

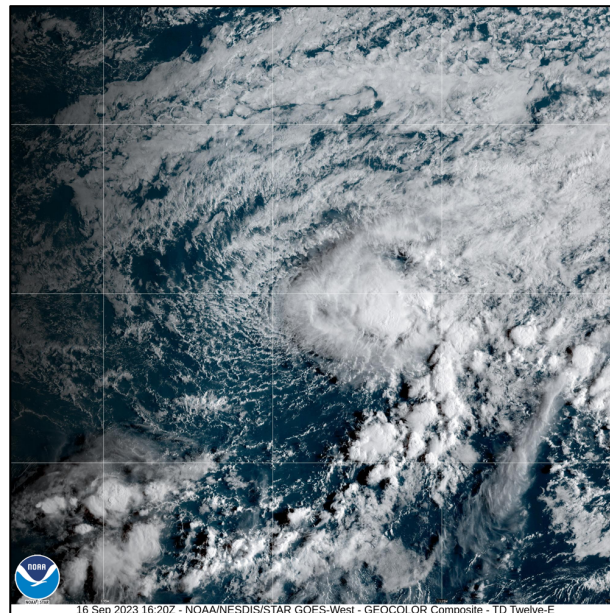


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

TROPICAL DEPRESSION TWELVE-E (EP122023)

15–18 September 2023

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GOES-18 GEOCOLOR IMAGE OF TROPICAL DEPRESSION TWELVE-E AT 1620 UTC 16 SEPTEMBER 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR

Tropical Depression Twelve-E developed over the far western portion of the eastern Pacific basin and moved into the central Pacific basin as a tropical cyclone. The depression became a remnant low well southeast of the Big Island of Hawaii.

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 Tropical Depression Twelve-E.

Tropical Depression Twelve-E

15–18 SEPTEMBER 2023

BEST TRACK

The “best track²” positions and intensities for Tropical Depression Twelve-E are listed in Table 1. The best track chart of Tropical Depression Twelve-E’s path is given in Fig. 1, with the wind and pressure histories along with available observations³ shown in Figs. 2 and 3, respectively. Operationally, the depression was shown to have degenerated into a remnant low shortly after entering the central Pacific basin. The system however, produced a burst of deep convection around the typical overnight diurnal maximum, and in the post-analyzed best track it is shown to have remained a tropical cyclone for another 18 hours, through 0000 UTC 18 September.

Origin

The depression appears to have formed from a tropical wave that entered the eastern Pacific basin on 5 September. Although it is difficult to trace the tropical wave across the tropical Atlantic and Caribbean Sea, a Hovmöller diagram (not shown) suggests it departed the west coast of Africa on 26 August.

Peak Intensity and Minimum Pressure

The 30-kt peak intensity of Tropical Depression Twelve-E is based on subjective Dvorak satellite estimates of T2.0 (30 kt) from TAFB, and several scatterometer overpasses that revealed peak winds of around 30 kt (Fig. 2).

The estimated minimum central pressure of 1007 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 Twelve-E.

CASUALTY AND DAMAGE STATISTICS

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

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 Tropical Depression Twelve-E. The location of genesis was accurately forecast with the genesis occurring just outside only the first (low category) genesis area issued. All the other NHC genesis areas issued accurately encompassed the genesis location. The NHC Tropical Weather Outlook provided about three and a half days of lead time for the development of this system.

A verification of NHC official track forecasts for Tropical Depression Twelve-E is given in Table 3. Due to the relatively short duration of the tropical cyclone, there are a limited number of verifying forecasts. The official track forecast errors were higher than the mean official errors for the previous 5-yr period. The OCD5 errors were also much larger than their 5-year means, suggesting the track forecasts for the depression were more difficult than average.

A verification of NHC official intensity forecasts for Tropical Depression Twelve-E. is given in Table 4. Official intensity forecast errors were lower than the mean official errors for the previous 5-yr period, albeit for the small sample size.

Due to depression's brief existence as a tropical cyclone, no meaningful comparison of official forecasts and track and intensity model guidance can be made.



