

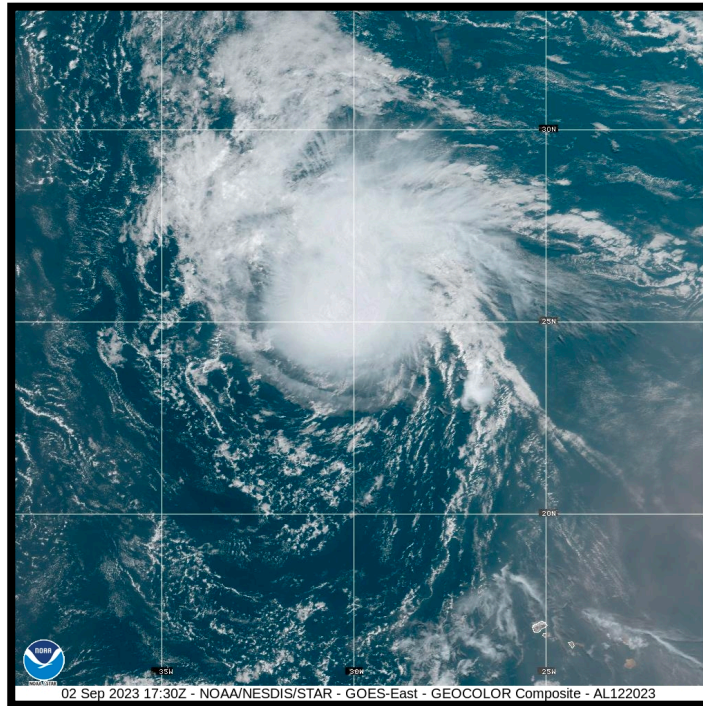


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

TROPICAL STORM KATIA (AL122023)

31 August–4 September 2023

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National Hurricane Center
30 January 2024



GOES-16 GEOCOLOR IMAGE OF TROPICAL STORM KATIA NEAR PEAK INTENSITY AT 1730 UTC 2 SEPTEMBER 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR.

Katia was a short-lived tropical storm that formed over the eastern Atlantic just west of the Cabo Verde Islands but did not directly impact 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 Katia.

Tropical Storm Katia

31 AUGUST–4 SEPTEMBER 2023

BEST TRACK

The “best track²” positions and intensities for Tropical Storm Katia are listed in Table 1. The best track chart of Katia’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 reports or land-based winds of tropical storm force associated with Katia.

Origin

Katia developed from a tropical wave that emerged off the west coast of Africa on 29 August. As the wave moved west-northwestward, scatterometer and surface observations indicated that a well-defined circulation formed at 0000 UTC 30 August as the system started moving over the Cabo Verde Islands. However, it took over a day before convection became sufficiently organized to designate the system as a tropical depression at 1800 UTC 31 August.

Peak Intensity and Minimum Pressure

Katia’s peak intensity of 50 kt occurred around 1800 UTC 2 September. This intensity estimate is based on a blend of subjective and objective intensity estimates. On the higher end, TAFB provided a Dvorak fix of T3.5/55 kt while SATCON provided a 52-kt estimate at 1500 UTC that day. On the lower end, SAB provided a Dvorak fix of T2.5/35 kt, with ADT at 34 kt near that time.

The estimated minimum central pressure of 998 mb is based on the Knaff-Zehr-Courtney (KZC) pressure-wind relationship, though it is worth noting that some of the pressure estimates provided by subjective and objective guidance were a bit lower.

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 Katia.

CASUALTY AND DAMAGE STATISTICS

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

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. Katia's genesis was well anticipated, with 6 days (144 h) of lead time from when the first low genesis probability was issued in the 7-day outlook. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Katia. The genesis location was captured within all the 7-day formation areas depicted by TWOs issued by NHC.

A verification of NHC official track forecasts for Katia is given in Table 3a. Official track forecast errors were a little greater than the mean official errors for the previous 5-yr period from 12–48 h, though a single 60-h forecast was lower than this benchmark. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. Only the ECMWF (EMXI) and the GFEX (a blend of the GFS and ECMWF) outperformed the official NHC forecast at all lead times.

A verification of NHC official intensity forecasts for Katia is given in Table 4a. Official intensity forecast errors were lower than the mean official errors for the previous 5-yr period for all available lead times except for 24 h which was a bit higher. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. In general, the higher resolution hurricane-regional model guidance (HAFS-A/B, HWRF, HMON) all performed quite well, outperforming the official NHC intensity forecast for some, but not all, lead times.

