

Tropical Cyclone Report
Hurricane Max
18-22 September 2005

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Max was a short-lived tropical cyclone that absorbed Tropical Storm Lidia and later became a Category 1 hurricane (on the Saffir-Simpson Hurricane Scale). Max did not affect land.

a. Synoptic History

The system that led to the development of Max appears to have been a tropical wave that crossed the west coast of Africa on 4 September. The wave proceeded across the tropical Atlantic without development, passed through the Lesser Antilles on 10 September, and then traversed the Caribbean Sea. The southern portion of the wave crossed Central America on 13 September and entered the eastern Pacific basin. The area of disturbed weather associated with the wave became large but disorganized on 14 September to the south of Guatemala. While the disturbance remained large during the next few days as it proceeded westward a couple hundred miles off the Pacific coast of Mexico, convection did not consolidate until 16 September. That day the system received its first Dvorak classifications from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB). Early on 18 September, the convective banding became more evident as the system approached Tropical Storm Lidia, which was nearly stationary about 725 n mi southwest of Cabo San Lucas, Mexico. Unhindered by the relatively small circulation of Lidia, the larger disturbance approaching from the east gained organization, and it is estimated that it became a tropical depression by 1200 UTC 18 September about 500 n mi south-southwest of Cabo San Lucas. 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 newly-formed depression became a tropical storm with estimated maximum sustained winds of 35 kt at about 1800 UTC 18 September. Lidia had weakened to a depression by that time and was being drawn northeastward toward Max. By 0000 UTC 19 September, Lidia was no longer identifiable, having been absorbed by Max into the southern portion of its circulation. Max turned northwestward on 19 September along the southwestern edge of a mid-level ridge extending from Texas westward to Baja California, and the storm steadily strengthened within an environment of weak vertical wind shear. It became a hurricane by 0000 UTC 20 September while centered about 520 n mi southwest of Cabo San Lucas. Continuing northwestward, Max maintained hurricane status for about 24 h. During that time it reached its estimated peak intensity of 75 kt at 1200 UTC 20 September, when satellite imagery depicted a well-defined eye about 25 n mi in diameter. However, by that time the hurricane was beginning to pass over cooler waters. As a result, it abruptly weakened the next day, and the intensity is

estimated to have decreased to 45 kt by 1800 UTC 21 September. A weak mid-level ridge to the north of Max then forced the tropical storm westward. Max remained a marginal tropical storm at 0600 UTC 22 September but lost all deep convection a few hours later. It degenerated to a remnant low by 1800 UTC that day about 700 n mi west of Cabo San Lucas. The remnant low drifted slowly southward for a few days and dissipated on 26 September.

b. Meteorological Statistics

Observations in Max (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 Max. Max's peak intensity of 75 kt at 1200 UTC 20 September is based upon subjective Dvorak intensity estimates of 77 kt from both TAFB and SAB at that time.

c. Casualty and Damage Statistics

There were no reports of damage or casualties associated with Hurricane Max.

d. Forecast and Warning Critique

The NHC eastern Pacific Tropical Weather Outlook (TWO) products first mentioned the tropical wave that became Max on 13 September, about five days prior to when it became a depression, when the wave had just emerged into the eastern Pacific near Nicaragua. Only the possibility of slow development was conveyed in the TWOs during the following few days. An increased potential for this system to become a tropical depression was mentioned beginning about two days prior to genesis. Within about 12 hours of genesis, however, the TWOs conveyed that development of this precursor disturbance might be limited due to its proximity to Tropical Storm Lidia. The formation and development of Max and its absorption of Lidia on 18 September were not well-anticipated.

Average official track errors (with the number of cases in parentheses) for Max were 19 (15), 35 (13), 56 (11), 73 (9), 97 (5), and 179 (1) n mi for the 12, 24, 36, 48, 72, and 96 h forecasts, respectively. These errors are much less than the corresponding average official track errors for the 10-yr period 1995-2004¹: 37, 68, 97, 123, 175, and 208 n mi, respectively (Table 4). Note that, due to the relatively short life span of Max, only one 96-h forecast and no 120-h forecasts were verified. The official track forecasts outperformed nearly all of the individual models at all lead times, with exceptions being the BAMB and BAMD trajectory models on just

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

a few 72-h and 96-h forecasts. The various consensus models (i.e., CONU, GUNA, FSSE) also had lower errors than the official forecasts at some lead times.

