NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

TROPICAL STORM CLAUDETTE

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19–22 June 2021

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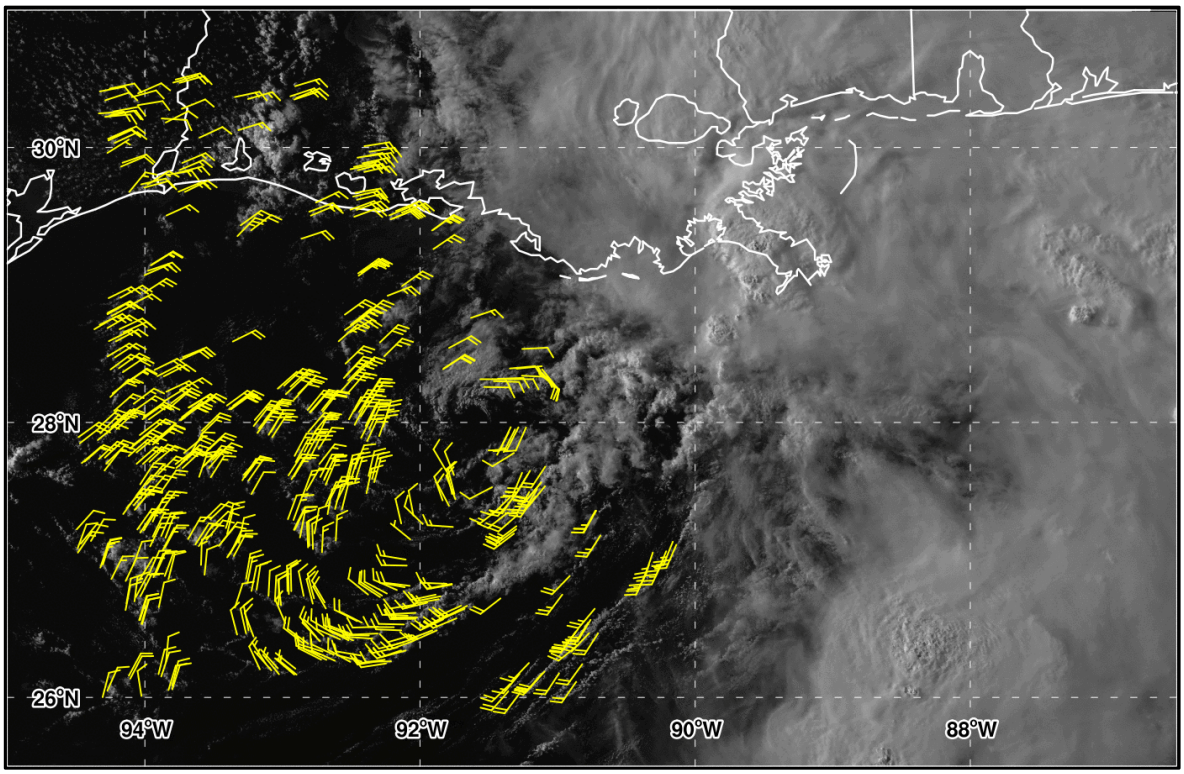

GOES-16 VISIBLE SATELLITE IMAGE WITH LOW-LEVEL DERIVED MOTION WINDS AT 2230 UTC 18 JUNE, SHORTLY BEFORE TROPICAL STORM CLAUDETTE DEVELOPED IN THE GULF OF MEXICO. DATA USED TO CREATE THIS SATELLITE IMAGE IS COURTESY OF THE NOAA BIG DATA PROJECT.

Claudette was a sprawling tropical storm that formed in the Gulf of Mexico, made landfall in Louisiana, and moved across the southeastern United States before emerging over the Atlantic Ocean. Claudette produced substantial rainfall that resulted in flash flooding across portions of the Gulf Coast and inland over central Alabama and was directly responsible for 4 deaths in that state.

Tropical Storm Claudette

19–22 JUNE 2021

SYNOPTIC HISTORY

Claudette developed from a broad circulation that straddled Central America across both the eastern Pacific and the Bay of Campeche. The incipient disturbance was a low amplitude easterly wave that was first tracked moving into the eastern Caribbean Sea on 6 June. This wave moved across the southern Caribbean Sea, and briefly developed disorganized convection before moving inland over Nicaragua and Honduras on 10 June. The remnants of this system then interacted with the eastern portion of an enhanced monsoon trough in the east Pacific, resulting in an expansive circulation that developed over Central America on 12 June. This broad cyclonic circulation briefly resembled a Central American Gyre[1], though the larger-scale circulation did not persist long enough to achieve that classification. Nonetheless, this convectively active system remained nearly stationary during the next several days and produced heavy rainfall across portions of Central America and Mexico.

Over time, the larger-scale circulation broke down into two distinct disturbances on opposite sides of Central America. The system south of Central America ultimately developed into Tropical Storm Dolores[2] on 18 June in the eastern Pacific. To the north of Central America, an area of low pressure formed in the Bay of Campeche within the broader circulation on 14 June. This low initially meandered over the southern Gulf of Mexico over the next several days, struggling to organize further due to strong northwesterly vertical wind shear and proximity to land. However, by 16 June, this low began to move north-northeastward into the central Gulf of Mexico, with convection gradually increasing in organization, though remaining sheared east of the center. An Air Force Reserve reconnaissance aircraft investigated this system on the afternoon of 17 June and found that it had not yet developed a well-defined circulation. Overnight, convection increased further, with scatterometer data indicating winds up to 35 kt occurring in this activity well east of the poorly-defined center. Ultimately, this convection helped to spawn a better-defined, though still broad, circulation farther to the north. By late on 18 June, visible satellite imagery revealed the development of closed, cyclonic flow with the low (cover photo), while an Air Force Reserve reconnaissance aircraft indicated that the center had become sufficiently well-defined to classify the system as a tropical storm by 0000 UTC 19 June, about 80 n mi south of Morgan City, Louisiana. The “best track” chart of Claudette’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[3].

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[1] A Central American gyre (CAG) is a broad lower-tropospheric cyclonic circulation occurring near Central America. For more information, please refer to Papin, P., L. F. Bosart, R. D. Torn, 2017: A Climatology of Central American Gyres. *Mon. Wea. Rev*., **145**, 1983–2000.

[2] Tropical Storm Dolores’ report is available at https://www.nhc.noaa.gov/data/tcr/EP042021_Dolores.pdf

[3] A digital record of the complete best track, including wind radii, can be found on line at ftp://ftp.nhc.noaa.gov/atcf. Data for the current year’s storms are located in the *btk* directory, while previous years’ data are located in the *archive* directory.

Claudette's surface circulation remained broad while the cyclone was located over the Gulf of Mexico, with multiple low-level swirls rotating around a mean center. The radius of maximum winds also remained very large, with tropical-storm-force winds primarily observed in the convective activity displaced east of the center. This structure was mainly the result of continued 20–30 kt of southwesterly vertical wind shear from an upper-level trough centered over Texas, which also helped import dry mid-level air over Claudette's center. These unfavorable environmental conditions also limited the initial peak intensity to only 40 kt between 0000–0600 UTC 19 June as the storm moved northward and then northeastward around the northwestern side of a mid-level ridge centered near Cuba.

On this track, Claudette made landfall over southeastern Louisiana around 0430 UTC 19 June in Terrebonne Parish about 25 n mi south-southwest of Houma. After landfall, Claudette weakened as it moved northeastward into Mississippi and Alabama, becoming a tropical depression by 1800 UTC that day. The system continued to produce sporadic convection over the next day or so as the broad circulation moved across Georgia and South Carolina. By the time Claudette reached North Carolina at 0600 UTC 21 June, more organized convection developed along and just off the North Carolina coast, and coastal surface observations indicated that the system had re-intensified back into a tropical storm. Claudette reached a second peak intensity of 40 kt as the cyclone's center moved offshore into the Atlantic Ocean between 0600 and 1800 UTC 21 June. At this point, the storm was accelerating to the northeast and undergoing extratropical transition. This transition was complete by 0600 UTC 22 June, with the extratropical low ultimately dissipating by 0600 UTC 23 June about 100 n mi southeast of the coast of Nova Scotia, Canada.

METEOROLOGICAL STATISTICS

Observations in Claudette (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), and objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Global Precipitation Mission (GPM), the European Space Agency's Advanced Scatterometer (ASCAT), and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Claudette. Observations also include flight-level and stepped frequency microwave radiometer (SFMR) observations from three flights of the 53rd Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command from 17–18 June.

Ship reports of winds of tropical storm force associated with Claudette are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3.

Winds and Pressure

Claudette's first estimated peak intensity of 40 kt from 0000–0600 UTC 19 June, including landfall at 0430 UTC, is based on a combination of scatterometer, flight-level, and 10-m surface wind observations occurring prior to and during this period. An earlier ASCAT-A pass at 1408 UTC 18 June showed a large region of 35-40 kt winds occurring over the eastern portions of the system's circulation. That evening, an Air Force Reserve reconnaissance mission flew a single leg into the eastern portion of Claudette, a measured a peak 850-mb flight-level wind of 47 kt at around 0020 UTC 19 June, which equates to an intensity of about 38 kt at the surface. The highest surface wind observation not associated with mesoscale convection was a WeatherFlow station in Gulfport, Mississippi that reported a sustained wind of 39 kt gusting to 52 kt at 0413 UTC 19 June.

It should be noted that additional marine wind platforms above the standard 10-m elevation, including ship observations from the vessel *Legacy* (call sign WDF731), reported somewhat higher sustained winds between 40–45 kt from 1600 UTC 18 June to 0900 UTC 19 June. In addition, a couple of surface stations around 10-m elevation in the Florida Panhandle reported sustained winds between 45–50 kt on the morning of 19 June. These higher winds were attributed to a mesoscale line of severe thunderstorms that moved inland along the western Florida panhandle and were deemed not representative of the larger-scale wind field associated with Claudette.

Claudette's second estimated peak intensity of 40 kt from 0600 UTC 21 June to 0000 UTC 22 June is similarly based on surface observations and scatterometer wind data. Starting after 0000 UTC 21 June, several coastal stations in South Carolina and North Carolina observed 35–40 kt winds within convection directly related to Claudette's circulation. One WeatherFlow station in South Carolina at the Isle of Palms Pier observed a sustained wind of 40 kt at 9-m elevation at 0109 UTC. Numerous other South Carolina and North Carolina stations around 10-m elevation also observed sustained tropical-storm-force winds between 0000–1200 UTC on 21 June. NOAA buoy 41001 also reported a sustained wind of 39 kt gusting to 45 kt at 1558 UTC that day. As Claudette transitioned into an extratropical cyclone, ASCAT-A and ASCAT-B passes over the system showed peak wind retrievals of 37 and 38 kt, respectively, which after accounting for some undersampling also supports the 40-kt second peak intensity.

