NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

TROPICAL STORM DANIEL

(EP042024)

3–5 August 2024

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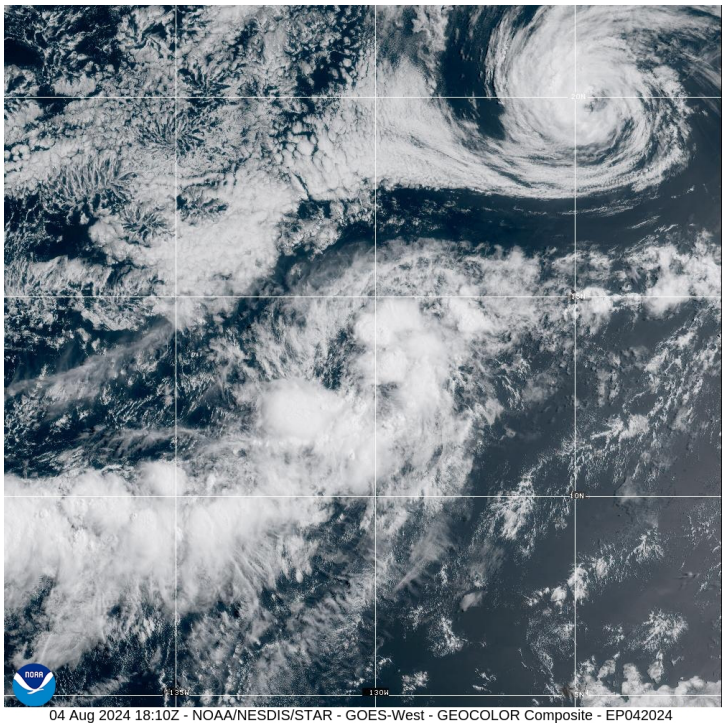
National Hurricane Center
8 January 2024



04 Aug 2024 18:10Z - NOAA/NESDIS/STAR - GOES-West - GEOCOLOR Composite - EP042024

GOES-WEST GEOCOLOR SATELLITE IMAGE OF TROPICAL STORM DANIEL AT 1810 UTC 4 AUGUST 2024. TROPICAL STORM CARLOTTA IS IN THE UPPER RIGHT PART OF THE IMAGE, COURTESY OF NOAA/NESDIS/STAR.

Daniel was a minimal and short-lived tropical storm that remained over the open waters of the eastern North Pacific.

[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 Daniel.

Tropical Storm Daniel

3–5 AUGUST 2024

BEST TRACK

The "best track[2]" positions and intensities for Tropical Storm Daniel are listed in Table 1. The best track chart of Daniel's path is given in Fig. 1, with the wind and pressure histories along with available observations[3] shown in Figs. 2 and 3, respectively. The cyclone moved slowly westward for a day or so, and then turned northward and northeastward while being steered by the flow associated with the larger circulation of Carlotta which passed to the north of Daniel. After becoming a minimal tropical storm, the system showed little change in strength for a couple of days, and microwave imagery indicated that the low-level circulation dissipated around 0000 UTC 6 August.

There were no ship reports received of winds of tropical storm force associated with Daniel.

Origin

Daniel formed from an impulse within a broad trough of low pressure that was located well to the southwest of the southern tip of Baja California during late July and early August. The system could not be easily tracked back to a tropical wave from the Atlantic basin. The persistent area of disturbed weather in this area gradually developed a low-level circulation, and is estimated to have become a tropical depression at 0000 UTC 3 August while centered about 1270 n mi west-southwest of the southern tip of Baja California. The cyclone strengthened into a 35-kt tropical storm about 6 h later.

Peak Intensity and Minimum Pressure

Daniel's peak intensity of 35 kt is supported by subjective Dvorak estimates from TAFB and SAB. Objective Dvorak estimates and scatterometer observations were generally within 5 kt

[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 *btk* 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 Daniel.

of this value. The scatterometer values of near 40 kt early on 3 August shown on Fig. 2 appear to be rain inflated.

