

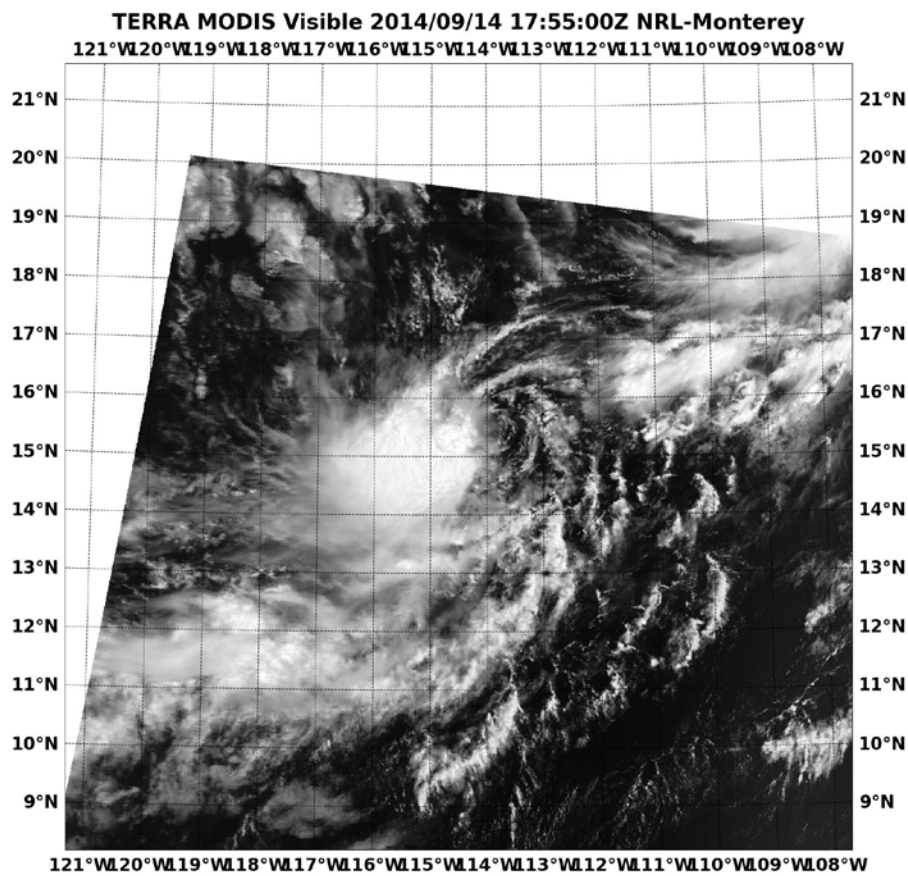


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL DEPRESSION SIXTEEN-E (EP162014)

11 – 15 September 2014

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National Hurricane Center
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MODIS IMAGE OF TROPICAL DEPRESSION SIXTEEN-E FROM THE NASA TERRA SATELLITE AT 1755 UTC 14 SEPTEMBER 2014. IMAGE COURTESY OF NRL MONTEREY.

Tropical Depression Sixteen-E existed simultaneously with Hurricane Odile.

Tropical Depression Sixteen-E

11 – 15 SEPTEMBER 2014

SYNOPTIC HISTORY

Tropical Depression Sixteen-E appears to have formed from a tropical wave that cannot be reliably traced to Africa. The disturbance was first noticed over the central tropical Atlantic on 29 August. Generating disorganized convection, the system marched westward and entered the eastern Pacific on 2 September. A westward motion at a decreased forward speed occurred for the next several days. The disturbance spawned a low pressure area on 9 September about 770 n mi south-southwest of Cabo San Lucas, Mexico, and the associated convection showed signs of organization the next day. The low drifted northwest, and an additional increase in organization led to the formation of a tropical depression near 0600 UTC 11 September about 715 n mi southwest of Cabo San Lucas. 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.

After genesis, the depression moved slowly northwestward and northward, steered by a weak mid-level ridge to the east. This ridge subsequently dissipated as the large and intensifying circulation of Hurricane Odile, centered about 800 n mi east of the depression, became the dominant steering mechanism, and the depression turned eastward on 12 September. Easterly and northeasterly vertical wind shear produced by Odile’s outflow prevented any intensification, and this would eventually cause the depression’s demise. As the cyclone drew closer to the north-northwestward-moving Odile on 13 September, it turned southeastward. This was followed by an eastward motion around the south side of Odile’s larger circulation on 14 September. The associated convection decayed early on 15 September, and the depression degenerated to a remnant low around 0600 UTC that day about 380 n mi south-southwest of Cabo San Lucas. The low turned northeastward later that day, and then moved northward on 16 September. Subsequently weakening into a trough, the remnants of the depression moved through the Gulf of California into northwestern Mexico later that day.

