

Tropical Cyclone Report
Tropical Storm Matthew
8-10 October 2004

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Matthew made landfall on the Louisiana coast as a tropical storm with 35 kt winds.

a. Synoptic History

The origin of Matthew can be traced to a tropical wave that moved across the west coast of Africa on 19 September. The wave was very difficult to track between Africa and the Lesser Antilles because its close proximity to Tropical Storm Lisa and another large disturbance in the tropical Atlantic. The wave crossed the Lesser Antilles on 29 September and began to interact with a westward moving upper-level low. Cloudiness and showers gradually increased as the wave moved very slowly westward, trailing the upper-level low. The shower activity associated with the wave reached the Bay of Campeche on 5 October and gradually became better organized while moving little. An upper-level ridge became established over the convection and surface pressures began to fall in the area. On 7 October, data from a reconnaissance aircraft indicated a broad area of low pressure had formed just east of Tampico, Mexico, accompanied by light winds. The system continued to become better organized while moving little, and it is estimated that a tropical depression formed at 1200 UTC 8 October about 180 n mi southeast of Brownsville Texas. By 1800 UTC that day the cyclone strengthened into Tropical Storm Matthew. Initially, the cyclone moved toward the east and east-northeast, but then gradually turned to the northeast and north steered by a large mid- to upper-level low over western Texas. It is estimated that Matthew reached its peak intensity of 40 knots and a minimum pressure of 997 mb at 1800 UTC 9 October. Matthew's center made landfall just west of Cocodrie, Louisiana about 1100 UTC 10 October. Maximum estimated winds were then 35 knots. Thereafter, Matthew weakened to a depression and became an extratropical low. It continued moving northward and was absorbed by a frontal system at 1200 UTC 11 October.

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 Matthew (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA), as well as flight-level observations from flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command. Microwave satellite imagery from NOAA polar-orbiting satellites, the

NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, and Defense Meteorological Satellite Program (DMSF) satellites were also useful in tracking Matthew.

Table 2 shows selected surface observations including reports from southern Louisiana of heavy rainfall. The maximum rainfall was reported at Reserve in St. John Parish with 16.23 inches. There was an 83-kt wind gust in the continuous wind data from the BURL1 site during the time Matthew made landfall. This gust appears to be related to a meso-scale convective cell and is not representative of the strength of the tropical storm.

c. Casualty and Damage Statistics

One tornado briefly occurred near Golden Meadow, damaging the roof of a trailer. In Terrebonne Parish about 20 homes were flooded by the combination of rains and storm surge. There was a report of a 5.85 ft surge at Frenier as indicated in Table 2. According to local newspapers, Grand Isle suffered extensive beach front erosion. There were no known deaths or injuries.

d. Forecast and Warning Critique

Matthew was a short-lived tropical cyclone and there were only a few forecasts to verify. The few track forecasts produced errors are comparable to the average official track errors for the 10-yr period 1994-2003. The average official intensity errors were smaller than the average official intensity errors over the same period.

A strong pressure gradient prevailed over the northeastern Gulf of Mexico and produced gale force winds in that area during the formation of Matthew. As the circulation of the tropical cyclone headed for the coast, a tropical storm warning was issued from the Alabama-Florida border westward to Intracoastal City, Louisiana at 2100 UTC 9 October. The tropical storm warning replaced the existing gale warning about 15 hours before the poorly-defined center of Matthew crossed the Louisiana coast. The warning was discontinued at 1500 UTC 10 October.

Table 1. Best track for Tropical Storm Matthew, 8-10 October, 2004.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
08 / 1200	24.0	95.4	1007	30	tropical depression
08 / 1800	24.1	94.2	1004	35	tropical storm
09 / 0000	24.6	93.7	1000	40	"
09 / 0600	25.3	93.2	1002	35	"
09 / 1200	26.3	92.8	1002	35	"
09 / 1800	26.8	92.0	997	40	"
10 / 0000	27.3	91.4	998	40	"
10 / 0600	28.1	91.2	999	40	"
10 / 1200	29.4	90.9	1000	30	tropical depression
10 / 1800	30.4	90.9	1002	25	"
11 / 0000	32.0	91.0	1003	25	extratropical
11 / 0600	33.6	91.9	1005	20	"
11 / 1200					Absorbed by front
10 / 1100	29.2	91.0	999	35	Landfall near Cocodrie, LA.
09 / 1800	26.8	92.0	997	40	minimum pressure

Table 2. Selected surface and coastal observations for Tropical Storm Matthew, 8-10 October, 2004.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft) ^c	Storm tide (ft) ^d	Total rain (in)
	Date/time (UTC)	Press. (mb)	Date/time (UTC) ^a	Sustained (kt) ^b	Gust (kt)			
Louisiana								
New Orleans Lakefront Airport	10/1205	1003.7	10/1306	33	41			4.06
BURL1 (CMAN)	10/1200	1004.0	10/0940	42	48			
Grand Isle GDIL1 (CMAN)	10/1100	1002.8	10/0927		40	3.61		
Lumcon	10/1000	1001.7	10/0200		34			
LSU Agricultural Stn. Citrus			10/1506		38			5.47
Tambour Bay	10/1000	999.7						
Cocodrie						3.7		
NWS Mandeville						5.3		
NWS Frenier						5.85		
Slidell KASD								5.16
Baton Rouge KBTR								7.42
New Orleans KMSY								7.50
Galliano								14.28
Thibodaux								9.43
LSU Agricultural Stn Sugarcane								13.02
Houma								8.86
Paradis								8.68
Reserve								16.23

^a Date/time is for sustained wind when both sustained and gust are listed.

^b Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.

^c Storm surge is water height above normal astronomical tide level.

^d Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).

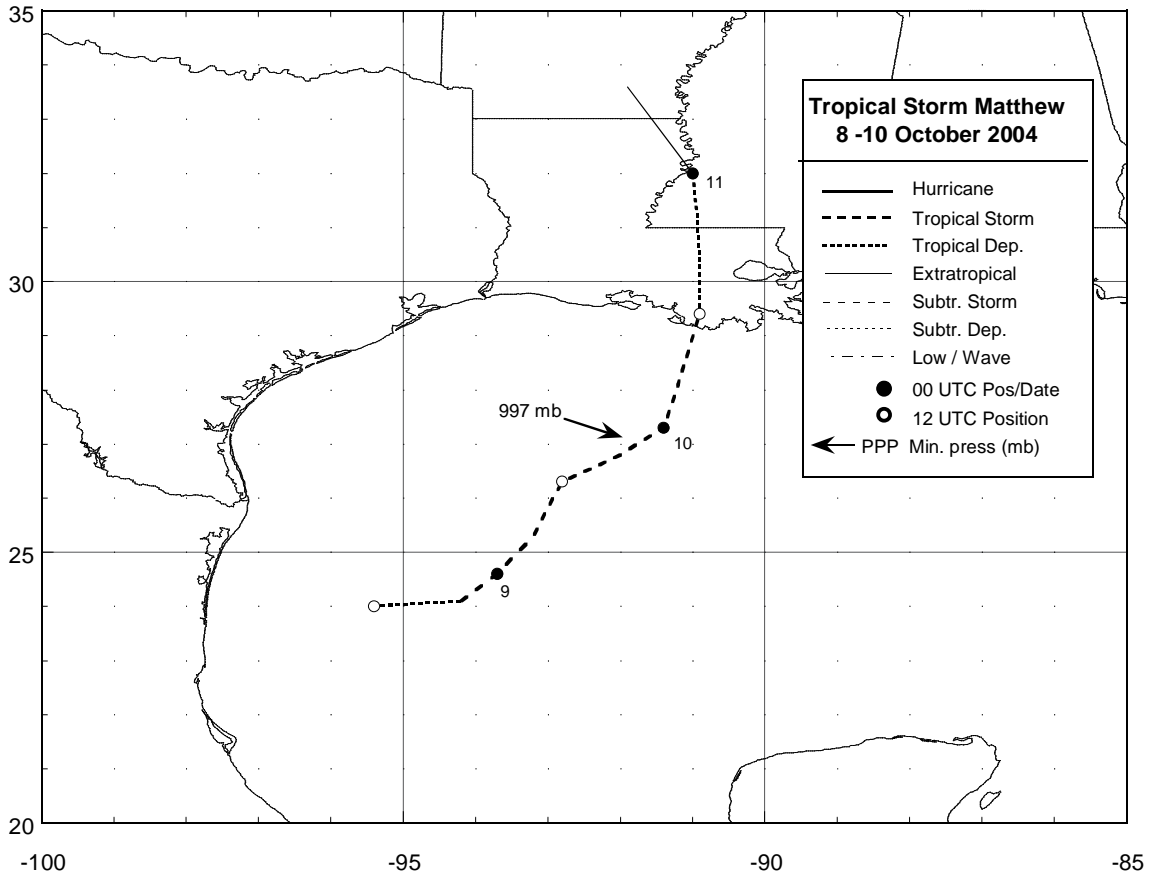


Figure 1. Best track positions for Tropical Storm Matthew, 8-10 October, 2004.

