

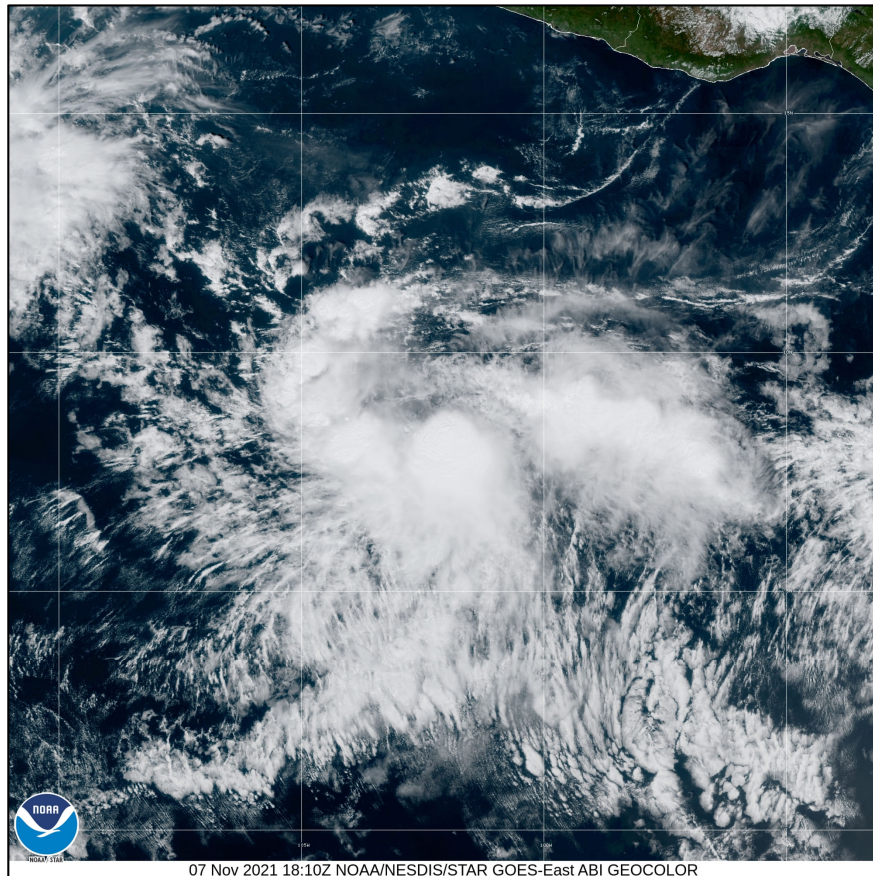


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL STORM TERRY (EP182021)

4–10 November 2021

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National Hurricane Center
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07 Nov 2021 18:10Z NOAA/NESDIS/STAR GOES-East ABI GEOCOLOR
GOES-16 GEOCOLOR SATELLITE IMAGE OF TROPICAL STORM TERRY AROUND THE TIME OF ITS PEAK INTENSITY AT 1810 UTC 7 NOVEMBER. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Terry was a weak tropical cyclone that formed off the coast of Central America and did not affect land while moving generally westward, only briefly reaching tropical storm status.

Tropical Storm Terry

4–10 NOVEMBER 2021

SYNOPTIC HISTORY

Terry appears to have originated from a tropical wave that moved across Central America and entered the eastern North Pacific Ocean on 2 November. Scatterometer wind data indicated that an area of low pressure with a well-defined surface center formed shortly after the wave emerged over the eastern Pacific waters to the west of Costa Rica by 1800 UTC that day. However, the associated convection was not persistent or well-organized around the low-level center. The next day, deep convection gradually increased and began showing signs of organization while the low moved westward at 5 to 10 kt. The convection continued to increase early on 4 November, and it is estimated that a tropical depression formed by 0600 UTC that day about 200 n mi west of the coast of Costa Rica. Despite warm sea-surface temperatures, the depression failed to strengthen during the next couple of days, possibly due to mid-level shear and dry air entrainment, while it gradually accelerated westward away from land at low latitude ($< 10^{\circ}\text{N}$). Convection then increased in coverage and intensity between 6–7 November within conducive environmental conditions of weak (< 10 kt) deep-layer vertical wind shear, warm sea-surface temperatures, and a relatively moist mid-level environment. This resulted in the depression strengthening into Tropical Storm Terry by 1200 UTC 7 November, when it was centered about 520 n mi south of Acapulco, Mexico. Scatterometer wind data confirmed the presence of tropical-storm-force winds later that morning. The “best track” chart of Terry’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.