METEOROLOGICAL STATISTICS

Observations in Tropical Depression Sixteen-E (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

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.

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 the depression.

An ASCAT observation of 33 kt winds southeast of the center of the depression near 1728 UTC 14 September (Figure 2) suggests, when combined with other satellite intensity estimates, that the cyclone could have been a tropical storm for a time on that day. However, the data are too ambiguous to support an after-the-fact upgrade.

There were no surface observations of tropical-storm-force winds from Tropical Depression Sixteen-E.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties associated with Tropical Depression Sixteen-E.

FORECAST AND WARNING CRITIQUE

The genesis of Tropical Depression Sixteen-E was poorly forecast. The system was not mentioned in the Tropical Weather Outlook (TWO) until 36 h before genesis, at which time it was given a low (<30%) chance of development in both the 0-2 day and 3-5 day time frames (Table 2). The chance was raised to medium (30-50%) in a special TWO 21 h before genesis, and then raised to high (>50%) 12 h before genesis.

A verification of NHC official track forecasts for Tropical Depression Sixteen-E is given in Table 3a. Official forecast track errors were lower than the mean official errors for the previous 5-yr period for the 12-36 h periods and comparable to the mean errors at 48 h. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. The official forecasts were generally better than the guidance through 48 h.

A verification of NHC official intensity forecasts for Tropical Depression Sixteen-E is given in Table 4a. Official forecast intensity errors were significantly lower than the mean official errors for the previous 5-yr period, as the official forecast correctly indicated the cyclone would only strengthen slightly if at all. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. As low as the official forecast errors were, many of the models outperformed the official forecasts.

No watches or warnings were issued for Tropical Depression Sixteen-E.



Table 1. Best track for Tropical Depression Sixteen-E, 11 -15 September 2014.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 0600	12.5	116.5	1009	25	low
10 / 1200	12.8	117.4	1009	25	"
10 / 1800	13.3	118.1	1009	30	"
11 / 0000	13.9	118.6	1009	30	"
11 / 0600	14.7	119.1	1007	30	tropical depression
11 / 1200	15.4	119.7	1006	30	"
11 / 1800	16.0	120.2	1006	30	"
12 / 0000	16.4	120.2	1006	30	"
12 / 0600	16.7	119.9	1006	30	"
12 / 1200	16.9	119.5	1006	30	"
12 / 1800	16.9	119.0	1007	30	"
13 / 0000	16.7	118.5	1007	30	"
13 / 0600	16.4	118.0	1007	30	"
13 / 1200	16.0	117.5	1007	30	"
13 / 1800	15.7	117.1	1007	30	"
14 / 0000	15.3	116.5	1007	30	"
14 / 0600	15.0	115.6	1007	30	"
14 / 1200	15.0	114.7	1006	30	"
14 / 1800	15.4	113.8	1006	30	"
15 / 0000	16.0	112.8	1005	30	"
15 / 0600	16.8	111.6	1004	30	low
15 / 1200	18.0	110.5	1003	30	"
15 / 1800	19.4	109.6	1003	30	"
16 / 0000	20.8	109.1	1004	30	"
16 / 0600	22.4	108.8	1005	25	"
16 / 1200					dissipated
15 / 0000	16.0	112.8	1005	30	minimum pressure



Table 2. Number of hours in advance of formation of Tropical Depression Sixteen-E 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 (<30%)	36	36
Medium (30%-50%)	21	21
High (>50%)	18	18



Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Depression Sixteen-E, 11 – 15 September 2014. 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	16.1	34.9	45.4	73.1	159.5		
OCD5	66.8	151.3	267.3	420.8	702.1		
Forecasts	13	11	7	5	1		
OFCL (2009-13)	25.7	41.4	55.0	68.6	97.8		
OCD5 (2009-13)	37.2	74.8	118.0	162.5	249.4		



Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Depression Sixteen-E, 11 – 15 September 2014. 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	29.3	37.4	44.8	64.9	159.5		
OCD5	65.2	144.3	247.8	403.5	702.1		
GFSI	34.3	63.1	118.2	167.9	399.9		
GHMI	32.4	86.6	160.1	228.4	404.2		
HWFI	40.6	55.0	88.5	128.1	297.0		
EMXI	35.9	63.8	95.3	147.9	273.7		
NVGI	45.1	73.9	102.1	82.0	343.1		
GFNI	33.6	54.9	74.9	96.2	86.9		
CMCI	58.4	98.8	104.9	79.2	108.6		
TVCE	30.4	46.7	56.6	69.9	141.3		
LBAR	60.6	147.0	247.2	384.9	550.0		
AEMI	32.0	48.3	55.7	58.0	117.3		
BAMS	40.6	68.5	128.1	272.6	426.9		
BAMM	40.6	85.2	175.7	326.1	526.6		
BAMD	63.4	135.5	226.0	336.7	552.5		
Forecasts	11	9	5	3	1		



Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Depression Sixteen-E, 11-15 September 2014. 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	1.2	2.7	5.0	4.0	5.0		
OCD5	2.9	3.9	4.3	4.0	3.0		
Forecasts	13	11	7	5	1		
(EP) OFCL (2009-13)	6.1	10.4	13.4	14.5	15.0		
(EP) OCD5 (2009-13)	7.7	12.7	16.4	18.8	20.5		

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Depression Sixteen-E, 11 – 15 September 2014. 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	1.2	2.7	5.0	4.0	5.0		
OCD5	2.9	3.9	3.8	4.0	3.0		
HWFI	3.1	4.1	5.8	3.0	11.0		
GHMI	2.8	2.4	2.2	3.6	2.0		
DSHP	1.3	1.7	1.3	2.6	8.0		
LGEM	0.5	1.5	1.8	1.0	0.0		
ICON	1.4	1.3	1.7	0.8	5.0		
IVCN	1.4	1.3	1.7	0.8	5.0		
GFNI	1.8	3.5	6.0	5.0	19.0		
GFSI	1.9	3.4	3.0	2.6	23.0		
Forecasts	13	11	6	5	1		

