NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

TROPICAL STORM ERNESTO

(AL052018)

15–17 August 2018

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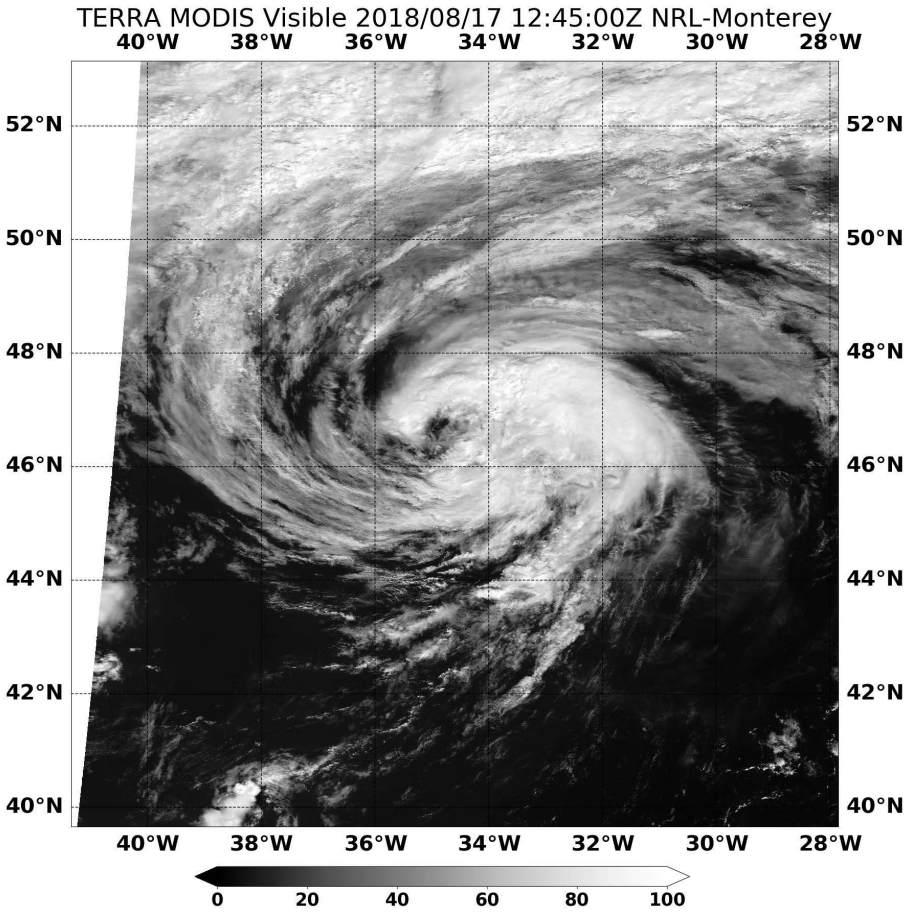

TERRA/MODIS VISIBLE IMAGE OF ERNESTO AT 1245 UTC 17 AUGUST COURTESY OF NASA AND NRL.

Ernesto had a non-tropical origin and a short life span over the North Atlantic.

Tropical Storm Ernesto

15–17 AUGUST 2018

SYNOPTIC HISTORY

Ernesto had a complex origin from a non-tropical weather system. A mid- to upper-level baroclinic trough in the westerlies moved across the New England states and Canadian Maritimes on 11–12 August. A surface low formed on 12 August well to the south of Newfoundland and moved eastward for a day before turning southward by 14 August. While that occurred, the upper-level trough amplified to the southeast of the low, leaving the now-decaying surface low in an area of unfavorable upper-level winds. However, a new surface low formed in response to the amplifying trough early on 15 August about 700 n mi west-southwest of the western Azores. The associated convection became better organized, and it is estimated that the low became a subtropical depression near 0600 UTC 15 August. 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[1].

The cyclone was moving north-northwestward at the time of genesis. This motion was soon followed by a turn toward the northeast as the system moved along the southern edge of the mid-latitude westerlies. The cyclone became a subtropical storm 6 h after genesis, and the estimated maximum winds reached a peak of 40 kt later that day. On 16 August, Ernesto acquired sufficient organized convection and anticyclonic outflow – indicative of an upper-level warm core – to be considered a tropical storm, although this transition did not produce an increase in intensity. A motion over the cold waters of the northeastern Atlantic late on 17 August led to the convection dissipating, and Ernesto subsequently decayed to a post-tropical low near 0000 UTC 18 August about 700 n mi north-northeast of the Azores. Shortly thereafter, the remnants merged with a frontal system and became an extratropical low. The extratropical remnants of Ernesto moved east-northeastward with minimal gale-force winds, and the system dissipated over the British Isles on 19 August.

