Tropical Cyclone Report
Tropical Storm Dalila
(EP072007)
22-27 July 2007

Daniel P. Brown
National Hurricane Center
29 August 2007

Tropical Storm Dalila was a northwestward-moving tropical cyclone that reached its peak intensity near Socorro Island.

a. Synoptic History

Dalila formed from a tropical wave that entered the eastern North Pacific Ocean on 17 July. The wave spawned a broad area of low pressure several hundred nautical miles south-southeast of the Gulf of Tehuantepec on 19 July. As the low moved west-northwestward during the next couple of days, the associated shower activity gradually increased. Dvorak satellite classifications were initiated shortly before 0000 UTC 21 July and additional development during the next 24 h led to the formation of a tropical depression at 0000 UTC 22 July, centered about 400 n mi south of Manzanillo, Mexico. 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.

Northeasterly shear inhibited significant strengthening and the cyclone remained a tropical depression for the next two days. The depression moved west-northwestward during the first 24 h of its existence, but then turned northwestward on 23 July around the southwestern portion of a mid-level ridge centered over northern Mexico. The shear decreased late on 23 July, which allowed thunderstorm activity to form closer to the circulation center. The depression strengthened and became a tropical storm at 0000 UTC 24 July, while located about 350 n mi southwest of Manzanillo. Thereafter, the shear continued to relax and Dalila gradually gained strength, reaching a peak intensity of 50 kt at 0000 UTC 25 July, while centered about 50 n mi southeast of Socorro Island. Dalila continued moving northwestward and its center passed over or very near Socorro Island just after 0600 UTC 25 July. The next day the tropical storm turned west-northwestward and began moving over progressively cooler water which initiated a weakening trend. Dalila weakened to a tropical depression at 0600 UTC 27 July and degenerated to a remnant low 12 h later, while located about 400 n mi west of the southern tip of Baja California. The remnant low moved west-northwestward during the next couple days before slowing down and turning west-southwestward on 29 July. It then drifted southward on 30 July and dissipated about 700 miles west of the southern tip of Baja California around 1200 UTC that day.

b. Meteorological Statistics

Observations in Dalila (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 were also useful in tracking Dalila.

The best-track intensity of Dalia on 22-23 July is slightly lower than the subjective Dvorak intensity estimates (Fig. 2). During this time the center was extremely difficult to locate in conventional infrared imagery and the estimated center location of some of these Dvorak fixes were likely too far west and farther embedded in the deep convection. This resulted in slightly inflated intensity estimates, which were somewhat exacerbated during this time period due to Dvorak rules that do not allow prompt weakening.

Four QuikSCAT passes between 1313 UTC 23 July and 0115 UTC 25 July were helpful in determining the intensity of Dalila during this time. The pass at 1313 UTC 23 July detected tropical storm force winds within the tropical cyclone's circulation, however analysis of these data suggest that these vectors were rain-inflated. The estimated peak intensity of 50 kt was based on data from the 0115 UTC 25 July QuikSCAT pass. Because Dalila was an atypically large tropical cyclone, the corresponding estimated minimum pressure is a little lower than what the standard Dvorak pressure-wind relationship yields.

There were no surface observations available from Socorro Island during the passage of Dalila, and no ship observations of winds of tropical storm force in association with Dalila were received.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The Tropical Weather Outlook issued at 1700 UTC 20 July, about 31 h prior to development, was the first Outlook to describe the area of disturbed weather from which Dalila developed. However, the first Outlook to explicitly mention possible tropical depression formation was issued only about 7 h prior to genesis.

A verification of official and guidance model track forecasts is given in Table 2. Average official track errors (with number of cases in parentheses) for Dalila were 32 (21), 48 (19), 69 (17), 99 (15), 142 (11), 165 (7), and 187 (3) n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. The official track errors through 72 h are comparable to the average 5-year (2002-2006) official track errors while errors at days 4 and 5 are lower than the 5-year mean. The shallow and medium Beta and Advection Model (BAMS and BAMM) errors were lower than the NHC track forecasts for most time periods. The official track errors were lower than most of the individual dynamical model guidance; however, the consensus of these models (GUNA and CONU) and the Florida State Super Ensemble (FSSE) provided forecasts that were slightly better than the NHC track predictions through 96 h.