Terry turned toward the west-northwest late on 7 November as it neared the western periphery of a mid-level ridge centered over Mexico. The convective structure degraded once again early on 8 November, and scatterometer data indicated that Terry weakened to a tropical depression by 1200 UTC that day. The depression changed little in organization and maintained its intensity during the next day or two. The system’s structure started to degrade early on 10 November as Terry moved into increasingly unfavorable conditions consisting of stronger south-southwesterly vertical wind shear and drier mid-level air. Outflow from the remnants of Tropical Storm Sandra, which dissipated on 9 November about 600 n mi west-northwest of Terry, may have also played a role in increasing the vertical wind shear over Terry. Scatterometer wind data early on 10 November indicated that Terry degenerated into a trough of low pressure shortly after 1200 UTC when it was located about 770 n mi south-southwest of the southern tip of the Baja California peninsula.

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.

METEOROLOGICAL STATISTICS

Observations in Terry (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), objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison (CIMSS). Data and imagery from NOAA polar-orbiting 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 Terry.

Terry's peak intensity of 35 kt from 1200 UTC 7 November to 0600 UTC 8 November is based on a blend of ASCAT data and subjective and objective Dvorak estimates. Some of the satellite data suggested a slightly higher peak, with ADT estimates reaching 49 kt and peak subjective Dvorak estimates of 45 and 35 kt from TAFB and SAB, respectively. An ASCAT pass from 1411 UTC 7 November revealed a few vectors in the 35–40 kt range in Terry's southeastern quadrant. However, some of the higher vectors were flagged due to rain contamination, and the highest reliable winds on this pass appear to be around 35 kt. Therefore, the peak intensity is set to 35 kt based largely on the scatterometer data.

There were no ship or buoy reports of tropical-storm-force winds associated with Terry.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis of Terry was not well forecast as the tropical cyclone formed sooner than anticipated. Table 2 provides the number of hours in advance of formation associated with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. The disturbance that became Terry was first mentioned in the TWO with a low chance (<40%) of formation during the next 5 days only 54 h prior to genesis. The 5-day probabilities reached the medium (40–60%) and high categories (>60%) 30 h and 18 h prior to when Terry formed, respectively. Regarding the 2-day genesis probabilities, a low chance of genesis was shown 36 h, medium chance 18 h, and high chance 12 h before Terry developed.

A verification of NHC official track forecasts for Terry is given in Table 3a. The official forecast (OFCL) mean errors were below their 5-yr means at 12 and 24 h, but above the means at 36 h and beyond. The OCD5 errors were greater than their 5-yr means at all forecast times, indicating that Terry's track was more difficult to predict than average. A homogeneous



comparison of the official track errors with selected guidance models is given in Table 3b. The OFCL track forecasts performed fairly well relative to the guidance, but were outperformed at most forecast times by the consensus aids HCCA, TVCX, TVDG, and TVCE. Among the individual models, EMXI was a strong performer for the shorter lead times, and CMCI was the best model at the longer forecast times.

A verification of NHC official intensity forecasts for Terry is given in Table 4a. The official NHC intensity forecast errors were well below the 5-yr means from 12 to 72 h, near the mean at 96 h, and well above the mean at 120 h. The OCD5 errors were above their 5-yr means at all forecast times, indicating that Terry's intensity was more difficult to predict than average. NHC's intensity forecasts had a high bias for Terry, as several of the early forecasts predicted that the system would become a stronger tropical storm than what occurred. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The regional hurricane models HWFI, HMNI, and CTCI performed poorly for Terry, with all of those models exhibiting a significant high bias. The best intensity models for Terry were LGEM, GFSI, and EMXI. In particular, GFSI and EMXI outperformed OFCL at all times, correctly indicating that Terry would not intensify much during its lifespan.

There were no coastal watches or warnings associated with Tropical Storm Terry.