Table 1. Best track for Tropical Depression Twelve-E, 15–18 September.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 1200	15.0	135.3	1007	25	tropical depression
15 / 1800	15.0	135.8	1006	30	"
16 / 0000	14.7	136.4	1006	30	"
16 / 0600	14.6	137.2	1006	30	"
16 / 1200	14.5	138.1	1006	30	"
16 / 1800	14.3	139.2	1006	30	"
17 / 0000	13.8	140.3	1007	30	"
17 / 0600	13.5	141.4	1007	30	"
17 / 1200	13.4	142.7	1007	30	"
17 / 1800	13.2	144.0	1007	30	"
18 / 0000	12.8	145.3	1007	30	"
18 / 0600	12.3	146.5	1007	30	low
18 / 1200	11.9	147.8	1008	25	"
18 / 1800					dissipated
15 / 1800	15.0	135.8	1006	30	maximum wind 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%)	78	84
Medium (40%-60%)	66	78
High (>60%)	42	60



Table 3. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Depression Twelve-E, 15–18 September. 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	29.3	64.3	107.4	155.9				
OCD5	58.8	123.0	223.1	352.7				
Forecasts	5	5	4	2				
OFCL (2018-22)	22.1	34.0	45.4	56.0	70.9	78.7	100.5	117.8
OCD5 (2018-22)	36.7	73.4	114.0	156.9	193.2	244.5	317.0	376.0

Table 4. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Depression Twelve-E, 15–18 September. 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	4.0	6.0	7.5	5.0				
OCD5	3.2	4.0	2.8	2.0				
Forecasts	5	5	4	2				
OFCL (2018-22)	5.4	8.9	11.0	12.8	14.3	15.8	17.0	17.6
OCD5 (2018-22)	6.9	12.1	15.9	18.6	18.7	21.0	22.3	22.1

