NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

HURRICANE MARGOT

(AL142023)

7–16 September 2023

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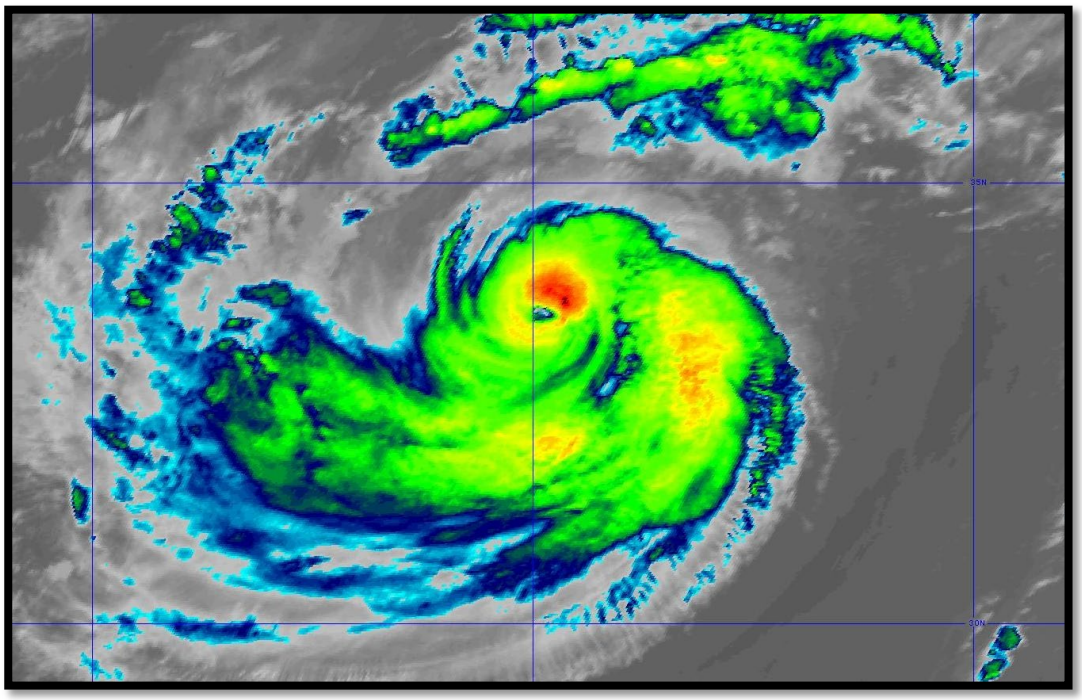

GOES-16 DIRTY LONGWAVE INFRARED SATELLITE IMAGE OF HURRICANE MARGOT AT 0800 UTC 13 SEPTEMBER 2023 WHILE IT WAS AT PEAK INTENSITY. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Margot was a large category 1 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that made a clockwise loop over the east-central subtropical Atlantic 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 Margot.

Hurricane Margot

7–16 SEPTEMBER 2023

BEST TRACK

The "best track[2]" positions and intensities for Hurricane Margot are listed in Table 1. The best track chart of Margot'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 winds of tropical storm force associated with Margot.

Origin

Margot developed from a tropical wave that moved off the west coast of Africa on 5 September. The wave produced heavy rains over portions of the Cabo Verde Islands on 6 and 7 September before it became a tropical depression.

Peak Intensity and Minimum Pressure

Margot's estimated peak intensity is 80 kt from 0600 to 1200 UTC 13 September. Subjective satellite intensity estimates from TAFB and SAB were steady at T4.5/77 kt from 0600 UTC 12 September through 0000 UTC 14 September. Within that period, Margot's satellite presentation appeared most organized—with the redevelopment of an eye in infrared imagery—from 0000 to 1200 UTC September (cover photo). In addition, Synthetic Aperture Radar (SAR) data, which is still being assessed for its utility in estimating tropical cyclone intensity, suggested that a peak in intensity occurred between 0600 and 1200 UTC 13 September.

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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), and 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 Margot.