Average official intensity errors were 6, 11, 13, 12, 4, and 0 kt for the 12, 24, 36, 48, 72, and 96 h forecasts, respectively. For comparison, the corresponding long-term official intensity errors are 6, 11, 14, 17, 19, and 18 kt. The official intensity errors during Max were comparable to the long-term averages through 36 h but were much less than the long-term averages thereafter. In general the official intensity forecasts had an early low bias and did not forecast as much strengthening as actually occurred, but the later forecasts did fairly well in anticipating the weakening of Max over cooler waters. The Statistical Hurricane Intensity Prediction Scheme (SHIPS) model was a little closer to capturing the strengthening phase, and as a result that model had slightly lower average errors out to 48 h than the official forecasts.

No coastal watches or warnings were required for Hurricane Max.

Table 1. Best track for Hurricane Max, 18-22 September 2005.

Date/Time (UTC)	Latitude (EN)	Longitude (EW)	Pressure (mb)	Wind Speed (kt)	Stage
18 / 1200	15.0	113.0	1007	30	tropical depression
18 / 1800	15.2	114.1	1005	35	tropical storm
19 / 0000	15.5	115.1	1005	35	"
19 / 0600	16.0	116.0	1000	45	"
19 / 1200	16.6	116.5	994	55	"
19 / 1800	17.3	116.9	990	60	"
20 / 0000	18.0	117.4	987	65	hurricane
20 / 0600	18.7	118.1	984	70	"
20 / 1200	19.3	118.8	981	75	"
20 / 1800	19.9	119.3	984	70	"
21 / 0000	20.7	119.7	987	65	"
21 / 0600	21.2	120.0	990	60	tropical storm
21 / 1200	21.5	120.5	995	50	"
21 / 1800	21.7	121.0	998	45	"
22 / 0000	21.8	121.4	1001	40	"
22 / 0600	21.8	121.7	1004	35	"
22 / 1200	21.8	122.1	1006	30	tropical depression
22 / 1800	21.8	122.5	1007	25	remnant low
23 / 0000	21.8	122.8	1008	25	"
23 / 0600	21.7	123.0	1008	20	"
23 / 1200	21.5	123.2	1008	20	"
23 / 1800	21.3	123.5	1009	20	"
24 / 0000	21.0	123.7	1009	20	"
24 / 0600	20.7	123.9	1010	20	"
24 / 1200	20.4	124.2	1010	20	"
24 / 1800	19.9	124.3	1010	20	"
25 / 0000	19.4	124.3	1010	20	"
25 / 0600	18.9	124.3	1010	20	"
25 / 1200	18.5	124.3	1010	15	"
25 / 1800	18.1	124.2	1010	15	"
26 / 0000	17.6	124.2	1010	15	"
26 / 0600					dissipated
20 / 1200	19.3	118.8	981	75	minimum pressure

Table 2. Preliminary forecast evaluation (heterogeneous sample) for Hurricane Max, 18-22 September 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.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	30 (15)	62 (13)	95 (11)	121 (9)	201 (5)	190 (1)	
GFNI	34 (12)	70 (10)	113 (8)	165 (6)	276 (2)		
GFDI	28 (13)	56 (11)	99 (9)	150 (7)	254 (4)		
GFSI	27 (13)	49 (11)	84 (9)	114 (7)	186 (3)		
AEMI	26 (14)	48 (12)	86 (10)	126 (8)	213 (4)		
NGPI	31 (12)	58 (10)	86 (8)	126 (6)	209 (2)		
UKMI	26 (12)	40 (10)	70 (8)	115 (6)	295 (2)		
BAMD	27 (15)	55 (13)	81 (11)	103 (9)	74 (5)	162 (1)	
BAMM	31 (14)	61 (13)	95 (11)	126 (9)	132 (5)	178 (1)	
BAMS	35 (14)	79 (13)	125 (11)	163 (9)	198 (5)	289 (1)	
CONU	22 (13)	35 (11)	52 (9)	72 (7)	127 (3)		
GUNA	20 (11)	29 (9)	48 (7)	72 (5)	136 (2)		
FSSE	23 (13)	31 (11)	50 (9)	66 (7)	93 (3)		
OFCL	19 (15)	35 (13)	56 (11)	73 (9)	97 (5)	179 (1)	
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.