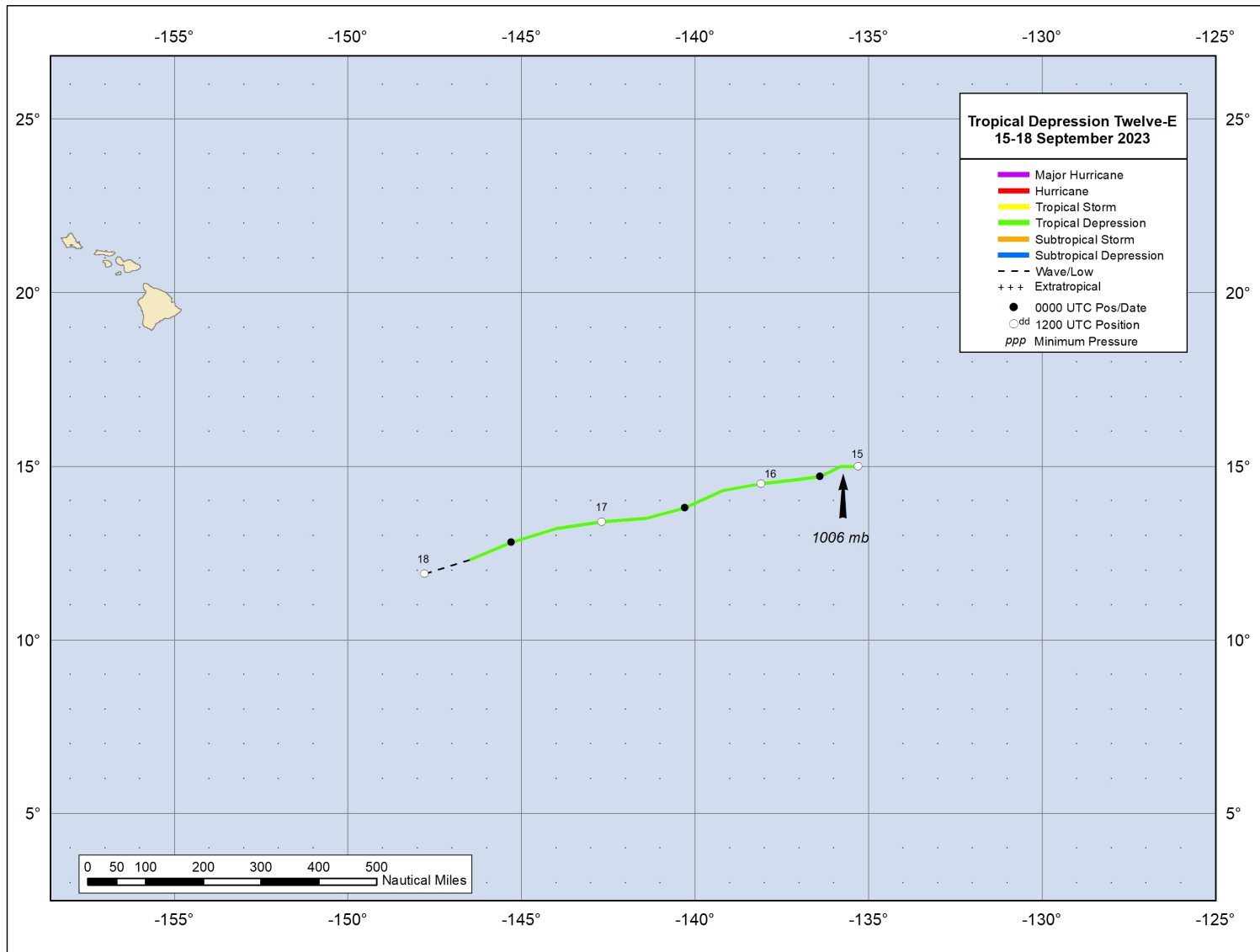


Figure 1. Best track positions for Tropical Depression Twelve-E, 15–18 September.

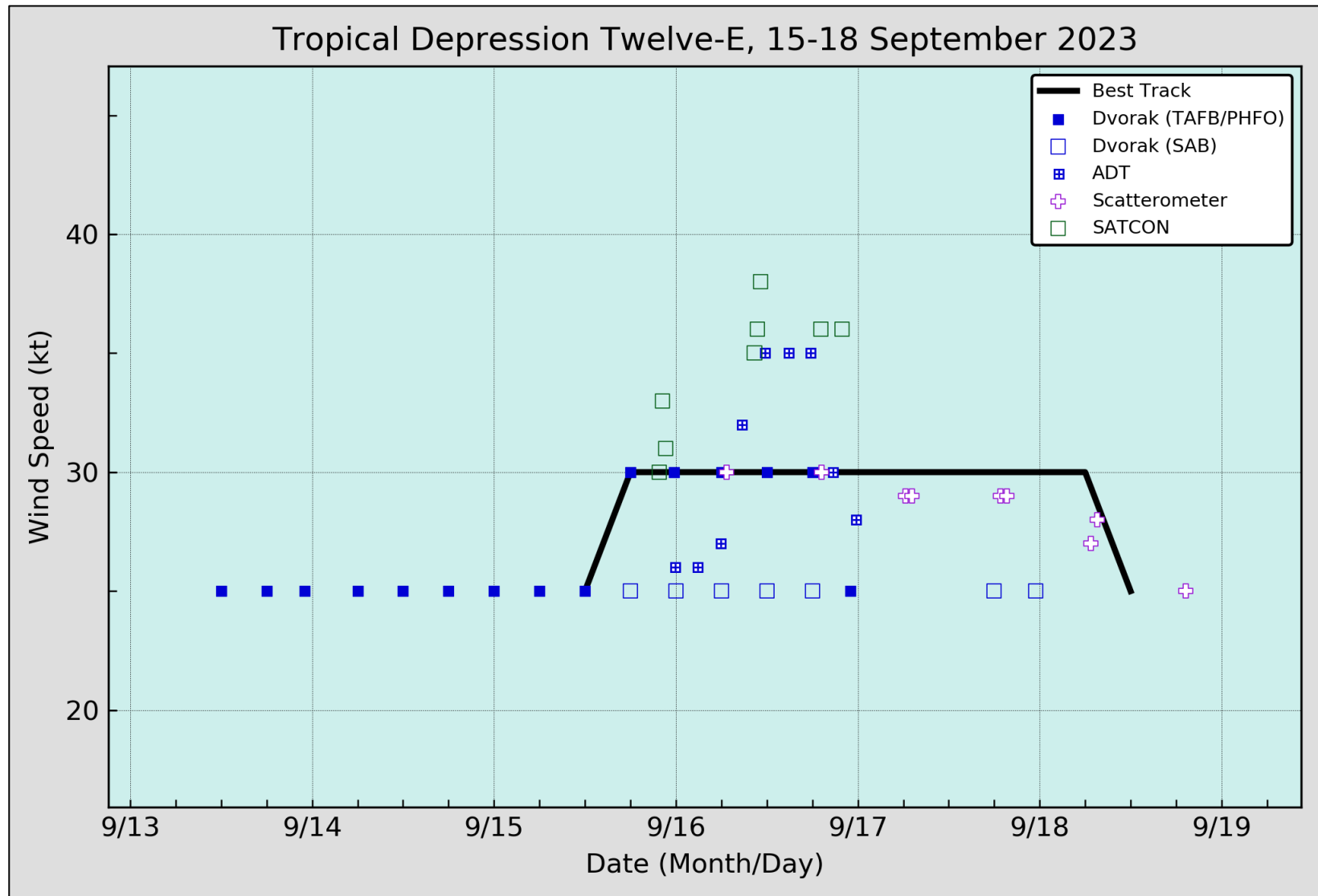


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Depression Twelve-E, 15–18 September. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

