NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

HURRICANE LESLIE

(AL132024)

2–12 October 2024

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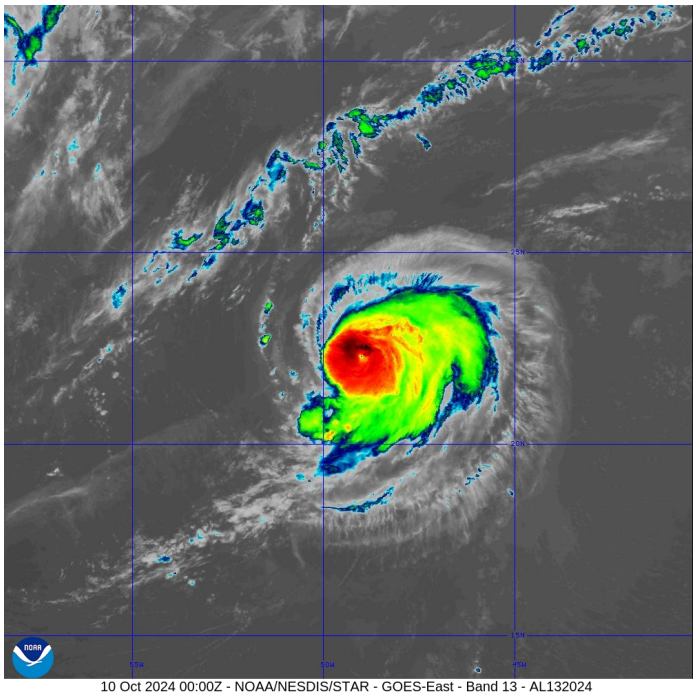
National Hurricane Center
22 January 2025



10 Oct 2024 00:00Z - NOAA/NESDIS/STAR - GOES-East - Band 13 - AL132024

GOES-EAST INFRARED SATELLITE IMAGE OF HURRICANE LESLIE AROUND THE TIME OF ITS PEAK INTENSITY AT 0000 UTC 10 OCTOBER 2024. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Leslie was a hurricane that formed over the eastern Atlantic 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 Leslie.

Hurricane Leslie

2–12 OCTOBER 2024

BEST TRACK

The "best track[2]" positions and intensities for Hurricane Leslie are listed in Table 1. The best track chart of Leslie'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 Leslie.

Origin

Leslie developed from a tropical wave that moved off the west coast of Africa on 28 September. A well-defined low with disorganized showers and thunderstorms developed on 1 October. Deep convection started to become more organized around a well-defined center the next day, with the formation of a tropical depression at 0600 UTC 2 October, about 300 n mi south-southwest of the Cabo Verde Islands.

Peak Intensity and Minimum Pressure

Leslie's estimated peak intensity of 90 kt at 0000 UTC 10 October is based on a blend of subjective and objective satellite intensity estimates, and is in best agreement with a subjective Dvorak intensity estimate of T5.0/ 90 kt from TAFB.

The estimated minimum central pressure of 970 mb 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), 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 Leslie.

CASUALTY AND DAMAGE STATISTICS

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

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 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Leslie. The genesis of Leslie occurred within all the areas depicted on the Graphical Tropical Weather Outlook, however the system was introduced only 72 h in advance of formation, indicating that the system developed earlier than anticipated.

A verification of NHC official track forecasts for Leslie is given in Table 3a. Official track forecast errors were much lower than the mean official errors for the previous 5-yr period at all verifying times. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. Of the available guidance, the simple and corrected consensus aids generally performed best for track, including HCCA, FSSE and TVDG. A verification of NHC official intensity forecasts for Leslie is given in Table 4a. Official intensity forecast errors were higher than the mean official errors for the previous 5-yr period for most of the forecast periods, except at the 36- and 48-h forecast times. The intensity forecast was somewhat complex given Hurricane Leslie was following the track of Hurricane Kirk, and the system was anticipated to move over Kirk's cool wake, with weakening forecast on 6–7 October. However, the system was able to maintain its intensity and re-strengthen, which contributed to the higher-than-average intensity errors. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. Statistical-dynamical models generally performed best for intensity, including the DSHP and LGEM, as well as the simple consensus ICON model.