Claudette's lowest estimated minimum central pressure of 1003 mb occurred at or shortly after landfall along the Louisiana coast. This value is based on a Weatherflow station at Bayou Bienvenue that measured a pressure of 1002.9 mb at 0825 UTC 19 June with a sustained wind of 7 kt while another station a couple hours later measured 1004 mb at Pontchartrain Causeway at 1056 UTC.

The structural characteristics of Claudette in the Gulf of Mexico and during landfall in Louisiana were somewhat atypical for a tropical cyclone, with deep convection focused away from the exposed center while the cyclone possessed a large radius of maximum winds. Although Claudette possessed some aspects akin to a subtropical cyclone, the upper-level cold-core trough responsible for shearing the system was positioned upstream over Texas rather than superimposed over the center. Thus, the best track maintains Claudette's classification as a sheared tropical storm rather than a subtropical storm.

Storm Surge[4]

Claudette produced storm surge inundation of 2 to 4 ft above normally dry ground along the coasts of southeastern Louisiana, Mississippi, and Alabama. The highest inundation occurred along the coast of Mississippi, where the National Ocean Service (NOS) tide gauge at the Bay Waveland Yacht Club recorded 4.4 ft above Mean Higher High Water (MHHW). That site also measured the largest storm surge produced by Claudette, 5.49 ft above normal tide levels. Elsewhere in Mississippi, United States Geological Survey (USGS) stream gauges at the East Pearl River at Claiborne and in the Back Bay of Biloxi measured peak water levels of 4.0 ft and 3.7 ft MHHW, respectively. A water level of 3.3 ft MHHW was recorded by the NOS station at the Pascagoula NOAA Laboratory. Table 3 and Figure 4 provide observations from various tide stations and water level sensors along the U.S. northern Gulf coast.

Some parts of the Alabama coast, particularly in Mobile County along the back bay north of Dauphin Island, experienced coastal flooding similar to that in Mississippi. For example, the NOS gauge at Bayou La Batre measured a water level of 3.7 ft MHHW. Minor coastal flooding occurred along the shores of Mobile Bay, where the highest recorded water level was 3.0 ft MHHW at Coast Guard Sector Mobile. Every other NOS gauge along the bay measured water levels between 2 and 3 ft MHHW. Inundation was significantly less on the barrier islands, and the NOS gauge on Dauphin Island measured a maximum water level of 1.7 ft MHHW.

Onshore winds were not as strong across southeastern Louisiana, thus water levels there were not quite as high as in Mississippi and Alabama but still led to some minor coastal flooding. The highest measurement, 3.2 ft MHHW, came from the NOS gauge at Shell Beach. Numerous other gauges recorded water levels of 2 to 3 ft MHHW across the area, including 2.9 ft MHHW at the U.S. Army Corps of Engineers (USACE) gauge at the Bayou Dupre Flood Gate and 2.8 ft at the USGS gauge at Crooked Bayou near Delacroix, both in St. Bernard Parish.

Elsewhere, inundation along the coast of the Florida Panhandle was no more than about 1 ft. The NOS gauge at Pensacola measured a peak water level of 1.7 ft MHHW. Claudette produced a small storm surge along the coast of the Carolinas, particularly in Pamlico Sound (e.g., 1.28 ft above normal tide levels at Oregon Inlet, North Carolina). However, water levels at all NOS gauges along the Carolina coast remained well below 1 ft MHHW.

Rainfall and Flooding

Claudette was responsible for a large swath of rainfall across the southeastern United States and Gulf coasts along and to the east of the track of the tropical cyclone's center. Several areas of excessive rainfall occurred in eastern Louisiana, southern Mississippi, central Alabama, and along the western Florida Panhandle. Table 3 provides selected rainfall totals over the entire

[4] Several terms are used to describe water levels due to a storm. **Storm surge** is defined as the abnormal rise of water generated by a storm, over and above the predicted astronomical tide, and is expressed in terms of height above normal tide levels. Because storm surge represents the deviation from normal water levels, it is not referenced to a vertical datum. **Storm tide** is defined as the water level due to the combination of storm surge and the astronomical tide, and is expressed in terms of height above a vertical datum, i.e. the North American Vertical Datum of 1988 (NAVD88). **Inundation** is the total water level that occurs on normally dry ground as a result of the storm tide, and is expressed in terms of height above ground level. At the coast, normally dry land is roughly defined as areas higher than the normal high tide line, or Mean Higher High Water (MHHW).

event in the United States, while Figure 5 provides an analysis of the total rainfall over the southeastern United States from 15–21 June 2021.

The highest rainfall total from the storm was 15.28 inches observed 6 miles west-northwest of Gulfport, Mississippi. This observation was part of a larger area of rainfall of more than 10 inches that occurred along coastal regions of far eastern Louisiana and the coast of Mississippi. In Louisiana, the highest rainfall total was 11.03 inches measured just east of Slidell while the city proper received 8–9 inches of rainfall. In Mississippi, a rainfall total of 14.30 inches fell in Lyman, 13.24 inches fell near D'Iberville, and 12.26 inches near Pearl River, while additional totals above 10 inches were observed near Diamondhead, Kiln, and Orange Grove. A substantial portion of this heavy rainfall fell in a 4-h period early on 19 June. In New Orleans proper, the highest rainfall totals were in the 3–5-inch range.

In Alabama, another swath of excessive rainfall occurred with Claudette in the central portion of the state, with a large region receiving 4–8-inch totals along the Interstate-20 to Interstate-59 corridor, much of it falling between 19–20 June. The highest rainfall total in this swath was at the Tuscaloosa Airport with 8.95 inches, while 6.91 inches fell near Fort Payne. The Birmingham International Airport also received 4.47 inches of rainfall during this period.

Significant rainfall also fell in Florida, with the highest total of 8.19 inches observed at the Pensacola Regional Airport. Totals of 5–8 inches were prevalent along the far western Florida panhandle from Pensacola to Milton. More modest rainfall totals were observed in Georgia, South Carolina, and North Carolina, though some amounts greater than 5 inches were observed in northwest Georgia in Menlo.

Tornadoes

A total of nine tornadoes occurred in association with Claudette as it traversed through the southeastern United States: 4 in Mississippi, 3 in Alabama, 1 in Georgia, and 1 in North Carolina (Table 4).

In Mississippi, two short-lived EF-0 tornadoes were observed in Pass Christian and Long Beach early on 19 June. A bit later that morning, two more short-lived tornadoes touched down in Jackson County. One was an EF-0 near Pascagoula while the other was an EF-1 that occurred along the Mississippi/Alabama state line.

In Alabama, the most significant event was a 22-mile long EF-2 tornado that moved northeast from East Brewton to Castleberry. The other two tornadoes were very short-lived EF-0 events. The first occurred early on 19 June near Cedar Point while the other EF-0 tornado occurred in the afternoon of 19 June to the northwest of Florala.

The longest tornado track occurred in Georgia, which was an EF-1 starting near Blakely in Clay County, extending for more than 30 miles to the north-northeast in the early afternoon of 19 June. Finally, a short-lived EF-0 tornado occurred near Somerset, North Carolina on 20 June.

CASUALTY AND DAMAGE STATISTICS

A total of 4 direct deaths[5] were associated with Claudette in the United States, all in Alabama. A tree fell on a house in Tuscaloosa killing a 3-year-old boy and a 24-year-old man. In addition, flooding rainfall resulted in the drowning of a man in Birmingham, while a 24-year-old woman was swept away in her car after driving into a flooded roadway. Claudette's rainfall was also indirectly related to a multi-car collision due to hydroplaning, costing the lives of 10 people, including 9 children, south of Montgomery.

Tropical-storm force wind gusts affected the Gulf coasts of Louisiana, Mississippi, Alabama, and the Florida Panhandle, primarily resulting in minor wind damage consisting of downed tree branches resulting power outages and some minor property damage. Heavy surf in combination with rip currents resulted in some beach erosion along the coasts of Mississippi, Alabama, and the Florida Panhandle.

Claudette's rainfall was also responsible for significant flooding of roadways and buildings in both Louisiana and Alabama (Fig. 6), resulting in multiple water rescues and making numerous roadways being impassable due to high water. In Slidell, at least 200 homes were affected by this flooding with at least 100 suffering at least minor flood damage. An additional 100 homes are estimated to have been flooded by the combined effects of storm surge and heavy rainfall in Hancock County, Mississippi. In Alabama, additional heavy rainfall led to flooded roadways becoming impassable or washing out in Tuscaloosa, while water rescues due to flash-flooding were reported in Birmingham, Northport, and Tuscaloosa.

Tornadoes that occurred in association with Claudette also resulted in damage in Mississippi, Alabama, Georgia, and North Carolina. In Mississippi, Pass Christian and Long Beach experienced some minor damage to buildings, one overturned camper, and a few uprooted trees. The EF-0 tornado near Pascagoula knocked down a few trees and produced some minor property damage while the EF-1 tornado along State Line Road also snapped a few power poles. In Alabama, an EF-2 tornado was responsible for significant damage causing the destruction of several mobile homes (Fig. 7) with additional property damage to a school and other homes in the area. There were 20 injuries overall, 2 serious, from this event. An EF-0 tornado near Cedar Point also resulted in one minor injury after a long board was launched through the window of a pickup truck. In Georgia, an EF-1 tornado produced mostly tree damage, though there were several mobile homes and pump houses damaged along its track. Finally, in Somerset, North Carolina, a short-lived EF-0 tornado uprooted a few trees, including one that fell on a building.

The NOAA National Centers for Environmental Information (NCEI) estimates that Claudette resulted in approximately $375 million dollars of damage in the United States with

[5] Deaths occurring as a direct result of the forces of the tropical cyclone are referred to as "direct" deaths. These would include those persons who drowned in storm surge, rough seas, rip currents, and freshwater floods. Direct deaths also include casualties resulting from lightning and wind-related events (e.g., collapsing structures). Deaths occurring from such factors as heart attacks, house fires, electrocutions from downed power lines, vehicle accidents on wet roads, etc., are considered indirect" deaths.

approximately 32,500 structures affected, spread out across parts of Louisiana, Mississippi, Alabama, and the Florida Panhandle.

The broad circulation associated with Claudette's precursor disturbance and Tropical Storm Dolores in the eastern Pacific Ocean also produced heavy rains, flooding, and mudslides over parts of Central American and Mexico beginning on 11 June. In Mexico, at least 400 homes were damaged by flooding and mudslides in Veracruz, while two people drowned due to floodwaters in Tuxtla Gutierrez, Chiapas. In Guatemala, one person was killed by a mudslide and more than 55,000 people were affected by flooding rainfall overall.

