satellite pictures showed a rather large, circular area of convection south of the Cape Verde Islands. Peripheral ship and satellite data indicated that a tropical depression had formed by 0600 GMT on August 29. The depression gradually strengthened while moving westward at 18 knots for the next 24 hours and reached tropical storm strength near 11.5N 36.0W about 1200 GMT on the 30th. Frederic continued at a remarkably steady 18 knot forward movement for the next 48 hours while gradually turning to the westnorthwest. Conditions appeared ideal for Frederic to become a very intense hurricane as David had in the same area. An eye became visible on infrared satellite pictures about 0600 GMT on September 1 and Frederic was upgraded to a hurricane near 13N 49W.

About this time the outflow from David, which had become a very intense hurricane lashing Hispaniola, began to descend from the northwest right over Frederic, and the newborn hurricane weakened to a tropical storm again by 0000 GMT on September 2. Frederic gradually turned more to the west and decelerated with the weakening trend continuing until winds finally dropped below storm strength just north of Haiti about 1800 GMT on September 6.

Frederic had passed over Puerto Rico and the Dominican Republic which helped disrupt the low level wind circulation in addition to the continued unfavorable impact of the outflow from David. The storm actually moved towards the southwest at less than 10 knots while southeast of the Dominican Republic, and then suddenly changed course towards the northwest during the afternoon of September 5 in a manner similar to David, passing just west of Santo Domingo about 0000 GMT on the 6th.

As David weakened over the northeastern U.S., Frederic continued slowly westward over or just south of the Cuban coast for the next four days. Escaping the unfavorable influence of David, Frederic proceeded to strengthen beginning about midday on the 7th, and regained tropical storm strength about 100 miles east of the Isle of Pines, Cuba about 0000 GMT on

September 9. Frederic turned to the northwest during the next 48 hours, moving at an average forward speed of 4 knots, and regained hurricane intensity over the western end of Cuba about 1200 GMT September 10. Factors which probably contributed to the strengthening while the center was so close to land were the very warm sea surface temperatures of 29-30°C, the large cyclonic envelope of the storm, and the establishment of a large anticyclone at 200 mb over the storm.

Except for the trochoidal motion frequently observed with tropical cyclones, Frederic moved steadily northwest and turned to the north northwest with increasing forward speed for the next 60 hours, the eye passing across Dauphin Island, Alabama about 0300 GMT on September 13 and crossing the coastline near the Mississippi-Alabama border about one hour later.

Frederic turned north and northeast and increased its forward speed to 20 knots during the next 24 hours, losing hurricane intensity near Meridian, Mississippi about 1200 GMT on the 13th and becoming part of a frontal low pressure area near the southwest corner of Pennsylvania about 1200 GMT on the 14th. The extratropical remnants of Frederic moved very rapidly northeastward through Pennsylvnia, New York, and western New England during the day and exited from northern Maine that evening.

I. METEOROLOGICAL STATISTICS, DEATHS, AND DAMAGES.

a.) Leeward Islands, Virgin Islands, and Puerto Rico.

Frederic weakened approaching the Leeward Islands and post-analysis indicates sustained winds had dropped below hurricane force well before the center reached the Leeward Islands. Maximum sustained winds were 25-35 knots with gusts of 45-60 knots. Rainfall amounts reported as of this writting were 10 inches in 12 hours in Eastern Puerto Rico...12 inches in 24 hours in St. Thomas...and 24 inches in 30 hours at St. Croix. A few tornadoes were reported in the Virgin Islands and Puerto Rico. Seven deaths have been reported at St. Maarten.

b.) Dominican Republic, Haiti, and Cuba.

Frederic continued to weaken to a tropical depression while over eastern Cuba, but regained hurricane status before leaving western Cuba. Heavy rains occurred over the Dominican Republic for several days after the center passed, augmenting the damage caused by David. Rains diminished as Frederic moved over eastern Cuba, but heavy rains and gale force winds were reported over western Cuba as the depression regained hurricane strength. No reports of deaths have been received from these areas, but damage estimates from western Cuba are high.

c.) United States.

As Frederic strengthened over the southeastern Gulf of Mexico, winds of 45-50 knots were reported at Dry Tortugas during the evening of the 10th and morning of the 11th.