Average official intensity errors (Table 3) for Dalila were 4, 6, 5, 8, 11, 15, and 17 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. Despite official intensity errors that were lower than the 5-year means, the NHC forecasts were biased high, especially at 96 and 120 h. Intensity guidance from the Decay-SHIPS model showed a similar high bias and the interpolated GFDL model (GFDI) was the only intensity predictor that was consistently better than the official intensity forecast.

Table 1. Best track for Tropical Storm Dalila, 22-27 July 2007.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
22 / 0000	12.5	104.6	1008	25	tropical depression
22 / 0600	12.6	105.3	1008	25	"
22 / 1200	12.7	105.9	1007	30	"
22 / 1800	12.9	106.6	1007	30	"
23 / 0000	13.2	107.3	1007	30	"
23 / 0600	13.8	108.0	1007	30	"
23 / 1200	14.5	108.5	1006	30	"
23 / 1800	15.1	108.9	1006	30	"
24 / 0000	15.8	109.3	1005	35	tropical storm
24 / 0600	16.4	109.7	1004	35	"
24 / 1200	16.9	110.0	1002	40	"
24 / 1800	17.5	110.3	999	45	"
25 / 0000	18.1	110.6	995	50	"
25 / 0600	18.7	110.9	996	50	"
25 / 1200	19.3	111.3	998	45	"
25 / 1800	19.8	111.8	1000	45	"
26 / 0000	20.3	112.3	1000	45	"
26 / 0600	20.9	112.9	1000	45	"
26 / 1200	21.5	113.7	1000	45	"
26 / 1800	22.0	114.8	1002	40	"
27 / 0000	22.4	115.7	1003	35	"
27 / 0600	22.7	116.6	1005	30	tropical depression
27 / 1200	23.0	117.5	1006	25	"
27 / 1800	23.3	118.2	1008	25	low
28 / 0000	23.6	118.9	1009	25	"
28 / 0600	23.9	119.6	1009	25	"
28 / 1200	24.2	120.3	1009	25	"
28 / 1800	24.5	121.0	1009	25	"
29 / 0000	24.6	121.5	1009	25	"
29 / 0600	24.6	121.9	1009	25	"
29 / 1200	24.6	122.2	1009	25	"
29 / 1800	24.4	122.5	1009	25	"
30 / 0000	24.1	122.5	1009	20	"
30 / 0600	23.8	122.5	1009	20	"
30 / 1200					dissipated
25 / 0000	18.1	110.6	995	50	minimum pressure

Table 2. Preliminary track forecast evaluation (heterogeneous sample) for Tropical Storm Dalila, 22-27 July 2007. 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.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	44 (21)	79 (19)	121 (17)	171 (15)	264 (11)	401 (7)	535 (3)
GFNI	38 (18)	76 (16)	107 (14)	132 (12)	186 (9)	195 (5)	365 (1)
GFDI	**31 (20)**	59 (18)	90 (16)	117 (14)	163 (10)	204 (6)	298 (2)
GFSI	**26 (21)**	**44 (18)**	73 (16)	110 (14)	**124 (8)**	**156 (4)**	
AEMI	**30 (21)**	56 (19)	94 (17)	132 (15)	179 (11)	231 (7)	228 (3)
NGPI	32 (21)	51 (19)	73 (17)	99 (15)	**137 (11)**	173 (7)	353 (3)
UKMI	41 (11)	66 (9)	90 (7)	101 (5)	**110 (3)**	**112 (1)**	
BAMD	43 (21)	74 (19)	106 (17)	138 (15)	194 (11)	241 (7)	270 (3)
BAMM	**30 (21)**	**45 (19)**	**64 (17)**	**82 (15)**	**107 (11)**	**134 (7)**	**111 (3)**
BAMS	**25 (21)**	**41 (19)**	**59 (17)**	**79 (15)**	**111 (11)**	**142 (7)**	240 (3)
CONU	**27 (21)**	**44 (19)**	**66 (17)**	**93 (15)**	**121 (10)**	**134 (6)**	226 (2)
GUNA	**26 (20)**	**43 (17)**	**60 (15)**	**83 (13)**	**107 (8)**	**121 (4)**	
FSSE	**24 (15)**	**32 (13)**	**39 (11)**	**58 (9)**	**81 (5)**	**53 (1)**	
OFCL	32 (21)	48 (19)	69 (17)	99 (15)	142 (11)	165 (7)	187 (3)
NHC Official (2002-2006 mean)	33 (1349)	57 (1192)	79 (1039)	99 (897)	140 (655)	188 (465)	233 (311)

