NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT[1]

TROPICAL STORM JOSE

(AL112023)

29 August–1 September 2023

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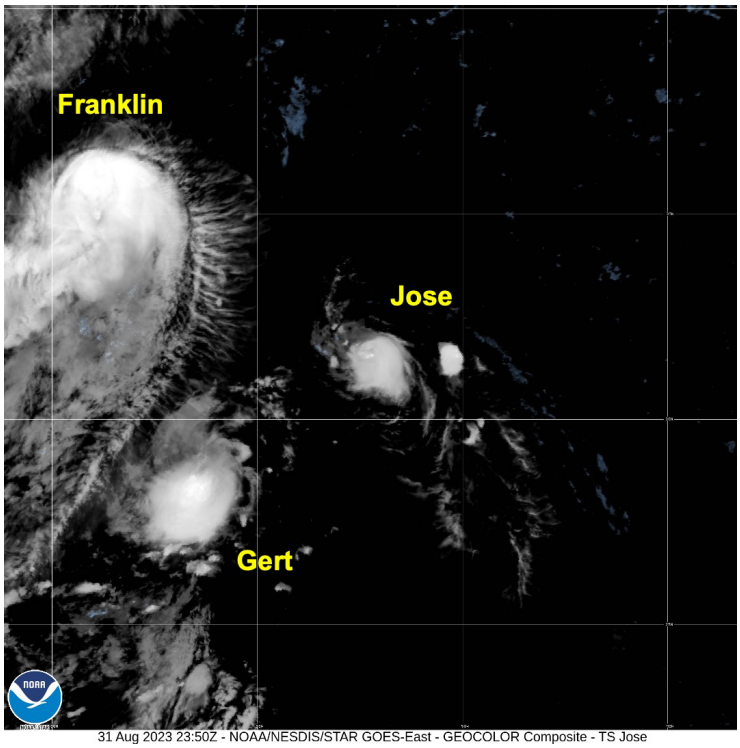
National Hurricane Center
19 December 2023



GOES-16 GEOCOLOR IMAGE OF TROPICAL STORM JOSE NEAR THE TIME OF ITS PEAK INTENSITY AT 2350 UTC 31 AUGUST 2023. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Jose was a compact tropical storm that moved northward over the central Atlantic before being absorbed by the larger and stronger Post-Tropical Cyclone Franklin.

[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 Jose.

TROPICAL STORM JOSE

29 AUGUST–1 SEPTEMBER 2023

BEST TRACK

The "best track[2]" positions and intensities for Tropical Storm Jose are listed in Table 1. The best track chart of Jose'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 in association with Jose.

Origin

Jose originated from a slow-moving tropical wave that moved off the west coast of Africa on 19 August. Unfavorable environmental conditions consisting of dry mid-level air and northeasterly shear prevented development over the eastern tropical Atlantic. Around 24 August, a broad area of low pressure formed in association with the wave about midway between the Cabo Verde Islands and the Lesser Antilles. The broad low moved slowly northwestward reaching more favorable environmental conditions over the central subtropical Atlantic where development occurred early on 29 August.

Peak Intensity and Minimum Pressure

Jose was a very small tropical cyclone. Tropical-storm-force winds are estimated to have extended outward only about 30 n mi from the center around the time of its peak intensity. Due to the cyclone's very small size, its estimated peak intensity of 55 kt is more uncertain than normal and is based primarily on satellite wind data from ASCAT, accounting for its potential undersampling.

Jose's structure improved on 31 August when a very small mid-level eye-like feature was noted on a couple of microwave images at 2051 UTC and 2356 UTC 31 August (Fig. 4). During that time, subjective Dvorak intensity estimates from TAFB and SAB peaked at T3.0 (45 kt).

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

Objective ADT estimates from UW/CIMSS peaked around T2.6 (37 kt), and SATCON estimates were as high as 47 to 50 kt between about 0000 and 0600 UTC 1 September. A couple of ASCAT passes that were available in real time from just after 0000 UTC 1 September, when the cyclone exhibited its best structure, showed peak winds of 42–43 kt. Ultra-high-resolution (UHR, 3–6 km resolution[4]) ASCAT data (Fig. 5) that became available during the post-analysis from those same passes showed peak winds of 47–49 kt. Given the very narrow band of maximum winds and small radius of maximum winds (RMW) of Jose at that time, it is likely that the peak winds were higher than estimated by both the standard and ultra-high resolution ASCAT data. Therefore, Jose's peak intensity is estimated at 55 kt at 0000 and 0600 UTC 1 September. It should be noted that additional uncertainty regarding Jose's peak intensity was introduced when Synthetic Aperture Radar (SAR) wind data from 2128 UTC 31 August revealed peak winds as high as 74 kt (Fig. 6). The validity of SAR data for estimating peak sustained winds in tropical cyclones is still being evaluated, and therefore that data was only used qualitatively to suggest that Jose's peak intensity was likely higher than that supported by conventional estimates alone. The SAR pass indicated that Jose had a very small RMW of around 5 n mi, which was consistent with the very compact inner-core structure seen in the microwave imagery around the same time (Fig. 6).

The estimated minimum central pressure of Jose of 996 mb at 0000 and 0600 UTC 1 September is based on the Knaff-Zehr-Courtney pressure-wind relationship.

