

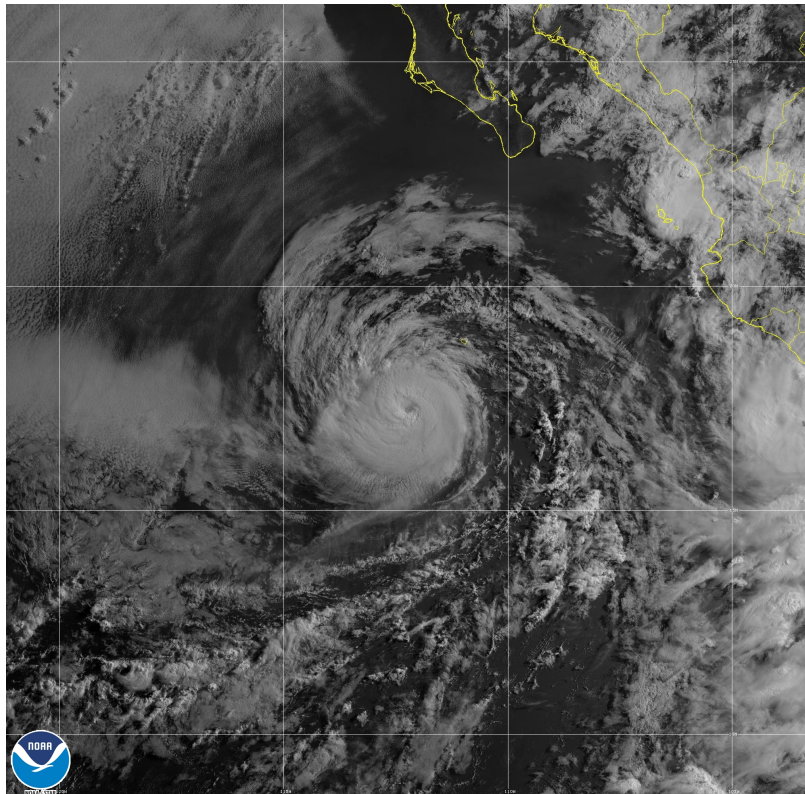


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

HURRICANE ADRIAN (EP012023)

27 June-2 July 2023

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National Hurricane Center
30 November 2023



30 Jun 2023 15:00Z - NOAA/NESDIS/STAR GOES-West - Band 02 - HU Adrian
GOES-18 VISIBLE IMAGE OF HURRICANE ADRIAN AT 1500 UTC 30 JUNE 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR.

Adrian was a Category 2 hurricane that remained over the open waters of the eastern North Pacific Ocean and did not directly impact land.

¹ This is an abbreviated Tropical Cyclone Report since there were no coastal watches or warnings and no direct fatalities reported in association with Adrian.

Hurricane Adrian

27 JUNE-2 JULY 2023

BEST TRACK

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

Origin

Adrian formed around 1200 UTC 27 June about 250 n mi south of Manzanillo, Mexico. The pre-existing disturbance from which Adrian developed is difficult to track, but it appears to have been a tropical wave that crossed Central America around 23-24 June.

Peak Intensity and Minimum Pressure

Adrian’s peak intensity of 90 kt from 1200 UTC to 1800 UTC 30 June is based on a blend of Dvorak estimates from TAFB, SAB, and the ADT at 0600 and 1200 UTC. The minimum central pressure of 970 mb is based on a blend of the Knaff-Zehr-Courtney pressure wind relationship and ADT estimates.

On 1 July, an automated observing station on Clarion Island located at 18.3°N 114.7°W measured a maximum sustained wind of 33 kt at 1015 UTC with a peak gust to 48 kt at 1130 UTC and a minimum pressure of 994 mb at 1445 UTC as the center of the weakening storm passed

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 Adrian.

just to the north. Based on a comparison with routine TAFB surface analyses, the pressure at this station appears to be a few mb too low.

CASUALTY AND DAMAGE STATISTICS

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

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. Adrian's genesis was well-anticipated in the longer range (e.g. 7 days) but not in the short range, since the 48-hour genesis probabilities were never put in the high category. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Adrian, and it can be seen that the NHC forecasts correctly specified the general location of genesis of this hurricane.

A verification of NHC official track forecasts for Adrian is given in Table 3a. 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 Adrian is given in Table 4a. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The mean official track forecast errors for Adrian were generally a little above the long-term averages, and the mean official intensity errors were below the averages. HFAI, HFBI, and GFSI (the HAFS and GFS models) were among the best performers for track guidance with mean errors mostly lower than the official forecasts. The mean official intensity forecasts were generally as good or better than the model guidance except at 96 hours for a single case.

