

Tropical Cyclone Report
Tropical Storm Greg
11-15 August 2005

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Greg was a small and short-lived tropical storm that remained well to the west of the coast of Mexico.

a. Synoptic History

The genesis of Greg appears to have been associated with a tropical wave that crossed the west coast of Africa on 27 July. While it was difficult to track in satellite imagery as it passed over the Caribbean Sea and northern South America, upper-air data suggest the wave reached Central America on 6 August and then entered the eastern Pacific basin. Its convective organization remained minimal for the next few days as it proceeded westward. The system eventually began to become better organized on 10 August and was given its first Dvorak classifications at 1800 UTC. The disturbance developed quickly on the morning of 11 August and is estimated to have become a tropical depression by 0600 UTC that day about 600 n mi south of Cabo San Lucas, 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. The depression moved slowly west-northwestward on 11 August along the southern periphery of a weak mid-level ridge centered near the Baja California peninsula. Despite some modest northerly wind shear associated with outflow from Hurricane Fernanda to its northwest, the depression strengthened to a tropical storm by 1200 UTC that day. It then reached its peak intensity of 45 kt at 0000 UTC 12 August while centered about 560 n mi south of Cabo San Lucas.

The mid-level ridge pushed Greg westward early on 12 August. Later that day, steering currents weakened and Greg began to move very slowly northwestward. Northerly wind shear increased, due to a combination of the upper-level anticyclone over Fernanda and an upper-level trough over Baja California, and Greg weakened to an intensity of 35 kt by 0000 UTC 13 August. Deep convection was sporadic that day, but Greg held on as a borderline tropical storm while moving slowly westward. By early on 14 August, a weak low- to middle-tropospheric ridge had built in between Fernanda and Greg, and a new surface low pressure system had developed to the east of Greg near the coast of Mexico. In response, Greg moved in a general southward direction, but the steering currents were weak, and Greg became essentially stationary late on 14 August about 600 n mi southwest of Cabo San Lucas. Meanwhile, strong upper-level easterly winds had increased the vertical wind shear on the tropical storm on 14 August, and Greg weakened to a depression by 1800 UTC that day. The depression resumed a slow motion,

toward the south-southwest, and degenerated to a remnant low by 0000 UTC 16 August. The remnant low was absorbed into the Intertropical Convergence Zone less than 24 h later.

b. Meteorological Statistics

Observations in Greg (Figs. 2 and 3) are limited to satellite observations. No ships or buoys provided data from within the circulation of the cyclone. The satellite observations include geostationary satellite-based Dvorak technique intensity estimates from TAFB, SAB and the U. S. Air Force Weather Agency (AFWA). Microwave satellite data and imagery from NOAA polar-orbiting satellites, Defense Meteorological Satellite Program (DMSP) satellites, and National Aeronautics and Space Administration (NASA) satellites including the Tropical Rainfall Measuring Mission (TRMM), QuikSCAT, and Aqua were also useful in tracking Greg. Greg's peak intensity of 45 kt on 12 August is based upon Dvorak intensity estimates of 45 kt from TAFB and SAB that day and on QuikSCAT data from 1320 UTC 12 August that also support that intensity.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

Tropical Weather Outlook (TWO) products issued by the NHC first mentioned the system that became Greg only about 14 h prior to when it became a tropical depression. Additionally, Greg's quick development into a depression on the morning 11 August was not expected. Even just a few hours prior to genesis, the TWO products anticipated only slow development of the system.

Average official track errors (with the number of cases in parentheses) for Greg were 35 (17), 70 (15), 89 (13), 111 (11), 206 (7), and 454 (3) n mi for the 12, 24, 36, 48, 72, and 96 h forecasts, respectively; since Greg was a short-lived storm, very few 96-h forecasts and no 120-h forecasts could be verified. The corresponding average official track errors for the 10-yr period 1995-2004¹ are 37, 68, 97, 123, 175, and 208 n mi, respectively (Table 4). The average official track forecast errors for Greg through 48 h are generally comparable to the long-term averages and are less than the corresponding errors of most of the available models. However, the average official errors are larger than the long-term averages at 72 and 96 h and, although based on only three verifiable forecasts, the 96-h errors were very large and exhibited essentially no skill. The official forecasts anticipated the slow and generally westward motion during Greg's early stages, but they forecast Greg to last longer than it did and to advance well west of where it actually stalled and weakened. The interpolated U. K. Met. Office global model (UKMI) performed well

¹ Errors given for the 96 h period are averages over the four-year period 2001-4.

during Greg, mainly since it forecast a much slower westward motion than the other models and the official forecast.

