NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

TROPICAL STORM FABIO

(EP062024)

5–7 August 2024

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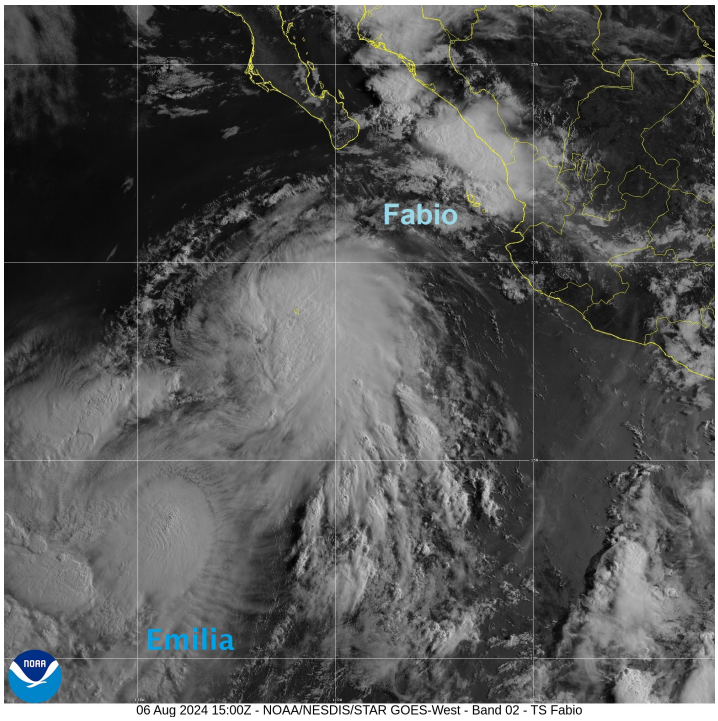

GOES-WEST VISIBLE SATELLITE IMAGE OF TROPICAL STORM FABIO, LOCATED TO THE NORTHEAST OF TROPICAL STORM EMILIA, JUST AFTER ITS PEAK INTENSITY AT 1500 UTC 6 AUGUST 2024. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Fabio was a short-lived tropical storm that interacted with and was ultimately absorbed by nearby Tropical Storm Emilia.

[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 Fabio.

TROPICAL STORM FABIO

5–7 AUGUST 2024

BEST TRACK

The "best track[2]" positions and intensities for Tropical Storm Fabio are listed in Table 1. The best track chart of Fabio'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.

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

Origin

Fabio developed from an interaction between the monsoon trough over the eastern Pacific Ocean and an African easterly wave. The tropical wave moved off the west coast of Africa on 18–19 July, reached the Windward Islands on 25 July, crossed over Central America on 27–28 July, and then into the eastern Pacific basin. The combined feature gradually lifted northwestward and broke down into two areas of low-level cyclonic turning, referred to as vorticity maxima. The western vorticity maxima became Tropical Storm Emilia[4] on 4 August. The eastern vorticity maxima initially became an elongated, gale-force, low pressure system early on 5 August. By 1200 UTC that day, the associated showers and thunderstorms became well organized as the system developed a well-defined center, and a tropical storm formed about 305 n mi south-southwest of Manzanillo, Mexico.

Peak Intensity and Minimum Pressure

Fabio's estimated peak intensity of 55 kt from 0600 to 1200 UTC on 6 August is supported by subjective Dvorak estimates from TAFB and SAB, and objective ADT estimates of T3.5/55 kt.

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[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 Fabio.

[4] https://www.nhc.noaa.gov/data/tcr/EP052024_Emilia.pdf

The estimated minimum central pressure of 996 mb at 1200 UTC 6 August is primarily based on the Knaff-Zehr-Courtney pressure-wind relationship.

