

Tropical Cyclone Report
Tropical Depression Ten
(AL102007)
21-22 September 2007

Jamie R. Rhome
National Hurricane Center
27 March 2008
(Updated to include second tornado in Florida)

Tropical Depression Ten was a short-lived cyclone that formed over the eastern Gulf of Mexico on 21 September and made landfall early on 22 September along the Florida panhandle.

a. Synoptic History

The genesis of Tropical Depression Ten originated from a complex interaction between an upper-level low, the tail-end of a decaying frontal zone, and a tropical wave. The tropical wave moved off the coast of Africa on 6 September and, after spawning Tropical Storm Ingrid on 12 September, reached the Bahamas on 17 September where it produced an area of disorganized showers and thunderstorms. At the same time, a cold front pushed southward over the eastern United States and became stationary over central Florida and the western Atlantic. The stationary frontal zone produced a large area of showers and thunderstorms that extended from northern Florida northeastward over the western Atlantic for several hundred miles. Initially, the areas of convection associated with the tropical wave and weakening stationary front were distinguishable. The areas merged on 18 September as a large upper-level low formed over Florida, producing a broad area of surface low pressure over the northwestern Bahamas. The surface low deepened over the next 24 hours as it moved westward over central Florida.

Still involved with the retrograding upper-level low, shower activity remained disorganized, and the broad surface low contained multiple embedded vorticity centers as it emerged into the eastern Gulf of Mexico. One of these centers became the dominant circulation around 1200 UTC 21 September and Tropical Depression Ten is estimated to have formed about 40 n mi southwest of Apalachicola, Florida. Given its involvement with the upper-level low, the depression was initially designated as a subtropical system. The depression quickly acquired tropical characteristics, including increasing convection near the low-level circulation center, as it separated from the upper-low during the afternoon of 21 September. The depression continued west-northwestward with little development and made landfall near Fort Walton Beach at 0000 UTC 22 September. Shortly after landfall, the depression degenerated into a remnant low that continued northward and dissipated over southwestern Alabama shortly after 0600 UTC 22 September.

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 Tropical Depression Ten (Figs. 2 and 3) include satellite-based Herbert-Poteat and Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), flight-level and dropwindsonde observations from two flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command, and two flights from NOAA P-3 research aircraft. 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 Tropical Depression Ten. Flight-level winds obtained from the Air Force Reconnaissance mission flown on the afternoon of 21 September indicated that tropical storm force winds could have been present within the band of convection east of the depression for a brief period between 1200-1800 UTC. However, dropsondes released in the same general area and nearby surface observations from data buoys and ships did not indicate tropical storm force winds at the surface. Peak wind gusts of 46 and 44 mph were reported at Milton and Destin, Florida, respectively.

The basis for Tropical Depression Ten's initial designation as a subtropical cyclone beginning at 1200 UTC 21 September and subsequent transition to a tropical cyclone at 1800 UTC includes conventional satellite imagery, land-based radar imagery, nearby surface observations, remotely-sensed ocean surface vector winds from QuikSCAT, and dropwindsondes obtained from the Air Force Hurricane Hunter mission flown on 21 September. Collectively, these data indicate that the depression was initially situated under an upper-level low with strongest convection and winds displaced to the east within a loosely organized band. Later that day, as the upper-level low moved westward away from the low-level circulation, convection formed over the low-level circulation, and the depression acquired tropical characteristics.

Rainfall totals over the southeastern United States were generally limited to less than an inch with isolated amounts of 1-3 inches reported over portions of Florida, Georgia, and Alabama.

c. Casualty and Damage Statistics

There were no reports of deaths attributable to the cyclone and impacts were minimal. Due to the potential threat to the northern Gulf coast, several coastal communities ordered evacuations and the state of Louisiana declared a state of emergency. Several oil companies evacuated non-essential workers and shut down oil platforms resulting in the disruption of U.S. Gulf oil and natural gas production. The precursor to Tropical Depression Ten produced two EF1 tornadoes on 20 September; one near Eustis, Florida that destroyed several homes in the area, and a second near Mayo, Florida which caused minor damage.

d. Forecast and Warning Critique

The pre-Tropical Depression Ten disturbance was first discussed by the National Hurricane Center within the Tropical Weather Outlook (TWO) beginning at 2130 UTC 17

September. At this time, the TWO noted that conditions would become favorable for development as the system moved across Florida and into the Gulf of Mexico. The potential for development of a subtropical or tropical cyclone was explicitly mentioned beginning at 1500 UTC 18 September, approximately 3 days prior to genesis. On 20 September, the TWO noted that conditions were favorable for genesis to occur at anytime within the next 24 hours. Advisories were initiated at 1500 UTC 21 September.

Since only 3 official forecasts were issued for Tropical Depression Ten, a meaningful analysis of forecast errors is not possible. A tropical storm warning was issued at 1500 UTC September from Apalachicola to mouth of the Mississippi. The tropical storm warning was discontinued at 0000 UTC 22 September. There were no reports of sustained winds to tropical storm force over land.

Table 1. Best track for Tropical Depression Ten, 21-22 September 2007.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
21 / 1200	29.1	85.4	1005	30	subtropical depression
21 / 1800	29.7	86.1	1005	30	tropical depression
22 / 0000	30.4	86.7	1006	25	"
22 / 0600	30.7	87.7	1007	20	remnant low
22 / 1200					dissipated
22 / 0000	30.4	86.7	1005	25	landfall near Fort Walton Beach
21 / 0000	27.6	84.5	1005	25	minimum pressure

Table 2. Watch and warning summary for Tropical Depression Ten, 21-22 September 2007.

Date/Time (UTC)	Action	Location
21 / 1500	Tropical Storm Warning issued	Apalachicola to Mouth of the Mississippi
22 / 0000	Tropical Storm Warning discontinued	Apalachicola to Mouth of the Mississippi

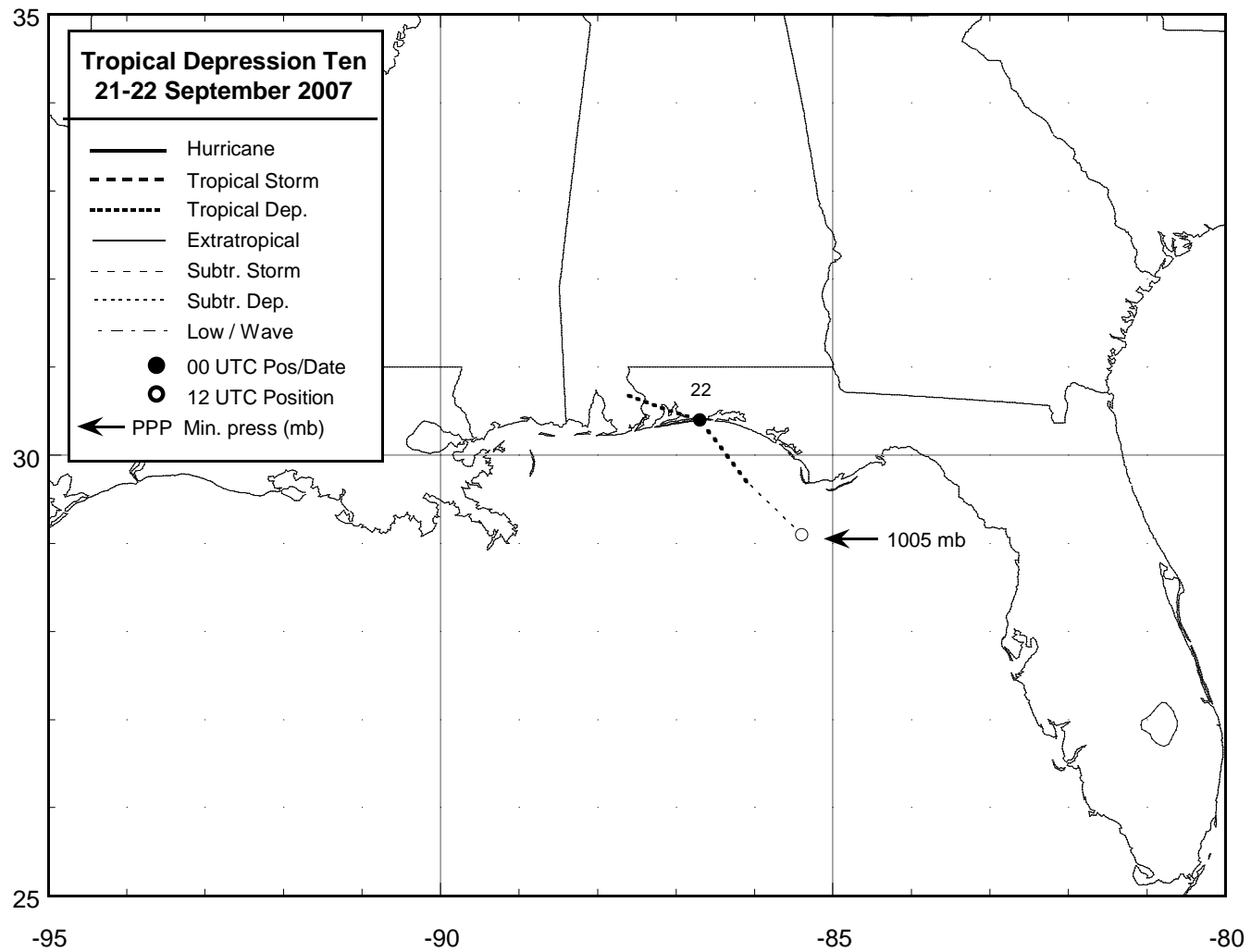


Figure 1. Best track positions for Tropical Depression Ten, 21-22 September 2007.

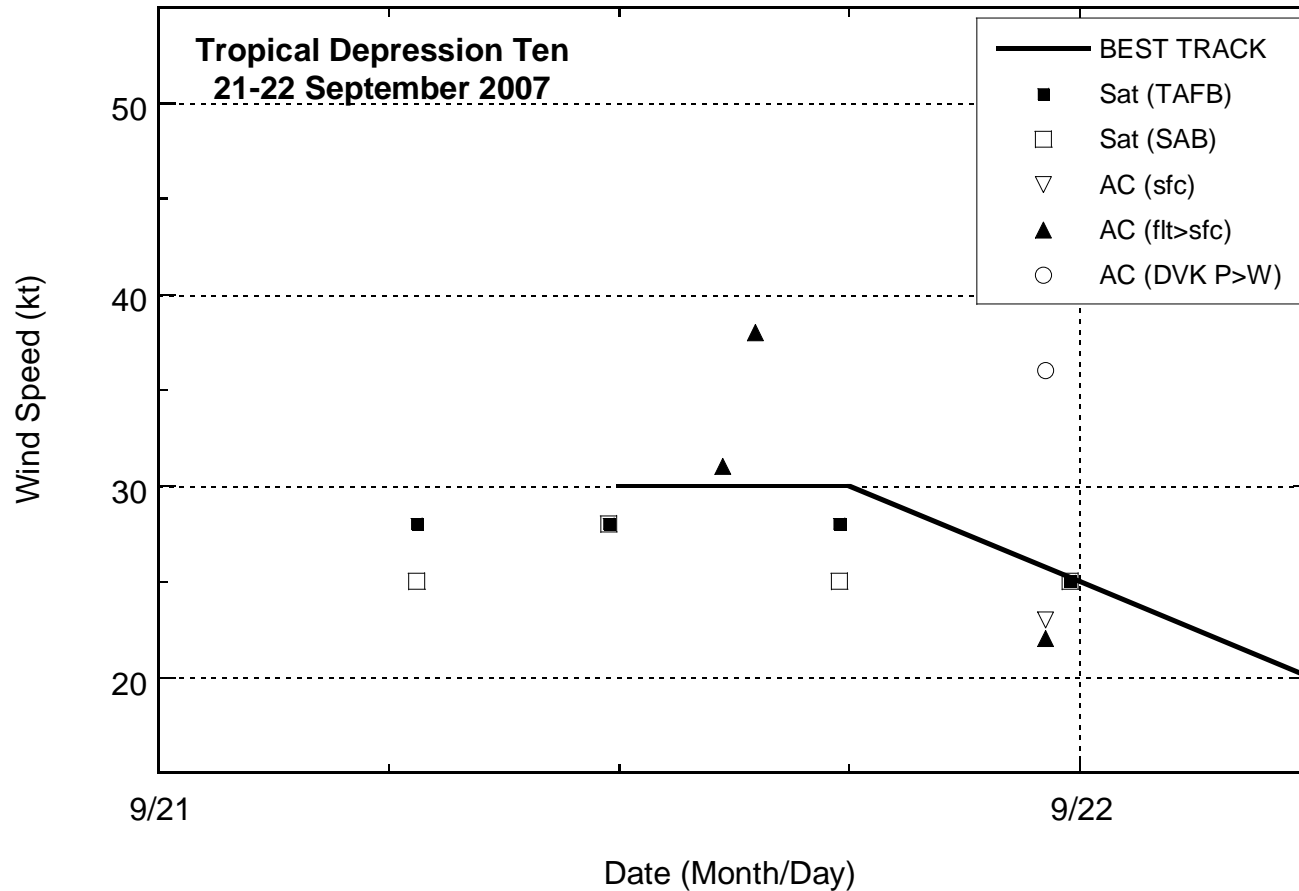


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Depression Ten, 21-22 September 2007. Aircraft observations have been adjusted for elevation using 90%, 80%, and 80% reduction factors for observations from 700 mb, 850 mb, and 1500 ft, respectively.

