

Tropical Cyclone Report
Hurricane Emilia
(EP052012)
7-15 July 2012

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Emilia was a category 4 hurricane (on the Saffir-Simpson Hurricane Wind Scale) over the eastern North Pacific that did not affect land.

a. Synoptic History

The genesis of Emilia was associated with the interaction of a tropical wave and the Intertropical Convergence Zone (ITCZ). A tropical wave departed the west coast of Africa on 23 June and moved westward at 15 to 20 kt across the eastern Atlantic Ocean during the next several days. A low pressure system developed along the wave on 28 June about 900 n mi to the east of the Lesser Antilles. This low dissipated a couple of days later, but the wave continued westward, emerging into the eastern Pacific late on 4 July. Meanwhile, an area of disturbed weather formed within the ITCZ on 4 July a couple of hundred nautical miles south of the Gulf of Tehuantepec. The disturbance was nearly stationary for the next day or two and merged with the tropical wave on 6 July, which resulted in the formation of a well-defined low pressure system around 0600 UTC 7 July. Curved bands became more distinct later that day and the low developed sufficient convective organization to be classified as a tropical depression by 1800 UTC 7 July, when it was located about 430 n mi south-southwest of Acapulco, 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 1¹.

The depression strengthened into a tropical storm 6 h after genesis while it was moving west-northwestward on the south side of a mid-level ridge that extended westward from Mexico into the eastern Pacific basin. In conducive atmospheric and oceanic environments, Emilia strengthened rapidly over the next couple of days. A banded eye feature became evident in microwave imagery late on 8 July, and Emilia obtained hurricane status by 0600 UTC 9 July. The hurricane continued to strengthen and reached its peak intensity of 120 kt a day later when it was located about 590 n mi south-southwest of the southern tip of Baja California; Fig. 4 shows Emilia near its maximum intensity. Emilia then weakened over the next 24 h to a 90-kt category 2 hurricane while it turned westward to the south of a strengthening subtropical ridge. The cause of the weakening appears to be an eyewall replacement; microwave images on 10 July showed a double-eyewall structure with the inner one eroding on the east side. As the outer eyewall

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 *bt* directory, while previous years’ data are located in the *archive* directory.

contracted on 11 July, Emilia regained strength and reached a secondary peak intensity of 105 kt around 0000 UTC 12 July.

After Emilia reached its secondary peak, the hurricane steadily weakened as it moved over cool water and into dry stable air. The eye became overcast around 0000 UTC 13 July when Emilia was a category 1 hurricane, and the cyclone weakened to a tropical storm 12 h later. Deep convection gradually decreased over the next couple of days, and Emilia continued to weaken. The cyclone became a remnant low by 1800 UTC 15 July when it was located about 1000 n mi east-southeast of the Hawaiian Islands. The remnant low continued moving westward for another couple of days before it opened into a trough shortly after 0000 UTC 18 July about 250 n mi south of Hawaii's Big Island.

b. Meteorological Statistics

Observations in Emilia (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), and objective Advanced Dvorak Technique (ADT) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Tropical Rainfall Measuring Mission (TRMM), the European Space Agency's Advanced Scatterometer (ASCAT), and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Emilia.

The 120-kt analyzed peak intensity of Emilia is based on Dvorak T-numbers of 6.0/115 kt from TAFB and SAB, and 6.2/120 kt from UW-CIMSS at 0600 UTC 10 July.

There were no ship reports of tropical-storm-force winds in association with Emilia.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Emilia was well predicted. The disturbance from which Emilia developed was introduced in the Tropical Weather Outlook and given a "low" (< 30%) chance of genesis over the next 48 h at 0600 UTC 4 July, 3.5 days before it became a tropical depression. The probability of formation was increased to the "medium" (30 to 50%) category 30 h before genesis and the "high" (>50%) category 18 h before formation.

A verification of NHC official track forecasts for Emilia is given in Table 2a. Official forecast track errors were considerably lower than the mean official errors for the previous 5-yr

period at all forecast times. In fact, at some forecast times the official track forecasts errors for Emilia were about 50% smaller than the previous 5-yr mean errors. A homogeneous comparison of the official track errors with selected guidance models is given in Table 2b. The official forecasts outperformed virtually all of the model guidance. The only models that beat the official forecasts were the multi-model TVCE consensus at 12 h and 96 h, the Florida State Super Ensemble (FSSE) at 12 h, and Geophysical Fluid Dynamical Lab (GHMI) at 120 h.

