

TROPICAL STORM CLAUDETTE

July 15 - 29, 1979

National Hurricane Center, NOAA
Miami, Florida

Claudette was a tropical storm for two brief periods separated by a five day interval during which it weakened to a disorganized tropical wave. However, the storm will long be remembered for its record-breaking rains in eastern Texas. If a measurement of 42 inches or rain in twenty-four hours near Alvin, TX, is accepted, Claudette has the dubious distinction of establishing a United States record for the greatest twenty-four hr rainfall total. This may also be a record for the world's greatest twenty-four hour rainfall occurring over flat terrain.

Claudette began as a tropical wave which moved off the African coast on 11 July. The wave was characterized by strong middle level winds just to the east of the wave axis. The rawinsonde report from Dakar, Senegal, at 1200 GMT, 12 July showed winds of 85 kts at 550 mbs - the strongest winds recorded at any level at that station during the hurricane season thus far.

A tropical depression formed from the wave on 16 July, about 450 miles east of the Leeward Islands. The depression was tracked west northwestward using satellite imagery until 1225 GMT, 17 July, when the first reconnaissance flight into the system measured winds of 45 kts, although the lowest pressure was only 1011 mbs. Even though the minimum pressure did not suggest a tropical storm, the depression was upgraded to Tropical Storm Claudette at 1600 GMT, based on wind measurements, and gale warnings were issued for the Leeward and Virgin Islands and Puerto Rico.

The center crossed the northern Virgin Islands but the heaviest convection extended for a considerable distance to the south and east of the center. Rainfall amounts generally ranged from 1.5 inches in the Virgin Islands to 2.5 inches in the larger islands of the French Antilles. However, there were reports of 7 to 8 inches of rain with flooding in the Point a Pitre to Grand Fonds region of Guadeloupe.

As the center approached Puerto Rico during the night of 17 July, the circulation became disorganized and the system weakened to a tropical depression. Further weakening ensued as the depression crossed the Mona Passage, and upon encountering the island of Hispaniola, the system became a disorganized tropical wave.

As the center skirted along the north coast of Puerto Rico, heavy rains fell over the southern part of the island. Amounts exceeding nine inches were measured in the Ponce area. One man drowned while attempting to cross a swollen river. Property losses were estimated at \$750,000. The metropolitan San Juan area received less than two inches of rain, and storm effects on the city were negligible.

During the period 18-21 July, portions of the wave

crossed the Dominican Republic, Haiti, Jamaica, the Bahamas, Cuba and extreme southern Florida, causing locally heavy rains and gusty winds. As the wave emerged into the southeast Gulf of Mexico, a depression formed on 21 July. Since the depression could be traced to the remnants of Claudette, the original name was retained.

As the depression moved northwestward through the Gulf of Mexico, its lack of organization made tracking difficult. The accompanying "best track" represents a considerably smoothed fit to reconnaissance and satellite position estimates that were frequently at variance with one another, which fell systematically to the north of corresponding reconnaissance fixes during the period. There is some suggestion that satellite images depicted a middle level vorticity center which paralleled the track of the surface center as determined from aerial reconnaissance data.

During the early morning hours of 23 July, an Air Force reconnaissance mission found that winds had reached gale force, and Claudette once again became a tropical storm. Gale warnings were issued from Biloxi, MS, to Freeport, TX, at 1300 GMT. As the storm approached the upper Texas coast, the situation became increasingly complex. The central part of the storm circulation elongated, and there is some evidence that the original center, situated in the southern part of this elongated envelope, weakened while a new center formed to the north. As the original center drifted to the west and dissipated, gale warnings were discontinued during the night of 24 July. However as the new center formed, and offshore oil rigs reported winds increasing to 40 kts, gale warnings were issued at 1430 GMT from Grand Isle, LA to Galveston, TX.

By midday on 24 July, the storm center came under surveillance of radars at Lake Charles, LA, and Galveston, TX. These radar reports showed that the center drifted northward and crossed the coast near the Texas-Louisiana border about 1900 GMT, 24 July. The center passed just north of Beaumont during the evening. It was thought that the predominant northward motion would continue since the storm was embedded in a strong east-west pressure gradient. Based on this reasoning, gale warnings were discontinued along the coast at 2200 GMT, 24 July. However, during the night the motion of the center became slow and erratic. Based on an examination of the surface winds and pressures at Beaumont, Houston, Lufkin and College Station, it appears that the track of the low pressure center described a small counterclockwise loop within the area bounded by these cities.

Since the center remained close to the coast, and the main source of inflow was a confluent band of southerly winds off the warm waters of the northwest Gulf

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of Mexico, the storm did not weaken as expected. Instead, the minimum pressure at Beaumont dipped to 997.8 mbs at 0030 GMT, 25 July, which was the lowest measurement during the life of the storm.