The estimated minimum central pressure of 969 mb is based on the Knaff-Zehr-Courtney pressure-wind relationship and is also supported by several SATCON-based pressure estimates. Margot's relatively low central pressure for a peak intensity of 80 kt is a result of the hurricane's large size, with tropical-storm-force winds extending about 200 n mi out from the center. Margot began developing an outer convective band and secondary wind maximum late on 11 September when it became a hurricane (Figs. 4a, c). The subsequent eyewall replacement was prolonged, with the smaller inner eyewall not dissipating until 14 September (Figs. 4b, d).

CASUALTY AND DAMAGE STATISTICS

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

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 5 shows composites of 7-day TWO genesis areas for each category prior to the formation of Margot. Margot's genesis location occurred within all potential formation areas depicted by NHC. However, the forecast lead time and confidence for genesis was poor, with the system first introduced in the TWO only 96 h before formation. The 7-day probabilities were raised to the medium (40-60%) category 72 h and the high (>60%) category 54 h before formation. These chances were lowered back to the medium category for a period before being raised back to high only 12 h before formation. The 48-h probability did not reach the high category before the time of genesis.

A verification of NHC official track forecasts for Margot is given in Table 3a. Official track forecast errors were lower than the mean official errors for the previous 5-yr period for the 12- through 48-h forecast times but higher for the 60- through 120-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 Margot 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 Margot.

Table 1. Best track for Hurricane Margot, 7–16 September 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
07 / 1200	15.5	26.0	1006	30	tropical depression
07 / 1800	16.0	27.3	1005	35	tropical storm
08 / 0000	16.5	28.6	1005	35	"
08 / 0600	17.1	30.1	1005	35	"
08 / 1200	17.8	31.8	1005	35	"
08 / 1800	18.5	33.6	1005	35	"
09 / 0000	19.1	35.1	1005	35	"
09 / 0600	19.7	36.4	1004	40	"
09 / 1200	20.2	37.5	1004	40	"
09 / 1800	20.7	38.3	1004	40	"
10 / 0000	21.2	38.9	1003	45	"
10 / 0600	21.8	39.4	1002	45	"
10 / 1200	22.5	39.8	1000	45	"
10 / 1800	23.3	40.0	998	50	"
11 / 0000	24.0	40.0	996	55	"
11 / 0600	24.7	40.0	993	55	"
11 / 1200	25.5	40.0	990	60	"
11 / 1800	26.4	39.9	986	65	hurricane
12 / 0000	27.5	39.6	981	70	"
12 / 0600	28.6	39.4	977	75	"
12 / 1200	29.8	39.3	974	75	"
12 / 1800	31.0	39.4	972	75	"
13 / 0000	32.1	39.6	970	75	"
13 / 0600	33.0	39.9	969	80	"
13 / 1200	33.7	40.3	969	80	"
13 / 1800	34.4	40.6	970	75	"
14 / 0000	35.1	40.7	972	75	"
14 / 0600	35.8	40.5	974	70	"
14 / 1200	36.3	40.1	976	70	"
14 / 1800	36.6	39.6	978	70	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 0000	36.7	39.1	980	65	"
15 / 0600	36.7	38.6	982	60	tropical storm
15 / 1200	36.5	38.1	984	55	"
15 / 1800	36.1	37.8	986	55	"
16 / 0000	35.7	37.8	988	55	"
16 / 0600	35.2	38.0	990	55	"
16 / 1200	34.7	38.5	993	50	"
16 / 1800	34.3	39.2	996	45	"
17 / 0000	34.0	40.1	999	40	low
17 / 0600	34.0	41.1	1001	35	"
17 / 1200	34.3	42.0	1003	35	"
17 / 1800	34.7	43.0	1005	35	"
18 / 0000	35.3	43.6	1006	30	"
18 / 0600	36.0	43.8	1007	30	"
18 / 1200	36.8	43.6	1008	30	"
18 / 1800	37.8	42.7	1009	30	"
19 / 0000					dissipated
13 / 0600	33.0	39.9	969	80	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. The number within the parenthesis indicates the number of hours before formation that the genesis probability was raised to that category for a second time.