A verification of NHC official intensity forecasts for Emilia is given in Table 3a. Official forecast intensity errors were lower than the mean official errors for the previous 5-yr period at most forecast times. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 3b. The performance of the official forecasts was comparable with that of the statistical models and consensus aids.

There were no watches or warnings associated with Emilia.

Table 1. Best track for Hurricane Emilia, 7-15 July 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
07 / 0600	9.6	98.5	1006	25	low
07 / 1200	9.8	99.8	1006	25	"
07 / 1800	10.0	101.2	1005	30	tropical depression
08 / 0000	10.3	102.6	1003	35	tropical storm
08 / 0600	10.6	104.0	1002	40	"
08 / 1200	10.9	105.4	1000	45	"
08 / 1800	11.2	106.6	997	50	"
09 / 0000	11.6	107.7	994	55	"
09 / 0600	12.0	108.8	987	65	hurricane
09 / 1200	12.4	109.9	974	85	"
09 / 1800	12.8	110.9	968	95	"
10 / 0000	13.2	111.9	954	110	"
10 / 0600	13.6	112.9	945	120	"
10 / 1200	13.9	113.8	948	115	"
10 / 1800	14.2	114.6	953	105	"
11 / 0000	14.4	115.5	967	95	"
11 / 0600	14.5	116.3	970	90	"
11 / 1200	14.6	117.2	970	95	"
11 / 1800	14.7	118.0	960	100	"
12 / 0000	14.8	118.8	958	105	"
12 / 0600	14.9	119.7	960	100	"
12 / 1200	15.0	120.8	960	100	"
12 / 1800	15.1	121.9	966	90	"
13 / 0000	15.2	123.0	977	80	"
13 / 0600	15.3	124.2	986	70	"
13 / 1200	15.4	125.4	993	60	tropical storm
13 / 1800	15.5	126.6	998	50	"
14 / 0000	15.6	127.9	1001	45	"
14 / 0600	15.6	129.2	1001	45	"
14 / 1200	15.6	130.6	1001	45	"
14 / 1800	15.6	132.1	1003	40	"
15 / 0000	15.6	133.7	1004	35	"
15 / 0600	15.6	135.4	1004	35	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 1200	15.5	137.1	1004	35	"
15 / 1800	15.4	138.7	1005	30	low
16 / 0000	15.3	140.3	1005	30	"
16 / 0600	15.2	141.9	1005	30	"
16 / 1200	15.0	143.5	1005	30	"
16 / 1800	14.9	145.1	1006	30	"
17 / 0000	14.8	146.7	1006	30	"
17 / 0600	14.7	148.4	1006	30	"
17 / 1200	14.7	150.1	1006	30	"
17 / 1800	14.7	151.9	1006	30	"
18 / 0000	14.7	153.7	1007	25	"
18 / 0600					dissipated
10 / 0600	13.6	112.9	945	120	maximum wind and minimum pressure

Table 2a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Emilia, 7-15 July 2012. Mean errors for the 5-yr period 2007-11 are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL (Emilia)	17.8	24.7	33.2	45.3	63.4	84.8	95.0
OCD5 (Emilia)	25.5	46.8	72.2	99.5	149.3	193.0	217.8
Forecasts	30	28	26	24	20	16	12
OFCL (2007-11)	28.6	46.3	62.7	78.1	108.0	145.3	181.1
OCD5 (2007-11)	38.5	74.8	116.0	159.8	246.1	324.2	392.8

Table 2b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Emilia, 7-15 July 2012. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 2a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	17.4	22.1	33.2	43.7	55.7	50.5	57.6
OCD5	25.0	45.5	72.2	94.4	125.5	158.8	183.7
GFSI	18.3	28.6	46.1	65.0	102.3	164.9	228.7
GHMI	21.4	31.0	44.7	56.8	69.3	54.0	55.5
HWFI	17.6	31.4	46.7	61.3	68.9	89.7	182.8
EGRI	22.7	36.1	51.6	75.4	131.6	162.6	191.0
EMXI	19.4	26.1	37.0	48.2	70.4	84.4	89.6
CMCI	25.1	34.3	49.6	69.1	97.3	114.8	154.0
AEMI	18.2	27.4	41.4	61.0	94.6	145.3	205.2
FSSE	15.8	24.7	39.2	52.1	63.0	69.2	91.7
TVCE	15.9	24.4	37.3	49.9	58.6	48.8	57.7
LBAR	23.4	53.1	106.2	162.2	257.1	336.0	291.9
BAMD	23.5	49.1	75.2	93.6	131.5	227.1	293.3
BAMM	19.5	33.9	53.1	80.6	136.6	218.2	289.1
BAMS	26.4	41.5	60.6	82.2	135.5	196.6	276.4
Forecasts	23	22	21	18	12	8	6