Average official intensity errors were 7, 13, 22, 27, 29, and 15 kt for the 12, 24, 36, 48, 72, and 96 h forecasts, respectively. The corresponding average official intensity errors over the 10-yr period 1995-2004 are 6, 11, 14, 17, 19, and 18 kt, respectively. Official intensity forecasts for Greg in general had errors larger than the long-term averages and had a significant high bias, mainly since they anticipated that vertical wind shear would weaken and allow Greg to strengthen to a hurricane. The official forecasts generally fell between the SHIPS model that forecast less strengthening and the GFDL that at times forecast strengthening to Category 2 intensity. As a result, the SHIPS model had smaller average errors than the official forecast at nearly all lead times.

No coastal watches or warnings were required in association with Greg.

Table 1. Best track for Tropical Storm Greg, 11-15 August 2005.

Date/Time (UTC)	Latitude (EN)	Longitude (EW)	Pressure (mb)	Wind Speed (kt)	Stage
11 / 0600	12.9	109.0	1008	25	tropical depression
11 / 1200	13.3	109.8	1004	35	tropical storm
11 / 1800	13.5	110.5	1002	40	"
12 / 0000	13.6	111.5	1000	45	"
12 / 0600	13.6	112.3	1000	45	"
12 / 1200	14.0	112.9	1000	45	"
12 / 1800	14.4	113.3	1002	40	"
13 / 0000	14.7	113.5	1003	35	"
13 / 0600	15.0	113.8	1003	35	"
13 / 1200	15.3	114.2	1003	35	"
13 / 1800	15.5	114.8	1003	35	"
14 / 0000	15.5	115.3	1002	40	"
14 / 0600	15.2	115.7	1002	40	"
14 / 1200	14.7	115.8	1003	35	"
14 / 1800	14.5	115.7	1004	30	tropical depression
15 / 0000	14.5	115.7	1005	30	"
15 / 0600	14.5	115.7	1005	30	"
15 / 1200	14.2	116.1	1006	30	"
15 / 1800	13.8	116.4	1008	25	"
16 / 0000	13.5	116.6	1008	25	low
16 / 0600	13.0	116.8	1008	20	"
16 / 1200	12.5	117.0	1009	20	"
16 / 1800					absorbed into ITCZ
12 / 0000	13.6	111.5	1000	45	minimum pressure

Table 2. Preliminary forecast evaluation (heterogeneous sample) for Tropical Storm Greg, 11-15 August 2005. 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 remnant low stage. Models not available at the time official forecasts were made are indicated by (*).

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	46 (17)	90 (15)	145 (13)	195 (11)	337 (7)	456 (3)	
GFNI	56 (14)	92 (12)	101 (10)	119 (8)	209 (4)		
GFDI	51 (16)	93 (14)	117 (12)	120 (10)	129 (6)	183 (2)	
GFDL*	46 (17)	92 (15)	120 (13)	133 (11)	120 (7)	148 (3)	
GFDN*	57 (15)	100 (12)	119 (11)	114 (9)	180 (5)	190 (1)	
GFSI	52 (15)	97 (13)	127 (11)	158 (9)	266 (5)	350 (1)	
GFSO*	54 (16)	99 (14)	138 (12)	154 (10)	243 (6)	369 (2)	
AEMI	46 (15)	76 (13)	95 (11)	114 (9)	132 (5)	214 (1)	
NGPI	51 (14)	90 (12)	92 (10)	117 (8)	170 (4)		
NGPS*	53 (15)	91 (13)	113 (11)	107 (9)	154 (5)	29 (1)	
UKMI	41 (15)	65 (13)	75 (11)	66 (9)	87 (5)	121 (1)	
UKM*	41 (8)	67 (7)	71 (6)	60 (5)	66 (3)	123 (1)	
BAMD	50 (17)	85 (15)	119 (13)	155 (11)	254 (7)	390 (3)	
BAMM	54 (17)	102 (15)	152 (13)	201 (11)	333 (7)	541 (3)	
BAMS	42 (17)	79 (15)	117 (13)	163 (11)	301 (7)	598 (3)	
CONU	45 (15)	75 (13)	87 (11)	90 (9)	110 (5)	170 (1)	
GUNA	43 (14)	79 (12)	93 (10)	97 (8)	126 (4)		
FSSE	50 (14)	87 (13)	112 (11)	111 (9)	115 (5)	195 (1)	
OFCL	35 (17)	70 (15)	89 (13)	111 (11)	206 (7)	454 (3)	
NHC Official (1995-2004 mean) ²	37 (2654)	68 (2378)	97 (2096)	123 (1829)	175 (1386)	208 (355)	259 (224)

