

Tropical Cyclone Report  
Hurricane Fabio  
(EP062012)  
12 – 18 July 2012

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Fabio, a category 2 hurricane (on the Saffir-Simpson Hurricane Wind Scale), was the last of three eastern Pacific tropical cyclones to form during an eight-day period. The hurricane did not impact land.

a. Synoptic History

Fabio originated primarily from a tropical wave that emerged from the coast of Africa on 27 June and moved westward across the Atlantic with little distinction for the next several days. The associated convection increased on 5 July while the system was over the central Caribbean Sea, and the now convectively active wave continued westward into the eastern Pacific on 7 July. A series of eastward-moving atmospheric Kelvin waves in this area created a large-scale environment favorable for development, and early on 9 July, a low pressure area formed where the tropical wave interacted with the Intertropical Convergence Zone several hundred nautical miles south of the Gulf of Tehuantepec. The low became better defined on 10 July, although the associated convection was disorganized. Subsequently, increased convective organization led to the formation of a tropical depression near 0000 UTC 12 July about 350 n mi south of Manzanillo, 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<sup>1</sup>.

The depression was moving west-northwestward at the time of genesis. Shortly thereafter, it turned westward as it intensified into a tropical storm. Fabio continued westward on the south side of the subtropical ridge for the rest of the day, and it steadily strengthened despite northeasterly vertical wind shear. It became a hurricane on 13 July as it turned toward the northwest. This motion was short-lived, and the hurricane again moved westward the next day. Fabio reached an estimated peak intensity of 95 kt early on 15 July, followed by a weakening trend as the center moved over progressively cooler sea surface temperatures. The cyclone turned toward the northwest on 16 July as a mid/upper-level trough along the U. S. west coast caused a large break in the subtropical ridge, and this motion was followed by a northward turn on 17-18 July. Fabio weakened to a tropical storm late on 16 July and to a tropical depression early on 18 July. Later that day, it degenerated to a remnant low about 345 n mi west-southwest of Punta Eugenia, Mexico. The low turned eastward on 19 July, then moved

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<sup>1</sup> 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.

east-southeastward before dissipating on 20 July about 105 n mi west-southwest of Punta Eugenia.

b. Meteorological Statistics

Observations in Fabio (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 Fabio.

The estimated peak intensity of 95 kt is based on a blend of subjective Dvorak estimates, ADT estimates, and AMSU estimates. The satellite signature of Fabio was at its best between 0600 and 1200 UTC 15 July, and it is possible it was a little stronger than 95 kt at that time. There are no reliable observations of tropical-storm-force or greater winds from Fabio.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Fabio was well forecast. The pre-Fabio disturbance was first mentioned in the Tropical Weather Outlook on 9 July, at which time it was given a low (less than 30%) chance of development in the next 48 h. This was raised to a medium (30-50%) chance later on 9 July, and to a high (greater than 50%) chance about 18 h before genesis.

A verification of NHC official track forecasts for Fabio is given in Table 2a. Official forecast track errors were lower than the mean official errors for the previous 5-yr period at all forecast times, with the errors being less than half than the 5-yr mean at 120 hours. The climatology-persistence (OCD5) errors for Fabio were all smaller than the 5-yr average, suggesting that the official forecasts benefitted from Fabio being easier than average to forecast. A homogeneous comparison of the official track errors with selected guidance models is given in Table 2b. The official forecasts generally had lower errors than those of the track forecast guidance. However, the National Weather Service Global Forecast System model (GFSI) and its ensemble mean (AEMI) had lower average errors than the official forecasts from 48-120 hours.

A verification of NHC official intensity forecasts for Fabio is given in Table 3a. Official forecast intensity errors again were lower than the mean official errors for the previous 5-yr period at all times, with the errors being less than half of the 5-yr mean at 96 and 120 hours. A

homogeneous comparison of the official intensity errors with selected guidance models is given in Table 3b. The official forecast errors were better than the intensity guidance for the vast majority of the forecast times. It should be noted that while the average errors were good, there was a 7-13 kt low bias in the official forecasts at several forecast times. This was due to Fabio reaching a greater peak intensity than called for in the early forecasts.

There were no watches or warnings associated with Fabio.

