

Tropical Cyclone Report
Hurricane Hilary
19-25 August 2005

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Hurricane Hilary was a category 2 hurricane (on the Saffir-Simpson Hurricane Scale) that brought tropical storm force winds to the Mexican coast near Manzanillo.

a. Synoptic History

The tropical wave associated with the genesis of Hilary moved across the west coast of Africa on 4 August. At that time the wave was associated with a large amount of deep convection, but the convection quickly diminished over the eastern tropical Atlantic. The wave moved westward without development, crossing northern South America and entering the eastern North Pacific on 17 August. By the following day a well-defined mid-level circulation had developed within the wave along with some banded convection south of Guatemala. The convective organization continued to increase, but the system was slow to develop a well-defined surface center of circulation. It is estimated that the system finally did so near 1800 UTC 19 August, becoming a tropical depression about 140 n mi south of Puerto Angel, Mexico.

The “best track” chart of the tropical cyclone’s path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1. Embedded within a deep easterly current to the south of the subtropical ridge, the depression initially moved westward at near 15 kt and strengthened briskly, becoming a tropical storm by 0600 UTC 20 August about 190 n mi south of Acapulco, Mexico, and a hurricane 18 h later when it was about 290 n mi south of Manzanillo. A weakness in the subtropical ridge caused the forward motion to slow and Hilary turned toward the northwest on 21 August. The pace of intensification also briefly relaxed during this time, but late that day Hilary turned back to the west-northwest at a faster forward speed and strengthened again, reaching its peak intensity of 90 kt near 0000 UTC 22 August. This strengthening was accompanied by an expansion of the wind field that briefly brought minimal tropical storm force winds to the Mexican coast in the Manzanillo area late on 21 August.

On 22 August, Hilary’s motion slowed abruptly and the hurricane’s deep convection began to diminish, particularly in the northern semicircle which was over cooler waters. Moving slowly to the west-northwest and northwest, Hilary gradually weakened over the next couple of days, becoming a tropical storm by 1800 UTC 24 August when it was about 435 n mi west of Cabo San Lucas, Mexico, and a tropical depression 24 h later. The system had lost the requisite convection of a tropical cyclone by 0000 UTC 26 August. Hilary’s remnant low moved generally westward before dissipating early on 28 August about 1075 n mi west-northwest of Cabo San Lucas.

b. Meteorological Statistics

Observations in Hilary (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA). Microwave satellite imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, and Defense Meteorological Satellite Program (DMSP) satellites were also useful in tracking Hilary.

Ship reports of winds of tropical storm force associated with Hilary are given in Table 2. Manzanillo reported sustained winds of 35 kt, with gusts to 40 kt, at 2145 UTC 21 August.

c. Casualty and Damage Statistics

There were no reports of damage or casualties associated with Hilary.

d. Forecast and Warning Critique

NHC Tropical Weather Outlooks first indicated the potential for tropical cyclone formation from Hilary's precursor disturbance about 24 h prior to genesis.

Average official track errors for Hilary were considerably lower than the average official track errors for the 10-yr period 1995-2004 (Table 3). Among the dynamical models, the GFS (and in particular the GFS ensemble mean, AEMI) and the GFDL performed well with Hilary. The consensus models also did well.

Average official intensity errors were 6, 8, 8, 10, 14, 17, and 19 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively, and were generally less than the average long-term official intensity errors (6, 11, 14, 17, 19, 18, and 19 kt, respectively).

Warnings associated with Hilary are given in Table 4. The tropical storm warning was issued only after the onset of tropical storm force winds at the coastline, as the increase in the size of Hilary's wind field was not anticipated. Forecasting the wind structure of tropical cyclones, particularly in the vicinity of complex terrain, continues to pose significant challenges. Interestingly, there were indications in the GFS model fields that the wind field would expand.

