

Tropical Cyclone Report
Hurricane Hernan
(EP092008)
6-12 August 2008

Daniel P. Brown
National Hurricane Center
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Hernan was a category 3 hurricane on the Saffir-Simpson Hurricane Scale that took a fairly typical path across the open waters of the eastern North Pacific Ocean.

a. Synoptic History

Hernan developed from a tropical wave that departed the west coast of Africa on 24 July. The wave produced only limited shower activity while traversing the Atlantic and Caribbean waters during the next week or so. After entering the eastern Pacific basin on 2 August, the wave moved into an existing area of broad cyclonic flow located a few hundred miles south of the coast of Mexico. The interaction between these two features produced an area of low pressure about 525 n mi south of Manzanillo, Mexico on 5 August. Convection increased in association with the low early the next day and by 1200 UTC 6 August, when the system was centered about 675 n mi south-southwest of the southern tip of Baja California, it had enough organization to be considered a tropical depression. 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 1¹.

The organization of the depression continued to increase, and Dvorak satellite intensity estimates indicate that it reached tropical storm strength by 0000 UTC 7 August. Despite moderate east-northeasterly shear, Hernan gradually strengthened during the next day or so while moving in a west to west-northwestward direction to the south of a mid-tropospheric ridge. Around 1200 UTC 7 August, an eye-like feature was detected in microwave imagery, however it was displaced to the southwest of the low-level center due to the shear. Early on 8 August, as the shear began to relax the low- and mid-level centers become more vertically aligned. Shortly thereafter, a ragged eye appeared in conventional satellite imagery and Dvorak intensity estimates suggest that Hernan attained hurricane strength while located about 775 miles southwest of the southern tip of Baja California. During the next 24 hours, Hernan rapidly intensified and reached an estimated peak intensity of 105 kt at 1200 UTC 9 August. A series of microwave images between 1553 UTC 9 August and 1508 UTC 10 August show that Hernan then underwent an eyewall replacement (Fig. 4). During this time, the hurricane also began traversing cooler waters, and these factors contributed to a gradual weakening of the cyclone. Additional weakening over even cooler waters on 11 August resulted in Hernan becoming a tropical storm around 0000 UTC 12 August. Over the next 24 h, the cyclone turned west-southwestward and the remaining convection gradually dissipated. Hernan degenerated into a

¹ A digital record of the complete best track, including wind radii, can be found on line at <ftp://ftp.nhc.noaa.gov/atcf>. Data for the current year’s storms are located in the *brk* directory, while previous year’s data are located in the *archive* directory.

remnant low around 0000 UTC 13 August. The remnant low moved west-southwestward over the next few days and eventually dissipated about 400 n mi southeast of the Island of Hawaii on 16 August.

b. Meteorological Statistics

Observations in Hernan (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB). Data and imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, the NASA Aqua, the Department of Defense Windsat, and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in tracking Hernan.

The estimated peak intensity of Hernan is based on a blend of subjective and objective Dvorak intensity estimates. Several QuikSCAT passes helped to estimate the strength of Hernan when it was a tropical storm. No ship reports of tropical storm force winds or greater were received in association with Hernan.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Hernan was not well anticipated. The area of disturbed weather from which Hernan formed was first discussed in the Tropical Weather Outlook about 24 h prior to formation. The first couple of Outlooks indicated only a gradual development of the system, and the first explicit mention of tropical depression formation did not occur until about 12 hours before the system became a tropical cyclone.

A verification of official and guidance model track forecasts is provided in Table 2. Average official track errors for Hernan (with the number of cases in parenthesis) were 24 (23), 42 (21), 67 (19), 82 (17), 87 (13), 65 (9), and 62 (5) n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. These errors are much lower than the long-term NHC average track errors, especially at 72 h and beyond. The 4- and 5- day NHC forecast errors were lower than any of the individual track models and were also superior to the often difficult to beat consensus models (TVCN and GUNA). The 96 and 120 h NHC average track errors for Hernan are among the lowest for any eastern Pacific tropical cyclone since these forecasts began in 2001.

The average official intensity errors were 7, 11, 13, 18, 24, 27 and 27 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. For comparison, the average long-term official intensity errors are 6, 10, 14, 16, 19, 19, and 19 kt, respectively. The NHC errors were a little higher than the long-term average intensity errors at 48 h and beyond. The official predictions had a low bias because many of the forecasts did not anticipate Hernan reaching category three strength.

