NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

TROPICAL STORM IVETTE

(EP102022)

13–16 August 2022

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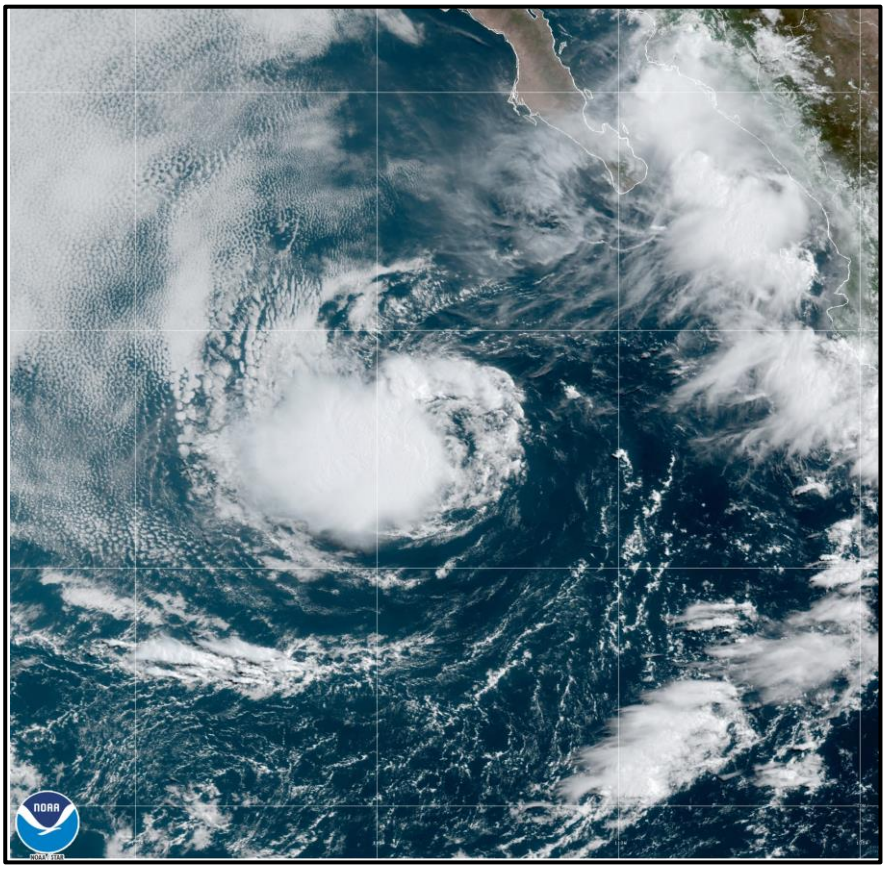
1 March 2023



GOES-16 GEOCOLOR SATELLITE IMAGE OF TROPICAL STORM IVETTE AT 1600 UTC 15 AUGUST 2022. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Ivette was a short-lived, minimal tropical storm that remained over the open waters of the eastern North Pacific

Tropical Storm Ivette

13–16 AUGUST 2022

SYNOPTIC HISTORY

Ivette appears to have originated from a tropical wave that crossed Central America and entered the eastern North Pacific on 7 August. This system cannot be easily traced back to Africa, but was evident as a low-pressure area over the southwestern Caribbean Sea on 4–5 August. The wave moved westward to the south of Central America and eastern Mexico through 8 August with little noticeable change in organization. On 9 August, the disturbance's associated deep convection began to increase, and the system showed signs of organization to the south of the southern Mexican coast the following day. Some banding features became apparent on 11 August, prompting the first Dvorak classifications that day. On 12 August, a low-level circulation formed a couple of hundred n mi south-southwest of Manzanillo, Mexico, but the system lacked sufficient deep convection to qualify as a tropical cyclone at that time. Under the influence of a low- to mid-level ridge to its north, the low turned from a northwestward to a west-northwestward heading. At around 1200 UTC 13 August, convection had increased enough to designate the formation of a tropical depression a little over 300 n mi south of the southern tip of the Baja California peninsula. The "best track" chart of the tropical cyclone's path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1[1].