Table 1. Best track for Hurricane Hilary, 19-25 August 2005.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
19 / 1800	13.3	96.6	1007	25	tropical depression
20 / 0000	13.5	98.2	1006	30	"
20 / 0600	13.6	99.8	1002	40	tropical storm
20 / 1200	13.8	101.3	997	50	"
20 / 1800	14.0	102.5	994	55	"
21 / 0000	14.3	103.7	987	65	hurricane
21 / 0600	14.9	104.7	983	70	"
21 / 1200	15.7	105.6	981	70	"
21 / 1800	16.5	107.1	979	75	"
22 / 0000	17.2	108.5	972	90	"
22 / 0600	17.8	110.0	970	90	"
22 / 1200	18.3	111.5	972	90	"
22 / 1800	18.6	112.3	974	85	"
23 / 0000	18.9	113.2	976	80	"
23 / 0600	19.2	114.1	981	75	"
23 / 1200	19.6	114.9	983	70	"
23 / 1800	20.0	115.6	985	70	"
24 / 0000	20.4	116.1	986	65	"
24 / 0600	20.9	116.7	987	65	"
24 / 1200	21.4	117.2	990	65	"
24 / 1800	22.0	117.7	994	55	tropical storm
25 / 0000	22.7	118.4	998	45	"
25 / 0600	23.3	119.1	1000	40	"
25 / 1200	23.9	119.9	1002	35	"
25 / 1800	24.3	120.7	1003	30	tropical depression
26 / 0000	24.7	121.6	1004	25	low
26 / 0600	25.0	122.6	1005	25	"
26 / 1200	25.3	123.6	1006	25	"
26 / 1800	25.6	124.6	1007	25	"
27 / 0000	25.7	125.5	1008	25	"
27 / 0600	25.7	126.5	1008	25	"
27 / 1200	25.6	127.5	1009	25	"
27 / 1800	25.5	128.5	1009	25	"
28 / 0000	25.5	129.4	1010	25	"
28 / 0600					dissipated
22 / 0600	17.8	110.0	970	90	minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Hilary, 19-25 August 2005.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
20 / 0000	PBBR	10.3	104.7	290 / 35	1008.2
21 / 2100	DGVC	18.6	103.9	130 / 45	1008.0
21 / 2100	WCZ523	19.3	105.6	120 / 37	1006.1
22 / 0000	WCZ523	19.2	105.2	160 / 40	1008.0
22 / 0000	3FZP8	20.0	106.5	140 / 37	1005.0
22 / 0600	JKHH	20.3	107.9	110 / 36	1009.2

Table 3. Preliminary forecast evaluation (heterogeneous sample) for Hurricane Hilary, 19-25 August 2005. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage, but does not include the extratropical stage, if any.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	40 (23)	76 (21)	99 (19)	122 (17)	158 (13)	186 (9)	222 (5)
GFNI	51 (22)	91 (20)	122 (18)	154 (16)	215 (12)	218 (7)	299 (3)
GFDI	32 (23)	45 (21)	43 (19)	48 (17)	101 (13)	153 (9)	182 (5)
GFSI	39 (21)	53 (17)	60 (15)	68 (13)	107 (9)	135 (5)	114 (1)
AEMI	34 (23)	56 (21)	61 (19)	63 (17)	84 (13)	91 (9)	119 (5)
NGPI	47 (22)	84 (20)	110 (18)	138 (16)	188 (12)	267 (8)	552 (4)
UKMI	40 (23)	70 (21)	91 (19)	103 (17)	136 (13)	157 (9)	157 (5)
BAMD	38 (23)	68 (21)	86 (19)	109 (17)	163 (13)	215 (9)	209 (5)
BAMM	35 (23)	68 (21)	99 (19)	138 (17)	202 (13)	188 (9)	186 (5)
BAMS	37 (23)	65 (21)	90 (19)	123 (17)	168 (13)	148 (9)	178 (5)
CONU	33 (23)	56 (21)	72 (19)	85 (17)	118 (13)	134 (9)	222 (5)
GUNA	33 (20)	53 (17)	62 (15)	69 (13)	110 (9)	131 (5)	178 (1)
FSSE	32 (20)	51 (18)	60 (16)	67 (14)	90 (10)	130 (6)	142 (2)
OFCL	37 (23)	59 (21)	70 (19)	73 (17)	94 (13)	115 (9)	120 (5)
NHC Official (1995-2004 mean) ¹	37 (2654)	68 (2378)	97 (2096)	123 (1829)	175 (1386)	208 (355)	259 (224)

¹ Errors given for the 96 and 120 h periods are averages over the four-year period 2001-4.