Table 1. Best track for Hurricane Hernan, 6-12 August 2008.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
06 / 1200	12.2	109.9	1006	25	tropical depression
06 / 1800	12.9	111.0	1006	30	"
07 / 0000	13.6	112.1	1005	35	tropical storm
07 / 0600	14.2	113.4	1000	45	"
07 / 1200	14.5	114.7	997	50	"
07 / 1800	14.5	116.0	994	55	"
08 / 0000	14.5	117.2	994	55	"
08 / 0600	14.5	118.3	990	60	"
08 / 1200	14.6	119.4	987	65	hurricane
08 / 1800	14.7	120.4	983	75	"
09 / 0000	14.9	121.3	977	80	"
09 / 0600	15.2	122.1	970	90	"
09 / 1200	15.5	122.8	956	105	"
09 / 1800	16.0	123.6	956	105	"
10 / 0000	16.5	124.4	961	100	"
10 / 0600	17.0	125.3	968	90	"
10 / 1200	17.5	126.2	975	80	"
10 / 1800	18.0	127.1	979	75	"
11 / 0000	18.4	128.0	980	75	"
11 / 0600	18.6	128.8	980	75	"
11 / 1200	18.8	129.7	984	70	"
11 / 1800	18.8	130.5	987	65	"
12 / 0000	18.8	131.3	992	55	tropical storm
12 / 0600	18.7	132.1	997	50	"
12 / 1200	18.6	132.9	1000	45	"
12 / 1800	18.5	133.7	1002	40	"
13 / 0000	18.3	134.5	1004	35	low
13 / 0600	18.1	135.3	1006	30	"
13 / 1200	17.9	136.1	1007	30	"
13 / 1800	17.6	136.9	1008	25	"
14 / 0000	17.3	137.7	1008	25	"
14 / 0600	17.0	138.5	1008	25	"
14 / 1200	16.7	139.5	1008	25	"
14 / 1800	16.3	140.6	1008	25	"
15 / 0000	15.9	141.7	1008	25	"
15 / 0600	15.6	142.8	1008	25	"
15 / 1200	15.4	144.0	1008	25	"
15 / 1800	15.3	145.2	1008	25	"
16 / 0000	15.2	146.5	1009	20	"
16 / 0600	15.1	147.7	1009	20	"

16 / 1200	15.0	149.0	1009	20	"
16 / 1800					dissipated
09 / 1200	15.5	122.8	956	105	minimum pressure

Table 2. Track forecast evaluation (heterogeneous sample) for Hurricane Hernan, 6-12 August 2008. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in boldface type.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	34 (24)	64 (22)	87 (20)	108 (18)	102 (14)	110 (10)	121 (6)
GFNI	28 (20)	70 (18)	122 (16)	173 (14)	239 (10)	253 (6)	417 (2)
GFDI	33 (24)	55 (22)	77 (20)	96 (18)	133 (14)	181 (10)	273 (6)
HWFI	27 (24)	50 (22)	64 (20)	71 (18)	81 (14)	111 (10)	119 (6)
GFSI	27 (23)	49 (20)	76 (18)	104 (16)	146 (11)	215 (7)	175 (3)
AEMI	32 (24)	61 (22)	92 (20)	117 (18)	149 (14)	163 (10)	162 (6)
NGPI	31 (23)	65 (21)	109 (19)	145 (17)	183 (13)	217 (9)	333 (5)
UKMI	38 (21)	68 (19)	89 (17)	99 (15)	89 (11)	89 (7)	90 (3)
EGRI	37 (20)	68 (18)	89 (16)	96 (15)	85 (11)	82 (7)	84 (3)
EMXI	27 (16)	51 (15)	78 (13)	110 (11)	199 (7)	295 (5)	361 (3)
BAMD	28 (24)	46 (22)	61 (20)	79 (18)	117 (14)	151 (10)	138 (6)
BAMM	32 (23)	48 (21)	60 (20)	69 (18)	89 (14)	129 (10)	163 (6)
BAMS	44 (23)	73 (21)	86 (20)	92 (18)	70 (14)	86 (10)	131 (6)
TVCN	22 (24)	41 (22)	67 (20)	90 (18)	116 (14)	143 (10)	187 (6)
GUNA	17 (19)	28 (16)	48 (14)	64 (13)	83 (8)	112 (5)	114 (1)
FSSE	19 (22)	36 (20)	58 (18)	71 (16)	65 (12)	76 (7)	85 (1)
OFCL	24 (23)	42 (21)	67 (19)	82 (17)	87 (13)	65 (9)	62 (5)
NHC Official (2003-2007 mean)	31.9 (12082)	55.1 (1129)	77.4 (979)	97.9 (849)	136.2 (620)	180.1 (439)	226.1 (293)

