

Tropical Cyclone Report
Hurricane Juliette
21 September-03 October 2001

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Hurricane Juliette was a category 4 hurricane (on the Saffir-Simpson Hurricane Scale) that brought 80-knot winds and heavy rain to the southern Baja California peninsula of Mexico. It also caused flooding in the state of Sonora on mainland Mexico and caused two deaths.

a. Synoptic History

The tropical wave that produced Tropical Depression Nine on 19 September over the western Caribbean was also the origin of Juliette. Tropical Depression Nine dissipated over Central America on the 20th. But its remnants and associated tropical wave continued westward over the eastern Pacific Ocean and became a depression at 0600 UTC on the 21st, about 90 nautical miles south of the coast of Guatemala. The “best track” begins at this time. Fig. 1 shows a map of the best track and Table 1 lists the best track positions, wind speeds and central pressures every six hours. Curves of wind speed and pressure versus time are shown in Figs. 2 and 3, along with the data on which these curves are based.

Juliette’s track was generally west-northwestward from the 21st to the 26th, while located south of a mid-level ridge. This track was approximately parallel to the coast of mainland Mexico, and the center remained from 100 to 200 nautical miles offshore. Under a weak vertical shear environment, Juliette strengthened. It became a hurricane on the 23rd, rapidly intensified to 115 knots with a pinhole eye on the 24th and reached 125 knots on the 25th. Aircraft and TRMM satellite data indicate that there were several concentric eyewalls and eyewall replacement cycles during the 24th through 27th.

By the 26th, a strong trough west of the U.S. west coast began digging southeastward and Juliette gradually turned toward the north and began weakening. Moving very slowly northward, the center passed just west of Cabo San Lucas on the southern tip of Baja California on the 28th as wind speeds decreased to near 80 knots. These winds, heavy rain, and waves pounded the southern peninsula. Under increasing vertical shear and progressively cooler sea surface temperatures, Juliette moved inland on the 30th near San Carlos on the west coast of Baja California, as a weakening 35-knot storm. It then moved over the waters of the central Gulf of California as a depression and finally dissipated on the 3rd of October over the far northern Gulf of California.

Satellite imagery showed that clouds associated with the remnants of Juliette spread into New Mexico, Arizona, and southern California.

b. Meteorological Statistics

Observations plotted in Figs. 2 and 3 include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U.S. Air Force Weather Agency (AFWA), as well as flight-level and dropwindsonde observations from three flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command and from one flight of a NOAA research aircraft.

In Fig. 2, it is seen that satellite objective T-number wind speed estimates were considerably higher than the reconnaissance aircraft wind speeds. On the 25th, the highest aircraft flight-level winds reduced to a surface wind speed of 118 knots, while, at the same time, objective T-number wind speeds were 140 knots. The 125-knot best track value is a compromise between these values giving more weight to the aircraft data. This same adjustment was applied to objective T-numbers on the 25th, when there was no reconnaissance.

Whereas a number of hurricanes have had lower pressures estimated from satellite imagery, the aircraft-measured 923 millibars on the 25th (Fig. 3) is the second-lowest measured sea-level pressure on record in the northeastern Pacific Ocean. Only Hurricane Ava in June 1973 had a lower measured pressure of 915 millibars.

The highest wind observation from Baja California was 76 knots sustained with a gust to 94 knots at about 0000 UTC on the 30th, from an automatic weather station at Cabo San Lucas. Rainfall totals include 5.35 inches on the 27th at Santiago on the extreme southern peninsula, 6.59 inches on the 30th at Empalme in the Sonora Province on the mainland, and 8.16 inches on October 3rd at San Felipe in the extreme northern peninsula. An unconfirmed report was received of "over a foot of rain" at Cabo San Lucas.

Ships reports of wind speeds greater than 33 knots are listed in Table 2.

The circulation became poorly defined as it moved over land on the west coast of Baja California near San Carlos on the 30th. The best track estimate of 35 knots at landfall is rather uncertain as the wind speeds were decreasing fast. Fig. 1 shows a continuous depression stage track across Baja California and the northern Gulf of California on the 30th. It is possible that the circulation dissipated over or near the southern Peninsula early on the 30th and another center formed in the northern Gulf of California later that day.

c. Casualty and Damage Statistics

Two deaths are attributed to Juliette. The Associated Press stated that a U.S. tourist surfing near the Baja California coast drowned in high seas on September 27th. The Mexican government news agency Notimex reported that a fisherman died near Acapulco when his small open boat capsized in high seas on the 24th.