The tropical cyclone formed within an environment of moderate to strong easterly to east-northeasterly vertical wind shear due to strong flow associated with a large upper-level anticyclone near northwestern Mexico. As a result, the low-level center of the cyclone was located near the eastern edge of the main area of deep convection, and on 14 August the center became even more removed to the east and northeast of the convection. The sheared environment limited significant strengthening, and after barely hanging on as a tropical cyclone, Ivette reached minimal tropical storm strength of 35 kt around 1200 UTC 15 August while centered about 370 n mi south-southwest of the southern tip of the Baja California peninsula. The system was moving very slowly southwestward within weak steering currents. Tropical storm status was short lived, and Ivette weakened back to a tropical depression by 0000 UTC 16 August as deep convection again became sheared to the west and southwest of the center.

[1] 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.

By 1800 UTC 16 August, Ivette no longer had enough organized convection to be considered a tropical cyclone, and the system degenerated into a remnant low pressure area centered about 440 n mi southwest of the southern tip of the Baja California peninsula. After moving quite slowly and at times becoming quasi-stationary from 14-16 August, the remnant low moved westward or west-northwestward at a faster forward speed within the low-level trade wind flow for around six days while intermittently generating patches of deep convection. The low dissipated late on 22 August about 1400 n mi east-southeast of the Hawaiian Islands.

METEOROLOGICAL STATISTICS

Observations in Ivette (Figs. 2 and 3) 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 this system. Ivette's peak intensity of 35 kt is based on ASCAT measurements ranging from 32 to 37 kt around 1700 UTC 15 August.

No ship or land reports of tropical-storm-force winds associated with Ivette have been received.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties due to Ivette.

FORECAST AND WARNING CRITIQUE

The genesis of Ivette was well anticipated, despite it being a weak system. It was first mentioned in the Tropical Weather Outlook (TWO) 126 h prior to genesis that an area of low pressure was forecast to form a few hundred miles south of southwestern Mexico in a few days, with a low (<40%) probability of development within 120 h (Table 2). A low probability of development within 48 h was first mentioned 102 h prior to genesis. The 120-h and 48-h genesis probabilities were raised to medium (40%-60%) 108 h and 78 h prior to formation, respectively. These probabilities were boosted into the high (>60%) category 84 h and 42 h prior to genesis, respectively. Figure 4 shows a composite of the genesis areas that were depicted in the Graphical TWOs (GTWOs) prior to Ivette's development, and the genesis location was correctly captured in every GTWO. It should be noted that, in the TWOs issued within a couple of days of Ivette's formation, it was stated that the system was expected to be a short-lived tropical cyclone.

Ivette's track and intensity were reasonably well predicted by the official forecasts, although the number of verifying forecasts is small due to the system's short lifetime as a tropical cyclone. A verification of NHC official track forecasts for Ivette is given in Table 3a. Official track forecast errors were comparable to the previous 5-yr mean errors at the 12- through 60-h forecast intervals. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. The European and Canadian models (EMXI and CMCI) were among the best performers, with slightly lower errors than the official forecasts.

A verification of NHC official intensity forecasts for Ivette is given in Table 4a. Official intensity forecast errors were lower than the mean official errors for the previous 5-yr period for the 12- through 60-h forecast intervals. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The Decay-SHIPS (DSHP) guidance generally had the lowest intensity errors. The official forecasts for Ivette (correctly) never called for it to strengthen much at all, although at least one NHC advisory did acknowledge the possibility that Ivette could briefly become a tropical storm.

There were no coastal watches or warnings required or issued in association with Ivette.

ACKNOWLEDGEMENTS

Figure 4 was provided by Philippe P. Papin of the National Hurricane Center.