Table 3. Preliminary intensity forecast evaluation (heterogeneous sample) for Tropical Storm Dalila, 22-27 July 2007. Forecast errors (kt) 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.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
SHF5	5.6 (21)	8.5 (19)	8.4 (17)	9.4 (15)	**11.2 (11)**	18.0 (7)	26.0 (3)
GFDI	3.9 (20)	**6.2 (18)**	6.4 (16)	**6.9 (14)**	**8.2 (10)**	**9.0 (6)**	**7.0 (2)**
SHIP	4.9 (21)	8.4 (19)	8.1 (17)	10.0 (15)	**11.1 (11)**	16.4 (7)	23.7 (3)
DSHP	4.9 (21)	8.4 (19)	8.1 (17)	10.0 (15)	**11.1 (11)**	16.4 (7)	23.7 (3)
FSSE	5.1 (15)	7.2 (13)	6.1 (11)	8.3 (9)	**8.6 (5)**	16.0 (1)	
ICON	4.2 (20)	6.9 (18)	7.4 (16)	9.9 (14)	**10.4 (10)**	17.5 (6)	21.5 (2)
OFCL	3.8 (21)	6.3 (19)	5.3 (17)	8.0 (15)	11.4 (11)	15.0 (7)	16.7 (3)
NHC Official (2002-2006 mean)	6.3 (1349)	11.0 (1192)	14.6 (1039)	16.9 (896)	18.9 (655)	18.5 (465)	19.3 (311)