The estimated minimum central pressure of 1005 mb is based on subjective Dvorak estimates from TAFB and SAB, and is estimated to have occurred around 1800 UTC 4 August when the storm's cloud pattern appeared to be the best organized. This estimate is also fairly close to those given by the Knaff-Zehr-Courtney pressure-wind relationship.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING VERIFICATION

Although the system that eventually developed into Daniel was mentioned fairly well in advance (nearly a week) in the NHC Tropical Weather Outlook (TWO), it was never considered very likely to form until around the actual time of genesis. Table 2 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. The 7-day formation probability was put into the medium category 78 h prior to genesis, but was set back to low 54 h before genesis. Neither the 2- nor 7-day formation probabilities reached the high category prior to the (post-analyzed) time of TC formation. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Daniel. The formation areas did correctly capture the observed location of TC genesis.

A verification of NHC official track forecasts for Daniel is given in Table 3a. Official track forecast errors were just a bit higher than the mean official errors for the previous 5-yr period. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. EMXI and HCCA were among the best performers for track prediction of this storm.

A verification of NHC official intensity forecasts for Daniel is given in Table 4a. Official intensity forecast errors were quite low, and below the mean official errors for the previous 5-yr period. The official forecasts, correctly, never predicted Daniel to strengthen significantly. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. Like the official forecasts, practically all of the guidance had low intensity errors for Daniel as well.

There were no coastal watches or warnings issued for Daniel.

ACKNOWLEDGEMENTS

Dr. Philippe Papin of the NHC produced Fig. 4.

Table 1. Best track for Tropical Storm Daniel, 3–5 August 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
03 / 0000	12.4	129.3	1007	30	tropical depression
03 / 0600	12.4	129.6	1006	35	tropical storm
03 / 1200	12.4	129.9	1006	35	"
03 / 1800	12.3	130.3	1006	35	"
04 / 0000	12.3	130.5	1006	35	"
04 / 0600	12.4	130.6	1006	35	"
04 / 1200	12.9	130.6	1006	35	"
04 / 1800	13.4	130.5	1005	35	"
05 / 0000	14.0	130.1	1006	35	"
05 / 0600	14.5	129.2	1006	35	"
05 / 1200	15.1	128.2	1006	35	"
05 / 1800	15.8	127.2	1008	30	tropical depression
06 / 0000					dissipated
04 / 1800	13.4	130.5	1005	35	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%)	90	162
Medium (40%-60%)	5	78
High (>60%)	-	-

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Daniel, 3–5 August 2024. 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	30.0	41.0	54.5	71.3				
OCD5	62.0	143.6	263.9	424.1				
Forecasts	8	6	4	2	0	0	0	0
OFCL (2019-23)	22.6	34.4	46.0	57.6	69.6	83.5	112.4	137.2
OCD5 (2019-23)	38.2	75.5	117.0	160.0	203.5	247.6	329.5	404.4

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Daniel, 3–5 August 2024. 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	33.1	41.0	54.5	71.3				
OCD5	59.1	143.6	263.9	424.1				
GFSI	45.0	81.5	125.0	158.1				
EMXI	**27.0**	**32.9**	**41.4**	**59.5**				
NVGI	**27.1**	43.5	81.0	**52.3**				
CMCI	50.0	92.8	124.1	132.7				
HWFI	33.2	44.1	**35.9**	**64.6**				
HMNI	42.9	52.0	**47.2**	80.0				
HFAI	34.5	57.1	68.7	77.2				
HFBI	36.0	54.1	59.8	**59.9**				
CTCI	36.9	47.8	70.5	82.0				
HCCA	**27.7**	**35.4**	**47.1**	**59.8**				
FSSE	33.2	57.4	92.7	128.3				
AEMI	39.7	62.2	82.9	87.2				
TVCE	**32.0**	42.9	**54.0**	**63.6**				
GFEX	36.2	53.9	80.1	100.3				
TVCX	**32.8**	41.3	54.7	**63.8**				
TVDG	**32.4**	43.2	61.2	72.2				
TABD	52.2	104.7	178.9	249.4				
TABM	43.5	77.6	127.9	170.4				
TABS	**31.1**	46.2	70.1	100.7				
Forecasts	7	6	4	2	0	0	0	0

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Daniel, 3–5 August 2024. 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	**1.2**	**5.8**	**6.2**	**2.5**				
OCD5	4.5	8.0	13.5	19.0				
Forecasts	8	6	4	2	0	0	0	0
OFCL (2019-23)	5.5	8.7	10.8	12.7	14.5	15.6	17.1	18.0
OCD5 (2019-23)	7.2	12.2	15.9	18.6	19.9	20.0	19.6	18.7

