

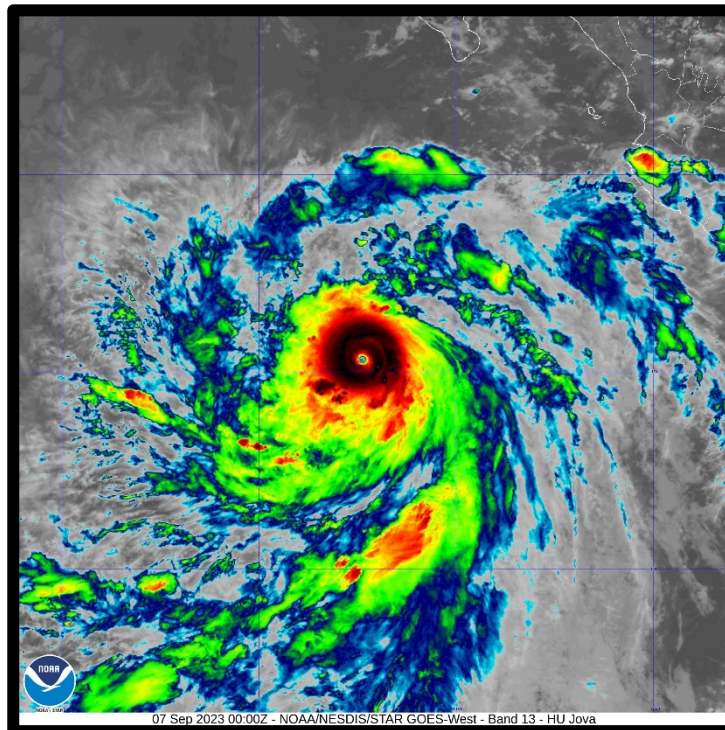


NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

HURRICANE JOVA (EP112023)

4–10 September 2023

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National Hurricane Center
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GOES-18 INFRARED IMAGERY AT 0000 UTC 7 SEPTEMBER WHILE JOVA WAS AT PEAK INTENSITY. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Jova was a category 5 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that occurred in 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 Jova.

Hurricane Jova

4–10 SEPTEMBER 2023

BEST TRACK

Hurricane Jova is notable for its impressive rapid intensification over a 48-h period, going from a 30-kt tropical depression on 0000 UTC 5 September to its peak intensity of 140-kt on 0000 UTC 7 September (cover photo). The “best track²” positions and intensities for Hurricane Jova are listed in Table 1. The best track chart of Jova’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 or buoy reports of tropical-storm-force winds associated with Jova.

Origin

The origins of Jova are from an easterly wave that exited the western coast of Africa on 23 August, crossed the Windward Islands on 29–30 August and crossed Central America on 1–2 September. A tropical depression formed over the eastern Pacific on 4 September.

Peak Intensity and Minimum Pressure

The peak intensity of 140 kt at 0000 UTC through 0600 UTC 7 September is supported by subjective Dvorak estimates from SAB and TAFB. While satellite intensity estimates continued to rise or were steady after the peak, this appears to be an artifact of the satellite classification constraints causing the estimates to lag during to the storm’s rapid intensification.

The estimated minimum central pressure of 926 mb is based on the Knaff-Zehr-Courtney (KZC) pressure-wind relationship.

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, among others, were also useful in constructing the best track of Jova.

CASUALTY AND DAMAGE STATISTICS

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

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 Jova. Jova's genesis location occurred within all potential formation areas depicted by NHC. However, the forecast lead time for genesis was short, with the system first introduced in the TWO only 90 h before formation. The 48-h probability did not reach the high category until 6 h prior to genesis.

A verification of NHC official track forecasts for Jova is given in Table 3a. Official track forecast errors were lower than the mean official errors for the previous 5-yr period for all forecast hours except 72 h. 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 Jova is given in Table 4a. Official intensity forecast errors were greater than the mean official errors for the previous 5-yr period for all forecast hours, largely due to NHC's forecast not anticipating the magnitude of the storm's rapid intensification and subsequent weakening. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. Of the available guidance, the statistical models (including LGEM and DSHP) performed better than the official forecast, particularly in the short-term forecast period, because they more accurately captured Jova's rapid intensification (Fig. 5). Several of the simple and corrected consensus aids (HCCA, ICON, etc.) had lower intensity errors than the NHC forecast throughout most, if not all, of the forecast period. Those guidance aids also predicted Jova's rapid weakening phase especially well. Regional and global dynamical models largely missed the rapid intensification event, though those aids tended to have errors lower than the official forecast errors in the long-term forecast period (72-96 h).

There were no coastal watches or warnings issued for Jova.



Table 1. Best track for Hurricane Jova, 4–10 September 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
04 / 1200	12.2	102.8	1007	30	low
04 / 1800	12.3	103.8	1007	30	tropical depression
05 / 0000	12.4	104.9	1006	30	"
05 / 0600	12.4	105.9	1004	35	tropical storm
05 / 1200	12.5	106.7	1001	45	"
05 / 1800	12.7	107.5	998	50	"
06 / 0000	13.0	108.2	993	60	"
06 / 0600	13.3	109.0	981	75	hurricane
06 / 1200	13.9	110.0	972	90	"
06 / 1800	14.6	111.1	953	115	"
07 / 0000	15.3	112.4	926	140	"
07 / 0600	16.1	113.7	926	140	"
07 / 1200	16.8	115.0	932	135	"
07 / 1800	17.4	116.6	941	125	"
08 / 0000	18.0	117.9	947	115	"
08 / 0600	18.8	119.1	959	100	"
08 / 1200	19.5	120.6	972	85	"
08 / 1800	20.1	121.9	980	75	"
09 / 0000	20.7	123.2	984	70	"
09 / 0600	21.2	124.2	986	60	tropical storm
09 / 1200	22.0	125.2	992	55	"
09 / 1800	22.6	125.8	999	45	"
10 / 0000	23.3	126.2	999	45	"
10 / 0600	23.8	126.6	1001	40	low
10 / 1200	24.2	127.0	1004	35	"
10 / 1800	24.5	127.4	1005	30	"
11 / 0000	24.7	127.7	1006	30	"
11 / 0600	24.8	128.2	1007	30	"
11 / 1200	24.7	128.6	1008	30	"



Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
11 / 1800	24.6	129.0	1009	25	"
12 / 0000	24.4	129.5	1010	25	"
12 / 0600	23.9	130.5	1011	25	"
12 / 1200	23.3	131.4	1011	25	"
12 / 1800	22.7	132.5	1012	20	"
13 / 0000	22.4	133.8	1012	20	"
13 / 0600	22.3	135.1	1012	20	"
13 / 1200	22.1	136.7	1012	20	"
13 / 1800	21.8	138.6	1012	20	"
14 / 0000	20.9	140.0	1013	20	"
14 / 0600					dissipated
07 / 0000	15.3	112.4	926	140	minimum pressure & maximum winds

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	90
Medium (40%-60%)	30	78
High (>60%)	6	66

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Jova, 4–10 September 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	19.7	30.0	39.8	48.9	64.0	80.4	86.1	73.6
OCD5	33.5	62.2	94.8	137.1	205.9	281.2	370.2	408.2
Forecasts	20	18	16	14	12	10	6	2
OFCL (2018-22)	22.1	34.0	45.4	56.0	70.9	78.7	100.5	117.8
OCD5 (2018-22)	36.7	73.4	114.0	156.9	193.2	244.5	317.0	376.0



Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Jova, 4–10 September 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	16.2	27.8	42.0	54.0	68.0	81.9	78.1	
OCD5	29.1	61.8	106.5	170.3	253.5	339.7	450.2	
GFSI	17.9	35.1	54.1	73.1	84.8	101.4	66.5	
HWFI	18.2	36.7	60.8	78.1	90.3	114.6	120.3	
HMNI	23.4	39.9	51.5	63.2	60.5	69.1	69.0	
HFAI	22.4	43.2	63.2	76.6	86.2	89.6	109.5	
HFBI	22.3	43.0	59.1	72.9	66.9	58.2	41.5	
EGRI	22.7	45.9	79.0	116.8	159.1	208.8	332.5	
EMXI	17.4	23.3	32.9	48.0	60.9	79.1	105.6	
NVGI	21.4	26.4	37.7	52.8	72.9	88.5	86.1	
CMCI	22.4	42.1	59.5	70.9	85.7	85.5	81.5	
CTCI	22.5	44.3	61.9	86.0	97.0	126.8	108.3	
TVCE	16.8	31.9	47.6	62.2	73.6	89.7	97.1	
TVCX	17.0	31.2	46.5	61.6	72.7	89.2	91.6	
GFEX	14.7	25.8	41.2	56.1	70.6	87.7	85.7	
TVDG	17.3	32.0	47.2	61.2	76.2	95.1	109.7	
HCCA	16.8	26.9	38.6	48.4	57.7	63.7	83.9	
FSSE	16.0	25.6	37.4	43.0	53.7	75.2	85.6	
AEMI	17.8	34.8	53.1	75.3	86.6	94.9	97.2	
TABS	25.8	46.0	59.9	82.3	123.5	148.8	57.0	
TABM	19.4	29.1	43.9	69.9	106.5	123.1	60.1	
TABD	18.3	28.3	46.2	74.2	104.5	127.4	58.7	
Forecasts	16	14	12	10	8	6	2	0

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Jova, 4–10 September 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	9.0	17.8	25.9	32.1	32.1	26.0	24.2	25.0
OCD5	10.7	20.7	30.0	37.5	39.2	34.8	15.8	17.5
Forecasts	20	18	16	14	12	10	6	2
OFCL (2018-22)	5.4	8.9	11.0	12.8	14.3	15.8	17.0	17.6
OCD5 (2018-22)	6.9	12.1	15.9	18.6	18.7	21.0	22.3	22.1

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Jova, 4–10 September 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	9.4	18.4	25.4	26.7	27.5	26.9	25.0	
OCD5	11.2	22.3	30.5	33.2	32.6	30.4	21.0	
HWFI	13.3	22.6	30.9	28.9	21.2	13.5	3.8	
HMNI	11.9	22.1	28.3	25.9	20.4	15.4	2.8	
HFAI	11.6	22.1	30.1	27.2	18.5	9.4	4.5	
HFBI	12.4	22.1	28.7	26.7	18.6	11.8	4.0	
DSHP	8.6	16.4	24.9	29.6	30.2	33.2	42.8	
LGEM	7.2	13.6	19.5	21.9	23.3	26.1	26.8	
ICON	9.6	18.3	24.4	24.1	19.8	16.4	16.5	
IVCN	10.1	19.3	26.2	24.0	16.8	11.2	11.0	
IVDR	10.7	20.6	28.4	26.2	18.3	10.2	7.0	
CTCI	10.7	19.9	27.5	24.8	15.7	10.4	7.2	
GFSI	14.0	28.1	39.0	40.2	34.9	23.1	9.0	
EMXI	16.5	31.9	43.4	44.3	35.3	22.9	6.8	
HCCA	9.2	15.8	20.6	18.0	9.0	5.5	7.2	
FSSE	9.6	19.2	28.4	27.5	18.8	13.4	20.0	
Forecasts	18	16	14	12	10	8	4	0

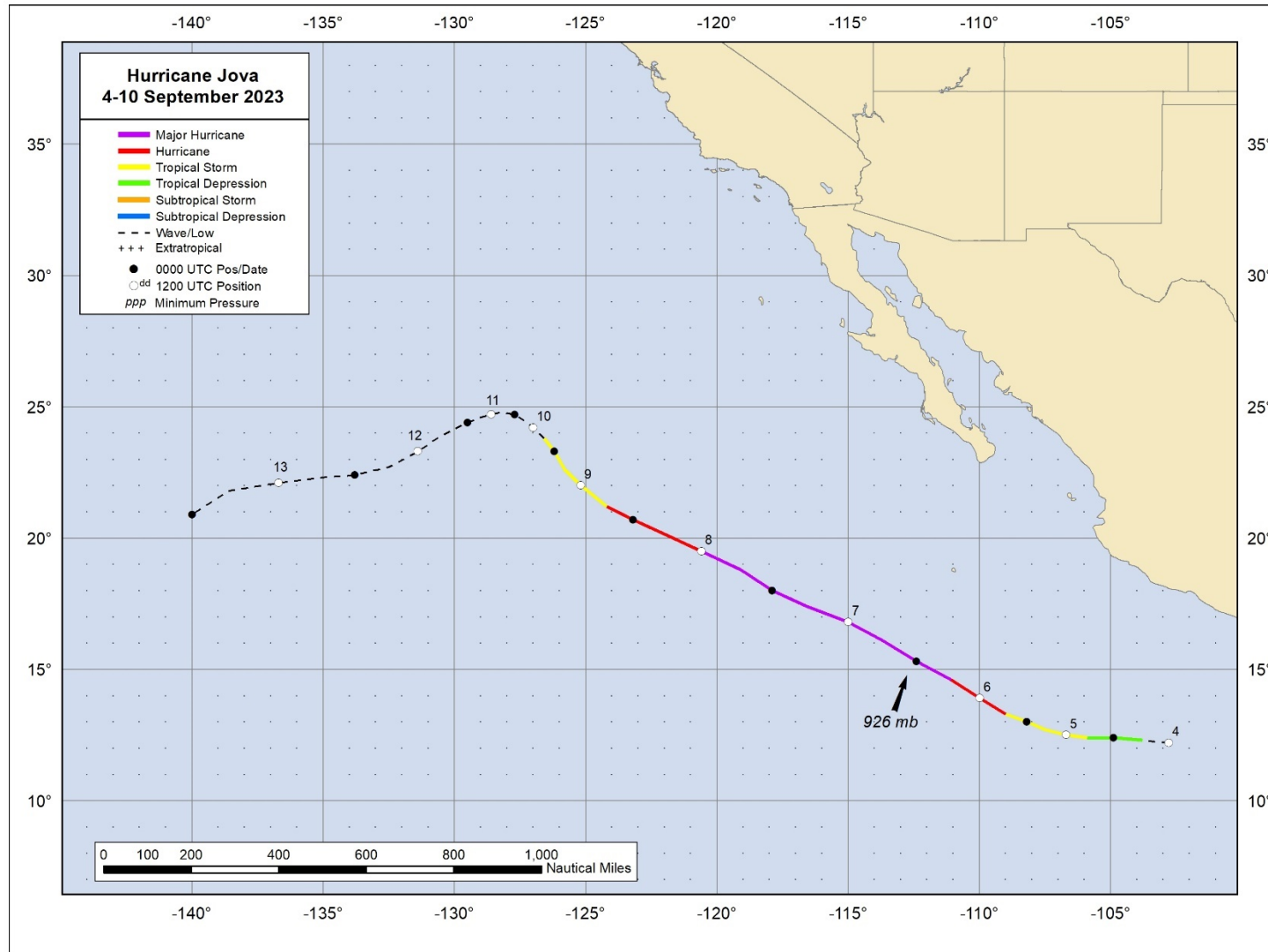


Figure 1. Best track positions for Hurricane Jova, 4–10 September 2023.

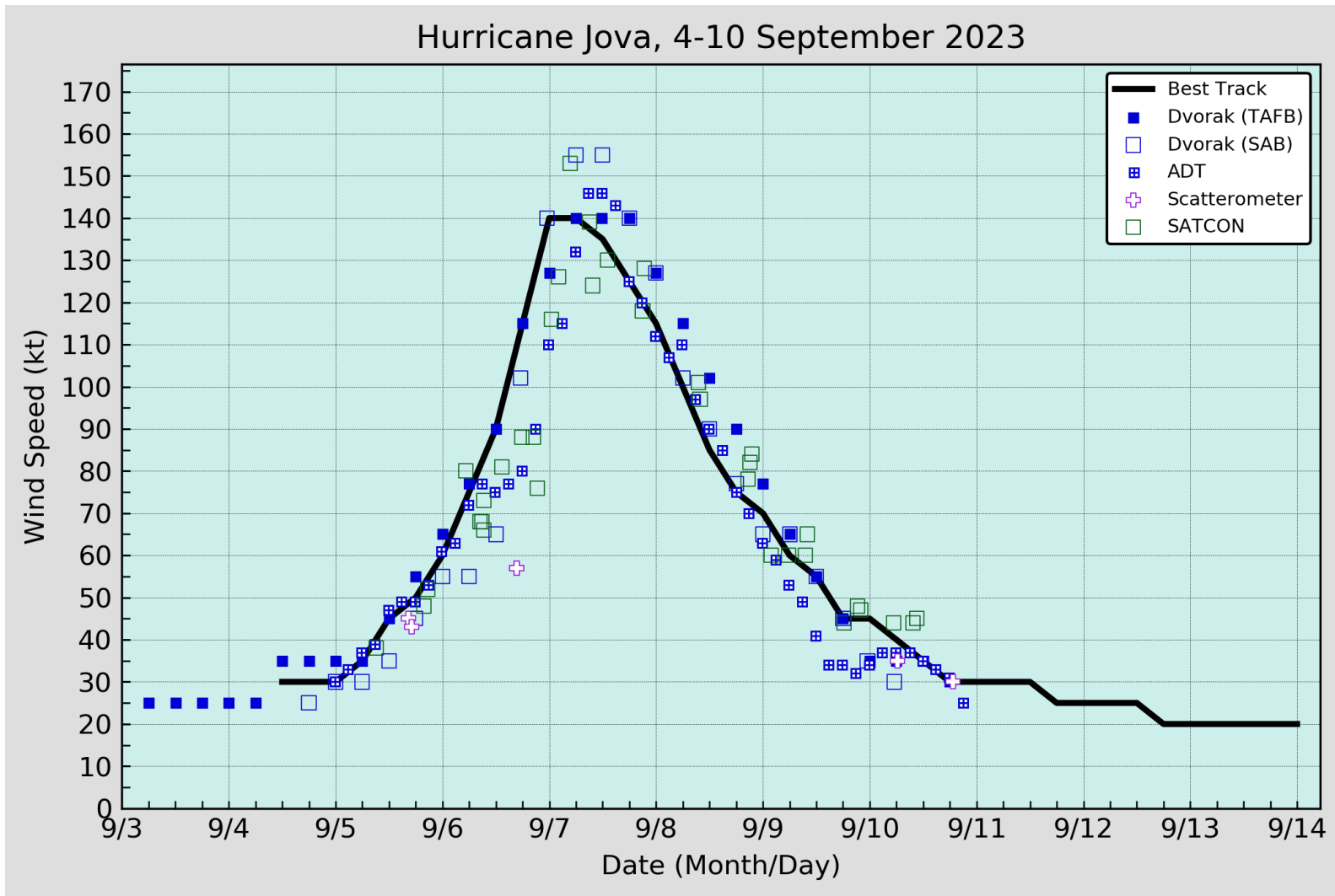


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Jova, 4–10 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

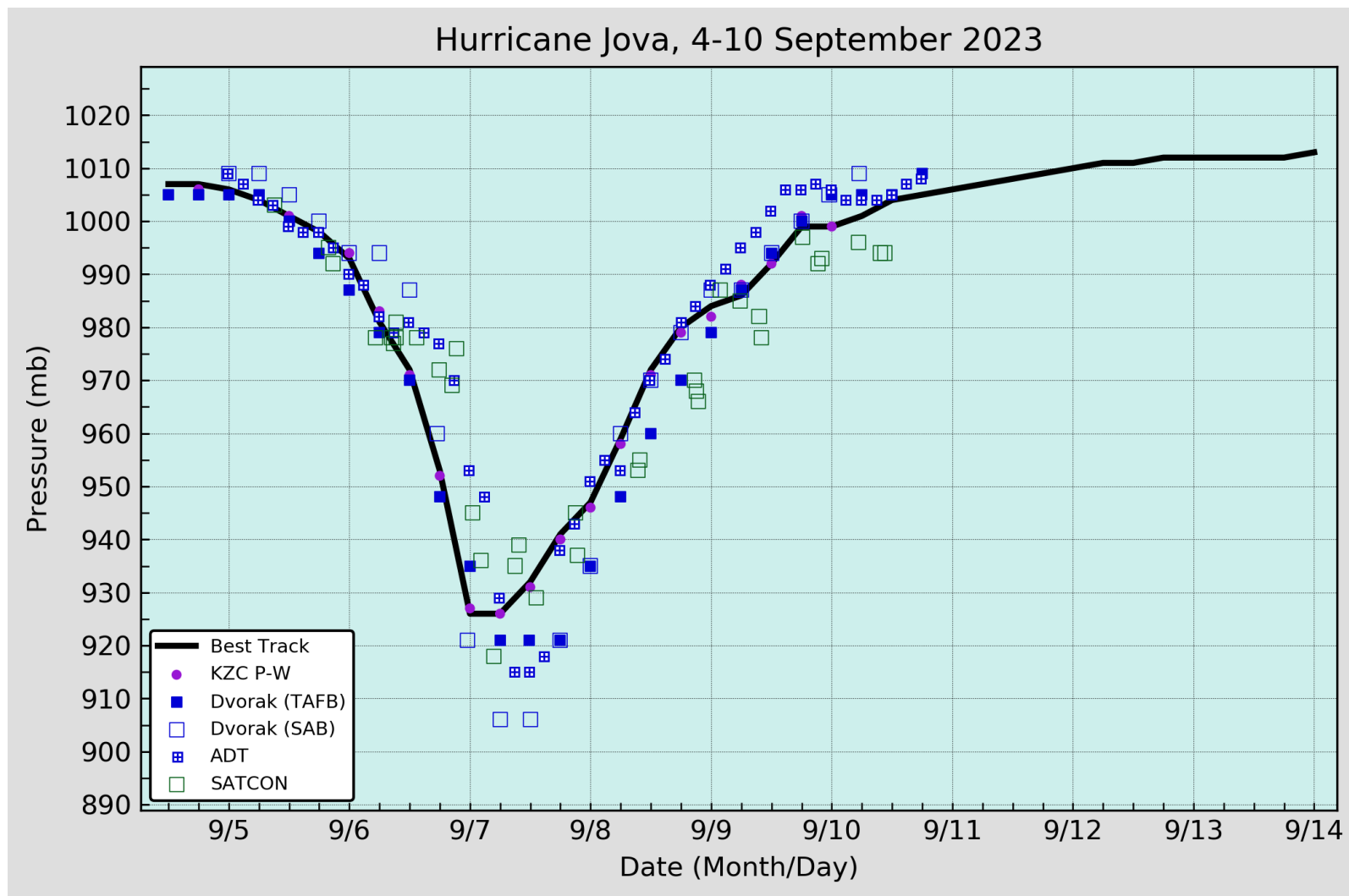


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Jova, 4–10 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

Jova 7-day Tropical Weather Outlook Areas

From: 0000 UTC 1 Sep 2023 to 1800 UTC 4 Sep 2023

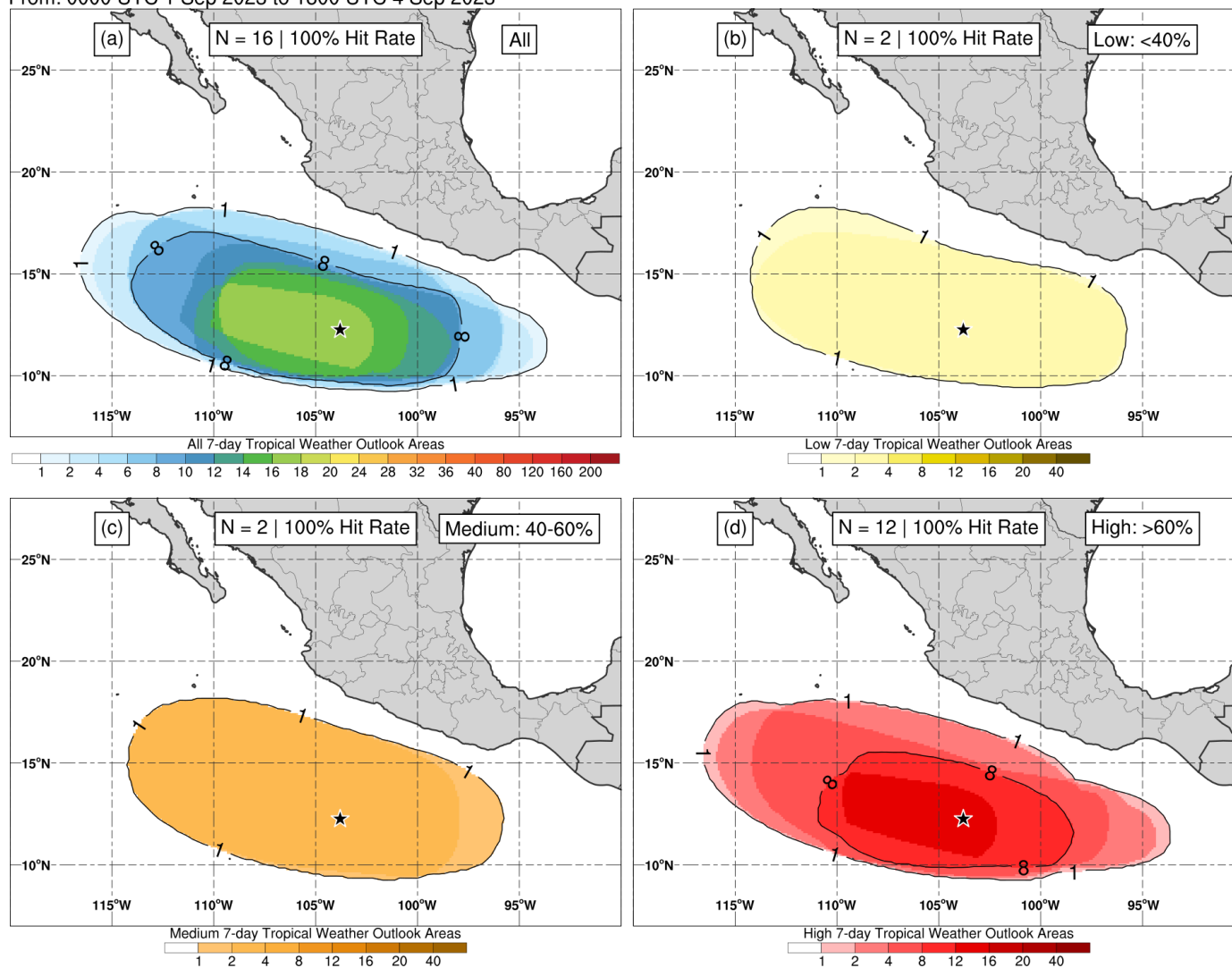


Figure 4. Composites of 7-day tropical cyclone genesis areas depicted in NHC’s Tropical Weather Outlooks prior to the formation of Jova for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated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

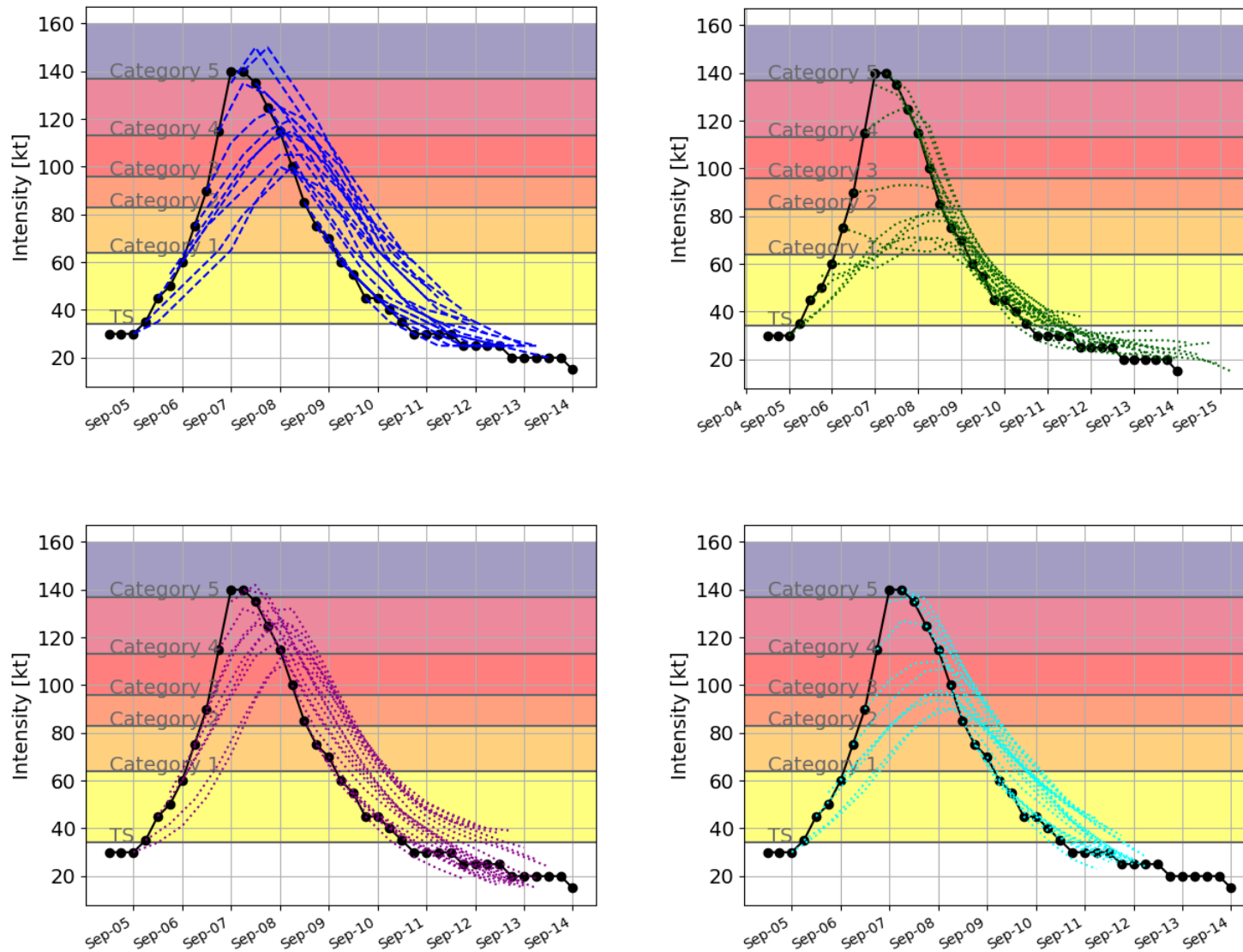


Figure 5. (Upper left) NHC official intensity forecasts (dashed blue lines) from 0000 UTC 5 September to 1800 UTC 9 September. (Upper right) Interpolated HAFS-A intensity forecasts (dotted dark green), (lower left) LGEM (dotted dark magenta), and (lower right) ICON (dotted cyan) are shown for the same times. The best track is depicted by the black line with markers shown every 6 hours.