CASUALTY AND DAMAGE STATISTICS

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

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. The genesis of Jose was very poorly forecast. Although the tropical wave from which Jose formed was introduced into the TWO more than 9 days before it developed, it was initially anticipated that Jose would form much sooner over the tropical Atlantic. The 7-day probabilities were raised to the high category more than 8 days before Jose formed, but the probabilities were lowered during the next several days with the 7-day genesis probabilities returning to the low category at 1800 UTC 26 August. The system was removed from the TWO at 1800 UTC the next day, which was only 30 hours before the system is shown to have become a tropical depression in the best track. The system was not re-introduced into the TWO until after it is assessed to have formed in the post-analyzed best track. Jose's very small size likely contributed to the poor genesis forecasts. During the day or two before formation, the global model guidance suggested the system would remain a weak trough,

[4] Data and resolution information provided by Zorana Jelenak (UCAR Project Scientist) through personal communication.

rather than acquire a very small, closed circulation that ultimately went on to become a tropical cyclone. Due to the poor genesis forecast, the location of development was also not well captured, and Figure 7 shows composites of 7-day TWO genesis areas for each category prior to the formation of Jose. Less than half of all genesis areas correctly captured the location of genesis.

A verification of NHC official track forecasts for Jose is given in Table 3a. Official track forecast errors were greater than the mean official errors for the previous 5-yr period through 48 h, but lower than the long-term means at 60 and 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 Jose is given in Table 4a. Official intensity forecast errors were much greater than the mean official errors for the previous 5-yr period. This was due to the unexpected intensification of the compact tropical cyclone. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The intensity guidance also had large errors, but nearly all the guidance exhibited lower mean errors than the official forecast.

There were no coastal watches or warnings issued for Jose.

Table 1. Best track for Tropical Storm Jose, 29 August–1 September 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt	Stage
29 / 0000	27.7	51.7	1014	30	tropical depression
29 / 0600	27.7	51.5	1013	30	"
29 / 1200	27.9	51.5	1012	30	"
29 / 1800	28.0	51.8	1012	30	"
30 / 0000	28.0	52.1	1011	30	"
30 / 0600	28.1	52.1	1010	30	"
30 / 1200	28.1	52.1	1010	30	"
30 / 1800	28.2	52.1	1010	30	"
31 / 0000	28.3	52.1	1009	35	tropical storm
31 / 0600	28.6	52.1	1006	40	"
31 / 1200	29.3	52.1	1004	45	"
31 / 1800	30.4	52.3	999	50	"
01 / 0000	31.6	52.5	996	55	"
01 / 0600	32.9	52.4	996	55	"
01 / 1200	34.9	51.4	997	50	"
01 / 1800	37.4	49.8	997	50	"
02 / 0000					dissipated
01 / 0000	31.6	52.5	996	55	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	**168-Hour Outlook**
Low (<40%)	204	222
Medium (40%-60%)	186	210
High (>60%)	-	192

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Jose, 29 August–1 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	30.7	39.6	63.7	70.2	**68.4**	**20.6**		
OCD5	52.8	103.6	157.3	124.6	53.2	108.1		
Forecasts	12	10	8	5	2	1		
OFCL (2018-22)	23.8	35.7	47.8	61.4	76.1	90.5	125.7	172.1
OCD5 (2018-22)	46.4	99.2	157.4	215.0	254.9	321.2	405.1	486.6

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Jose, 29 August–1 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	26.5	38.7	60.8	69.4				
OCD5	44.4	110.6	169.6	161.5				
GFSI	**23.9**	**37.8**	**58.3**	114.6				
EMXI	**18.9**	**34.9**	**58.5**	73.6				
CMCI	29.3	75.1	162.5	112.7				
HMNI	32.8	45.3	69.4	101.2				
HWFI	28.4	53.4	77.8	106.9				
HFAI	35.9	64.8	92.3	198.3				
HFBI	43.8	75.1	120.5	177.8				
CTCI	**22.0**	**30.7**	65.7	72.3				
AEMI	**24.8**	**34.3**	**57.4**	110.0				
HCCA	**24.5**	**37.6**	65.5	106.1				
TVCX	26.8	**37.9**	**55.2**	81.4				
GFEX	**21.3**	**30.2**	**42.2**	**64.0**				
TVCA	**26.4**	38.8	**57.8**	88.9				
TVDG	**25.4**	**37.4**	**56.6**	82.0				
TABD	45.4	112.4	156.8	103.1				
TABM	42.6	91.1	132.5	114.3				
TABS	45.5	100.5	152.9	130.2				
Forecasts	10	9	7	3				

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Jose, 29 August–1 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	8.8	13.5	16.2	20.0	25.0	25.0		
OCD5	6.3	8.0	6.6	5.2	7.0	1.0		
Forecasts	12	10	8	5	2	1		
OFCL (2018-22)	5.1	7.6	8.9	10.1	10.7	11.5	13.3	15.5
OCD5 (2018-22)	6.8	10.7	13.9	16.5	18.3	20.2	22.9	23.4