FORECAST AND WARNING CRITIQUE

Genesis

The potential of Claudette's genesis was anticipated well in advance, though uncertainty existed in both the specific timing of when and the location where the tropical cyclone ultimately developed in the Gulf of Mexico. Table 5 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook forecast in each likelihood category. A low (<40%) chance of genesis in the southwestern Gulf of Mexico during the next 5 days was first introduced 180 h before development occurred. The 5-day probabilities were increased to the medium (40–60%) and high (>60%) categories 156 h and 102 h before Claudette developed, respectively. However, the genesis areas for the low and medium categories only highlighted development in the southwestern Gulf of Mexico (Fig. 8b-c). Ultimately Claudette became a tropical cyclone farther north, which was better highlighted after the 5-day probabilities moved to the high category (Fig. 8d). For the 2-day probabilities, the pre-Claudette system was given a low, medium, and high chance of genesis 156, 78, and 60 h before formation, respectively. Overall, global model guidance struggled with the timing of development due to the initial system being affected by moderate to strong vertical wind shear, which delayed tropical cyclone development until the system moved closer to the northern Gulf Coast. Operationally, Claudette was not declared a tropical cyclone until after the system had moved inland over Louisiana, though further assessment of the system's structure indicated that genesis occurred prior to landfall at 0000 UTC 19 June.

Track

A verification of NHC official track forecasts for Claudette is given in Table 6a. Official track forecast errors were lower than the mean official errors for the previous 5-yr period from 12–24 h, near the mean at 36 h, but were higher than the mean at 48–60 h. Climatology-persistence (OCD5) track errors were significantly higher than their respective 5-yr means from 12–60 h, suggesting that Claudette's track was harder-than-usual to forecast for a typical Atlantic tropical cyclone. A homogeneous comparison of the official track errors with selected guidance models is given in Table 6b. Of the deterministic guidance, only the HWRF (HWFI) bested the official track forecast for most of the forecast periods. In fact, the ensemble and consensus aid guidance failed to outperform the official track forecast in the 12–48 h period, apart from the HFIP corrected

consensus (HCCA) at 36–48 h. However, much of this guidance outperformed the NHC forecast at 60 h (albeit with a small sample size).

Intensity

A verification of NHC official intensity forecasts for Claudette is given in Table 7a. Official intensity forecast errors (OFCL) were lower than the mean official errors for the previous 5-yr period at all forecast times, though the OCD5 intensity errors were also lower, suggesting that Claudette's intensity was easier-than-usual to forecast. Most of the OFCL intensity forecasts correctly predicted only modest intensification with a peak intensity of 40 kt, both prior to Claudette's landfall in Louisiana, and as it reemerged into the western Atlantic. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 7b. Overall, the intensity guidance also had low errors with Claudette, but most of the deterministic and consensus guidance failed to outperform the OFCL forecast, especially from 12–36 h. Of the consensus aids, HCCA preformed the best, outperforming the OFCL forecast at 24 and 60 h.

Watches and Warnings

Coastal watches and warnings associated with Claudette are given in Table 8. A Tropical Storm Warning was first issued from Intercoastal City to the Alabama/Florida border on 2100 UTC 17 June and included Lakes Pontchartrain and Maurepas, and metropolitan New Orleans, when NHC initiated Potential Tropical Cyclone advisories on the system. The Tropical Storm Warning was extended eastward to the Okaloosa/Walton County line in the Florida Panhandle at 0900 UTC 18 June. Tropical-storm-force winds are estimated to have first reached the coast within the initial warning area beginning around 1800 UTC 18 June, providing a lead time of only 21 h. While this is shorter than the desired lead times for tropical storm warnings, it should be noted that these warnings were issued before Claudette formed and was still a pre-genesis disturbance. Tropical storm conditions were already affecting the coast when Claudette became a tropical cyclone, and NHC starting advisories on the system as a Potential Tropical Cyclone before the system developed was critical to provide at least some lead time before tropical storm conditions reached the coast.

A Tropical Storm Watch was issued for the North Carolina coast from Cape Fear to Duck, including Pamlico and Albemarle Sounds, at 1500 UTC 19 June. The watch was then extended southward to South Santee River, South Carolina, while the portion from Little River Inlet to Duck, North Carolina was upgraded to a Tropical Storm Warning at 0900 UTC 20 June. Tropical-storm-force winds were observed within the watch and warning areas around 39 and 21 h after issuance, respectively.

Storm Surge

The initial peak storm surge inundation forecast was issued at 2100 UTC 17 June for 2 to 3 ft above normally dry ground somewhere between Intracoastal City, Louisiana, and the Mississippi/Alabama border, including Vermilion Bay and Lake Borgne. Storm surge inundation of 1 to 3 ft above normally dry ground was also forecast for the Alabama coast, including Mobile Bay. These forecast ranges were nearly steady up until Claudette's landfall and accurately

depicted the areas where the highest inundation occurred. The forecast range was slightly low for the coast of Mississippi, where inundation heights as high as 4 ft above normally dry ground occurred. NHC issued a storm surge forecast of 1 to 3 ft above normally dry ground from Cape Lookout, North Carolina, to the North Carolina/Virginia border at 1500 UTC 19 June, but no significant storm surge inundation is known to have occurred within that area. The forecast surge values above did not require the issuance of Storm Surge Watches or Warnings for Claudette.

IMPACT-BASED DECISION SUPPORT SERVICES (IDSS) AND PUBLIC COMMUNICATION

NHC began communication with emergency managers on 18 June when the system was still a disturbance over the Gulf of Mexico through its landfall as a tropical storm in southeastern Louisiana on 19 June. This communication included briefings with the Federal Emergency Management Agency (FEMA) headquarters and FEMA Regions 4 and 6, along with Gulf Coast states' emergency managers. These decision support briefings were coordinated through the FEMA Hurricane Liaison Team, embedded at the NHC. The NHC Tropical Analysis and Forecasting Branch (TAFB) also provided three live briefings to the United States Coastal Guard District 8 in New Orleans for Claudette, beginning on 16 June when the system was still a disturbance.

NHC conducted several Facebook Live broadcasts for Claudette beginning when the storm was still operationally designated as Potential Tropical Cyclone Three on 18 June. Key messages on Claudette, including before it was designated a tropical cyclone, were included in all NHC Tropical Cyclone Discussions, in graphical format on the NHC webpage, and through social media posts from 17–21 June.

ACKNOWLEDGMENTS

Data in Table 3 were compiled from Post Tropical Cyclone Reports and Public Information Statements issued by NWS Forecast Offices (WFOs) in New Orleans, LA, Mobile, AL, Birmingham, AL, and Wilmington, NC in addition to reports from the Weather Prediction Center, National Data Buoy Center, and NOS Center for Operational Oceanographic Products and Services. Special thanks to Senior Hurricane Specialist John Cangialosi for the Claudette "best track" map (Fig. 1).

Table 1. Best track for Tropical Storm Claudette, 19–22 June 2021.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
17 / 1800	22.5	92.2	1008	25	disturbance
18 / 0000	23.5	91.8	1007	30	"
18 / 0600	24.6	91.4	1007	35	"
18 / 1200	25.9	91.2	1007	35	"
18 / 1800	27.2	91.1	1006	40	"
19 / 0000	28.4	91.2	1005	40	tropical storm
19 / 0430	29.2	91.0	1003	40	"
19 / 0600	29.5	90.8	1003	40	"
19 / 1200	30.6	89.9	1004	35	"
19 / 1800	31.5	88.8	1005	30	tropical depression
20 / 0000	32.4	87.8	1005	25	"
20 / 0600	33.1	86.5	1006	25	"
20 / 1200	33.5	84.8	1007	25	"
20 / 1800	33.8	83.1	1008	25	"
21 / 0000	34.2	81.2	1007	30	"
21 / 0600	35.0	79.1	1006	40	tropical storm
21 / 1200	36.0	76.5	1005	40	"
21 / 1800	37.0	73.5	1004	40	"
22 / 0000	38.4	70.7	1004	40	"
22 / 0600	39.7	67.8	1004	40	extratropical
22 / 1200	41.2	65.2	1004	40	"
22 / 1800	42.6	62.4	1004	40	"
23 / 0000	44.1	59.6	1004	35	"
23 / 0600					dissipated
19 / 0600	29.5	90.8	1003	40	maximum winds and minimum pressure
19 / 0430	29.2	91.0	1003	40	landfall in Terrebonne Parish, Louisiana

Table 2. Selected ship reports with winds of at least 34 kt for Tropical Storm Claudette, including its pre-genesis phase.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
18 / 1100	9V3704	24.7	89.4	140 / 37	1011.0
18 / 1500	9V3704	24.5	88.5	140 / 37	1014.0
18 / 2000	WDF731	28.6	89.2	150 / 45	1012.9
19 / 0000	WDF731	28.4	88.6	150 / 40	1014.9

