NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

TROPICAL STORM COSME

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6–7 July 2019

David A. Zelinsky
National Hurricane Center
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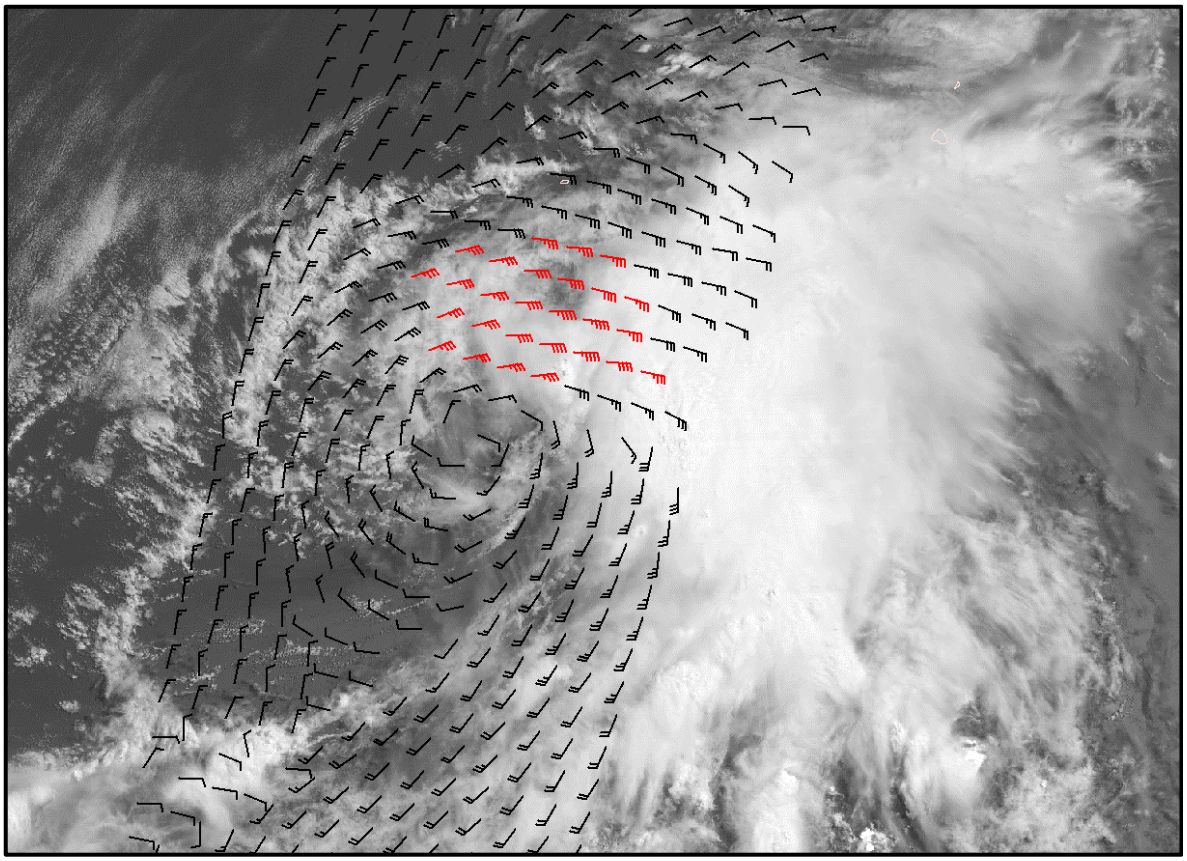

GOES-17 VISIBLE IMAGE OF TROPICAL STORM COSME WITH ASCAT-A DATA OVERLAYED, BOTH VALID AT 1720 UTC 6 JULY 2019. RED BARBS HIGHLIGHT AREAS OF 34 KT OR GREATER WINDS.

Cosme was a short-lived tropical storm that moved across the central portion of the eastern North Pacific basin.