CASUALTY AND DAMAGE STATISTICS

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

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 Fabio. The genesis of Fabio was predicted well in advance. The area was introduced in the TWO with a low chance for formation in the 7-day outlook over 8 days before formation. The 2-day probabilities reached the high category 42 hours prior to genesis. The models struggled geographically to determine which portion of the disturbance would develop into a tropical cyclone and less than 60% of the graphical TWO areas included the genesis location. All of the low and medium chance 7-day outlooks were located too far southeast as well as a significant portion of the high chance genesis areas. Ultimately, the portion of the disturbance that produced Tropical Storm Fabio was also associated with Tropical Storm Emilia, which formed the day before and just to the west of Fabio.

A verification of NHC official track forecasts for Fabio is given in Table 3a. Official track forecast errors were greater than the mean official errors for the previous 5-yr period, likely due to the complex interaction with the larger Tropical Storm Emilia. 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 Fabio is given in Table 4a. Official intensity forecast errors were greater than the mean official errors for the previous 5-yr period at the 12 and 24-hour lead times and below the mean for the 36- and 48-hour lead times. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. It is important to note these results are based on a small sample size due to the short-lived nature of Fabio.

There were no coastal watches or warnings issued for Fabio.

Table 1. Best track for Tropical Storm Fabio, 5–7 August 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
05 / 0600	14.0	105.7	1006	35	low
05 / 1200	14.3	106.2	1005	35	tropical storm
05 / 1800	15.2	107.2	1004	40	"
06 / 0000	15.8	108.5	998	50	"
06 / 0600	16.5	110.0	997	55	"
06 / 1200	17.5	111.5	996	55	"
06 / 1800	18.5	113.1	997	50	"
07 / 0000	19.5	115.0	999	45	"
07 / 0600	20.3	117.0	1001	40	"
07 / 1200	20.3	118.8	1001	40	"
07 / 1800	19.3	119.8	1002	35	low
08 / 0000	18.8	119.3	1003	30	"
08 / 0600					dissipated
06 / 1200	17.5	111.5	996	55	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%)	114	204
Medium (40%-60%)	72	168
High (>60%)	42	150

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Fabio, 5–7 August 2024. Mean errors for the previous 5-yr period are shown for comparison.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	45.3	81.6	111.5	145.3				
OCD5	69.9	165.3	289.8	561.0				
Forecasts	7	5	3	1				
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 Fabio, 5–7 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 3a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	45.7	105.1	124.9					
OCD5	62.6	133.8	166.3					
GFSI	**32.2**	**62.4**	**62.3**					
HWFI	**42.2**	**98.1**	**117.1**					
HMNI	48.8	**100.4**	129.1					
HFAI	**44.2**	**64.5**	**76.9**					
HFBI	47.3	**73.5**	**117.5**					
EMXI	47.6	135.2	181.3					
NVGI	107.1	196.6	223.6					
CMCI	96.4	182.6	196.3					
CTCI	48.1	**99.1**	153.9					
TVCE	**43.1**	**85.3**	**119.0**					
TVCX	**41.2**	**88.9**	**119.0**					
GFEX	**33.8**	**89.1**	**122.7**					
TVDG	**37.4**	**83.5**	**113.2**					
HCCA	64.7	122.3	130.4					
FSSE	**43.3**	**87.5**	**124.7**					
AEMI	**37.1**	**73.4**	**114.4**					
TABS	**42.8**	**38.6**	**8.2**					
TABM	**44.1**	**48.0**	**34.4**					
TABD	**44.0**	**48.3**	**56.6**					
Forecasts	3	2	1					

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Fabio, 5–7 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	7.9	13.0	**6.7**	**10.0**				
OCD5	8.7	14.6	11.7	20.0				
Forecasts	7	5	3	1				
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 Fabio, 5–7 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	3.3	12.5	5.0					
OCD5	4.0	18.5	18.0					
HWFI	**3.0**	**7.0**	8.0					
HMNI	**3.0**	**10.0**	7.0					
HFAI	5.7	**7.0**	**3.0**					
HFBI	6.0	**3.5**	7.0					
DSHP	4.3	21.5	27.0					
LGEM	4.0	19.0	20.0					
ICON	3.3	14.5	16.0					
IVCN	3.7	**11.0**	11.0					
IVDR	3.7	**9.0**	8.0					
CTCI	5.3	**6.5**	**3.0**					
GFSI	4.7	**7.0**	**4.0**					
EMXI	4.7	**6.5**	6.0					
HCCA	5.0	15.0	16.0					
FSSE	**3.0**	**8.0**	5.0					
Forecasts	3	2	1					