	Hours Before Genesis	
	48-Hour Outlook	**168-Hour Outlook**
Low (<40%)	60	96
Medium (40%-60%)	12	72
High (>60%)	0	54 (18)

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Margot, 7–16 September 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	**19.4**	**30.8**	**45.2**	**61.3**	82.3	107.5	157.5	173.3
OCD5	40.4	95.2	160.8	222.3	257.4	287.9	299.4	284.8
Forecasts	36	34	32	30	28	26	22	18
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 Hurricane Margot, 7–16 September 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	19.4	31.7	45.3	62.0	82.4	104.3	154.4	173.0
OCD5	39.8	92.4	154.5	216.1	243.6	262.4	284.8	296.6
GFSI	22.0	34.7	46.8	62.6	**80.2**	**97.6**	155.3	**166.6**
EMXI	**18.6**	**30.7**	**42.1**	**56.0**	**76.3**	**101.2**	157.4	188.2
EGRI	21.1	34.4	52.9	76.9	96.6	108.9	**127.0**	**154.5**
CMCI	22.0	38.8	54.4	73.1	97.4	125.0	195.8	250.0
NVGI	23.0	38.9	57.5	67.5	**70.1**	**79.4**	**129.2**	**162.9**
HWFI	25.2	44.2	62.9	83.8	114.2	145.9	217.3	242.2
HMNI	23.6	39.4	51.4	**61.7**	**78.8**	**103.0**	**148.9**	**167.7**
HFAI	24.6	37.2	45.4	**52.2**	**63.7**	**88.0**	**147.4**	**154.8**
HFBI	25.8	40.7	50.7	**60.2**	**75.6**	**98.4**	172.8	205.2
CTCI	24.2	42.3	61.6	83.0	104.7	121.7	180.4	197.6
TVCA	19.9	**31.5**	**43.6**	**58.1**	**76.4**	**96.7**	**143.8**	**151.4**
TVCX	19.6	**31.1**	**43.3**	**58.3**	**76.6**	**96.9**	**144.6**	**151.6**
TVDG	19.5	**31.0**	**43.1**	**59.0**	**77.2**	**96.5**	**141.8**	**147.7**
GFEX	**18.9**	**30.0**	**41.4**	**55.6**	**74.8**	**97.0**	**151.4**	**170.1**
HCCA	**18.7**	**29.0**	**40.6**	**59.0**	83.5	106.4	164.0	224.8
FSSE	**17.9**	**27.0**	**37.2**	**50.3**	**69.7**	**89.2**	**128.5**	**126.5**
AEMI	21.8	36.9	51.9	68.2	85.7	**103.8**	**146.6**	**139.6**
TABS	44.4	86.5	135.3	183.8	232.0	279.6	305.6	253.4
TABM	26.0	42.2	66.6	90.8	117.6	155.0	234.7	205.4
TABD	26.6	55.7	84.6	112.1	146.0	183.0	269.5	286.4
Forecasts	31	29	27	26	24	22	20	17

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Margot, 7–16 September 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	**3.1**	**3.7**	**5.0**	**7.0**	**7.3**	**7.5**	**5.9**	**6.7**
OCD5	4.5	5.5	7.0	8.9	9.6	10.3	8.0	11.1
Forecasts	36	34	32	30	28	26	22	18
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 Hurricane Margot, 7–16 September 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	3.1	3.8	4.7	6.6	7.1	7.1	5.5	6.8
OCD5	4.5	5.6	6.8	8.8	9.7	9.9	8.3	10.2
HWFI	4.8	6.0	6.6	8.0	7.3	**5.9**	6.6	10.4
HMNI	4.2	5.7	6.1	6.9	7.1	**6.5**	6.3	11.8
HFAI	4.9	6.9	7.6	7.9	8.7	8.5	9.4	8.0
HFBI	4.9	6.7	7.3	7.7	8.0	8.8	5.8	7.6
CTCI	4.1	4.9	6.4	9.4	8.9	9.1	5.8	**5.2**
DSHP	4.2	5.3	7.2	9.5	10.2	10.2	9.4	13.3
LGEM	4.5	5.1	6.8	8.9	10.4	10.3	7.5	**6.0**
ICON	3.3	**3.6**	**4.3**	**6.2**	**6.9**	**6.3**	**5.0**	7.6
IVCN	3.4	4.0	**4.5**	**6.0**	**6.8**	**5.9**	**4.2**	**5.1**
IVDR	3.6	4.4	5.2	**6.1**	**6.8**	**6.0**	**4.1**	**4.9**
HCCA	3.5	4.1	**4.4**	**6.4**	**6.7**	**5.6**	**5.0**	7.9
FSSE	3.3	4.2	4.8	6.9	7.1	7.2	10.5	15.7
GFSI	4.3	6.8	8.0	9.3	9.2	8.5	6.5	**5.1**
EMXI	4.2	5.7	7.4	9.4	10.4	10.8	11.5	10.4
Forecasts	34	32	30	28	26	24	21	17