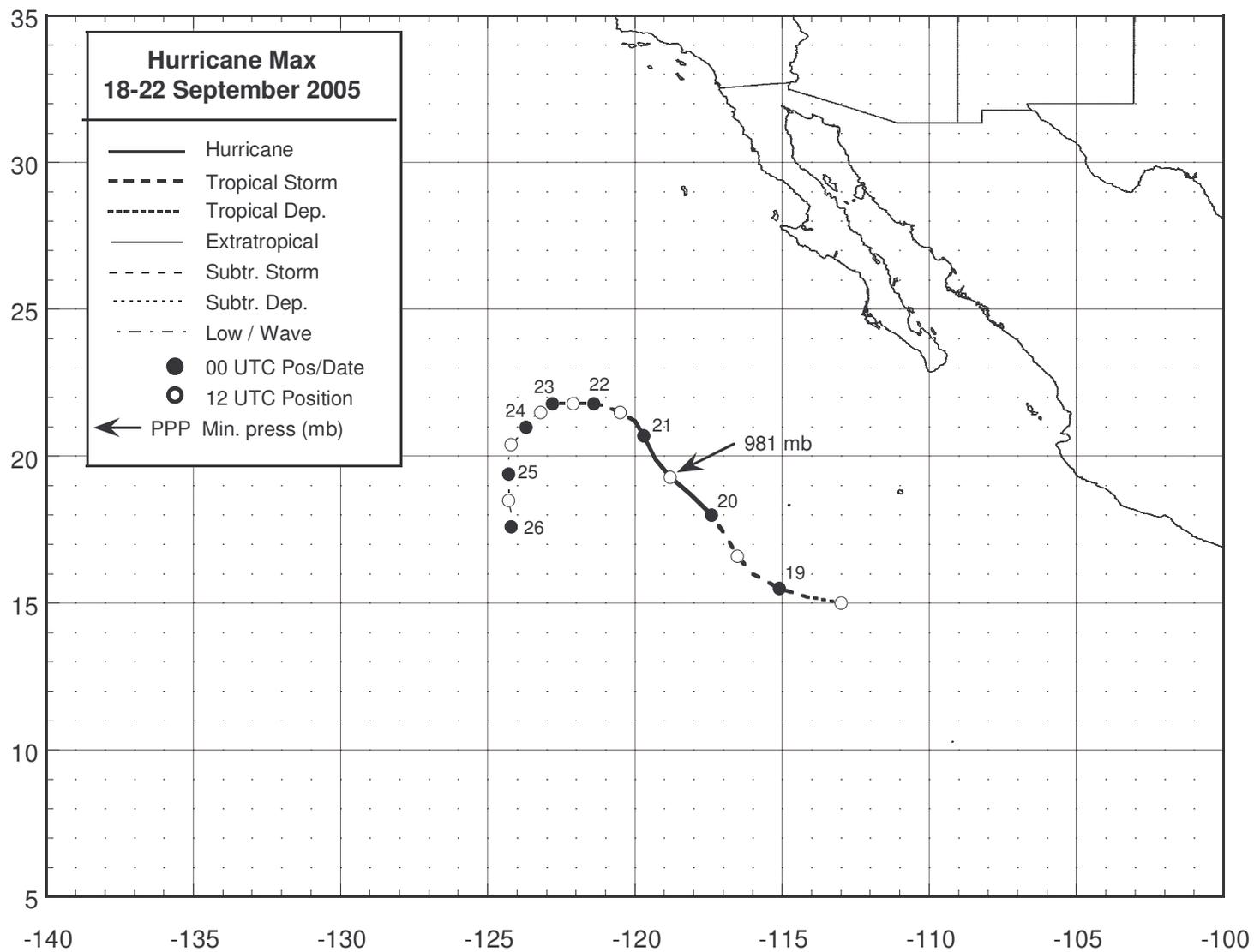


Figure 1. Best track positions for Hurricane Max, 18-22 September 2005.