The Notimex news agency also reported that Juliette "clobbered" the tourist resort of Cabo San Lucas, isolating it from the outside world for several days. The hurricane also caused flooding on mainland Mexico, driving more than 38,000 people from their homes

in coastal areas of Sonora state.

Thunderstorm activity associated with the cyclone's remnants moved into southern California on the 30th, knocking down trees and power lines across the Coachella Valley.

d. Forecast and Warning Critique

Average official track errors (with the number of cases in parentheses) were 33 (35), 53 (31), 74 (29), 103 (27), and 145 (23) n mi for the 12, 24, 36, 48, and 72 h forecasts, respectively. These errors are lower than the average official errors for the previous 10-years (37, 68, 99, 128, and 185 n mi, respectively). Several of the track guidance models had errors even smaller than the official errors, including the AVN, UKMET, and NOGAPS models.

Average official intensity errors were 11, 15, 15, 15, and 19 kt for the 12, 24, 36, 48, and 72 h forecasts, respectively. For comparison, the average official intensity errors over the 10-yr period 1991-2000 are 7, 12, 16, 19, and 21 kt, respectively. The best intensity guidance model, SHIPS, had errors of 14, 15, 14, 14, and 16 knots, respectively.

Table 3 lists the watches and warnings that were issued for Mexico.

Table 1. Best track for Hurricane Juliette, 21 September- 03 October 2001.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
21 / 0600	12.6	91.1	1007	30	tropical depression
21 / 1200	13.0	92.8	1005	35	tropical storm
21 / 1800	13.5	94.3	997	35	"
22 / 0000	13.6	95.8	996	40	"
22 / 0600	13.6	97.3	996	45	"
22 / 1200	13.5	98.5	995	45	"
22 / 1800	13.5	99.7	994	45	"
23 / 0000	14.2	100.4	992	50	"
23 / 0600	14.6	101.3	986	55	"
23 / 1200	14.8	102.2	976	65	hurricane
23 / 1800	14.9	102.8	960	85	"
24 / 0000	14.8	103.3	941	110	"
24 / 0600	15.0	103.5	941	115	"
24 / 1200	15.1	103.8	952	100	"
24 / 1800	15.2	104.1	957	95	"
25 / 0000	15.4	104.7	941	115	"
25 / 0600	15.9	105.3	935	125	"
25 / 1200	16.2	106.2	928	125	"
25 / 1800	16.4	107.2	923	125	"
26 / 0000	16.8	107.9	925	125	"
26 / 0600	17.5	108.6	930	115	"
26 / 1200	18.2	109.1	935	105	"
26 / 1800	18.8	109.8	940	100	"
27 / 0000	19.4	110.3	942	95	"
27 / 0600	20.1	110.5	949	90	"
27 / 1200	20.7	110.8	955	85	"
27 / 1800	21.4	110.7	961	80	"
28 / 0000	22.3	110.7	968	80	"

