NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

HURRICANE KRISTY

(EP122024)

21–27 October 2024

Lisa Bucci
National Hurricane Center
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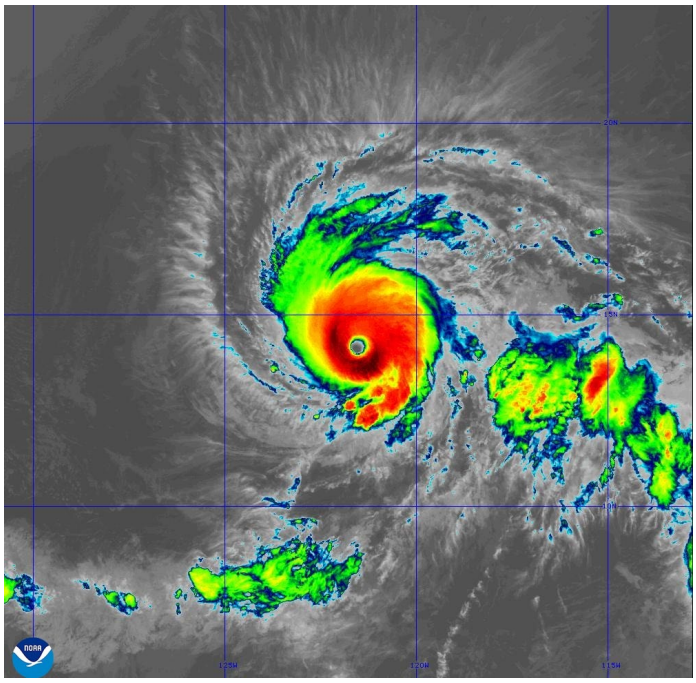

GOES-18 INFRARED SATELLITE IMAGE AT 2050 UTC 24 OCTOBER WHILE KRISTY WAS AT PEAK INTENSITY. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Hurricane Kristy was a powerful category 5 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that occurred over the eastern Pacific Ocean 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 Kristy.

Hurricane Kristy

21–27 OCTOBER 2024

BEST TRACK

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

Origin

Kristy developed from the remnants of Atlantic basin Tropical Storm Nadine[4]. The surface circulation of Nadine dissipated over southern Mexico and the remnants moved over the eastern Pacific Ocean on 20 October. Showers and thunderstorms increased in organization as the system moved quickly westward during the next day, all while maintaining a robust circulation in the mid-levels of the troposphere that was possibly enhanced by an ongoing Tehuantepec gap wind event. Based on satellite surface wind observations, a well-defined surface center developed by 1200 UTC 21 October, resulting in a tropical depression forming about 200 n mi south of Acapulco, Mexico.

Peak Intensity and Minimum Pressure

Kristy's peak intensity of 140 kt from 1800 UTC 24 October through 0000 UTC 25 October is supported by a blend of the subjective and objective satellite intensity estimates and is closest to the TAFB and SAB Dvorak estimates of T7.0/140 kt.

The estimated minimum central pressure of 926 mb at 1800 UTC 24 October is based on the Knaff-Zehr-Courtney pressure-wind relationship.

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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, and the Time-Resolved Observations of Precipitation structure and storm Intensity with a Constellation of Smallsats (TROPICS) satellites, among others, were also useful in constructing the best track of Kristy.

[4] https://www.nhc.noaa.gov/data/tcr/AL152024_Nadine.pdf

CASUALTY AND DAMAGE STATISTICS

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

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. Kristy's genesis was not predicted well in advance. The system was only introduced into the 7-day TWO 4 days before genesis occurred. The 2-day genesis probabilities were raised to the high category (>60%) 18 hours prior to formation. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Kristy. The location of genesis was east of many of the formation areas, suggesting that Kristy formed more rapidly than numerical models and forecasters anticipated.

A verification of NHC official track forecasts for Kristy is given in Table 3a. Official track forecast errors were lower than the mean official errors for the previous 5-yr period. 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 Kristy 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 through 72-hour lead times and below the mean errors for the 96- and 120-hour lead times, likely due to the rapid intensification. 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 Kristy.

ACKNOWLEDGEMENTS

Philippe Papin for generating the genesis graphic (Figure 4).