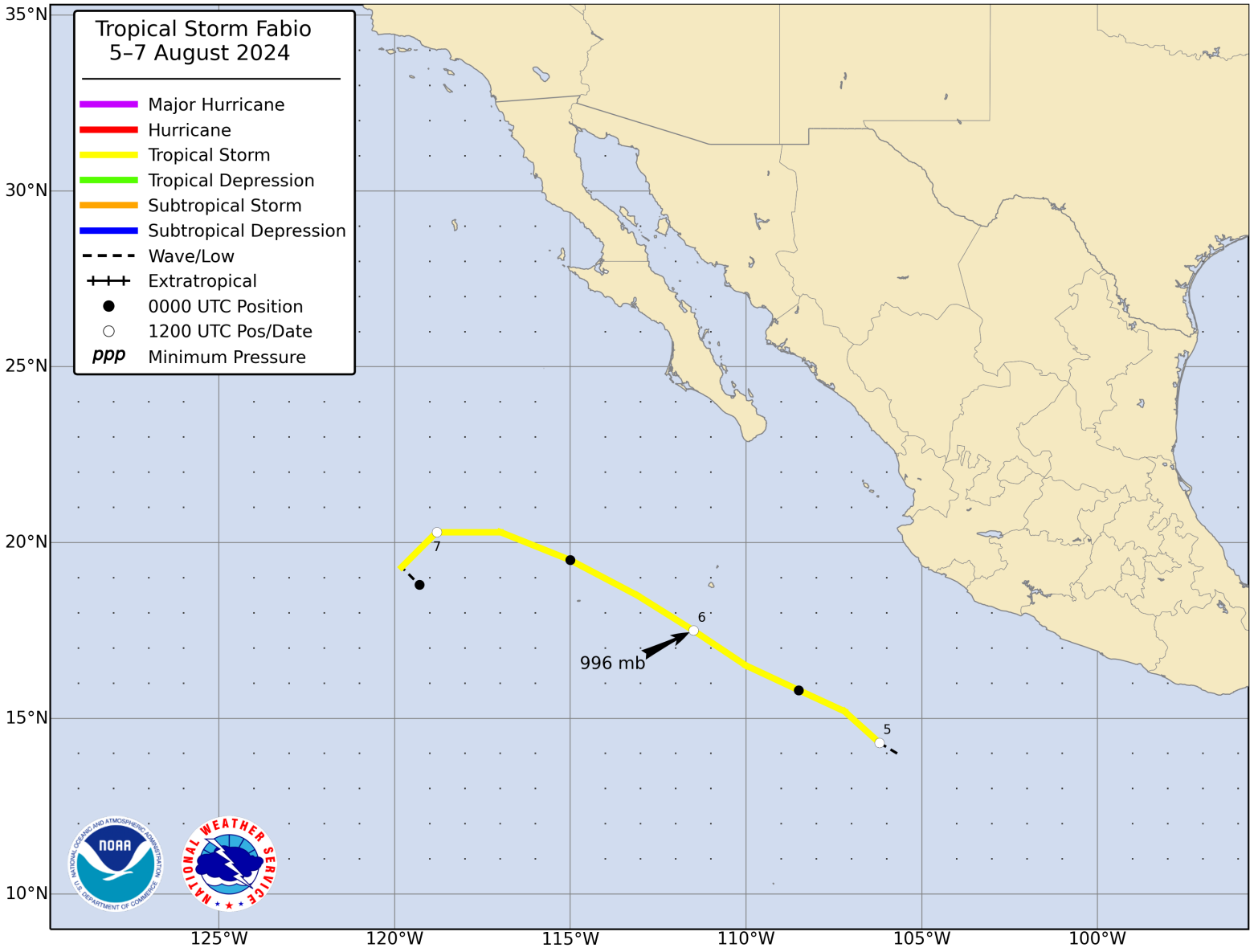

Figure 1. Best track positions for Tropical Storm Fabio, 5–7 August 2024.