Table 3. Selected surface observations for Tropical Storm Claudette, 19–22 June 2021.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Louisiana									
International Civil Aviation Organization (ICAO) Sites									
New Orleans Lakefront Airport (KNEW) (30.04N 90.03W)	19/1038	1005.4	18/2232	30	38				2.13
New Orleans Armstrong International Airport (KMSY) (29.98N 90.25W)	19/0953	1006.1	18/2253	26	37				1.54
Slidell Airport (KASD) (30.34N 89.82W)									5.82
Coastal-Marine Automated Network (C-MAN) Sites									
Southwest Pass (BURL1) (28.90N 89.43W)			18/1800	40 (38 m)	46				
National Ocean Service (NOS) Sites									
Shell Beach (SHBL1) (29.87N 89.67W)	19/0830	1006.3	18/2048	33 (16 m)	42	4.03		3.2	
New Canal Station (NWCL1) (30.03N 90.11W)	19/0842	1005.2	19/0018	30 (10 m)	42	2.70		2.4	
Pilot's Station East (PSTL1) (28.93N 89.41W)	19/0848	1006.4	18/1642	40 (24 m)	49			1.3	
Grand Isle (GISL1) (29.26N 89.96W)	19/0830	1006.9	18/1942	29 (9 m)	43	1.64		1.2	
Berwick, Atchafalaya River (TESL1) (29.67N 91.24W)	19/0800	1006.4	19/0042	18 (13 m)	25	0.52		1.0	
Port Fourchon (PTFL1) (29.11N 90.20W)						1.47		0.9	
Freshwater Canal Locks (FRWL1) (29.55N 92.31W)			18/1718	16 (20 m)	22	1.59		0.8	
Pilottown (PILL1) (29.18N 89.26W)	19/0736	1007.7	19/0854	35 (12 m)	42	1.20		0.7	
Eugene Island (EINL1) (29.37N 91.38W)	19/0730	1006.6	18/2006	24 (10 m)	27	1.27		0.7	
LAWMA, Amerada Pass (AMRL1) (29.45N 91.34W)	19/0724	1006.7	18/1854	16 (11 m)	22	0.89		0.4	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Frenier Landing (FREL1) (30.11N 90.42W)	19/0842	1004.9	18/2324	27 (10 m)	34				
WeatherFlow Sites									
Bayou Bienvenue (XBYU) (30.00N 89.90W)	19/0825	1002.9	18/2145	39 (27 m)	49				
Dulac (KDUL) (29.34N 90.73W)	19/0817	1005.2	18/1807	23 (10 m)	41				
New Orleans Lakefront Airport (XLKF) (30.04N 90.02W)	19/0804	1004.5	18/2243	27 (10 m)	35				
Pontchartrain Causeway – Midlake (XPTN) (30.20N 90.12W)	19/1056	1004	18/2241	35 (13 m)	44				
Jefferson Parish (XJEF) (29.94N 90.23W)			18/2304	26 (10 m)	37				
United States Geological Survey (USGS) Stream Gauges									
Crooked Bayou near Delacroix (CBDL1) (29.71N 89.72W)							4.13	2.8	
Barataria Bay N of Grand Isle (NGIL1) (29.42N 89.95W)							3.22	2.4	
Barataria Pass at Grand Isle (EGIL1) (29.27N 89.95W)							3.06	2.3	
Caminada Pass NW of Grand Isle (CPGL1) (29.23N 90.05W)							3.04	2.3	
Little Lake near Cutoff (CTFL1) (29.52N 90.18W)							2.77	2.1	
Caillou Lake SW of Dulac (DCLL1) (29.25N 90.92W)							2.47	1.5	
Caillou Bay SW of Cocodrie (CCOL1) (29.08N 90.87W)							2.06	1.2	
US Army Corps of Engineers (USACE) Gauges									
Bayou Dupre Flood Gate (BDML1) (29.94N 89.84W)							4.13	2.9	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Chef Menteur Pass near Lake Borgne (CMPL1) (30.07N 89.80W)							3.97	2.8	
Bayou Bienvenue Flood Gate (30.00N 89.92W)							3.77	2.6	
Rigolets near Lake Pontchartrain (RIGL1) (30.16N 89.74W)							3.62	2.6	
Lake Pontchartrain at Lakefront Airport (PLAL1) (30.04N 90.02W)							3.14	2.6	
Lake Pontchartrain at Mandeville (LPML1) (30.37N 90.09W)							2.98	2.3	
Lake Pontchartrain – West End (WEGL1) (30.02N 90.12W)							2.63[l]	2.1[l]	
Pass Manchac Ponchatoula (PMPL1) (30.28N 90.40W)							1.67	0.7	
Mississippi River SW Pass at East Jetty (SWBL1) (28.93N 89.41W)							2.02	0.4	
Hydrometeorological Automated Data System (HADS) Sites (NWS)									
Rigolets Near Lake Ponchatrain (RIGL1) (30.16N 89.74W)									8.19
Pearl River 6 NNW (PRUL1) (30.46N 89.78W)									5.70
Pearl River (PERL1) (30.39N 89.74W)									5.64
Other Sites									
Slidell 4.4 E (US1LAST0017) (30.28N 89.70W)									11.03
Slidell 5 E (KLASLIDE118) (30.29N 89.70W)									10.23
Slidell 3.2 E (LA-ST-26) (30.28N 89.72W)									9.71

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Slidell 1.7 NE (LA-ST-23) (30.30N 89.76W)									8.89
Slidell Sewage Plant (SISL1) (30.27N 89.77W)									8.87
Slidell (168539) (30.27N 89.77W)									8.74
Slidell 3.3 NE (US1LAST0022) (30.32N 89.74W)									8.68
Slidell 0.2 SE (US1LAST0010) (30.28N 89.78W)									8.66
Pearl River 2.0 S (LA-ST-20) (30.16N 89.74W)									7.98
Eden Isle (FW7679) (30.23N 89.80W)									7.91
McNeil 4 WSW (AU216) (30.64N 89.70W)									5.27
Mississippi									
ICAO Sites									
Gulfport Airport (KGPT) (30.40N, 89.07W)	19/0723	1006.6	19/0723	37	50				5.71
Biloxi Air Force Base (KBIX) (30.43N 88.92W)	19/0956	1007.4	19/0826	35	45				5.68
Pascagoula Trent Lott Airport (KPQL) (30.46N 88.53W)	19/1215	1008.5	19/0810	24	36				8.00
NOS Sites									
Bay Waveland Yacht Club (WYCM6) (30.33N 89.33W)			19/0418	33 (10 m)	46	5.49		4.4	
Pascagoula NOAA Lab (PNLM6) (30.37N 88.56W)						3.87		3.3	
Petit Bois Island, Port of Pascagoula (PTBM6) (30.21N 88.51W)	19/0942	1008.0	19/1030	34 (5 m)	46				
WeatherFlow Sites									
Gulfport (XGPT) (30.36N 89.11W)	19/1004	1005.2	19/0413	39 (10 m)	52				
Biloxi (XBIL) (30.43N 88.98W)	19/0804	1004.2	19/0829	19 (15 m)	34				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Ship Island (XSHI) (30.23N 88.98W)	19/0746	1004.9	19/0821	45 (12 m)	53				
USGS Stream Gauges									
East Pearl River near Claiborne (EPCM6) (30.19N 89.53W)							5.32	4.0	
Back Bay of Biloxi (BBBM6) (30.42N 88.98W)							5.15	3.7	
Old Fort Bayou at Ocean Springs (OPFM6) (30.42N 88.82W)							4.93	3.5	
West Pascagoula River at Gautier (WPGM6) (30.38N 88.61W)							4.35	3.0	
Pascagoula River at Pascagoula (PRPM6) (30.37N 88.56W)							4.21	2.9	
HADS Sites									
Gulfport 6 WNW (GLFM6) (30.40N 89.2W)									15.28
Lyman 4E (LYMM6) (30.48N 89.03W)									14.30
D'iberville 4N (DIBM6) (30.48N 88.90W)									13.24
Pearl River 6.2E (NAPM6) (30.35N 89.65W)									12.26
Jourdan River near Kiln 2 SSW (KLNM6) (30.39N 89.44W)									11.22
Orange Grove 3 NNE (ORAM6) (30.46N 88.45W)									10.51
Merrill (MRRM6) (30.98N 88.73W)									9.44
Caesar 3 WSW (CREM6) (30.57N 89.59W)									9.43
Necaise 1N (NNHM6) (30.62N 89.41W)									9.09
Graham Ferry Pascagoula River (PGFM6) (30.61N 88.64W)									8.69

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
McNeill 3W (MNLM6) (30.66N 89.69W)									8.66
Gautier 6 NNW (SHCM6) (30.39N 89.00W)									5.88
Wiggins 6E (BLCM6) (30.85N 89.03W)									5.74
Ocean Springs (OCSM6) (30.23N 88.67W)									5.42
Brooklyn 1 SW (BKNM6) (31.05N 89.20W)									5.37
Shubuta (SHBM6) (31.87N 88.7W)									5.32
Grand Bay (GRBM6) (30.44N 88.43W)									5.17
Waynesboro 3 WNW (WYNM6) (31.68N 88.68W)									5.09
COOP Sites									
Biloxi (BLXM6) (30.39N 89.00W)									5.98
Ocean Springs (226484) (30.41N 88.79W)									5.42
Wiggins (WGGM6) (30.87N 89.12W)									5.20
Other Sites									
Diamondhead 0.9 NNW (MS-HC-05) (30.39N 89.38W)									11.84
Kiln 11N (KMSPERKI15) (30.57N 89.45W)									11.16
Kiln 3.3 N (MS-HC-09) (30.46N 89.43W)									10.98
Lyman 3 NW (KMSGULFP107) (30.53N 89.17W)									10.55
Waveland 1.0 NW (US1MSHC0018) (30.30N 89.40W)									9.89
Kiln 6.6N (US1MSHC0013) (30.52N 89.43W)									9.59
Perkinston 11 WSW (PERK19) (30.74N 89.33W)									9.43

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Wade 6 ENE (KMSMOSSP34) (30.67N 88.47W)									8.90
Pass Christian 8.9 NNW (MS-HR-15) (30.44N 89.28W)									8.42
Moss Point 1 SSW (KMSMOSSP17) (30.41N 88.5W)									8.37
Moss Point 1.2 NNW (MS-JC-27) (30.44N 88.53W)									8.35
Pass Christian 5.0 N (US1MSHR0019) (30.39N 89.25W)									8.06
Pearlington 1 S (MSPEARL15) (30.24N 89.60W)									8.04
Saucier 1.7 NNE (MS-HR-22) (30.66N 89.13W)									7.97
Pass Christian 9.8 NNW (MS-HR-37) (30.46N 89.28W)									7.80
Biloxi 13.1 NNW (US1MSHR0034) (30.57N 89.05W)									7.71
Perkinston (PERK18) (30.74N 89.13W)									7.35
Escatawpa 6 NE (KMSMOSSP27) (30.74N 89.13W)									6.95
Gulfport 5.3 NW (MS-HR-39) (30.44N 89.13W)									6.51
Pass Christian 3.5 NE (US1MSHR0010) (30.36N 89.21W)									6.36
Piscayune 5.6 ENE (MS-PR-04) (30.55N 89.59W)									6.27
Gautier 4.9 N (MS-JC-22) (30.46N 88.65W)									6.27
Ocean Springs 3.3 E (MS-JC-02) (30.41N 88.75W)									6.09
Ocean Springs 3.2 SE (US1MSJC0008) (30.36N 88.77W)									5.83