The highest winds reported thus far in squalls and gusts are as follows: Dauphin Island bridge 126 knots; Dauphin Island Sea Lab 119 knots before equipment destroyed; Pascagoula Ingalls Ship Yard 110 knots; Pascagoula Civil Defense 100 knots before equipment broke; Biloxi Civil Defense, Keesler AFB, and Gulfport Air National Guard all 85 knots; Mobile Airport and Civil Defense both 84 knots; Pensacola Naval Air Station 83 knots; Hattiesburg, Mississippi 78 knots; Meridian, Mississippi Airport 70 knots; Pensacola Municipal Airport 68 knots; Hancock County, Mississippi 64 knots.

Gale force winds in gusts occurred near the track of Frederic throughout eastern Mississippi...western Alabama...and many sections of Tennessee...Kentucky...southern Ohio...western portions of Pennsylvania & New York...and through western New England. Along the coasts, gale force winds or higher occurred from the New Orleans east area southward to the Mississippi River delta and eastward to the Panama City area, as well as along portions of the New England coast.

Tides of 8 to 12 feet above normal were reported in the hurricane warning area from Pascagoula, Mississippi to western Santa Rosa Island. Tides were 12 feet at Gulf Shores, Alabama...11 feet at Fort Morgan, Alabama...9.5 feet at Gulf State Park...12 feet just south of Mobile Tunnel and 8 feet just north of Mobile Tunnel...10 feet on the east end of Dauphin Island and 7.5 feet on the west end... 9 feet at Bayou La Batre...9 feet at Fairhope...9 feet on western Santa Rosa Island, Florida.

Rainfall amounts of 8 to 12 inches fell from Pascagoula to Mobile with 4 to 6 inches through other parts of eastern Mississippi and western Alabama, and northwestern Florida and northward through Tennessee. Amounts of 2 to 4 inches were reported along the track all the way to New England. No rainfall induced flooding of any consequence was associated with Frederic in the United States.

Over a dozen tornadoes were reported...mostly along the Gulf coastal sections, but they resulted in no deaths or injuries and only minor property damage.

Thus far, 11 storm related deaths have been attributed to Frederic in the U. S., but only 2 were caused directly. Although a final count of storm related deaths is unavailable it is believed to be less than 15.

Preliminary estimates of damages exceeding 2 billion dollars make it likely that Frederic will rank as one of the costliest if not the costliest hurricane ever to hit the U. S. Insurance industry estimates of insured losses stand at 750 million dollars as of this report.

Preliminary estimates of persons evacuated are between 300,000 and 400,000.

The maximum sustained winds in Frederic during its lifetime were estimated at 115 knots based on aircraft reonnaissance and pressure-wind relationships. The NOAA research aircraft reported a flight level wind of 138 knots a short time prior to landfall...very close to that observed at Dauphin Island. The lowest central pressure of 943 millibars was reported by Air Force reconnaissance aircraft about 1200 GMT on the 12th, when the center was about 200 miles southeast of Mobile. However, the central pressure reported by reconnaissance aircraft during the last 6 hours was 946 millibars. Unofficial pressure reports along the coast in the eye were Dauphin Island Sea Lab 943 mb, Grand Bay, Alabama 931 mb (appears unrealistic), Pascagoula Civil Defense 946 mb. Meridian, Mississippi had a minimum sea level pressure of 977 mb (28.85 inches)...the lowest in their records. Calm winds were observed at Pascagoula for about one hour, and over the western end of Dauphin Island. Calm winds were <u>not</u> observed in Mobile.

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2. WATCHES & WARNINGS

LOCATION	TYPE	EFFECTIVE	DISCONTINUED
Leeward Islands north of Guadeloupe	Hurricane Watch	9/1/2200Z	9/3/1900Z east 9/4/1000Z west
Martinique, Dominica, Guadeloupe	Hurricane Watch	9/2/1000Z	9/2/2200Z for Dominica
Dominica northward including Leeward Is.	Gale Warnings	9/2/1600Z	9/4/1000Z west ? east
Virgin Islands	Gale Warnings	9/2/2200Z	9/5/1600Z
Virgin Islands, Puerto Rico	Hurricane Watch	9/2/2200Z	9/4/1600Z
North & east Coastal sections of Puerto Rico	Gale Warnings	9/3/2200Z	9/5/1600Z
Remainder of P. Rico	Gale Warnings	9/4/1000Z	9/5/1600Z
North & east Coastal sections of Dom. Republic	Gale Warnings	9/4/1900Z	9/7/0230Z
Remainder of Dom. Rep. except northwest coast	Gale Warnings	9/5/0100Z	9/7/0230Z
Southwest peninsula of Haiti	Gale Warnings	9/5/1800Z	9/7/0230Z
Southeast Bahamas, Turks & Caicos Islands	Gale Warnings	9/5/2200Z	9/7/0230Z
Dry Tortugas	Gale Warnings	9/10/1600Z	9/11/2200Z
Panama City, FL to Vermilion Bay, LA	Hurricane Watch	9/11/2200Z	9/12/0230Z except 9/12/2200Z west of Grand Isle to Vermilion Bay.
Grand Isle, LA to Panama City, FL	Hurricane Warnings	9/12/0230Z	9/13/1300Z except 9/13/1000Z west of Biloxi, MS to Grand Isle, LA.
East of Panama City to Cedar Keys, FL	Gale Warnings	9/12/0230Z	9/13/1300Z
Lake Ontario & east half of Lake Erie	Gale Warnings	9/14/ ? 9/14/1400Z	? 9/15/0545Z
Merrimac River, MA to Watch Hill, R.I.	Gale Warnings	9/14/2100Z	9/15/0900Z

