NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL STORM PRISCILLA

(EP192019)

20–21 October 2019

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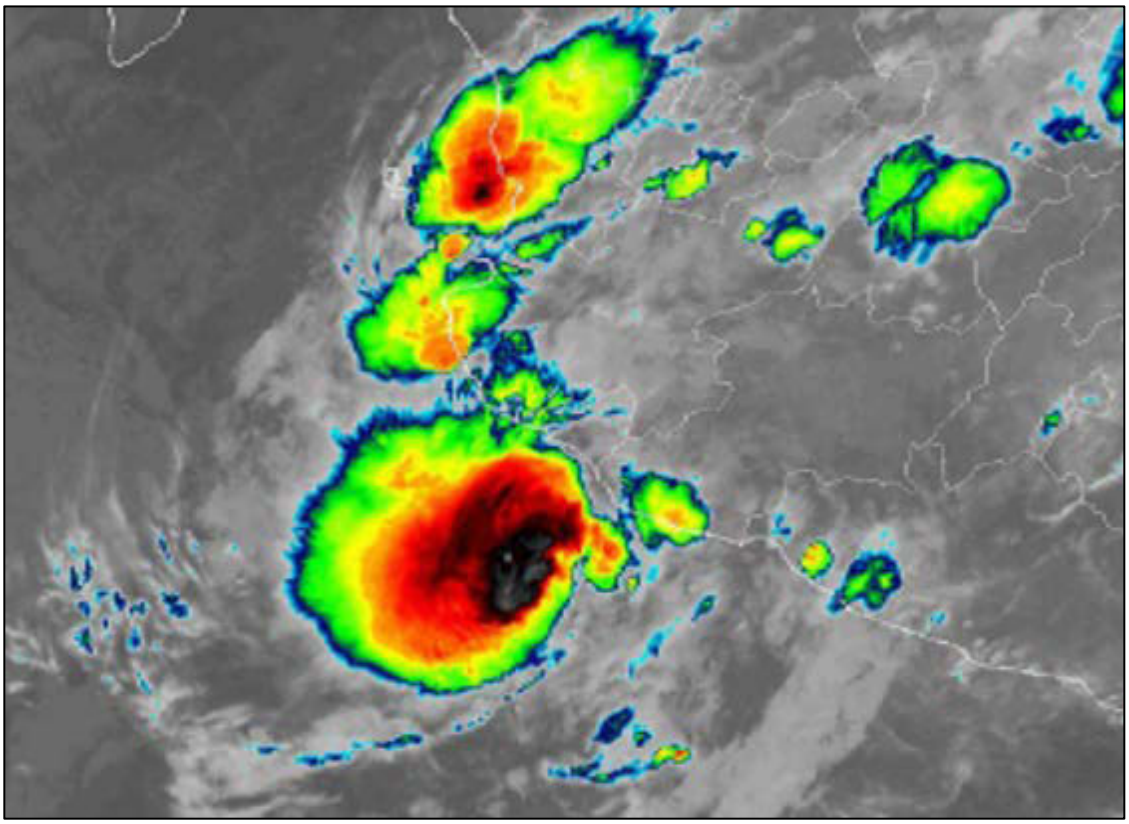

GOES-16 INFRARED SATELLITE IMAGE AT 1200 UTC 20 OCTOBER 2019 WHEN PRISCILLA WAS LOCATED SOUTH-SOUTHEAST OF MANZANILLO, MEXICO, WITH A PEAK INTENSITY OF 35 KT.

Priscilla was a short-lived, low-end tropical storm that made landfall along the coast of southwestern Mexico just to the east of Manzanillo. The cyclone produced locally heavy rainfall across the Mexican states of Nayarit, Jalisco, Colima, and Michoacán.

Tropical Storm Priscilla

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SYNOPTIC HISTORY

The disturbance that spawned Priscilla was a tropical wave that moved off the west coast of Africa late on 3 October. The relatively innocuous system moved steadily westward across the tropical Atlantic for the next week until it reached the southwestern Caribbean Sea where deep convection began to increase on 11 October. The wave fractured by late 12 October, with the northern portion moving northwestward across the Yucatan Peninsula of Mexico and eventually leading to the development of Atlantic Tropical Storm Nestor in the Gulf of Mexico on 18 October. The southern portion of wave continued a slow westward motion across Central America and southeastern Mexico, emerging over the Gulf of Tehuantepec early on 15 October where deep convection began to increase steadily. Around 1200 UTC 19 October, satellite and ship observations indicated that an overnight burst of strong convection along the wave axis had spun up a small but well-defined low pressure system about 90 n mi south-southeast of Punta San Telmo, Mexico. Although the associated thunderstorm activity decreased during the late morning and afternoon of 19 October, convection redeveloped late that day and became better organized while the low moved slowly westward, and it is estimated that a tropical depression formed by 0000 UTC 20 October about 120 n mi south-southeast of Manzanillo, Mexico. The depression then turned sharply northward and intensified into a tropical storm 6 h later. 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].

A large ridge to the east of the cyclone steered Priscilla generally northward until landfall occurred just east of Manzanillo around 1930 UTC 20 October. During that time, Priscilla maintained its peak intensity of 35 kt (cover photo) due to most of the deep convection having been displaced over the western semicircle by moderate easterly to southeasterly deep-layer vertical wind shear. After landfall, Priscilla weakened to a tropical depression 6 h later, and dissipated shortly thereafter over the rugged mountainous terrain of southwestern Mexico. The remnant moisture plume associated with the short-lived tropical cyclone spread quickly northeastward over northeastern Mexico and into the south-central United States, which may have aided the development of severe weather and heavy rains that occurred across that area on 20–21 October.

METEOROLOGICAL STATISTICS

Observations in Tropical Storm Priscilla (Figs. 2 and 3) include subjective satellite-based

[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.

Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), and 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 Priscilla.

Priscilla's estimated peak intensity of 40 kt at 1200 UTC 20 October is based on several UW-CIMSS SATCON intensity estimates of 38 kt surrounding that time period, which was coincident with the cyclone's best satellite appearance and convective organization. The estimated minimum pressure of 1003 mb is based on the Knaff-Zehr-Courtney (KZC) pressure-wind relationship.

There were no ship or land reports of tropical-storm-force winds associated with Priscilla.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties associated with Priscilla. The cyclone, including its precursor and remnants, produced locally heavy rainfall of more than 4 inches across portions of the Mexican states of Nayarit, Jalisco, Colima and Michoacán (Fig. 4). However, there were no reports of significant freshwater flooding or damage due to these rains.

The following rainfall totals are some of the more significant reports that were received: San Blas, Nayarit – 6.42 inches (163.0 mm); Higuera Blanca, Jalisco – 5.33 inches (135.4 mm); Callejones, Colima – 5.22 inches (132.6 mm).

FORECAST AND WARNING CRITIQUE

The genesis of Priscilla was poorly forecast, which isn't unusual for systems that develop close to land and only become short-lived, weak tropical cyclones. The wave from which Priscilla formed was first introduced in the Tropical Weather Outlook 48-h and 120-h forecast periods with a low probability (<40% chance) of genesis only 30 h prior to formation (Table 2), and the probabilities never reached the medium (40–60%) or high (>60%) categories. The primary reason for the poor genesis forecasts was that the global models kept the bulk of the disturbance's circulation inland over the mountainous terrain of southern Mexico, a negative factor that generally prevents the formation of tropical cyclones.

Due to Priscilla's short lifetime, there were only two 12-h forecasts that verified. Thus, a comprehensive verification of NHC official (OFCL) and guidance track and intensity forecast errors is not provided. The two 12-h OFCL track forecasts had a mean track error of 28.5 n mi,

which was slightly higher than the 5-yr average forecast track error. The 12-h official intensity forecast error of 5.0 kt was near the mean official error for the previous 5-yr period.

A Tropical Storm Warning was issued for the southwestern coast of Mexico from Punta San Telmo westward to Playa Pérula at 0900 UTC 20 October, the time that advisories were initiated on the cyclone.

ACKNOWLEDGEMENTS

Special thanks to Senior Hurricane Specialist John Cangialosi for the preparation of Priscilla's track map, and also to the Servicio Meteorológico Nacional de Mexico, CONAGUA (Mexican Meteorological Service) for the rainfall data.