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Daniel, 3–5 August 2024. 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 5a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	0.7	5.8	6.2	2.5				
OCD5	4.1	8.0	13.5	19.0				
DSHP	1.4	**3.8**	**6.0**	10.5				
LGEM	1.1	**3.3**	**5.2**	9.0				
HWFI	3.0	**3.0**	**3.2**	5.0				
HMNI	1.6	**3.5**	**1.8**	3.0				
HFAI	1.7	**3.0**	**1.0**	3.0				
HFBI	1.9	**4.3**	**2.2**	**2.0**				
CTCI	2.9	**3.5**	**3.5**	5.0				
FSSE	1.1	**3.0**	**1.5**	**1.0**				
GFSI	1.7	**1.5**	**1.5**	3.0				
EMXI	0.9	**1.3**	**2.2**	**2.0**				
ICON	0.7	**2.7**	**2.2**	3.0				
IVCN	**0.3**	**1.8**	**2.2**	**2.0**				
IVDR	**0.4**	**2.2**	**1.5**	**2.0**				
HCCA	2.3	**5.2**	**5.2**	2.5				
Forecasts	7	6	4	2	0	0	0	0

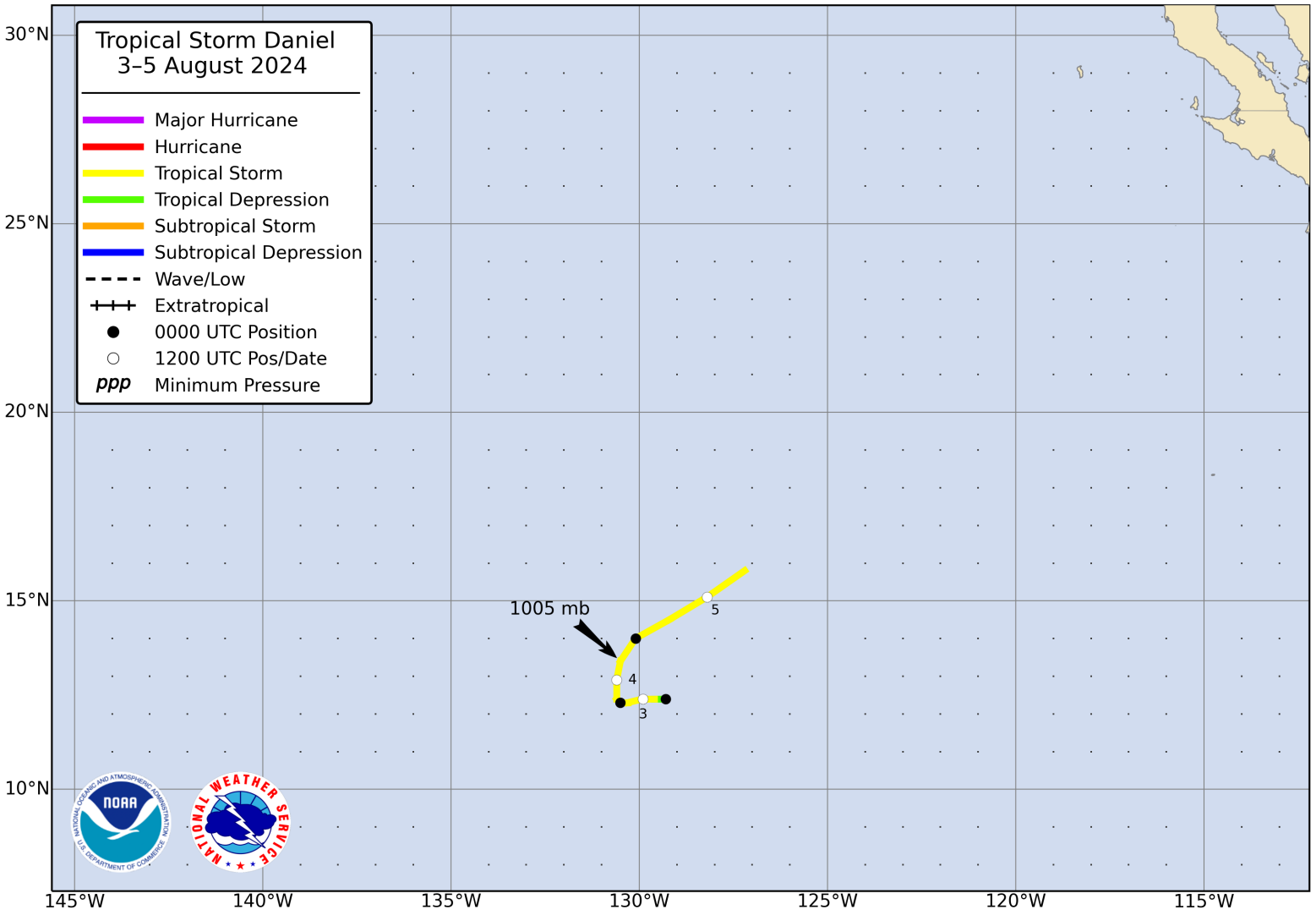


Figure 1. Best track positions for Tropical Storm Daniel, 3–5 August 2024.