Table 1. Best track for Hurricane Fabio, 12 – 18 July 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 1200	11.7	100.6	1007	20	low
10 / 1800	11.7	101.3	1007	25	"
11 / 0000	11.8	101.9	1006	25	"
11 / 0600	12.0	102.5	1006	25	"
11 / 1200	12.5	103.3	1005	25	"
11 / 1800	12.9	104.1	1004	25	"
12 / 0000	13.3	105.0	1003	30	tropical depression
12 / 0600	13.5	106.0	1002	35	tropical storm
12 / 1200	13.6	106.8	1001	40	"
12 / 1800	13.7	107.7	1000	45	"
13 / 0000	13.8	108.6	998	50	"
13 / 0600	14.2	109.4	995	55	"
13 / 1200	14.8	110.2	992	60	"
13 / 1800	15.3	111.0	983	70	hurricane
14 / 0000	15.6	111.9	981	75	"
14 / 0600	15.9	112.9	980	75	"
14 / 1200	16.1	113.8	977	80	"
14 / 1800	16.2	114.7	973	85	"
15 / 0000	16.3	115.5	970	90	"
15 / 0600	16.5	116.3	966	95	"
15 / 1200	16.7	117.0	966	95	"
15 / 1800	17.1	117.8	970	90	"
16 / 0000	17.5	118.5	975	85	"
16 / 0600	18.0	119.2	979	80	"
16 / 1200	18.6	119.8	985	70	"
16 / 1800	19.3	120.1	991	60	tropical storm
17 / 0000	20.0	120.4	995	50	"
17 / 0600	20.8	120.5	998	45	"
17 / 1200	21.8	120.6	1001	40	"
17 / 1800	22.6	120.6	1004	35	"
18 / 0000	23.5	120.6	1006	30	tropical depression
18 / 0600	24.4	120.8	1007	30	"
18 / 1200	25.3	120.9	1008	25	low
18 / 1800	26.2	120.8	1009	25	"
19 / 0000	27.0	120.5	1010	25	"
19 / 0600	27.3	119.9	1011	20	"
19 / 1200	27.4	119.4	1012	20	"
19 / 1800	27.5	118.7	1013	20	"
20 / 0000	27.4	117.9	1013	20	"
20 / 0600	27.0	116.9	1013	15	"

20 / 1200					dissipated
15 / 0600	16.5	116.3	966	95	minimum pressure and maximum wind

Table 2a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Fabio, 12 – 18 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 (Fabio)	<b>16.3</b>	<b>29.0</b>	<b>40.2</b>	<b>59.4</b>	<b>91.7</b>	<b>124.6</b>	<b>121.3</b>
OCD5 (Fabio)	26.4	61.1	98.5	128.8	151.2	187.2	328.6
Forecasts	23	21	19	17	13	9	5
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 Fabio, 12 – 18 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	15.6	27.8	39.3	57.2	83.4	115.2	125.1
OCD5	27.6	66.2	108.0	141.2	152.0	223.3	395.6
GFSI	17.5	<b>25.0</b>	<b>32.5</b>	<b>39.2</b>	<b>49.4</b>	<b>73.9</b>	<b>82.1</b>
GHMI	28.7	52.0	68.5	87.1	148.1	245.1	422.5
HWFI	17.6	29.1	<b>37.8</b>	<b>49.0</b>	<b>66.7</b>	123.7	159.4
NGXI	21.7	42.3	72.1	97.4	123.7	<b>93.9</b>	144.0
EMXI	18.5	32.4	54.7	83.9	126.8	164.0	197.1
CMCI	19.1	39.5	66.3	94.4	129.5	126.5	<b>113.0</b>
TVCN	18.0	31.4	45.5	63.4	93.9	127.7	176.4
AEMI	18.3	28.5	41.3	<b>50.4</b>	<b>58.6</b>	<b>65.4</b>	<b>89.5</b>
LBAR	25.1	45.1	70.5	93.4	135.7	155.0	227.3
BAMS	29.8	59.0	96.2	134.7	158.7	177.0	178.5
BAMM	25.1	46.7	70.1	94.0	102.8	161.3	229.4
BAMD	26.1	45.4	64.6	80.9	<b>78.8</b>	<b>114.4</b>	207.8
Forecasts	20	18	16	14	10	7	3