Table 4. Watch and warning summary for Hurricane Hilary, 19-25 August 2005.

Date/Time (UTC)	Action	Location
21 / 2200	Tropical Storm Warning issued	Punta San Telmo to Cabo Corrientes
22 / 0900	Tropical Storm Warning discontinued	Punta San Telmo to Cabo Corrientes

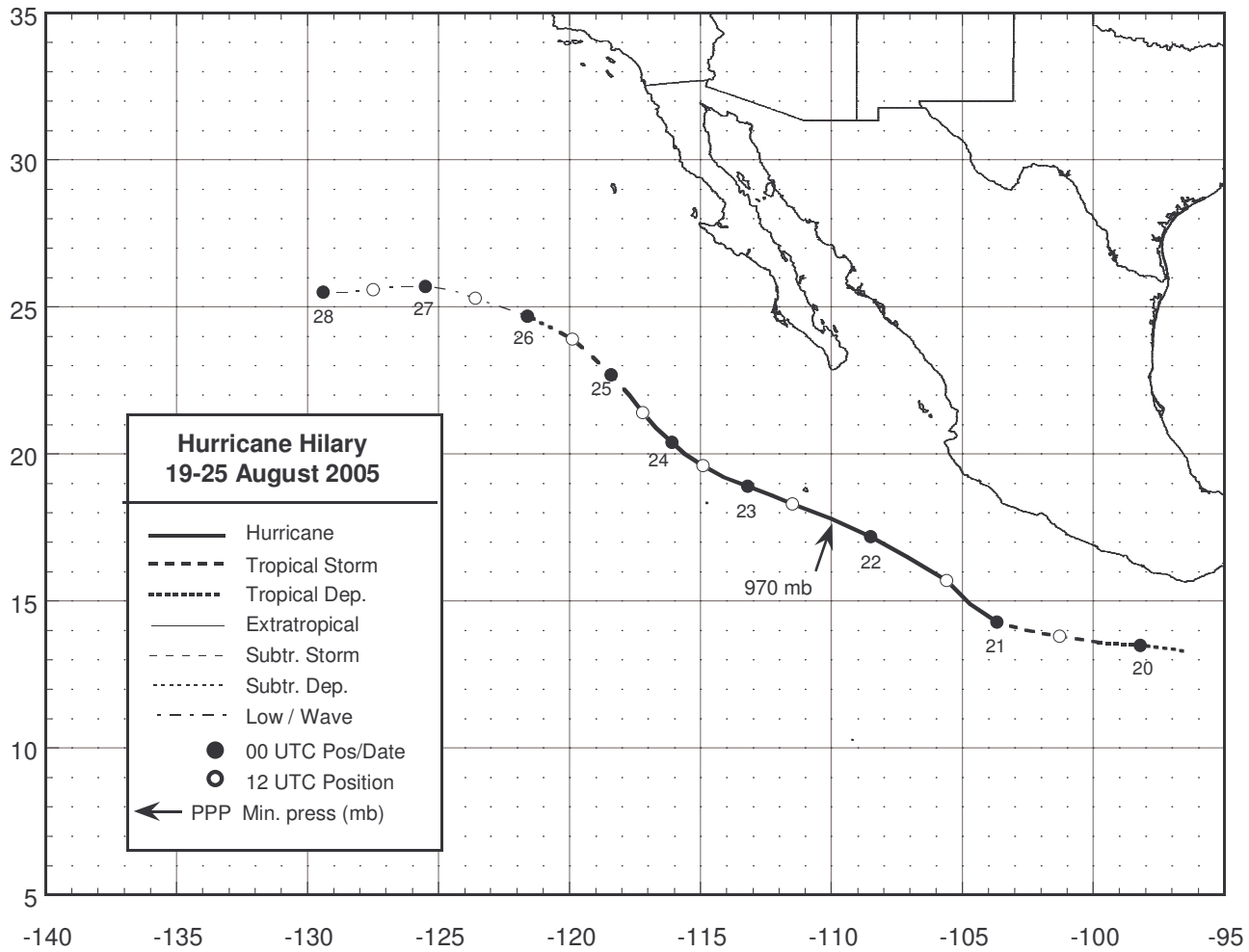


Figure 1. Best track positions for Hurricane Hilary, 19-25 August 2005.