Table 1(cont.). Best track for Hurricane Juliette, 21 September- 03 October 2001.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
28 / 0600	22.8	111.0	971	75	hurricane
28 / 1200	23.0	111.1	981	70	"
28 / 1800	23.2	111.1	987	60	tropical storm
29 / 0000	23.4	111.2	987	60	"
29 / 0600	23.6	111.3	983	65	hurricane
29 / 1200	23.8	111.5	985	65	"
29 / 1800	24.0	111.7	990	45	tropical storm
30 / 0000	25.0	112.0	1000	35	"
30 / 0600	26.1	111.8	1003	30	tropical depression
30 / 1200	27.1	111.8	1005	30	"
30 / 1800	28.2	112.0	1005	30	"
01 / 0000	28.7	112.2	1005	25	"
01 / 0600	29.2	112.5	1006	25	"
01 / 1200	29.7	112.7	1006	25	"
01 / 1800	30.2	113.1	1006	30	"
02 / 0000	30.4	113.3	1006	30	"
02 / 0600	30.6	113.6	1006	30	"
02 / 1200	30.5	113.8	1006	30	"
02 / 1800	30.4	114.4	1007	30	"
03 / 0000	30.2	114.6	1008	25	"
03 / 0600	dissipated				
30 / 0000	25.0	112.0	1000	35	landfall near San Carlos, Mexico on Baja California
25 / 1800	16.4	107.2	923	125	minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Juliette, 21 September-03 October 2001.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
24/0000	PHKG	12.9	108.6	280/39	1007.0
24/0000	C6JM8	12.7	103.9	270/40	1009.0
25/0600	V7AP3	10.5	101.0	200/39	1009.0
25/1200	V7AP3	10.8	103.0	210/36	1006.7
25/1800	V7AP3	11.1	105.0	210/34	1008.5
26/0000	3FIF8	19.0	104.5	110/40	1007.5
26/0000	V7AP3	11.5	107.0	210/34	1005.7
26/1200	CY414	11.4	111.9	240/36	1008.0
26/1200	V7AP3	12.5	110.9	220/45	1007.0
27/0600	H3KF	17.0	110.9	240/36	1005.0
27/1800	4XFD	23.8	112.2	030/35	1004.5
28/0000	MSTM6	22.9	111.5	030/45	988.3
28/0000	4XFD	23.2	111.3	040/53	993.0
28/0600	4XFD	22.7	112.7	320/55	997.0
28/0600	MSTM6	21.4	110.4	250/39	996.5
28/1200	4XFD	21.6	112.3	280/40	1000.0
28/1200	MSTM6	20.5	108.5	160/34	1005.4
29/1800	ZCBD9	19.9	112.7	270/37	1007.6

Table 3. Watch and warning summary for Hurricane Juliette, 21 September-03 October 2001.

Date/Time (UTC)	Action	Location
21/1800	tropical storm warning	Salina Cruz to Acapulco
21/2100	tropical storm watch	west of Acapulco to Lazaro Cardenas
22/0300	tropical storm warning discontinued	Salina Cruz to Puerto Angel
22/0300	tropical storm warning	Acapulco to Zihuatanejo
22/0300	tropical storm watch	Zihuatanejo to Manzanillo
22/1500	all watches and warning discontinued	
23/1500	hurricane watch	Lazaro Cardenas to Manzanillo
23/2100	hurricane watch	Manzanillo to Cabo Corrientes
23/2100	tropical storm warning	Lazaro Cardenas to Cabo Corrientes
25/1500	all watches and warning discontinued	
26/0300	tropical storm warning	Lazaro Cardenas to Cabo Corrientes
26/0300	tropical storm watch	southern Baja peninsula - south of a line from Cabo San Lazaro to Los Burros
26/1500	tropical storm warning	southern Baja peninsula - south of a line from Cabo San Lazaro to Los Burros
26/1500	tropical storm warning discontinued	Lazaro Cardenas to Cabo Corrientes
27/0300	tropical storm warning extended north	Cabo San Lazaro to Punta Abreojos and Los Burros to Loreto
27/0900	hurricane warning	west coast of Baja - south of 24 deg. N east coast of Baja - south of Punta Arena
27/2100	hurricane warning extended	24 deg. N to Cabo San Lazaro and Punta Arena to Los Burros
28/0300	tropical storm warning extended	east coast of Baja - Loreto to Santa Rosalia
28/0300	tropical storm warning	Mazatlan to Yavaros
28/2100	tropical storm warning discontinued	Mazatlan to Yavaros
28/2100	replace hurricane warning with tropical storm warnings	west coast of Baja - south of San Lazaro east coast of Baja - south of Los Burros
29/0300	hurricane warnings	southern Baja peninsula south of 25 deg. N
29/1500	replace hurricane warning with tropical storm warning...tropical storm warning now in effect for	southern Baja peninsula south of Punta Abreojos on the west coast and south of Santa Rosalia on the east coast
30/0300	tropical storm warning discontinued	south of 24 deg. N along both coasts
30/0900	all warnings discontinued	