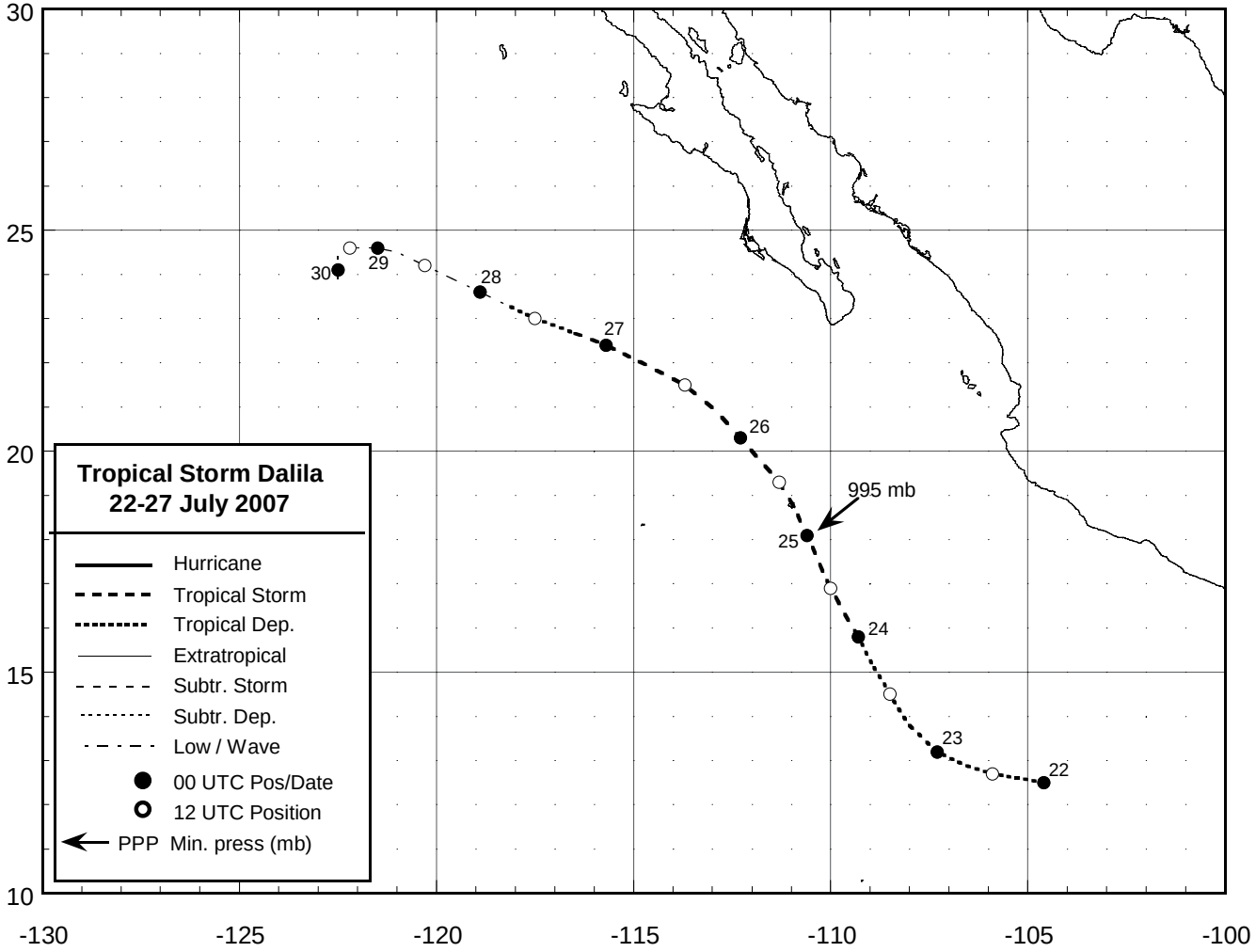

Figure 1. Best track positions for Tropical Storm Dalila, 22-27 July 2007.

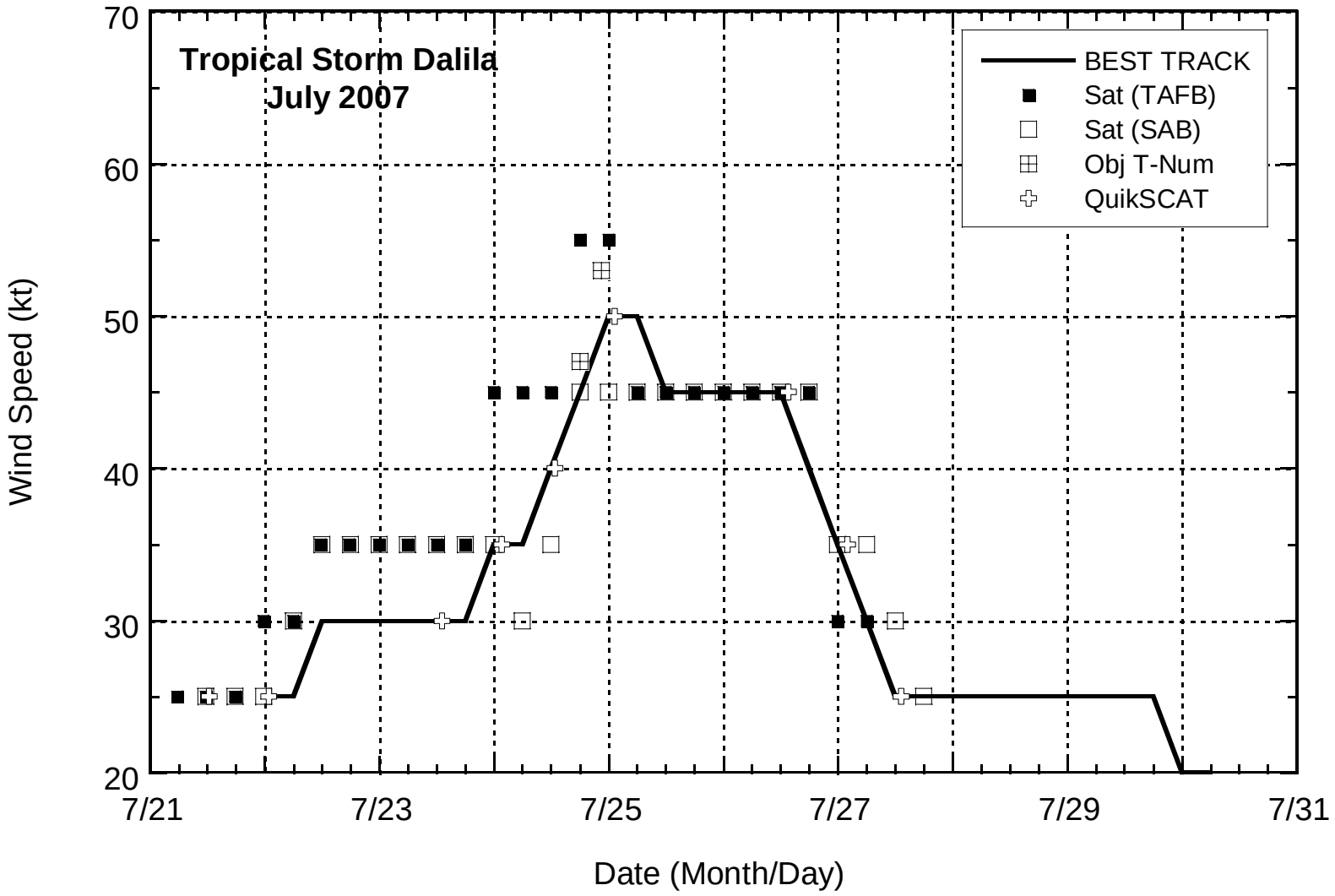

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Dalila, 22-27 July 2007.