Table 1. Best track for Tropical Storm Ivette, 13-16 August 2022.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
12 / 1200	15.4	106.7	1009	25	low
12 / 1800	16.0	107.6	1009	25	"
13 / 0000	16.7	108.5	1009	25	"
13 / 0600	17.3	109.4	1009	25	"
13 / 1200	17.7	110.3	1008	30	tropical depression
13 / 1800	17.9	111.1	1007	30	"
14 / 0000	18.1	111.9	1007	30	"
14 / 0600	18.2	112.4	1007	30	"
14 / 1200	18.2	112.9	1007	30	"
14 / 1800	18.1	113.1	1007	30	"
15 / 0000	18.0	113.3	1007	30	"
15 / 0600	17.9	113.4	1007	30	"
15 / 1200	17.8	113.5	1005	35	tropical storm
15 / 1800	17.7	113.7	1005	35	"
16 / 0000	17.6	113.9	1006	30	tropical depression
16 / 0600	17.4	114.2	1006	30	"
16 / 1200	17.2	114.5	1006	30	"
16 / 1800	17.2	114.8	1007	25	low
17 / 0000	17.3	115.3	1007	25	"
17 / 0600	17.5	115.7	1007	25	"
17 / 1200	17.7	116.2	1007	25	"
17 / 1800	17.9	116.7	1008	20	"
18 / 0000	18.1	117.1	1008	20	"
18 / 0600	18.4	117.6	1008	20	"
18 / 1200	18.5	118.2	1008	20	"
18 / 1800	18.4	118.8	1009	20	"
19 / 0000	18.2	119.3	1009	20	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
19 / 0600	17.9	119.7	1009	20	"
19 / 1200	17.6	120.0	1009	20	"
19 / 1800	17.2	120.5	1009	20	"
20 / 0000	16.9	121.0	1009	20	"
20 / 0600	16.6	121.5	1009	20	"
20 / 1200	16.4	122.2	1008	25	"
20 / 1800	16.4	122.9	1008	25	"
21 / 0000	16.6	123.7	1008	25	"
21 / 0600	16.9	124.6	1008	25	"
21 / 1200	17.0	125.6	1008	25	"
21 / 1800	17.1	126.7	1008	25	"
22 / 0000	17.2	127.8	1010	25	"
22 / 0600	17.2	128.9	1010	25	"
22 / 1200	17.2	130.0	1010	25	"
22 / 1800	17.1	131.1	1011	20	"
23 / 0000					dissipated
15 / 1200	17.8	113.5	1005	35	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	**120-Hour Outlook**
Low (<40%)	102	126
Medium (40%-60%)	78	108
High (>60%)	42	84

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Ivette, 13-16 August 2022. 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	**21.8**	42.2	58.6	73.1	**70.3**			
OCD5	34.5	83.5	150.4	249.6	326.4			
Forecasts	10	8	6	4	2	0	0	0
OFCL (2017-21)	21.9	33.8	45.6	56.9	74.8	79.9	99.5	121.3
OCD5 (2017-21)	35.8	72.3	112.7	155.0	198.7	239.0	309.2	372.2

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Ivette, 13-16 August 2022. Errors smaller than the NHC official forecast are shown in boldface type.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	21.8	42.2	58.6	73.1	70.3			
OCD5	34.5	83.5	150.4	249.6	326.4			
GFSI	27.9	45.8	**57.1**	77.4	77.5			
EMXI	**20.4**	**34.4**	**47.8**	**52.3**	**36.4**			
CMCI	**18.6**	**30.6**	**37.8**	**45.2**	**46.2**			
EGRI	29.5	50.5	78.9	121.1	171.5			
NVGI	22.5	**41.0**	66.7	104.2	114.2			
HWFI	29.2	57.8	89.6	129.8	201.4			
HMNI	28.0	44.8	**46.9**	**50.5**	**52.5**			
CTCI	26.7	42.8	**53.3**	**64.2**	**51.4**			
AEMI	26.1	45.2	60.2	82.4	86.2			
HCCA	**18.6**	**33.8**	**44.2**	**54.5**	**62.2**			
GFEX	22.8	**37.9**	**47.1**	**57.0**	**54.6**			
TVCE	24.5	43.3	**57.5**	76.8	92.0			
TVCX	23.4	42.8	59.4	79.6	88.1			
TVDG	24.7	43.1	60.1	83.6	95.3			
TABD	44.6	98.7	160.8	225.4	277.9			
TABM	30.1	56.5	86.5	126.3	151.2			
TABS	27.8	51.2	70.7	97.0	120.1			
Forecasts	10	8	6	4	2	0	0	0

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Ivette, 13-16 August 2022. 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	**2.5**	**3.8**	**6.7**	**11.2**	**10.0**			
OCD5	4.4	3.9	5.8	6.8	15.0			
Forecasts	10	8	6	4	2	0	0	0
OFCL (2017-21)	5.5	9.1	11.1	12.9	15.3	15.6	16.4	17.0
OCD5 (2017-21)	7.0	12.2	15.8	18.6	20.4	21.2	22.3	21.8