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Emilia, 7-15 July 2012. Mean errors for the 5-yr period 2007-11 are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL (Emilia)	6.5	10.9	13.5	11.7	4.8	14.1	11.7
OCD5 (Emilia)	8.5	14.9	18.0	17.3	17.5	22.6	16.6
Forecasts	30	28	26	24	20	16	12
OFCL (2007-11)	6.4	10.6	13.7	15.1	17.0	18.5	17.8
OCD5 (2007-11)	7.5	12.4	16.1	18.4	20.1	20.1	20.8

Table 3b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Emilia, 7-15 July 2012. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 3a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	6.7	11.1	14.0	11.4	4.6	17.2	11.7
OCD5	8.8	15.4	18.6	18.5	13.6	20.7	10.3
GHMI	8.4	12.6	16.3	16.0	13.5	12.4	5.3
HWFI	8.4	13.0	15.8	18.3	20.5	27.7	13.8
DSHP	7.9	10.3	13.4	12.9	8.0	10.0	16.3
LGEM	7.9	12.0	15.0	14.8	9.5	12.3	8.8
FSSE	7.6	10.0	12.9	17.4	14.4	14.3	10.2
ICON	7.8	11.1	13.8	14.3	12.2	14.2	8.7
IVCN	7.8	11.1	13.8	14.3	12.2	14.2	8.7
Forecasts	29	27	25	21	13	9	6