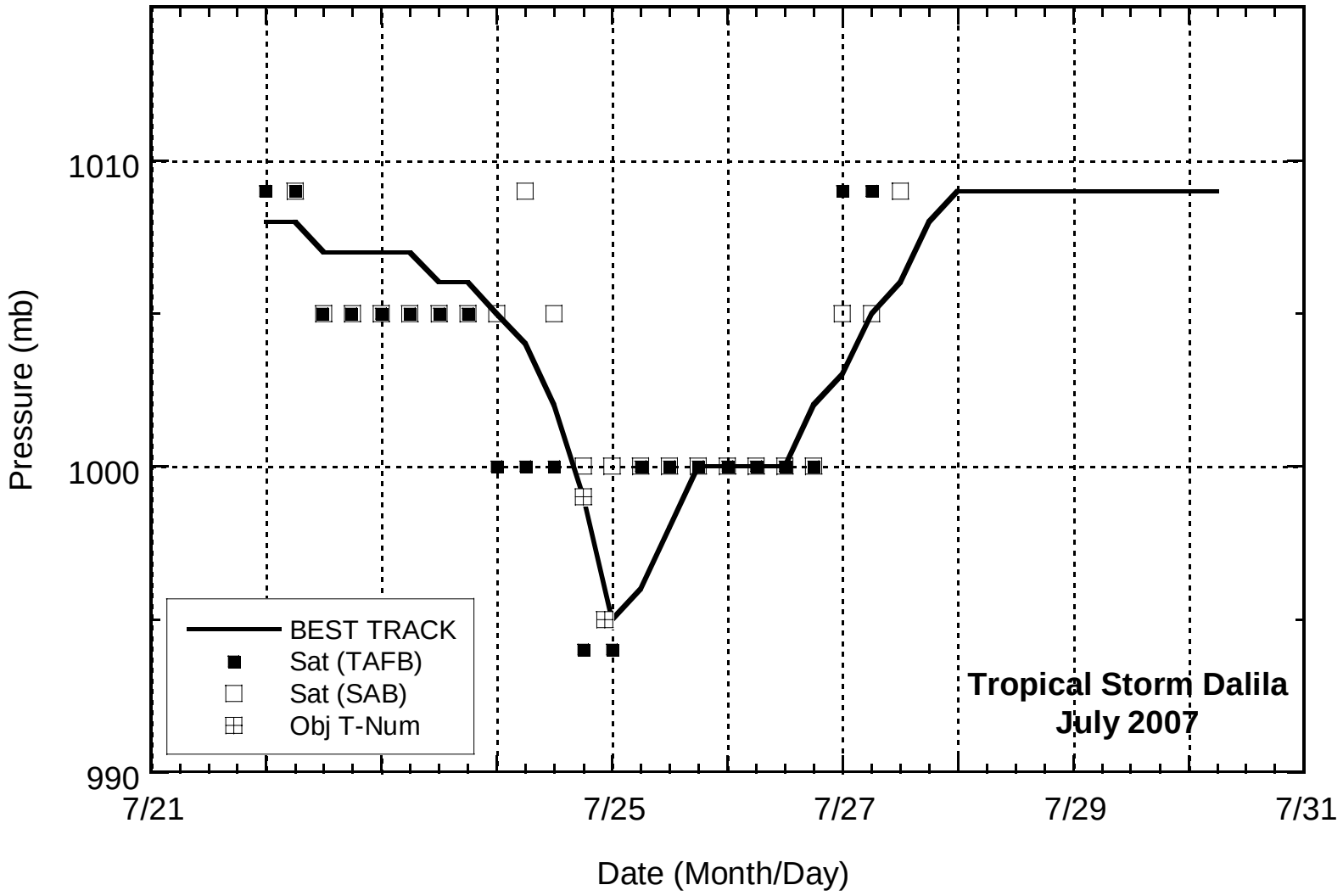

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Dalila, 22-27 July 2007.