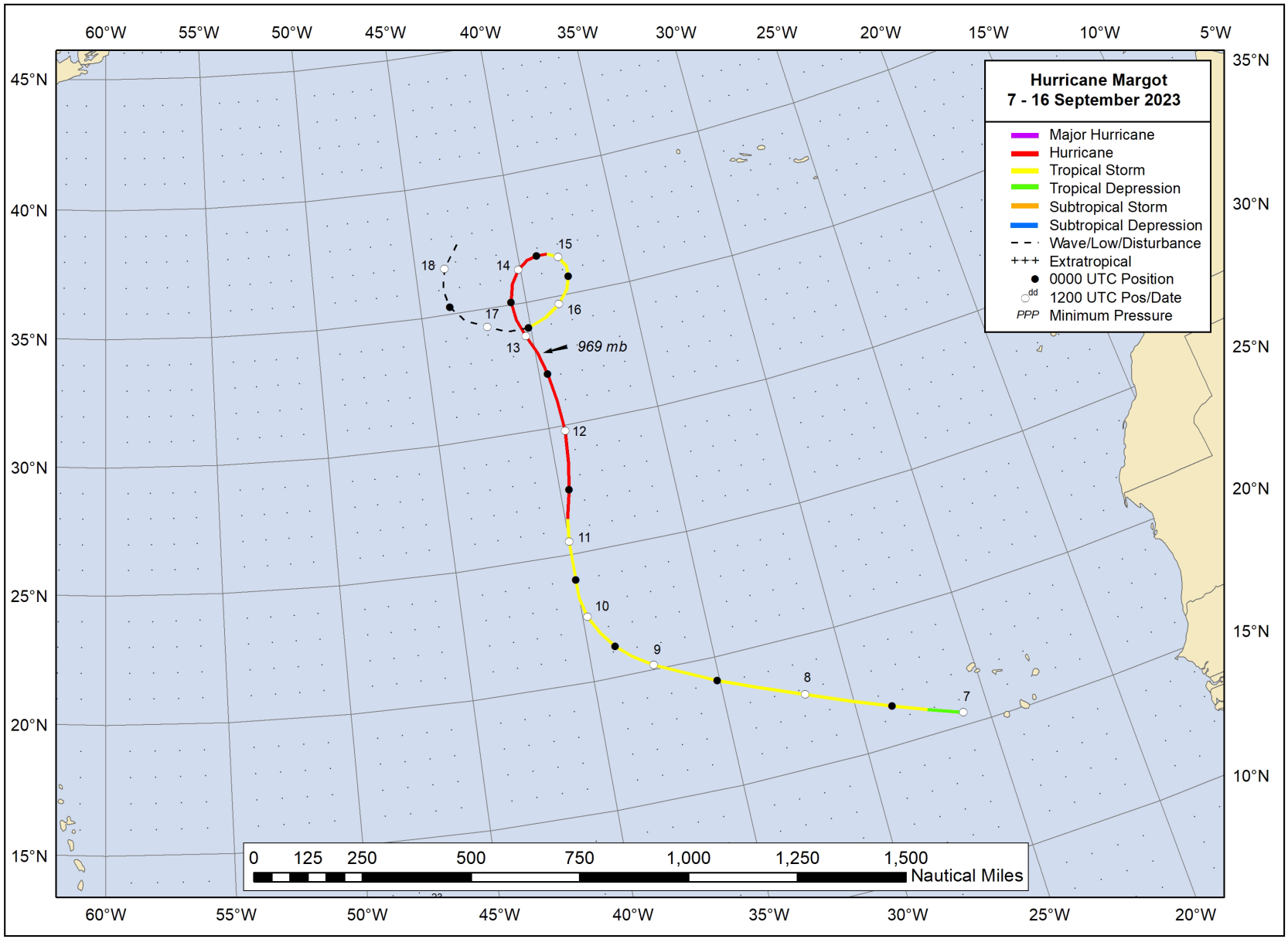

Figure 1. Best track positions for Hurricane Margot, 7–16 September 2023.

