

Tropical Cyclone Report
Tropical Storm Josephine
(AL102008)
2-6 September 2008

Eric S. Blake
National Hurricane Center
5 December 2008

Josephine formed in the far eastern Atlantic Ocean and dissipated just a few days later over open waters due to strong vertical wind shear.

a. Synoptic History

A strong tropical wave with an associated surface low left the west coast of Africa late on 31 August. Convection associated with the low was already starting to become organized on 1 September, with well-defined upper-level outflow, and a tropical depression formed by 0000 UTC 2 September, centered about 275 n mi south-southeast of Sal in the Cape Verde Islands. The system became a tropical storm six hours later when a strong burst of convection formed near the center. 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 1¹.

Josephine generally moved on a heading between west and west-northwest at about 10 kt due to mid-tropospheric ridging to the north of the tropical cyclone. The cyclone continued to strengthen on 2 September, reaching a peak intensity of 55 kt on 3 September. However, an upper-level trough between Josephine and Hurricane Ike caused vertical wind shear to increase late on 3 September, and Josephine began to weaken. This trough was stronger than average for early September, perhaps aided by upper-level outflow from intensifying Ike to the west. Deep convection associated with Josephine sputtered during the next couple of days as the tropical cyclone encountered slightly cooler waters and more stable air, while the shear remained strong. The system briefly moved northwestward on 5 September and slowed its forward motion. After a flare-up of convection overnight, thunderstorms diminished during the day, and Josephine weakened to a tropical depression early on 6 September, about 725 n mi west of Sal. Six hours later, absent of deep convection, the system had degenerated into a remnant low. The low turned toward the west and accelerated, briefly producing some convection on 7 September. The thunderstorms soon dissipated, and only a weak low-level swirl remained by late in the day. The low moved westward for a couple of days, sped up and turned southwestward on 9 September. Satellite images suggest that the low dissipated early on 10 September, about 450 n mi east of Guadeloupe.

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 *bt* directory, while previous years’ data are located in the *archive* directory.

b. Meteorological Statistics

Observations in Josephine (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and 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, among others, were also useful in tracking the storm. The peak intensity of 55 kt is based on satellite estimates from TAFB and QuikSCAT. The ship PFC William B. Baugh, call sign KRPW, reported 35 kt winds at 1800 UTC 3 September, and was the only tropical storm force wind report received for this storm.

c. Casualty and Damage Statistics

There were no reports of damage or deaths related to Josephine.

d. Forecast and Warning Critique

The genesis forecasts for Josephine were relatively good. Almost immediately after the wave that spawned Josephine left Africa, it was included in the Tropical Weather Outlooks, and judged to have either a medium or high likelihood of developing within 48 hours. An explicit mention of tropical depression formation was included 12 hours before genesis.

The average official track errors for Josephine were 35, 78, 131, 199 and 307 n mi for the 12, 24, 36, 48, 72 h forecasts, respectively. The number of forecasts ranged from 14 at 12 h to 4 at 72 h. These forecast errors were considerably higher than the five-year average official track errors (Table 2) beyond 12 h. The European Center (EMXI) model and the NOGAPS (NGPI) had particularly low errors for Josephine—much lower than the official forecast. This appears to be due to the NHC forecast tending to follow the Global Forecast System (GFS)-based guidance, including the GFDL, HWRF and the BAMS models, which had a poor track performance during this storm with a marked westward bias.

Average official intensity errors were 4, 6, 12, 11, and 21 kt for the 12, 24, 36, 48, 72 h forecasts, respectively. These errors are lower than the long-term averages (Table 3), except at 72 h. However, the official forecasts had a high bias, and the tropical cyclone dissipated much earlier than anticipated. Most statistical guidance had reasonably good forecasts for this system. The HWRF model had particularly skillful intensity forecasts for Josephine, while the GFDL had much higher errors than the official forecast and a large high bias.