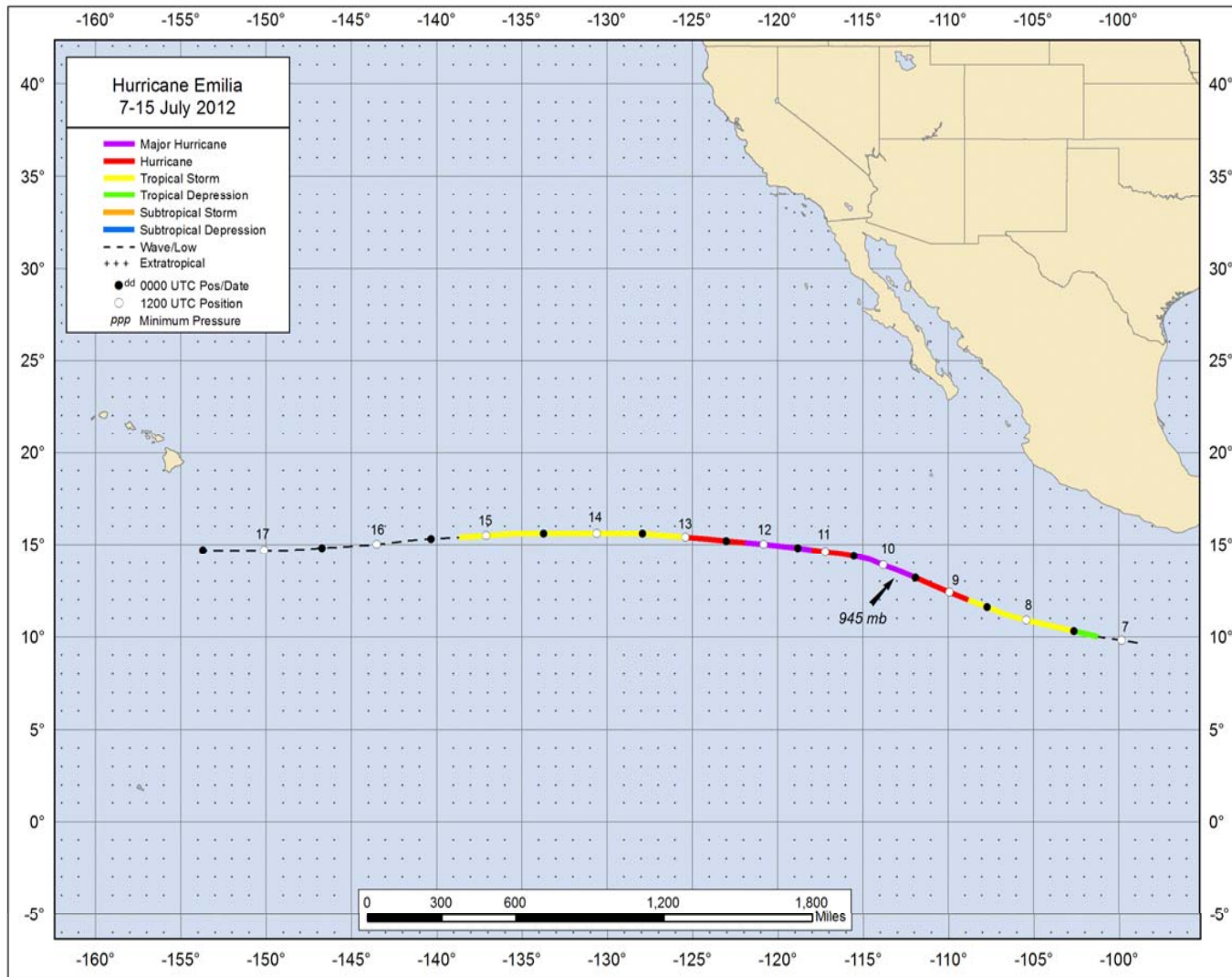


Figure 1. Best track positions for Hurricane Emilia, 7-15 July 2012.