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Jose, 29 August–1 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	9.5	14.4	18.6	21.7				
OCD5	**6.4**	**8.1**	**6.7**	**5.7**				
HWFI	**8.4**	**10.4**	**13.7**	**12.7**				
HMNI	**9.2**	**9.2**	**12.6**	**16.0**				
HFAI	**9.0**	14.9	**16.0**	25.0				
HFBI	9.7	**11.0**	**13.7**	25.3				
CTCI	**7.4**	**8.0**	**16.0**	**21.0**				
DSHP	**8.3**	**12.4**	**15.1**	**14.7**				
LGEM	**7.8**	**12.0**	**16.3**	**17.7**				
ICON	**7.8**	**10.2**	**14.1**	**15.0**				
IVCN	**8.0**	**9.8**	**13.7**	**18.3**				
IVDR	**8.2**	**10.0**	**13.7**	**19.0**				
HCCA	**7.9**	**8.8**	**12.9**	**17.0**				
GFSI	**8.1**	**11.7**	**16.0**	**20.0**				
EMXI	**8.7**	**11.0**	**15.1**	**19.7**				
Forecasts	10	9	7	3				

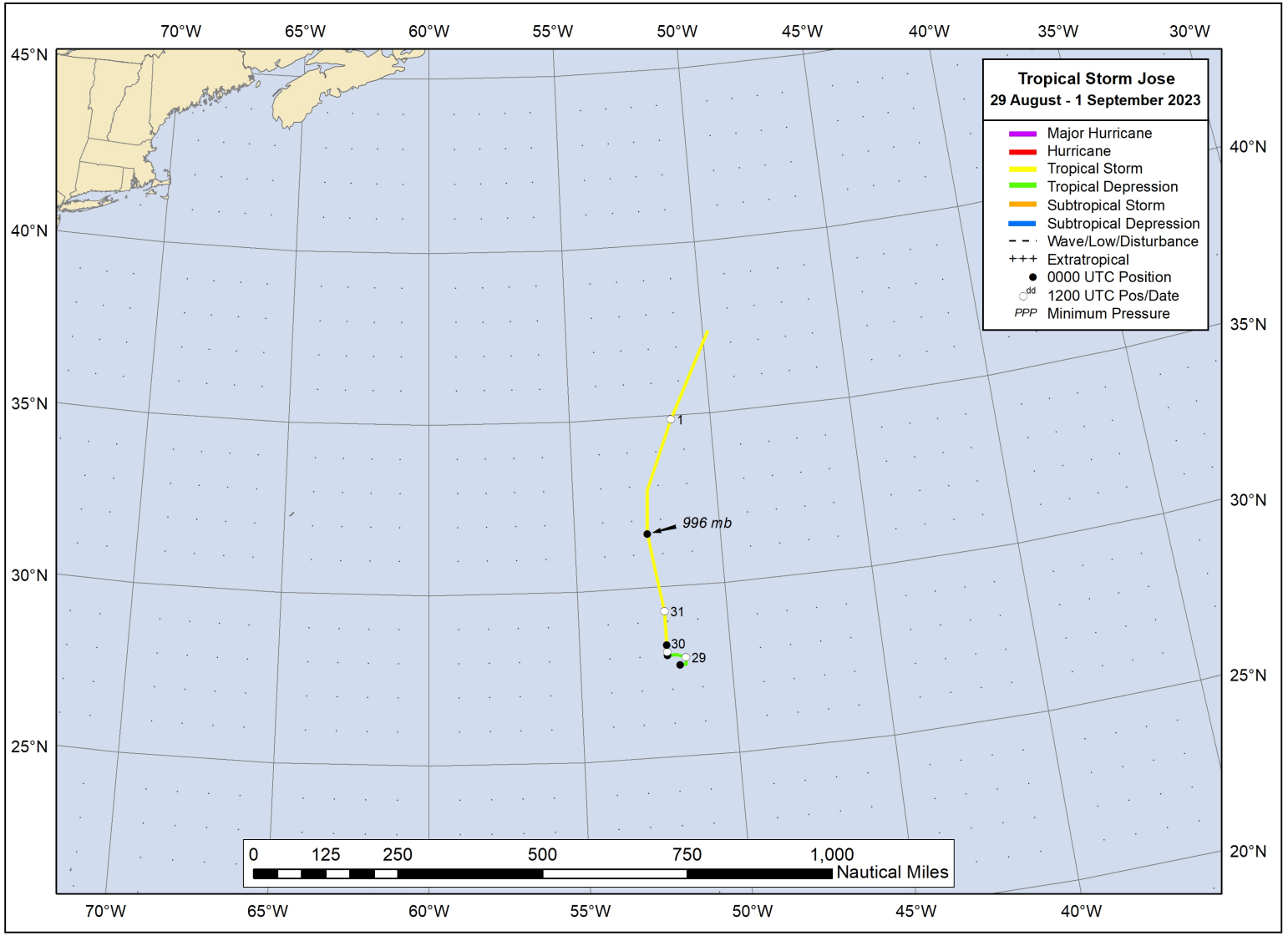


Figure 1. Best track positions for Tropical Storm Jose, 29 August–1 September 2023.