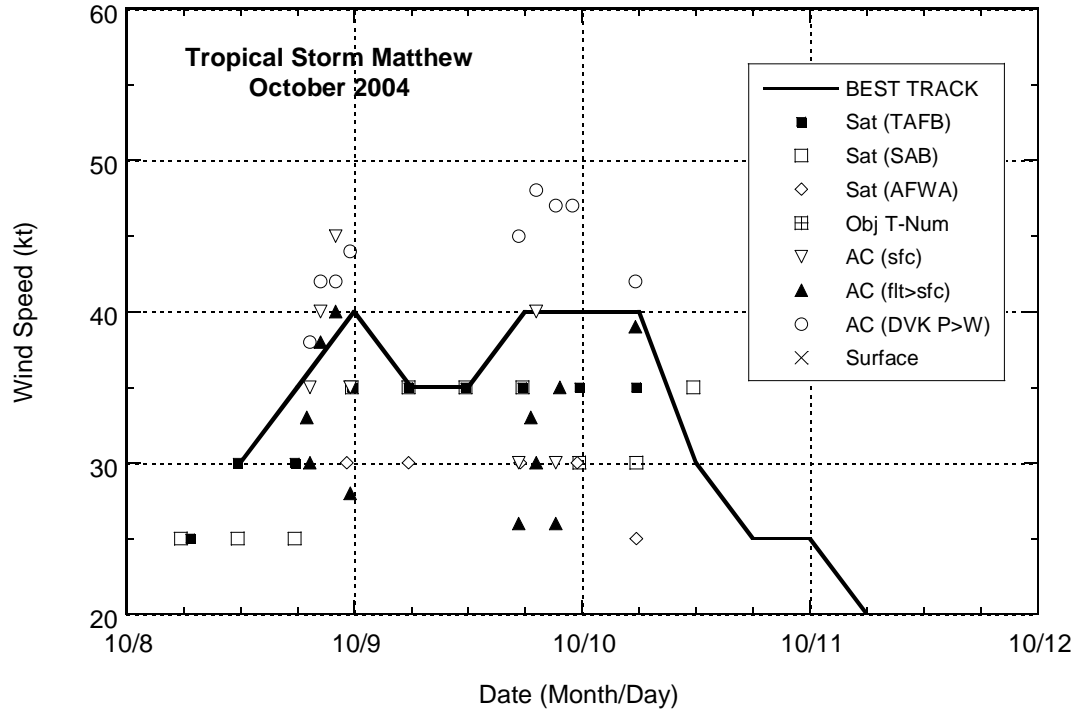


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Matthew, 8-10 October, 2004. Aircraft observations have been adjusted for elevation using 80% reduction factors for observations from 1500 ft or less.

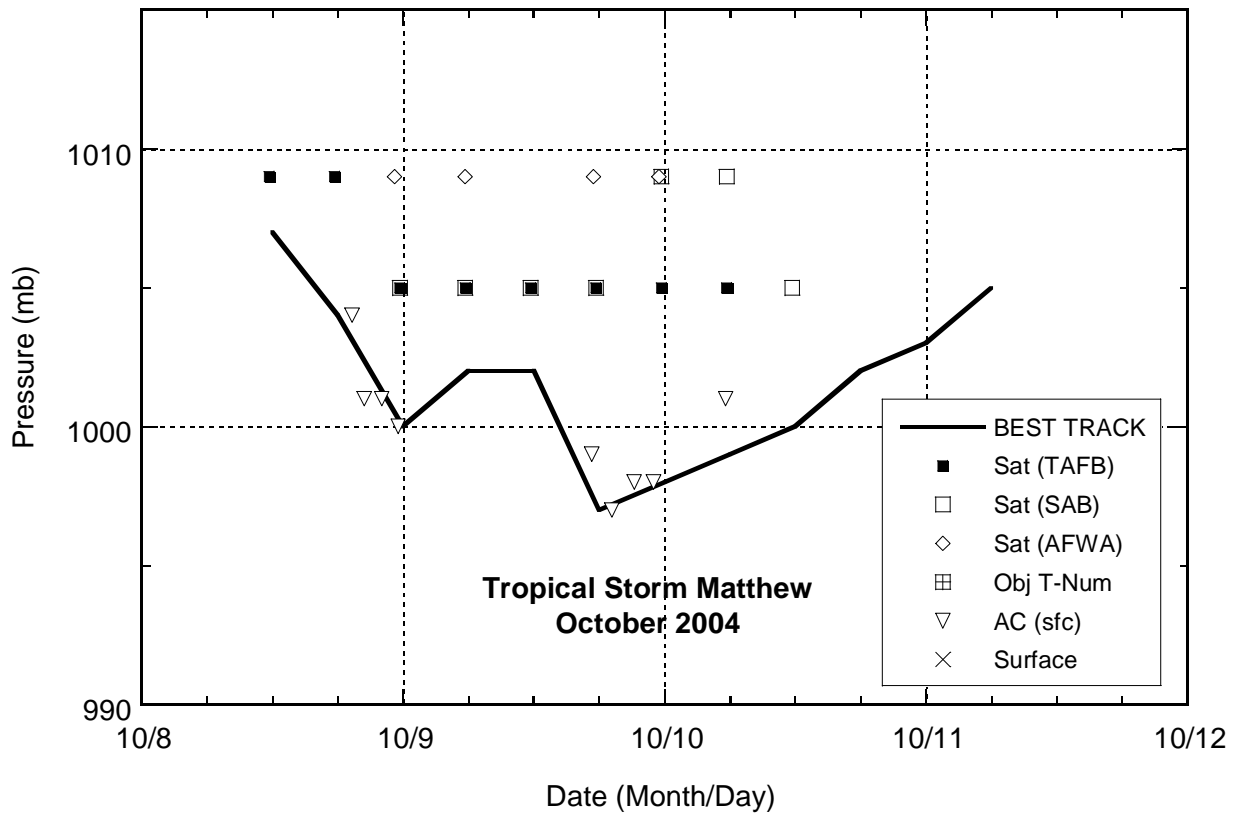


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Matthew, 8-10 October, 2004.