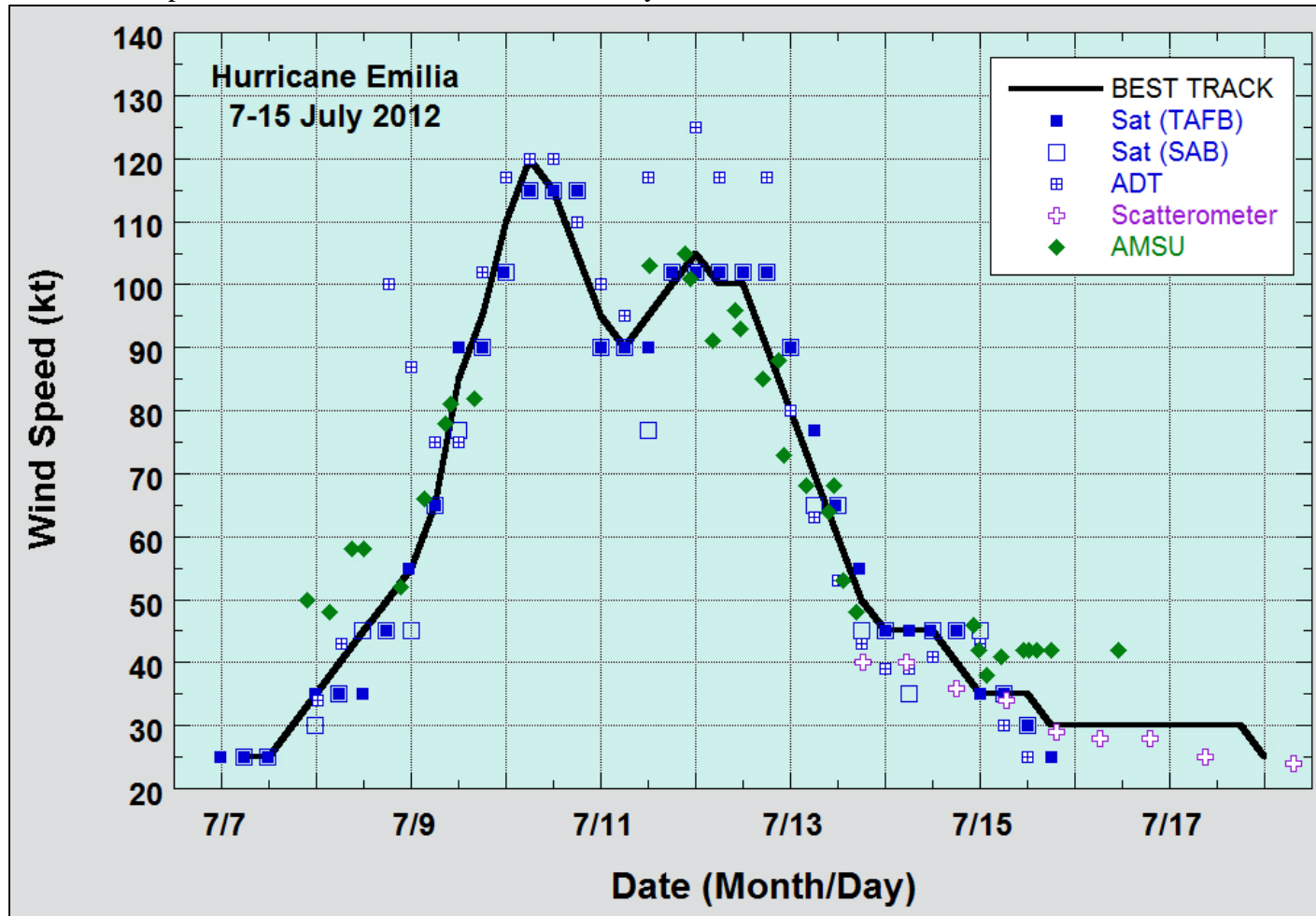


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Emilia, 7-15 July 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

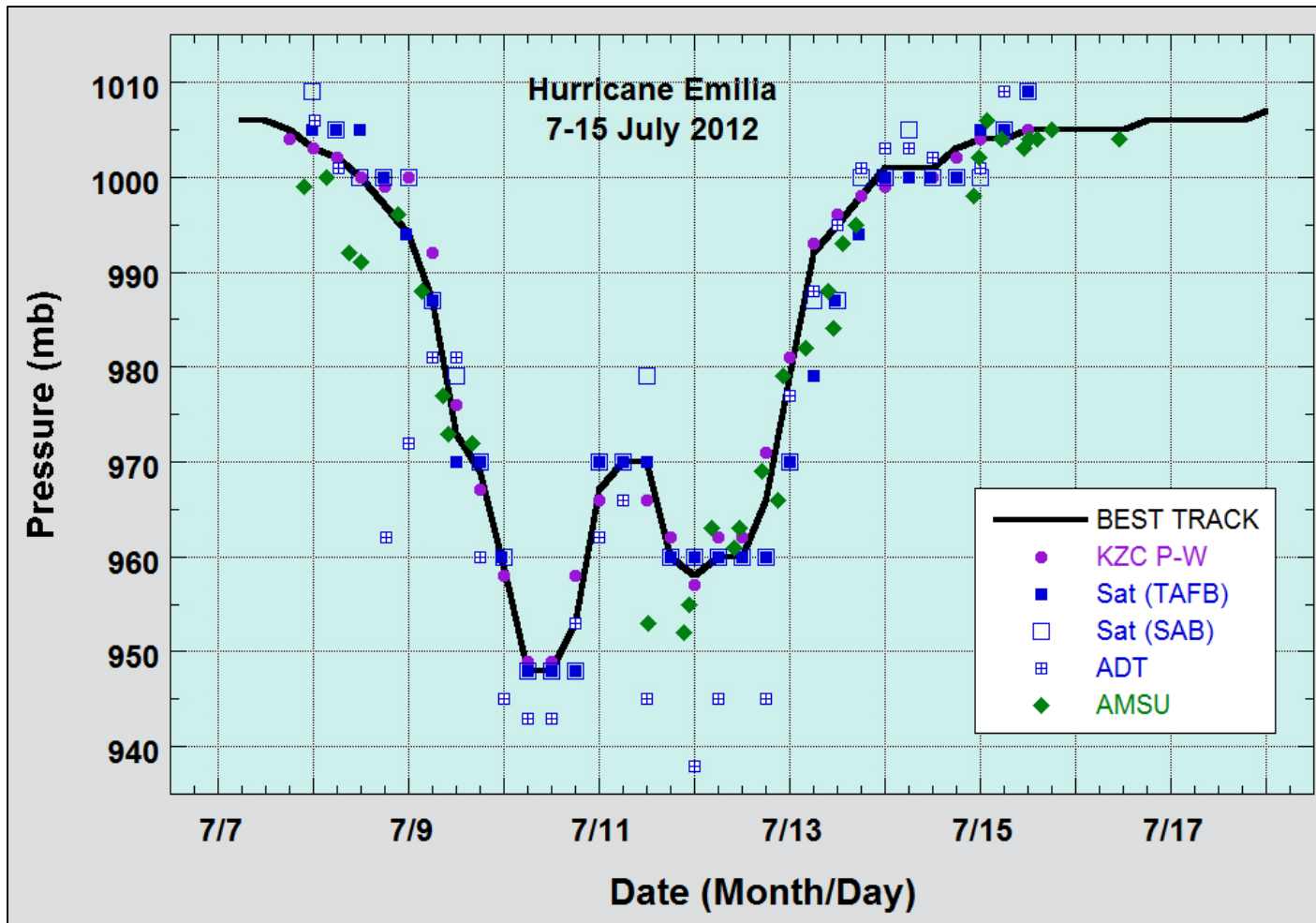


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Emilia, 7-15 July 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC P-W values are obtained by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind data. Dashed vertical lines correspond to 0000 UTC.