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Vancleave 1.6 NNE (MS-JC-28) (30.56N 88.65W)									5.81
Perkinston 1.7 NE (US1MSST0004) (30.80N 89.11W)									5.67
Brooklyn 2.4 S (US1MSFR0015) (31.02N 89.20W)									5.34
Alabama									
ICAO Sites									
Mobile / Bates Field (KMOB) (30.68N 88.25W)	19/2156	1009	19/1059	32	43				5.17
Mobile Downtown (KBFM) (30.64N 88.07W)	19/2153	1009	19/0948	29	40				3.22
Evergreen (KGZH) (31.42N 87.04W)	19/2253	1010	19/1530	24	35				3.28
Tuscaloosa Airport (KTCL) (33.31N 87.62W)									8.95
C-MAN Sites									
Dauphin Island (DPIA1) (30.25N 88.08W)	19/1000	1008.9	19/0900	36	40				
NOS Sites									
Bayou La Batre Bridge (BLBA1) (30.41N 88.25W)						4.19		3.7	
Coast Guard Sector Mobile (MCGA1) (30.65N 88.06W)	19/1042	1007.7	19/0848	27 (9 m)	33	3.59		3.0	
Mobile State Docks (OBLA1) (30.71N 88.04W)	19/1948	1008.6				3.22		2.7	
Chickasaw Creek (CIKA1) (30.78N 88.07W)						3.03		2.6	
West Fowl River Bridge (WFRA1) (30.38N 88.16W)						3.19		2.5	
Weeks Bay, Mobile Bay (WBYA1) (30.42N 87.83W)						3.18		2.5	
Dog River Bridge (BYSA1) (30.57N 88.09W)						3.09		2.4	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
East Fowl River Bridge (EFRA1) (30.44N 88.11W)						2.78		2.3	
Dauphin Island (DILA1) (30.25N 88.08W)	19/1000	1008.9	19/0900	36 (13 m)	41	2.10		1.7	
Fort Morgan (FMOA1) (30.23N 88.03W)	19/1000	1008.9	19/0900	43 (38 m)	49				
WeatherFlow Sites									
Buccaneer Yacht Club (XBUC) (30.58N 88.07W)	19/1036	1007	19/0940	35 (10 m)	43				
Gulf Shores - Foley (XGLF) (30.36N 87.65W)	19/2100	1006	19/1334	36 (10 m)	43				
Mill Point - Perdido Bay (XMLP) (30.30N 87.51W)	19/1058	1009	19/1128	34 (6 m)	44				
HADS Sites									
Lake Tuscaloosa (LKTA1) (33.27N 87.51W)									8.25
Black Warrior River (TODA1) (33.21N 87.59W)									6.58
Fort Payne (FOPA1) (34.44N 85.72W)									5.90
Blue Pond 4 NE (BLPA1) (34.29N 85.68W)									5.47
Ensley (ENSA1) (33.52N 86.88W)									5.25
COOP Sites									
Tuscaloosa ACFD (18380) (33.21N 87.62W)									8.73
Tuscaloosa Oliver Dam (18385) (33.21N 87.59W)									6.58
Brewton 3 NNE (63899) (31.14N 87.05W)									6.03
Sand Mt. Substation (17207) (34.29N 85.97W)									5.55
Helena (13781) (33.27N 86.83W)									5.54
Oakman (16001) (33.72 87.38W)									5.04

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Holt Lock & Dam (13930) (33.25N 87.25W)									5.00
Other Sites									
Middle Bay Lighthouse (MBLA1) (30.43N 88.01W)	19/1030	1007.1	19/0900	39					
Tuscaloosa 1.3 ENE (US1ALTS0022) (33.25N 87.52W)									7.84
Fort Payne 1.4 WSW (US1ALDK009) (34.44N 85.72W)									6.91
Foley 4.9 SE (US1ALBW0095) (30.35N 87.63W)									6.89
Crossville 2.2 NNE (US1ALDK0018) (34.31N 85.98W)									6.65
Guntersville 2.2 SW (US1ALMS006) (34.33N 86.29W)									6.58
Elberta 3.9S (US1ALBW0096) (30.36N 87.61W)									5.97
Tillmans Corner 4.3 WNW (US1ALBM001) (30.61N 88.26W)									5.61
Mobile 10.4W (US1ALMB0071) (30.67N 88.23W)									5.59
Guntersville 1.2 S (US1ALMS0018) (34.34N 86.27W)									5.57
Albertville 5.5 N (US1ALMS0022) (34.34N 86.21W)									5.54
Pollard 2.4N (US1ALES0001) (31.06N 87.17W)									5.41
Fairfield 1.8 NE (US1ALJF0025) (33.49N 86.89W)									5.28
Mobile 2.6 WNW (US1ALMB004) (30.69N 88.13W)									5.22
Mobile 11.2 WSW (US1ALMB0072) (30.64N 88.27W)									5.20

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Seale 2.4 NNE (US1ALRS0007) (32.33N 85.16W)									5.20
Wilmer 7.9 SE (US1ALMB0024) (30.73N 88.27W)									5.19
Tillmans Corner 8.7 WSW (US1ALMB0063) (30.61N 88.33W)									5.16
Albertville 1.2 W (US1ALMS0031) (34.26N 86.23W)									5.14
Summerdale 2.7 WNW (US1ALBW0085) (30.50N 87.74W)									5.13
Mountain Brook 1.7N (US1ALJF0057) (33.51N 86.74W)									5.10
Florida									
ICAO Sites									
Pensacola (KPNS) (30.47N 87.20W)	19/2153	1009	19/1146	50	70				8.19
Pensacola NAS (KNPA) (30.35N 87.32W)	19/2056	1010	19/1130	34	44				
Destin / Ft. Walton Beach (KDTS) (30.40N 86.47W)	19/2153	1011	19/1530	21	40				4.42
Crestview (KCEW) (30.79N 86.52W)	19/2253	1010	19/2150	23	40				
Tyndall Air Force Base (KPAM) (30.07N 85.58W)									5.63
NOS Sites									
Pensacola (PCLF1) (30.40N 87.21W)	19/2054	1009.4	19/1148	31 (10 m)	41	2.19		1.7	
Panama City Beach (PCBF1) (30.21N 85.88W)	19/2242	1012.2	19/2106	32 (17 m)	43	1.81		1.0	
Panama City (PACF1) (30.15N 85.67W)			19/2130	27 (10 m)	35	1.30		0.8	
WeatherFlow Sites									
Santa Rosa Sound (XSRS) (30.38N 87.01W)	19/1122	1009	19/1144	49 (7 m)	61				
Gulf Breeze (XGBZ) (30.36N 87.16W)	19/2103	1008	19/1137	37 (15 m)	52				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Crystal Beach (XCBS) (30.39N 87.41W)			19/2342	26 (14 m)	36				
Okaloosa Island Fishing Pier (XOFP) (30.39N 86.59W)			19/2238	37 (14 m)	45				
Ft. Walton Beach (XFWB) (30.40N 86.56W)			19/2249	35 (7 m)	41				
St. Andrew Bay (XSTA) (30.13N 85.72W)			19/1902	33 (10 m)	37				
HADS Sites									
Milton 8NE (MLTF1) (30.73N 86.95W)									7.20
Pensacola (PSAF1) (30.53N 87.20W)									6.09
Panama City (PCYF1) (30.20N 85.63W)									6.01
COOP Sites									
Pensacola 7 NNE (86999) (30.53N 87.20W)									5.39
Other Sites									
Micanopy 2.1 WNW (US1FLAL0054) (29.52N 82.31W)									7.19
Pensacola 4.7 N (USFLES0053) (30.51 87.18W)									6.53
Century (KFLCENTU2) (30.96N 87.27W)									6.20
Pensacola 1.9 NE (USFLES0026) (30.46N 87.17W)									6.11
Pensacola 1 SSW (FL-ES-58) (30.43N 87.20W)									6.03
Choctaw Naval Outlying Field Milton (53848) (30.51N 86.96W)									5.98
Pensacola 6.4 N (US1FLES0054) (30.54N 87.21W)									5.84
Century 12.1 W (US1FLES0039) (30.96N 87.47W)									5.59
Gonzalez 2.1E (US1FLES0015) (30.57N 87.26W)									5.13

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Milton 2.9 NW (FL-SR-26) (30.67N 87.08W)									5.08
Georgia									
WeatherFlow Sites									
Tybee South (XTYE) (31.99N 80.85W)			20/1507	38 (10 m)	43				
Tybee Island (XTYB) (32.02N 80.84W)			20/1510	22 (11 m)	36				
HADS Sites									
Menlo (MNLG1) (34.45N 85.47W)									5.94
Canton - Etowah River (CNNG1) (34.24N 84.50W)									5.87
COOP Sites									
Summerville (SMRG1) (34.45N 85.39W)									5.35
Monticello (95988) (33.33N 83.70W)									5.14
South Carolina									
WeatherFlow Sites									
Isle of Palms Pier (XIOP) (32.78N 79.79W)			21/0109	40 (9 m)	54				
Winyah Bay Range (XWIN) (33.19N 79.18W)			21/0104	35 (17 m)	49				
Shutes Folly (XSHF) (32.77N 79.91W)			20/1637	33 (14 m)	44				
Folly South End (XFSE) (32.64N 79.97W)			21/0145	34 (12 m)	41				
Calibogue Sound (XCLB) (32.11N 80.84W)			20/1519	32 (6 m)	41				
Fort Sumter Range Front Light (XSUM) (32.75N 79.87W)			20/1647	33 (13 m)	38				
Murrells Inlet (XMUR) (33.52N 79.03W)			20/2344	27 (8 m)	34				
Other Sites									
Aiken 3.9 S (US1SCAK0053) (33.48N 81.73W)									5.71

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Daniel Island 1.4 S (US1SCBK0067) (33.48N 32.85W)									5.43
North Carolina									
NOS Sites									
Johnny Mercer Pier Wrightsville Beach (JMPN7) (34.21N 77.79W)			21/0412	35 (8 m)	46				
WeatherFlow Sites									
KHK Resort (XRTH) (35.58N 75.47W)			21/0908	40 (18 m)	44				
Avon Ocean (XAVO) (35.35N 75.50W)			21/1006	36 (13 m)	42				
Waves (XWAV) (35.57N 75.47W)			21/0907	36 (12 m)	41				
Frisco Woods (XFRI) (35.25N 75.63W)			21/0841	35 (7 m)	40				
Ocracoke (XOCR) (35.15N 76.01W)			21/0746	34 (8 m)	40				
Oak Island (XOKI) (33.91N 78.12W)			21/0332	34 (11 m)	39				
Fort Macon (XMAC) (34.70N 76.69W)			21/0652	32 (11 m)	39				
Avon Sound (XAVN) (35.37N 75.51W)			21/0848	35 (5 m)	38				
Federal Point (XFED) (33.96N 77.94W)			21/0359	35 (17 m)	38				
Real Slick (XSLK) (35.57N 75.49W)			21/0905	30 (7 m)	38				
Buxton (KBUX) (35.26N 75.52W)			21/0840	26 (11 m)	38				
Pamlico Sound (XPM2) (35.43N 75.83W)			21/0821	34 (14 m)	37				
Oregon Inlet (XORI) (35.80N 75.55W)			20/2320	32 (11 m)	36				
Jennettes Pier (XJNP) (35.91N 75.59W)			21/0915	31 (20 m)	35				
Oregon Inlet CG (XORE) (35.77N 75.52W)			20/2257	26 (11 m)	34				
Other Sites									
Waxhaw 4.0 NNE (US1NCUN0009) (34.98N 80.72W)									4.10

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Offshore									
Oil Platforms									
West Delta 27A (Anglo Suisse Offshore) (KDLP) (29.12N 89.55W)			19/0835	41 (35 m)	51				
Main Pass 289C AWOS (Apache Corp) (KVKY) (29.26N 88.44W)			19/1255	42 (115 m)	48				
Main Pass 140B AWOS (Apache Corp) (KMIS) (29.30N 88.84W)			19/1015	41 (85 m)	48				
Louisiana Offshore Oil Port (LOPL1) (28.89N 90.02W)	19/0652	1008.1	19/0652	35 (58 m)	42				
NOAA Buoys									
Luke Offshore Test Platform (42040) (29.21N 88.23W)	19/1030	1009.2	18/1850	33 (4 m)	45				
Orange Beach (42012) (30.07N 87.56W)	19/1100	1008.8		45 (4 m)	51				
Frying Pan Shoals (41013) (33.44N 77.73W)			21/0620	39 (4 m)	43				

[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 reports are 2 min; buoy averaging periods are 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] For most locations, storm tide is water height above the North American Vertical Datum of 1988 (NAVD88). Storm tide is water height above Mean Lower Low Water (MLLW) for NOS stations in Puerto Rico, the U.S. Virgin Islands, and Barbados.
[e] Estimated inundation is the maximum height of water above ground. For NOS tide gauges, the height of the water above Mean Higher High Water (MHHW) is used as a proxy for inundation.
[l] Incomplete data

Table 4. Tornadoes documented during Tropical Storm Claudette.

County	Begin Location	End Location	EF Scale	Begin Date/Time	Length (miles)	Width (yards)	Deaths	Injuries	Damage
Mississippi									
Harrison	1 NE Pass Christian	1 NNE Pass Christian	0	19/0537	0.25	50	0	0	
Harrison	1 SSW Long Beach	Long Beach	0	19/0731	1.15	75	0	0	
Jackson	6 NE Dees	6 NE Dees	1	19/1035	0.83	50	0	0	
Jackson	1 ESE Pascagoula	1 ESE Pascagoula	0	19/1008	0.49	25	0	0	
Alabama									
Escambia	2 SW East Brewton	5 NW Castleberry	2	19/1231	22.07	650	0	20	
Covington	7 NW Florala	7 NW Florala	0	19/1812	0.60	25	0	0	
Mobile	Cedar Point Pier	Cedar Point Pier	0	19/0816	0.05	25	0	1	
Georgia									
Clay	NW Blakely	NNW Cuthbert	1	19/1731	30.32	400	0	0	
North Carolina									
Chowan	Somerset	Somerset	0	20/1907	2.50	75	0	0	

Table 5. Number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the "Low" category do not include forecasts of a 0% chance of genesis.

	Hours Before Genesis	
	48-Hour Outlook	**120-Hour Outlook**
Low (<40%)	156	180
Medium (40%-60%)	78	156
High (>60%)	60	102

Table 6a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Claudette, 19–22 June 2021. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	**21.1**	**35.7**	49.1	70.7	129.7			
OCD5	51.2	135.4	210.8	279.3	444.4			
Forecasts	11	9	7	5	3			
OFCL (2016-20)	23.9	36.3	49.1	63.9	79.0	94.1	128.1	169.7
OCD5 (2016-20)	45.1	97.2	157.2	216.7	271.1	325.4	414.4	490.0

Table 6b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Claudette, 19–22 June 2021. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 6a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	20.8	33.2	49.1	70.7	140.1			
OCD5	54.2	122.4	210.8	279.3	457.6			
GFSI	33.0	56.6	86.4	137.3	157.8			
EMXI	27.2	43.2	63.8	74.2	**119.7**			
CMCI	25.1	34.7	78.1	94.2	**92.0**			
NVGI	34.6	53.9	90.2	114.4	189.5			
HWFI	**15.8**	**31.9**	55.0	**49.4**	**104.2**			
HMNI	23.0	33.2	55.2	**69.4**	**125.4**			
HCCA	22.8	35.0	**44.4**	**44.7**	**68.1**			
AEMI	31.9	68.9	114.1	143.4	**123.2**			
GFEX	27.4	43.9	69.0	96.4	**90.5**			
TVCA	22.0	36.9	58.8	71.9	**106.6**			
TVCX	22.3	37.0	58.5	72.1	**104.8**			
TVDG	24.5	38.9	60.7	77.9	**106.0**			
TABS	55.1	91.4	120.4	155.9	187.2			
TABM	34.7	52.1	69.8	105.5	171.3			
TABD	25.3	36.9	**44.9**	**41.1**	**38.5**			
Forecasts	8	7	7	5	2			

Table 7a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Claudette, 19–22 June 2021. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	**2.7**	**1.7**	**2.1**	**5.0**	**8.3**			
OCD5	4.7	7.1	7.9	10.4	12.7			
Forecasts	11	9	7	5	3			
OFCL (2016-20)	5.4	8.0	9.6	10.9	11.5	12.1	13.3	14.5
OCD5 (2016-20)	7.0	11.0	14.3	16.8	18.3	19.7	21.7	23.0

Table 7b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Claudette, 19–22 June 2021. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 7a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	3.1	2.1	2.1	5.0	12.5			
OCD5	4.0	6.0	7.9	10.4	13.0			
HWFI	4.2	3.3	2.1	5.2	13.0			
HMNI	3.6	3.4	3.0	6.0	15.0			
DSHP	4.1	6.0	6.9	9.2	13.0			
LGEM	4.0	5.9	7.4	9.6	13.0			
ICON	3.2	3.6	3.1	7.0	13.0			
IVCN	3.2	3.6	3.1	7.0	13.0			
IVDR	3.8	2.9	2.4	6.4	13.5			
HCCA	3.4	**1.9**	2.9	5.0	**8.0**			
GFSI	5.4	3.0	3.9	9.8	16.0			
EMXI	3.9	5.3	2.9	**4.4**	**8.0**			
CMCI	4.8	3.9	4.7	**4.0**	**5.0**			
NVGI	5.2	4.6	3.3	7.2	**5.0**			
Forecasts	8	7	7	5	2			

Table 8. Watch and warning summary for Tropical Storm Claudette.

Date/Time (UTC)	Action	Location
17 / 2100	Tropical Storm Warning issued	Intracoastal City to AL/FL Border
17 / 2100	Tropical Storm Warning issued	Lake Pontchartrain
17 / 2100	Tropical Storm Warning issued	Lake Maurepas
18 / 0900	Tropical Storm Warning modified to	Intracoastal City to Okaloosa/Walton CL
18 / 1500	Tropical Storm Warning modified to	Morgan City to Okaloosa/Walton CL
19 / 1500	Tropical Storm Watch issued	Cape Fear to Duck
19 / 1500	Tropical Storm Warning modified to	Mississippi River to Okaloosa/Walton CL
19 / 1500	Tropical Storm Warning discontinued	Lake Pontchartrain
19 / 1500	Tropical Storm Warning discontinued	Lake Maurepas
19 / 1800	Tropical Storm Warning modified to	AL/MS Border to Okaloosa/Walton CL
19 / 2100	Tropical Storm Warning discontinued	All
20 / 0900	Tropical Storm Watch discontinued	Cape Fear to Duck
20 / 0900	Tropical Storm Watch issued	South Santee River to Little River Inlet
20 / 0900	Tropical Storm Warning issued	Little River Inlet to Duck
21 / 0900	Tropical Storm Watch discontinued	All
21 / 0900	Tropical Storm Warning modified to	Cape Fear to Duck
21 / 1200	Tropical Storm Warning discontinued	All

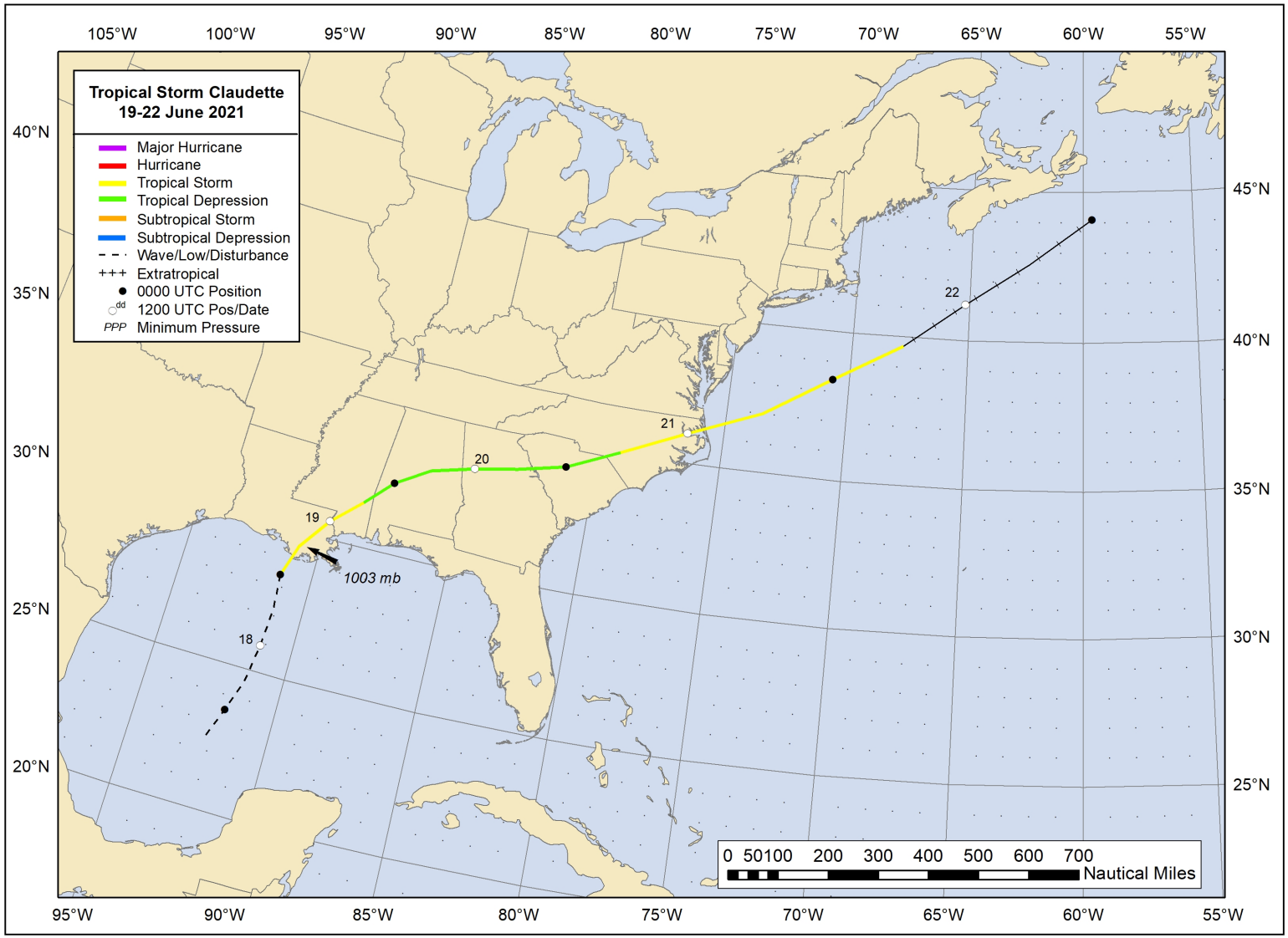

Figure 1. Best track positions for Tropical Storm Claudette, 19–22 June 2021. Tracks during the extratropical stage are partially based on analyses from the NOAA Weather Prediction Center and the NOAA Ocean Prediction Center.