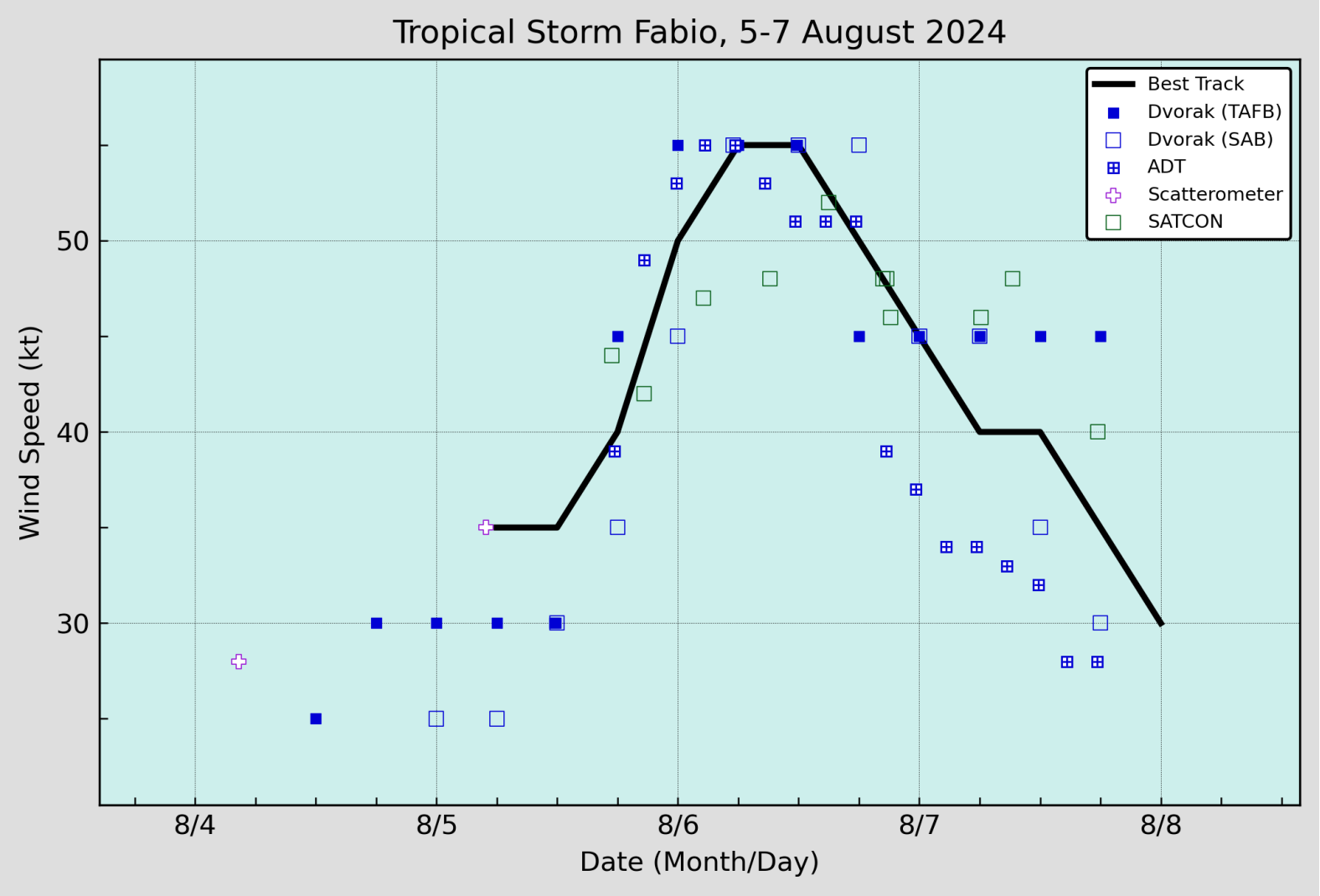

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Fabio, 5–7 August 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