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Fabio, 12 – 18 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 (Fabio)	<b>5.2</b>	<b>7.9</b>	<b>11.8</b>	<b>13.8</b>	<b>14.2</b>	<b>8.3</b>	<b>7.0</b>
OCD5 (Fabio)	4.7	10.0	15.5	18.2	22.1	17.1	17.6
Forecasts	23	21	19	17	13	9	5
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 Fabio, 12 – 18 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	5.2	8.0	12.2	14.4	14.2	8.3	7.0
OCD5	<b>4.7</b>	10.4	15.8	18.5	22.1	17.1	17.6
HWFI	7.3	13.3	17.3	20.1	20.7	15.1	13.2
GHMI	7.7	15.7	22.2	23.6	24.4	16.8	10.4
DSHP	<b>5.1</b>	8.6	13.1	14.4	15.7	12.0	<b>6.4</b>
LGEM	5.4	10.3	15.4	19.3	19.3	12.3	<b>6.4</b>
ICON	6.0	11.2	15.7	18.5	18.9	12.0	<b>6.2</b>
IVCN	6.0	11.2	15.7	18.5	18.9	12.0	<b>6.2</b>
Forecasts	23	20	18	16	13	9	5



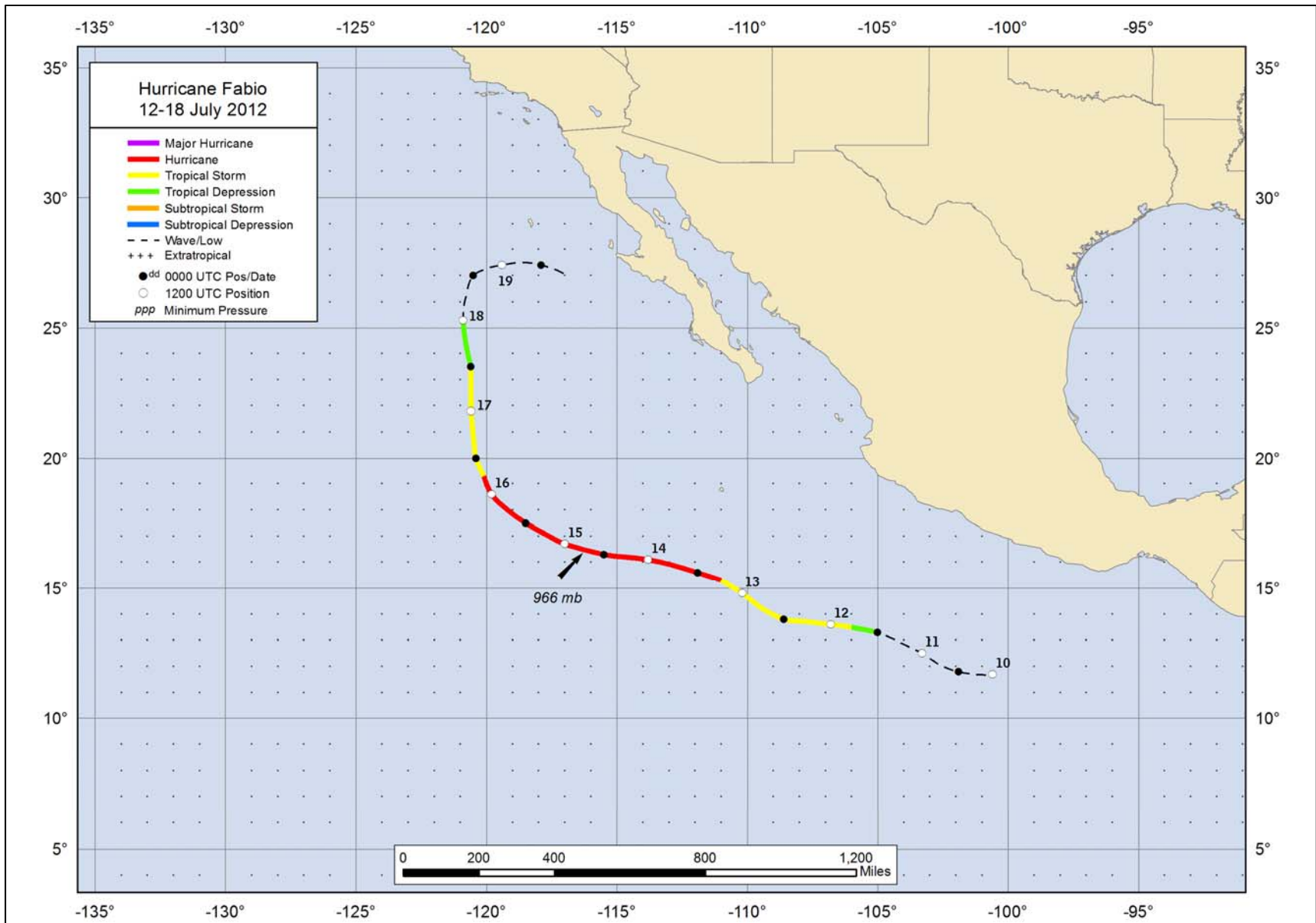


Figure 1. Best track positions for Hurricane Fabio, 12 – 18 July 2012.

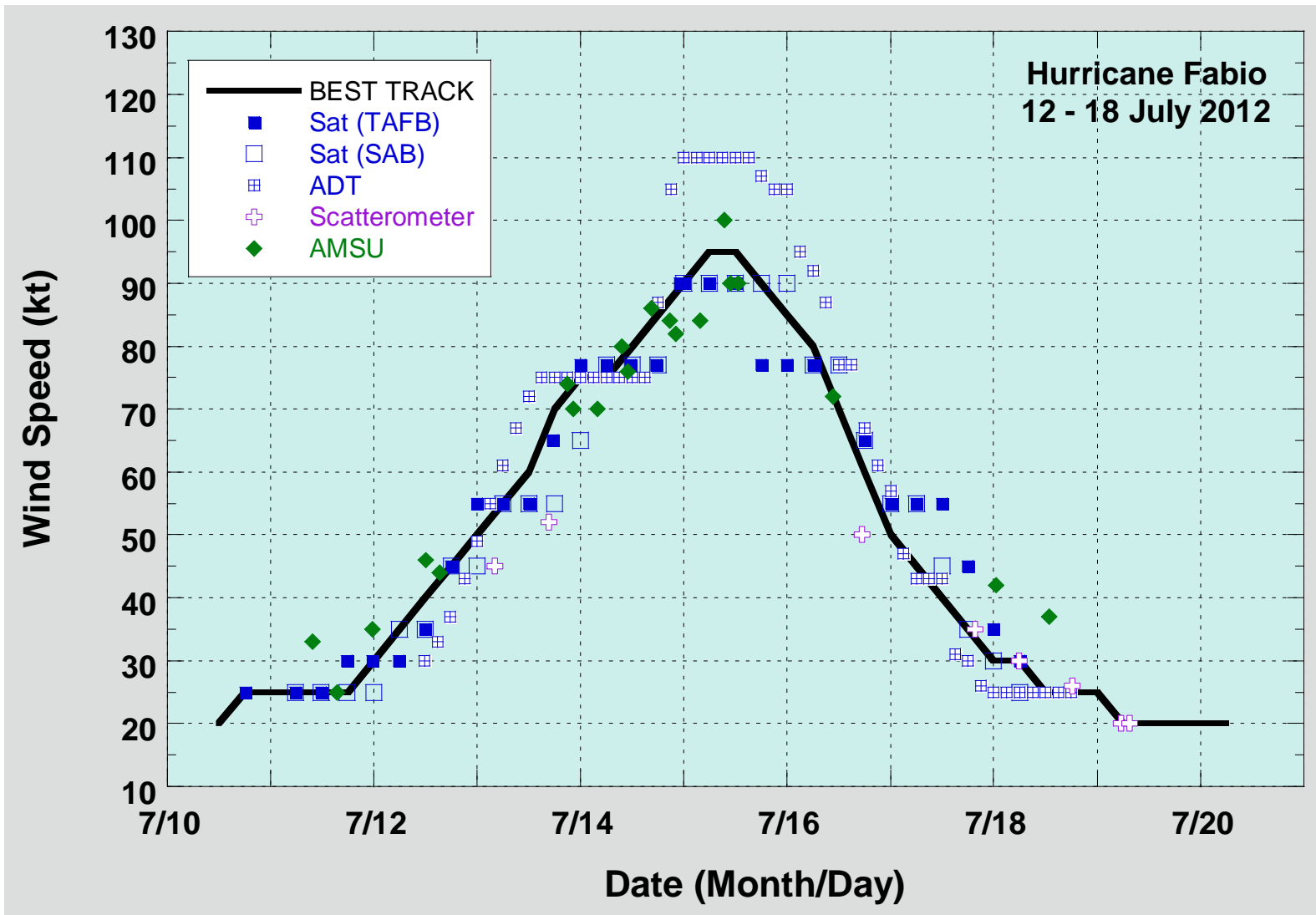


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Fabio, 12 – 18 July 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