There were no coastal watches or warnings issued for Leslie.

Table 1. Best track for Hurricane Leslie, 2–12 October 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
01 / 0000	10.2	24.4	1008	25	low
01 / 0600	10.3	24.8	1007	25	"
01 / 1200	10.5	25.4	1007	25	"
01 / 1800	10.6	26.0	1007	30	"
02 / 0000	10.7	26.7	1007	30	"
02 / 0600	10.7	27.6	1007	30	tropical depression
02 / 1200	10.6	28.5	1006	30	"
02 / 1800	10.5	29.3	1006	30	"
03 / 0000	10.4	29.8	1005	35	tropical storm
03 / 0600	10.3	30.2	1002	40	"
03 / 1200	10.1	30.7	1001	45	"
03 / 1800	9.9	31.3	1001	45	"
04 / 0000	9.8	31.7	999	50	"
04 / 0600	9.8	32.2	998	50	"
04 / 1200	9.9	32.7	997	55	"
04 / 1800	10.1	33.3	994	60	"
05 / 0000	10.3	33.9	990	65	hurricane
05 / 0600	10.5	34.5	986	70	"
05 / 1200	10.9	35.1	986	70	"
05 / 1800	11.3	35.7	985	70	"
06 / 0000	11.8	36.4	983	75	"
06 / 0600	12.4	36.9	980	80	"
06 / 1200	13.0	37.6	980	80	"
06 / 1800	13.7	38.2	980	80	"
07 / 0000	14.5	39.1	980	80	"
07 / 0600	15.2	40.0	983	75	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
07 / 1200	16.0	40.9	985	70	"
07 / 1800	16.8	41.9	989	65	"
08 / 0000	17.6	43.0	992	60	tropical storm
08 / 0600	18.3	44.0	992	60	"
08 / 1200	19.0	45.1	992	60	"
08 / 1800	19.7	46.1	989	65	hurricane
09 / 0000	20.3	46.8	987	70	"
09 / 0600	20.9	47.5	984	75	"
09 / 1200	21.4	48.2	981	80	"
09 / 1800	21.9	48.6	974	85	"
10 / 0000	22.3	49.0	970	90	"
10 / 0600	22.6	49.7	974	85	"
10 / 1200	22.9	50.2	980	75	"
10 / 1800	23.5	50.8	990	65	"
11 / 0000	24.1	51.1	997	55	tropical storm
11 / 0600	24.9	51.1	999	50	"
11 / 1200	25.8	50.8	1000	45	"
11 / 1800	27.0	50.0	1000	45	"
12 / 0000	28.4	48.8	1001	45	"
12 / 0600	30.4	47.1	1002	45	"
12 / 1200					dissipated
10 / 0000	22.3	49.0	970	90	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%)	60	72
Medium (40%-60%)	42	60
High (>60%)	36	54

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Leslie. 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	**15.3**	**25.7**	**39.5**	**51.5**	**61.0**	**63.9**	**54.9**	**68.9**
OCD5	36.9	72.6	107.6	134.9	170.8	201.4	232.8	238.0
Forecasts	38	36	34	32	30	28	24	20
OFCL (2019-23)	23.9	36.5	49.3	63.4	79.2	93.4	132.9	190.4
OCD5 (2019-23)	45.7	97.1	153.0	205.4	254.9	297.8	372.7	439.1