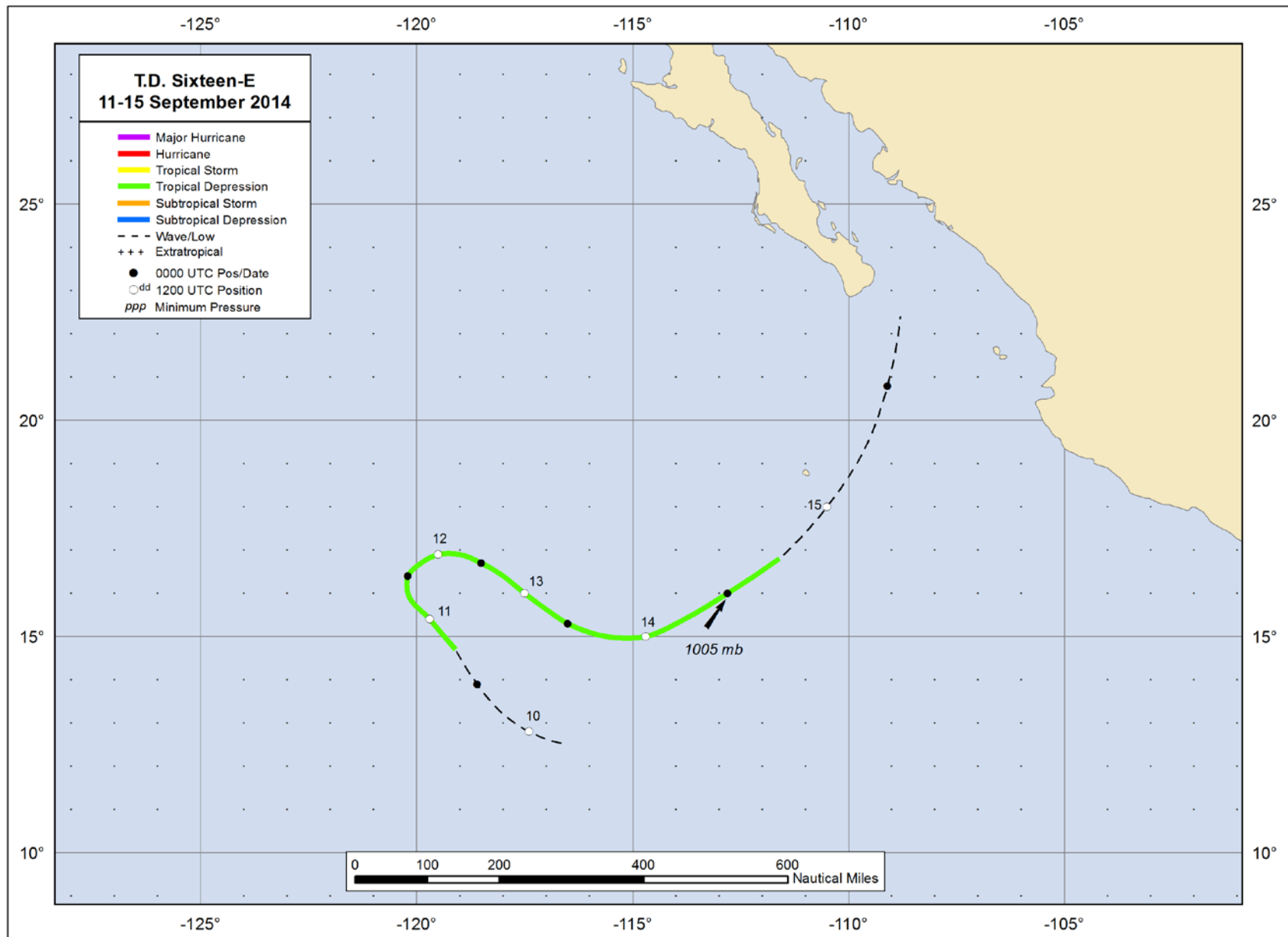


Figure 1. Best track positions for Tropical Depression Sixteen-E, 11 – 15 September 2014.

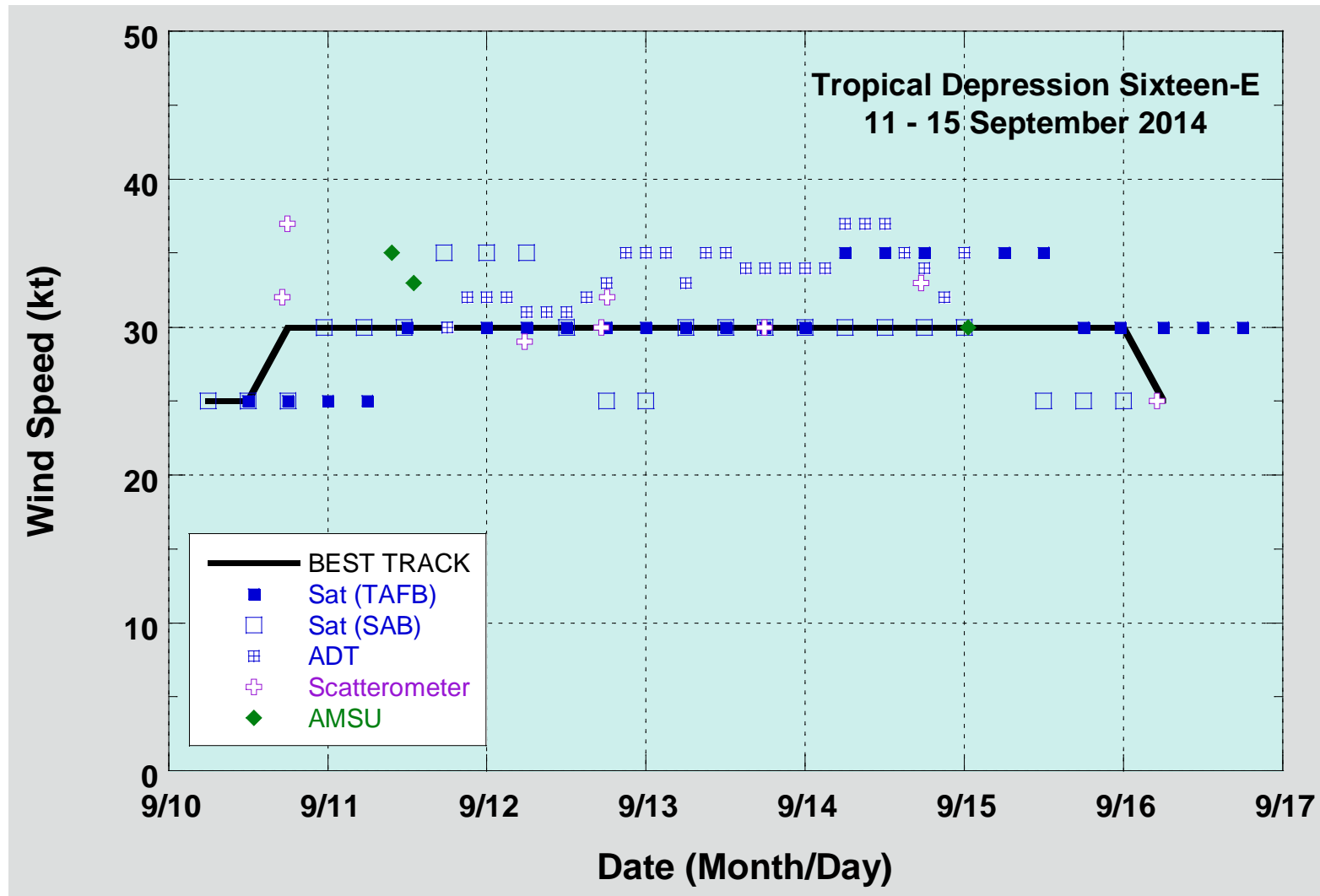


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Depression Sixteen-E, 11 – 15 September 2014. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