Table 1. Best track for Tropical Storm Priscilla, 20–21 October 2019.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
19 / 1200	16.9	102.9	1007	20	low
19 / 1800	16.9	103.4	1006	25	"
20 / 0000	17.1	103.8	1005	30	tropical depression
20 / 0600	17.4	103.9	1004	35	tropical storm
20 / 1200	17.9	104.0	1003	40	"
20 / 1800	18.7	104.0	1004	35	"
20 / 1930	18.9	104.0	1004	35	"
21 / 0000	19.5	104.1	1006	25	tropical depression
21 / 0600					dissipated inland
20 / 1930	18.9	104.0	1004	35	landfall near Cuyutlán, Mexico
20 / 1200	17.9	104.0	1003	40	minimum pressure & maximum intensity

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	120-Hour Outlook
Low (<40%)	30	30
Medium (40%-60%)	—	—
High (>60%)	—	—

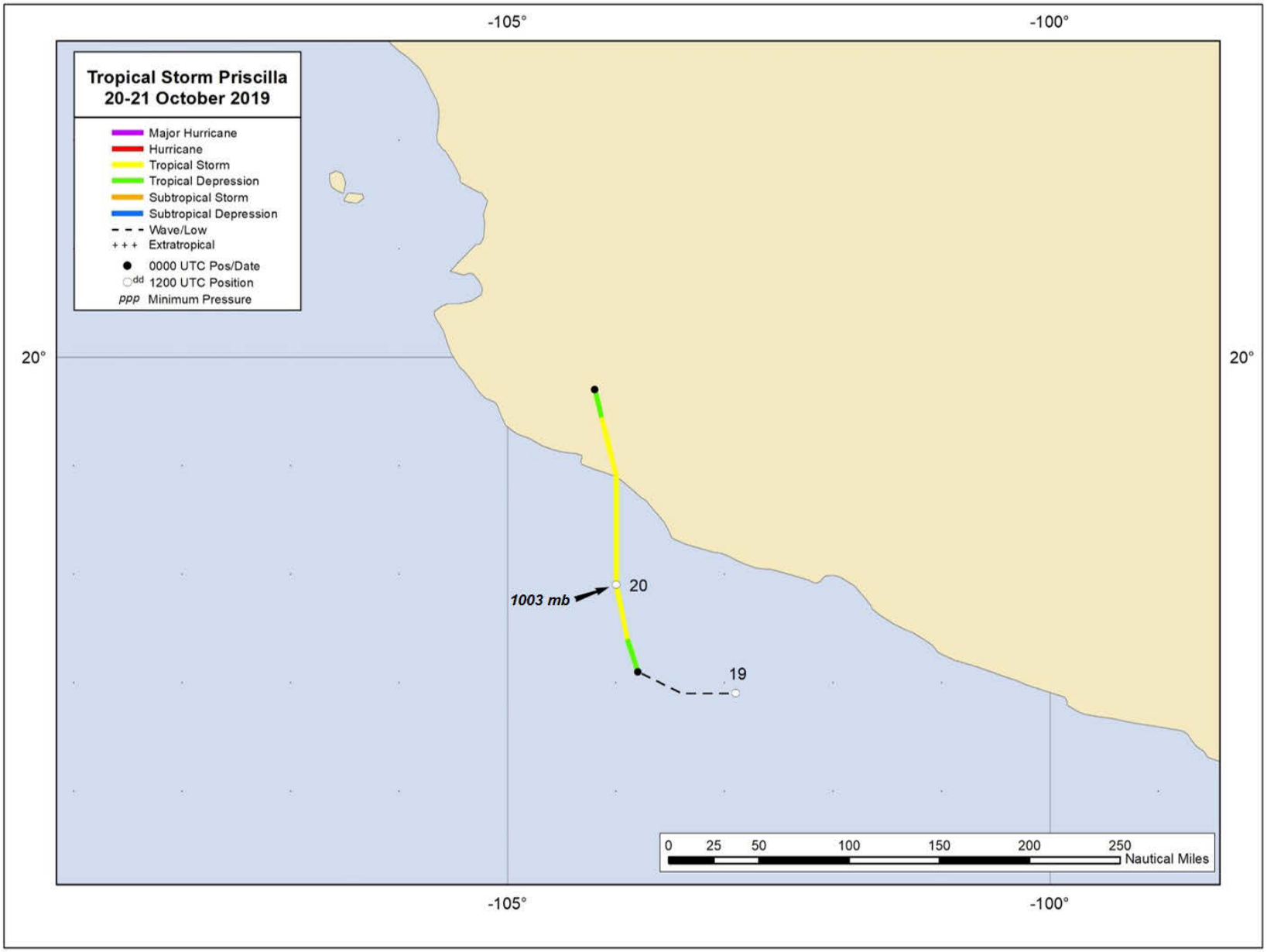

Figure 1. Best track positions for Tropical Storm Priscilla, 20–21 October 2019.