Tropical Storm Cosme

6–7 JULY 2019

SYNOPTIC HISTORY

The origins of Cosme can be traced to a tropical wave that moved off the west coast of Africa on 23 June. The wave produced limited convection while it moved quickly westward across the Atlantic, and it reached South America on 27 June. The tropical wave was poorly defined while it crossed northern South America but became more apparent on 2 July when it emerged over the far eastern North Pacific. Deep convection associated with the wave also increased after it reached the eastern North Pacific, likely enhanced by favorable conditions associated with an eastward-propagating convectively coupled atmospheric Kelvin Wave and the positive phase of the Madden-Julian Oscillation. A broad and elongated low developed along the wave axis on 4 July, and by 5 July the disturbance was already producing tropical-storm-force winds. However, the system lacked a well-defined center and its deep convection was disorganized at that time, a consequence of 15–20 kt of southwesterly vertical wind shear. Beginning around 0300 UTC 6 July, convection near and to the east of the broad low increased and became more concentrated, and a well-defined center developed by 1200 UTC that day, marking the formation of Tropical Storm Cosme about 650 n mi west-southwest of Manzanillo, Mexico. The “best track” chart of Cosme’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.

Cosme was already at its peak intensity of 45 kt when it became a tropical storm, due in large part to anomalously high pressures between Mexico and the new tropical cyclone (Fig. 4). After genesis, a combination of dry mid-level air, marginal sea surface temperatures and the aforementioned shear prevented Cosme from becoming any better organized. Instead, the cyclone gradually weakened over the next 36 h while convection intermittently developed near its center. During that time, Cosme initially moved west-northwestward, and then turned northwestward, as it moved along the southwestern periphery of a low- to mid-level ridge centered over Mexico. By 0000 UTC 8 July, Cosme lost all of its central deep convection and became a post-tropical remnant low when it was located about 575 n mi west-southwest of the southern tip of the Baja California Peninsula. The remnant low turned north-northwestward and continued on that heading for about a day. The low then slowed and turned toward the west on 10 July while it gradually spun down until it opened into a trough by 0000 UTC 11 July.

METEOROLOGICAL STATISTICS

Observations in Tropical Storm Cosme (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), 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 Cosme.

Cosme's peak intensity of 45 kt was based on ASCAT-A and ASCAT-B data around 1800 UTC 6 July that showed peak winds of 40–45 kt.

There were no ship or buoy reports of tropical-storm-force winds associated with Cosme. An automated Mexican Navy observation site on Isla Clarion reported sustained winds of 31 kt and a maximum wind gust of 36 kt around 2100 UTC 6 July, when the center of Cosme was located about 150 n mi south-southwest of the island.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis of Cosme was well forecast, although the tropical storm ultimately developed a little later than called for in some of the earliest forecasts. Table 2 provides the number of hours in advance of formation associated with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. The precursor tropical wave was first mentioned in the TWO with a low (<40%) chance of development within 5 days 180 h prior to the formation of the tropical storm. The 5-day probability was increased to the medium (40–60%) and high (>60%) categories 150 h and 108 h prior to the formation of the tropical storm, respectively. The wave and associated low pressure system were first given a low chance of formation in the 48-h (2-day) forecast 78 h before genesis. The probabilities were increased to the medium category 54 h, and the high category 18 h, prior to the development of Cosme.

Due to the short existence of Cosme, there were only four verifying 12-h forecasts and two verifying 24-h forecasts. Therefore, a comprehensive verification of official and guidance track and intensity forecasts is not provided. The mean official track errors were 30.5 n mi and 51.2 n mi at 12 h and 24 h, respectively. Both values are higher than the previous 5-yr period means. The NHC and guidance track forecasts had a south and west bias. The NHC intensity forecast errors (7.5 kt at 12 h, 10 kt at 24 h) were comparable to the previous 5-yr period means. The NHC forecasts had a slight high bias as Cosme weakened somewhat faster than anticipated.

There were no coastal watches or warnings associated with Tropical Storm Cosme.