Table 1. Best track for Hurricane Kristy, 21–27 October 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
21 / 1200	13.5	100.0	1005	30	tropical depression
21 / 1800	13.4	101.4	1005	35	tropical storm
22 / 0000	13.7	102.7	1003	40	"
22 / 0600	14.2	104.1	1001	45	"
22 / 1200	14.5	105.8	997	50	"
22 / 1800	14.6	107.6	993	60	"
23 / 0000	14.7	109.2	983	70	hurricane
23 / 0600	14.5	111.1	973	85	"
23 / 1200	14.4	113.0	958	105	"
23 / 1800	14.1	114.7	942	125	"
24 / 0000	14.2	116.4	936	135	"
24 / 0600	14.1	118.2	938	130	"
24 / 1200	14.0	119.7	932	135	"
24 / 1800	14.1	121.0	926	140	"
25 / 0000	14.3	122.2	926	140	"
25 / 0600	14.9	123.4	932	130	"
25 / 1200	15.5	124.3	948	115	"
25 / 1800	16.2	125.4	958	105	"
26 / 0000	17.1	126.4	965	95	"
26 / 0600	18.1	127.2	972	85	"
26 / 1200	19.2	128.1	982	70	"
26 / 1800	20.2	128.9	990	60	tropical storm

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
27 / 0000	21.1	129.3	996	55	"
27 / 0600	21.7	129.5	1000	50	"
27 / 1200	22.5	129.6	1003	45	low
27 / 1800	22.5	129.7	1005	35	"
28 / 0000	22.3	130.2	1007	35	"
28 / 0600	21.8	130.8	1008	30	"
28 / 1200	21.1	131.6	1009	30	"
28 / 1800	20.6	132.8	1009	25	"
29 / 0000	19.7	134.1	1009	25	"
29 / 0600					dissipated
24 / 1800	14.1	121.0	926	140	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%)	48	96
Medium (40%-60%)	30	78
High (>60%)	18	54

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Kristy. 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	**15.6**	**21.0**	**28.4**	**33.8**	**50.4**	**65.9**	**105.1**	**124.9**
OCD5	36.8	83.7	145.7	213.0	272.2	311.4	419.4	567.2
Forecasts	21	19	17	15	13	11	7	3
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 Kristy. 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	14.7	19.7	27.7	32.9	54.1	71.2	111.2	115.1
OCD5	34.5	75.9	131.1	187.1	238.7	271.3	363.9	531.3
GFSI	18.9	32.6	40.5	45.4	**47.7**	**52.7**	**77.1**	145.3
HWFI	17.1	23.6	28.0	**31.4**	**40.0**	**48.6**	**99.9**	125.1
HMNI	18.0	20.5	**24.0**	**31.7**	**47.9**	**69.1**	139.5	167.9
HFAI	20.8	35.6	39.5	42.2	56.7	71.8	**102.8**	**56.7**
HFBI	20.8	33.4	44.3	44.1	61.3	73.6	**88.4**	**77.7**
EGRI	21.2	32.6	48.4	66.0	87.3	121.4	245.4	340.8
EMXI	15.3	19.9	29.0	37.0	58.3	**65.4**	**85.5**	**76.2**
NVGI	24.1	43.6	62.5	89.4	109.8	136.0	210.7	445.7
CMCI	24.1	34.5	40.7	52.8	65.3	78.4	156.4	285.5
CTCI	21.1	35.0	47.4	68.7	95.6	116.9	**96.2**	**93.5**
TVCE	15.3	20.9	**26.8**	33.0	**50.5**	**65.5**	**103.2**	123.5
TVCX	15.3	21.0	**25.9**	**32.0**	**50.2**	**63.4**	**99.1**	115.3
GFEX	**14.5**	23.1	30.1	34.4	**47.1**	**57.7**	**78.6**	**111.4**
TVDG	14.8	**19.6**	**25.2**	**30.3**	**46.7**	**60.7**	**108.6**	138.5
HCCA	**12.7**	**17.6**	**25.7**	40.2	59.5	**70.7**	112.1	**105.8**
FSSE	15.1	**19.4**	**26.1**	**31.3**	**43.2**	**58.6**	**110.4**	156.7
AEMI	19.7	30.7	37.7	41.5	**52.0**	**68.2**	**109.7**	197.9
TABS	45.8	97.9	136.3	166.4	203.7	245.1	292.6	424.9
TABM	31.5	58.4	85.0	111.1	143.6	170.0	197.4	279.5
TABD	27.8	50.2	64.5	74.8	81.3	80.9	**55.4**	**86.7**
Forecasts	19	17	15	13	11	9	5	2