METEOROLOGICAL STATISTICS

Observations in Ernesto (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 and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting

[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 *btk* directory, while previous years' data are located in the *archive* directory.

satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Global Precipitation Mission (GPM), 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 Ernesto.

There were no observations of tropical-storm-force winds during the subtropical and tropical cyclone phases of Ernesto. While the system passed close to the British Isles as an extratropical low, there are no available observations of gale-force winds.

It should be noted that the intensity estimates from the ADT and the SATCON techniques show higher winds and lower pressure than the subjective Dvorak estimates and the available scatterometer data, and the reasons for this are unclear. The best track, including the estimated peak intensity of 40 kt, lies closer to the latter two data sets.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis forecasts of Ernesto had mixed, but generally poor, results. The chance that a subtropical or tropical cyclone might form over the central North Atlantic was first mentioned in the Tropical Weather Outlook 102 h before genesis with a low chance of development (<40%) in the next 5 days. However, the 48-h probability was not raised to a medium chance (40–60%) until 18 h before genesis, and it was not raised to a high chance (>60%) until the time of genesis. In addition, many of the genesis forecasts were related to the first low pressure area that decayed, and it was not until 12 h before genesis that the genesis potential of the second low pressure area was recognized.

A verification of NHC official track forecasts for Ernesto is given in Table 3a. Official forecast track errors were lower than the mean official errors for the previous 5-yr period, although the number of forecasts is fairly small. The official forecasts correctly captured that Ernesto would quickly become embedded in the westerlies and move northeastward over the Atlantic. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. While the number of forecasts is again small, a few of the track models had lower errors than the official forecasts, especially at 12 h.

A verification of NHC official intensity forecasts for Ernesto is given in Table 4a. Official forecast intensity errors were lower than the mean official errors for the previous 5-yr period, although the number of forecasts is again small. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. Both the official forecasts

and the guidance correctly forecast that Ernesto would not intensify much due to its motion over the cool waters of the northeastern Atlantic.

There were no coastal watches or warnings issued for Ernesto.

Table 1. Best track for Tropical Storm Ernesto, 15–17 August 2018.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 0000	36.9	45.5	1011	30	low
15 / 0600	37.4	45.7	1009	30	subtropical depression
15 / 1200	37.8	45.9	1008	35	subtropical storm
15 / 1800	38.5	45.8	1008	35	"
16 / 0000	39.3	45.4	1008	35	"
16 / 0600	40.3	44.7	1008	35	"
16 / 1200	41.5	43.8	1007	40	"
16 / 1800	42.4	42.1	1007	40	tropical storm
17 / 0000	43.5	40.2	1007	40	"
17 / 0600	44.9	37.9	1006	40	"
17 / 1200	46.6	35.1	1005	40	"
17 / 1800	48.3	31.8	1003	40	"
18 / 0000	49.8	27.7	999	40	low
18 / 0600	51.3	22.6	1002	35	extratropical
18 / 1200	52.3	18.2	1003	35	"
18 / 1800	53.4	13.8	1004	35	"
19 / 0000	54.2	9.6	1005	35	"
19 / 0600	55.0	4.5	1007	35	"
19 / 1200					dissipated
17 / 1800	48.3	31.8	1003	40	minimum pressure as a tropical cyclone

Table 2. For Tropical Storm Ernesto, number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the "Low" category do not include forecasts of a 0% chance of genesis.

	Hours Before Genesis	
	48-Hour Outlook	**120-Hour Outlook**
Low (<40%)	66	102
Medium (40%-60%)	18	18
High (>60%)	0	0

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Ernesto, 15–17 August 2018. Mean errors for the previous 5-yr period 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	**18.5**	**16.7**	**16.2**	**14.2**			
OCD5	45.8	110.6	222.1	365.0			
Forecasts	9	7	5	3			
OFCL (2013-17)	24.1	37.4	50.5	66.6	98.4	137.4	180.7
OCD5 (2013-17)	44.7	95.8	153.2	211.2	318.7	416.2	490.6