Table 1. Best track for Tropical Storm Cosme, 6–7 July 2019.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
06 / 1200	15.5	114.9	1001	45	tropical storm
06 / 1800	15.9	115.8	1001	45	"
07 / 0000	16.3	116.7	1002	40	"
07 / 0600	16.8	117.5	1004	35	"
07 / 1200	17.5	118.1	1004	35	"
07 / 1800	18.3	118.8	1004	35	"
08 / 0000	19.0	119.4	1005	30	low
08 / 0600	19.6	119.9	1007	25	"
08 / 1200	20.2	120.3	1008	25	"
08 / 1800	20.7	120.5	1009	25	"
09 / 0000	21.2	120.7	1009	25	"
09 / 0600	21.6	120.8	1009	25	"
09 / 1200	21.9	120.9	1011	20	"
09 / 1800	22.2	121.0	1011	20	"
10 / 0000	22.5	121.3	1011	20	"
10 / 0600	22.6	121.7	1011	20	"
10 / 1200	22.6	122.1	1011	20	"
10 / 1800	22.4	122.5	1011	20	"
11 / 0000					dissipated
06 / 1200	15.5	114.9	1001	45	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	**120-Hour Outlook**
Low (<40%)	78	180
Medium (40%-60%)	54	150
High (>60%)	18	108

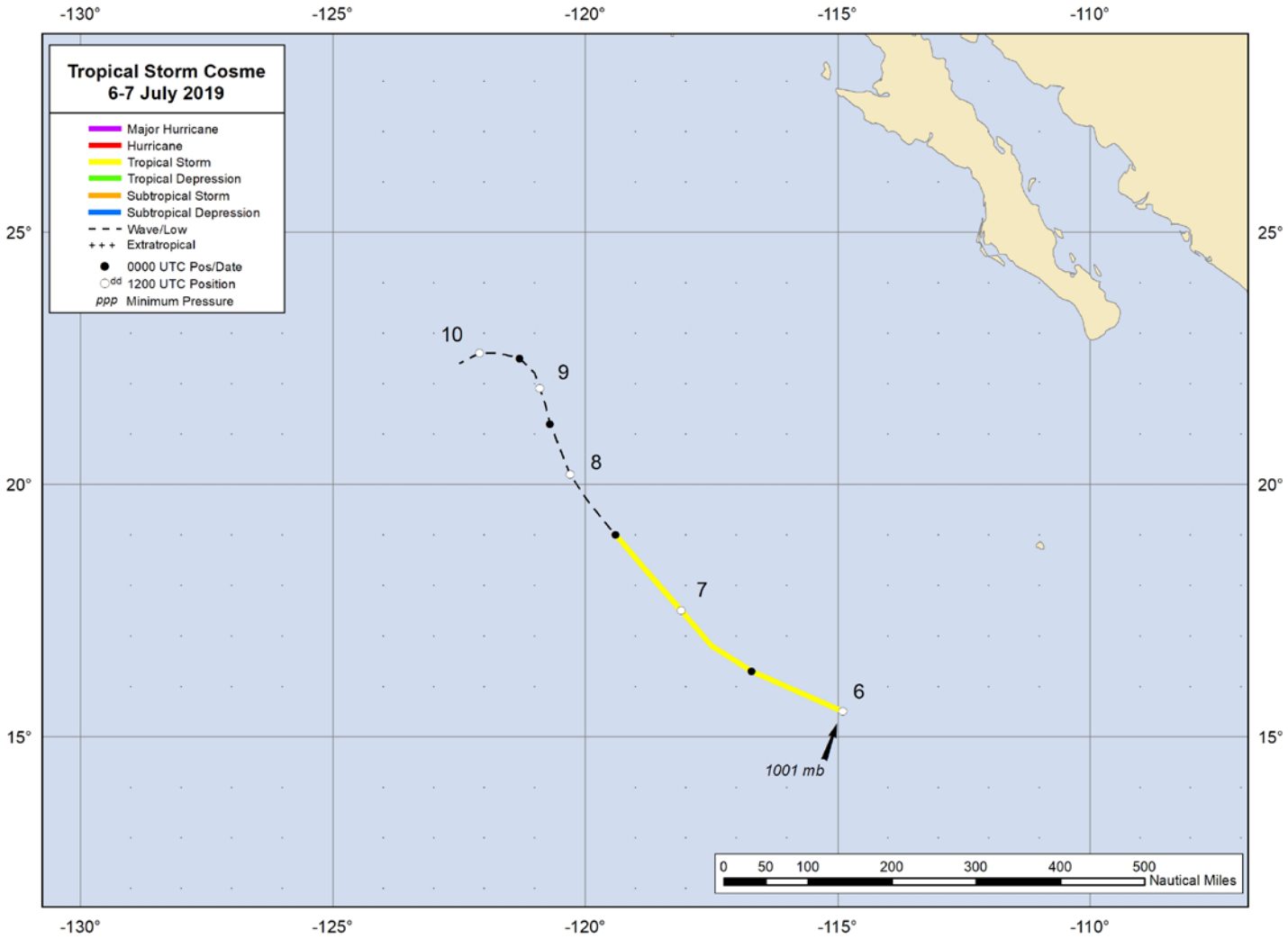

Figure 1. Best track positions for Tropical Storm Cosme, 6–7 July 2019.

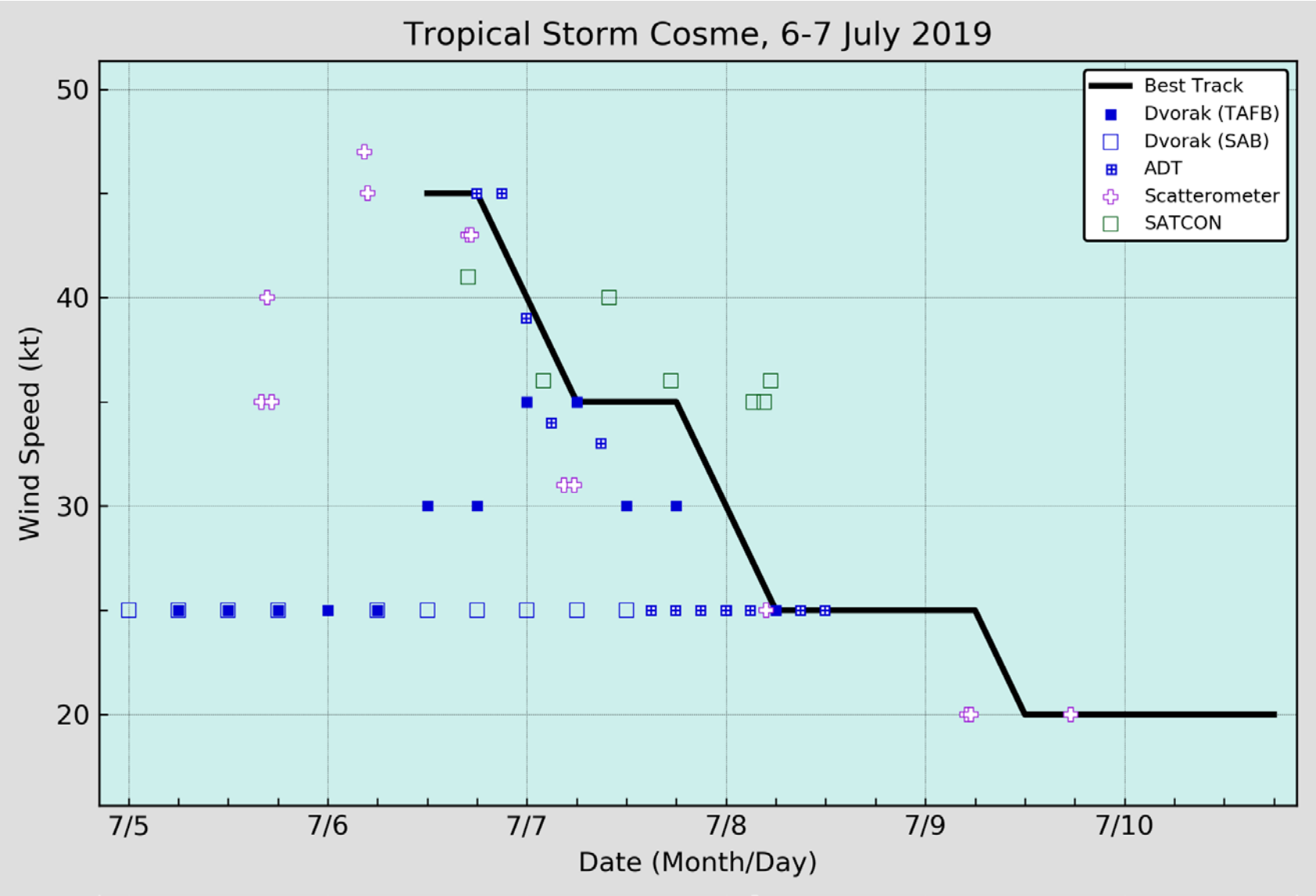

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Cosme. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological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

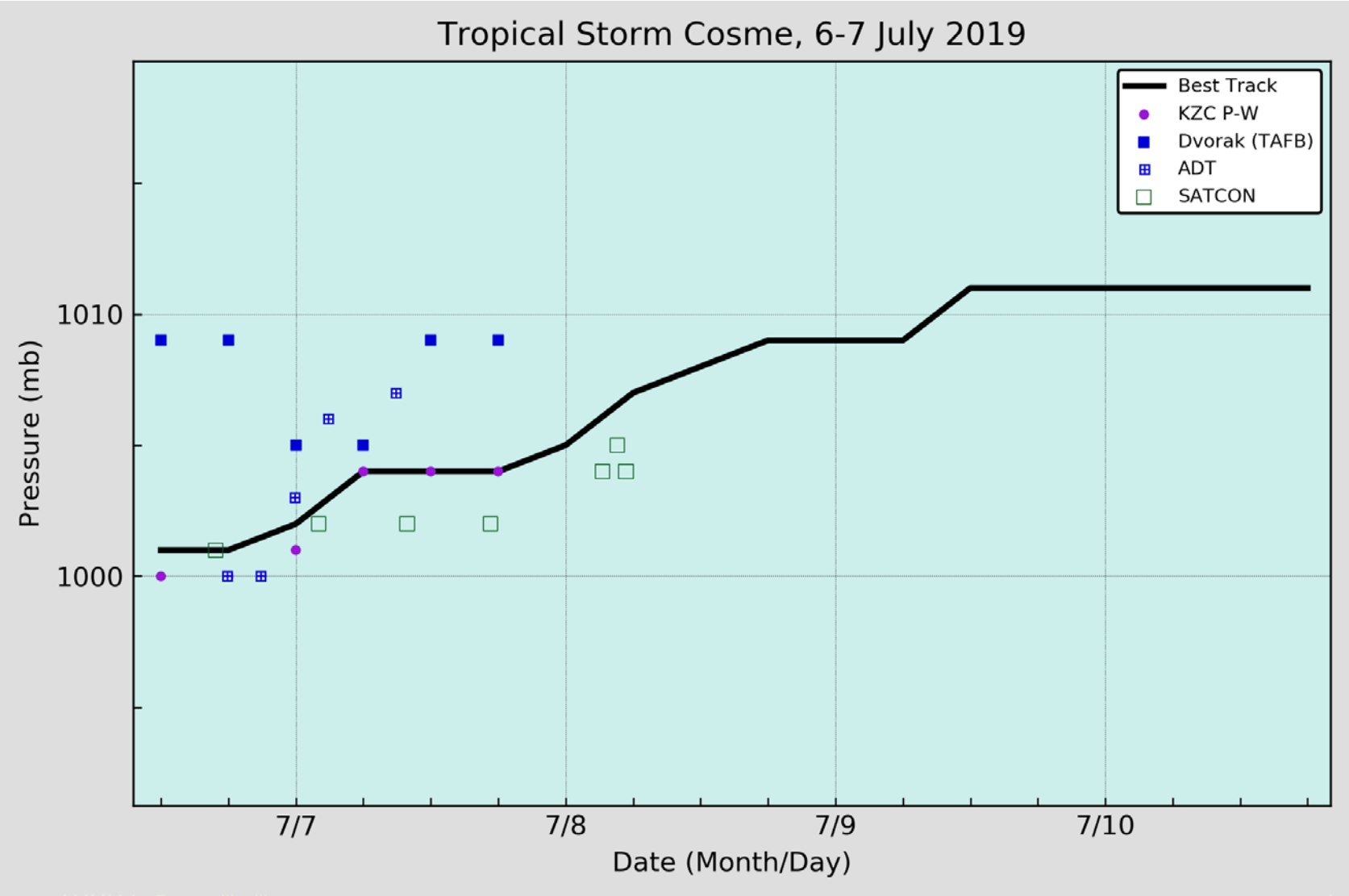

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Cosme. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC.

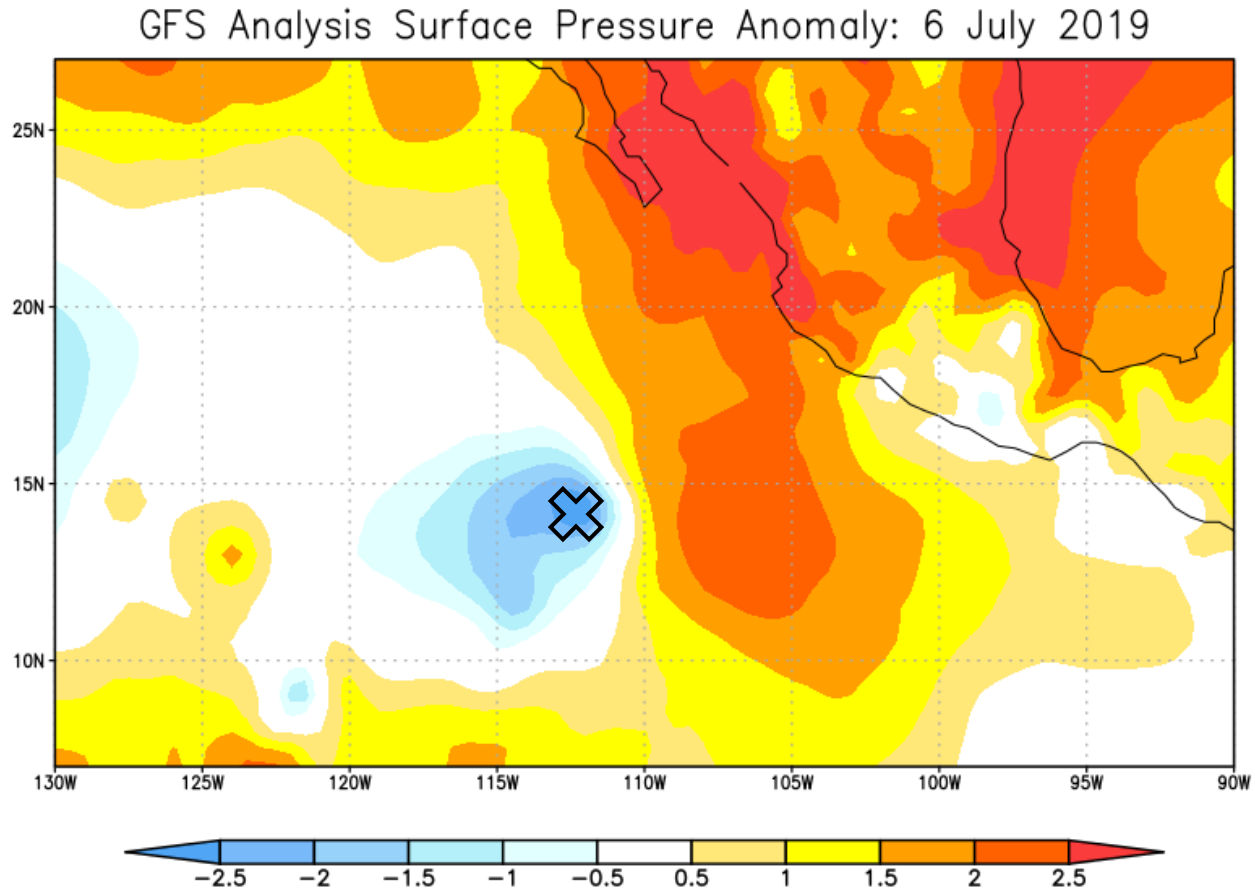

Figure 4. Surface pressure anomaly (shaded, mb) at 0000 UTC 6 July 2019 based on GFS analysis fields. Anomalies were computed relative to a 31-day mean from 7 June–7 July 2019, valid at 0000 UTC each day. The outlined black X is an approximate location of the broad low that became Cosme. Anomalously high pressure to the north and east of the low contributed to the strong pressure gradient and 45-kt winds associated with Cosme at the time of its formation.