² Errors given for the 96 and 120 h periods are averages over the four-year period 2001-04.

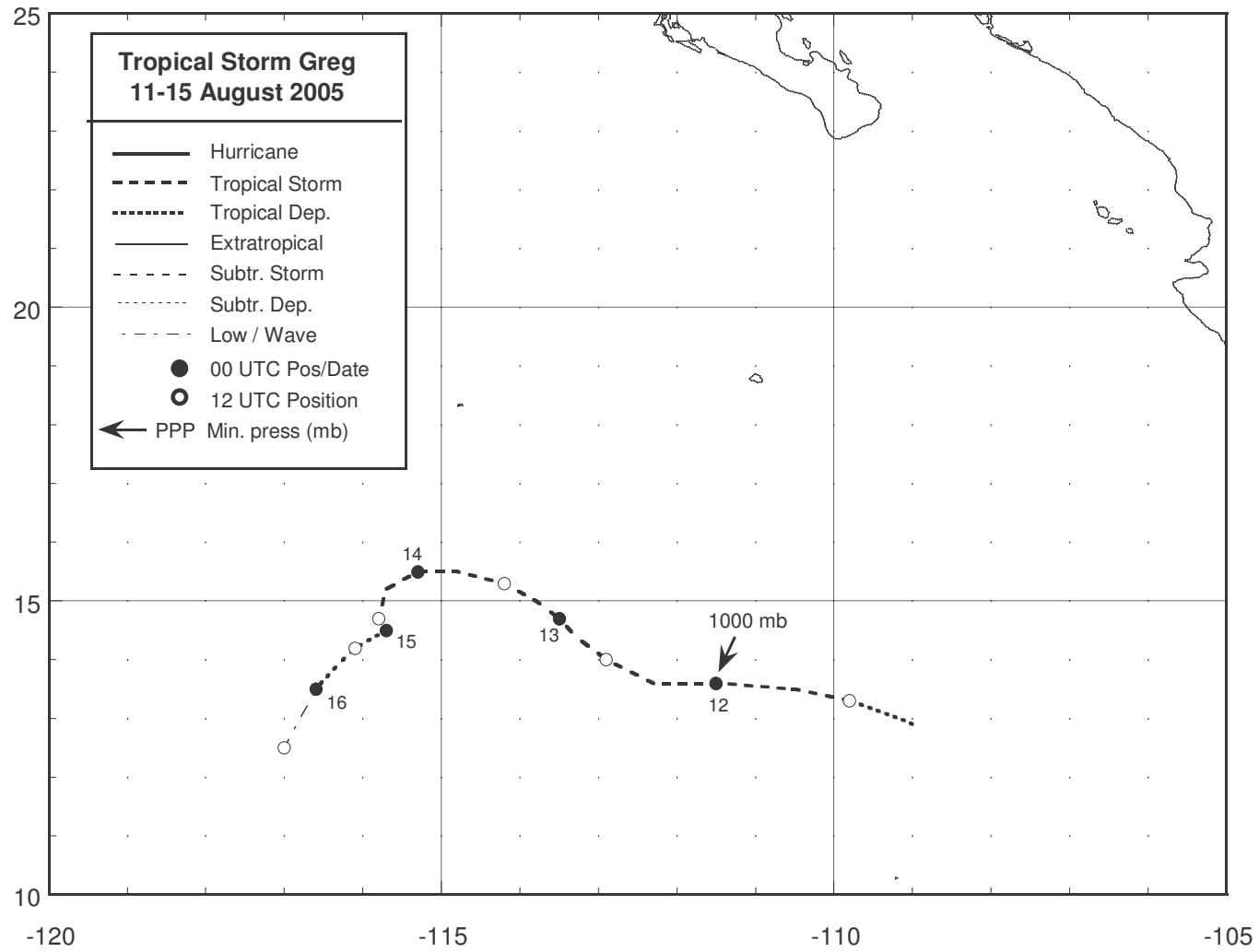


Figure 1. Best track positions for Tropical Storm Greg, 11-15 August 2005.

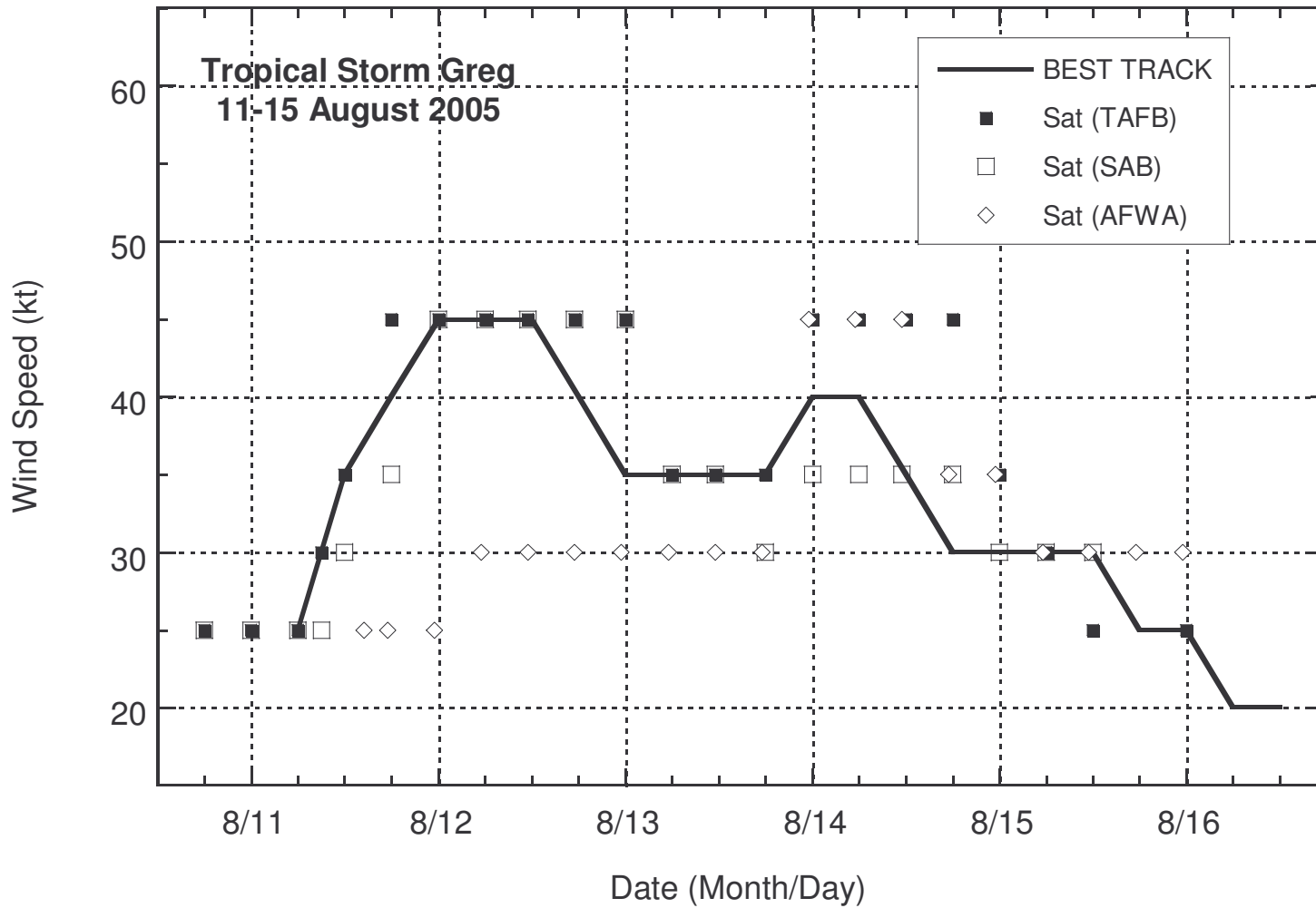


Figure 2. Maximum wind estimates and best track maximum sustained surface wind speed curve for Tropical Storm Greg, 11-15 August 2005.

