

Tropical Cyclone Report
Hurricane Javier
10-19 September 2004

Lixion A. Avila
National Hurricane Center
15 November 2004

Javier's winds reached 130 kt, making Javier the strongest hurricane of the 2004 eastern North Pacific hurricane season.

a. Synoptic History

Javier originated from a tropical wave that crossed the west coast of Africa 29 August. The wave was devoid of deep convection for several days during its westward trek across the tropical Atlantic. It then interacted with an upper-low near the Lesser Antilles, and both systems moved westward across the Caribbean Sea. The upper-low weakened and the wave continued westward, and it crossed Central America on 9 September with an increase in convective activity. Once the wave entered the eastern Pacific, the cloud pattern became better organized with deep convection but limited upper-level outflow. Dvorak T-numbers suggested that a tropical depression formed at 1800 UTC 10 September about 300 n mi south-southeast of Salina Cruz, Mexico. Satellite images showed that a central dense overcast developed over the circulation center, and intensity estimates based on this cloud pattern indicate that the cyclone became a tropical storm at 1200 UTC 11 September.

Under light wind shear, Javier continued to strengthen and reached hurricane status at 1800 UTC 12 September. It then moved slowly between the west-northwest and northwest around the periphery of a subtropical ridge centered over Mexico. Thereafter, Javier intensified at a rapid rate as indicated by the quick development of a distinct eye. The hurricane reached its estimated peak intensity of 130 knots and a minimum pressure of 930 mb at 0000 UTC 14 September, when the cyclone was located about 270 n mi south-southwest of Manzanillo, Mexico. Microwave data showed the formation of concentric eyewalls and Javier weakened, but it maintained category 3 intensity on the Saffir/Simpson Hurricane Scale for the next three days. Javier moved northwestward toward cool waters, and this along with strong southwesterly shear resulted in weakening. Javier then turned northward and north-northeastward, and as a weakening tropical depression crossed Baja California between Cabo San Lazaro and Punta Abreojos around 1100 UTC 19 September. The depression continued toward the north-northeast over the Sea of Cortes and weakened to a remnant low at 1800 UTC 19 September. The low moved inland near Guaymas, Mexico, and dissipated over the high terrain of the state of Sonora. Mid-level moisture from Javier spread northeastward over northern Mexico and the southwestern United States.

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.

b. Meteorological Statistics

Observations in Javier (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB). Microwave satellite imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, and Defense Meteorological Satellite Program (DMSP) satellites were also useful in tracking Javier.

Ship reports of winds of tropical storm force associated with Javier are given in Table 2.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

Average official track errors (with the number of cases in parentheses) for Javier were 24 (34), 42(32), 60 (30), 71(28), 105(24), 137(20), and 196(16) n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. These errors are smaller than the average official track errors for the 10-yr period 1994-2003¹ of 38, 70, 100, 127, 180, 210, and 247 n mi, respectively. Table 3 shows the track errors associated with selected operational models. Note that the official track errors were smaller than nearly all models.

Average official intensity errors were 8, 15, 19, 22, 18, 25 and 27 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. For comparison, the average official intensity errors over the 10-yr period 1994-2003 are 6, 11, 15, 17, 20, 18, and 19 kt, respectively. Note that the average official errors are larger than the 10-yr period errors. This is related to Javier's rapid intensification, a process which in general is difficult to forecast.

Tropical storm watches and warnings were required for portions of Baja California and a summary is included in Table 4.

¹ Errors given for the 96 and 120 h periods are averages over the three-year period 2001-3.