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Ivette, 13-16 August 2022. Errors smaller than the NHC official forecast are shown in boldface type.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	2.5	3.8	6.7	11.2	10.0			
OCD5	4.4	3.9	**5.8**	**6.8**	15.0			
HWFI	5.3	6.5	7.2	**8.2**	**5.5**			
HMNI	3.1	5.4	6.7	**8.8**	**9.5**			
CTCI	3.5	**1.9**	**3.0**	**5.0**	**8.0**			
DSHP	3.0	4.4	**2.7**	**1.0**	**3.5**			
LGEM	3.7	5.6	**5.5**	**5.0**	**4.0**			
ICON	3.3	4.6	**4.7**	**5.2**	**4.5**			
IVCN	3.0	4.0	**4.2**	**5.2**	**5.0**			
IVDR	3.1	4.2	**4.7**	**6.0**	**6.0**			
HCCA	3.0	**3.4**	**3.2**	**5.5**	**8.0**			
GFSI	4.1	5.9	7.3	**8.8**	**9.0**			
EMXI	4.0	6.1	7.5	**9.0**	10.5			
Forecasts	10	8	6	4	2	0	0	0

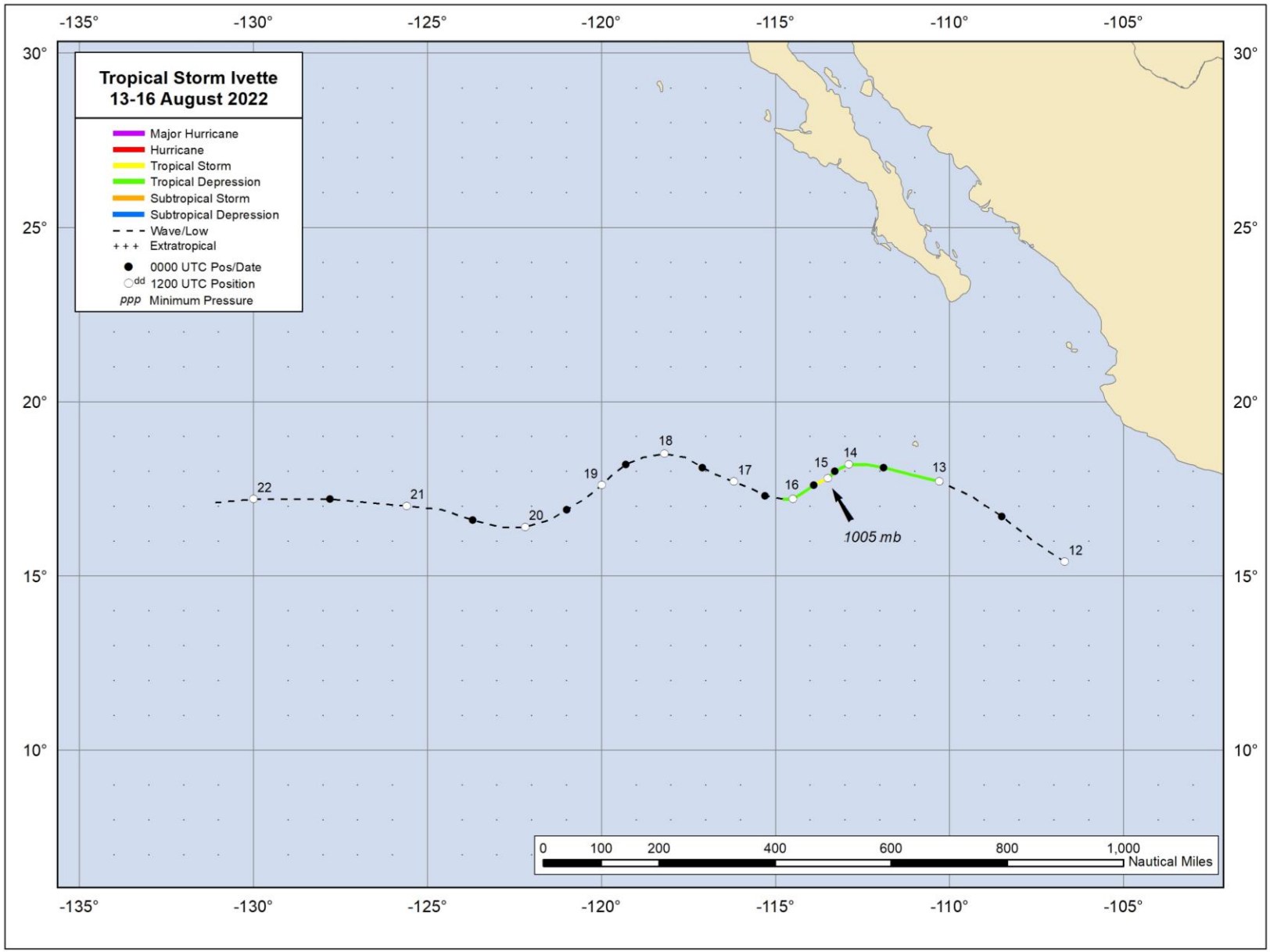


Figure 1. Best track positions for Tropical Storm Ivette, 13-16 August 2022.

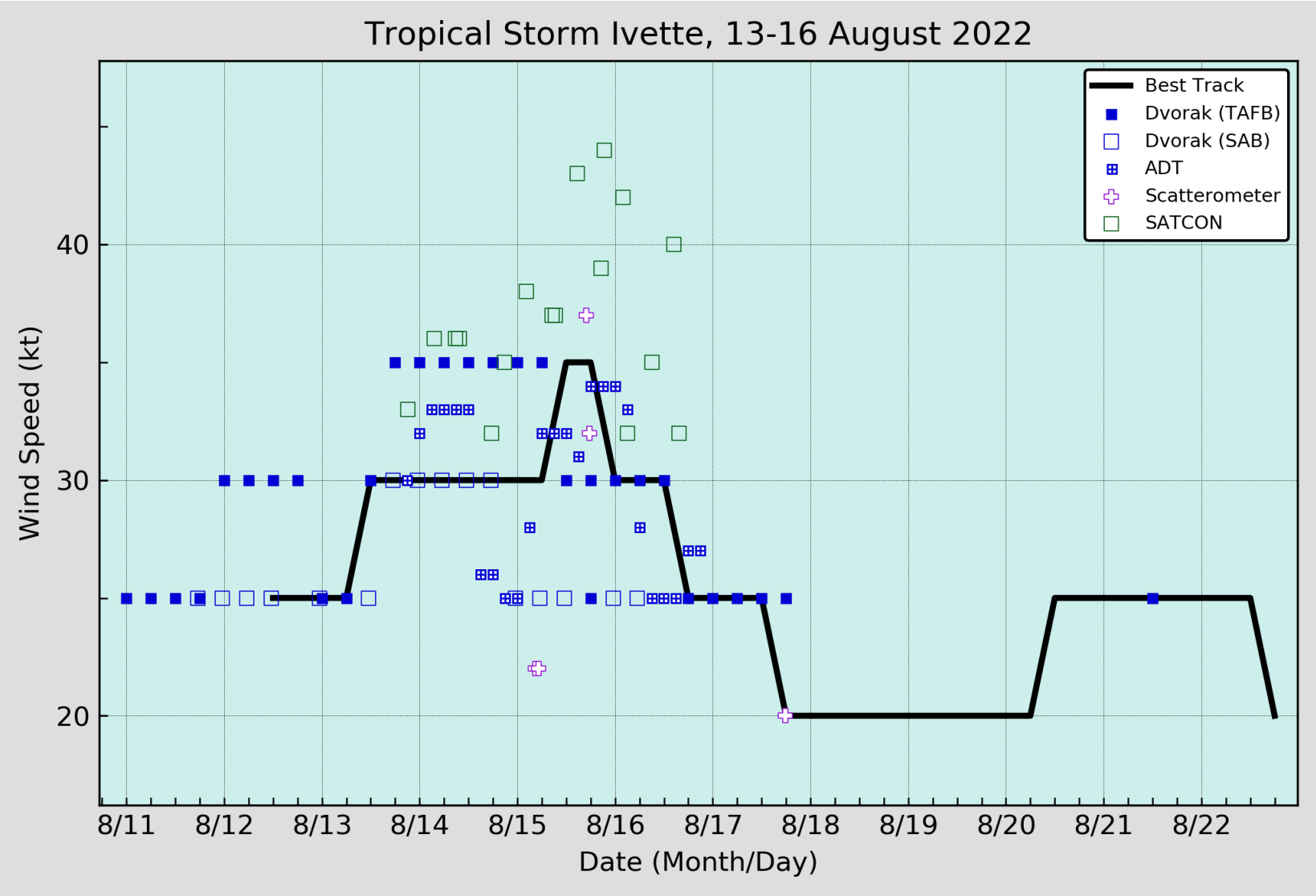


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Ivette, 13-16 August 2022. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