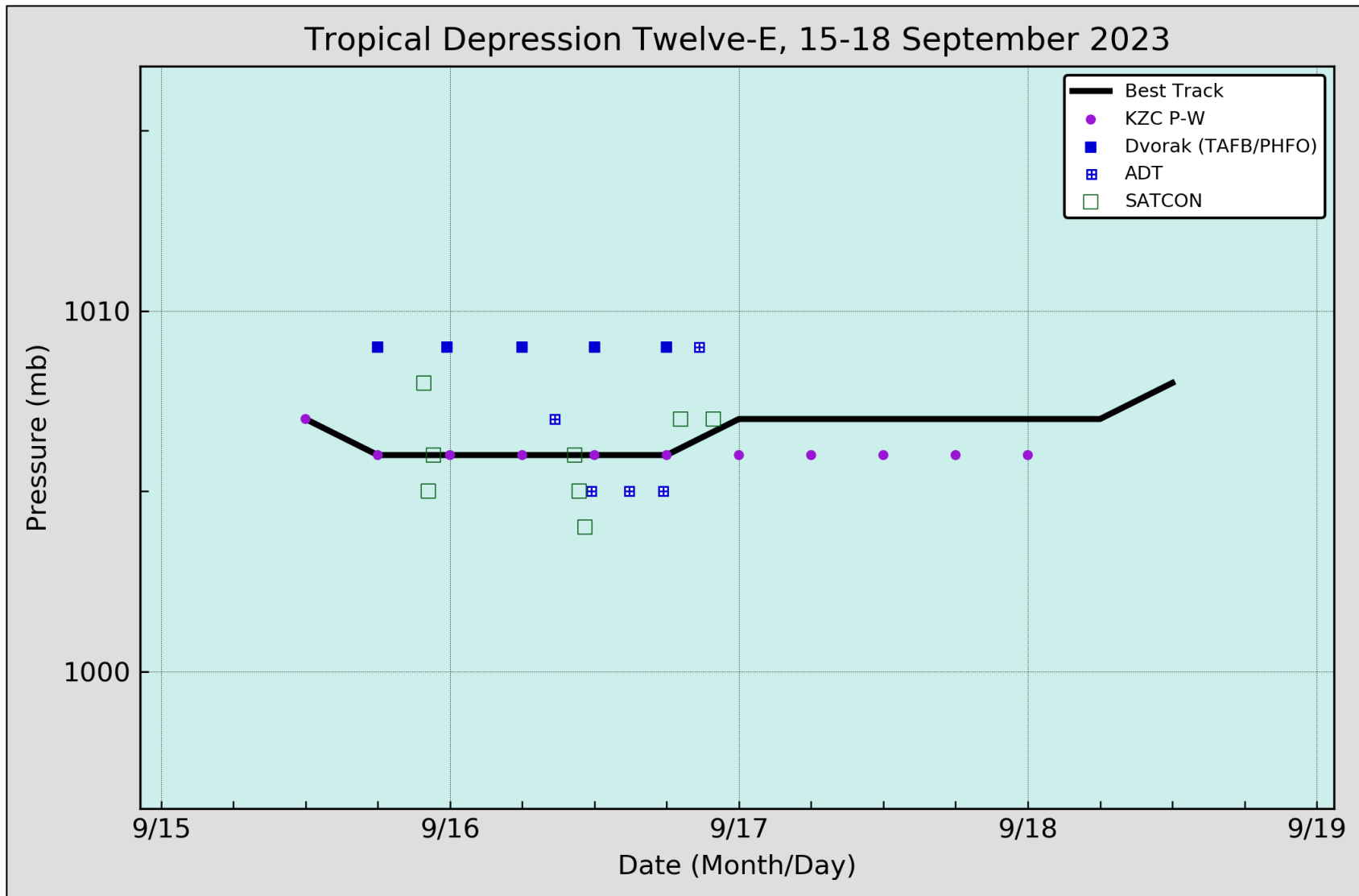


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Depression Twelve-E, 15–18 September. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute 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.