Table 1. Best track for Tropical Storm Josephine, 2-6 September 2008.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
02 / 0000	12.3	21.9	1007	30	tropical depression
02 / 0600	12.7	23.2	1005	35	tropical storm
02 / 1200	13.0	24.2	1005	35	"
02 / 1800	13.3	25.3	1000	45	"
03 / 0000	13.5	26.3	997	50	"
03 / 0600	13.6	27.2	994	55	"
03 / 1200	13.7	28.2	994	55	"
03 / 1800	13.8	29.2	994	55	"
04 / 0000	13.9	30.0	997	50	"
04 / 0600	14.1	30.9	997	50	"
04 / 1200	14.4	31.9	1000	45	"
04 / 1800	14.6	32.7	1002	40	"
05 / 0000	15.0	33.4	1002	40	"
05 / 0600	15.4	34.0	1002	40	"
05 / 1200	15.6	34.5	1003	40	"
05 / 1800	15.8	34.9	1004	35	"
06 / 0000	16.2	35.5	1006	30	tropical depression
06 / 0600	16.5	36.4	1006	30	remnant low
06 / 1200	16.7	37.3	1007	25	"
06 / 1800	16.8	38.3	1007	25	"
07 / 0000	16.9	39.2	1007	25	"
07 / 0600	17.0	40.1	1007	30	"
07 / 1200	17.1	40.9	1007	30	"
07 / 1800	17.2	41.6	1007	25	"
08 / 0000	17.3	42.4	1007	25	"
08 / 0600	17.5	43.3	1007	25	"
08 / 1200	18.0	44.2	1009	25	"
08 / 1800	18.1	45.6	1010	25	"
09 / 0000	17.8	47.3	1010	25	"
09 / 0600	16.8	49.3	1010	25	"
09 / 1200	16.3	51.4	1010	25	"
09 / 1800	16.3	52.5	1010	25	"
10 / 0000	16.3	53.6	1011	20	"
10 / 0600					dissipated
03 / 0600	13.6	27.2	994	55	minimum pressure

Table 2. Track forecast evaluation (heterogeneous sample) for Tropical Storm Josephine, 2-6 September 2008. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in boldface type.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	35 (15)	67 (13)	103 (11)	155 (9)	282 (5)	403 (1)	
GFNI	28 (8)	42 (6)	55 (4)	108 (2)			
GFDI	40 (15)	91 (13)	153 (11)	226 (9)	321 (5)	349 (1)	
HWFI	39 (15)	84 (13)	146 (11)	222 (9)	318 (5)	350 (1)	
GFSI	65 (15)	126 (13)	185 (11)	253 (9)	321 (5)	384 (1)	
AEMI	77 (15)	145 (13)	222 (11)	309 (9)	424 (5)	534 (1)	
NGPI	23 (12)	29 (10)	35 (8)	56 (6)	76 (3)	129 (1)	
EGRI	42 (12)	84 (10)	137 (8)	189 (6)	385 (2)		
EMXI	17 (13)	23 (11)	30 (9)	58 (7)	83 (3)	27 (1)	
BAMD	56 (15)	116 (13)	203 (11)	304 (9)	438 (5)	576 (1)	
BAMM	56 (15)	117 (13)	194 (11)	283 (9)	389 (5)	413 (1)	
BAMS	78 (14)	175 (12)	291 (10)	425 (8)	533 (5)	388 (1)	
LBAR	37 (14)	82 (12)	136 (10)	205 (8)	326 (5)	462 (1)	
TVCN	30 (15)	59 (13)	94 (11)	150 (9)	241 (5)	236 (1)	
TVCC	29 (15)	55 (13)	86 (11)	135 (9)	224 (5)	216 (1)	
GUNA	32 (9)	59 (7)	94 (5)	175 (3)			
FSSE	32 (13)	74 (11)	135 (9)	214 (7)	357 (3)		
OFCL	35 (14)	78 (12)	131 (10)	199 (8)	307 (4)		
NHC Official (2003-2007 mean)	34.0 (1742)	58.2 (1574)	82.2 (1407)	106.2 (1254)	154.2 (996)	207.5 (787)	272.5 (627)