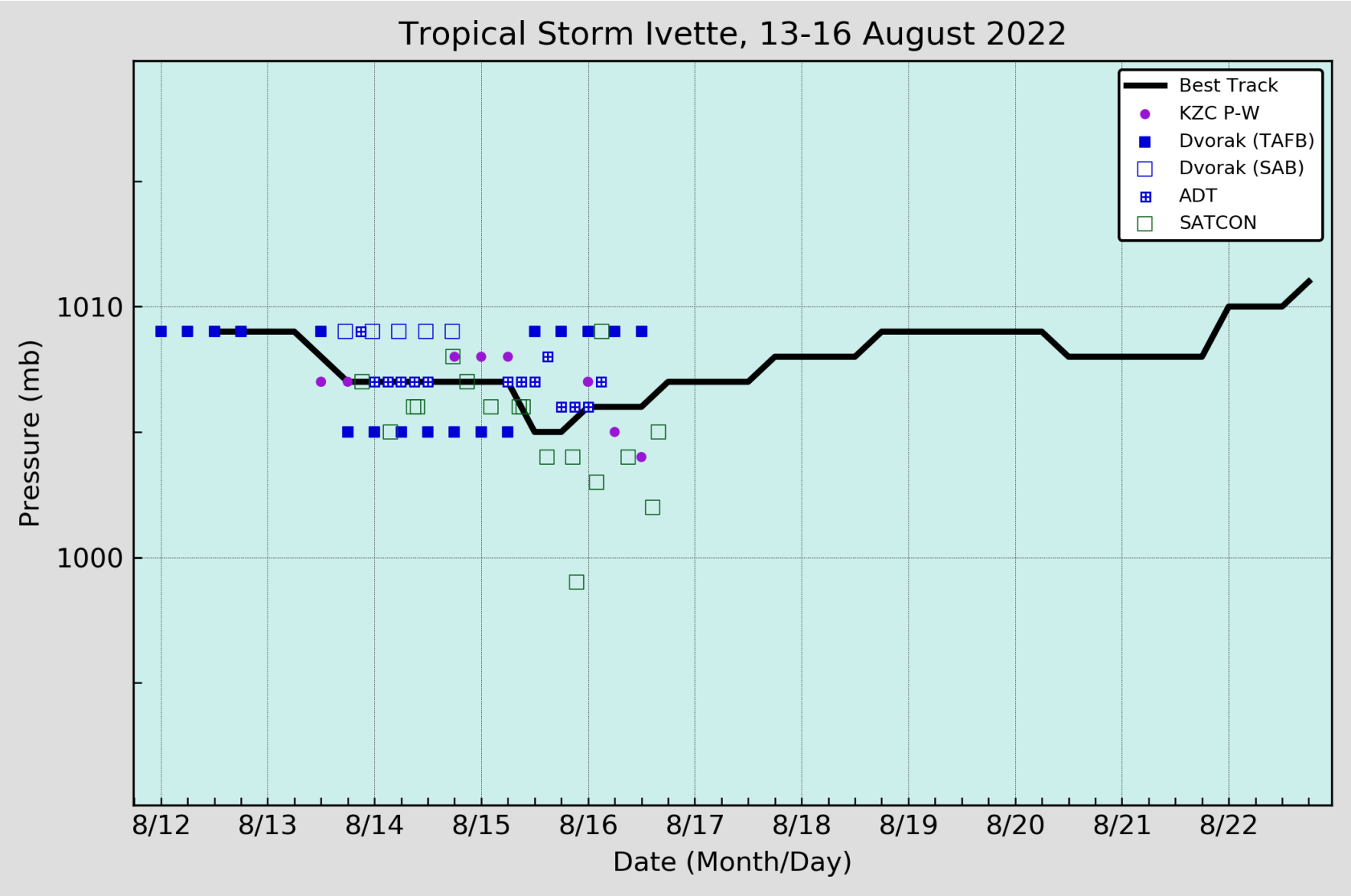


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Ivette, 13-16 August 2022. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