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Leslie. 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	15.2	26.6	40.7	52.6	61.5	64.2	54.1	73.9
OCD5	35.3	69.0	100.9	123.8	158.0	188.0	210.4	201.6
GFSI	17.5	34.4	50.5	63.0	83.6	96.5	93.0	90.5
HWFI	18.6	29.9	46.6	62.9	71.0	78.3	93.8	119.9
HMNI	**15.0**	**22.6**	**39.0**	61.0	70.9	66.3	77.3	121.1
HFAI	19.4	33.9	48.3	60.6	70.0	77.4	108.1	148.7
HFBI	18.4	30.3	41.4	58.0	66.5	**60.7**	74.2	128.0
EGRI	17.2	31.8	48.1	62.8	75.3	89.6	98.5	137.5
EMXI	15.5	27.5	44.2	59.1	69.8	77.4	91.4	134.2
CMCI	18.2	33.4	45.9	54.6	**61.1**	66.0	82.8	119.3
CTCI	18.1	38.1	54.7	75.7	90.1	98.4	126.8	200.3
TVCA	**13.9**	**24.7**	**38.6**	52.6	**61.1**	**61.9**	66.3	100.6
TVCX	**13.9**	**25.0**	**37.7**	**51.9**	**59.6**	**60.9**	65.6	99.9
GFEX	15.4	27.7	42.5	53.5	65.2	70.7	74.5	100.9
TVDG	**13.7**	**24.3**	**37.3**	**50.1**	**59.6**	**62.2**	62.3	96.8
HCCA	**13.8**	**24.4**	**37.3**	**50.4**	**59.6**	**57.6**	**52.1**	75.2
FSSE	**14.0**	**24.2**	**37.1**	**50.8**	**59.2**	**63.7**	66.3	87.7
AEMI	18.5	36.4	53.8	71.6	90.8	103.4	105.0	133.4
TABS	30.1	64.9	101.2	136.4	152.3	151.4	120.0	109.0
TABM	26.9	51.7	77.1	104.9	145.5	196.6	268.8	321.6
TABD	33.5	73.5	121.0	165.3	214.1	268.1	363.8	484.0
Forecasts	35	33	31	29	27	25	21	18

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Leslie. 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	5.1	7.6	**8.2**	**8.9**	10.5	14.3	16.5	16.0
OCD5	7.7	12.0	14.8	16.9	16.0	14.4	15.2	14.4
Forecasts	38	36	34	32	30	28	24	20
OFCL (2019-23)	5.0	7.3	8.5	9.7	10.4	10.9	12.9	15.5
OCD5 (2019-23)	6.6	10.2	13.1	15.6	17.2	18.6	21.8	22.6

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Leslie. 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	5.3	7.6	7.7	8.6	10.7	15.0	18.1	16.4
OCD5	8.0	12.1	14.8	16.8	16.0	**13.6**	**13.8**	**14.7**
HWFI	10.7	15.3	17.0	16.6	16.0	17.7	22.8	21.2
HMNI	7.7	11.7	13.9	14.4	15.0	16.0	**17.6**	24.3
HFAI	10.4	14.1	18.2	19.2	20.3	20.6	20.0	21.8
HFBI	10.6	15.8	18.2	21.0	22.4	20.7	22.5	22.4
DSHP	6.7	9.7	8.2	**7.2**	**8.2**	**10.3**	**12.9**	17.1
LGEM	7.5	10.2	10.0	9.1	**7.9**	**9.2**	**13.5**	**14.6**
ICON	7.1	9.9	10.0	9.7	**9.6**	**10.5**	**13.9**	**14.7**
IVCN	7.4	10.9	12.1	12.4	13.0	**12.6**	**16.0**	16.8
IVDR	7.7	11.8	13.0	13.6	14.1	**13.7**	**16.7**	17.6
CTCI	8.6	12.8	14.3	13.5	14.9	16.4	24.4	33.3
GFSI	7.8	11.3	12.0	12.4	12.6	**12.5**	**15.8**	**15.3**
EMXI	6.6	8.6	9.6	11.5	13.1	16.8	23.7	30.8
HCCA	6.7	9.6	10.6	12.1	13.5	**13.8**	18.4	21.3
FSSE	7.0	10.9	12.8	14.1	16.4	18.4	23.9	22.6
Forecasts	35	33	31	29	27	25	21	18