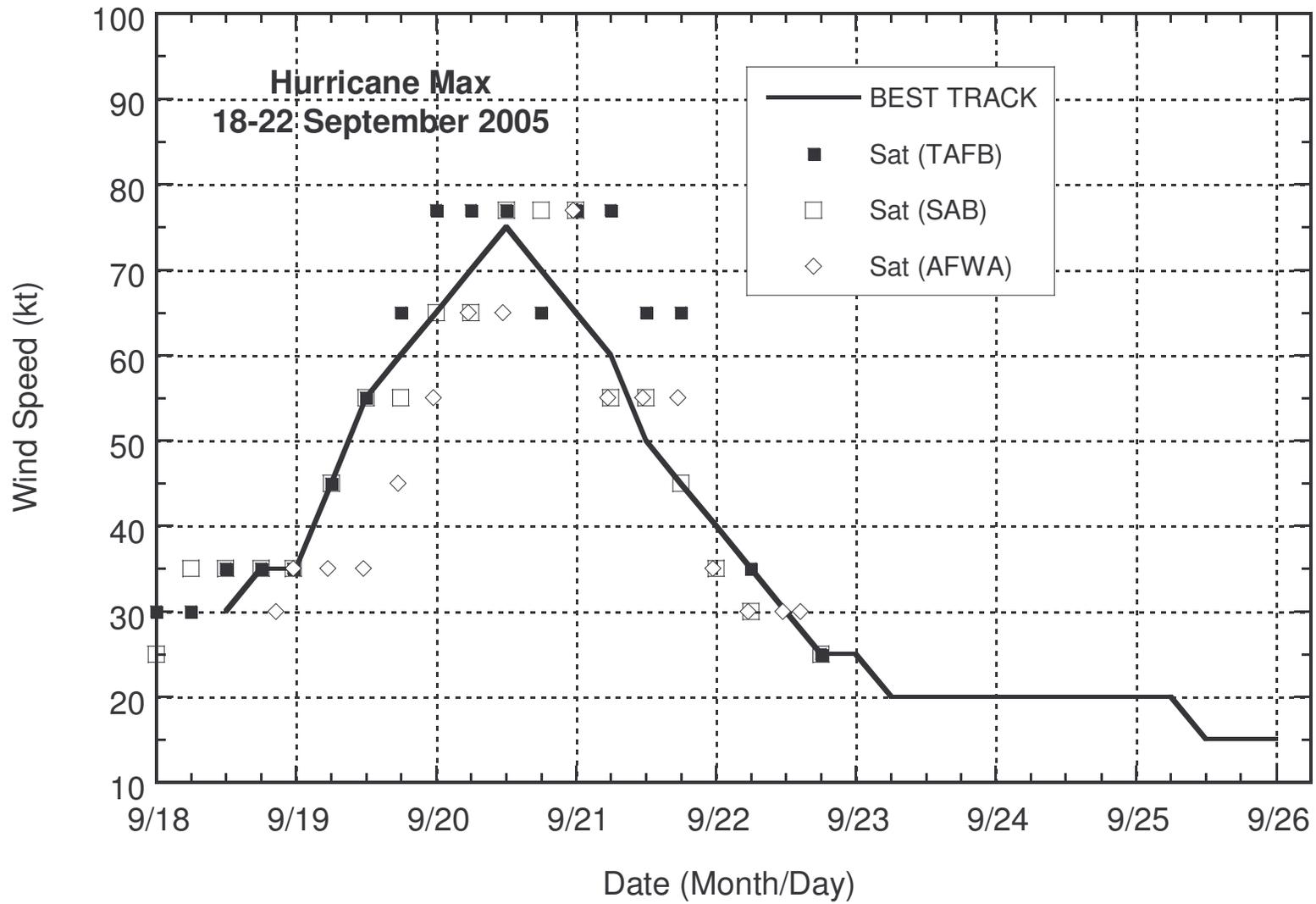


Figure 2. Maximum wind estimates and best track maximum sustained surface wind speed curve for Hurricane Max, 18-22 September 2005.