Table 3. Intensity forecast evaluation (heterogeneous sample) for Hurricane Hernan, 6-12 August 2008. Forecast errors (kt) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in boldface type.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
OCD5	8.8 (24)	15.0 (22)	16.6 (20)	17.7 (18)	22.6 (14)	16.1 (10)	7.7 (6)
GHMI	10.3 (24)	15.0 (22)	19.2 (20)	23.6 (18)	27.5 (14)	22.8 (10)	23.0 (6)
HWFI	10.6 (24)	18.9 (22)	22.5 (20)	26.3 (18)	34.6 (14)	24.3 (10)	22.2 (6)
LGEM	8.7 (24)	14.8 (22)	17.3 (20)	21.5 (18)	27.4 (14)	23.5 (10)	20.3 (6)
DSHP	8.3 (24)	14.1 (22)	15.5 (20)	17.8 (18)	20.6 (14)	14.2 (10)	8.2 (6)
FSSE	8.7 (22)	13.4 (20)	15.9 (18)	19.2 (16)	24.3 (12)	25.7 (7)	14.0 (1)
ICON	9.4 (24)	15.4 (22)	17.5 (20)	20.2 (18)	26.1 (14)	20.4 (10)	16.2 (6)
OFCL	6.7 (23)	10.7 (21)	13.2 (19)	17.6 (17)	24.2 (13)	26.7 (9)	27.0 (5)
NHC Official (2003-2007 mean)	6.2 (1282)	10.4 (1129)	13.9 (979)	16.3 (848)	18.7 (620)	19.2 (439)	19.1 (293)