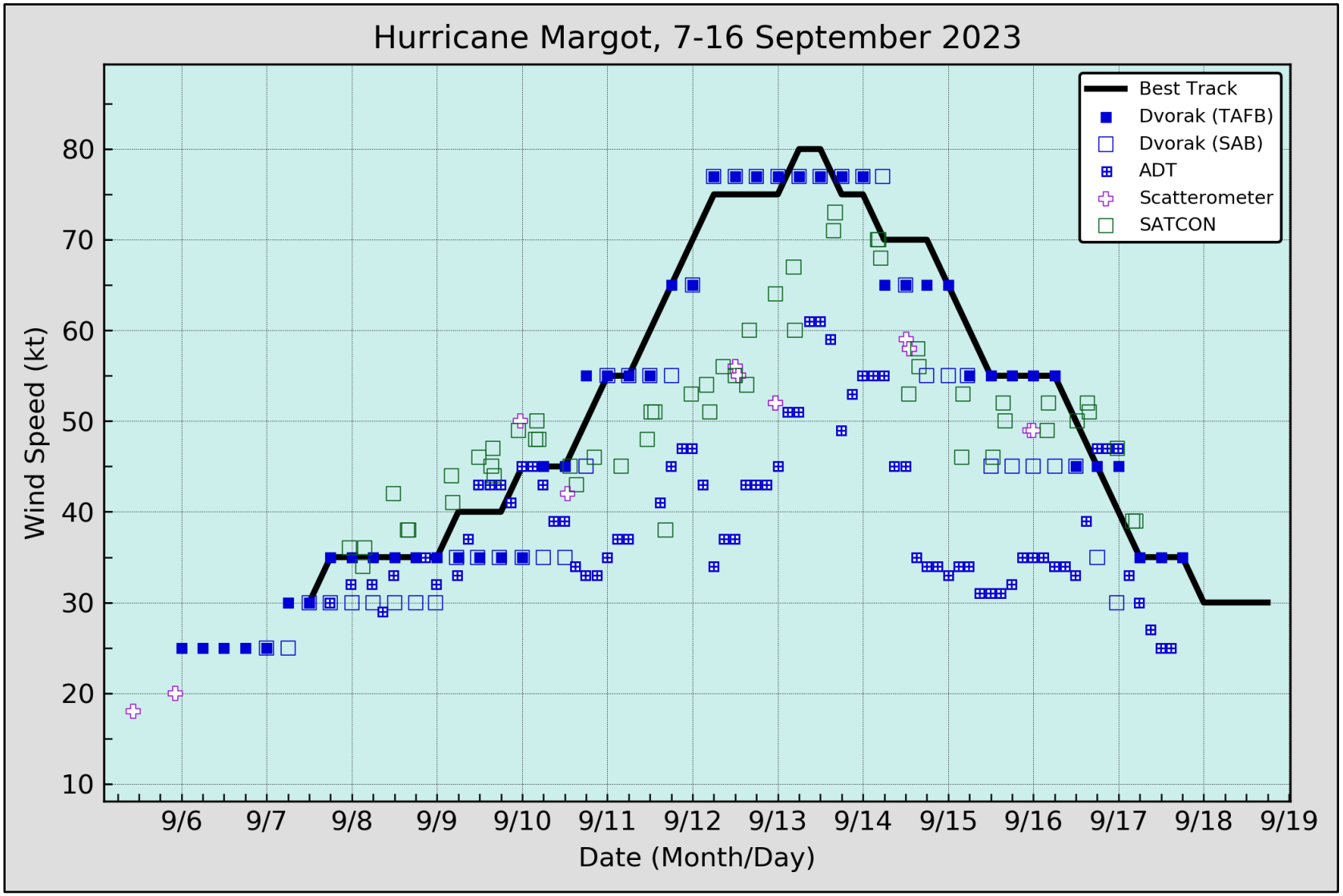

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Margot, 7–16 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