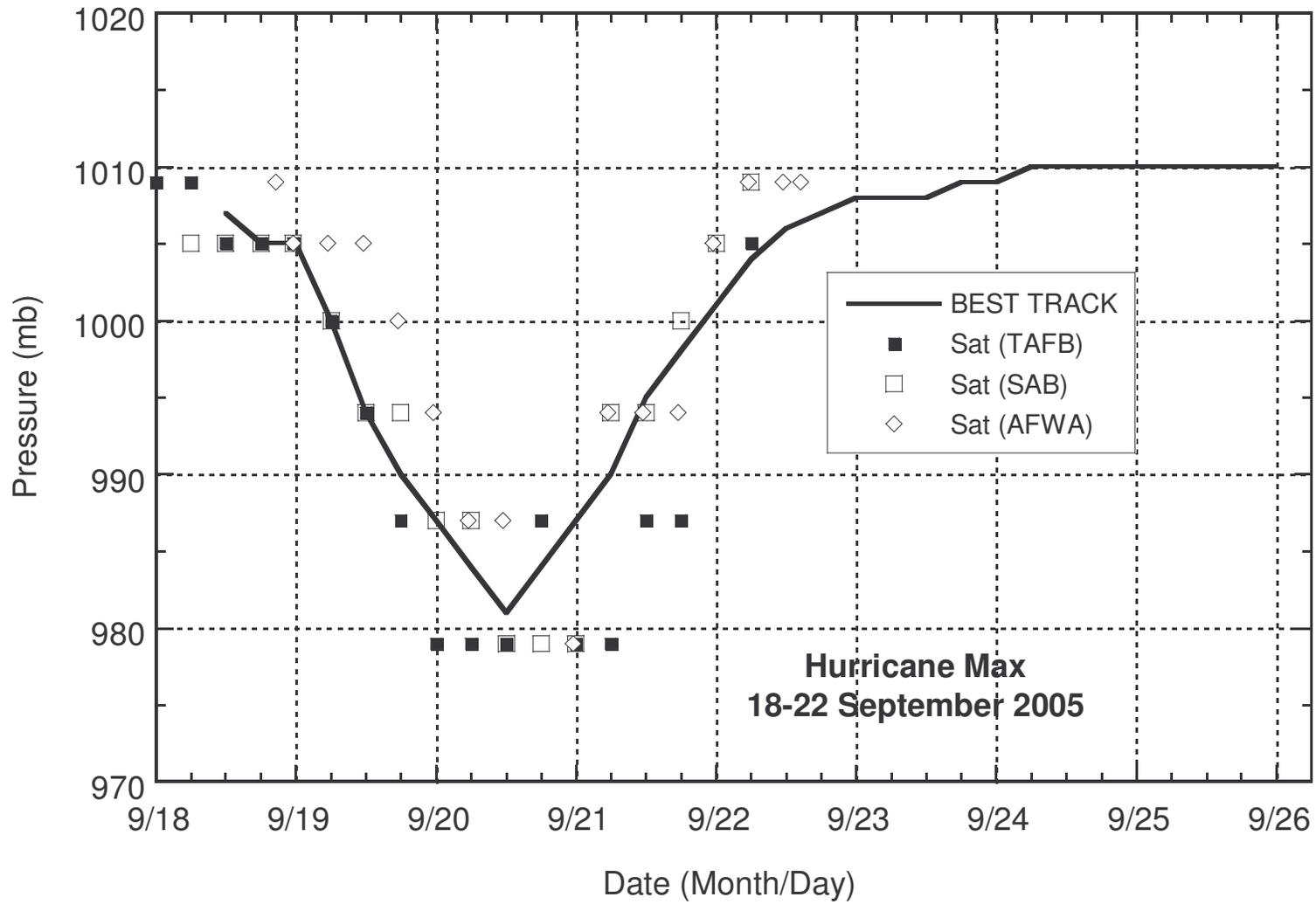


Figure 3. Minimum pressure estimates and best track minimum central pressure curve for Hurricane Max, 18-22 September 2005.