Twelve-E 7-day Tropical Weather Outlook Areas

From: 0000 UTC 12 Sep 2023 to 1200 UTC 15 Sep 2023

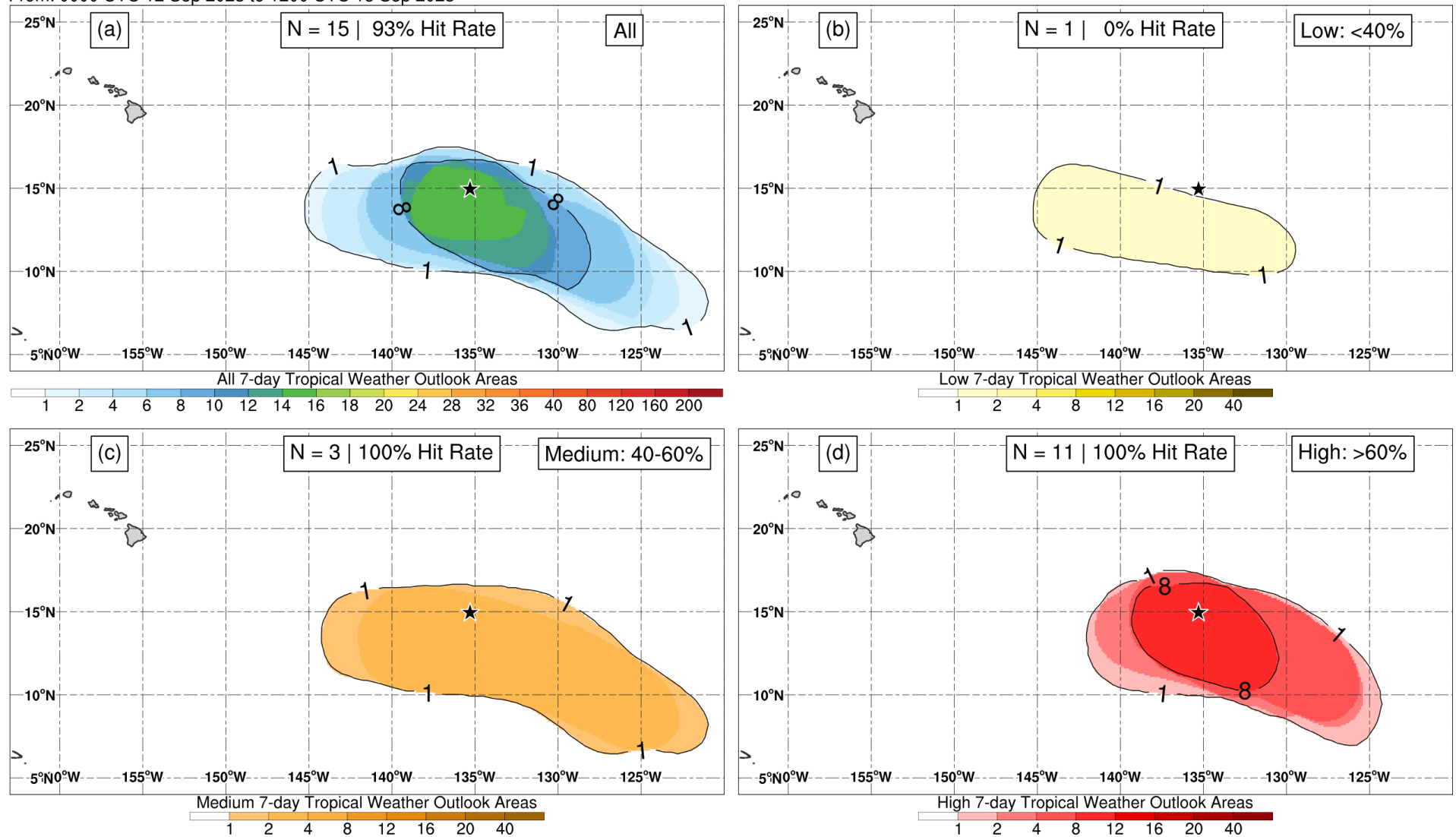


Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Tropical Depression Twelve-E for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location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