Table 1. Best track for Tropical Storm Terry, 4–10 November 2021.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
02 / 1800	8.8	84.9	1009	20	low
03 / 0000	8.6	85.4	1008	25	"
03 / 0600	8.6	86.0	1007	25	"
03 / 1200	8.7	86.6	1007	25	"
03 / 1800	8.7	87.4	1007	30	"
04 / 0000	8.7	88.3	1007	30	"
04 / 0600	9.0	89.0	1007	30	tropical depression
04 / 1200	9.2	89.7	1007	30	"
04 / 1800	9.5	90.3	1007	30	"
05 / 0000	9.7	90.8	1007	25	"
05 / 0600	9.7	91.4	1007	25	"
05 / 1200	9.5	92.0	1007	25	"
05 / 1800	9.2	92.9	1008	25	"
06 / 0000	8.9	93.9	1008	25	"
06 / 0600	8.7	94.9	1007	30	"
06 / 1200	8.5	96.0	1007	30	"
06 / 1800	8.3	97.1	1007	30	"
07 / 0000	8.2	98.4	1007	30	"
07 / 0600	8.2	99.7	1007	30	"
07 / 1200	8.2	100.9	1006	35	tropical storm
07 / 1800	8.5	102.2	1006	35	"
08 / 0000	9.0	103.4	1006	35	"



Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
08 / 0600	9.5	104.6	1006	35	"
08 / 1200	9.9	106.0	1007	30	tropical depression
08 / 1800	10.3	107.4	1007	30	"
09 / 0000	10.7	108.7	1007	30	"
09 / 0600	11.1	109.9	1007	30	"
09 / 1200	11.4	111.1	1008	25	"
09 / 1800	11.6	112.3	1008	25	"
10 / 0000	11.8	113.6	1008	25	"
10 / 0600	11.8	114.9	1008	25	"
10 / 1200	11.7	116.4	1008	25	"
10 / 1800					dissipated
07 / 1800	8.5	102.2	1006	35	maximum wind and minimum pressure

Table 2. Number of hours in advance of formation of Terry 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%)	36	54
Medium (40%-60%)	18	30
High (>60%)	12	18

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Terry, 4–10 November 2021. 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	60	72	96	120
OFCL	17.4	31.4	49.6	69.7	87.0	94.2	108.0	142.2
OCD5	37.1	84.9	143.7	232.9	301.4	376.1	642.5	851.9
Forecasts	23	21	19	17	15	13	9	5
OFCL (2016-20)	21.3	33.1	44.0	54.6	65.3	76.0	95.9	116.6
OCD5 (2016-20)	33.1	69.4	107.8	147.0	183.4	219.7	280.2	342.0



Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Terry, 4–10 November 2021. 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	60	72	96	120
OFCL	17.9	31.6	49.5	69.9	86.8	95.2	103.2	142.6
OCD5	35.8	81.0	135.3	221.0	283.3	356.5	630.2	860.3
GFSI	23.0	41.4	61.4	91.0	119.2	148.8	174.2	225.5
HWFI	29.5	51.4	72.2	89.9	95.1	94.3	92.6	168.0
HMNI	22.2	46.0	74.5	104.4	126.7	141.5	154.3	132.6
EGRI	25.7	48.9	74.0	98.7	115.8	126.8	148.1	201.8
CMCI	22.2	42.5	60.5	78.3	83.4	92.6	86.4	54.5
EMXI	14.8	24.8	37.2	51.9	79.5	109.2	131.6	117.0
NVGI	22.3	31.6	55.0	74.7	81.2	97.1	75.5	113.6
CTCI	20.9	36.4	55.5	75.5	88.2	92.3	120.6	124.0
AEMI	24.9	44.8	62.7	81.8	95.4	101.1	118.2	183.3
HCCA	18.8	30.4	39.9	56.0	65.0	73.1	78.8	124.4
TVCE	18.5	31.2	47.2	65.7	80.8	86.2	87.9	99.7
TVDG	18.8	30.1	45.3	62.0	75.1	83.7	93.2	125.6
TVCX	17.5	29.2	42.3	58.6	72.3	79.1	86.1	106.1
GFEX	16.4	24.3	38.5	62.3	84.7	103.4	116.0	130.9
TABS	20.4	32.9	44.0	63.4	84.1	105.2	149.9	204.9
TABM	31.1	67.3	105.4	152.9	199.0	232.2	255.6	273.2
TABD	37.8	84.2	137.1	195.2	255.9	307.3	379.1	416.0
Forecasts	20	19	17	15	13	11	7	3

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Terry, 4–10 November 2021. 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	60	72	96	120
OFCL	3.5	4.8	4.5	5.6	6.3	9.2	18.9	30.0
OCD5	8.1	19.2	30.8	45.8	36.8	37.9	41.1	26.8
Forecasts	23	21	19	17	15	13	9	5
OFCL (2016-20)	5.6	9.0	10.9	12.6	14.0	15.3	16.0	16.7
OCD5 (2016-20)	7.2	12.0	15.3	17.6	19.0	20.4	21.2	20.8