There were no coastal watches or warnings issued for Adrian.

ACKNOWLEDGEMENTS

Philippe Papin provided Fig. 4.



Table 1. Best track for Hurricane Adrian, 27 June–2 July 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
27 / 1200	15.2	104.5	1006	30	tropical depression
27 / 1800	15.2	105.5	1002	40	tropical storm
28 / 0000	15.2	106.4	997	50	"
28 / 0600	15.2	107.1	994	55	"
28 / 1200	15.2	107.6	989	65	hurricane
28 / 1800	15.3	108.1	986	70	"
29 / 0000	15.4	108.7	986	70	"
29 / 0600	15.6	109.4	982	75	"
29 / 1200	15.9	109.9	982	75	"
29 / 1800	16.2	110.4	980	75	"
30 / 0000	16.5	111.0	976	80	"
30 / 0600	16.7	111.4	973	85	"
30 / 1200	17.0	111.9	970	90	"
30 / 1800	17.3	112.5	970	90	"
01 / 0000	17.6	113.1	977	80	"
01 / 0600	17.9	113.7	983	70	"
01 / 1200	18.2	114.2	994	55	tropical storm
01 / 1800	18.5	114.7	997	50	"
02 / 0000	18.8	115.2	1000	45	"
02 / 0600	19.1	115.8	1005	35	"
02 / 1200	19.4	116.4	1005	30	low
02 / 1800	19.7	117.1	1005	25	"
03 / 0000	19.9	117.8	1006	25	"
03 / 0600	20.0	118.5	1007	25	"
03 / 1200	20.1	119.3	1007	20	"
03 / 1800	20.2	120.0	1010	20	"
04 / 0000	20.1	120.6	1011	20	"
04 / 0600	20.0	121.1	1011	15	"
04 / 1200	19.9	121.7	1011	15	"
04 / 1800	19.9	122.4	1012	15	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
05 / 0000					dissipated
30 / 1200	17.0	111.9	970	90	Maximum winds and minimum pressure

Table 2. Number of hours in advance of formation of Adrian 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%)	96	168
Medium (40%-60%)	18	150
High (>60%)	0	126

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Adrian, 27 June–2 July 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	20.8	34.9	47.8	71.5	92.3	106.3	126.8	
OCD5	27.9	53.0	76.1	112.2	164.7	224.1	446.4	
Forecasts	17	15	13	11	9	7	3	
OFCL (2018-22)	22.1	34.0	45.4	56.0	70.9	78.7	100.5	
OCD5 (2018-22)	36.7	73.4	114.0	156.9	193.2	244.5	317.0	



Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Adrian, 27 June–2 July 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	20.5	34.0	46.5	69.5	90.1	106.0	120.1	
OCD5	21.8	38.0	52.1	76.8	115.8	159.7	370.9	
HFAI	21.3	32.5	42.4	55.6	67.4	87.8	144.6	
HFBI	19.8	33.6	45.6	59.7	65.7	77.5	88.5	
HWFI	26.7	54.9	83.8	112.7	144.0	183.4	251.8	
HMNI	24.2	41.0	57.6	78.4	90.7	103.0	157.3	
CTCI	17.4	28.6	50.0	77.4	110.1	145.6	188.0	
GFSI	18.1	28.6	39.1	57.3	66.6	75.6	85.2	
EMXI	25.2	44.9	63.0	89.2	114.7	135.0	143.4	
EGRI	35.7	64.8	89.9	114.4	141.7	177.7	236.1	
CMCI	26.1	46.1	76.7	109.1	130.3	155.0	178.3	
AEMI	19.5	33.8	49.4	73.5	99.0	126.0	194.4	
TVCE	21.8	38.5	54.3	76.5	97.1	117.6	152.4	
HCCA	22.8	35.3	45.6	64.2	81.2	97.0	120.1	
FSSE	22.0	35.8	49.9	68.1	92.2	109.5	130.5	
Forecasts	15	13	11	9	7	5	1	0



Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Adrian, 27 June–2 July 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	3.8	7.3	7.7	5.9	7.2	6.4	6.7	
OCD5	7.0	12.9	15.6	15.3	16.9	18.7	10.0	
Forecasts	17	15	13	11	9	7	3	
OFCL (2018-22)	5.4	8.9	11.0	12.8	14.3	15.8	17.0	
OCD5 (2018-22)	6.9	12.1	15.9	18.6	18.7	21.0	22.3	



Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Adrian, 27 June–2 July 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	4.3	7.7	8.6	7.2	6.4	3.0	15.0	
OCD5	6.9	13.2	16.3	15.4	14.4	15.6	20.0	
DSHP	5.6	8.8	9.4	7.8	10.3	11.0	6.0	
LGEM	5.9	8.5	9.5	5.4	8.4	12.0	12.0	
HFAI	10.4	13.1	15.9	19.0	16.9	11.2	6.0	
HFBI	7.3	11.1	16.4	19.8	18.4	14.0	7.0	
HWFI	7.9	11.2	13.0	12.9	10.3	6.6	1.0	
HMNI	7.5	12.6	14.5	14.6	12.1	10.4	7.0	
CTCI	7.9	12.1	14.1	13.2	10.0	7.6	2.0	
GFSI	7.9	13.2	13.7	10.6	10.0	7.8	3.0	
EMXI	8.9	16.1	19.2	18.4	14.6	7.8	0.0	
EGRI	9.7	14.7	16.4	14.8	13.3	14.0	15.0	
CMCI	11.1	19.7	22.5	20.9	19.7	15.6	5.0	
IVCN	6.3	8.2	8.9	9.7	7.3	4.8	0.0	
ICON	5.5	7.5	7.5	6.6	7.4	6.4	3.0	
HCCA	5.6	8.2	10.1	10.7	9.6	8.2	6.0	
FSSE	5.6	8.2	9.8	11.9	11.7	11.2	6.0	
Forecasts	15	13	11	9	7	5	1	0