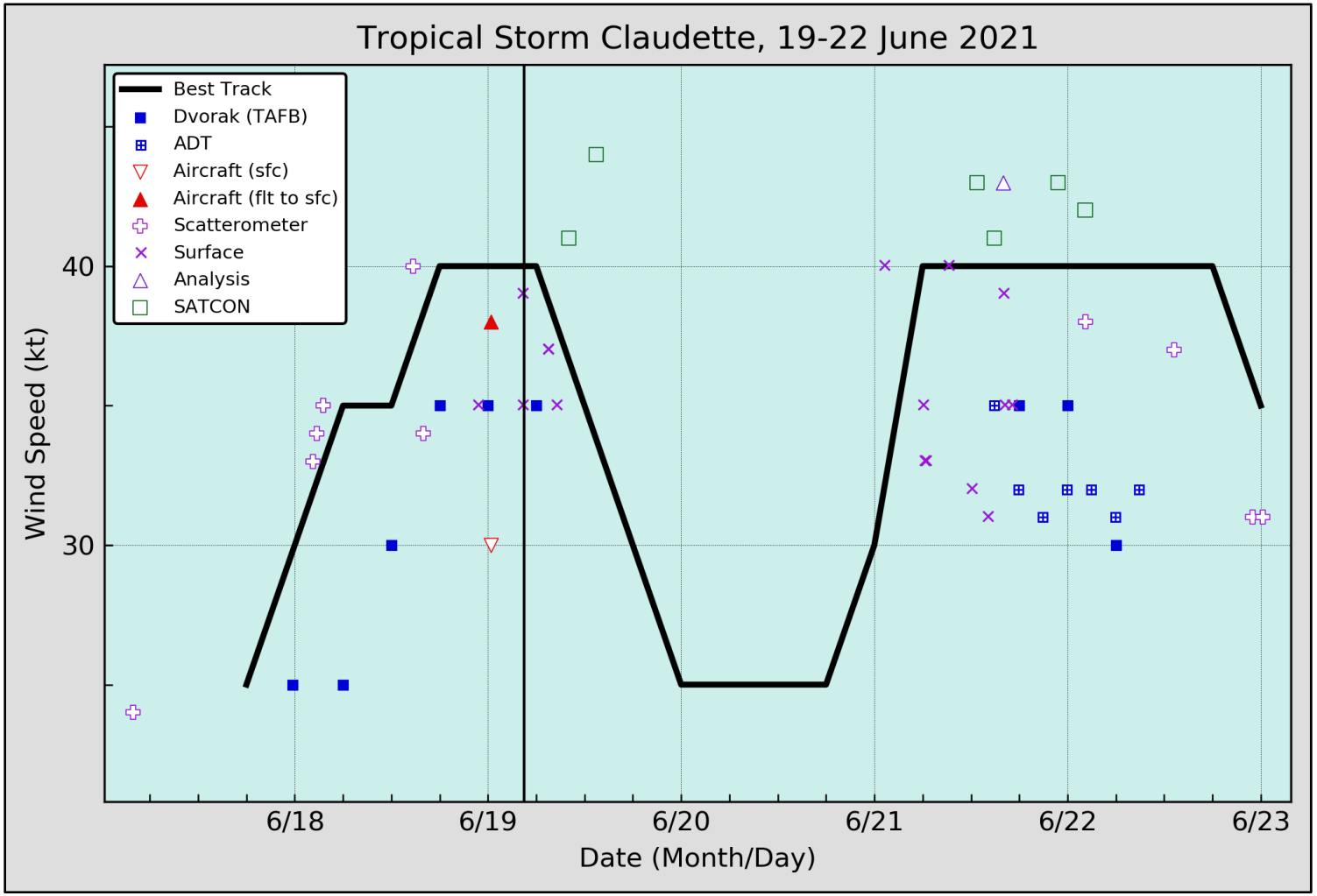

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Claudette, 19–22 June 2021. Aircraft observations have been adjusted for elevation using 80% adjustment factor for observations from 850 mb. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC, and the solid vertical line correspond to landfall.

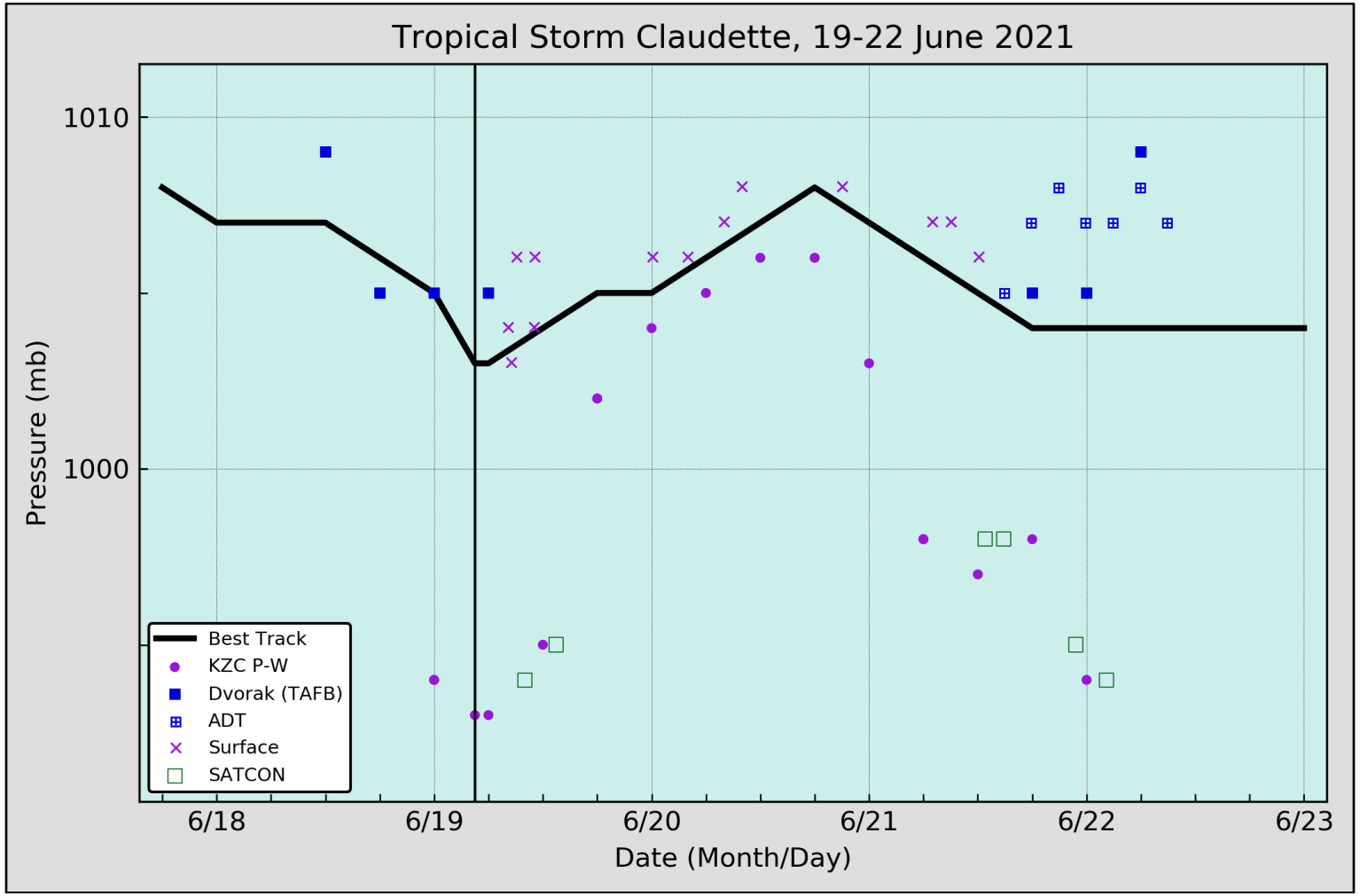

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Claudette, 19–22 June 2021. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC, and the solid vertical line corresponds to landfall.

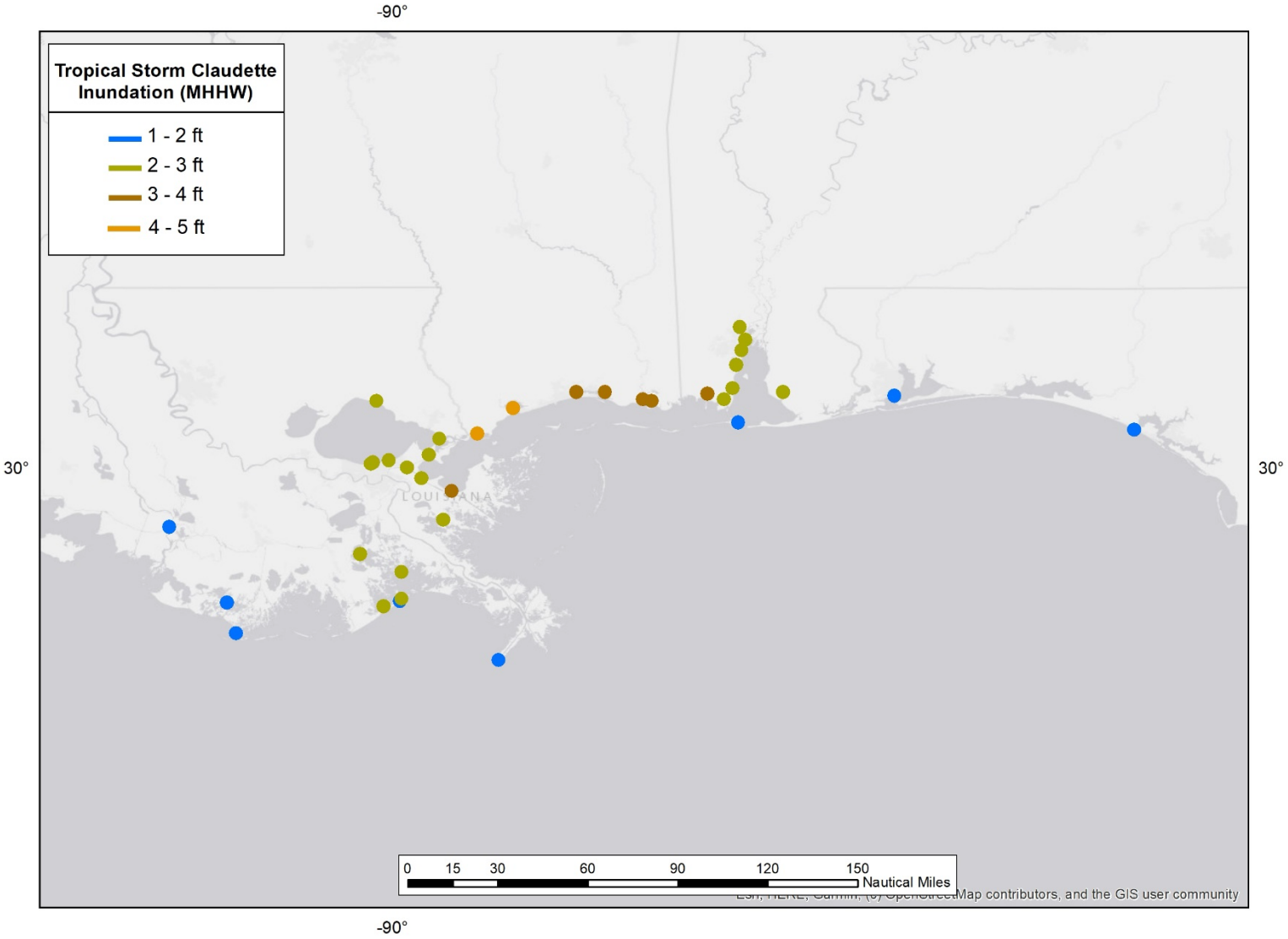

Figure 4. Maximum water levels measured from tide and stream gauges from Tropical Storm Claudette. Water levels are referenced as feet above Mean Higher High Water (MHHW), which is used as a proxy for inundation (above ground level) on normally dry ground along the immediate coastline.

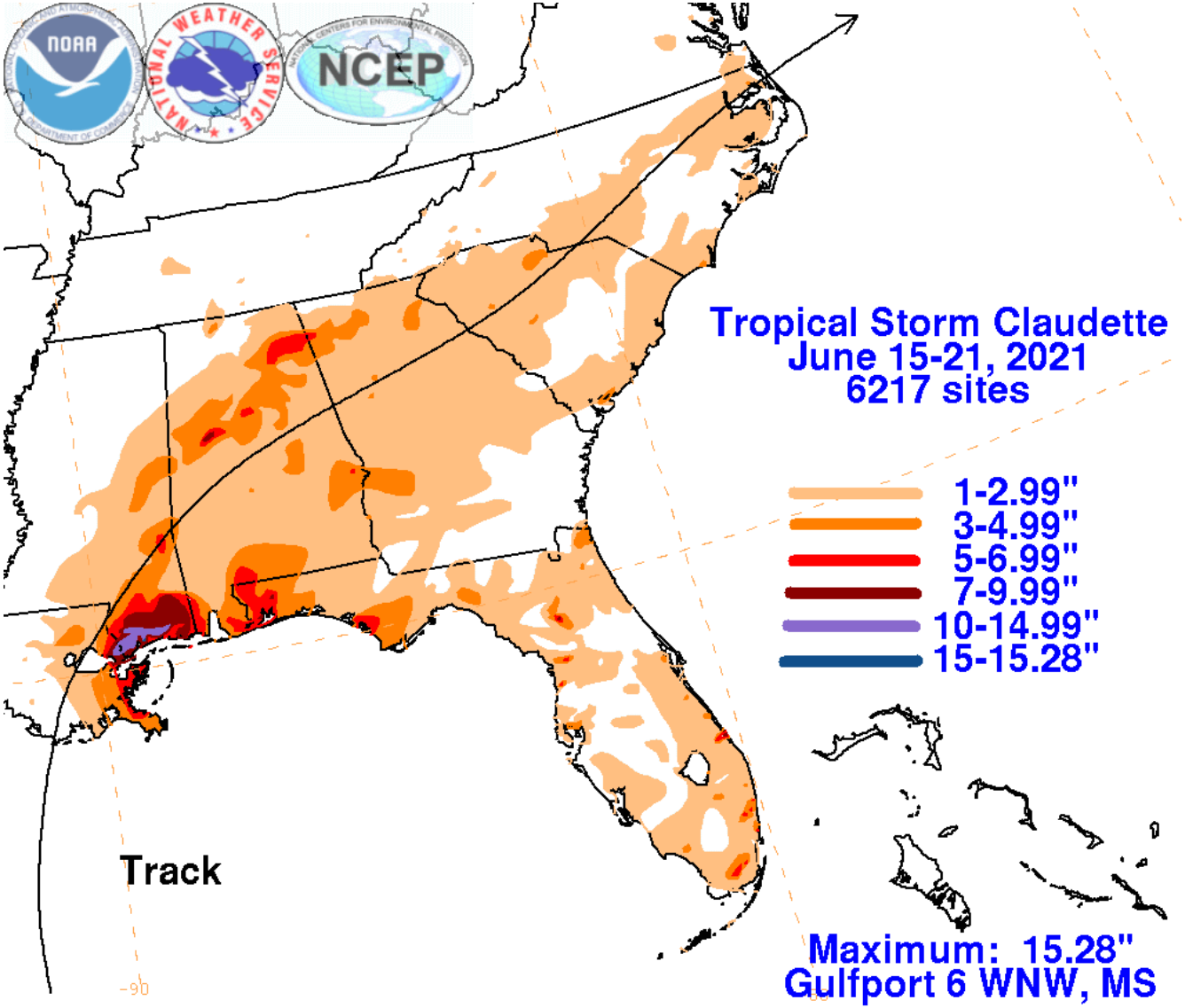

Figure 5. Rainfall accumulations (inches) between 15–21 June 2021 in the United States from Tropical Storm Claudette. Image courtesy of David Roth and Zack Taylor from the NOAA Weather Prediction Center.

Figure 6. Select images illustrating the flooding rainfall observed with Claudette in both Louisiana and Alabama. Imagery via NWS Birmingham (https://www.weather.gov/bmx/event_06192021) for Northport and Tuscaloosa, Alabama and from St. Tammany Fire Protection District 1 for Slidell, Louisiana.

Figure 7. Damage associated with an EF-2 Tornado in East Brewton, AL. Image via Fox10 News (https://www.fox10tv.com/news/alabama/ts-claudette-brings-tornado-damage-to-southern-alabama/article_b974600c-d16a-11eb-8446-674d90b6b3dd.html).

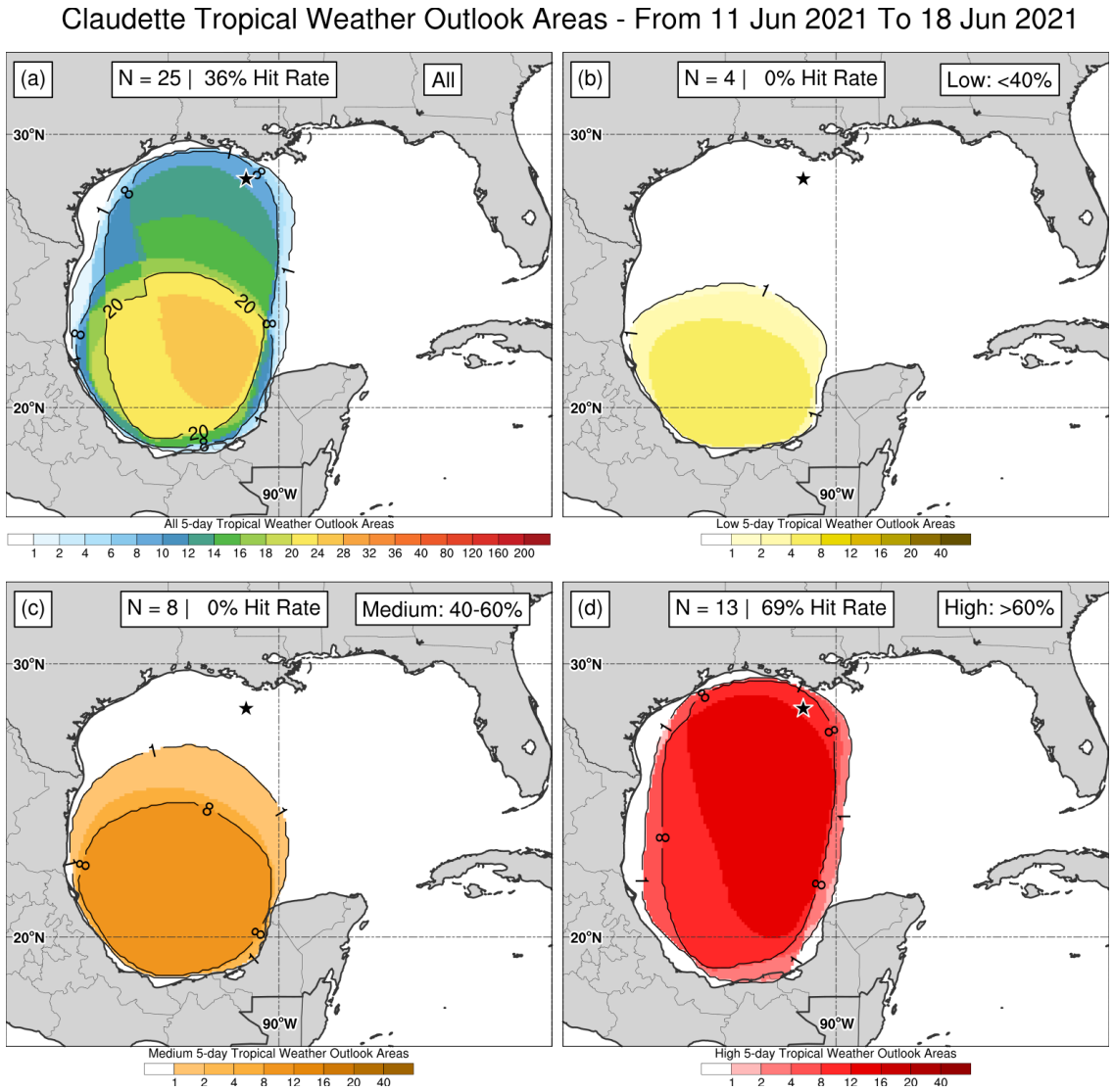

Figure 8. 5-day tropical weather outlook genesis areas associated with the disturbance that developed into Tropical Storm Claudette for (a) all probability areas (10–100%, multi-color shading), (b) low probability areas (< 40%, yellow shading), (c) medium probability areas (40–60%, orange shading), and (d) high probability areas (> 60%, red shading). The black star in each panel indicates the genesis location of Claudette.