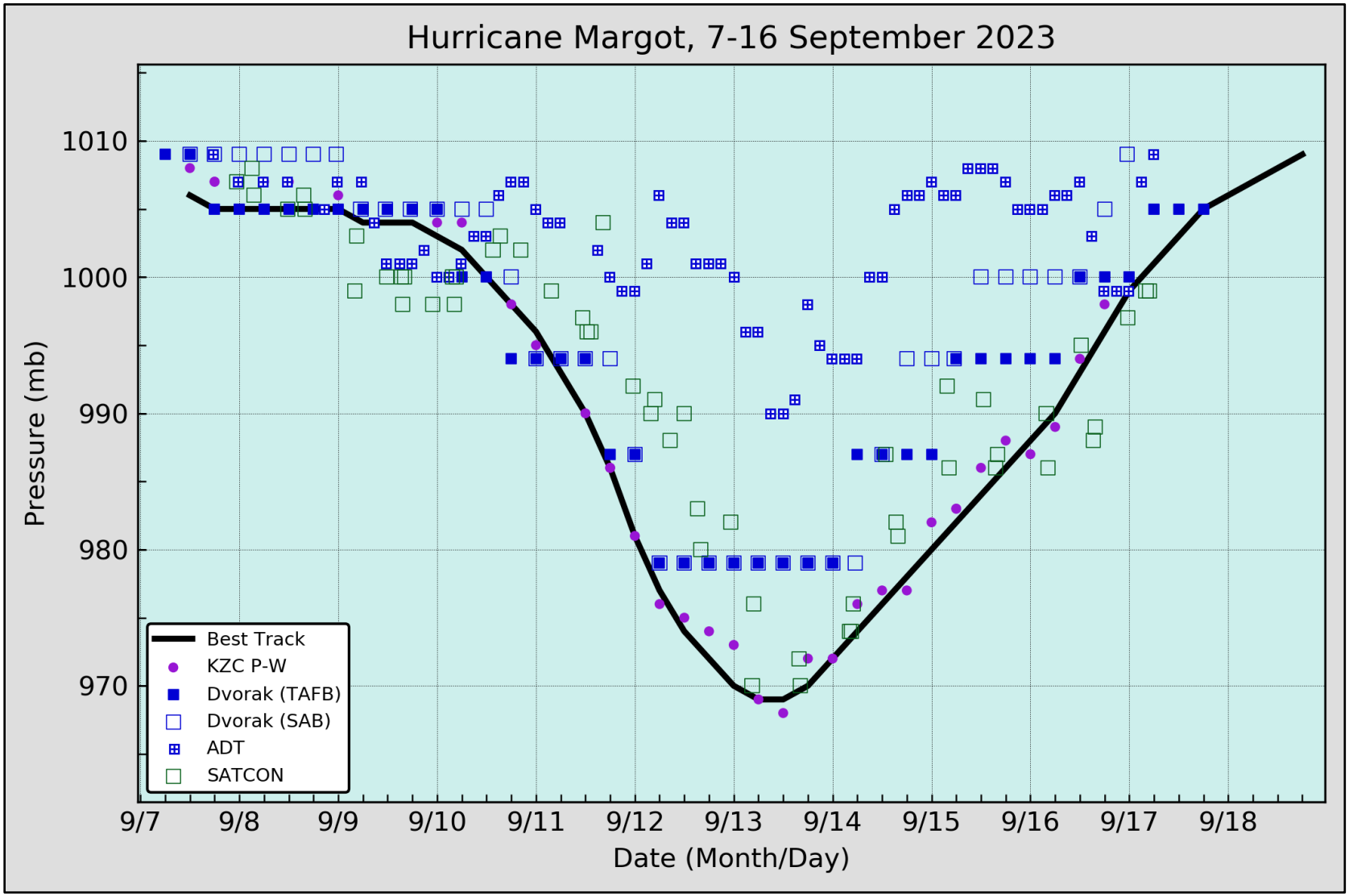

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Margot, 7–16 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