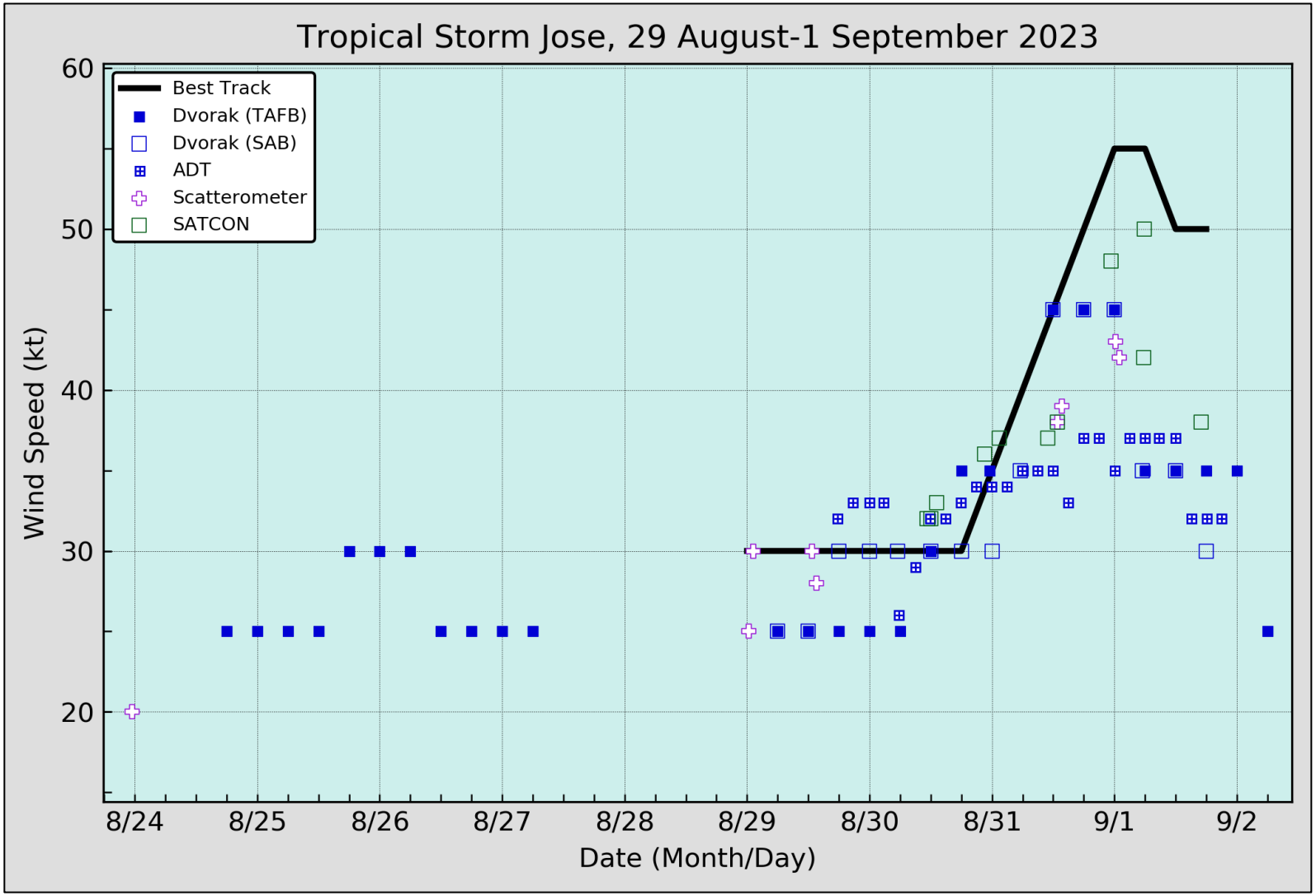


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Jose, 29 August–1 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

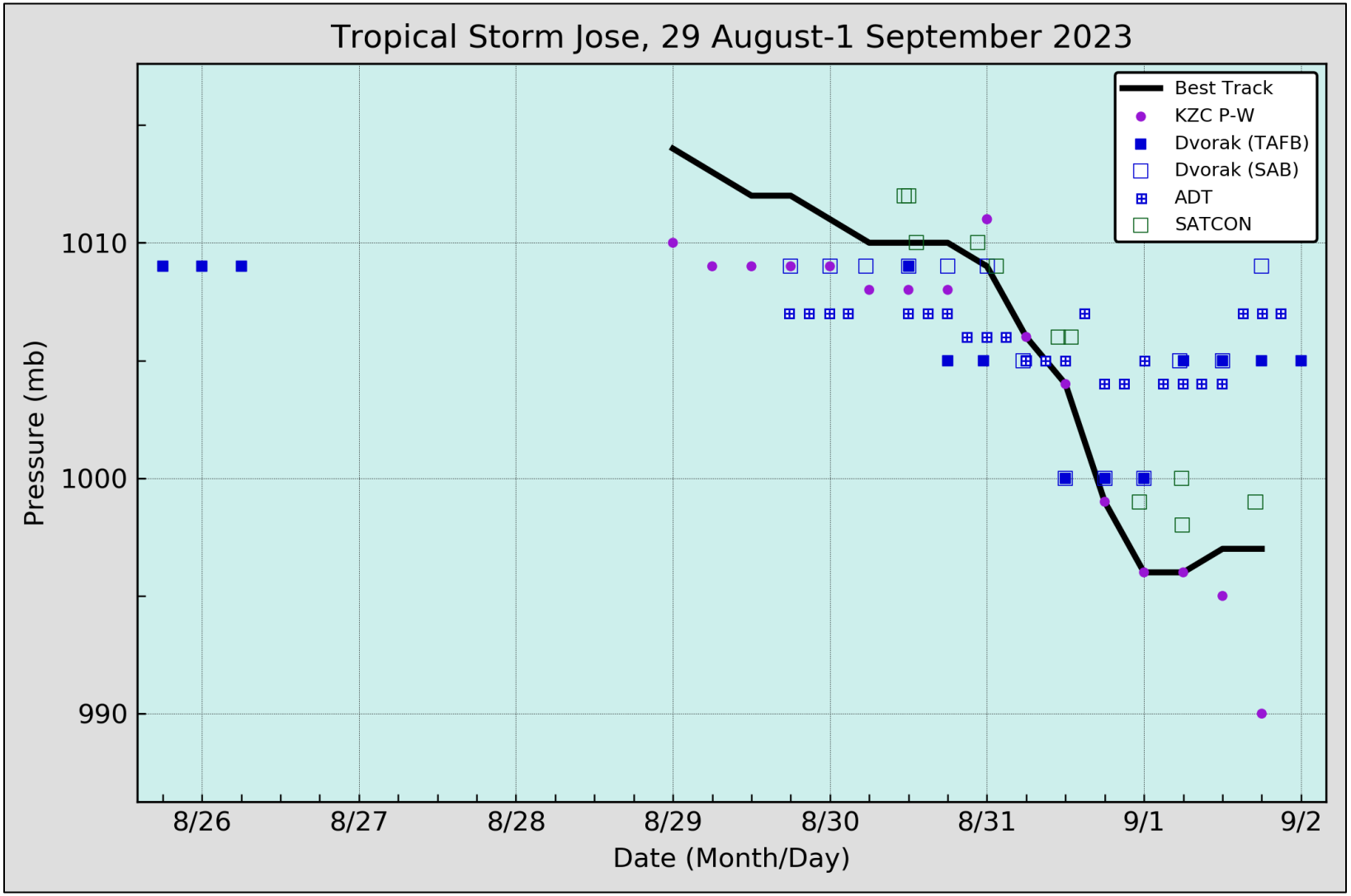


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Jose, 29 August–1 September 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute 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.

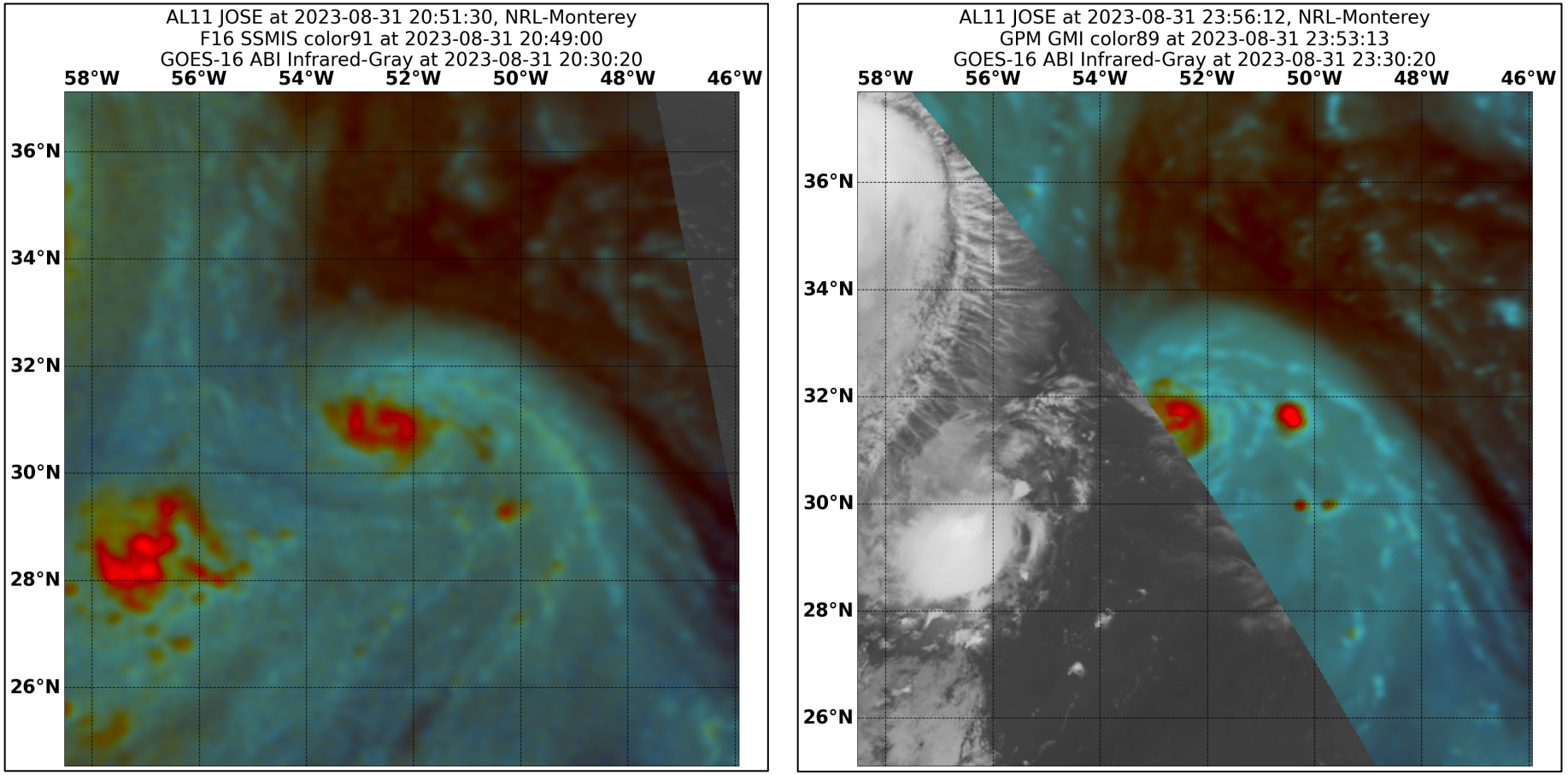


Figure 4. SSMIS 91-GHz Color Composite image (left) at 2051 UTC 31 August and GMI 89-GHz Color Composite image (right) at 2356 UTC 31 August of Tropical Storm Jose. Note the very small mid-level eye feature that becomes better defined by the time of the image on the right. Between the time of these two images, data from the Synthetic Aperture Radar (SAR) instrument (Fig. 6) indicated that the radius of maximum winds was about 5 n mi which is consistent with the compact inner core noted in the microwave imagery. Images courtesy of the Naval Research Laboratory.

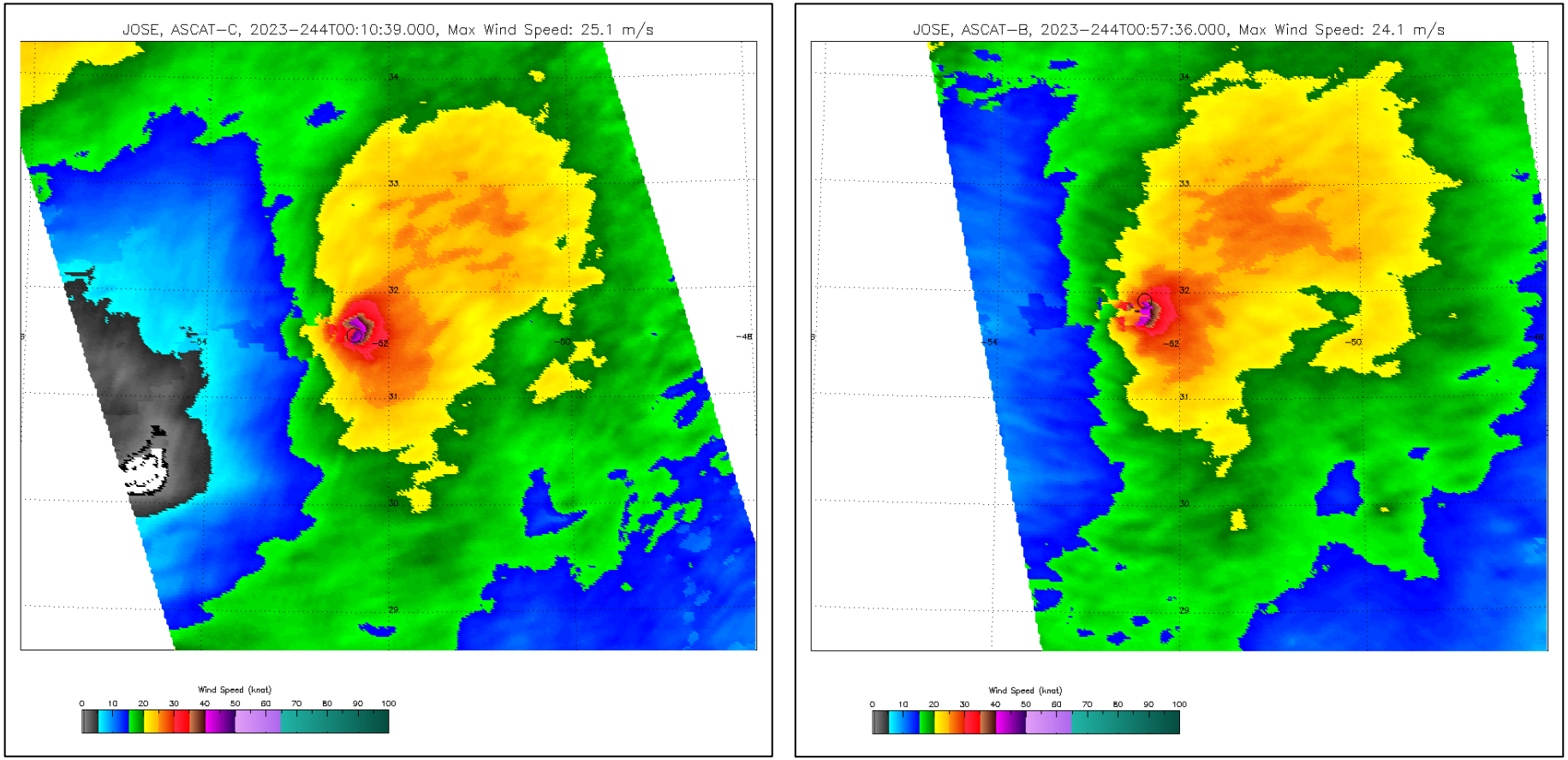
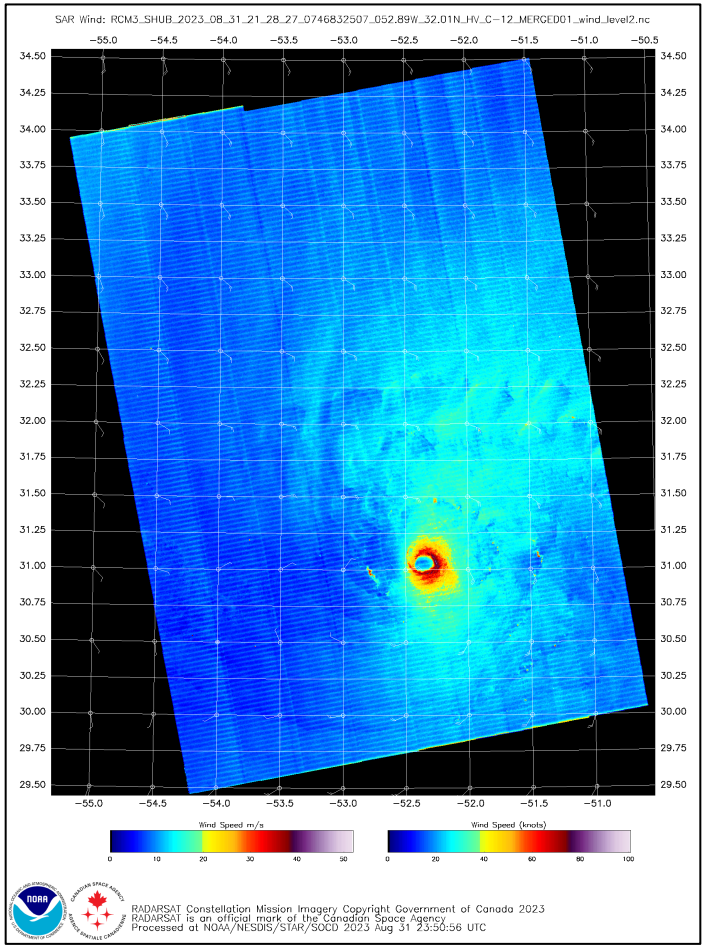


Figure 5. Ultra-High Resolution (UHR) ASCAT-C (left) and ASCAT-B (right) surface (10 m) wind data at 0010 and 0057 UTC 1 September, respectively. Peak winds were in the 47 to 49 kt (24.1 to 25.1 m/s) range. These data were collected within an hour of the time of Jose's best organization in microwave imagery (Fig. 4). Data courtesy of Zorana Jelenak (UCAR).



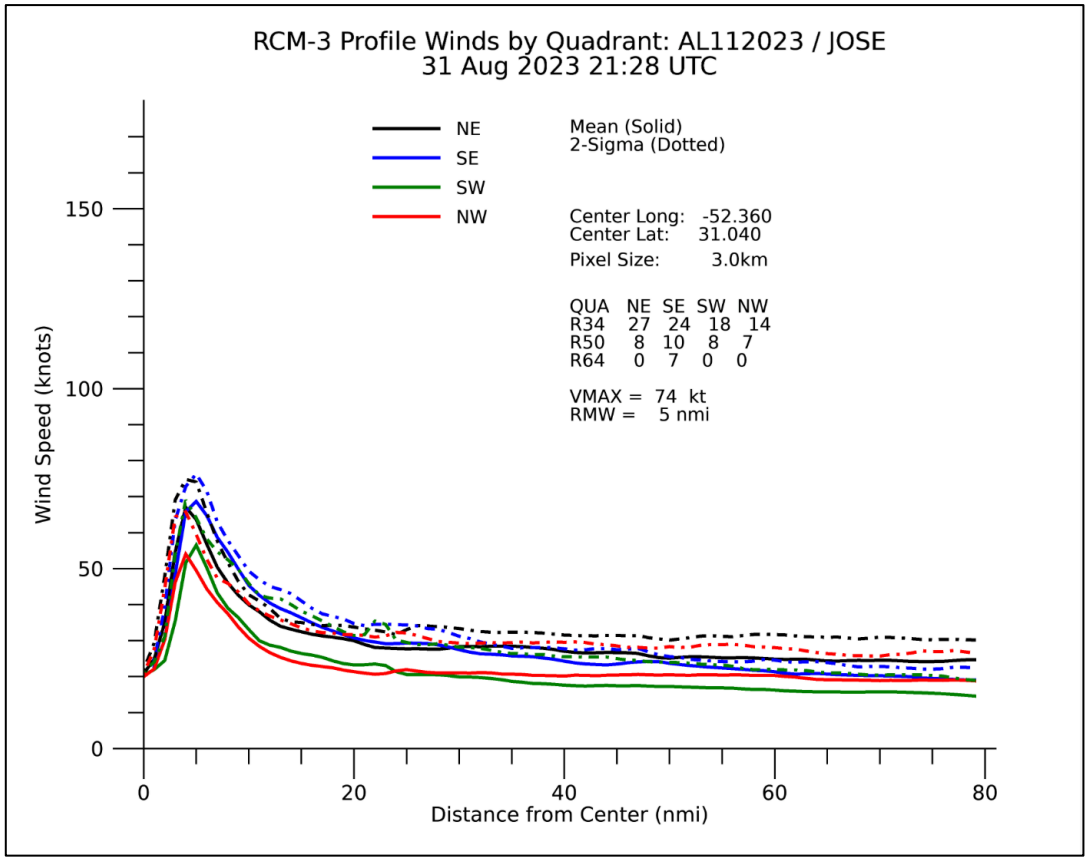


Figure 6. Synthetic Aperture Radar (SAR) surface (10 m) wind estimates (left) and wind profile by quadrants (right) at 2128 UTC 31 August for Tropical Storm Jose. Data from this instrument indicated that Jose had a radius of maximum winds (RMW) of around 5 n mi. The instrument estimated peak winds as high as 74 kt, however the calibration of wind estimates from this instrument are still being examined, and the data were only used qualitatively when estimating Jose's peak intensity.

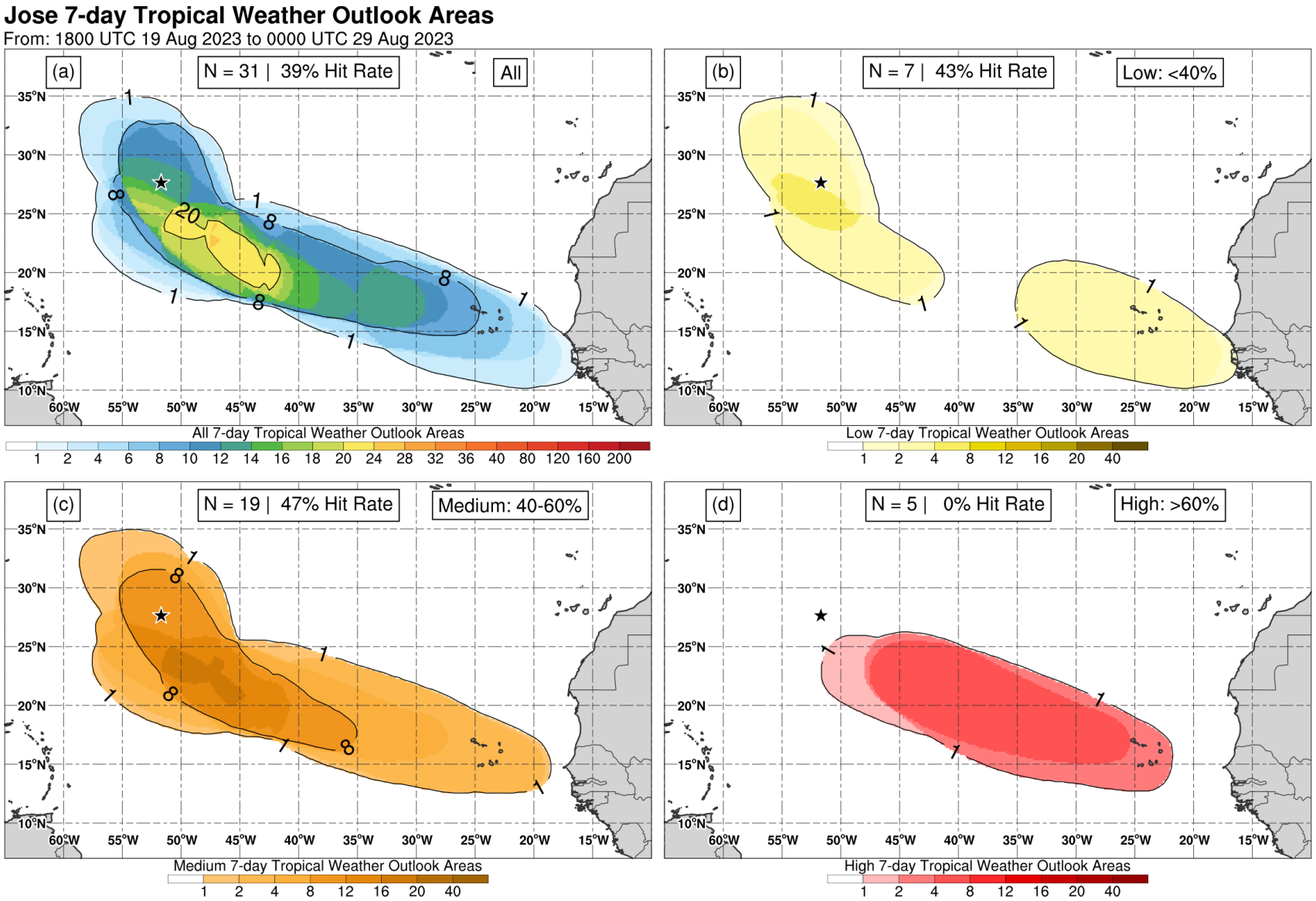


Figure 7. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Tropical Storm Jose for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of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