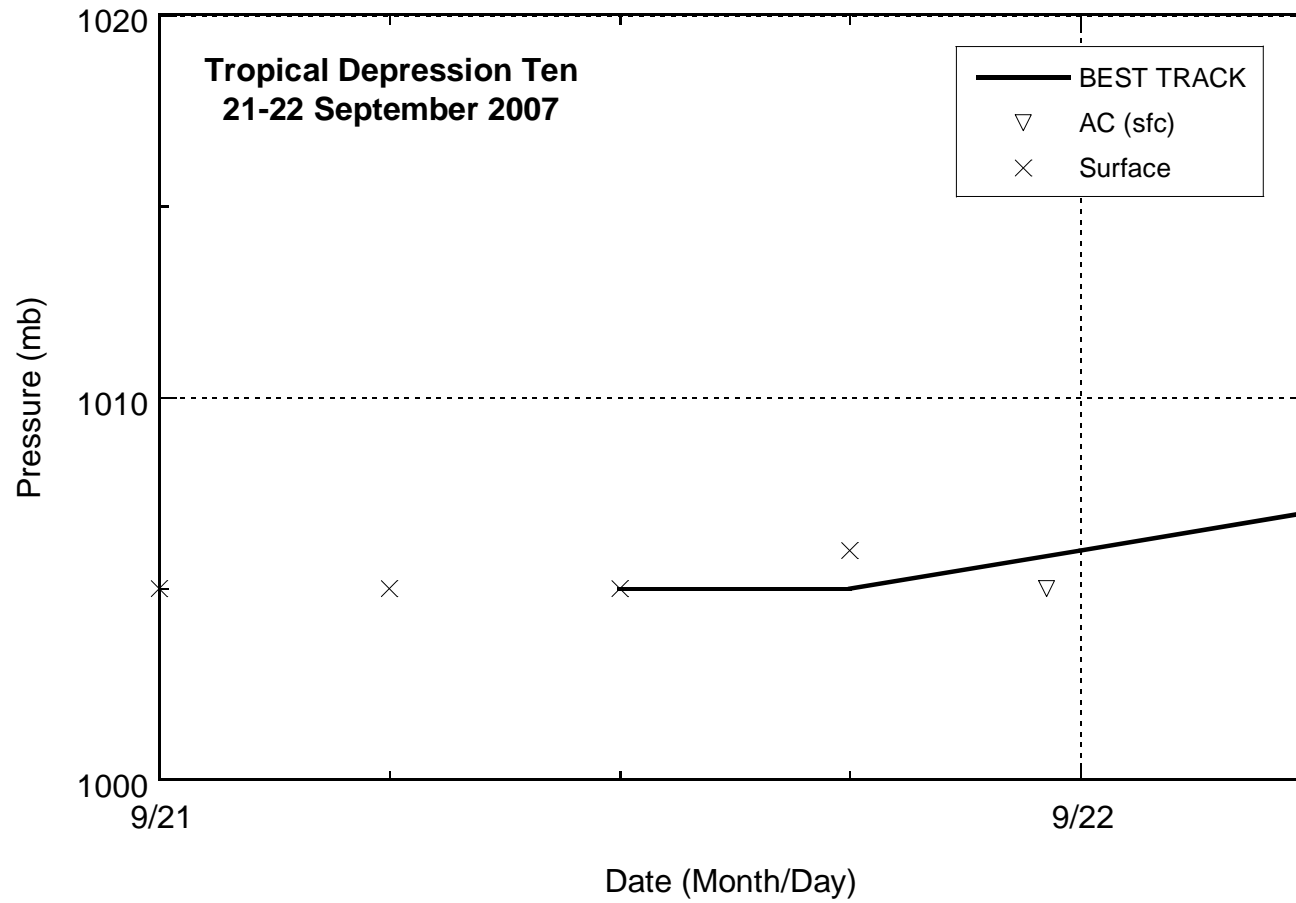


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Depression Ten, 21-22 September 2007.