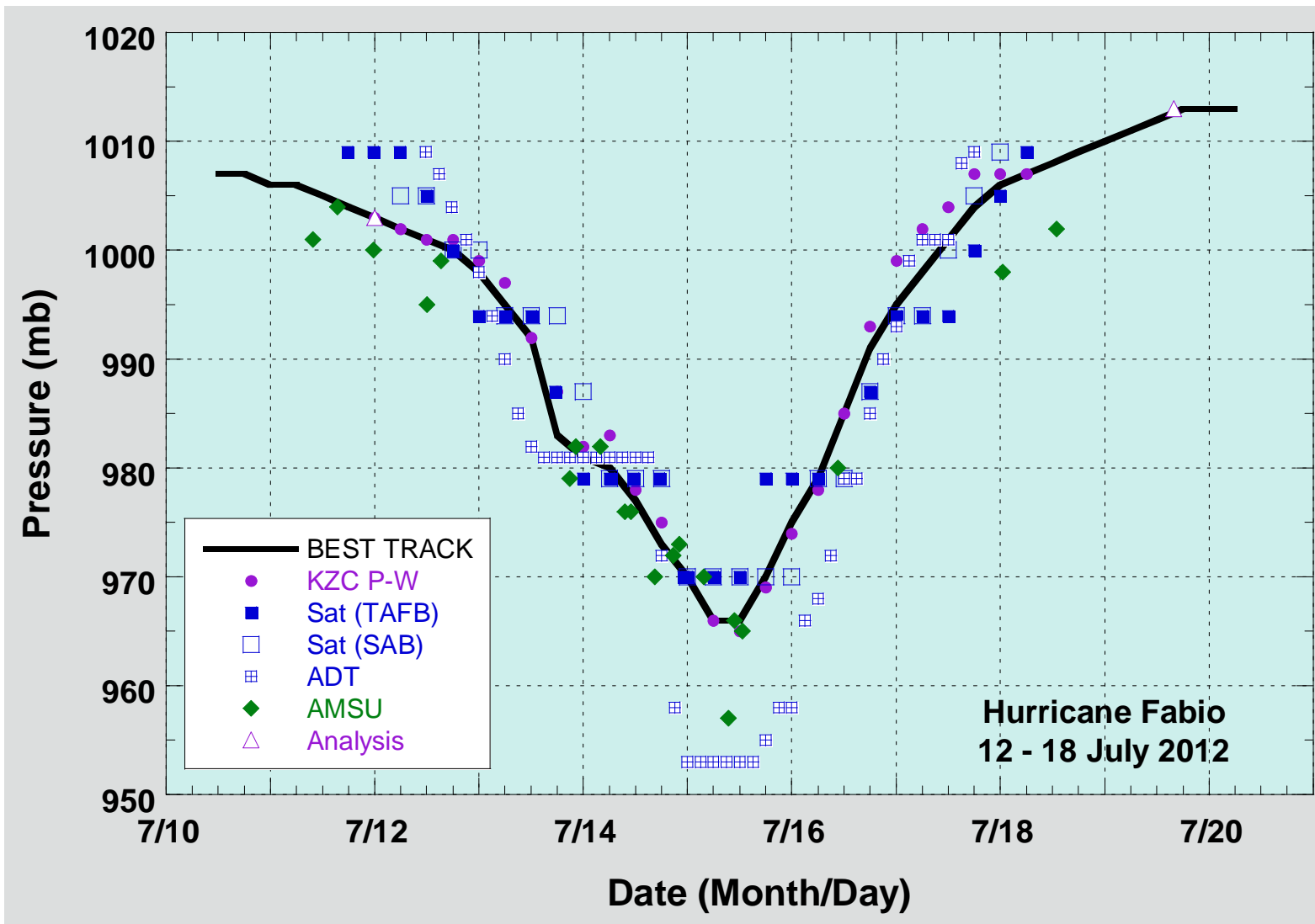


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Fabio, 12 – 18 July 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC 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.