There were no coastal watches or warnings issued for Katia.



Table 1. Best track for Tropical Storm Katia, 31 August–4 September 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
30 / 0000	14.9	21.3	1008	25	low
30 / 0600	15.2	22.4	1007	25	"
30 / 1200	15.4	23.4	1007	25	"
30 / 1800	15.5	24.1	1007	25	"
31 / 0000	15.8	24.8	1007	25	"
31 / 0600	16.1	25.5	1007	25	"
31 / 1200	16.5	26.2	1006	30	"
31 / 1800	17.0	27.0	1006	30	tropical depression
01 / 0000	17.7	27.6	1006	30	"
01 / 0600	18.5	27.9	1006	30	"
01 / 1200	19.3	28.1	1006	30	"
01 / 1800	20.2	28.3	1006	30	"
02 / 0000	21.1	28.5	1005	35	tropical storm
02 / 0600	22.3	28.8	1004	40	"
02 / 1200	23.5	29.4	1000	45	"
02 / 1800	24.5	30.1	998	50	"
03 / 0000	25.3	30.9	1000	45	"
03 / 0600	26.0	31.5	1002	40	"
03 / 1200	26.5	32.0	1006	35	"
03 / 1800	26.9	32.7	1006	35	"
04 / 0000	27.1	33.3	1007	30	tropical depression
04 / 0600	27.4	33.6	1008	30	low
04 / 1200	27.7	34.0	1009	30	"
04 / 1800	27.9	34.4	1010	30	"
05 / 0000	28.0	34.5	1010	25	"
05 / 0600	28.2	34.6	1010	25	"
05 / 1200	28.3	34.6	1010	25	"
05 / 1800	28.3	34.2	1010	25	"
06 / 0000	28.0	33.7	1010	25	"
06 / 0600	27.6	33.1	1010	25	"



Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
06 / 1200	27.4	32.2	1011	25	"
06 / 1800	26.7	31.8	1011	25	"
07 / 0000	26.0	31.8	1010	30	"
07 / 0600	25.4	32.2	1010	30	"
07 / 1200	24.6	32.7	1011	25	"
07 / 1800	24.0	33.8	1011	25	"
08 / 0000	23.2	34.8	1011	25	"
08 / 0600	22.3	36.0	1011	25	"
08 / 1200	21.5	37.6	1011	25	"
08 / 1800	20.5	39.2	1011	25	"
09 / 0000	19.6	40.9	1011	25	"
09 / 0600	18.4	42.0	1011	25	"
09 / 1200	17.6	42.9	1011	25	"
09 / 1800	16.8	43.7	1011	25	"
10 / 0000	16.0	44.5	1012	20	"
10 / 0600	15.4	45.5	1012	20	"
10 / 1200	15.0	46.3	1012	20	"
10 / 1800	14.8	46.9	1012	20	"
11 / 0000	14.6	47.4	1012	20	"
11 / 0600	14.5	47.9	1012	20	"
11 / 1200	14.4	48.1	1012	20	"
11 / 1800	14.4	48.3	1012	20	"
12 / 0000	14.4	48.3	1012	20	"
12 / 0600	14.5	48.3	1012	20	"
12 / 1200	14.6	48.2	1012	20	"
12 / 1800	14.7	48.1	1012	15	"
13 / 0000	14.9	48.0	1012	15	"
13 / 0600	15.1	47.8	1012	15	"
13 / 1200	15.0	47.6	1012	15	"
13 / 1800	14.9	47.7	1012	15	"
14 / 0000	14.7	47.8	1012	15	"



Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
14 / 0600	14.5	48.0	1012	15	"
14 / 1200	14.2	48.4	1012	15	"
14 / 1800	13.6	48.8	1012	15	"
15 / 0000	13.0	49.2	1012	15	"
15 / 0600	12.4	49.1	1012	15	"
15 / 1200	11.8	48.8	1012	15	"
15 / 1800					dissipated
02 / 1800	24.5	30.1	998	50	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%)	66	144
Medium (40%-60%)	36	84
High (>60%)	12	18



Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Katia. 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	28.8	42.8	50.0	62.7	73.4			
OCD5	52.4	107.8	110.2	116.6	96.9			
Forecasts	9	7	5	3	1			
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 Katia. 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	28.9	39.7	46.0	57.1				
OCD5	53.7	107.6	106.0	109.9				
GFSI	32.4	54.0	72.5	91.5				
EMXI	24.2	34.0	39.3	22.5				
CMCI	29.2	43.3	54.2	58.7				
NVGI	32.1	57.8	77.5	106.2				
HFAI	27.7	41.3	52.4	75.7				
HFBI	31.0	49.8	74.1	116.5				
HWFI	29.3	51.5	71.5	92.0				
HMNI	40.0	58.0	47.3	53.1				
CTCI	32.2	58.1	75.2	112.3				
HCCA	26.4	39.6	51.8	68.8				
TVCA	26.8	40.5	49.3	68.6				
TVDG	27.1	40.6	49.1	70.0				
TVCX	27.5	39.0	45.9	64.8				
AEMI	34.1	53.1	67.5	88.2				
GFEX	26.3	39.0	41.3	53.2				
TABS	37.5	59.6	79.5	109.5				
TABM	45.7	80.5	105.8	143.6				
TABD	57.5	108.4	137.3	173.4				
Forecasts	8	6	4	2				



Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Katia. 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	4.4	8.6	7.0	3.3	0.0			
OCD5	8.2	14.4	11.6	6.7	11.0			
Forecasts	9	7	5	3	1			
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 Katia. 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	5.0	8.3	6.2	2.5				
OCD5	8.9	15.2	12.2	7.5				
HFAI	3.5	5.7	4.8	5.0				
HFBI	4.4	7.3	7.0	8.5				
HWFI	6.5	6.3	5.8	5.5				
HMNI	6.8	8.7	5.0	2.0				
CTCI	7.0	10.0	9.5	9.0				
DSHP	7.6	12.3	8.5	6.0				
LGEM	8.8	13.0	9.8	7.0				
HCCA	5.0	8.2	6.8	7.0				
IVCN	5.4	9.0	7.0	6.0				
ICON	6.4	10.0	7.2	5.0				
IVDR	5.4	8.5	6.8	5.5				
GFSI	7.5	9.8	9.5	8.5				
EMXI	5.9	8.0	6.0	5.5				
Forecasts	8	6	4	2				