Table 1. Best track for Hurricane Javier, 10-19 September, 2004.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 1800	11.2	93.5	1005	30	tropical depression
11 / 0000	11.4	95.3	1004	30	"
11 / 0600	11.6	96.6	1003	30	"
11 / 1200	11.7	97.8	1002	35	tropical storm
11 / 1800	11.9	99.2	1001	40	"
12 / 0000	12.0	100.4	1000	45	"
12 / 0600	12.2	101.4	994	55	"
12 / 1200	12.5	102.4	991	60	"
12 / 1800	13.1	103.4	987	65	hurricane
13 / 0000	13.6	104.0	979	75	"
13 / 0600	14.1	104.8	970	90	"
13 / 1200	14.7	105.4	957	105	"
13 / 1800	15.2	106.1	942	120	"
14 / 0000	15.9	106.8	930	130	"
14 / 0600	16.3	107.2	936	125	"
14 / 1200	16.6	107.5	936	125	"
14 / 1800	17.0	107.7	936	125	"
15 / 0000	17.4	108.0	936	125	"
15 / 0600	17.7	108.3	936	125	"
15 / 1200	18.1	108.6	948	115	"
15 / 1800	18.5	109.0	948	115	"
16 / 0000	18.9	109.5	950	110	"
16 / 0600	19.1	110.0	960	100	"
16 / 1200	19.4	110.4	960	100	"
16 / 1800	19.8	110.9	960	100	"
17 / 0000	20.5	111.2	960	100	"
17 / 0600	21.0	111.6	960	100	"
17 / 1200	21.5	111.9	962	95	"
17 / 1800	21.9	112.1	965	90	"
18 / 0000	22.4	112.4	970	75	"
18 / 0600	23.0	112.8	975	65	"
18 / 1200	23.3	113.2	987	50	tropical storm
18 / 1800	23.9	113.4	995	45	"
19 / 0000	24.8	113.5	1001	30	tropical depression
19 / 0600	25.7	113.2	1001	30	"
19 / 1200	26.9	112.7	1003	25	"
19 / 1800	28.5	112.0	1003	20	remnant low
20 / 0000	30.0	111.3	1004	20	"
20 / 0600					dissipated
19 / 1100	26.6	113.0	1003	25	Landfall, west coast of Baja California.
14 / 0000	15.9	106.8	930	130	minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Javier, 10-19 September, 2004.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
15 / 0900	LAOL5	16.1	108.6	260 / 35	1003.0

Table 3. Preliminary forecast evaluation (heterogeneous sample) for Hurricane Javier, 10-19 September, 2004. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage, but does not include the extratropical stage, if any.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	27 (34)	51 (32)	78 (30)	115 (28)	223 (24)	315 (20)	413 (16)
GFNI	41 (32)	71 (28)	107 (26)	129 (24)	161 (20)	238 (16)	413 (12)
GFDI	24 (33)	43 (31)	63 (29)	88 (27)	133 (23)	194 (19)	218 (14)
GFDL	28 (34)	42 (32)	60 (30)	81 (28)	130 (24)	185 (20)	225 (15)
GFDN	38 (31)	72 (29)	103 (26)	131 (24)	162 (21)	224 (17)	365 (13)
GFSI	28 (32)	51 (30)	85 (29)	120 (27)	192 (23)	299 (19)	360 (15)
GFSO	35 (34)	56 (31)	81 (29)	115 (28)	183 (24)	294 (20)	367 (16)
AEMI	33 (33)	54 (31)	77 (29)	90 (27)	154 (23)	230 (19)	286 (15)
NGPI	36 (33)	68 (31)	94 (29)	122 (27)	174 (23)	220 (18)	202 (13)
NGPS	39 (34)	67 (32)	99 (30)	122 (28)	178 (24)	169 (18)	189 (13)
UKMI	27 (29)	53 (29)	82 (28)	106 (26)	170 (22)	156 (16)	235 (14)
UKM	30 (17)	55 (16)	76 (15)	99 (14)	143 (12)	187 (9)	235 (8)
BAMD	33 (34)	64 (32)	96 (30)	130 (28)	194 (24)	296 (20)	383 (16)
BAMM	31 (34)	53 (32)	77 (30)	109 (28)	187 (24)	311 (20)	423 (16)
BAMS	38 (34)	70 (32)	105 (30)	141 (28)	243 (24)	377 (20)	491 (16)
CONU	25 (33)	45 (31)	62 (29)	79 (27)	119 (23)	171 (19)	224 (15)
GUNA	23 (29)	41 (28)	60 (28)	77 (26)	111 (22)	125 (15)	175 (12)
OFCL	24 (34)	42 (32)	60 (30)	71 (28)	105 (24)	137 (20)	196 (16)
NHC Official (1994-2003 mean)	39 (2746)	72 (2474)	103 (2196)	131 (1928)	186 (1476)	197 (283)	223 (179)

Table 4. Watch and warning summary for Hurricane Javier, 10-19 September, 2004.