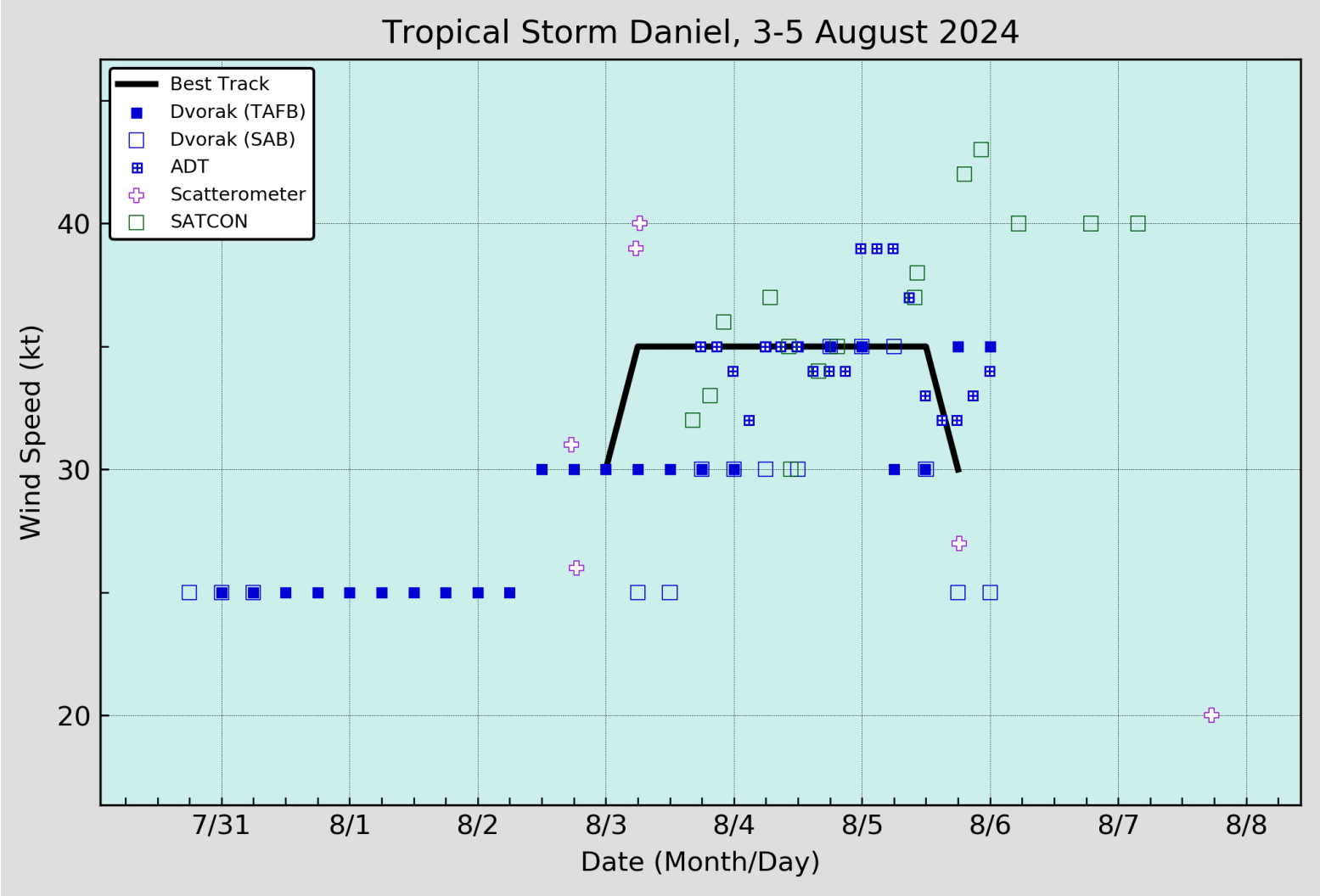


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Daniel, 3–5 August 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