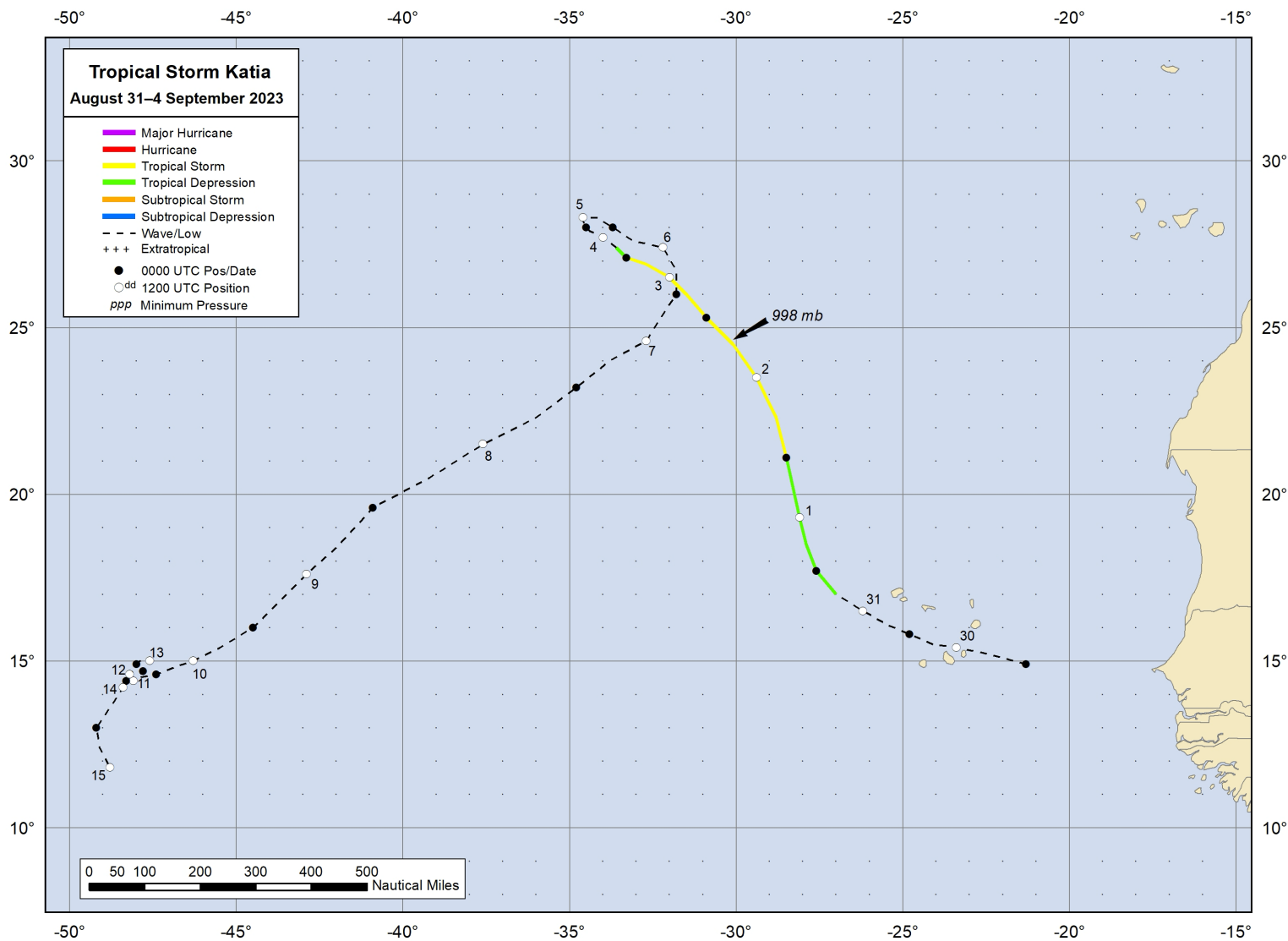


Figure 1. Best track positions for Tropical Storm Katia, 31 August–4 September 2023.