Date/Time (UTC)	Action	Location
15/2100	Tropical Storm Watch Issued	Southern portion of Baja California from Bahia Magdalena to La Paz including San Carlos, Mexico
16/2100	Tropical Storm Watch Discontinued	All locations
17/2100	Tropical Storm Warning Issued	Baja California from Bahia Magdalena to Punta Eugenia.
17/2100	Tropical Storm Watch Issued	Baja California from north of Punta Eugenia to San Jose de las Palomas
19/0300	Tropical Storm Warning and Watch Discontinued	All locations

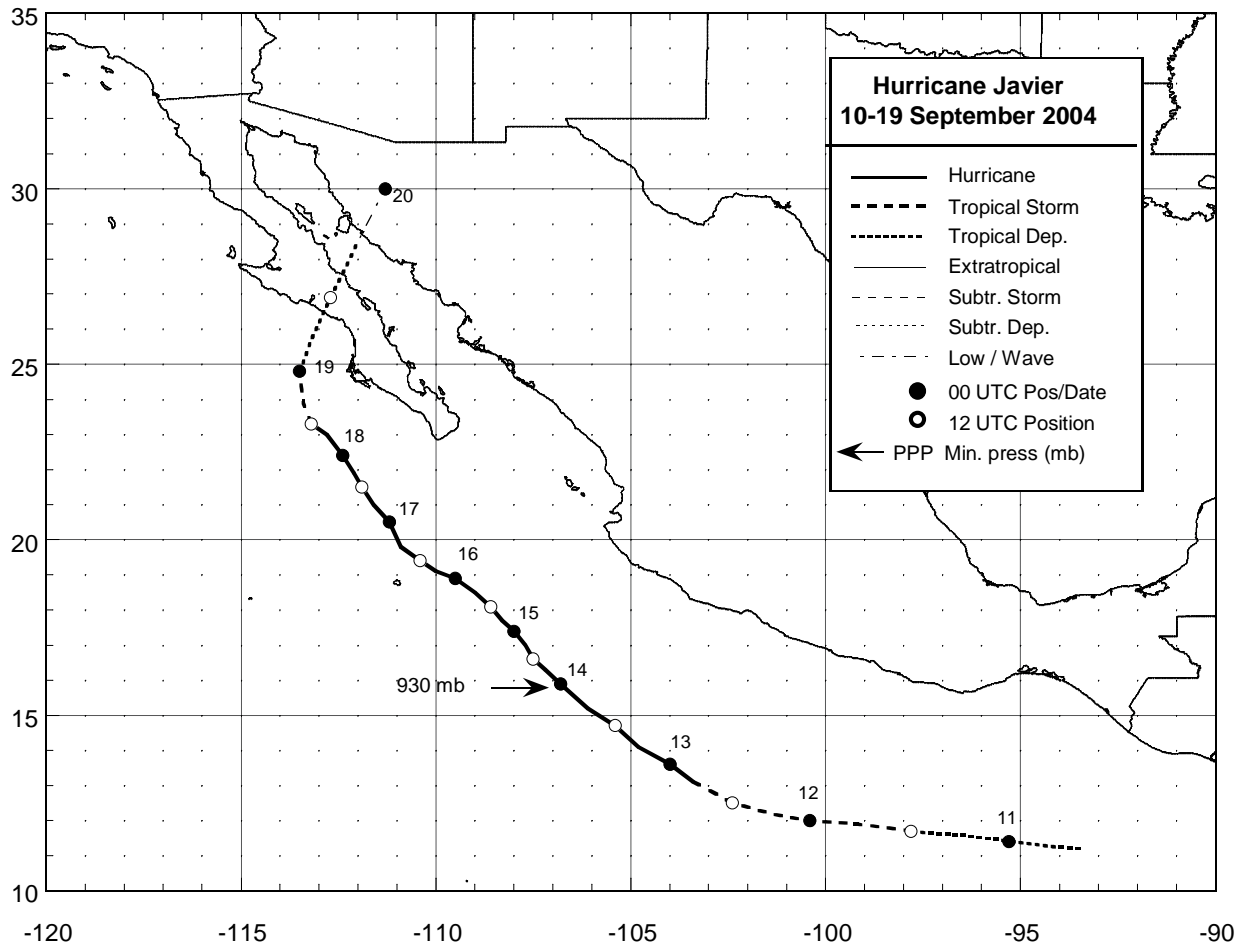


Figure 1. Best track positions for Hurricane Javier, 10-19 September, 2004.

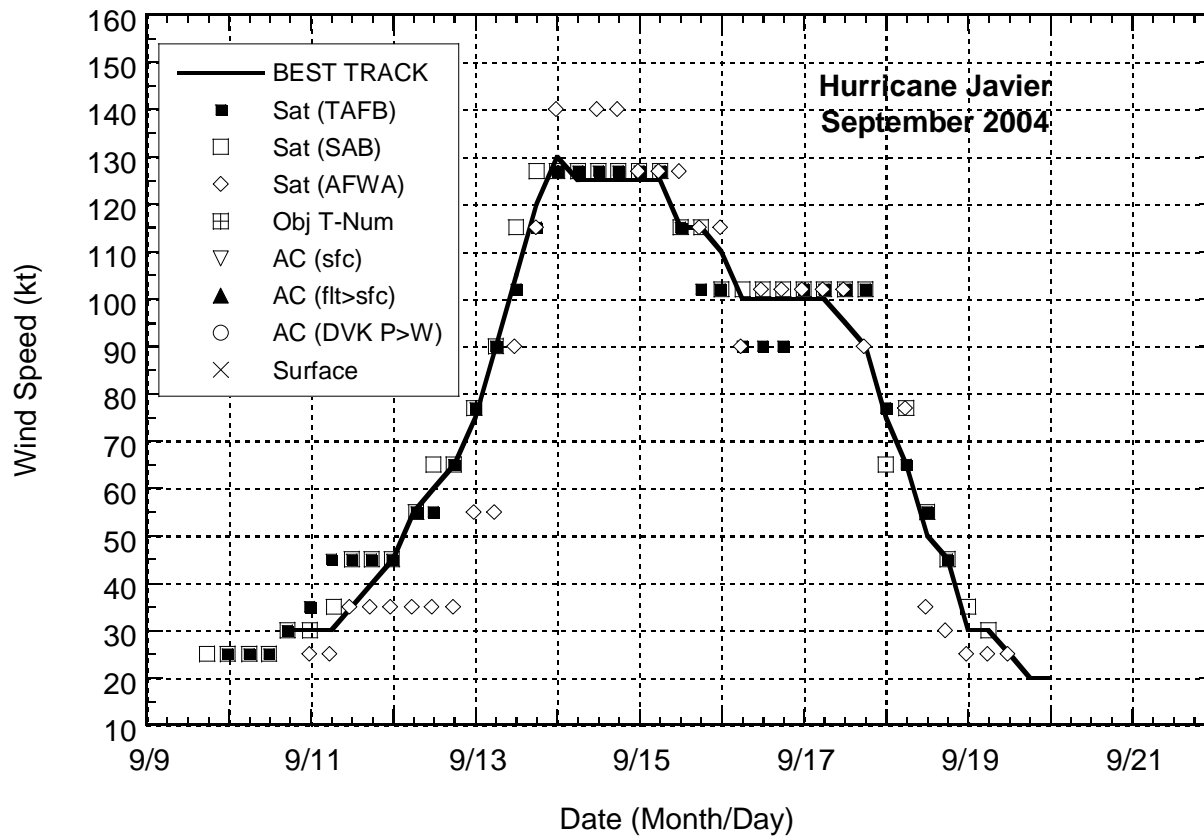


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Javier, 10-19 September, 2004.