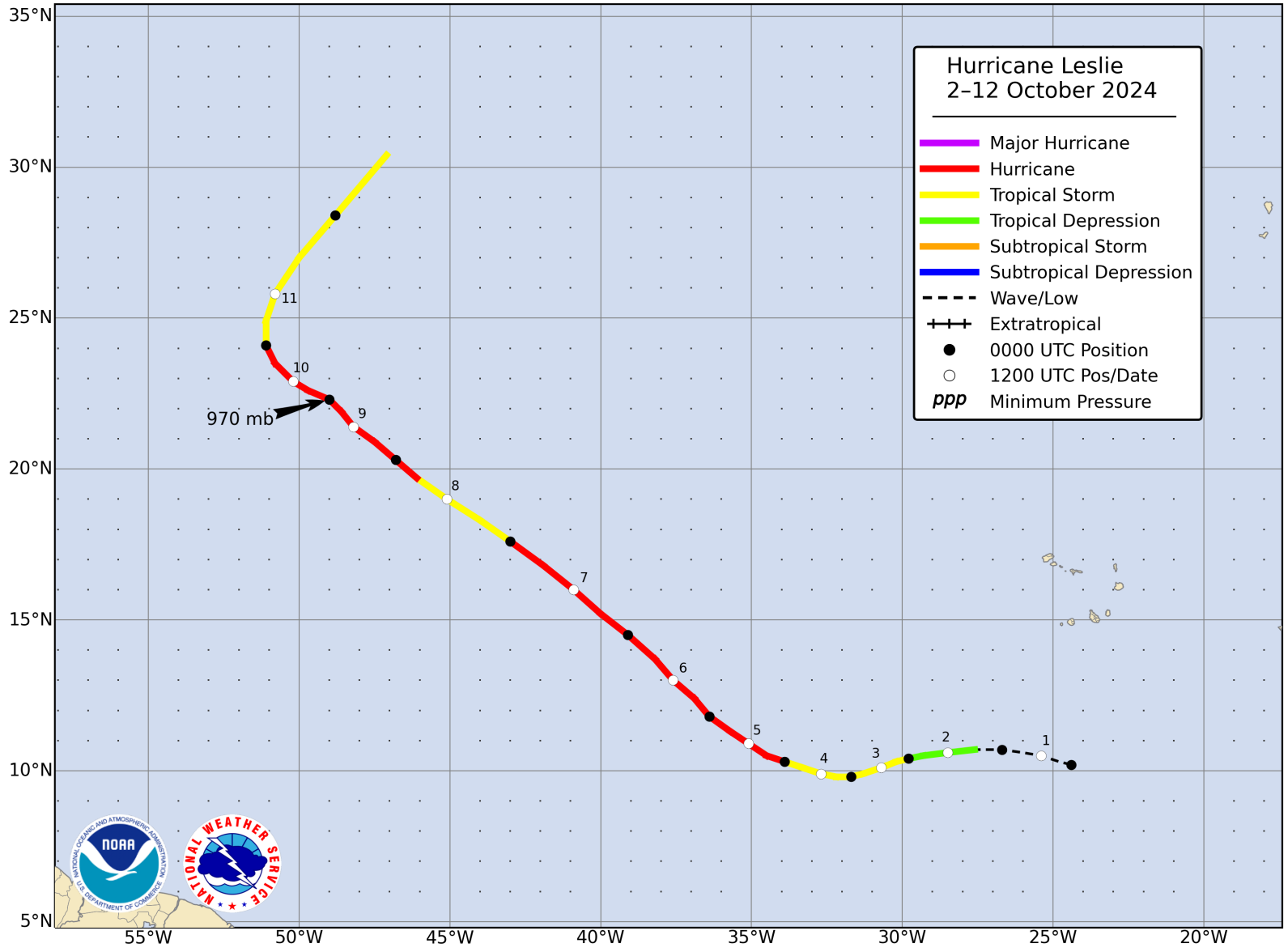

Figure 1. Best track positions for Hurricane Leslie, 2–12 October 2024.