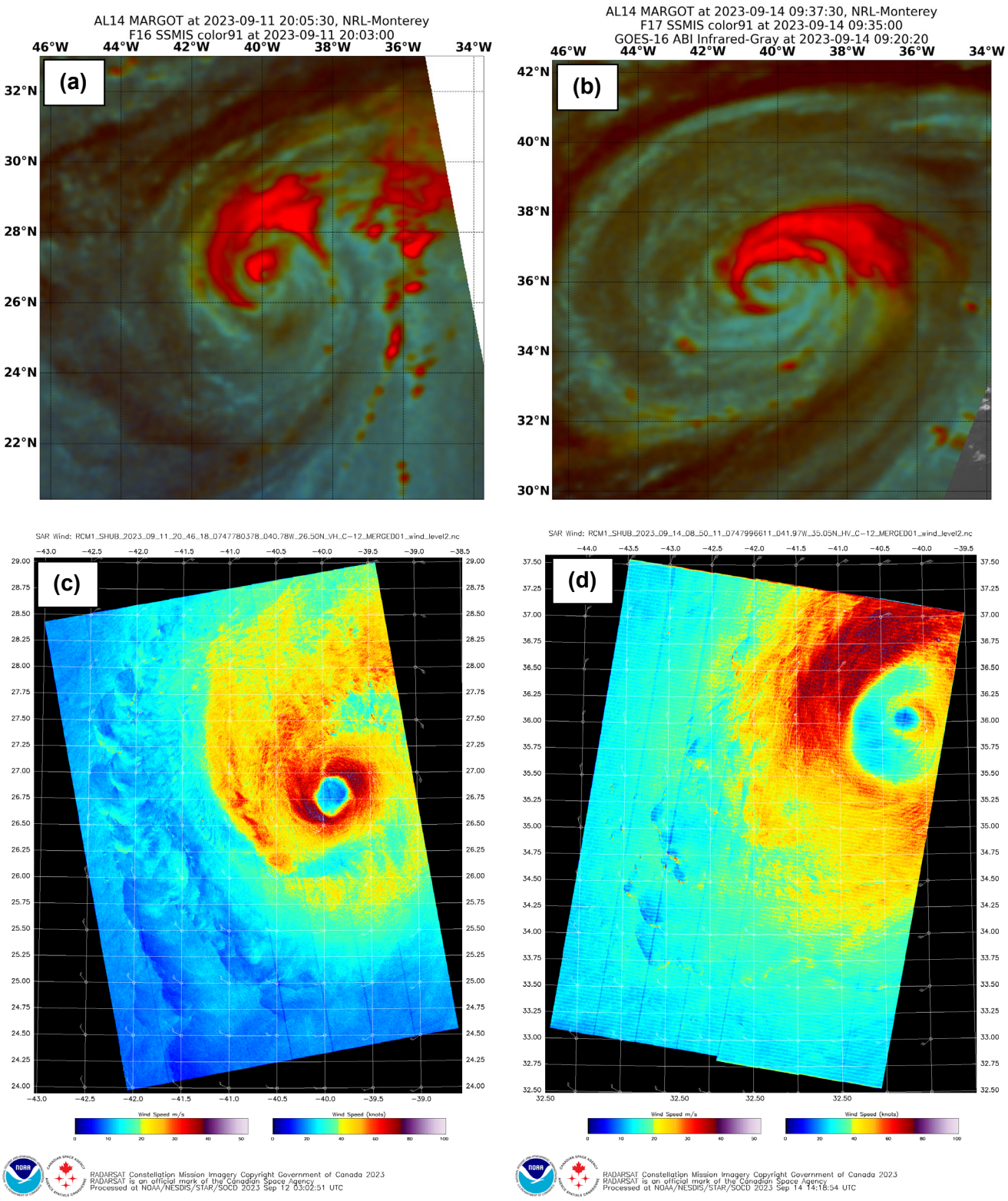

Figure 4. 91-GHz SSMIS color composite images of Hurricane Margot at (a) 2003 UTC 11 September 2023 and (b) 0920 UTC 14 September, and nearly-coincident Synthetic Aperture Radar (SAR) wind retrievals at (c) 2046 UTC 11 September and (d) 0850 UTC 14 September. Images courtesy of the Naval Research Laboratory and NOAA/NESDIS/STAR.