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Ernesto, 15–17 August 2018. 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	18.5	16.7	16.2	14.2			
OCD5	45.8	110.6	222.1	365.0			
GFSI	**14.7**	18.4	26.4	18.3			
HWFI	19.3	25.8	31.9	27.8			
HMNI	20.0	19.4	**14.7**	35.9			
EMXI	**16.2**	21.9	22.1	31.6			
CMCI	21.1	25.7	59.0	110.8			
TVCA	**14.8**	17.1	23.0	24.9			
TVCX	**14.7**	**16.6**	21.3	22.9			
GFEX	**14.6**	18.7	18.6	19.7			
TVDG	14.5	**16.0**	20.5	23.9			
HCCA	19.6	30.6	49.9	58.1			
AEMI	**13.8**	18.2	23.3	17.8			
TABS	34.5	40.0	47.8	66.0			
TABM	36.7	61.0	83.4	94.6			
TABD	37.2	66.1	99.9	117.2			
Forecasts	9	7	5	3			

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Ernesto, 15–17 August 2018. Mean errors for the previous 5-yr period 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	**1.7**	**3.6**	**3.0**	**5.0**			
OCD5	2.9	3.3	8.8	16.7			
Forecasts	9	7	5	3			
OFCL (2013-17)	5.5	8.0	10.1	11.4	12.7	14.5	15.0
OCD5 (2013-17)	7.1	11.1	14.4	17.4	20.6	22.3	23.7

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Ernesto, 15–17 August 2018. 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 4a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	1.9	2.5	2.5	5.0			
OCD5	3.1	3.0	9.0	18.0			
HWFI	**1.0**	**1.3**	**2.0**	**2.0**			
HMNI	3.2	4.5	3.8	**1.0**			
GFSI	**1.8**	**1.7**	**1.5**	**0.5**			
EMXI	2.8	5.5	7.5	8.5			
DSHP	2.9	3.5	6.8	10.0			
LGEM	3.0	**2.2**	3.5	7.0			
ICON	2.0	**1.3**	2.8	**4.0**			
IVCN	2.8	**1.5**	3.0	**2.0**			
FSSE	2.4	3.2	6.2	9.5			
HCCA	2.4	**2.0**	4.5	5.0			
Forecasts	8	6	4	2			