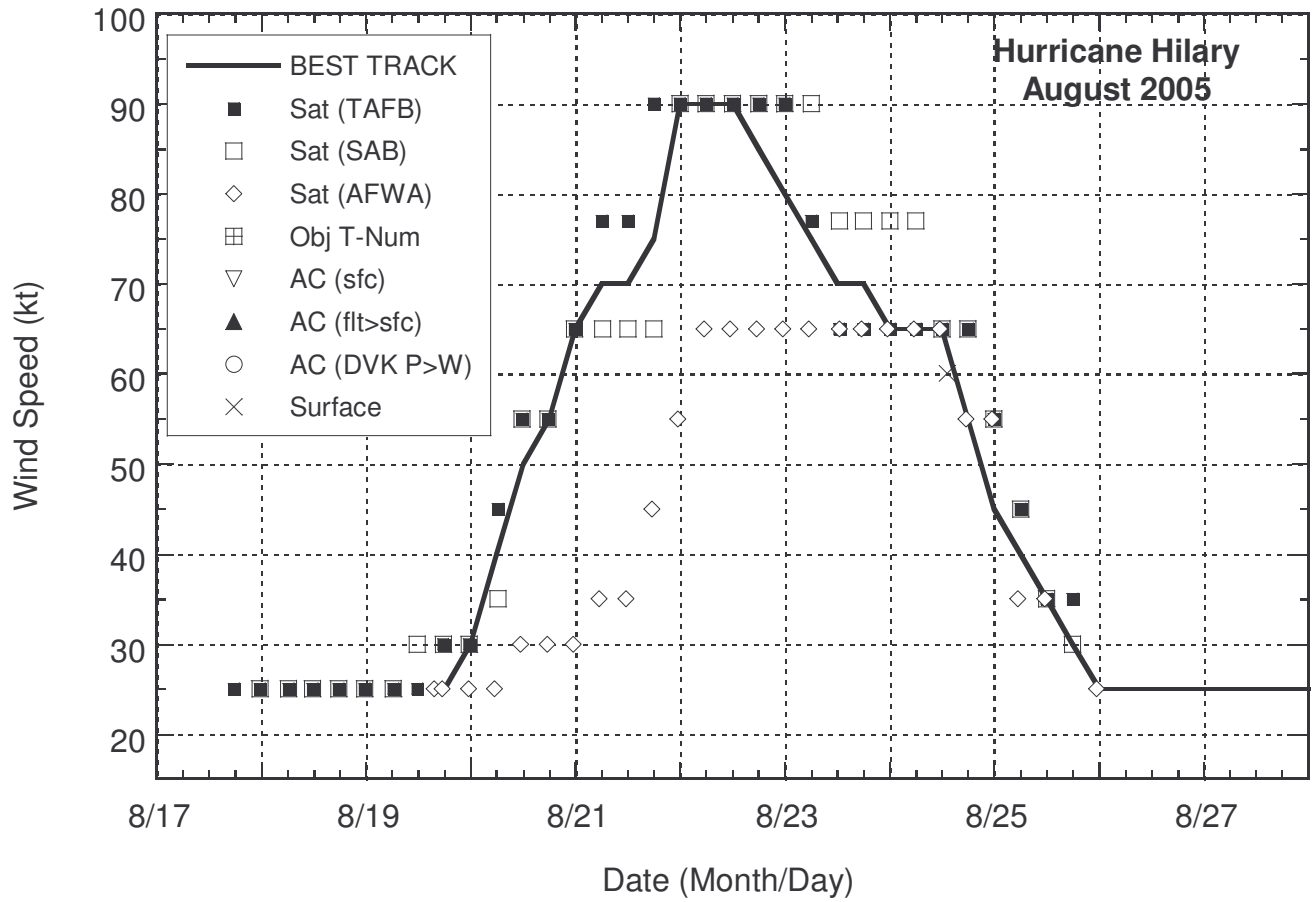


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Hilary, 19-25 August 2005.