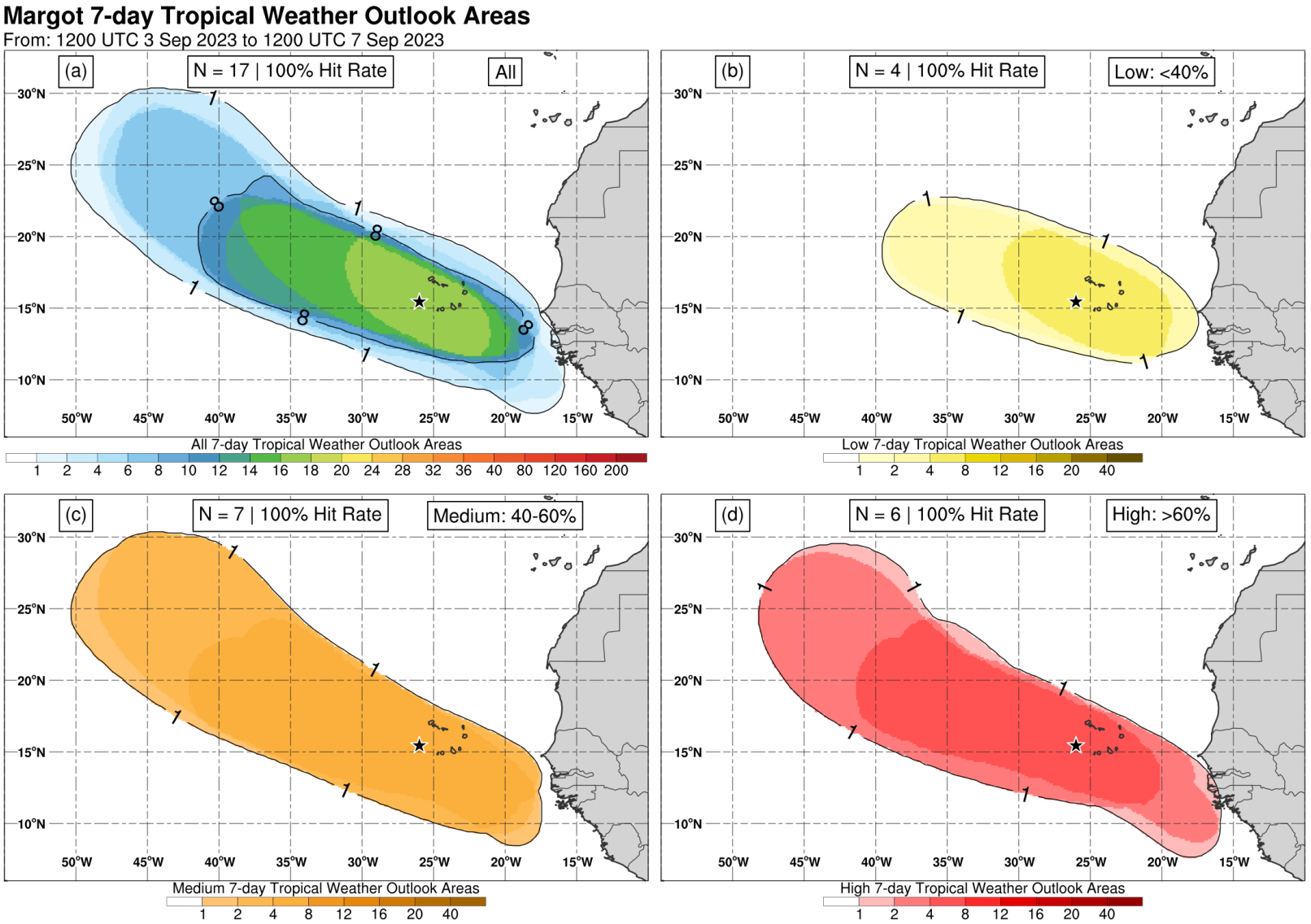

Figure 5. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Hurricane Margot for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.