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Kristy. 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	7.6	13.4	20.3	23.7	21.2	19.1	**8.6**	**16.7**
OCD5	12.0	19.5	28.3	36.6	39.9	40.5	21.6	1.3
Forecasts	21	19	17	15	13	11	7	3
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 Kristy. 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	7.6	13.4	20.3	23.7	21.2	19.1	8.6	16.7
OCD5	12.0	19.5	28.3	36.6	39.9	40.5	21.6	**1.3**
HWFI	10.3	16.0	20.8	23.7	21.6	**16.4**	9.4	18.3
HMNI	12.0	19.3	25.8	28.1	25.2	21.1	10.4	21.7
HFAI	13.2	25.5	35.6	37.6	28.5	20.7	12.0	**12.0**
HFBI	10.7	18.2	26.4	29.1	25.5	22.5	13.0	18.0
DSHP	9.6	14.5	**19.2**	**22.8**	22.7	**19.0**	10.4	**11.7**
LGEM	8.6	15.6	21.6	**23.4**	21.4	**18.9**	8.9	**4.3**
ICON	9.6	15.9	20.9	**23.2**	**21.0**	**17.6**	**6.7**	**12.0**
IVCN	10.3	18.5	26.1	28.5	23.9	19.2	8.6	**9.7**
IVDR	10.8	19.6	27.8	30.8	25.5	19.7	9.3	**10.7**
CTCI	12.8	26.5	37.9	41.7	31.4	22.4	11.4	**11.0**
GFSI	12.7	23.5	34.1	39.3	34.6	27.8	10.7	**10.3**
EMXI	15.9	31.2	43.6	51.9	49.2	43.9	13.3	**3.7**
HCCA	10.6	16.4	23.4	26.8	22.1	**17.9**	9.1	**13.0**
FSSE	9.2	16.5	25.9	30.5	24.0	**17.6**	11.9	25.3
Forecasts	21	19	17	15	13	11	7	3