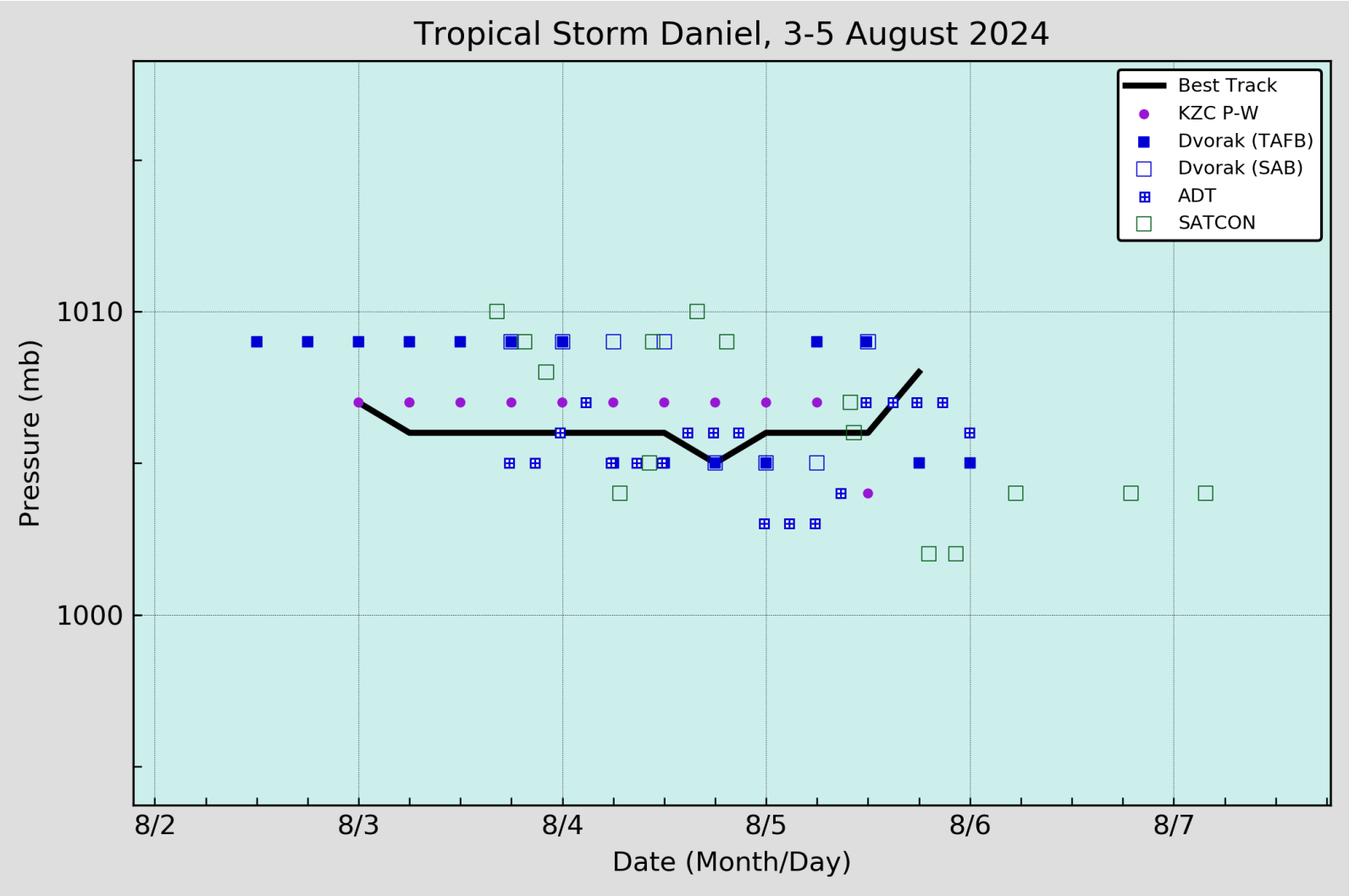


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Daniel, 3–5 August 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