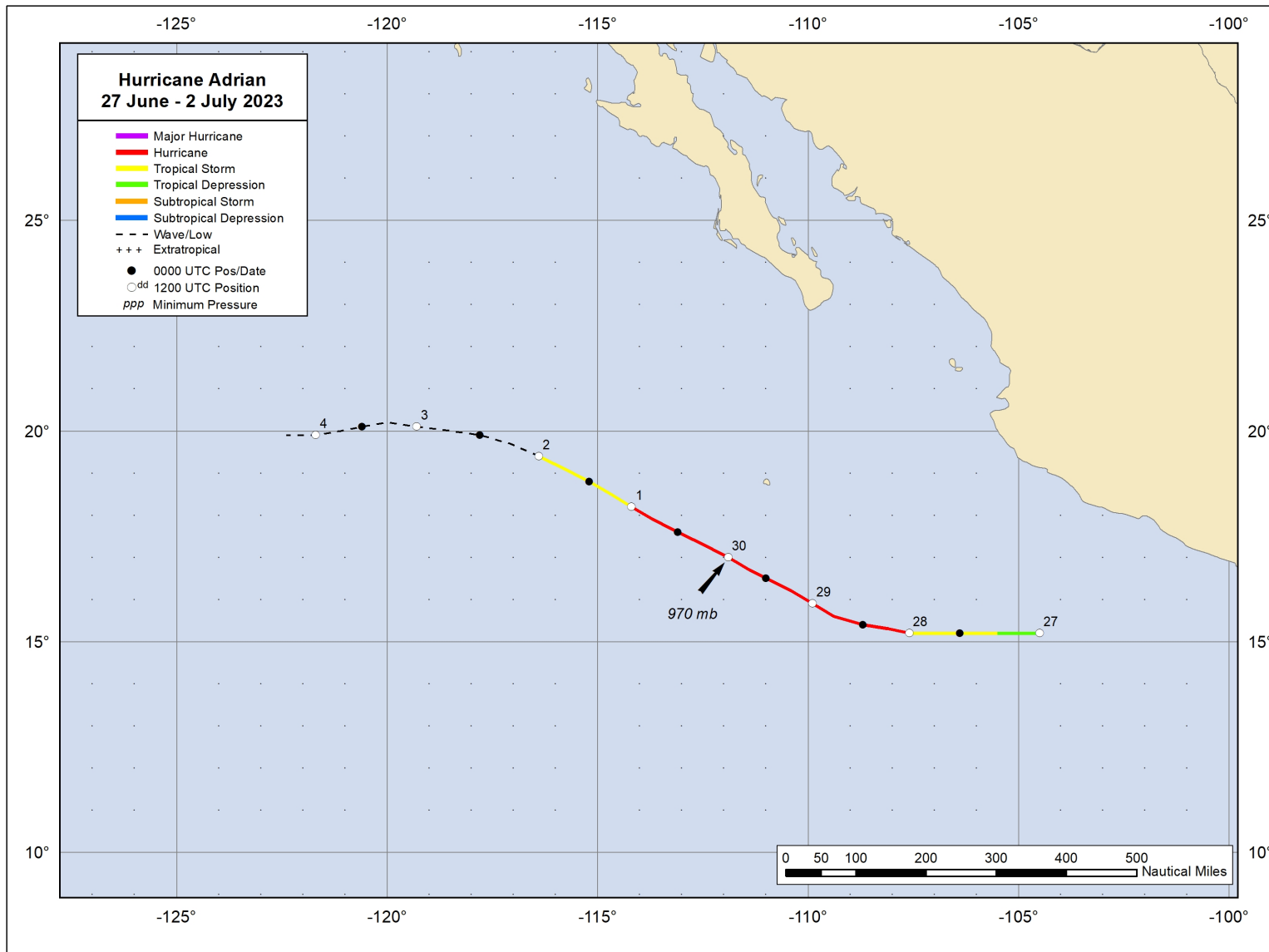


Figure 1. Best track positions for Hurricane Adrian, 27 June–2 July 2023.

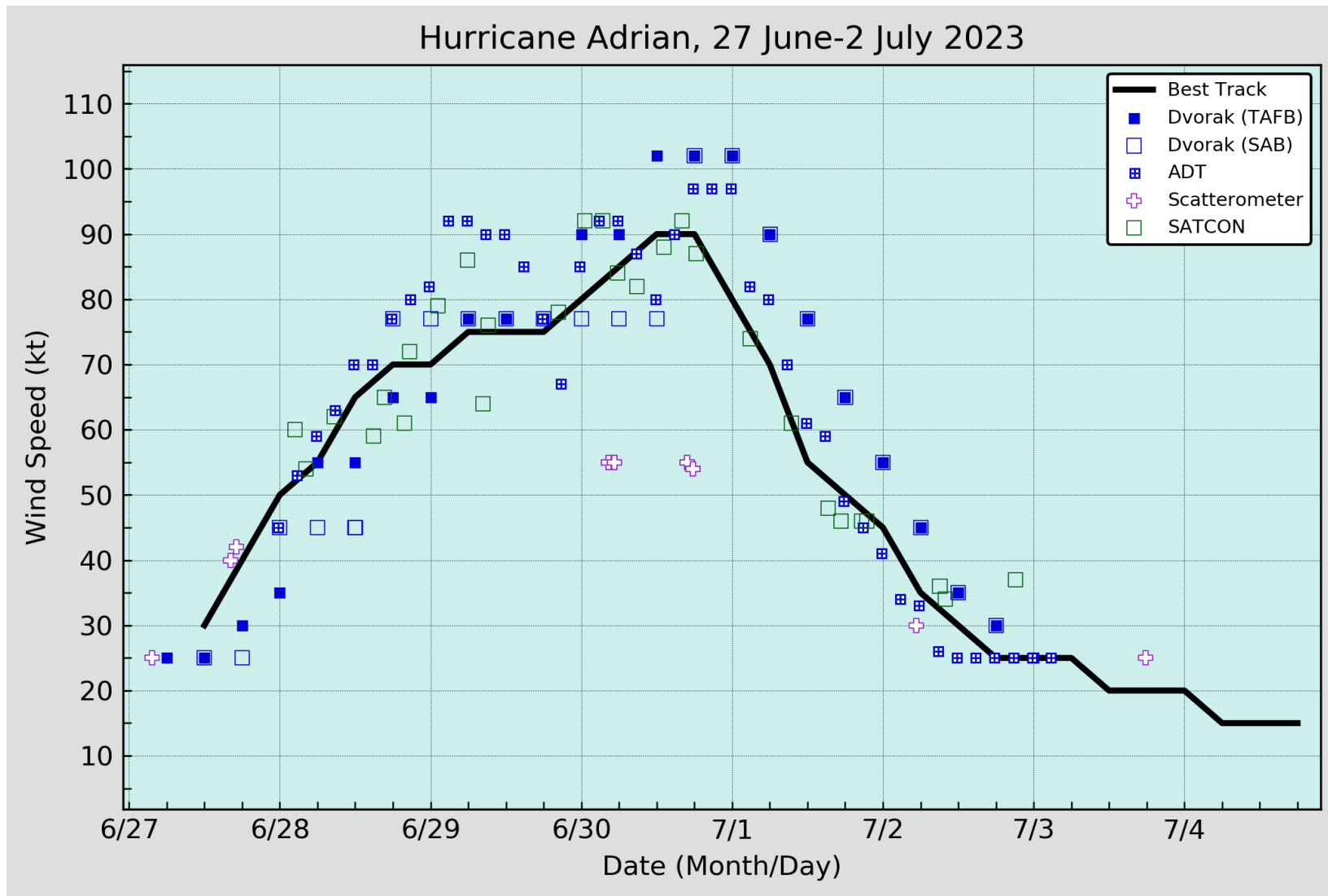


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Adrian, 27 June–2 July 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

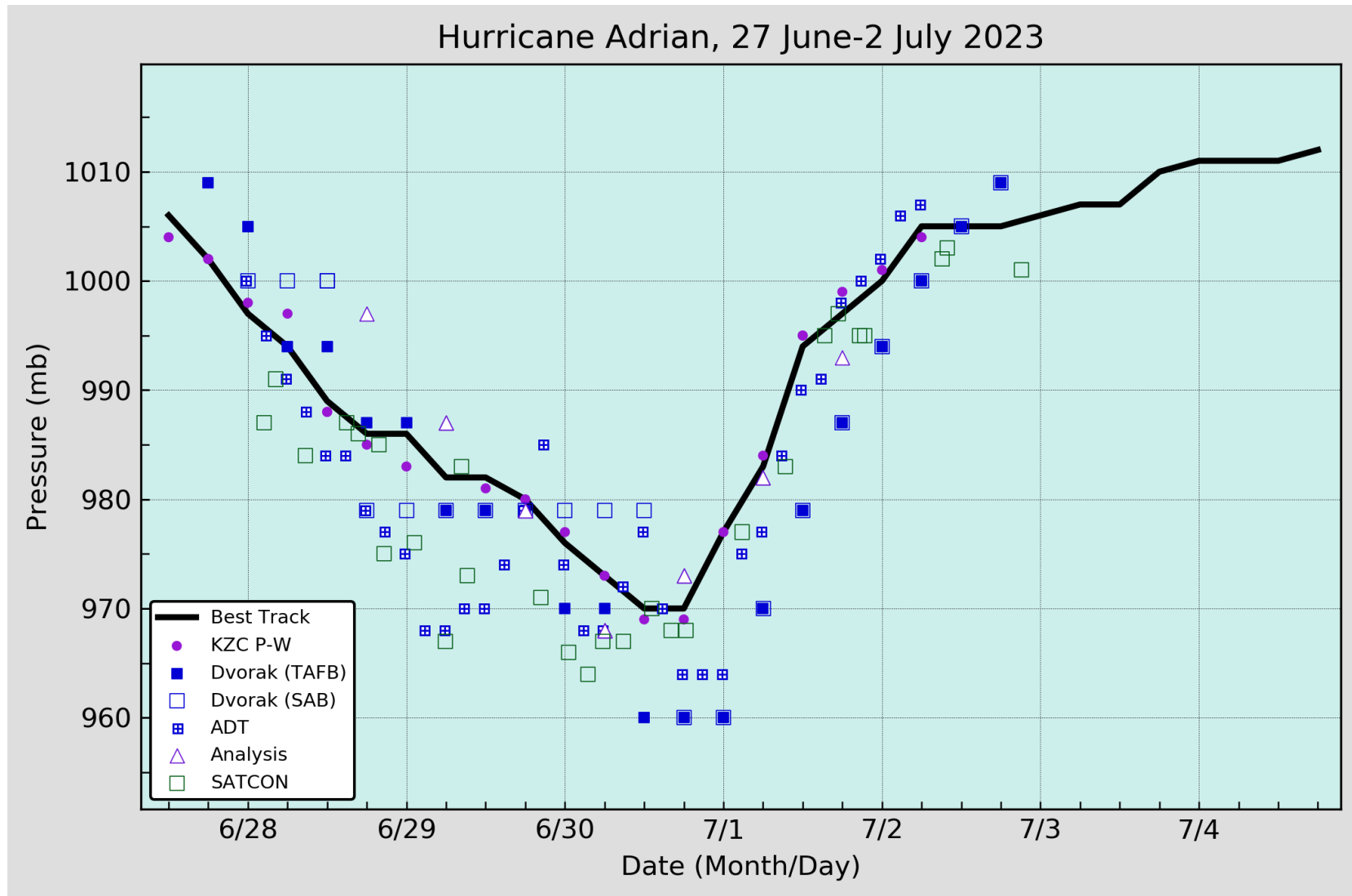


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Adrian, 27 June–2 July 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

Adiran 7-day Tropical Weather Outlook Areas

From: 1200 UTC 20 Jun 2023 to 1200 UTC 27 Jun 2023

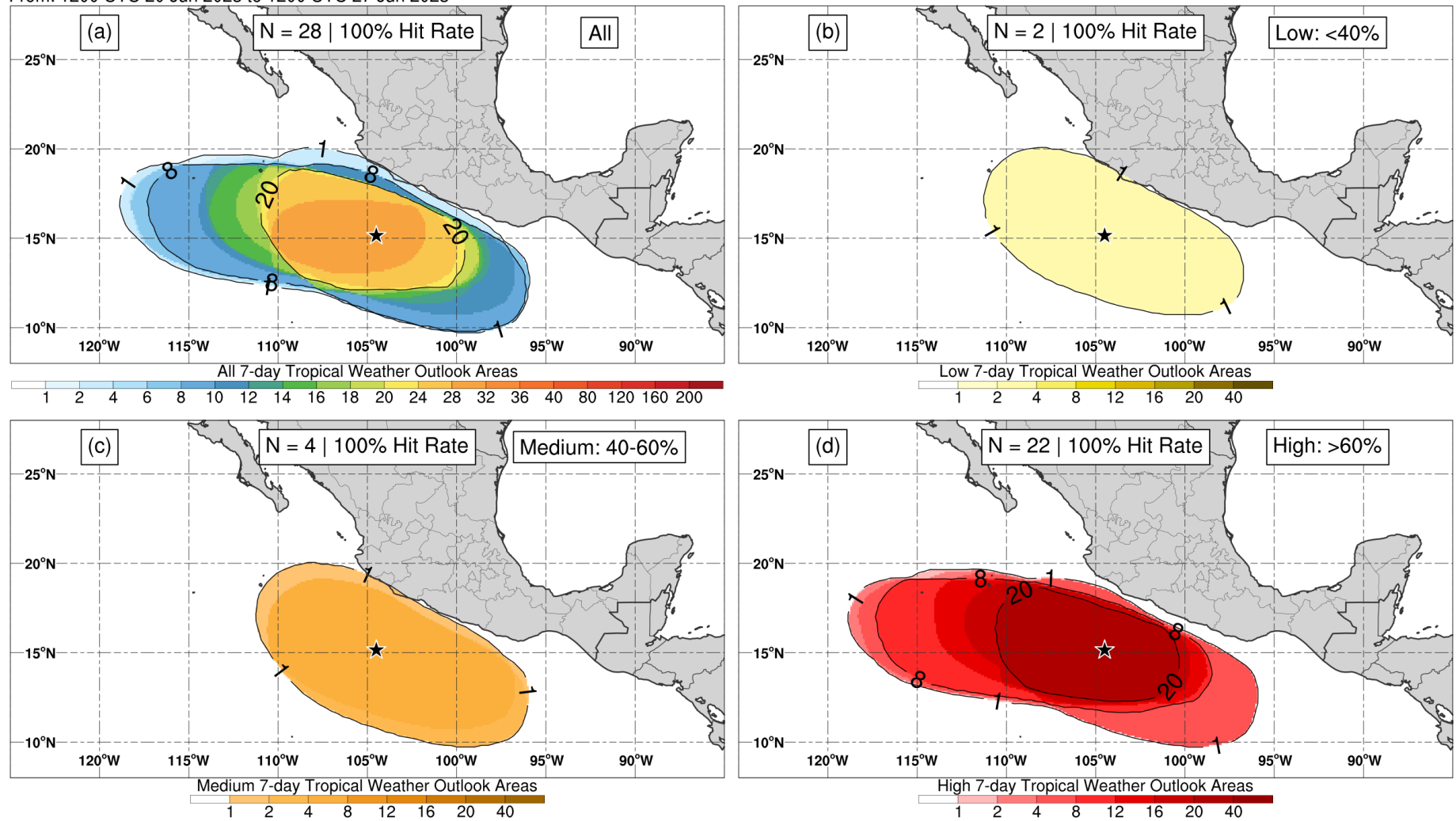


Figure 4. Composites of 5-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Hurricane Adrian for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) the medium (40–60%) category, and (d) the high (>60%) category. Adrian’s location of genesis is indicated by the black star, and the hit rate in each plot indicates the percentage of outlook areas that captured the location of genesis.