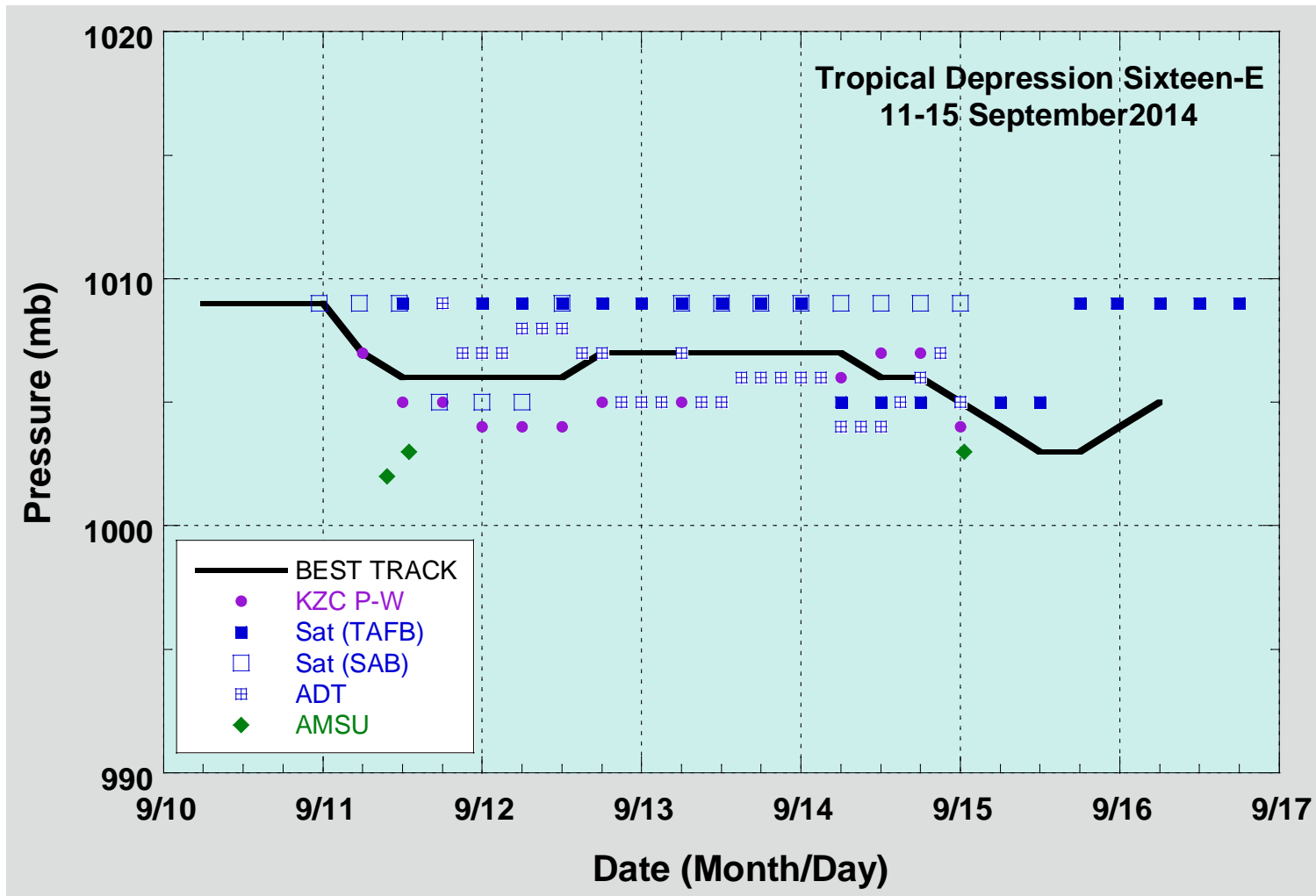


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Depression Sixteen-E, 11 – 15 September 2014. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC.