

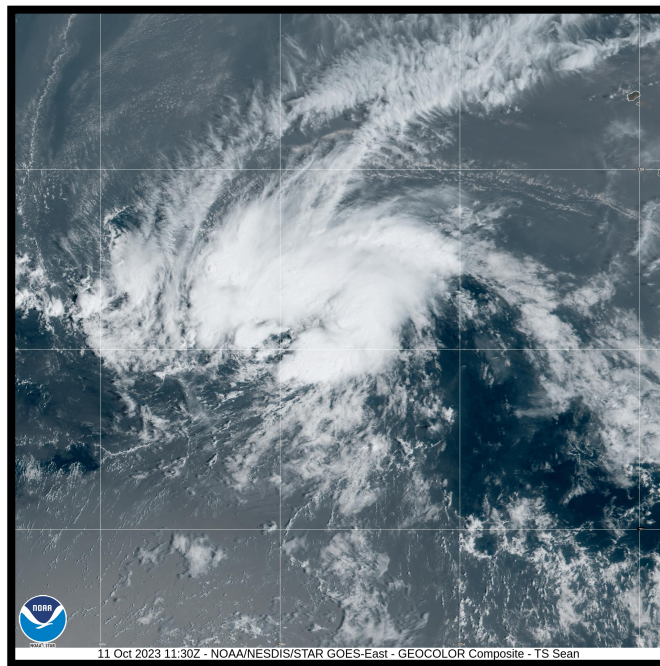


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

TROPICAL STORM SEAN (AL192023)

10–15 October 2023

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National Hurricane Center
21 February 2024



GOES-16 GEOCOLOR IMAGE OF TROPICAL STORM SEAN AT 1130 UTC 11 OCTOBER 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR.

Sean was a tropical storm that remained over the tropical Atlantic Ocean and did not affect land.

¹ This is an abbreviated Tropical Cyclone Report since there were no coastal watches or warnings issued and no direct fatalities reported in association with Sean.

Tropical Storm Sean

10–15 OCTOBER 2023

BEST TRACK

The “best track²” positions and intensities for Tropical Storm Sean are listed in Table 1. The best track chart of Sean’s path is given in Fig. 1, with the wind and pressure histories along with available observations³ shown in Figs. 2 and 3, respectively.

There were no ship or land-based reports of winds of tropical storm force associated with Sean.

Origin

Sean developed from a low-latitude tropical wave that moved off the west coast of Africa on 5 October. The tropical wave was located within a marginally conducive environment, with dry air and vertical wind shear initially hindering development as it moved westward across the tropical Atlantic. On 9–10 October, environmental conditions improved, and showers and thunderstorms became better organized. The system became a tropical depression at 1800 UTC 10 October.

Peak Intensity and Minimum Pressure

Sean was an asymmetric and sheared tropical cyclone for most of its lifetime. Tropical-storm-force winds were confined to the northern semicircle as the system encountered dry air and vertical wind shear throughout its time as a tropical cyclone. Sean’s estimated peak intensity of 40 kt is primarily based on ASCAT satellite wind data, as well as a blend of subjective satellite-based Dvorak estimates from TAFB and SAB.

The estimated minimum central pressure of Sean of 1005 mb is based on the Knaff-Zehr-Courtney pressure-wind relationship.

² 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*k directory, while previous years’ data are located in the *archive* directory.

³ Observations 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. 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 Sean.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING VERIFICATION

Table 2 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Sean. Sean's genesis location occurred within all potential formation areas depicted by NHC. The lead time for genesis was well forecast, with the system first introduced in the TWO 138 h before formation, and the 48-h probability reached the high category 24 h before the time of genesis.

A verification of NHC official track forecasts for Sean is given in Table 3a. Official track forecast errors were higher than the mean official errors for the previous 5-yr period for the 12-h through 60-h forecast times but lower for the 72-h through 96-h forecasts. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b.

A verification of NHC official intensity forecasts for Sean is given in Table 4a. Official intensity forecast errors were lower than the mean official errors for the previous 5-yr period at all forecast times. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b.

There were no coastal watches or warnings issued for Sean.

Table 1. Best track for Tropical Storm Sean, 10–15 October 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 1800	9.6	30.2	1007	30	tropical depression
11 / 0000	9.8	31.4	1006	35	tropical storm
11 / 0600	10.1	32.6	1006	35	"
11 / 1200	10.7	33.7	1006	35	"
11 / 1800	11.3	34.7	1007	30	tropical depression
12 / 0000	11.8	35.6	1007	30	"
12 / 0600	12.3	36.4	1007	30	"
12 / 1200	12.8	37.1	1006	35	tropical storm
12 / 1800	13.3	37.8	1005	40	"
13 / 0000	13.7	39.0	1005	40	"
13 / 0600	14.0	40.1	1005	40	"
13 / 1200	14.3	41.2	1006	35	"
13 / 1800	14.6	42.2	1006	35	"
14 / 0000	14.9	42.7	1006	35	"
14 / 0600	15.3	43.3	1007	30	tropical depression
14 / 1200	15.8	43.9	1007	30	"
14 / 1800	16.3	44.5	1007	30	"
15 / 0000	16.8	45.1	1008	30	"
15 / 0600	17.3	45.8	1009	30	"
15 / 1200	17.6	46.6	1010	25	low
15 / 1800	17.9	47.6	1010	25	"
16 / 0000	18.1	48.6	1011	25	"



Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
16 / 0600	18.2	49.8	1011	25	"
16 / 1200	18.3	51.0	1011	20	"
16 / 1800	18.4	52.2	1011	20	"
17 / 0000					dissipated
12 / 1800	13.3	37.8	1005	40	maximum winds and minimum pressure



Table 2. 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	168-Hour Outlook
Low (<40%)	96	138
Medium (40%-60%)	48	108
High (>60%)	24	84



Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Sean, 10–15 October 2023. 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	29.0	52.1	67.7	79.9	82.9	72.1	93.7	
OCD5	34.1	73.1	103.7	107.3	107.9	128.1	263.9	
Forecasts	16	14	12	10	8	6	2	
OFCL (2018-22)	23.8	35.7	47.8	61.4	76.1	90.5	125.7	172.1
OCD5 (2018-22)	46.4	99.2	157.4	215.0	254.9	321.2	405.1	486.6



Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Sean, 10–15 October 2023. 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	29.0	52.1	67.7	79.9	82.9	72.4	93.7	
OCD5	34.1	73.1	103.7	107.3	107.9	139.3	263.9	
GFSI	31.4	61.6	94.3	124.5	137.4	154.5	193.5	
HWFI	29.0	55.3	74.5	88.1	113.1	175.2	243.9	
HMNI	34.6	54.9	75.8	94.4	102.2	107.0	181.0	
HFAI	32.1	51.6	58.2	70.6	73.3	84.6	131.8	
HFBI	35.5	60.5	72.2	83.0	89.6	102.8	152.2	
EGRI	33.6	58.3	72.2	82.3	89.7	95.3	77.0	
EMXI	31.6	54.1	71.7	85.4	93.2	94.6	51.3	
NVGI	30.3	52.7	73.5	100.0	128.8	138.5	175.7	
CMCI	28.1	46.4	60.2	72.1	83.7	81.2	134.8	
TVCA	28.9	50.8	65.5	79.8	83.2	82.3	116.0	
TVCX	28.8	50.3	65.5	79.0	83.5	82.4	111.3	
GFEX	27.9	46.9	68.4	92.0	101.8	88.3	80.4	
TVDG	30.5	51.2	66.5	81.7	86.2	84.4	109.2	
HCCA	29.6	51.8	65.6	77.4	74.2	55.0	62.3	
AEMI	28.2	52.7	80.7	107.9	120.0	130.8	195.0	
TABS	30.3	63.7	94.6	127.0	141.6	172.0	263.2	
TABM	34.2	66.7	99.5	144.9	193.3	240.8	335.3	
TABD	37.7	87.9	149.4	217.8	285.7	322.7	359.7	
Forecasts	16	14	12	10	8	5	2	



Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Sean, 10–15 October 2023. 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	3.4	3.6	2.9	1.5	4.4	5.0	5.0	
OCD5	5.2	9.6	10.4	14.3	16.0	19.2	28.5	
Forecasts	16	14	12	10	8	6	2	
OFCL (2018-22)	5.1	7.6	8.9	10.1	10.7	11.5	13.3	15.5
OCD5 (2018-22)	6.8	10.7	13.9	16.5	18.3	20.2	22.9	23.4



Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Sean, 10–15 October 2023. 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	3.4	3.6	2.9	1.5	4.4	5.0	5.0	
OCD5	5.2	9.6	10.4	14.3	16.0	21.0	28.5	
HWFI	4.6	3.6	3.3	4.3	3.1	4.2	7.0	
HMNI	4.3	3.6	2.7	2.4	2.8	1.4	3.5	
HFAI	4.3	2.7	2.5	4.9	8.1	9.2	21.0	
HFBI	4.8	4.6	4.8	4.9	7.1	6.4	8.0	
DSHP	4.9	6.1	5.2	3.6	2.2	5.6	10.0	
LGEM	5.2	6.0	6.4	7.3	6.2	5.6	3.0	
ICON	4.6	4.6	3.6	3.5	2.2	2.6	3.5	
IVCN	4.2	4.1	2.5	1.8	2.8	3.8	10.5	
IVDR	4.4	3.8	2.4	1.8	3.0	3.6	10.0	
GFSI	5.4	5.8	7.2	8.7	9.9	9.6	10.5	
EMXI	4.0	3.4	4.9	5.4	5.6	5.2	10.5	
HCCA	4.6	3.4	2.7	2.4	3.8	3.6	8.0	
Forecasts	16	14	12	10	8	5	2	

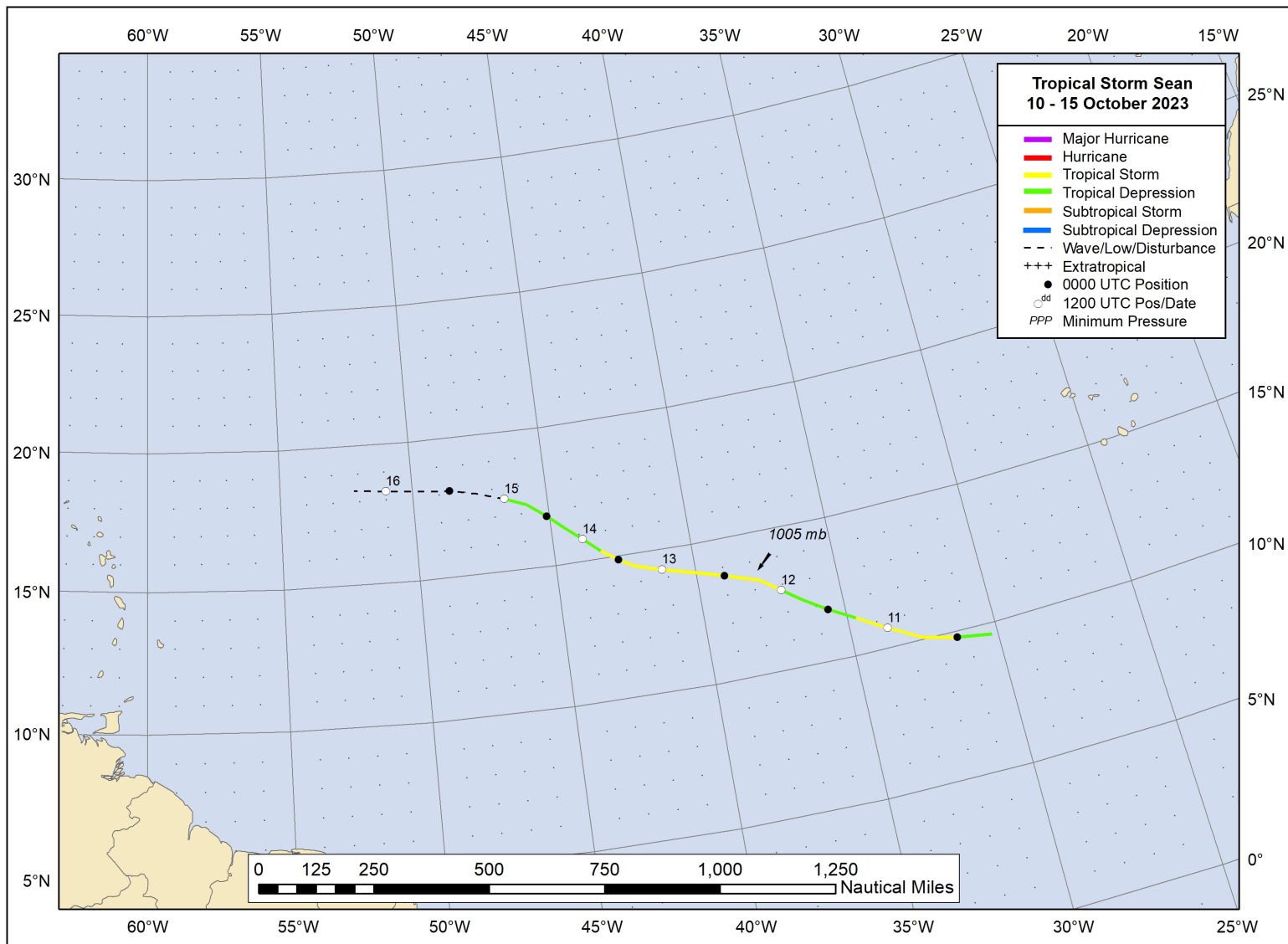


Figure 1. Best track positions for Tropical Storm Sean, 10–15 October 2023.

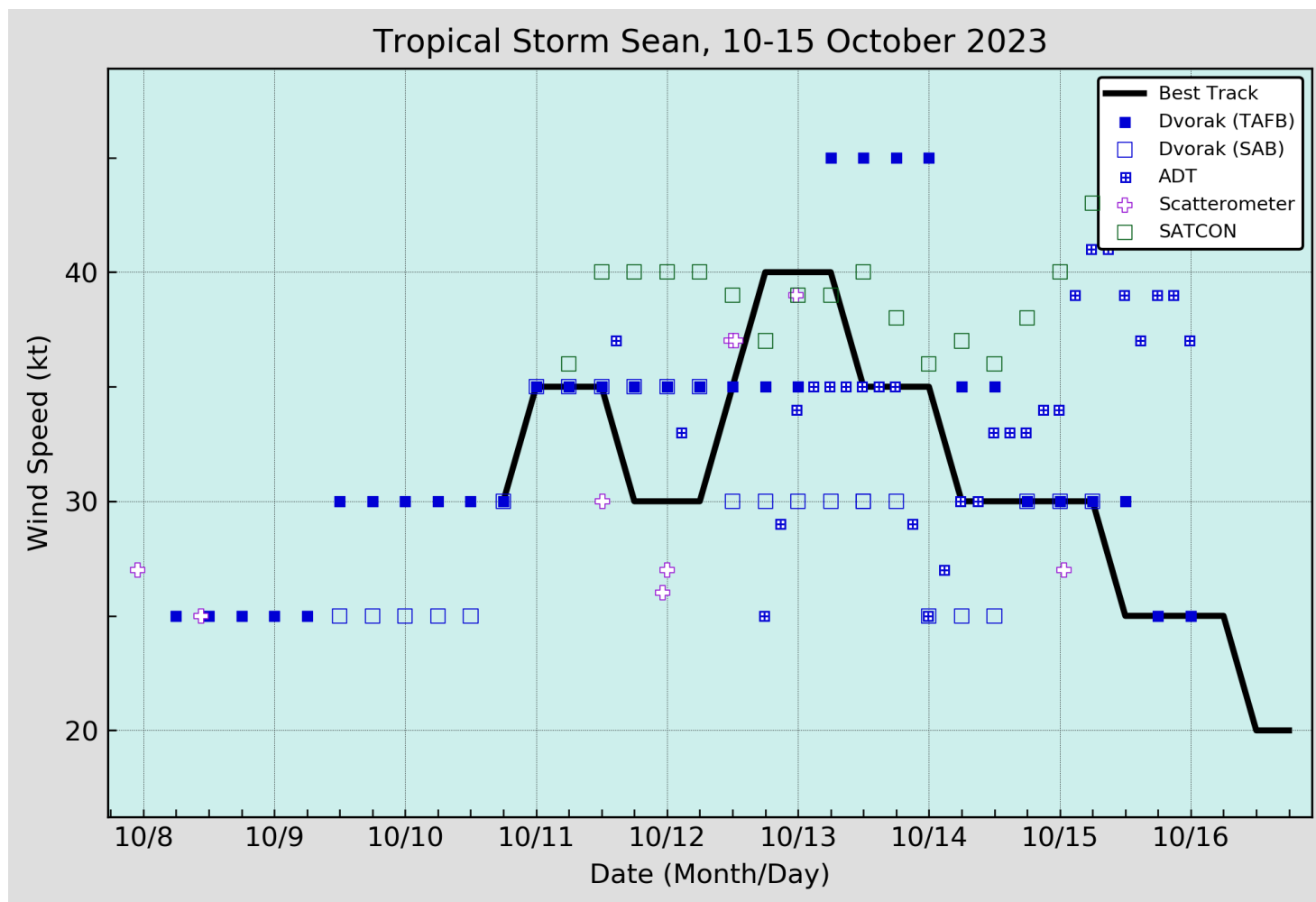


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Sean, 10–15 October 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

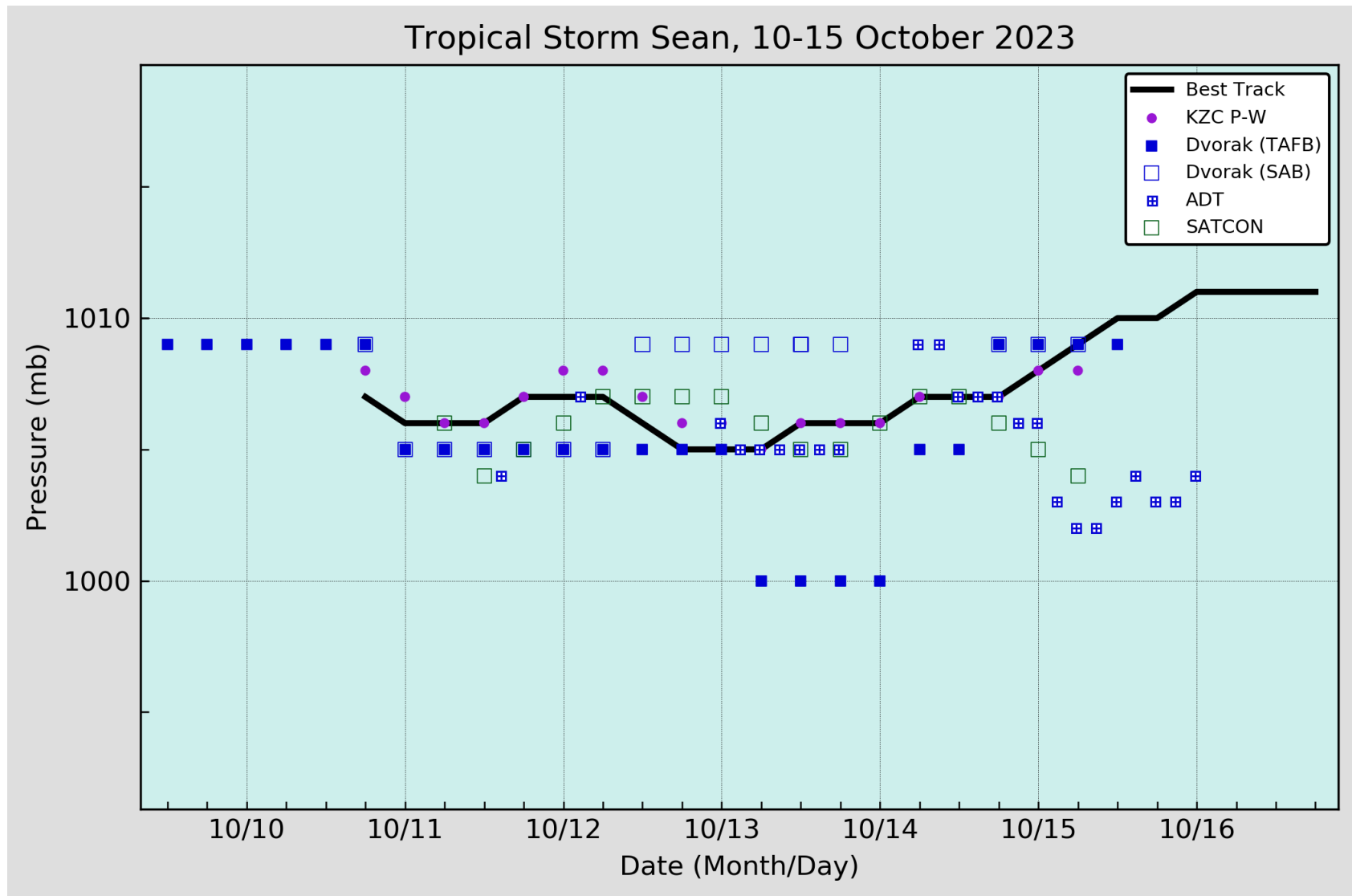


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Sean, 10–15 October 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

Sean 7-day Tropical Weather Outlook Areas

From: 0000 UTC 5 Oct 2023 to 1800 UTC 10 Oct 2023

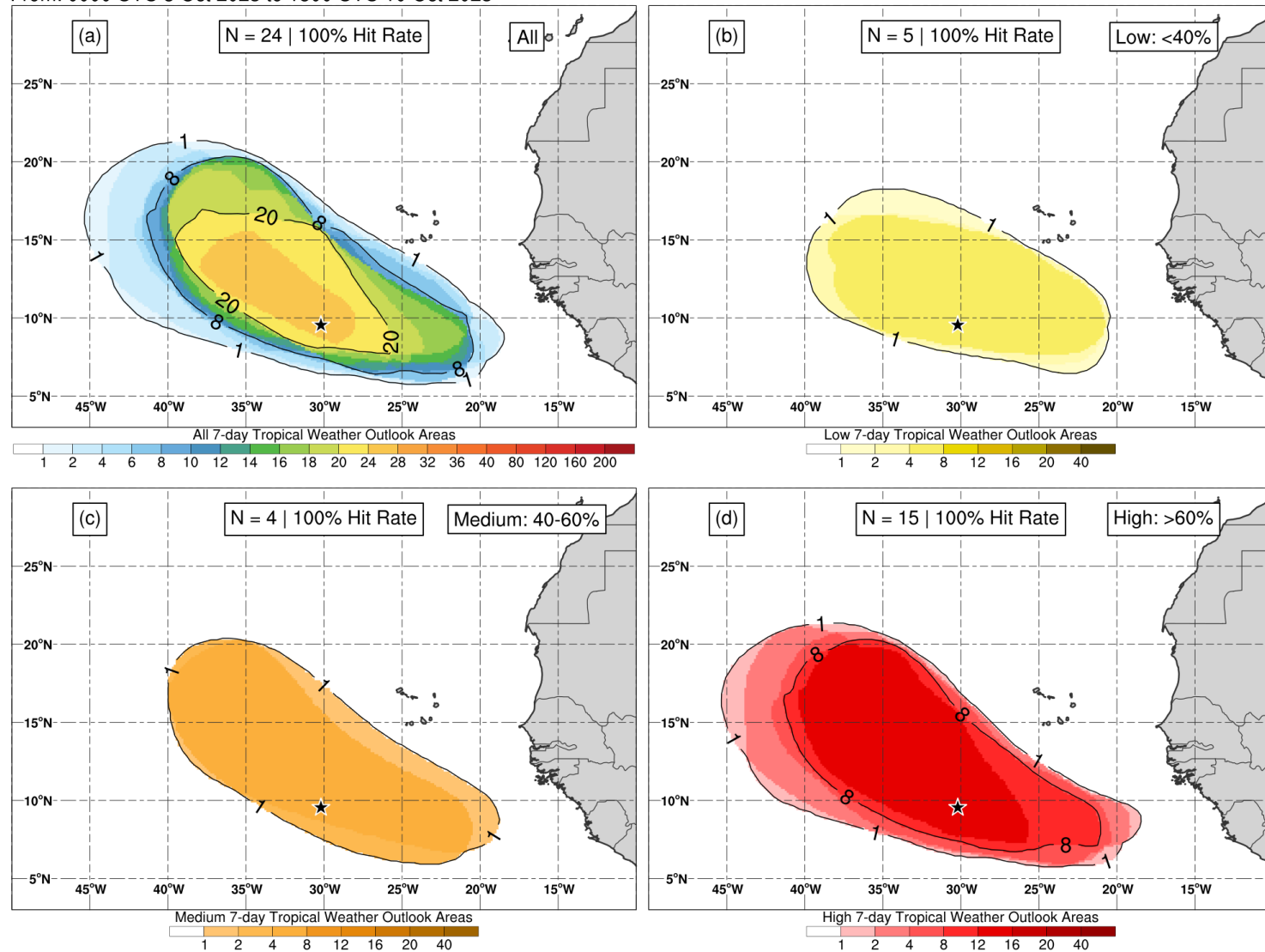


Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Tropical Storm Sean for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.