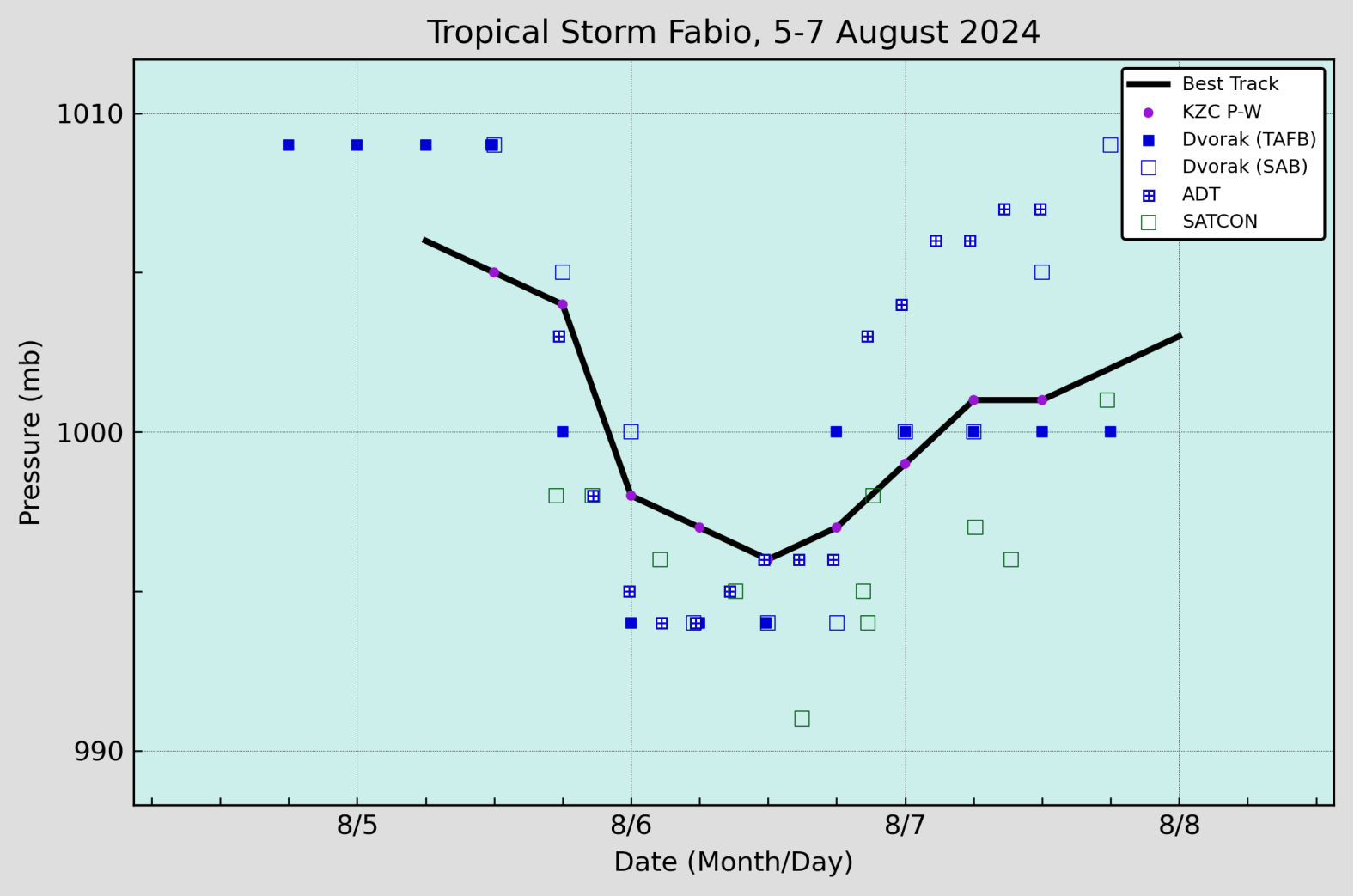

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Fabio, 5–7 August 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