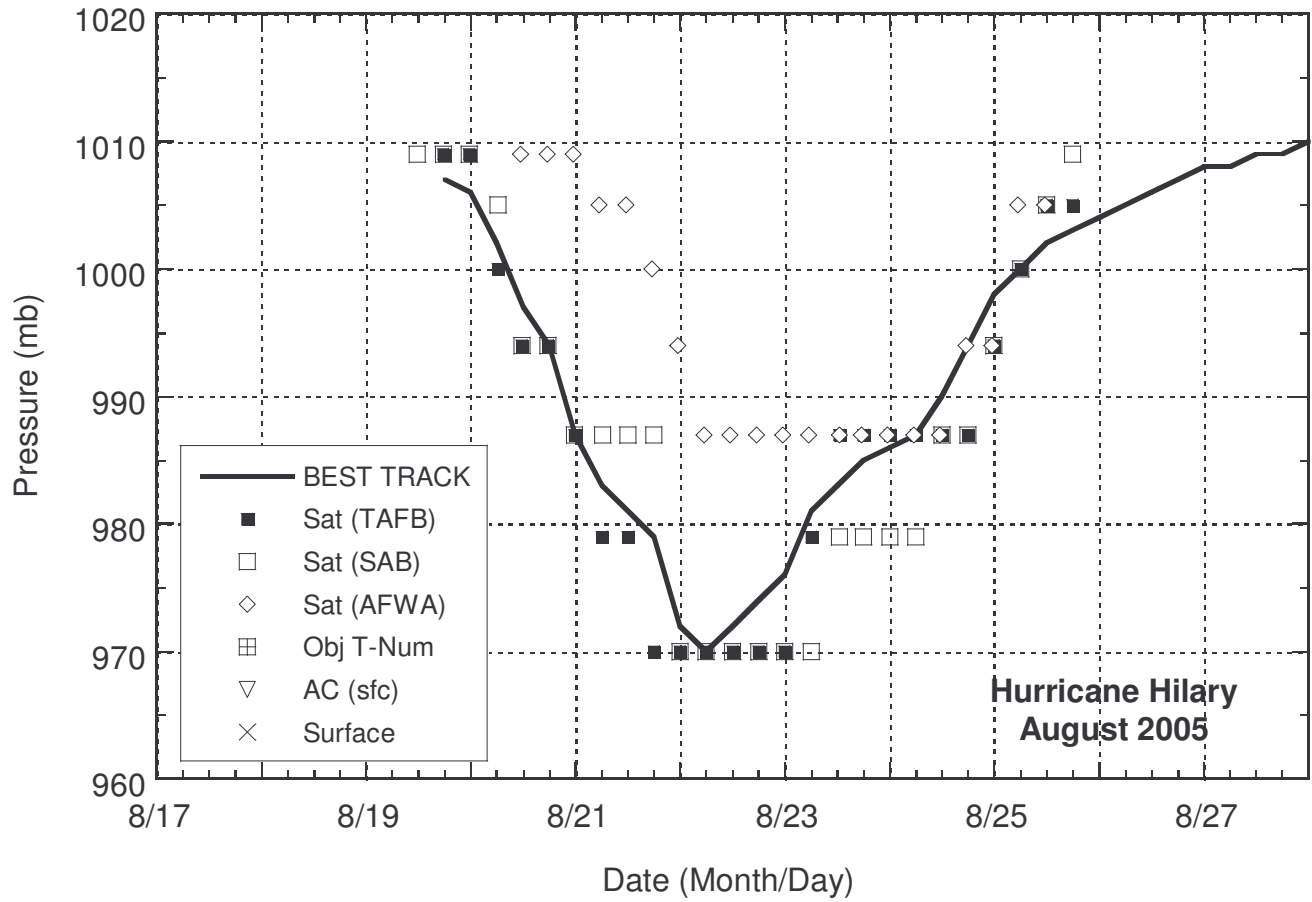


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Hilary, 19-25 August 2005.