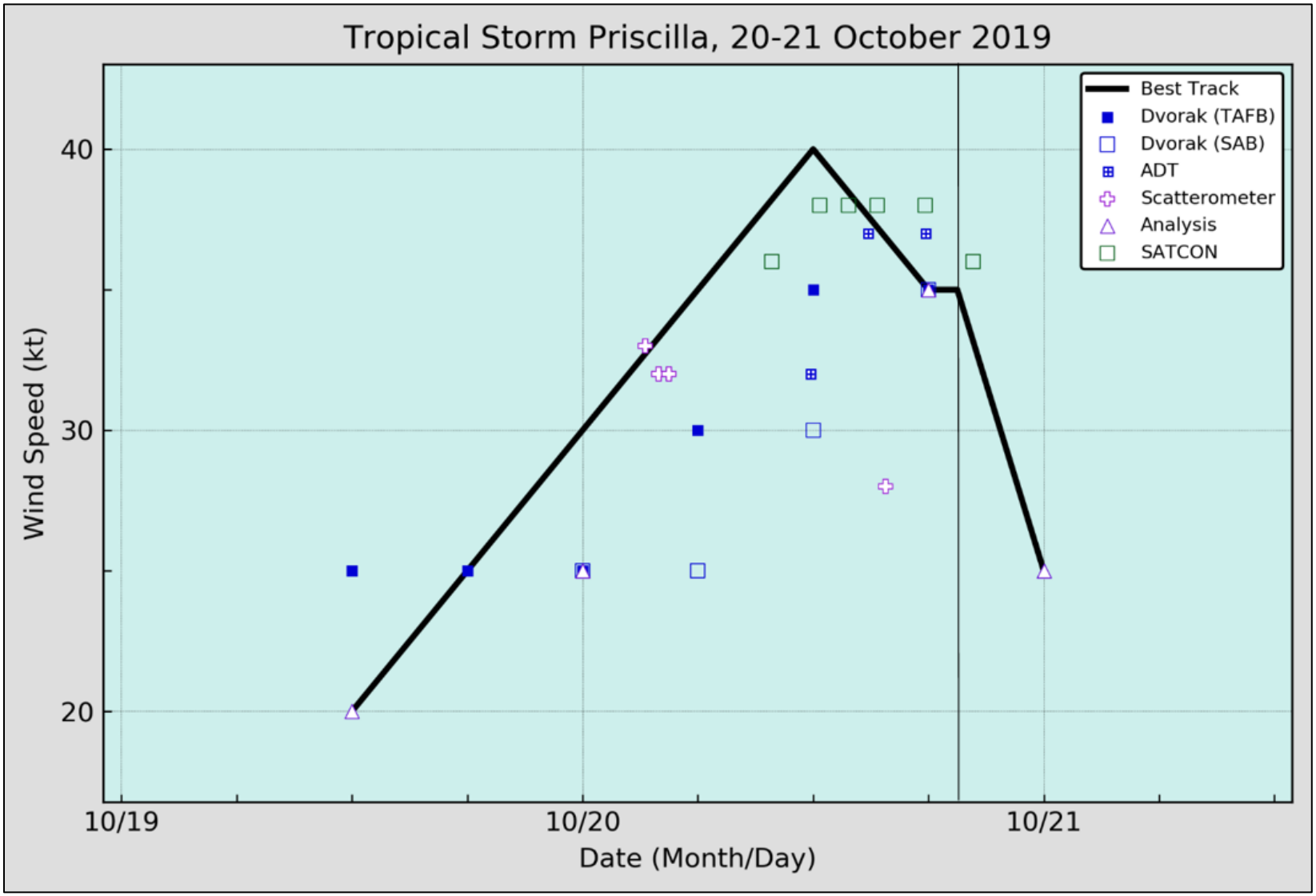

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Priscilla, 20–21 October 2019. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC, and the solid vertical line corresponds to landfall.