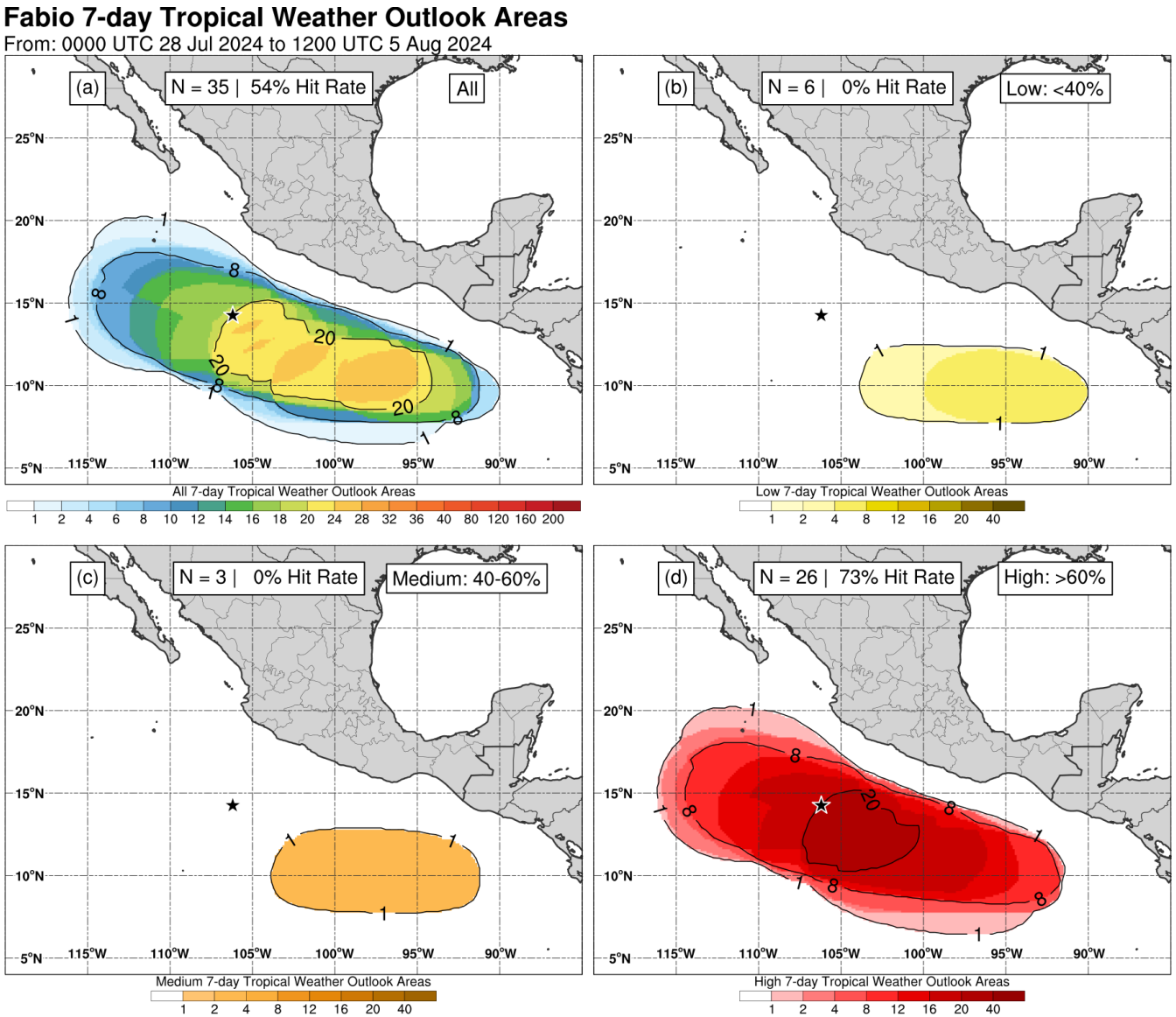

Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Fabio for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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