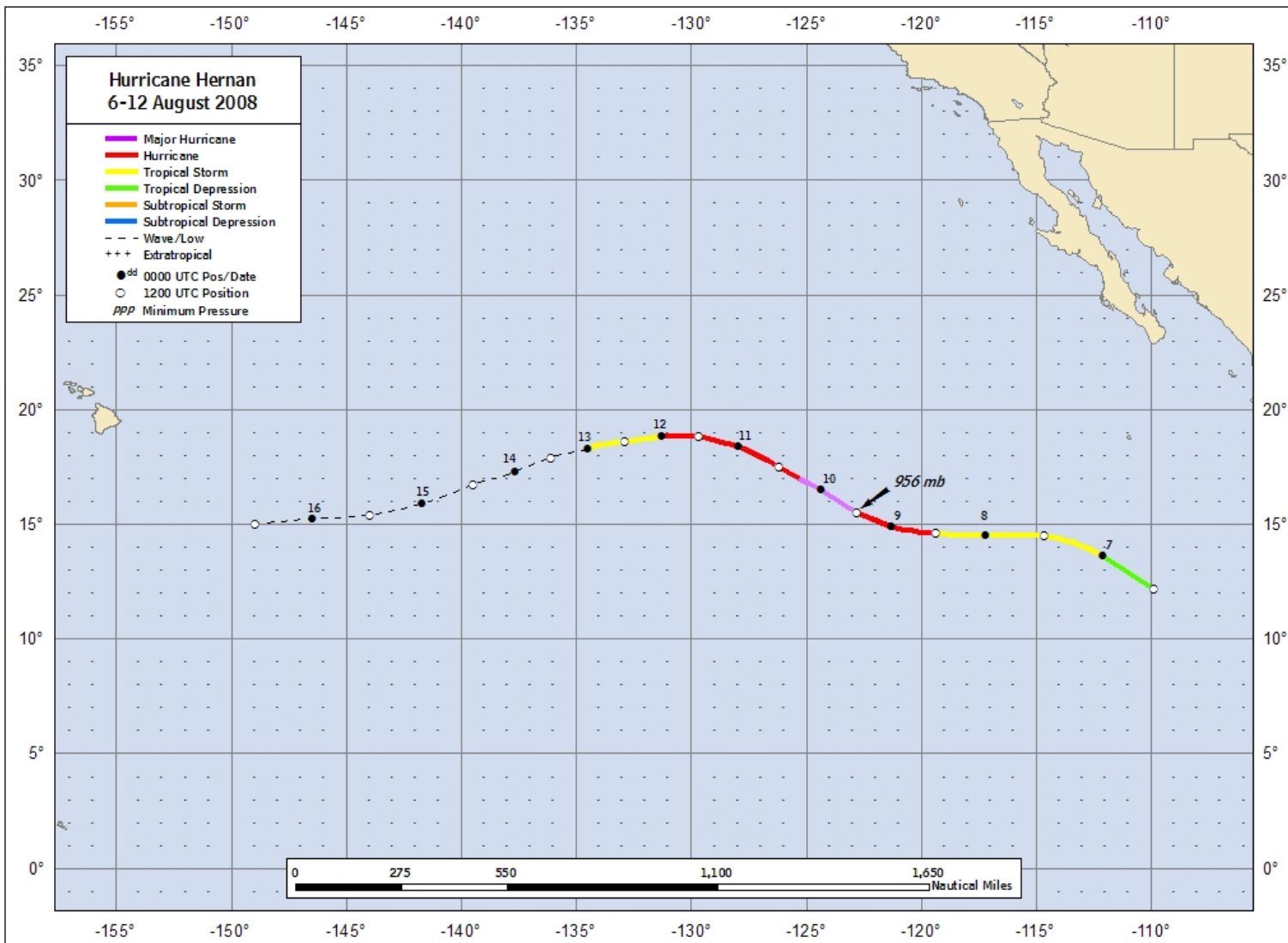


Figure 1. Best track positions for Hurricane Hernan, 6-12 August 2008.

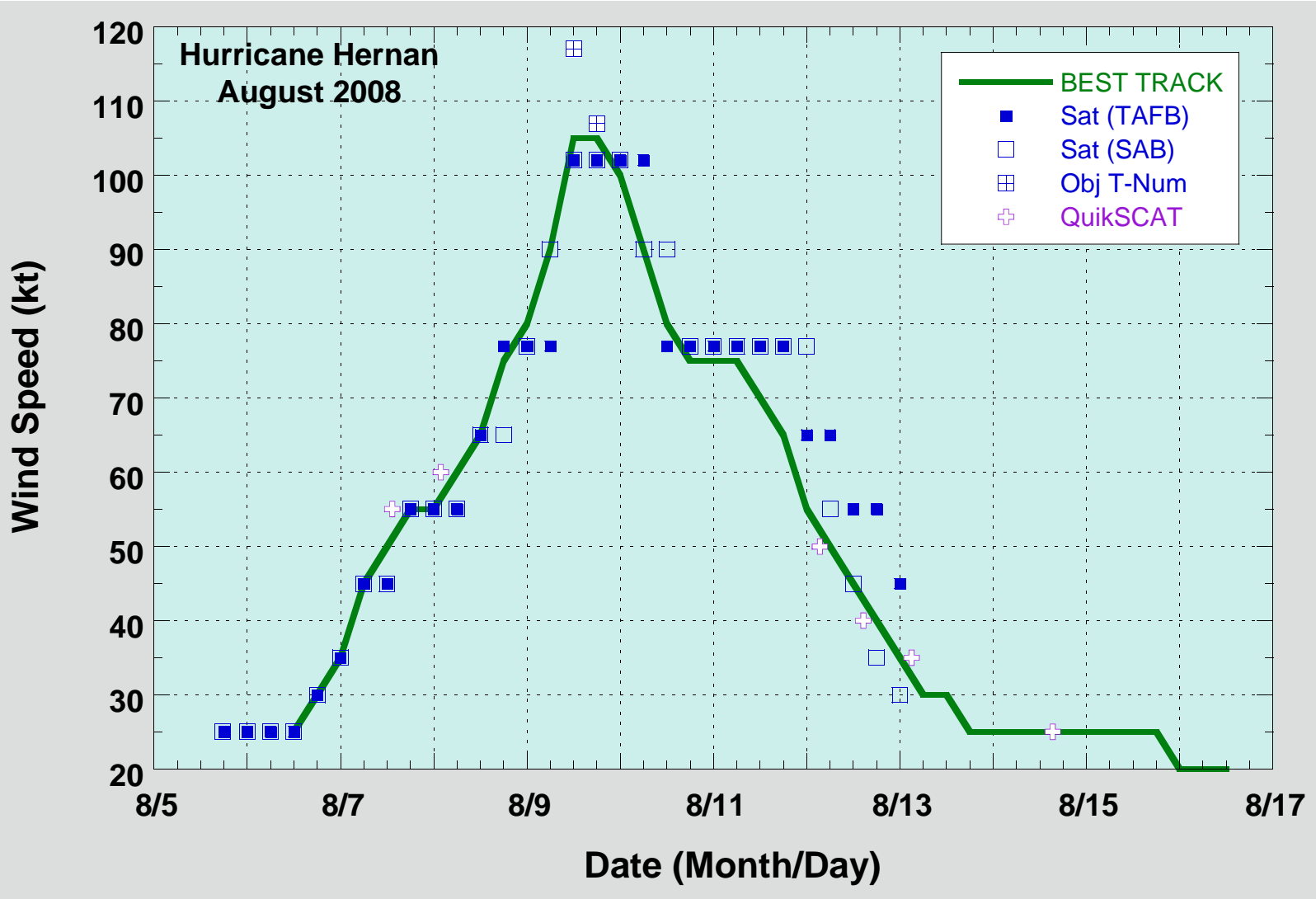


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Hernan, 6-12 August 2008. Objective Dvorak estimates represent linear averages of adjusted raw T-numbers from the Advanced Dvorak Technique over a four-hour period centered on the nominal observation time.