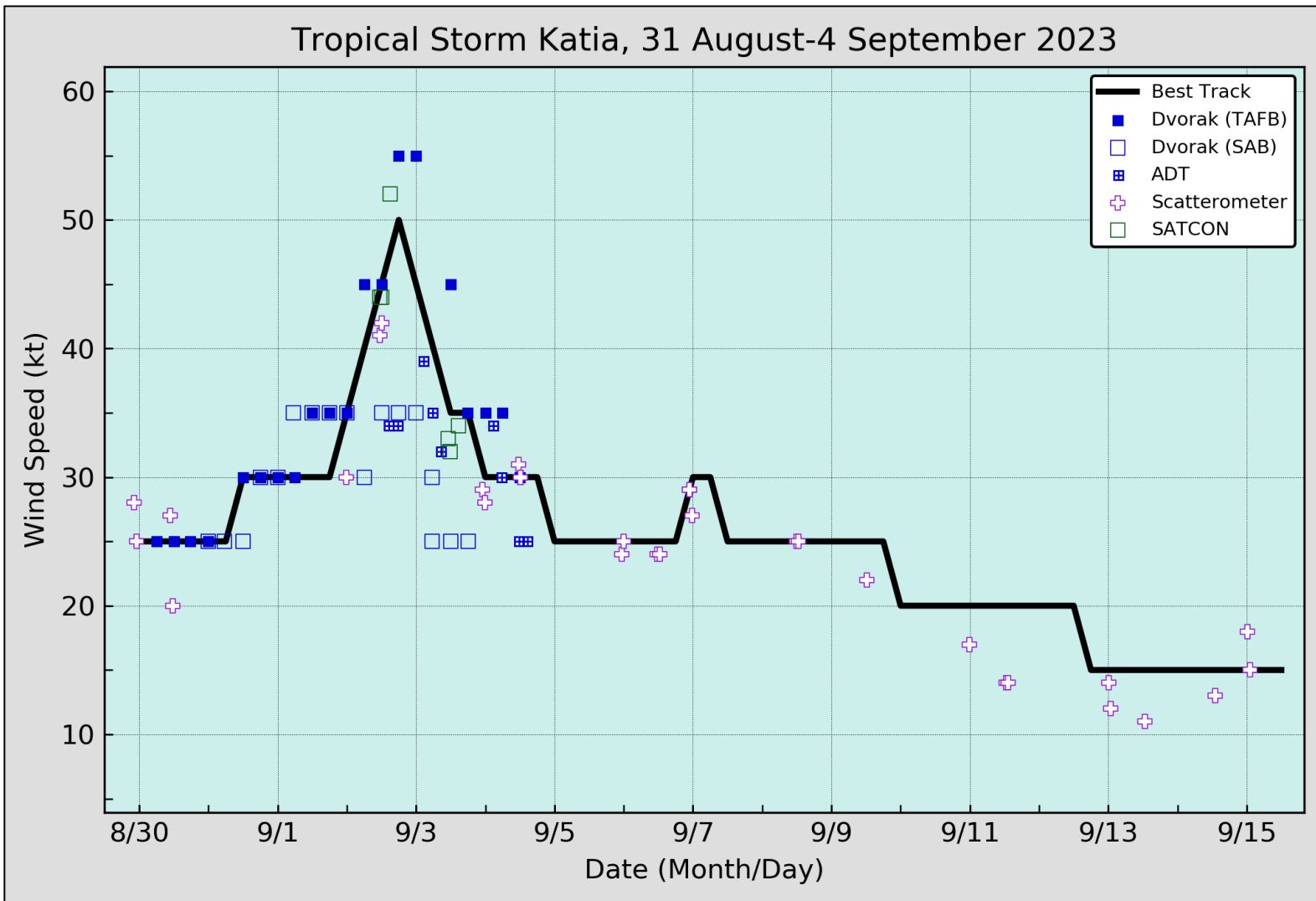


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Katia, 31 August–4 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

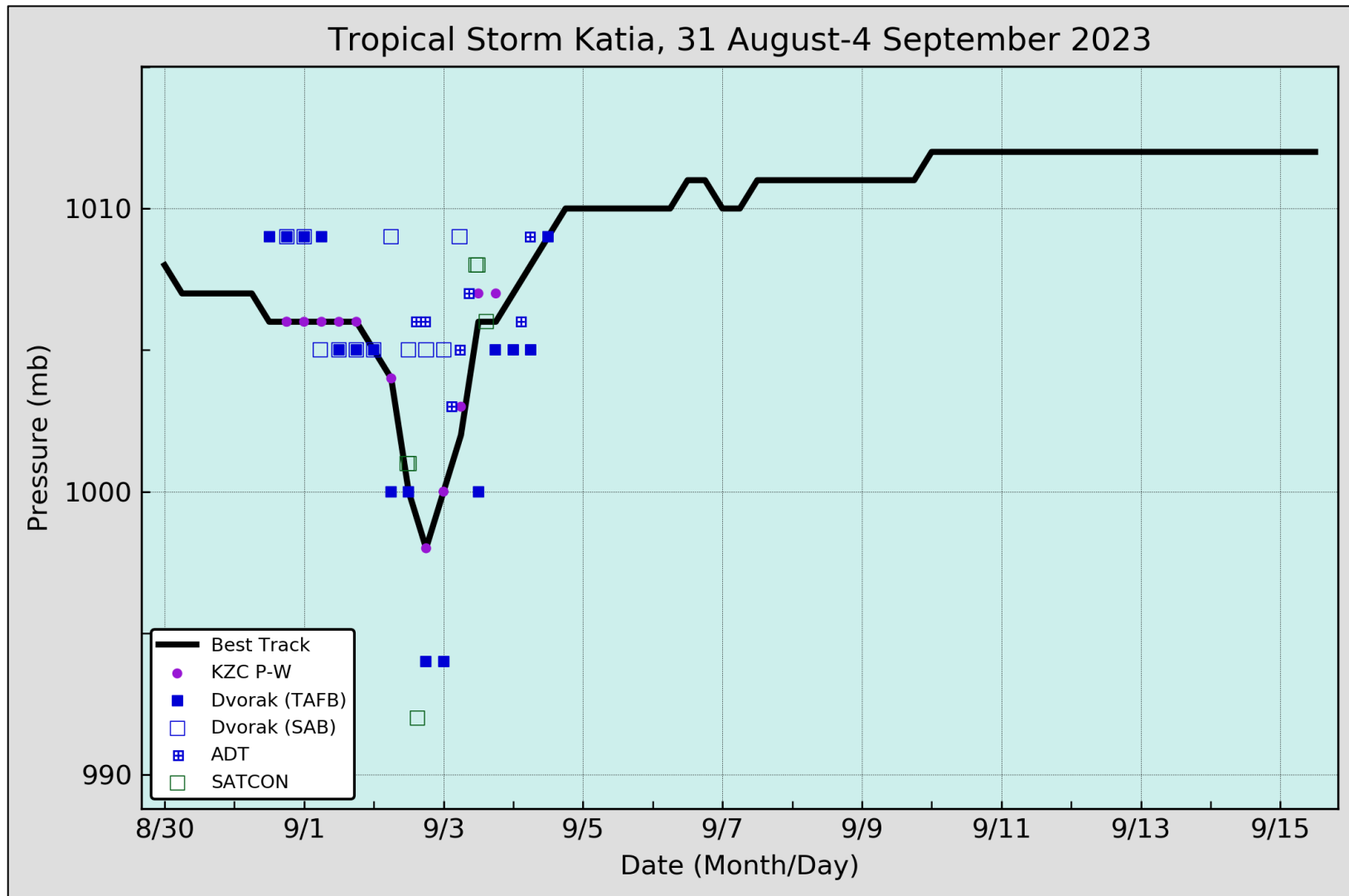


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Katia, 31 August–4 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute 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.