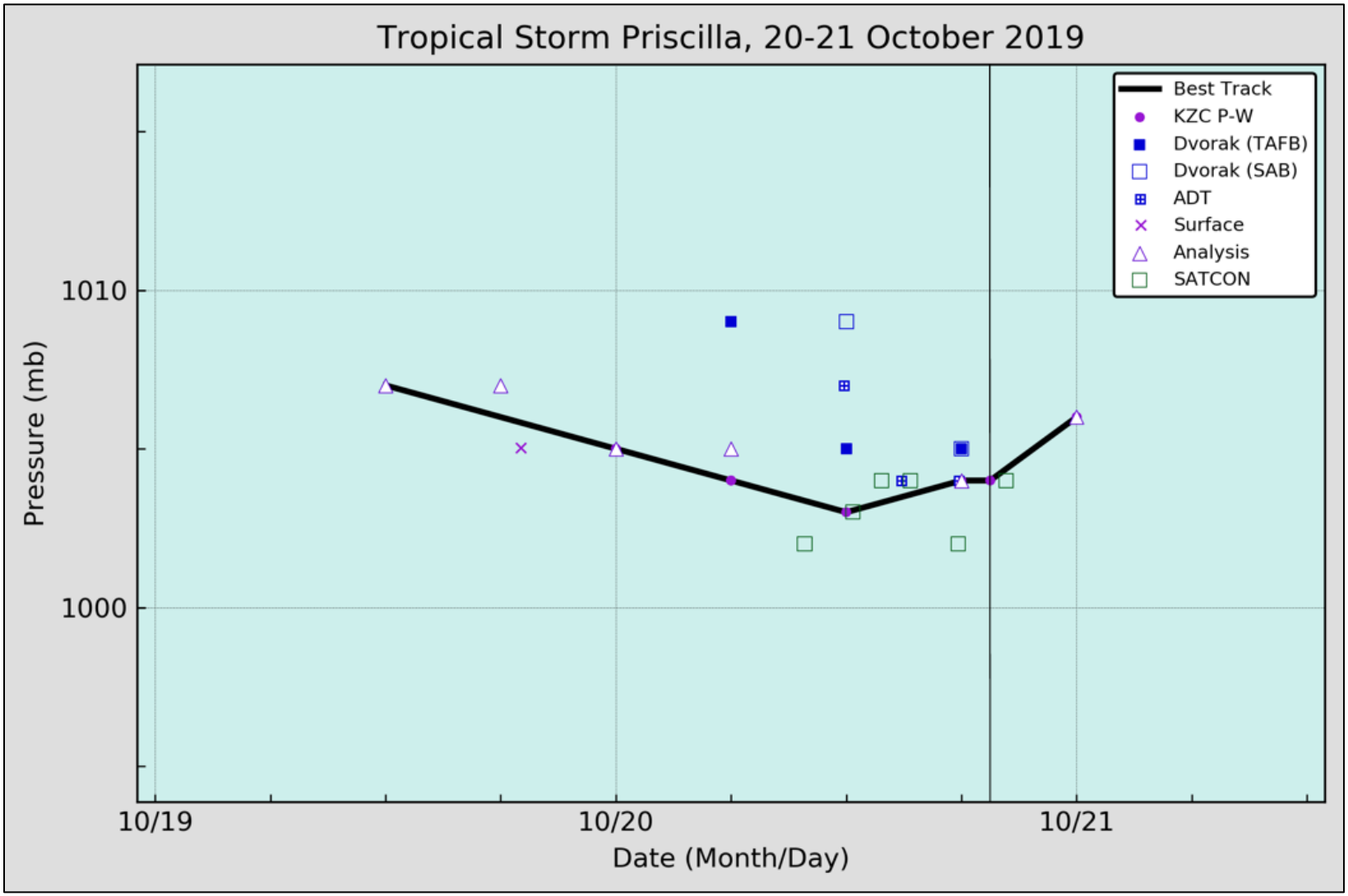

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Priscilla, 20–21 October 2019. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for 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, and the solid vertical line corresponds to landfall.

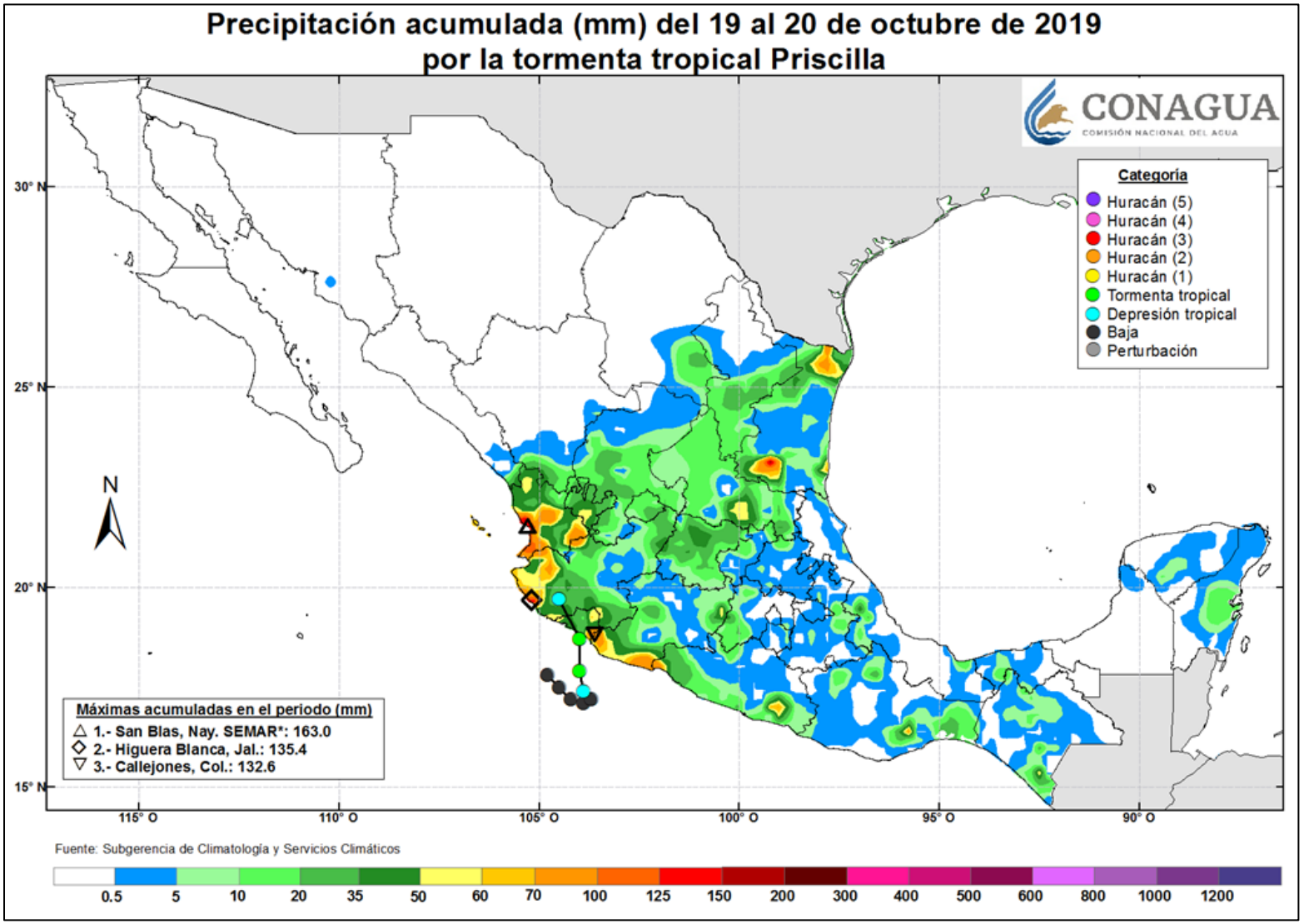

Figure 4. Total rainfall (mm) during the 48-hour period of 19–20 October 2019 associated with Priscilla. The area of maximum rainfall occurred in the Mexican states of Nayarit, Jalisco, and Colima. Figure courtesy of the Servicio Meteorológico Nacional de Mexico, CONAGUA.