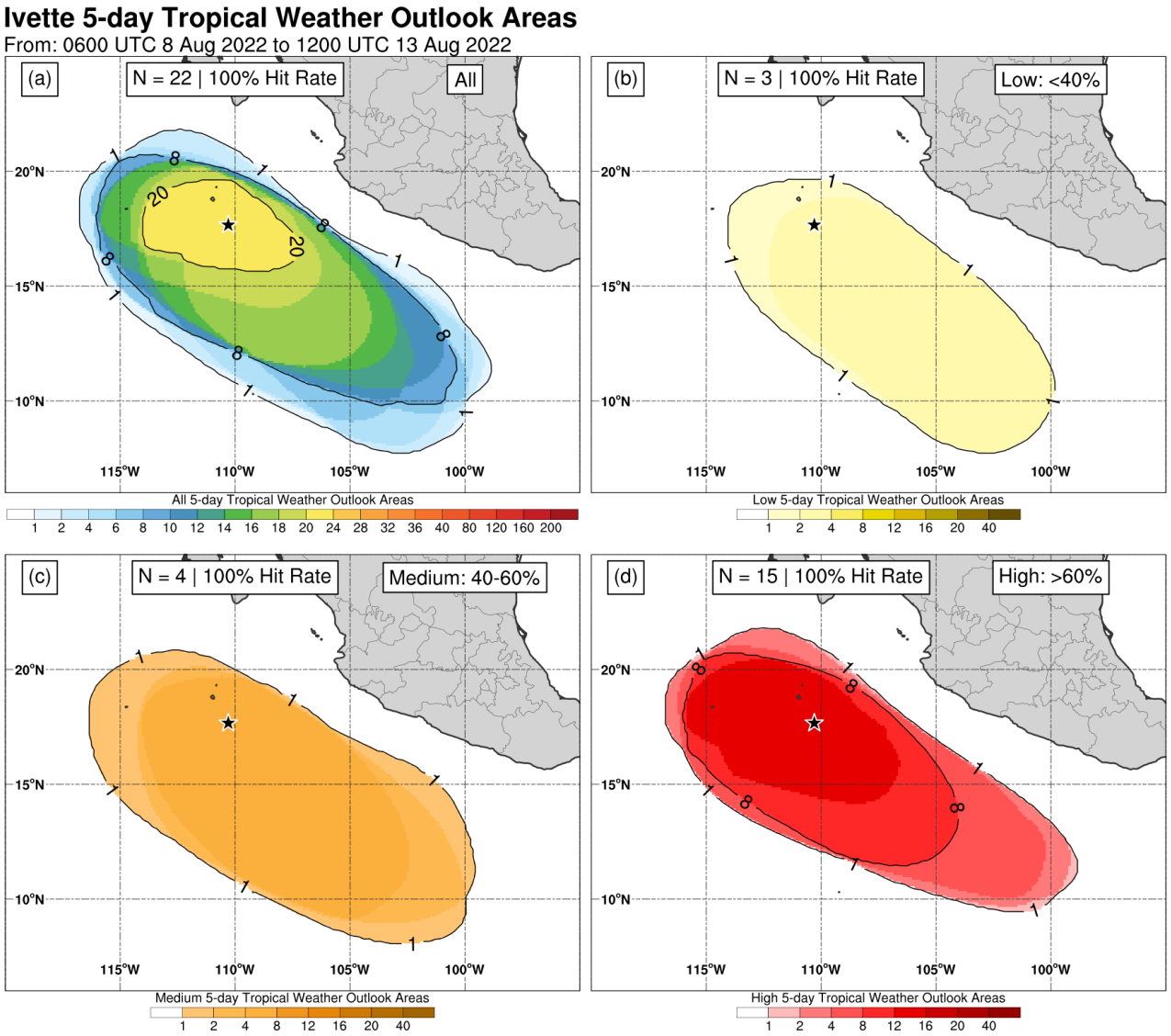


Figure 4. Composites of 5-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Tropical Storm Ivette for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) the medium (40–60%) category, and (d) the high (>60%) category. Ivette's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