Finally, on 26 July the residual low pressure system weakened as it moved northward, passing just to the east of Waco and Dallas. The low crossed eastern Oklahoma, Missouri, Illinois, Indiana, Ohio and into West Virginia where it merged with a frontal system on 29 July.

As the storm stalled over eastern Texas during the night of 24 July, torrential rains began along the coastal sections of Texas from the Houston-Galveston area to Matagorda. This area of heavy rain coincided with a zone of low level convergence which persisted for about 30 hours. Maximum amounts in excess of thirty inches occurred near Alvin, in Brazoria County and near Sargent, in Matagorda County. A subsequent report received from a cooperative observer located 8.5 miles due west of WSO, Alvin showed that 42 inches of rain fell between 1200 GMT, 25 July and 1200 GMT, 26 July - a United States record for twenty-four

hour rainfall amount. The same station had a storm total rainfall of 45 inches.

No estimate of dollar damage due to flooding is available at this writing. However, it is likely to exceed \$100 million. At least one death in Texas was attributed to Claudette. Minor damage due to tide and wave action occurred along the Louisiana coast, where tides were generally 1.5 to 3.5 feet above normal. Several boats were sunk and homes damaged in Cameron, LA, where about one hundred persons were evacuated.

The highest sustained winds associated with Claudette were 45 kts reported by an oil rig off the central Louisiana coast from 1200 GMT to 1600 GMT 24 July. Oil rigs also reported winds of 40 kts off the upper Texas and Louisiana coasts on 26 July, thirty hours after the storm center moved inland. Winds were estimated at 45 to 55 kts at Cameron at 1915 GMT, 24 July. Air Force reconnaissance reported surface winds of 45 kts at 1225 GMT, 17 July as Claudette originally developed east of the Virgin Islands.

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Preliminary Report

DAY	TIME Z	LATITUDE	LONGITUDE	MIN. PRES. (mbs)	MAX WIND (kts)	CATEGORY
15	12	12.5	46.3	1014	20	trop disturbance
	18	12.8	48.4	1014	20	
16	00	13.4	50.4	1012	25	trop depression
	06	14.6	52.1	1012	25	
	12	15.7	53.8	1011	30	
	18	16.5	55.5	1011	30	
17	00	17.0	57.2	1011	30	trop storm
	06	17.5	58.8	1011	30	
	12	17.8	60.3	1011	40	
	18	18.0	62.1	1010	40	
18	00	18.2	63.8	1010	40	trop depression
	06	18.3	65.4	1011	30	
19	12	18.4	67.0	1011	30	trop. disturbance (wave)
	18	18.5	68.5	1012	25	
	00	18.7	69.5	1012	20	
	06	18.8	70.5	1012	20	
20	12	18.8	71.4	1012	20	
	18	19.0	72.4	1012	20	
	00	19.0	73.3	1013	20	
	06	19.2	74.7	1013	20	
21	12	19.5	76.7	1013	20	
	18	20.0	78.7	1013	20	
	00	20.6	80.4	1013	20	
	06	21.4	82.2	1013	25	
22	12	22.1	83.5	1012	30	trop depression
	18	22.8	85.0	1010	30	
	00	23.5	86.5	1007	30	
	06	24.0	87.4	1007	30	
23	12	24.5	88.5	1007	30	
	18	25.0	89.5	1006	30	
	00	25.4	90.5	1005	30	
	06	25.9	91.4	1004	30	
24	12	26.4	92.4	1003	35	trop storm
	18	26.9	92.9	1003	35	
	00	27.5	93.4	1003	35	
	06	28.3	93.5	1003	35	
25	12	28.8	93.7	1002	45	
	18	29.6	93.9	1000	45	
	00	30.3	93.9	997	40	
	06	30.3	94.3	998	35	
26	12	30.5	94.8	1000	30	trop depression (over-land)
	18	30.5	95.2	1001	30	
	00	30.2	95.3	1001	30	

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Day	Time	Latitude	Longitude	Min. Pres.	Max Wind	Category
26	06	30.6	95.1	1002	30	trop depression (over land)
	12	30.8	95.4	1003	30	
	18	31.3	96.3	1004	25	
27	00	31.8	96.6	1004	20	
	06	32.7	96.4	1006	20	
	12	34.0	95.9	1007	15	
	18	35.3	95.3	1007	15	
28	00	36.4	94.6	1007	15	
	06	37.8	93.4	1008	15	
	12	38.6	91.0	1009	15	
	18	38.8	88.0	1009	15	
29	00	39.0	85.2	1010	15	
	06	39.0	82.8	1011	15	
	12	39.0	80.2	1011	15	