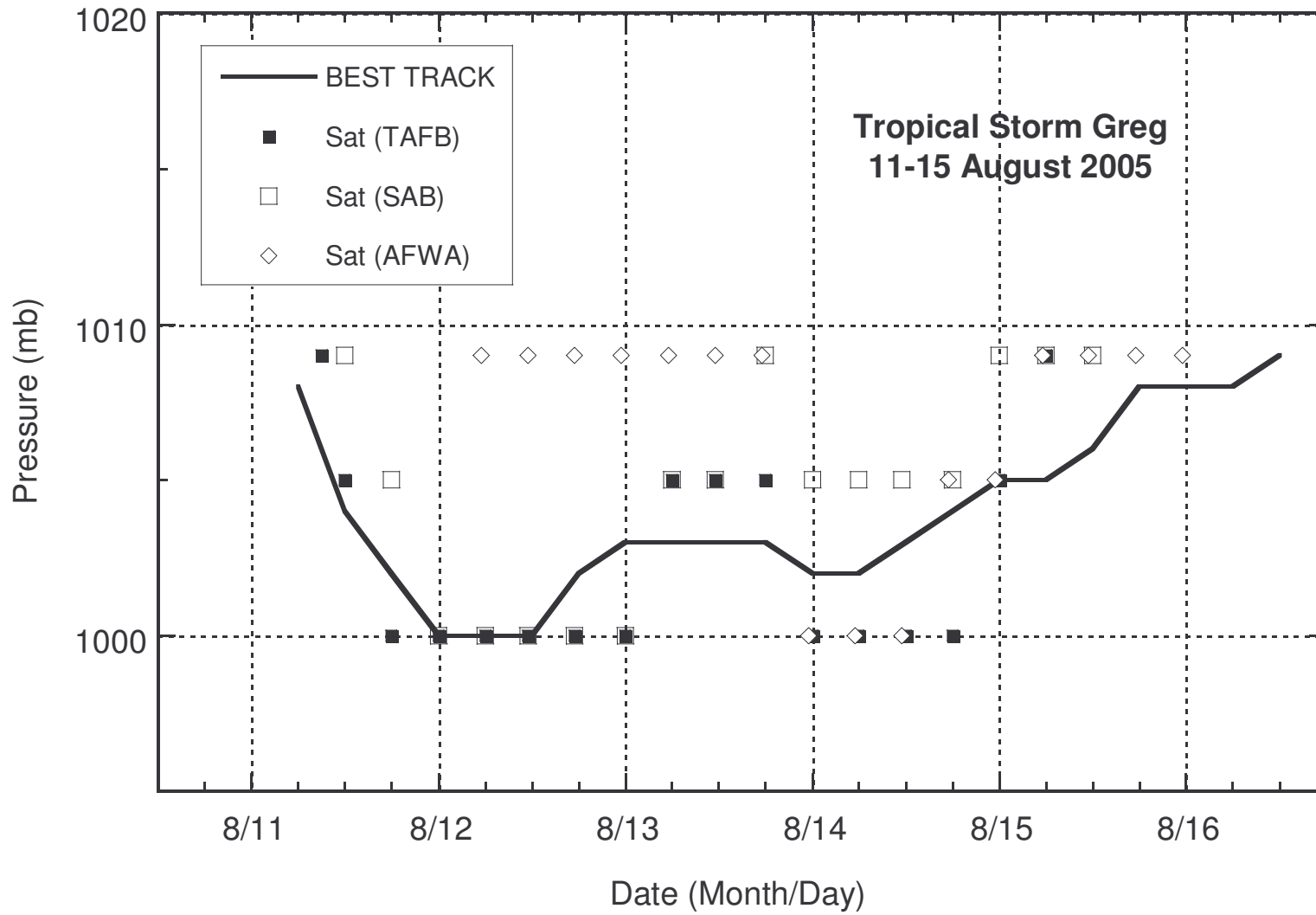


Figure 3. Minimum pressure estimates and best track minimum central pressure curve for Tropical Storm Greg, 11-15 August 2005.