PRELIMINARY BEST TRACK

HURRICANE FREDERIC

Aug. 29 - Sept. 14, 1979

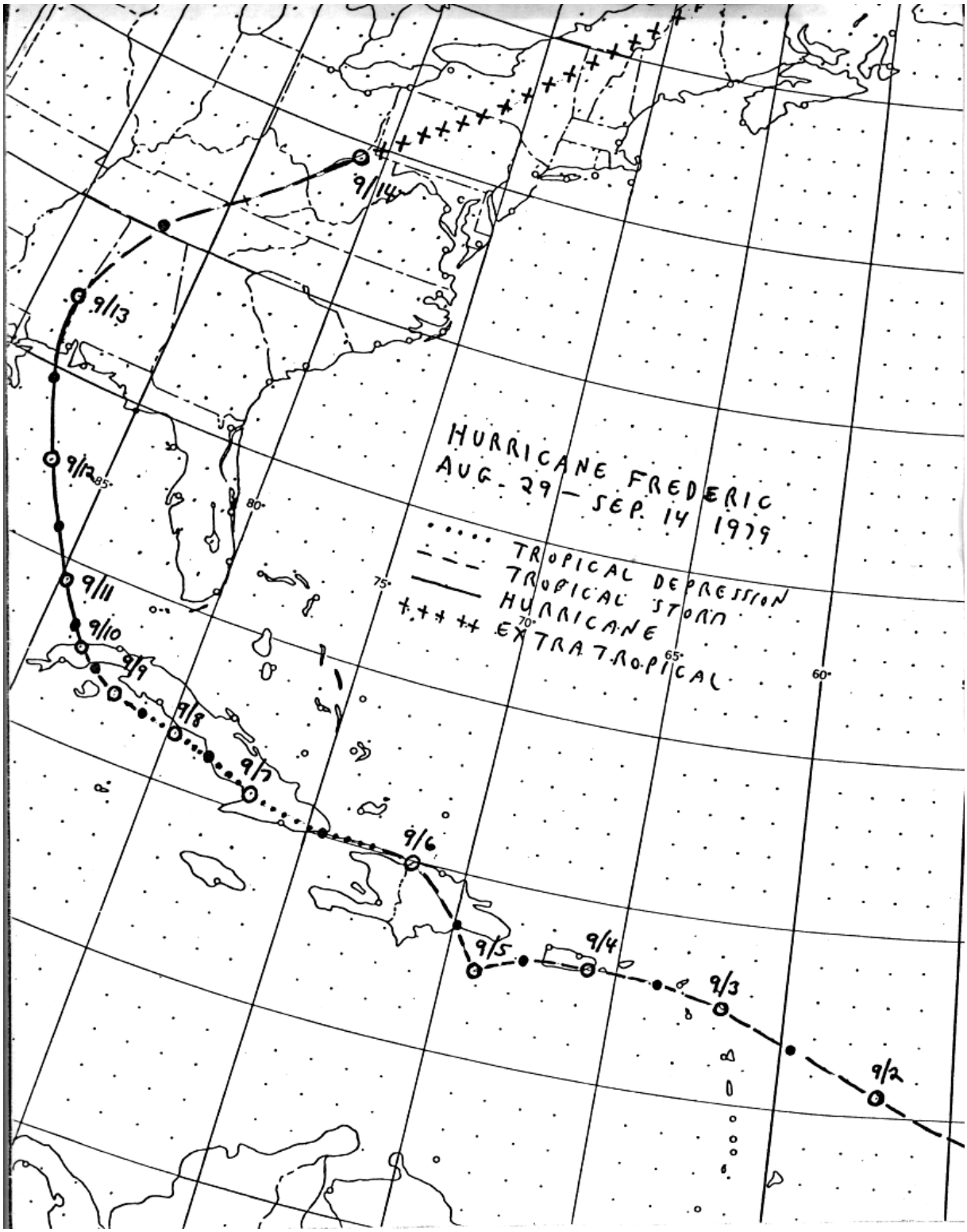
DATE	TIME (GMT)	LAT.	LONG.	PRESSURE (MB)	WIND (KT)	STAGE
8/29	06	11.0	25.5		25	TROPICAL DEPRESSSION
	12	11.1	28.0		30	
	18	11.2	30.5		30	
8/30	00	11.3	32.5		30	
	06	11.4	34.2		30	
	12	11.5	36.0		35	TROPICAL STORM
	18	11.6	37.8		40	
8/31	00	11.7	39.7		45	
	06	11.8	41.6		50	
	12	11.9	43.5		55	
	18	12.0	45.1		55	
9/01	00	12.5	47.0		60	
	06	12.9	48.7		65	HURRICANE
	12	13.3	50.4		65	
	18	13.8	52.3		65	
9/02	00	14.3	54.1		60	TROPICAL STORM
	06	14.9	55.5		60	
	12	15.5	57.2	996	60	
	18	16.3	58.8	999	55	
9/03	00	16.7	59.8	1002	55	
	06	17.1	60.8		55	
	12	17.5	61.8	999	50	
	18	17.8	62.8		50	
9/04	00	18.0	63.8		50	
	06	18.1	64.8		45	
	12	18.1	65.8	1004	45	
	18	18.1	66.8		45	
9/05	00	18.0	67.8		45	
	06	17.5	68.7		45	
	12	17.4	69.2	1008	40	
	18	17.8	69.6		40	
9/06	00	18.5	69.9	1005	40	
	06	19.4	70.7		35	
	12	19.9	71.8	1006	35	
	18	20.0	73.0		30	TROPICAL DEPRESSION
9/07	00	20.1	74.5		30	
	06	20.3	75.8		25	
	12	20.6	77.0	1005	25	
	18	20.9	78.0	1004	25	
9/08	00	21.1	78.7	1003	30	
	06	21.3	79.3	1003	30	
	12	21.5	79.8	1002	30	
	18	21.6	80.5	1002	30	