Table 3. Intensity forecast evaluation (heterogeneous sample) for Tropical Storm Josephine, 2-6 September 2008. Forecast errors (kt) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in boldface type.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
OCD5	7.1 (15)	9.9 (13)	14.9 (11)	17.6 (9)	22.2 (5)	31.0 (1)	
GHMI	5.1 (15)	7.2 (13)	15.4 (11)	17.4 (9)	33.2 (5)	30.0 (1)	
HWFI	4.6 (15)	5.4 (13)	6.5 (11)	7.8 (9)	9.4 (5)	0.0 (1)	
LGEM	6.4 (15)	8.2 (13)	10.9 (11)	9.3 (9)	8.6 (5)	1.0 (1)	
DSHP	5.4 (15)	6.5 (13)	11.1 (11)	13.8 (9)	20.8 (5)	18.0 (1)	
FSSE	5.0 (13)	7.2 (11)	13.1 (9)	16.6 (7)	31.0 (3)		
ICON	5.1 (15)	5.2 (13)	8.5 (11)	8.6 (9)	14.4 (5)	12.0 (1)	
OFCL	3.9 (14)	6.3 (12)	11.5 (10)	11.3 (8)	21.3 (4)		
NHC Official (2003-2007 mean)	6.7 (1742)	10.0 (1574)	12.3 (1407)	14.3 (1254)	18.2 (996)	19.7 (787)	21.8 (627)

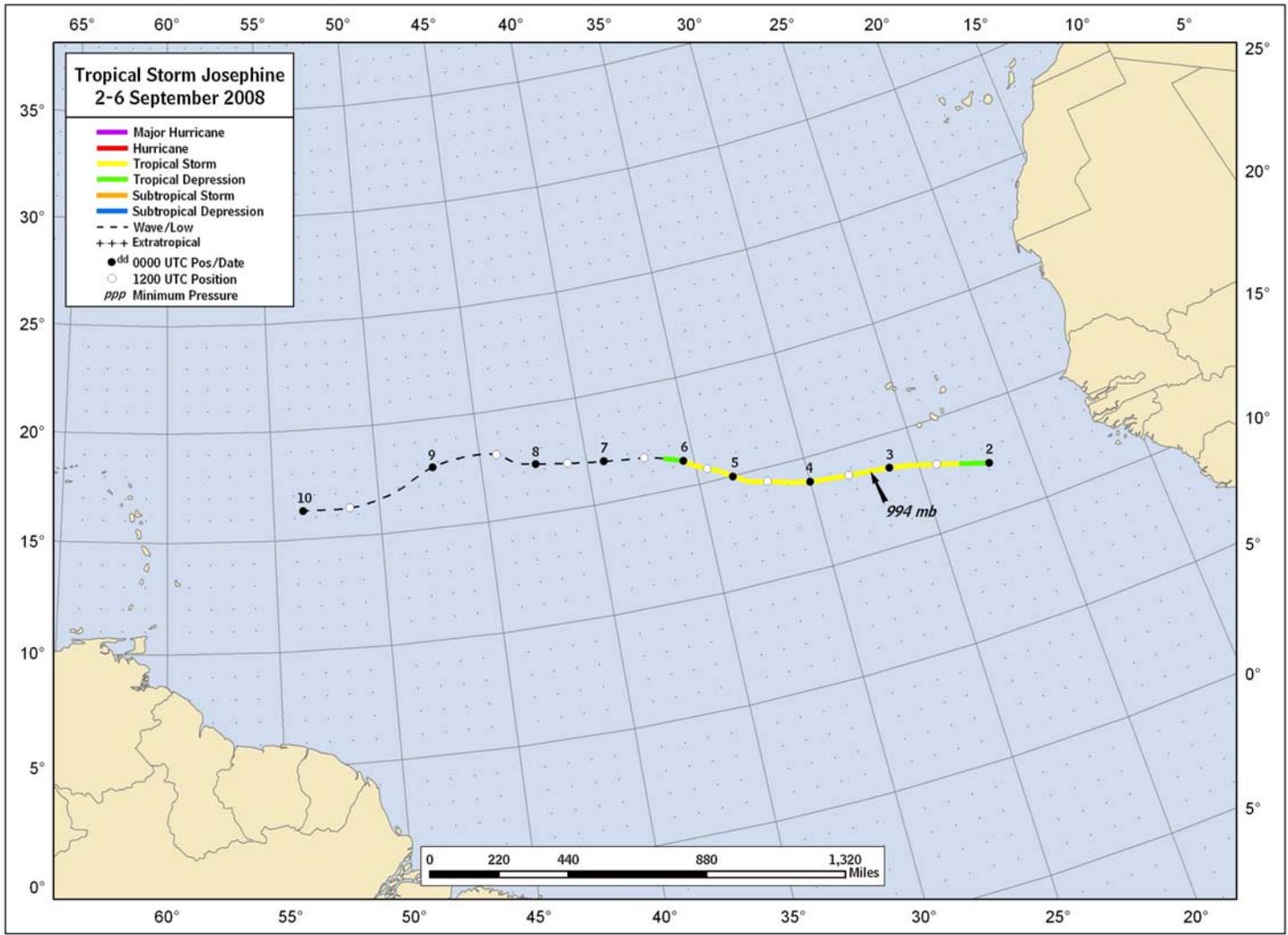


Figure 1. Best track positions for Tropical Storm Josephine, 2-6 September 2008.