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Terry, 4–10 November 2021. 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	60	72	96	120
OFCL	3.6	4.5	4.4	5.3	6.1	9.2	18.8	30.0
OCD5	8.1	18.9	30.6	45.6	37.0	38.5	45.1	32.8
HWFI	5.3	6.1	8.2	12.2	17.1	23.0	46.5	44.5
HMNI	5.6	7.1	9.5	12.9	18.9	22.6	33.8	53.0
CTCI	5.8	6.9	9.2	10.8	11.9	13.8	23.8	35.5
DSHP	4.5	4.3	5.7	8.0	10.7	15.2	25.4	29.0
LGEM	4.5	4.1	5.4	6.8	7.6	8.3	6.9	6.2
HCCA	5.1	6.8	8.4	9.8	13.9	16.0	20.2	21.8
IVCN	4.8	4.8	6.2	7.6	10.6	14.0	24.9	33.0
GFSI	3.4	3.7	4.1	3.5	2.4	2.0	8.6	18.8
EMXI	2.9	2.2	2.8	3.0	3.2	4.1	2.5	2.0
Forecasts	21	20	18	16	14	12	8	4

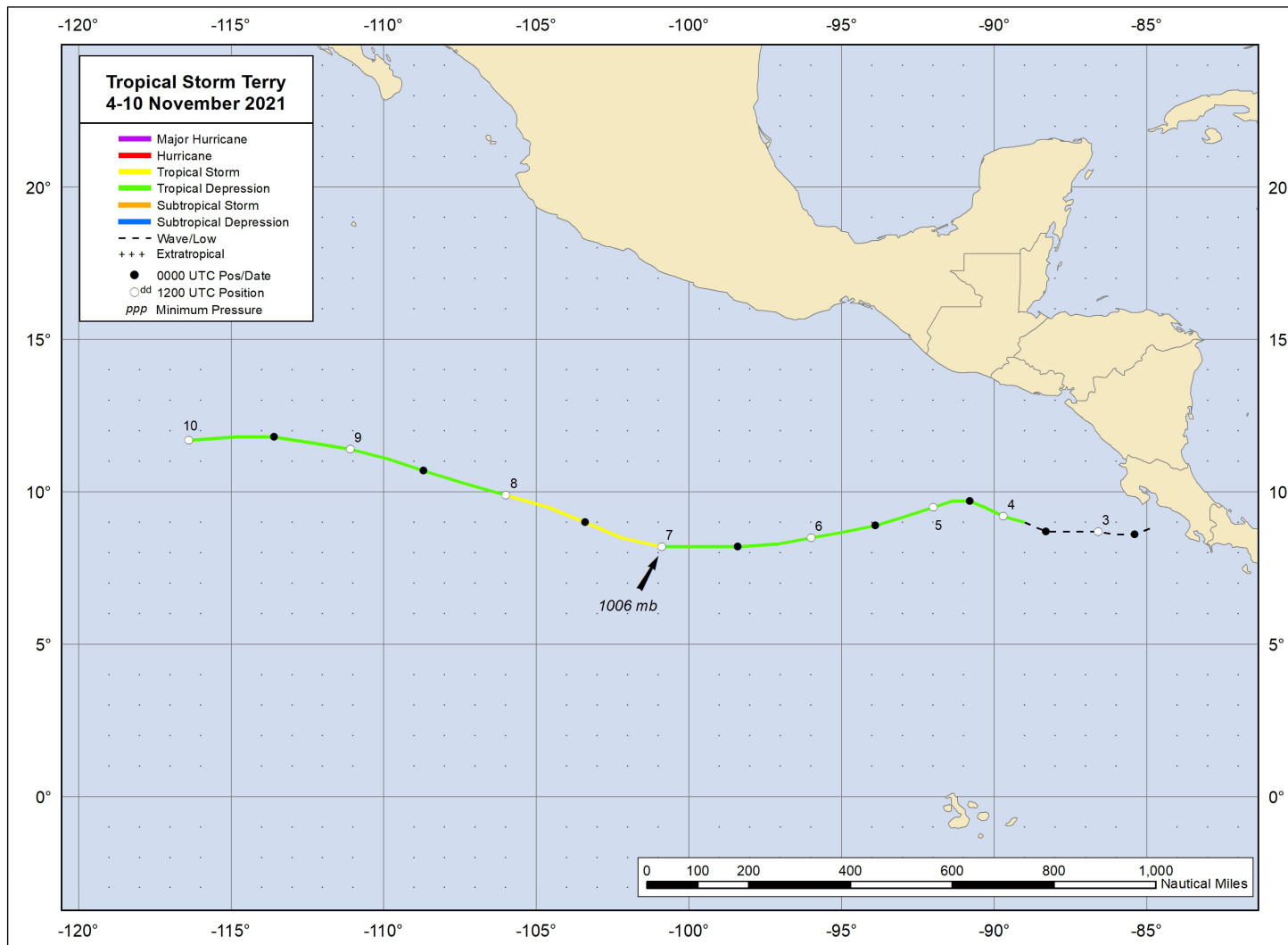


Figure 1. Best track positions for Tropical Storm Terry, 4–10 November 2021.

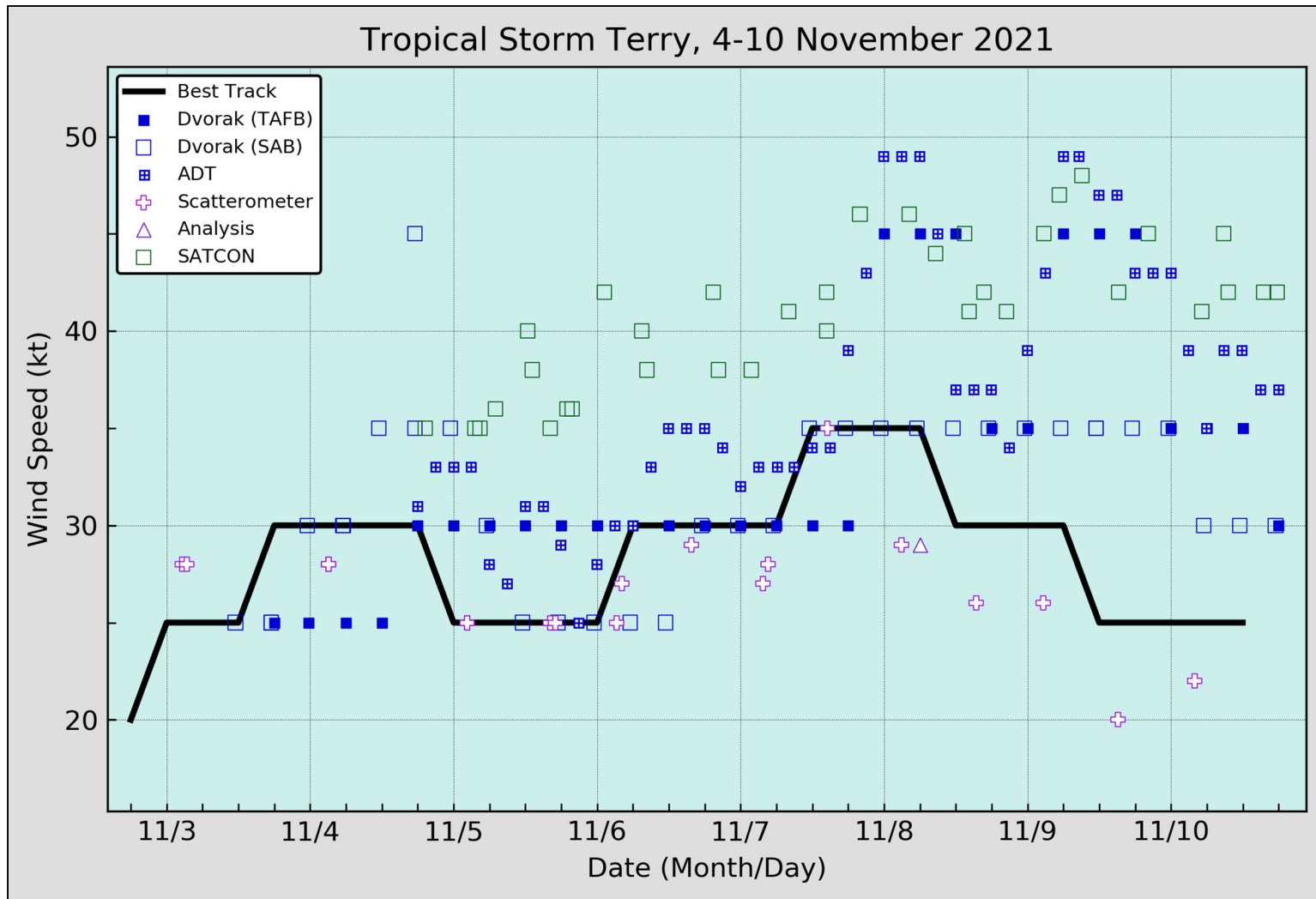


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Terry, 4–10 November 2021. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