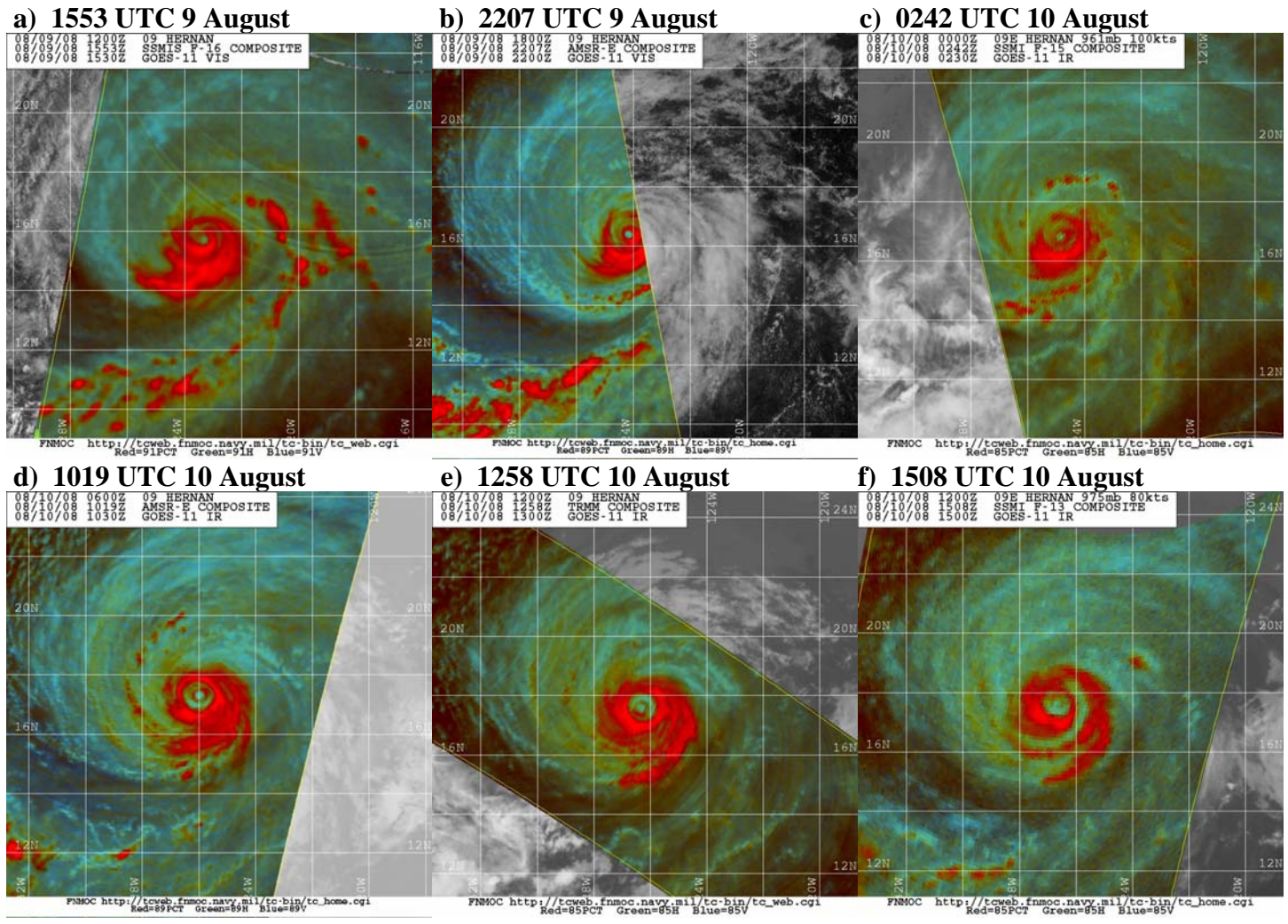


Figure 4. Series of composite 85-91 GHz passive microwave images showing Hurricane Hernan completing an eye-wall replacement between 1553 UTC 9 August and 1508 UTC 10 August. Images courtesy of the Fleet Numerical Meteorology and Oceanography Center (FNMOC).