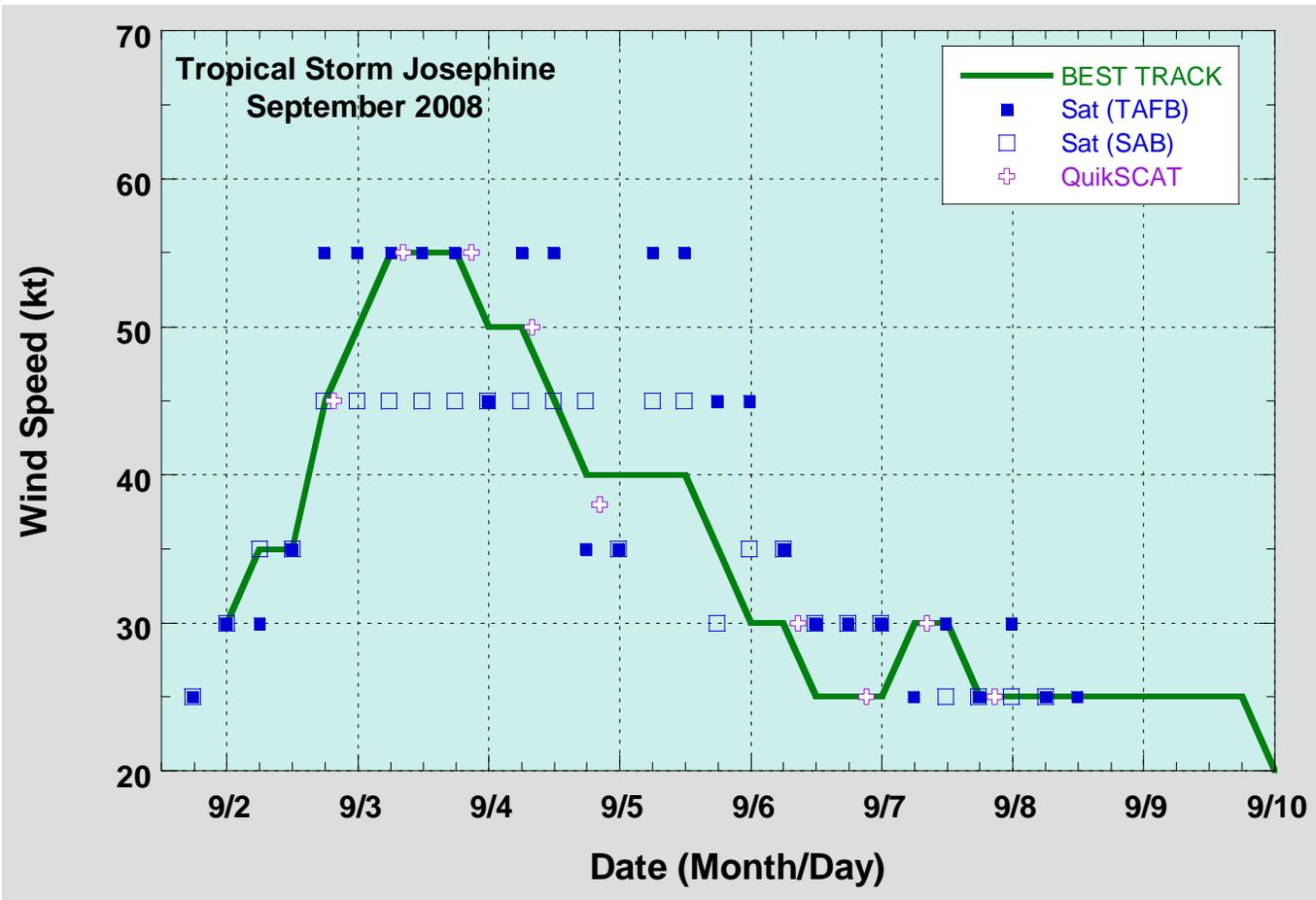


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Josephine, 2-6 September 2008.