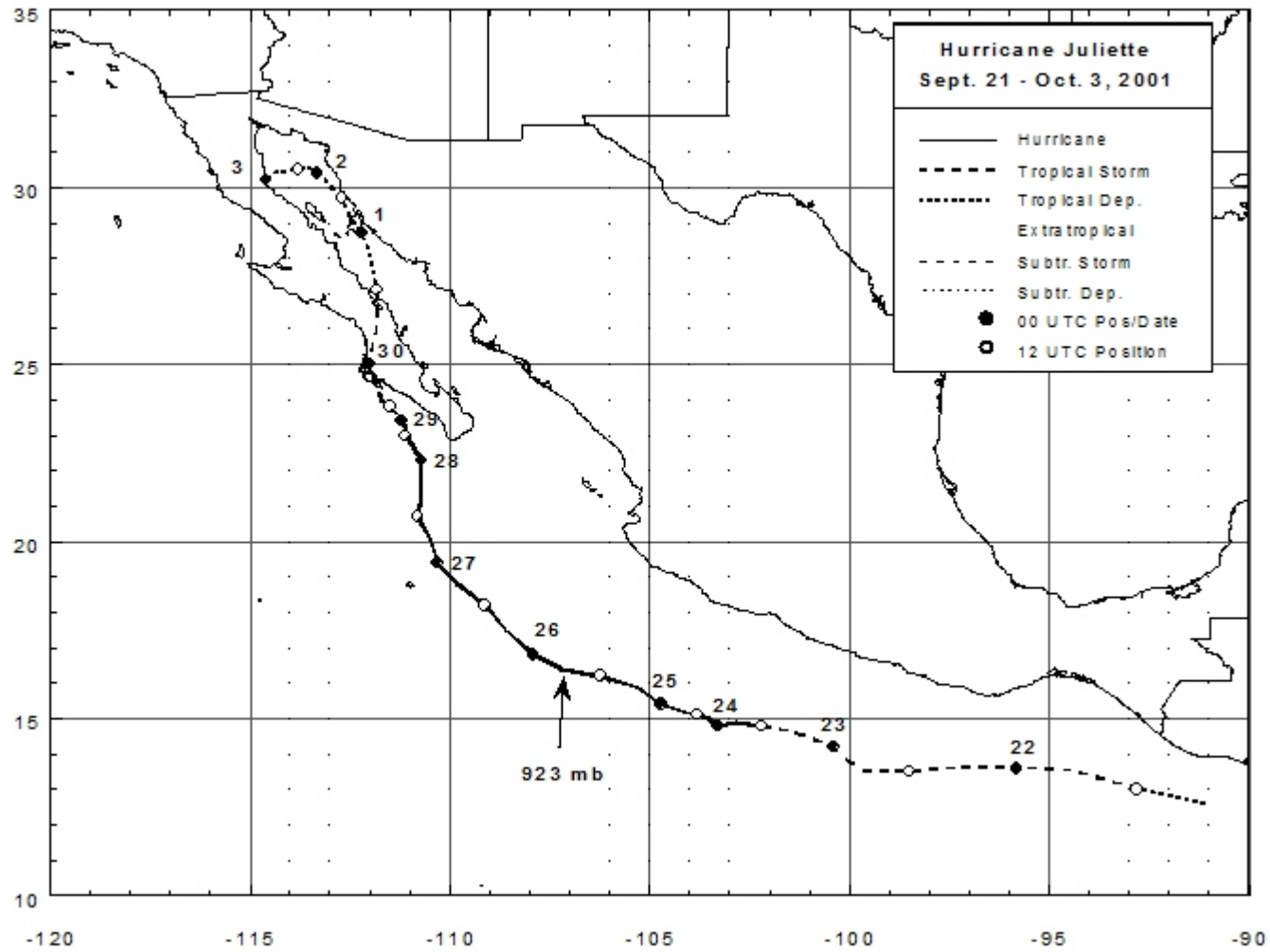


Figure 1. Best track positions for Hurricane Juliette, 21 September-03 October 2001.