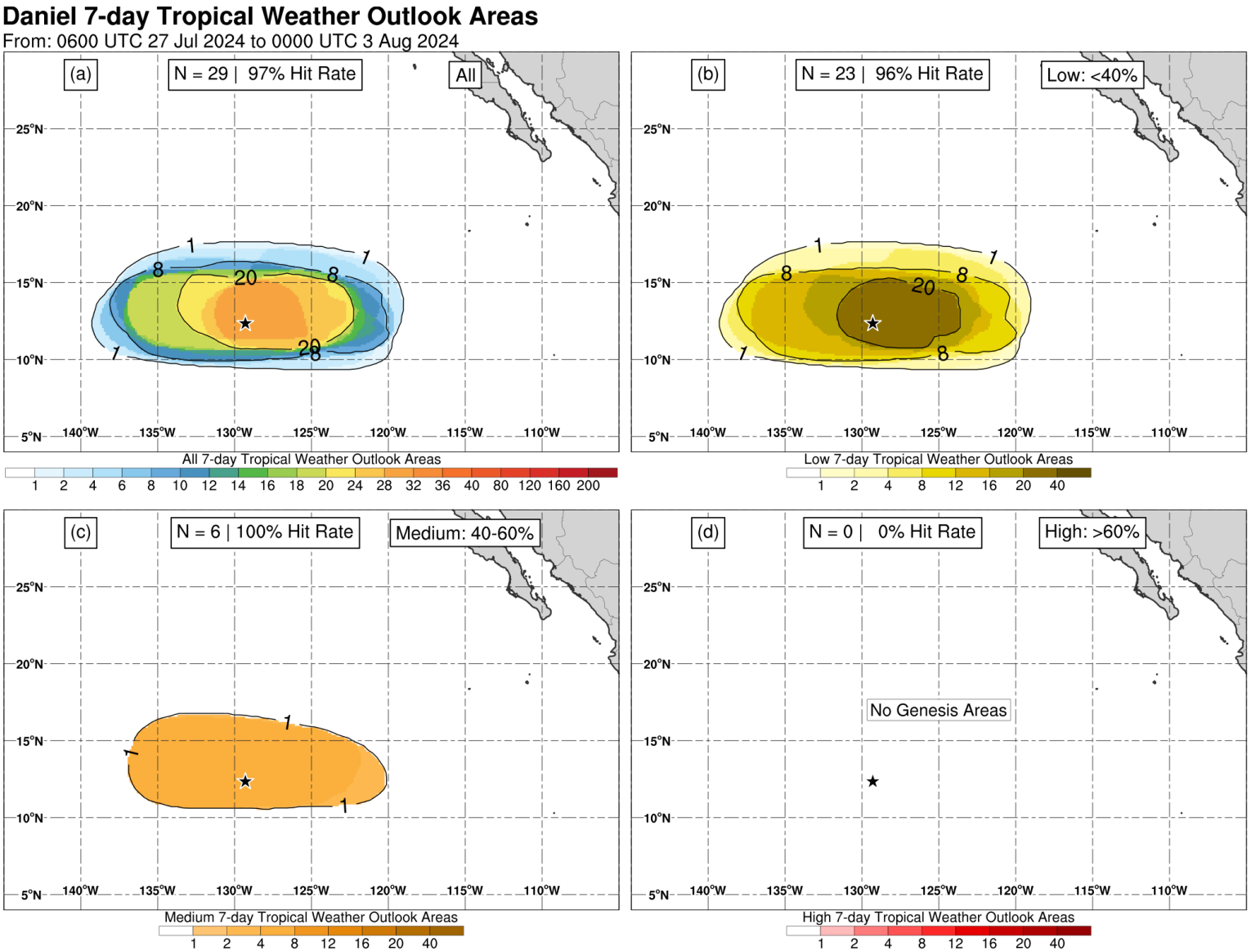


Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Daniel for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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