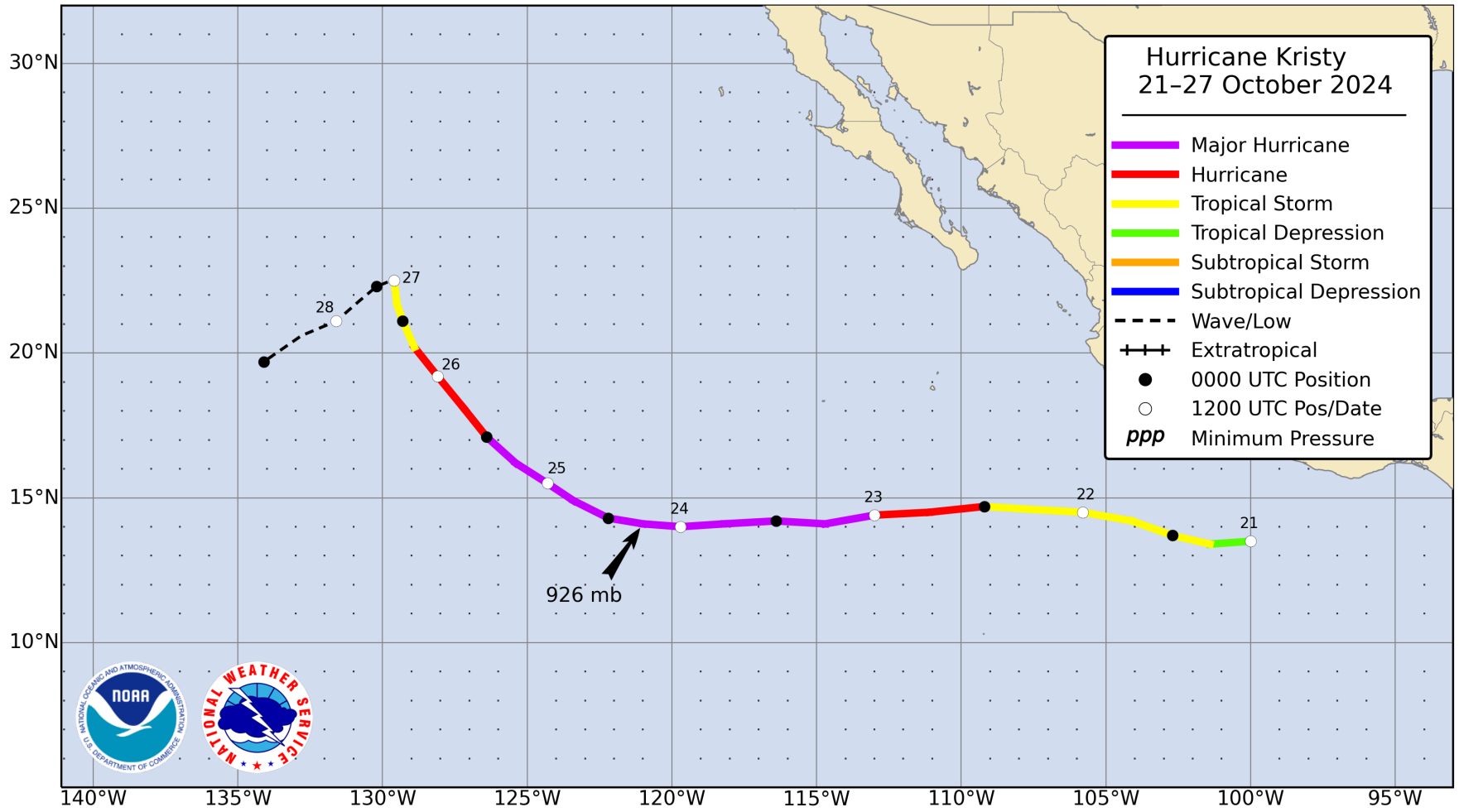

Figure 1. Best track positions for Hurricane Kristy, 21–27 October 2024.