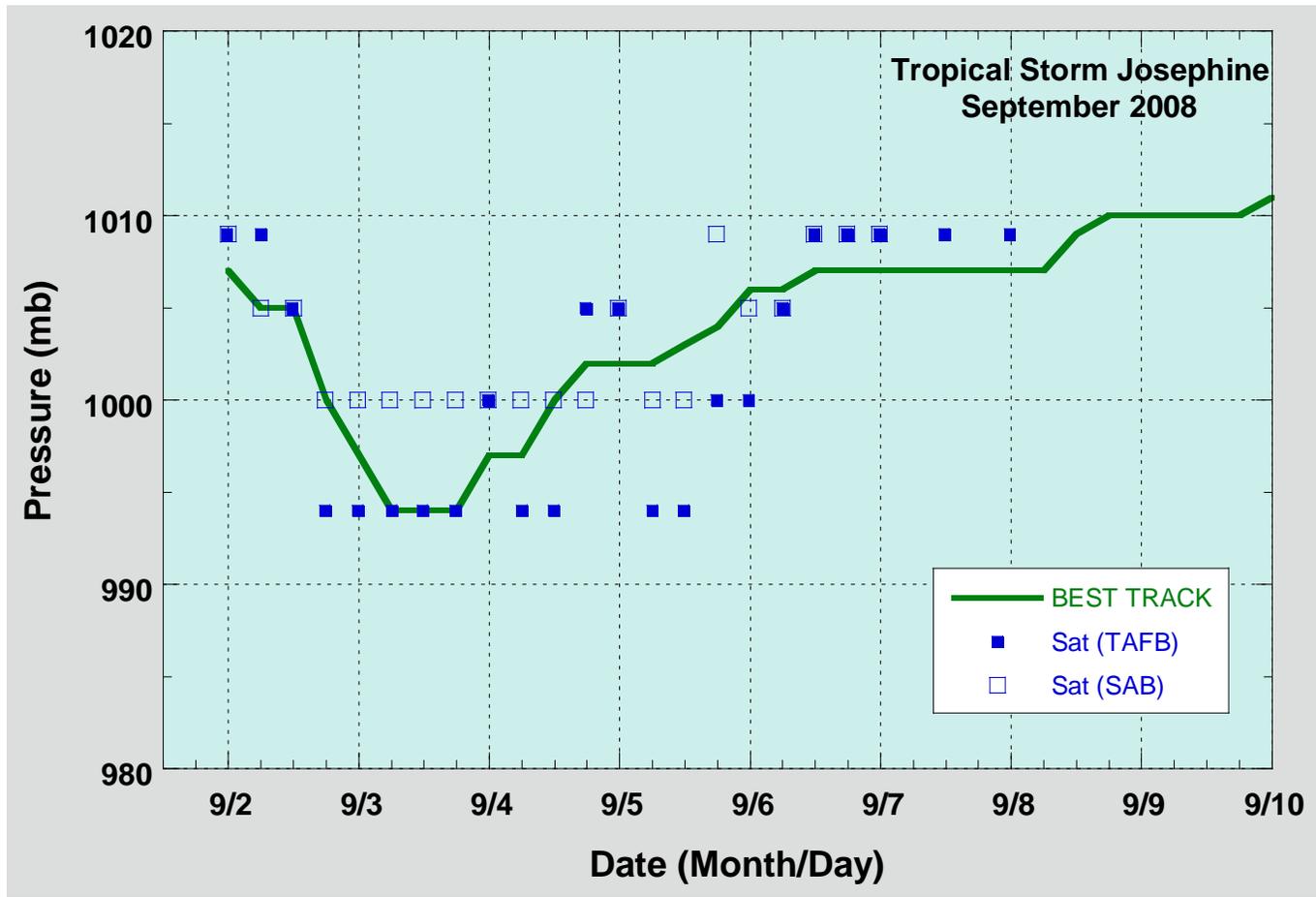


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Josephine, 2-6 September 2008.