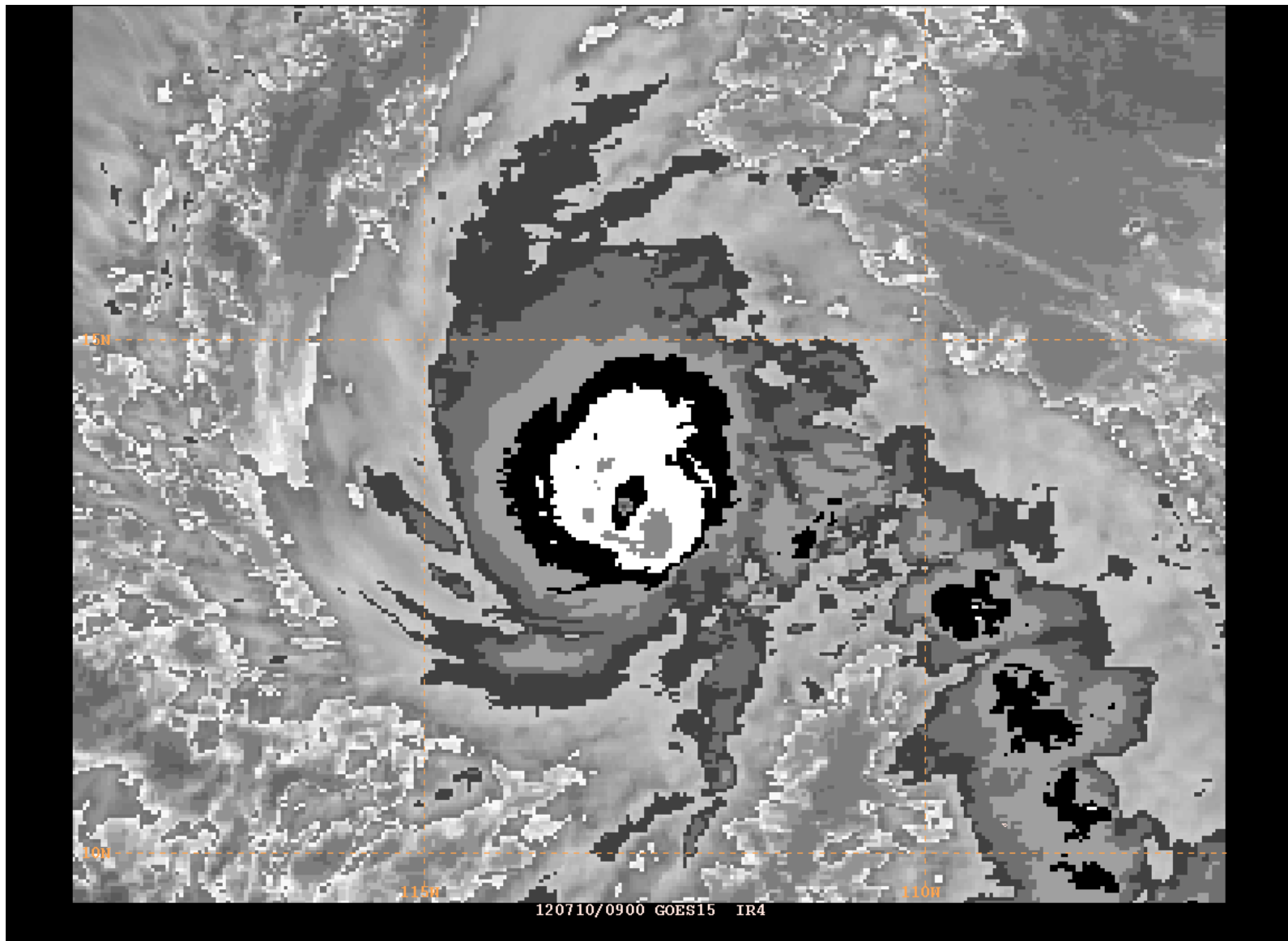


Figure 4. GOES-15 infrared satellite picture of Emilia near peak intensity at 0900 UTC 10 July 2012.