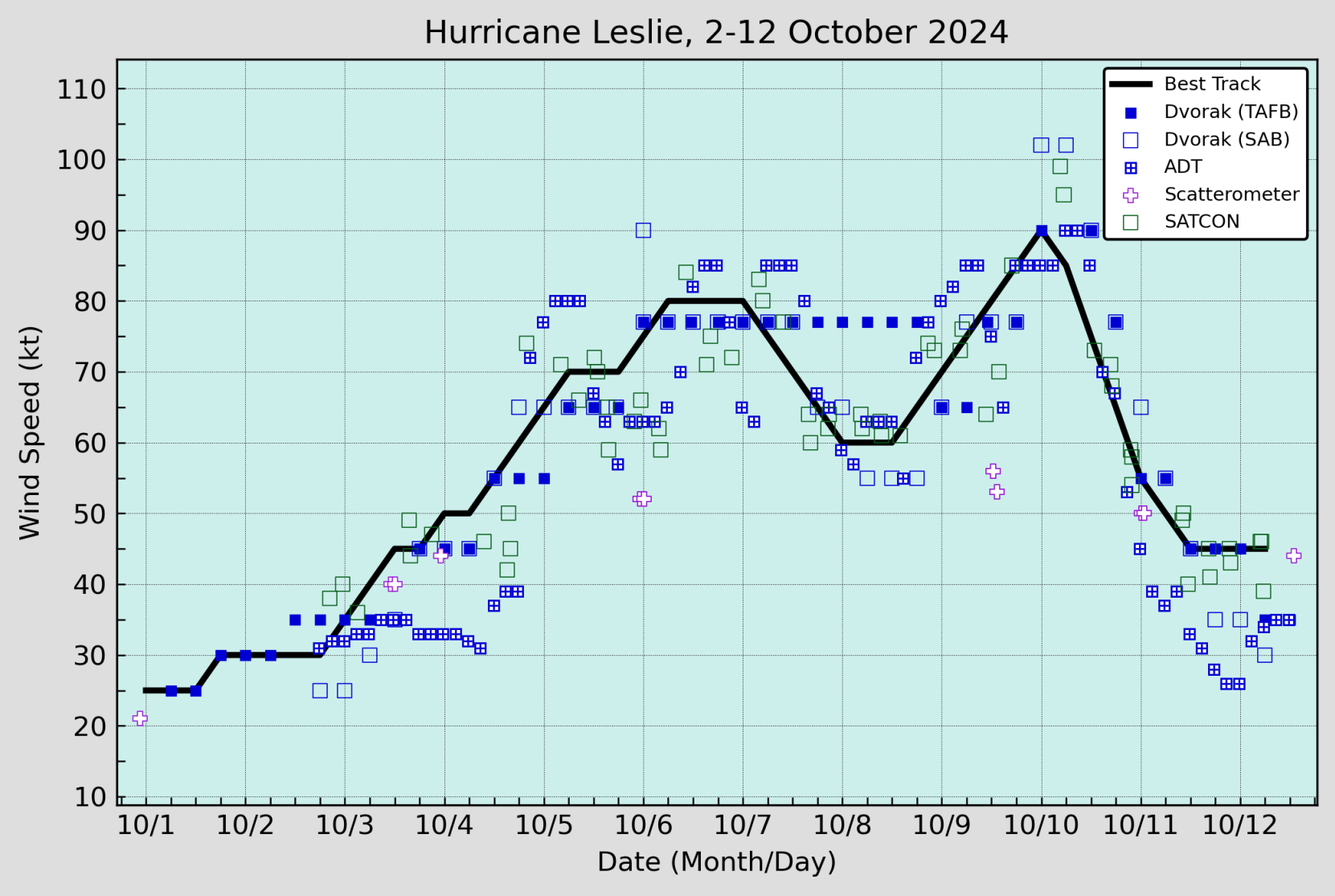

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Leslie, 2–12 October 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

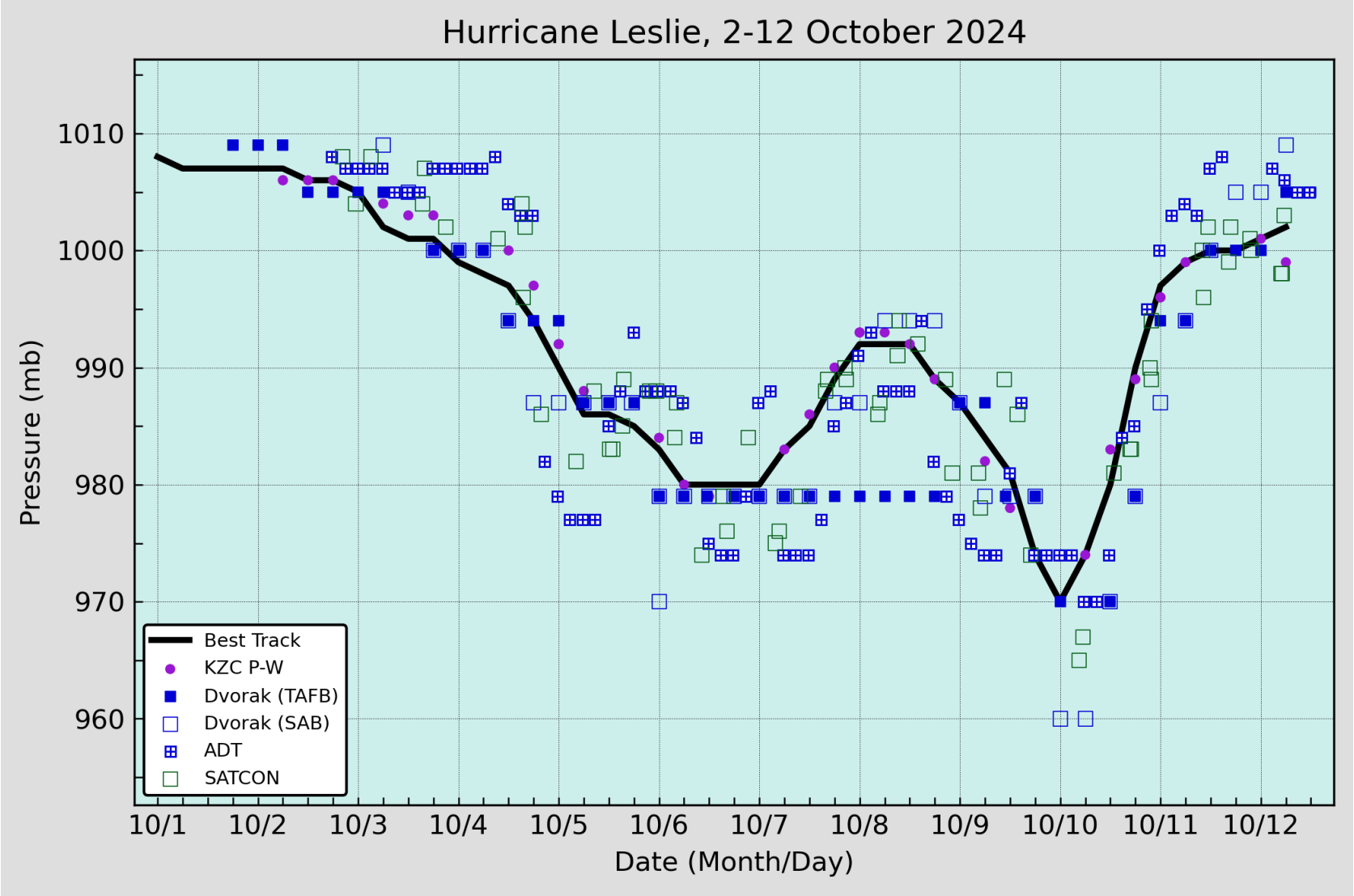

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Leslie, 2–12 October 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

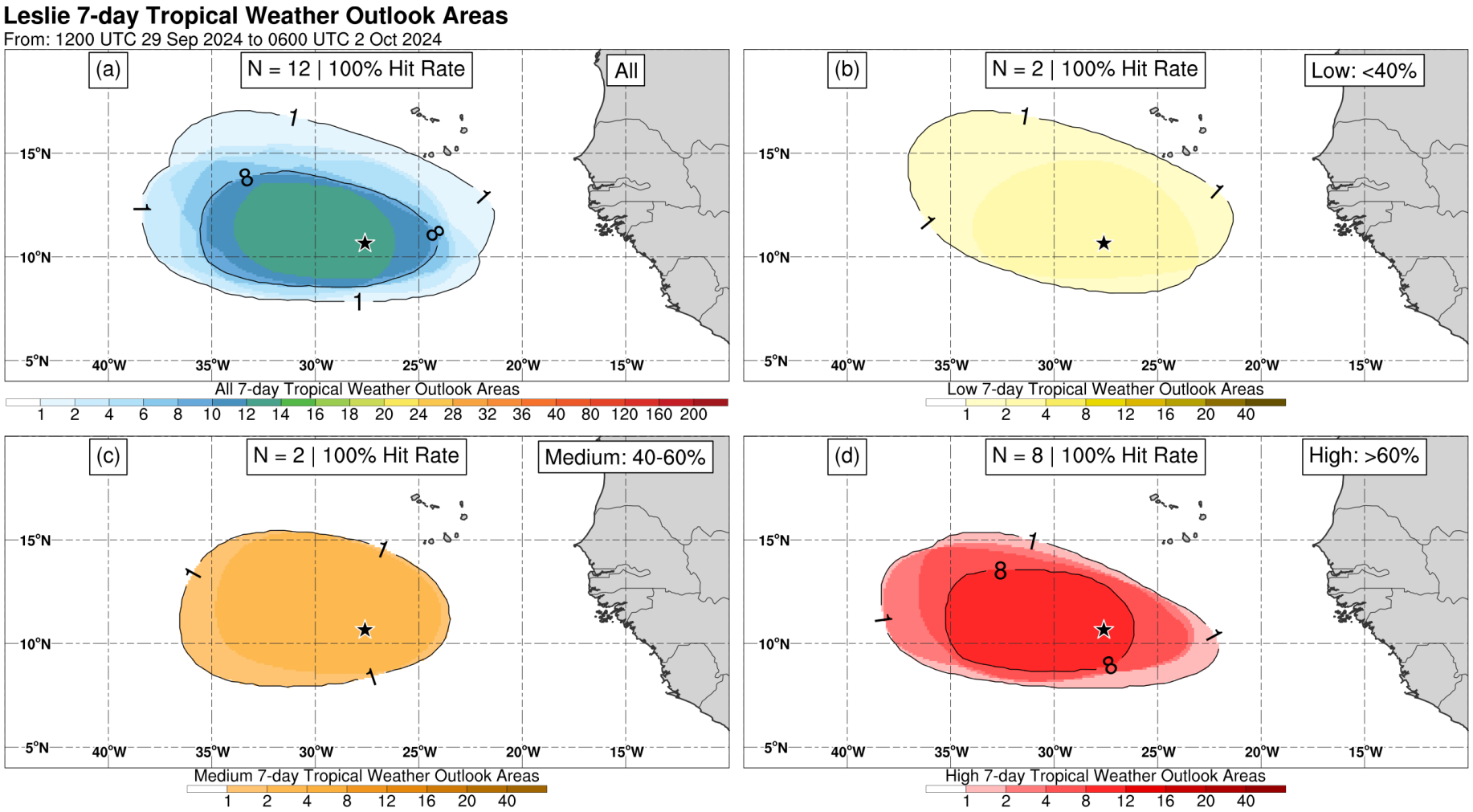

Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Leslie for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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