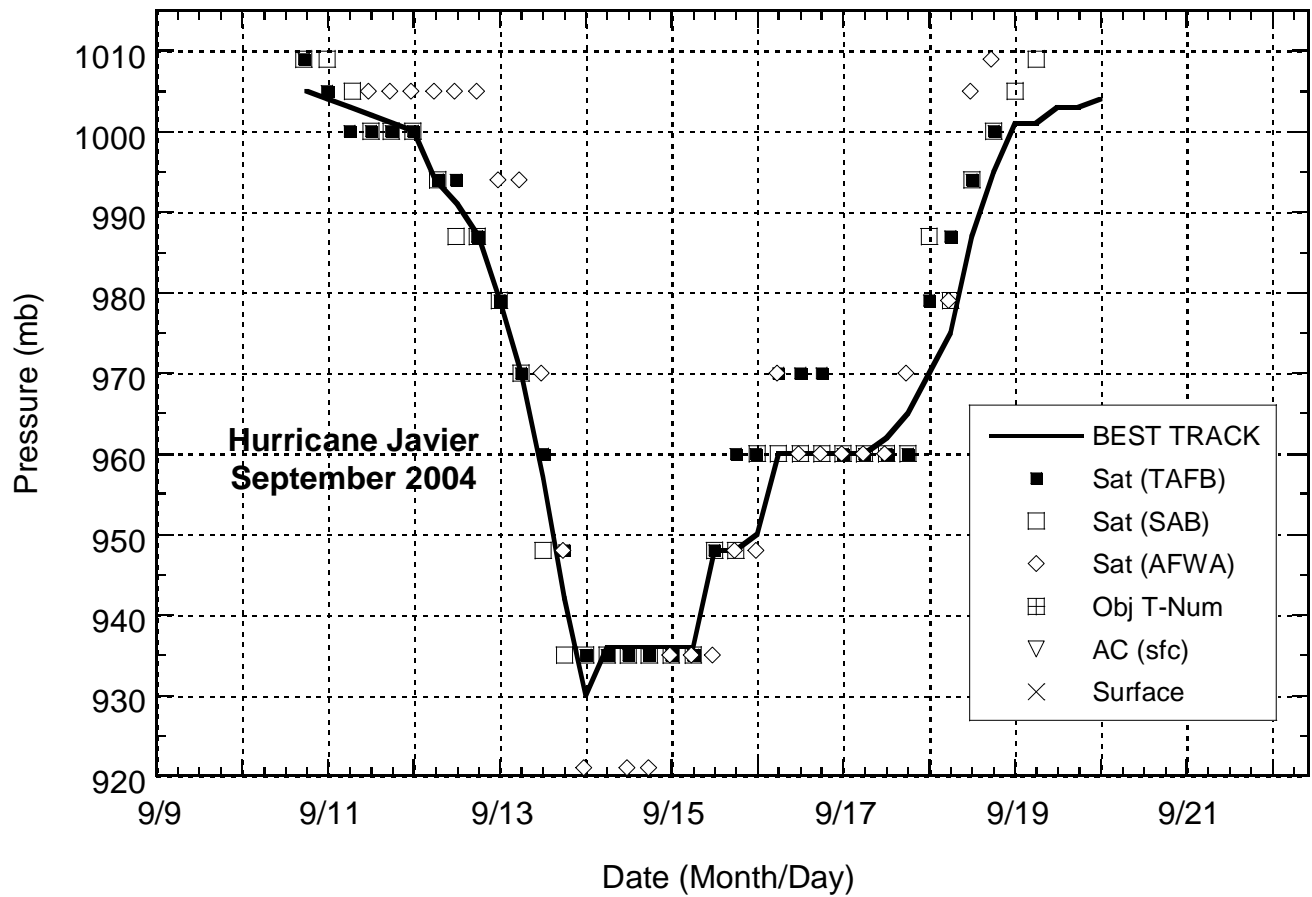


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Javier, 10-19 September, 2004.