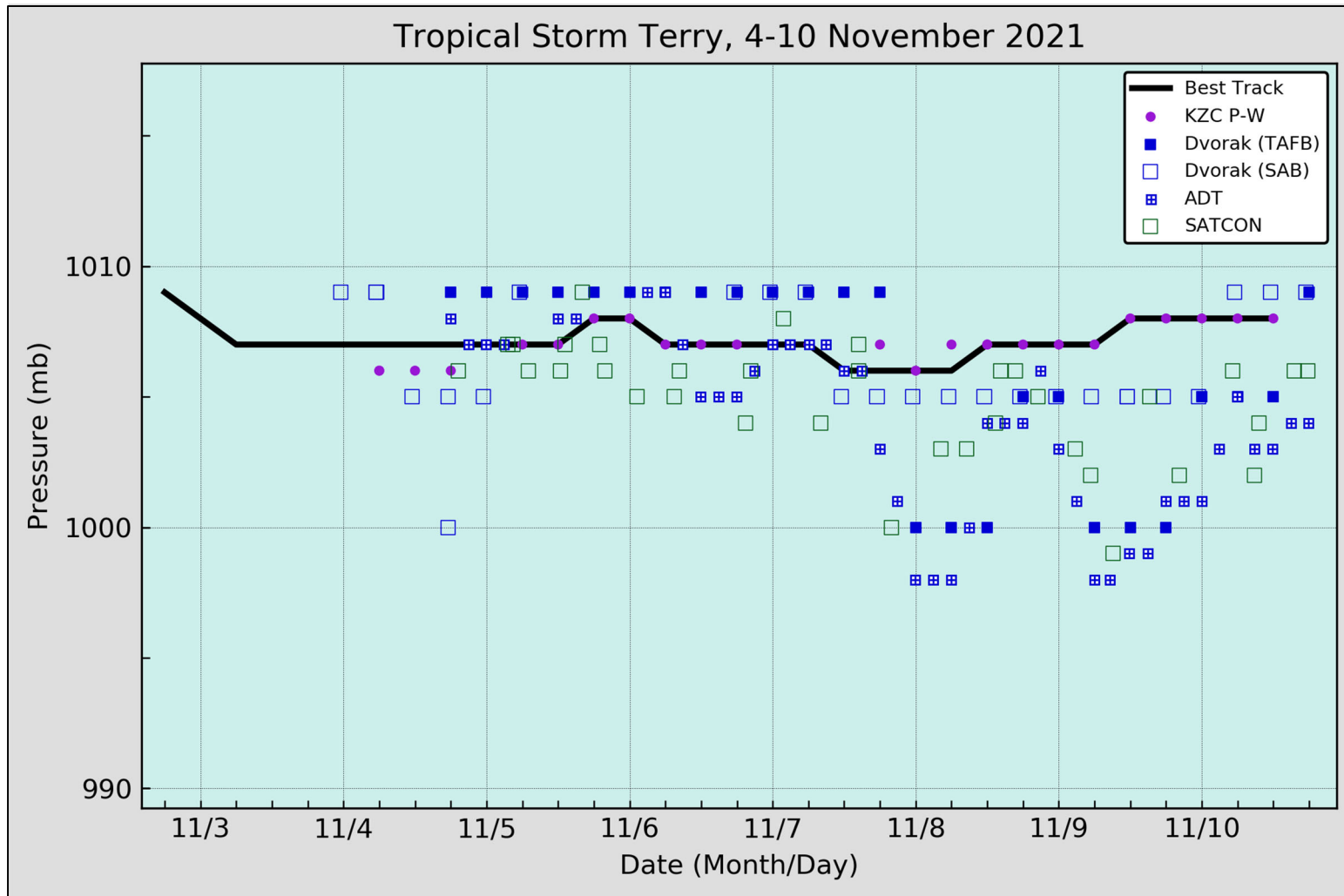


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Terry, 4–10 November 2021. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.