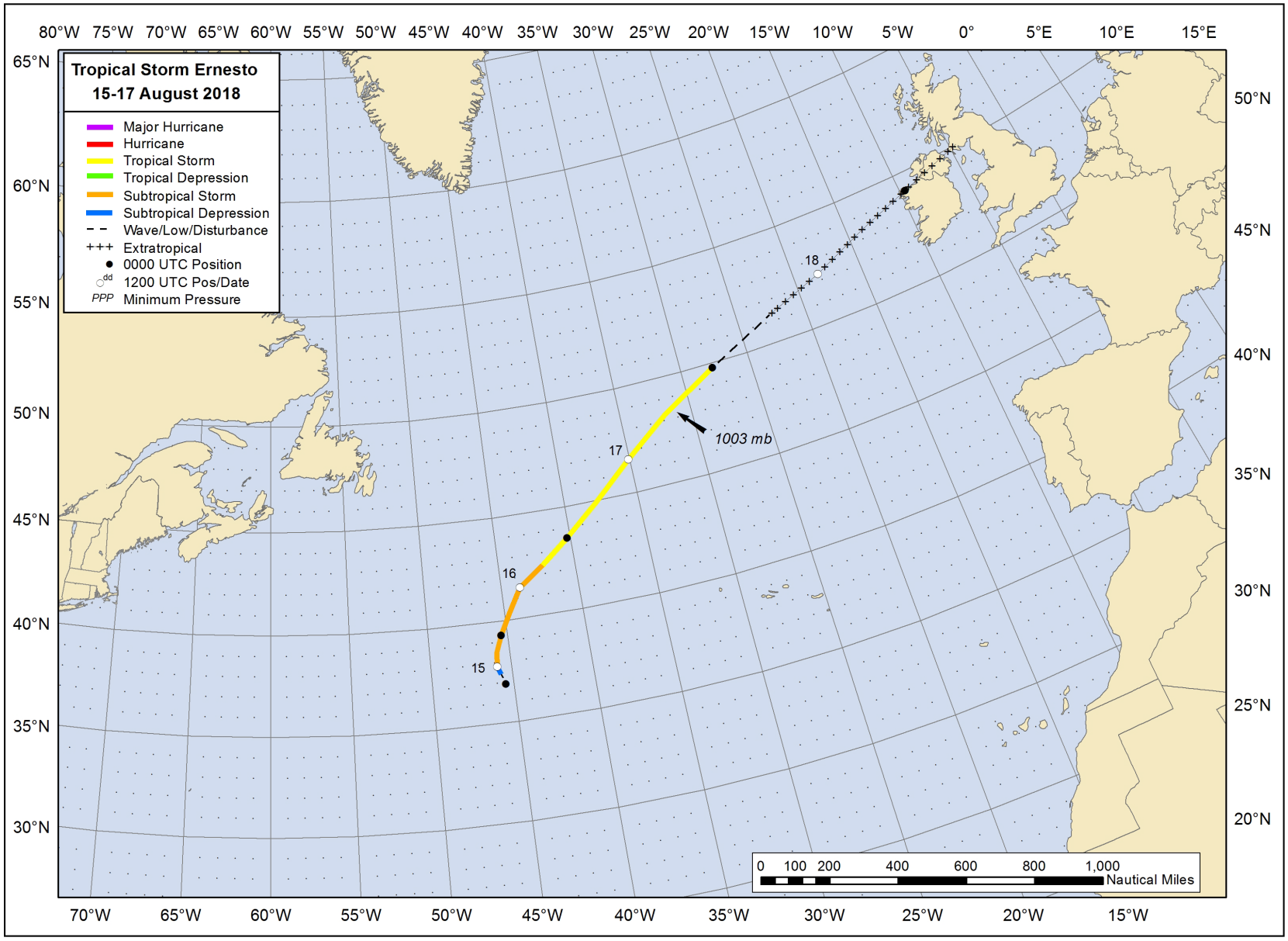

Figure 1. Best track positions for Tropical Storm Ernesto, 15–17 August 2018.

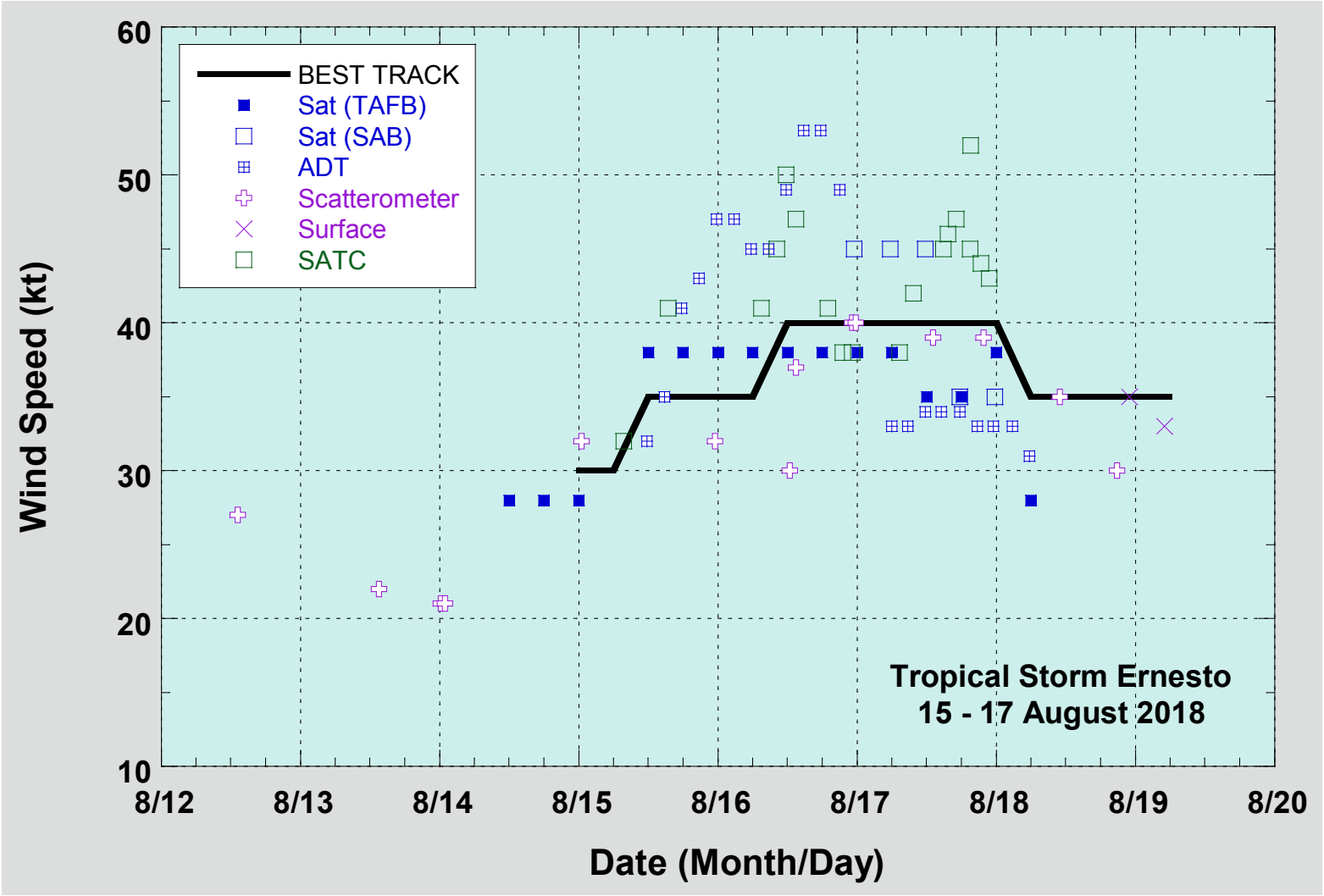

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Ernesto, 15–17 August 2018. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates (SATC) are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

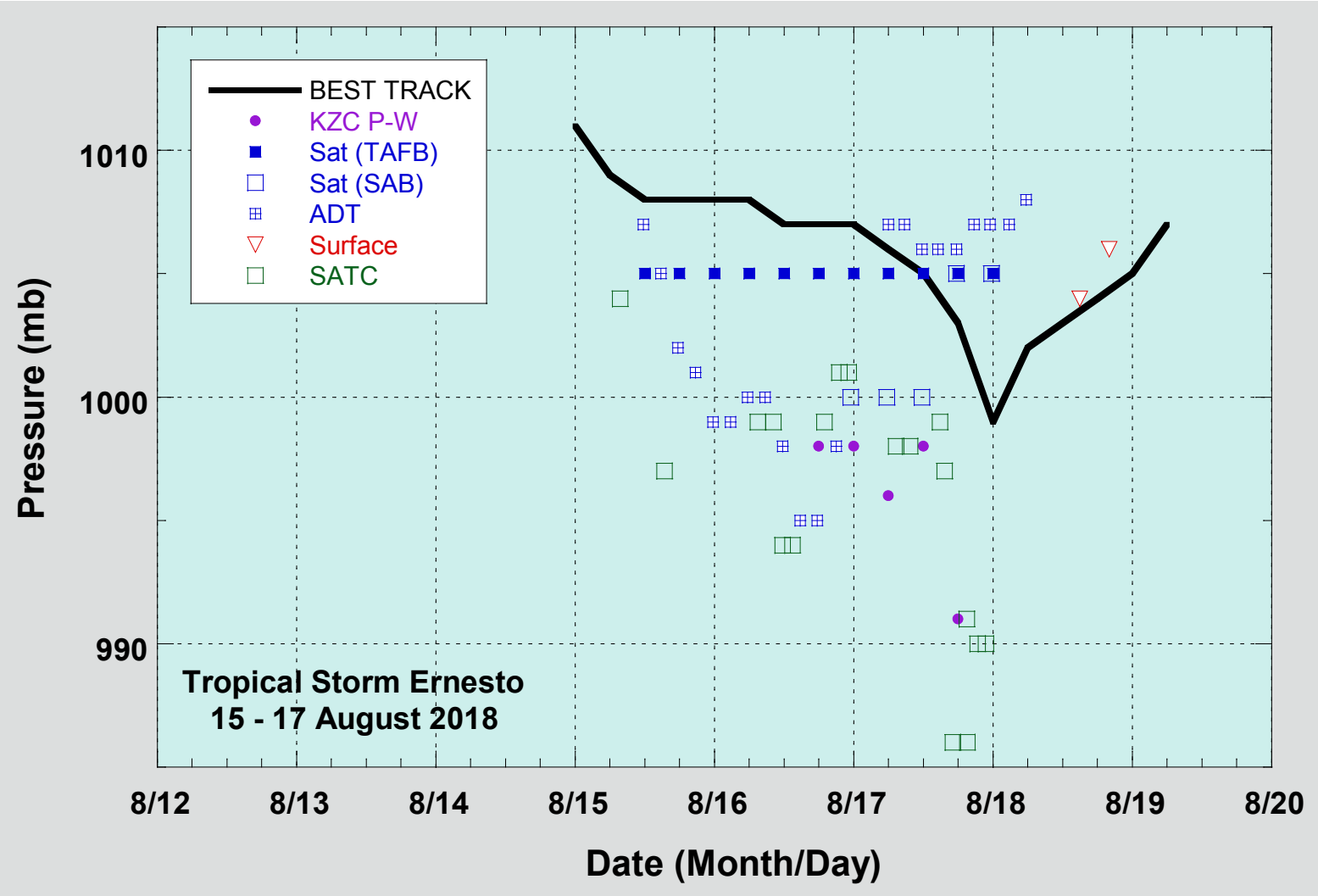

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Ernesto, 15–17 August 2018. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates (SATC) are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC.