NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL STORM JAVIER

(EP112022)

1–3 September 2022

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National Hurricane Center
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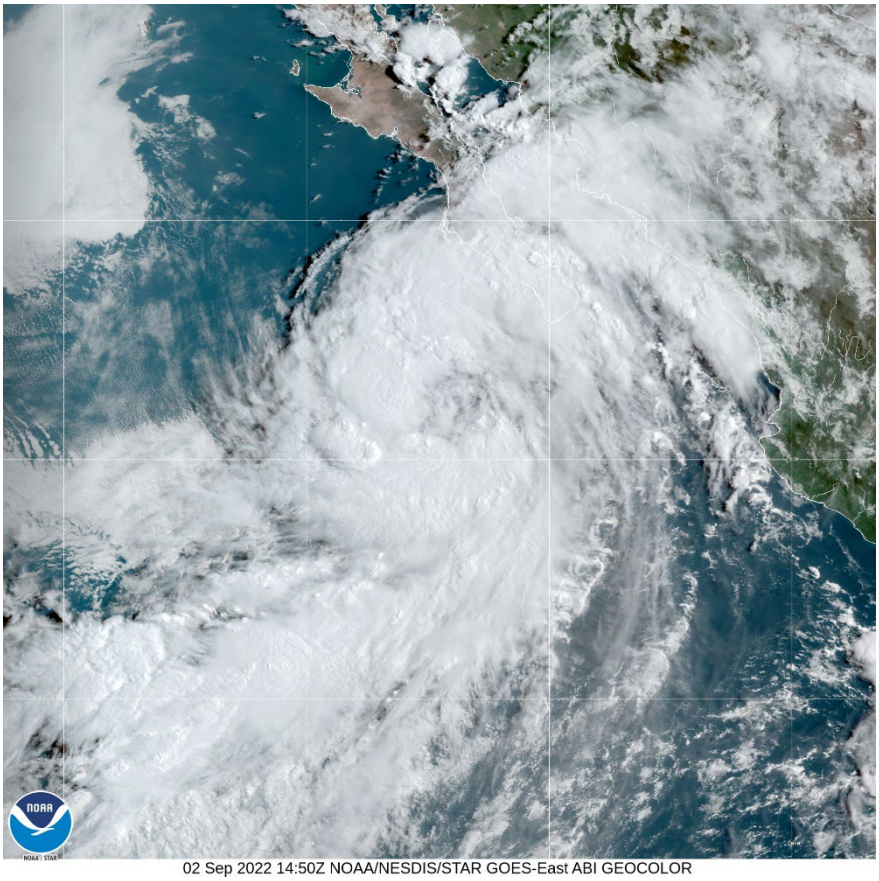

GOES-16 GEOCOLOR IMAGE OF JAVIER AT 1450 UTC 2 SEPTEMBER 2022. IMAGE COURTESY OF NOAA NESDIS STAR.

Javier was a short-lived tropical storm that brought tropical storm conditions to portions of Baja California Sur.

Tropical Storm Javier

1–3 SEPTEMBER 2022

SYNOPTIC HISTORY

The originating weather system of Javier is a bit uncertain. The precursor disturbance was a cloud cluster that first became apparent along the Pacific coast of northern South America and Central America on 25-26 August. It is possible that this cluster was associated with a tropical wave as mentioned in NHC Tropical Weather Outlooks (TWOs) issued on the disturbance. However, if it was, the wave was not reliably detectable any farther east in satellite imagery or model analyses. The associated convection gradually increased over the next few days as the system moved westward to west-northwestward to the south of Central America and eastern Mexico. A large low pressure area formed on 31 August about 225 n mi southwest of Manzanillo, Mexico, with the system moving generally northwestward with increasing convective organization during the subsequent 24 h. Although scatterometer data showed gale-force winds during this time, these winds were in an area of westerly and southwesterly monsoon flow well removed from the center and were not representative of the system's intensity. An additional increase in convective organization led to the formation of a tropical depression near 1800 UTC 1 September about 25 n mi east-southeast of Socorro Island, Mexico. 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].

After genesis, the depression continued moving northwestward on the west side of the subtropical ridge and passed near Socorro Island. Gradual strengthening occurred, with the depression reaching tropical storm strength around 0600 UTC 2 September. Javier strengthened some more that day, and it reached an estimated peak intensity of 45 kt at 0000 UTC 3 September while centered about 165 n mi west-southwest of Cabo San Lucas, Mexico. During Javier's strengthening phase, the storm had a large area of tropical-storm-force winds in the eastern semicircle, and these winds brushed the Pacific coast of the Mexican state of Baja California Sur. After reaching peak intensity, the convection diminished as the cyclone moved over decreasing sea surface temperatures. Javier degenerated to a gale-force post-tropical low by 1800 UTC 3 September, and the system weakened to a remnant low when the winds dropped below gale force at 0600 UTC 4 September. At that time, the low was centered about 160 n mi west-southwest of Punta Eugenia, Mexico. The remnants of Javier turned westward in the low-level flow later that day and continued to weaken, with that motion and trend continuing into 7 September. The remnant low finally dissipated early that day about 850 n mi west of Punta Eugenia.

[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.

METEOROLOGICAL STATISTICS

Observations in Javier (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 Javier.

The estimated peak intensity of 45 kt from 0000-1200 UTC 3 September is based on a combination of subjective and objective satellite intensity estimates during that time along with partial scatterometer overpasses.

Selected surface observations from land stations are given in Table 2. Javier likely produced tropical storm conditions along portions of the Pacific coast of the Mexican state of Baja California Sur, where sustained winds of 33 kt were reported at two stations: The Mexican Navy station at Puerto Cortes at 0500 UTC 3 September and a station in the mountains at Sierra La Laguna at 1610 UTC 2 September (elevation 1949 m). The latter station also reported a wind gust of 57 kt.

There were no reliable ship reports of tropical-storm-force winds from Javier.

Javier likely brought locally heavy rains to portions of Baja California Sur. However, no rainfall totals are available as of this writing.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis of Javier was adequately forecast (Table 3 and Fig. 4), although temporally the genesis forecasts were a little short-fused. The disturbance that spawned Javier was first introduced into the 5-day TWO with a low chance of development (<40%) 72 h before genesis. The formation chance was raised to the medium category (40-60%) 60 h before genesis and the high category (>60%) 48 h before genesis. For the 2-day TWO, the system was introduced with a low chance of development 66 h before genesis. The formation chance was raised to the medium category 48 h before genesis, but it was raised to the high category only at the time of

genesis as determined in post-analysis. The main issue with the genesis timing appears to have been the uncertainty of whether the broad system would become a tropical cyclone before it moved over cooler water.

A verification of NHC official track forecasts for Javier is given in Table 4. Javier was only a tropical cyclone for 42 h, so the number of verifying forecasts is small. Official track forecast errors were lower than the mean official errors for the previous 5-yr period at 12 h, and greater than the previous 5-yr means at 24 and 36 h. While the forecast tracks accurately captured the general motion, analysis of the individual forecasts (not shown) indicates that the forecast tracks had some left bias, with Javier moving more north and east of the track predictions.

A verification of NHC official intensity forecasts for Javier is given in Table 5. While the number of forecasts is again small, the official intensity forecast errors were lower than the mean official errors for the previous 5-yr period at all forecast times. The official forecast correctly showed that due to the relatively high latitude of genesis, Javier would undergo only modest strengthening before the cyclone reached cooler waters.

Due to the small number of forecasts, no verification of either the track or intensity forecast models is provided.

Watches and warnings associated with Javier are given in Table 6.

ACKNOWLEDGEMENTS

The MesoWest, the Secretaría de Marina (SEMAR), and the Meteorological Service of Mexico web sites provided the surface data. John Cangialosi provided the track map while Philippe Papin provided the genesis graphics.

Table 1. Best track for Tropical Storm Javier, 1 – 3 September 2022.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
31 / 1800	16.0	107.0	1007	30	low
01 / 0000	16.7	108.1	1006	30	"
01 / 0600	17.4	109.2	1005	30	"
01 / 1200	17.9	109.8	1004	30	"
01 / 1800	18.5	110.5	1003	30	tropical depression
02 / 0000	19.0	111.1	1002	30	"
02 / 0600	19.6	111.6	1000	35	tropical storm
02 / 1200	20.3	112.0	1000	40	"
02 / 1800	21.3	112.4	1000	40	"
03 / 0000	22.5	112.8	999	45	"
03 / 0600	23.6	113.6	999	45	"
03 / 1200	24.6	114.4	999	45	"
03 / 1800	25.4	115.5	1000	40	low
04 / 0000	26.3	116.6	1001	35	"
04 / 0600	27.0	117.9	1002	30	"
04 / 1200	27.3	119.2	1004	30	"
04 / 1800	27.5	120.4	1006	25	"
05 / 0000	27.7	121.6	1006	25	"
05 / 0600	27.7	122.8	1007	20	"
05 / 1200	27.7	123.9	1007	20	"
05 / 1800	27.7	125.1	1007	20	"
06 / 0000	27.6	126.2	1007	20	"
06 / 0600	27.5	127.3	1007	20	"
06 / 1200	27.5	128.4	1007	20	"
06 / 1800	27.5	129.5	1008	20	"
07 / 0000	27.4	130.6	1009	20	"
07 / 0600					dissipated
03 / 0000	22.5	112.8	999	45	maximum winds and minimum pressure

Table 2. Selected surface observations for Tropical Storm Javier, 1 – 3 September 2022.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)	Gust (kt)				
Mexico									
Hydrometeorological Automated Data System (HADS) Sites (NWS)									
Cabo San Lucas (CSLB7) (22.88N 109.93W)			02/1840	30	45				
Sierra La Laguna (SLGB7) (23.56N 110.00W)			02/1610	33	57				
Secretaria de Marina-Armada de Mexico (SEMAR) Sites									
Isla Guadeloupe (IGPB1) (28.88N 118.29W)	03/2345	1004.7	04/0230		35				
Isla Socorro (ISOC8) (18.73N 110.95W)			02/0545	28	41				
Puerto Cortes (SLGB7) (24.48N 111.82W)	03/0130	1001.1	03/0500	33	40				

[a] Date/time is for sustained wind when both sustained and gust are listed.
[c] Storm surge is water height above normal astronomical tide level.
[d] For most locations, storm tide is water height above the North American Vertical Datum of 1988 (NAVD88). Storm tide is water height above Mean Lower Low Water (MLLW) for NOS stations in Puerto Rico, the U.S. Virgin Islands, and Barbados.
[e] Estimated inundation is the maximum height of water above ground. For some USGS storm tide pressure sensors, inundation is estimated by subtracting the elevation of the sensor from the recorded storm tide. For other USGS storm tide sensors and USGS high-water marks, inundation is estimated by subtracting the elevation of the land derived from a Digital Elevation Model (DEM) from the recorded and measured storm tide. For NOS tide gauges, the height of the water above Mean Higher High Water (MHHW) is used as a proxy for inundation.

Table 3. Number of hours in advance of formation of Javier 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%)	66	72
Medium (40%-60%)	48	60
High (>60%)	0	48

Table 4. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Javier, 1 – 3 September 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	**20.0**	40.0	55.6					
OCD5	40.8	98.5	124.5					
Forecasts	6	4	2					
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 5. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Javier, 1 – 3 September 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	**0.8**	**1.2**	**0.0**					
OCD5	2.3	5.5	10.5					
Forecasts	6	4	2					
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 6. Watch and warning summary for Tropical Storm Javier, 1 – 3 September 2022.

Date/Time (UTC)	Action	Location
02/2100	Tropical Storm Watch issued	West coast of the Baja California peninsula from Cabo San Lucas to Punta Eugenia and east coast of the Baja California peninsula from Cabo San Lucas to Bahia San Juan Bautista
03/1540	Tropical Storm Warning issued	West coast of Baja California Sur from Puerto San Andresito to Punta Eugenia
03/2100	Tropical Storm Watch discontinued	West coast of the Baja California peninsula from Cabo San Lucas to Puerto San Andresito and the east coast of the Baja California peninsula
04/0000	All coastal warnings discontinued	

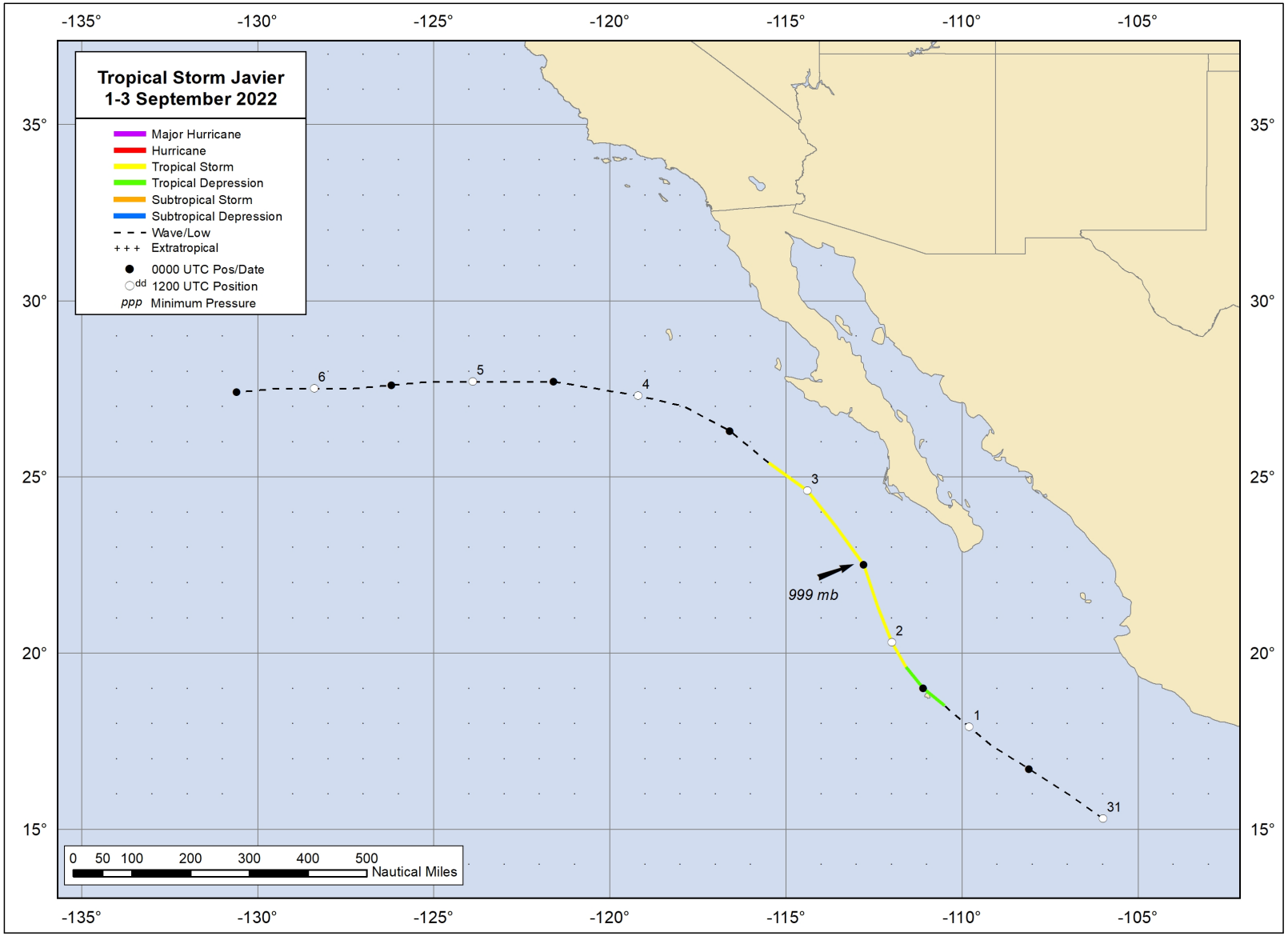

Figure 1. Best track positions for Tropical Storm Javier, 1 – 3 September 2022.

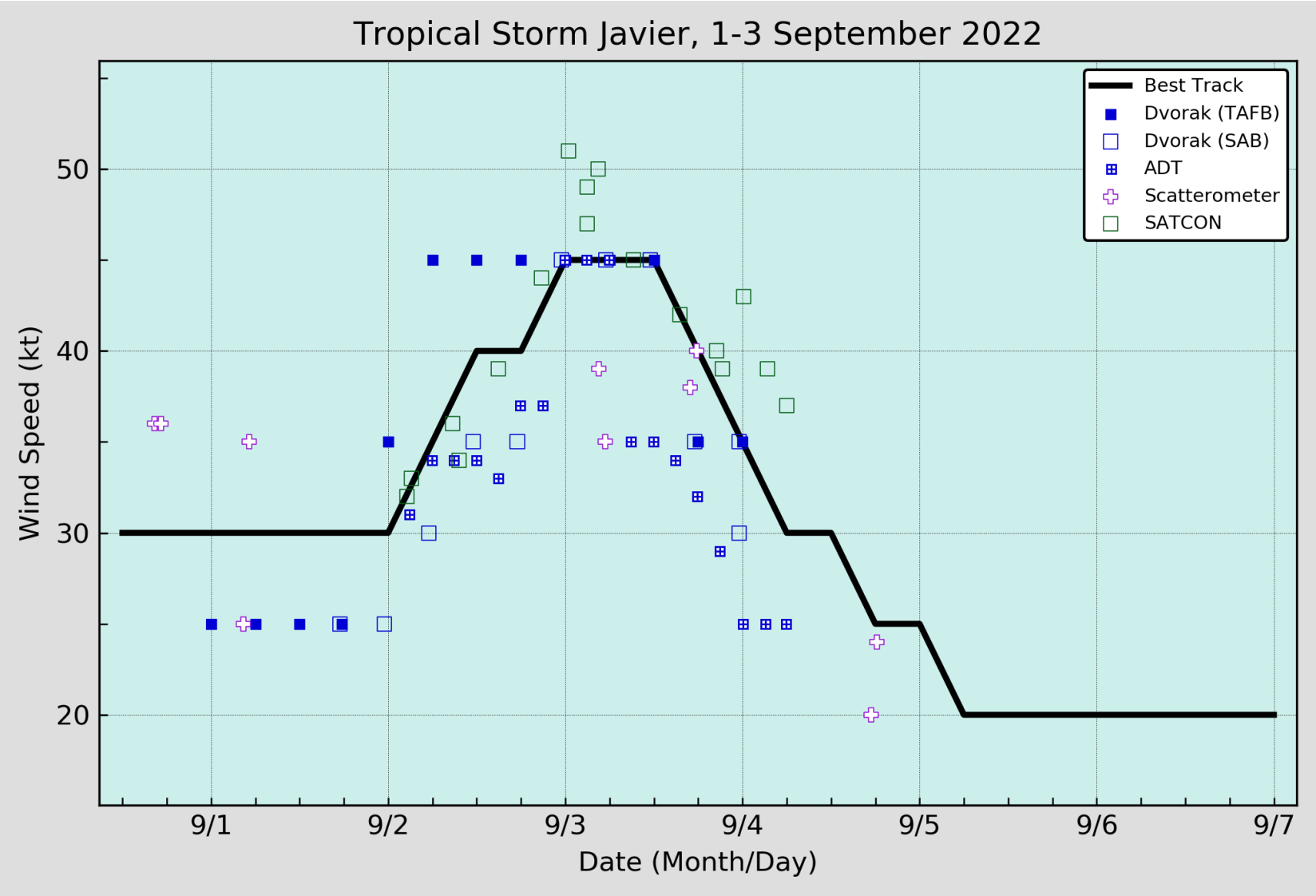

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Javier, 1 – 3 September 2022. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

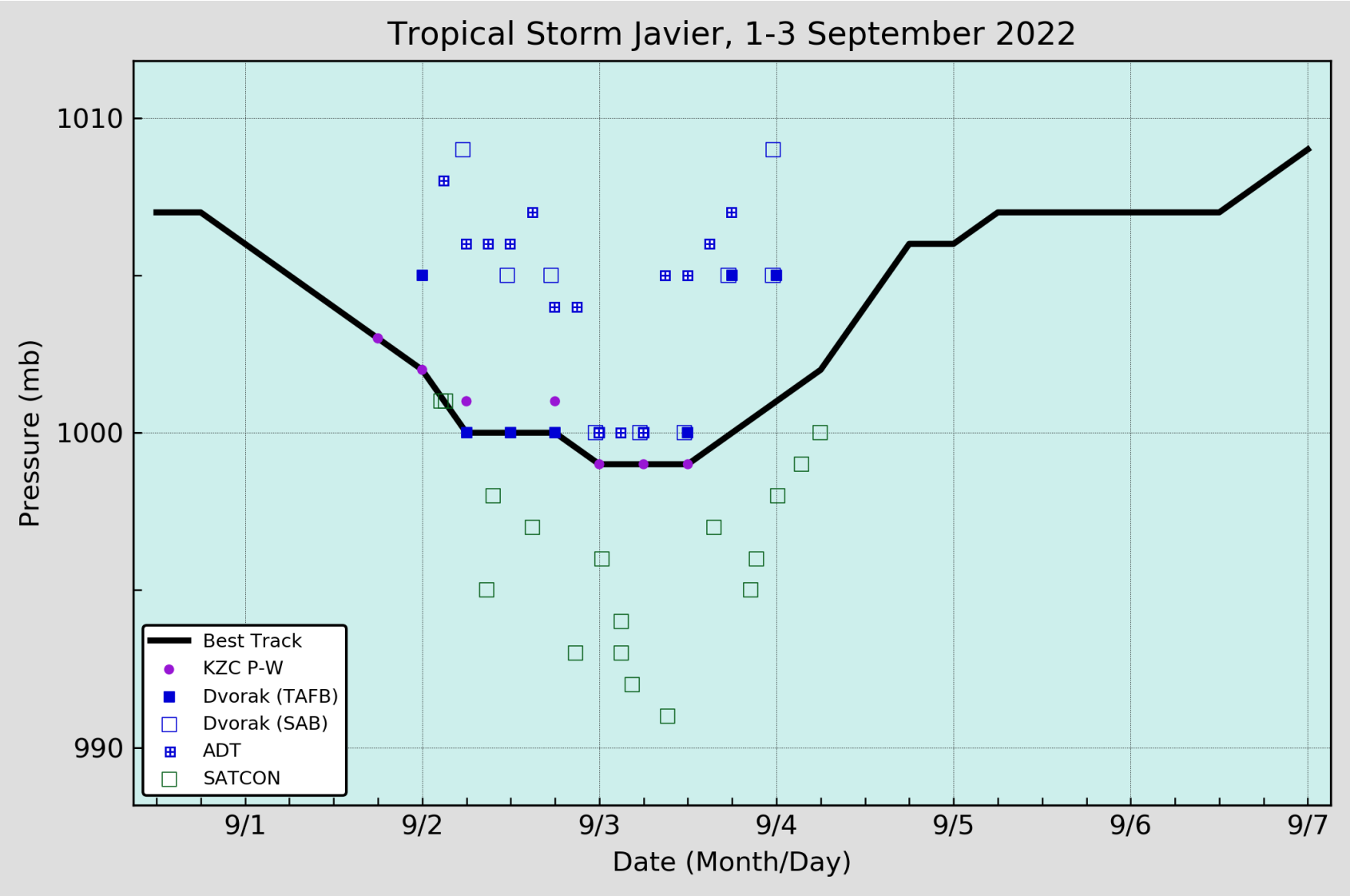

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Javier, 1 – 3 September 2022. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for 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.

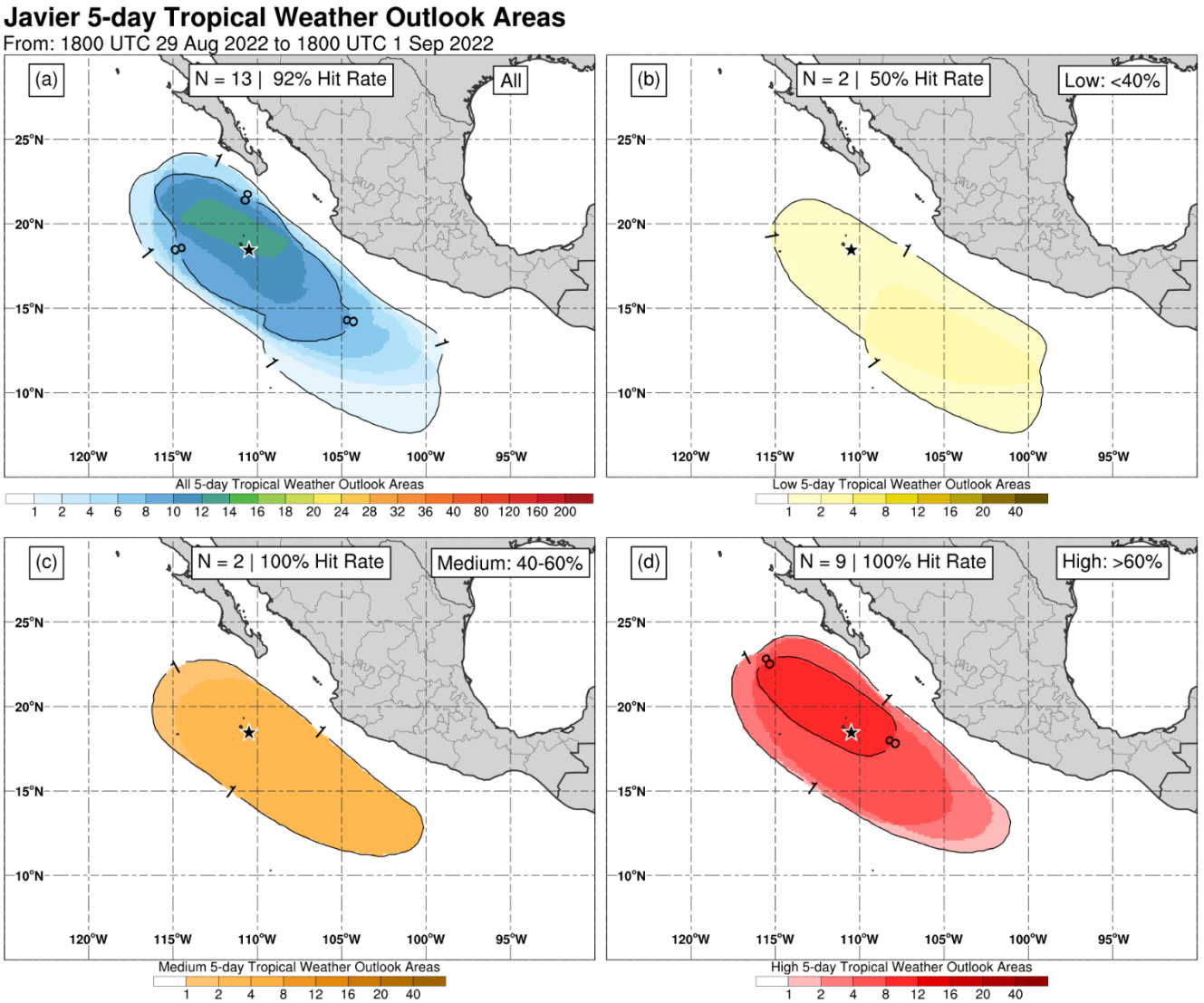

Figure 4. 5-day Tropical Weather Outlook genesis areas associated with the disturbance that developed into Tropical Storm Javier for (a) all probability areas (10–100%, multi-color shading), (b) low probability areas (< 40%, yellow shading), (c) medium probability areas (40–60%, orange shading), and (d) high probability areas (> 60%, red shading). The black star in each panel indicates the genesis location of Javier. Hit rate indicates the percentage of outlook areas where the genesis location was captured within.