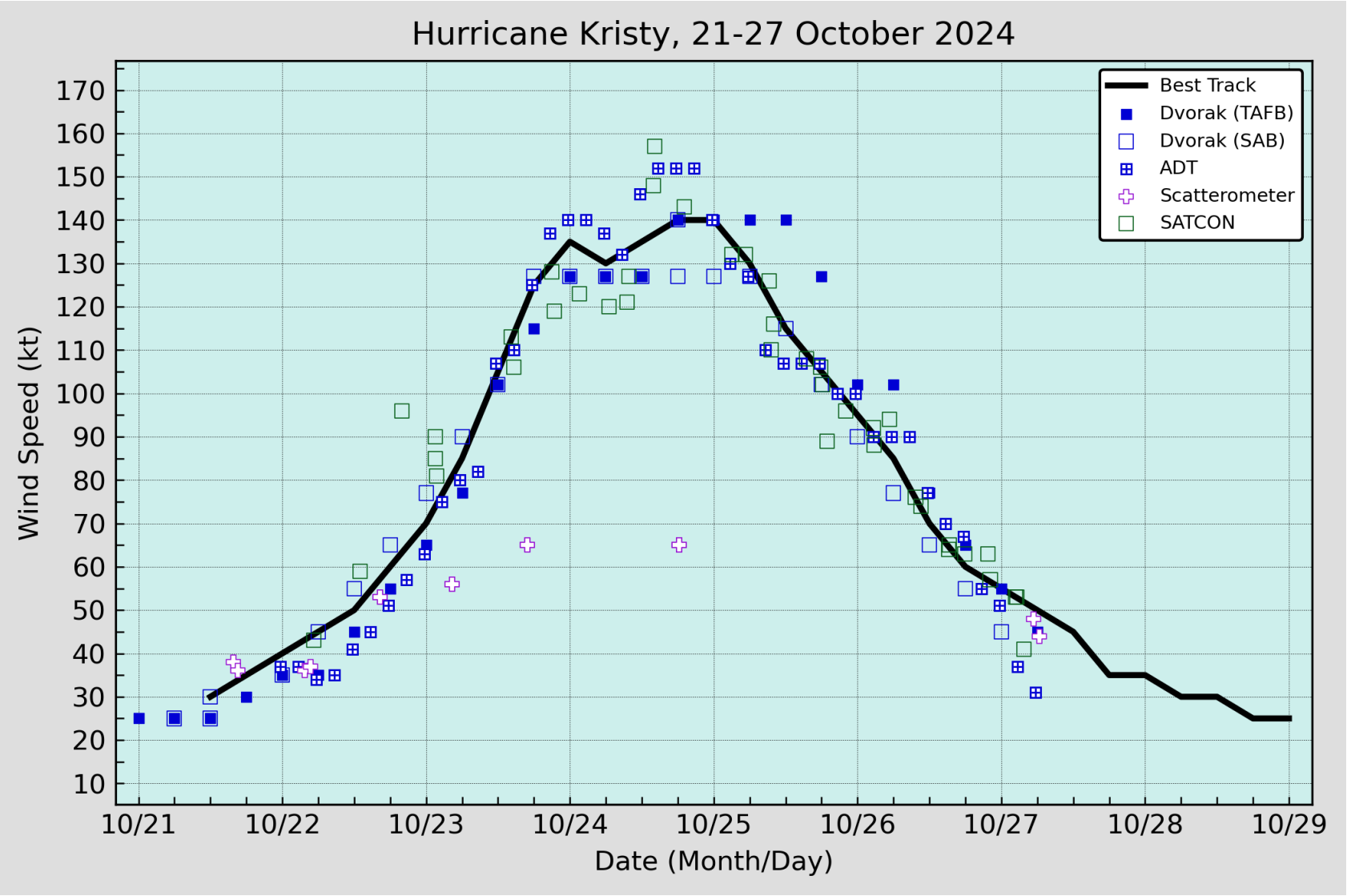

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Kristy, 21–27 October 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

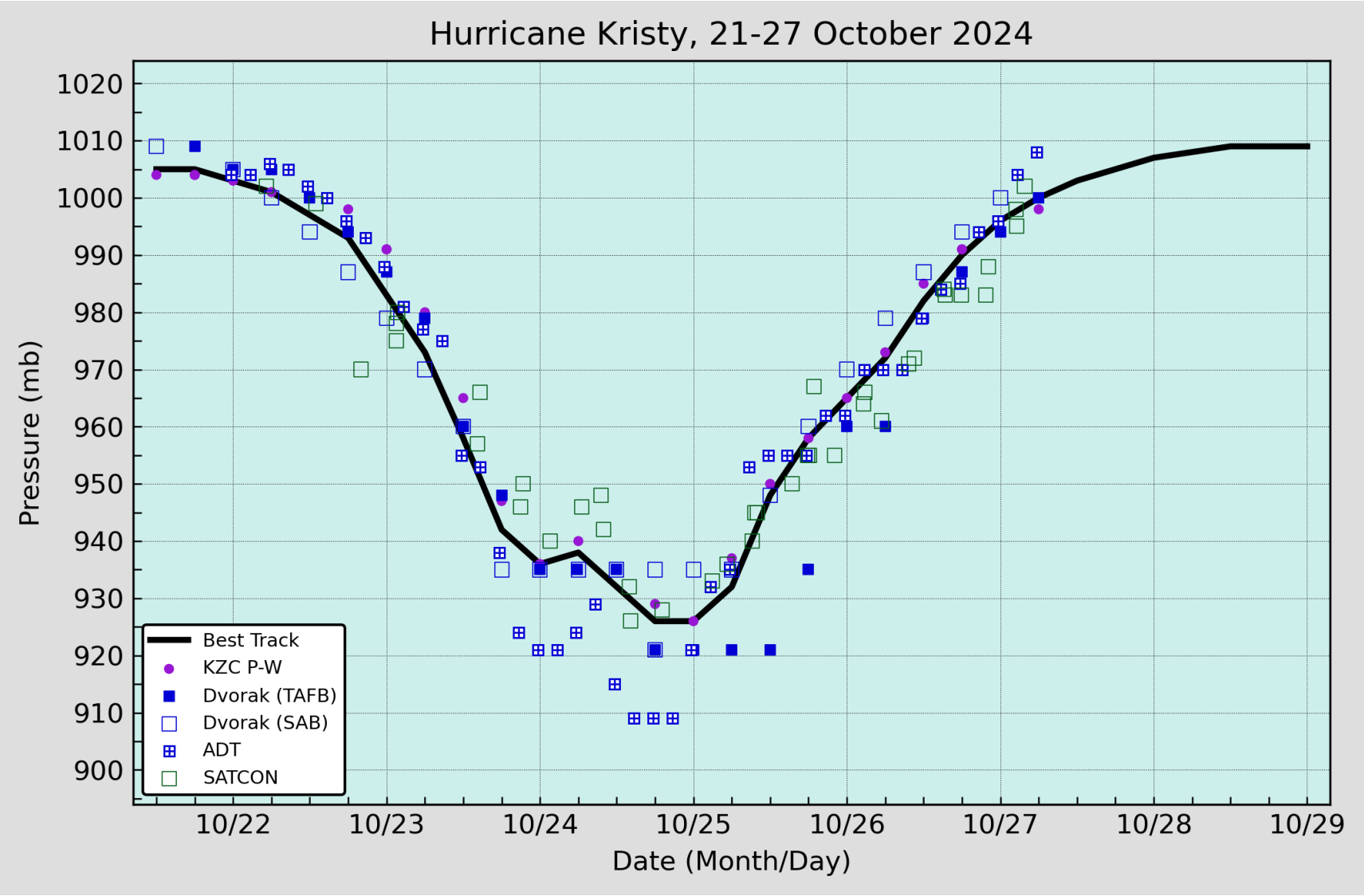

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Kristy, 21–27 October 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

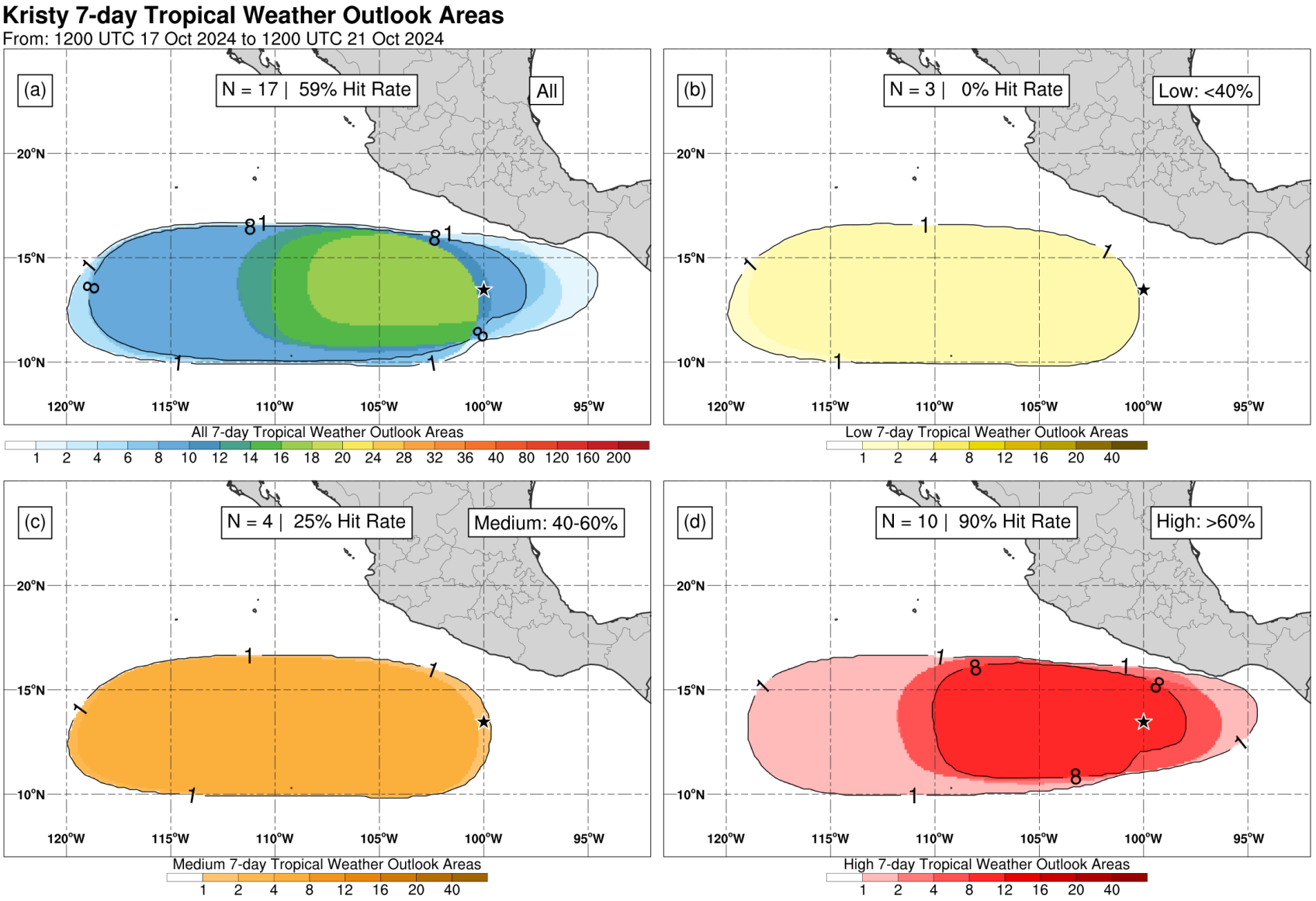

Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Kristy for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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