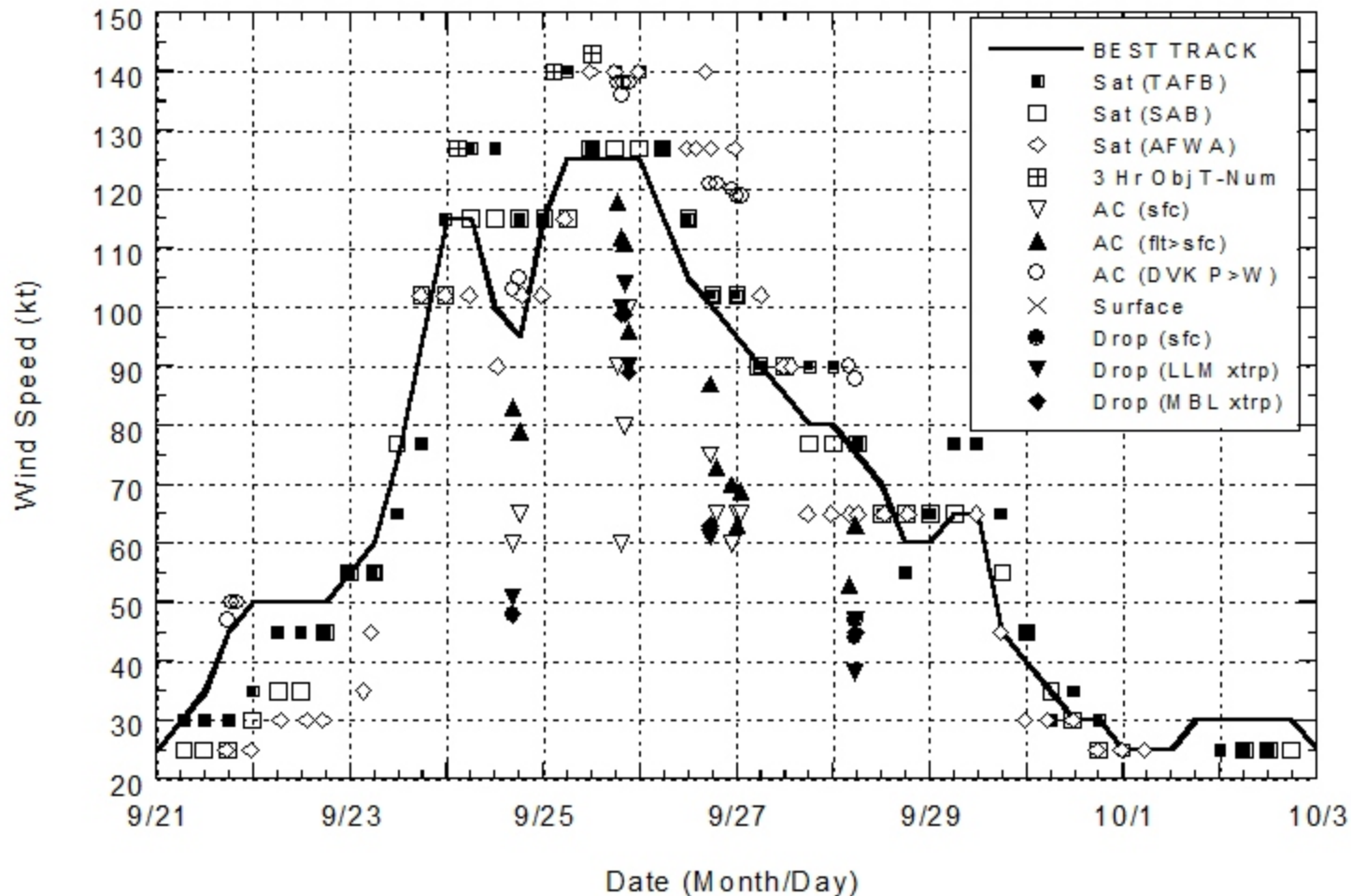


Figure 2. Best track maximum sustained surface wind speed curve for Hurricane Juliette, 21 September-03 October 2001, and the observations on which the best track curve is based. Aircraft observations have been adjusted for elevation using 90%, 80%, and 80% reduction factors for observations from 700 mb, 850 mb, and 1500 ft, respectively. Dropwindsonde observations include actual 10 m winds (sfc), as well as surface estimates derived from the mean wind over the lowest 150 m of the wind sounding (LLM), and from the sounding boundary layer mean (MBL).