Katia 7-day Tropical Weather Outlook Areas

From: 1800 UTC 25 Aug 2023 to 1800 UTC 31 Aug 2023

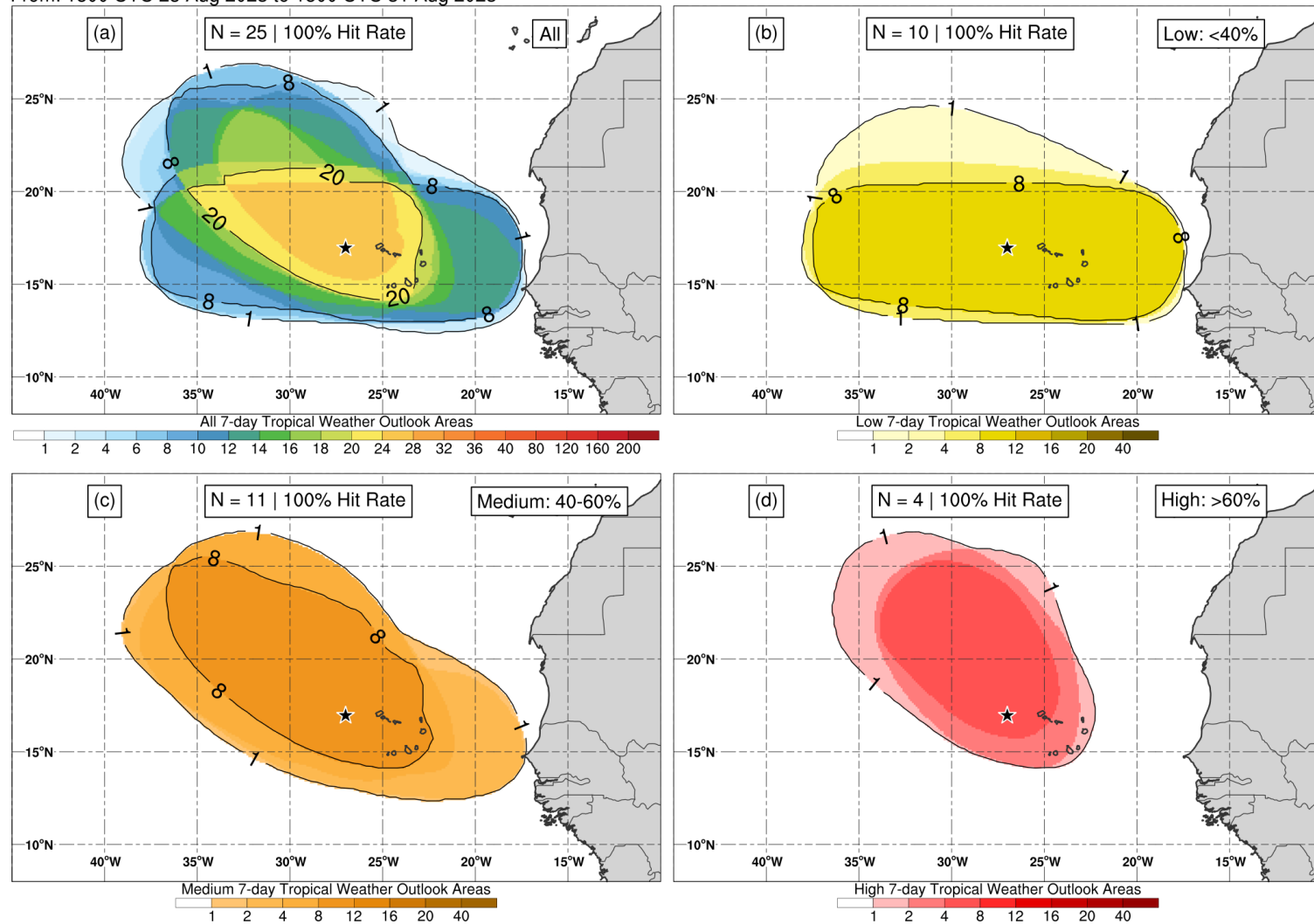


Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Katia for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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