

c. Tropical Storm Claudette, 16–29 July

Claudette was a tropical storm for two brief periods separated by a 5-day interval during which it weakened to a disorganized tropical wave. Claudette left the African coast as the strongest wave of the year at midtropospheric levels. The rawinsonde report from Dakar, Senegal at 1200 GMT 12 July showed winds of 85 kt at 550 mb.

A surface circulation was first evident on 16 July about 450 n mi east of the Leeward Islands. Based on Air Force reconnaissance reports of 45 kt winds the next morning, the depression was upgraded to tropical storm Claudette at 1600 GMT 17 July, even though the minimum central pressure was 1011 mb. Once again, gale warnings were required in the first tropical storm advisory because of the proximity of the storm center to the islands. This time the areas warned were the Leeward Islands, the Virgin Islands and Puerto Rico. It was the third consecutive storm in which gale warnings were issued in the first storm advisory. As had been the case with Ana, strong upper level westerly winds caused Claudette to weaken to a depression over Puerto Rico and to a tropical wave over Hispaniola. No sustained gale force winds were reported on any of the islands. The highest gust of 45 kt was reported on Antigua. Rainfall amounts of 7–8 inches fell on Guadeloupe, causing some flooding. Amounts exceeding 9 inches fell in southern Puerto Rico. There was one death by drowning in Puerto Rico and damage was estimated at \$750,000 because of river floods.

Phase two of tropical storm Claudette began as the tropical wave remnants moved into the southeastern Gulf of Mexico on the morning of 21 July. A depression formed later that day, and reached tropical storm strength during the morning of 23 July. Gale warning were issued with the first tropical storm advisory at 1300 GMT from Biloxi, Mississippi to Freeport, Texas.

At this time, the center of Claudette was poorly defined and elongated in a north-south direction. Satellite center locations fell systematically to the north of reconnaissance center locations. There is some evidence that the satellite images were depict-

ing a middle-level vorticity center which paralleled the track of the surface center as determined from aerial reconnaissance. During the evening of 23 July reconnaissance reports indicated that the surface center to the south had weakened to a depression, so gale warnings were discontinued early on 24 July. A dominant center, however, formed in the northern part of the elongated area and began drifting northward shortly before daybreak. Offshore oil rigs began reporting gale force winds, necessitating gale warnings once again at 1430 GMT. This time they extended from Grand Isle, Louisiana to Galveston, Texas. Because of poor center definition, the best track for Claudette (shown in Fig. 2) is considerably smoothed in the Gulf of Mexico, in order to reconcile satellite and reconnaissance locations that were frequently at variance with each other.

The center crossed the coast near the Texas-Louisiana border about 1800 GMT. It was expected to continue northward and spread heavy rains through the lower Mississippi Valley. Accordingly, gale warnings were discontinued along the coast at 2200 GMT. However, the development of a small high-pressure system aloft to the north of the center blocked the northward movement of Claudette, and caused it to turn slowly to the west, describing a tight loop over extreme southeast Texas during the next 24 h before finally moving off to the north. Because the center remained close to the coast, Claudette did not weaken and offshore oil rigs continued to report winds of gale force for 30 h after the center moved inland. Claudette's lowest pressure of 997 mb occurred near Beaumont, Texas after the center had moved inland. Maximum sustained winds in Claudette were 45 kt both east of the Virgin Islands and in the northwest Gulf of Mexico before landfall.

Claudette will be long remembered along coastal southeast Texas for the torrential rains which occurred while the center was making a loop in that area. A report of 42 inches in 24 h by an observer near Alvin, Texas is a United States 24 h rainfall record. This may also be a record for the world's greatest 24 h rainfall occurring over flat terrain. There were several reports of storm rainfall exceeding 30 inches from Alvin, Freeport and Sargent, Texas, making Claudette one of the wettest tropical cyclones ever to affect the United States. Fig. 3 is an isohyetal map prepared by the National Weather Service's Southern Region Headquarters office in Fort Worth, Texas, based on a bucket survey taken shortly after the storm.

The highest winds on the coast were estimated to be 45–55 kt in gusts at Cameron, Louisiana, around the time of landfall. Tides of 2–4 ft above normal caused minor damage along the Louisiana coast. Table 3 gives the meteorological data for Claudette.

TABLE 3. Meteorological data of Tropical Storm Claudette, 16-29 July 1979.

Location	Date	Pressure (inches)		Wind (mph)				Tide (ft)		Rainfall (inches)	
		Low	Time ^a	Fastest mile	Time ^a	Peak gust	Time ^a	Highest MSL	Time ^a	Storm total	Dates
Lesser Antilles										2.72	
Martinique	17			SSE 35	1550					7-8	
Guadeloupe	17					52				2.30	
Antigua	17					46					
Barbuda	17									8.06	17-18
Puerto Rico											
Ponce										12.75	23-26
United States										16.84	24-27
Texas											
Beaumont-Port Arthur WSO	24	29.46	1705		53	25/0518		60	25/0521	2-4 ^{bc}	
Port Arthur										4-5 ^b	
Sabine CG	25									3.8	23/0630
Galveston WSMO	24	29.66	1813	NE 20	23/1859	NE 33	23/1251				16.95
Baytown										3.5	14.24
Texas City	23										12.58
Houston Int'l Airport											2.83
Alvin WSO											25-26
Sargent				SSW 48	0600					3.1	30.70
Freeport	26										24-27
42 S Freeport	25										34.50
Louisiana											24-27
Cameron	24	29.56	1615								30.20
Lake Charles	24	29.61	1700	S 28	25/0226						3.1
Mobil Oil Rig 28.3°N 93.0°W	24			S 46	1000						
Mobil Oil Rig 28.7°N 92.3°W	24			SE 52	0600						
Mobil Oil Rig 28.2°N 91.8°W	24			SSE 40	0600 ^d						
Conoco Oil Rig 29.3°N 93.0°W	25			S 50	2325						

^a Central Standard Time.

^b Estimated.

^c Above normal.

^d First of several occurrences.

There was one death in Texas by drowning. The damage from the flooding produced by Claudette's heavy rains is estimated at \$400 million. Claudette was the tenth costliest tropical cyclone in United States history, and the only one not of hurricane intensity to rank in the top 25 (Hebert and Taylor, 1979).