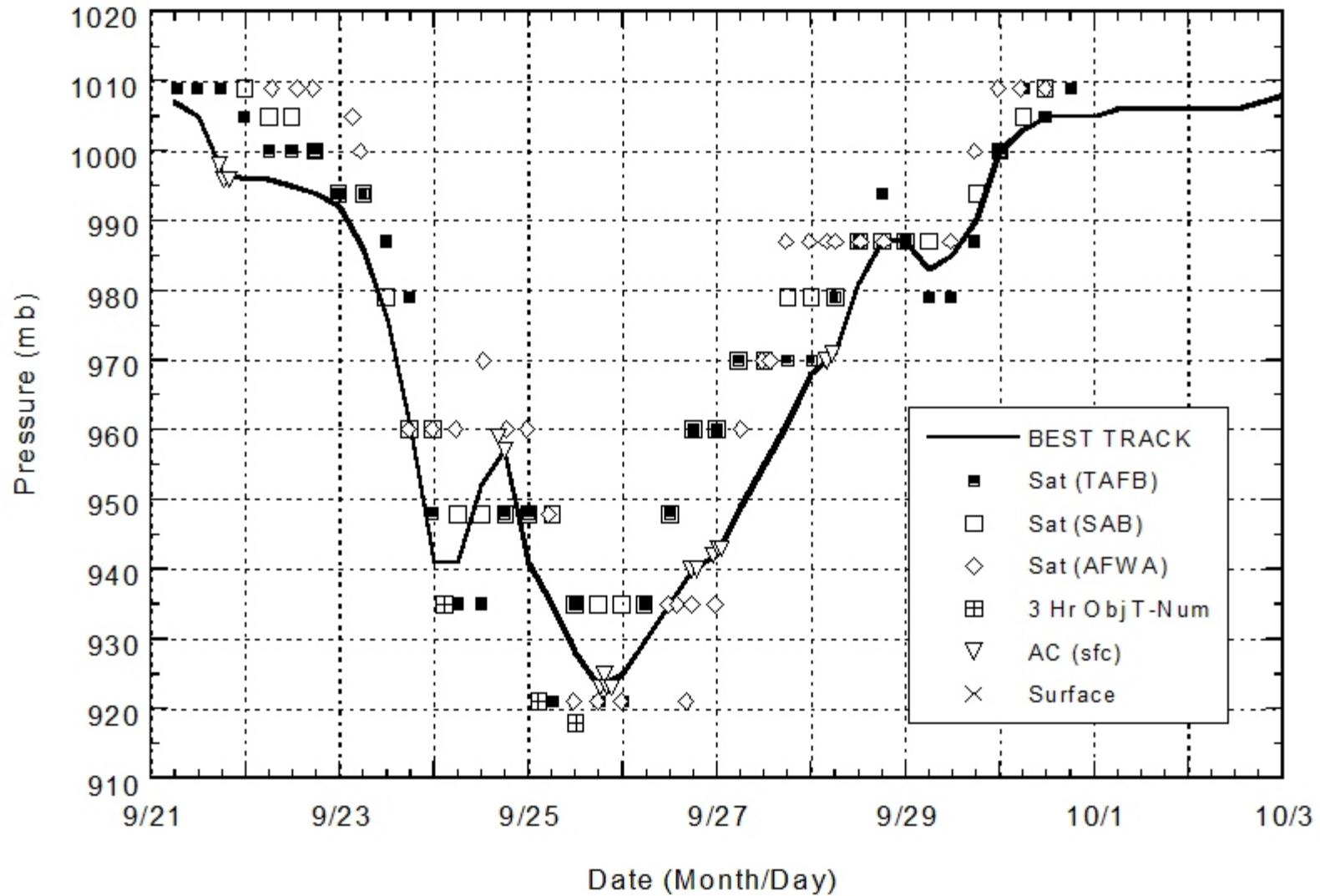


Figure 3. Best track minimum central pressure curve for Hurricane Juliette, 21 September-03 October 2001, and the observations on which the best track curve is based.