HURRICANE FREDERIC

DATE	TIME (GMT)	LAT.	LONG.	PRESSURE (MB)	WIND (KT)	STAGE
9/09	00	21.7	81.0	1001	35	TROPICAL STORM
	06	21.8	81.5	1000	40	
	12	21.9	82.0	999	45	
	18	22.0	82.5	997	50	
9/10	00	22.4	83.0	995	55	
	06	22.7	83.3	992	60	
	12	22.8	83.6	990	65	HURRICANE
	18	23.0	83.8	987	70	
9/11	00	23.3	84.0	985	75	
	06	23.8	84.4	983	75	
	12	24.4	84.8	980	85	
	18	25.0	85.2	968	95	
9/12	00	25.7	85.8	960	105	
	06	26.5	86.4	952	110	
	12	27.4	87.0	943	115	
	18	28.4	87.7	950	115	
9/13	00	29.7	88.0	946	115	
	06	30.8	88.5	955	95	
	12	32.2	88.7	975	65	
	18	34.0	88.0	985	45	TROPICAL STORM
9/14	00	35.2	87.0	990	40	
	06	37.0	84.5	996	35	
	12	39.5	81.0	997	35	
	18	42.5	76.0	998	30	EXTRA TROPICAL
9/15	00	48.0	68.0			

LANDFALLS (APPROXIMATE)

1 9/03	18	17.8	62.8	ST. BARTHELMY
2 9/04	12	18.1	65.8	HUMACAO, PUERTO RICO
3 9/06	00	18.5	69.9	SANTO DOMINGO, DOMINICAN REPUBLIC
4 9/07	00	20.1	74.5	EASTERN TIP OF CUBA
5 9/13	03	30.3	88.2	DAUPHIN ISLAND, ALABAMA


HURRICANE FREDERIC
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TROPICAL DEPRESSION
TROPICAL STORM
HURRICANE
EXTRATROPICAL
9/14
9/13
9/12
9/11
9/10
9/9
9/8
9/7
9/6
9/5
9/4
9/3
9/2
85°
80°
75°
70°
65°
60°