NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

TROPICAL STORM OLGA

(AL172019)

25 October 2019

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National Hurricane Center
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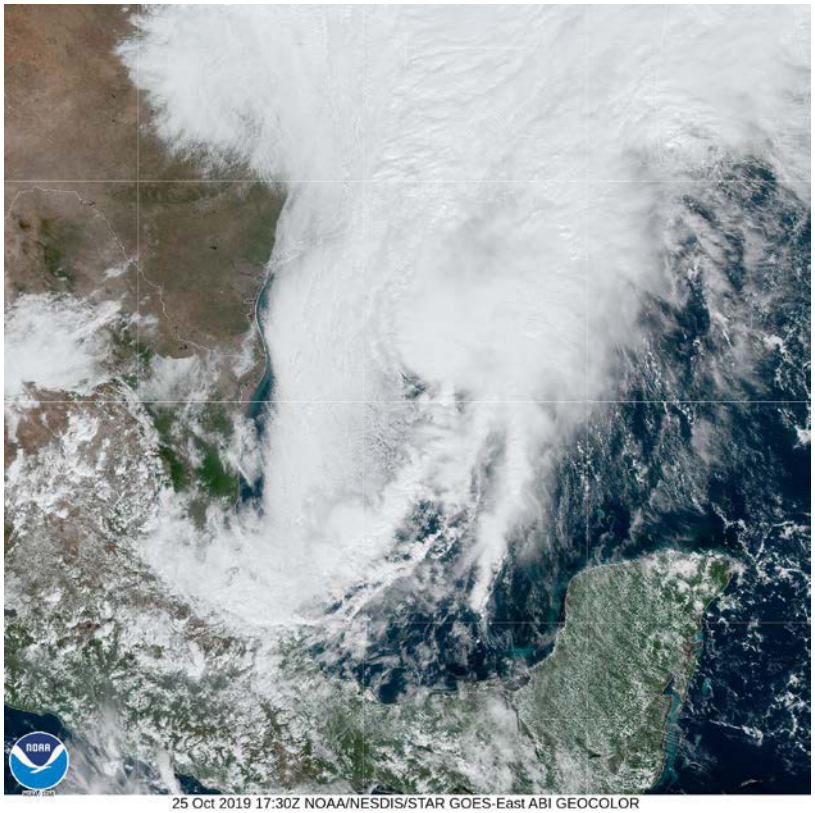

GOES-16 GEOCOLOR IMAGE OF TROPICAL STORM OLGA AT 1730 UTC 25 OCTOBER 2019. IMAGE COURTESY OF NOAA/NESDIS/STAR.

Olga was a short-lived tropical storm that became an extratropical cyclone shortly before making landfall in Louisiana accompanied by gale-force winds. Strong and damaging winds associated with this system spread well inland over the southeastern United States.

Tropical Storm Olga

25 OCTOBER 2019

SYNOPTIC HISTORY

The origin of Olga can be traced back to a well-defined tropical wave that crossed the west coast of Africa on 8 October. Although affected by strong shear, the system's associated convection intermittently showed signs of organization during its westward trek across the tropical Atlantic. On 17 October, the wave moved into the eastern Caribbean Sea. Over the next several days, the system moved slowly westward across the Caribbean, while continuing to produce intermittent deep convection. The wave reached Central America on 22 October and moved over the Yucatan Peninsula on 23 October. On 24 October, the wave spawned a broad area of low pressure over the Bay of Campeche. The low moved generally northward late on 24 October and early on 25 October, but it did not develop a well-defined center of circulation until 1200 UTC 25 October. By that time, early morning visible satellite imagery indicated a definite closed circulation had developed, and earlier scatterometer data suggested that the cyclone was of tropical storm intensity at genesis. Olga was centered about 340 n mi south-southwest of Lake Charles, Louisiana when it formed. 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[1].

Olga moved north-northeastward to northeastward on the east side of a deep-layer trough, and strengthened to an intensity of 40 kt around 1800 UTC 25 October (cover image). The system's tropical cyclone status was short lived, since by 0000 UTC 26 October it became embedded in a cold front and transformed into a 45-kt extratropical cyclone. The post-tropical cyclone crossed the southeast Louisiana coast around 0700 UC 26 October.

After landfall, the post-tropical cyclone became a significant inland wind event. The cyclone accelerated north-northeastward over Mississippi, western Tennessee, and extreme western Kentucky on 26 October. The weakening system passed over eastern Illinois and moved over Michigan on 27 October. Shortly after crossing Lake Huron later that day, the low dissipated over Canada.

METEOROLOGICAL STATISTICS

Observations in Olga (Figs. 2 and 3) include subjective satellite-based Dvorak technique

[1] 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.

intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Observations also include flight-level and stepped frequency microwave radiometer (SFMR) data from one flight of the 53rd Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command. 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 Olga.

The maximum intensity of the system as a tropical cyclone is estimated to be 40 kt based on a blend of flight-level and SFMR-observed surface winds from the reconnaissance mission. Some stronger winds were observed by the aircraft, but these were occurring behind the frontal boundary that was approaching Olga.

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

Winds

Post-tropical cyclone Olga produced strong and damaging winds over an approximately 300 n mi wide swath of the southern United States, including parts of Louisiana, Mississippi, and Tennessee. The highest wind observation over land was recorded at the LSU Coastal Studies Institute in Baton Rouge, Louisiana, where sustained winds of 48 kt and a gust of 62 kt were reported on 26 September. Wind gusts as high as 63 kt were reported at Mandeville, Louisiana. A wind gust to 64 kt was reported near Ripley, Mississippi. Wind gusts of 40–50 kt were widespread across the above three states.

Storm Surge[2]

The highest measured storm surge from Olga and its post-tropical remnants was 3.50 ft above normal tide levels at a National Ocean Service (NOS) gauge at the Bay Waveland Yacht

[2] 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) or Mean Lower Low Water (MLLW). **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).

Club in Bay St. Louis, Mississippi. Storm surges of 3.30 ft and 3.17 ft above normal tide levels were also observed at Bayou La Batre and Coast Guard Sector Mobile in Alabama, respectively.

The combined effect of the surge and tide produced minor to moderate coastal flooding with inundation levels of 1 to 2 ft above ground level, and isolated areas possibly near 3 ft, along the coasts of Alabama, Mississippi, and parts of southeastern Louisiana. The NOS gauges in Bay St. Louis, Mississippi, and at Bayou La Batre, Alabama, both measured maximum water levels of 2.7 ft above Mean Higher High Water (MHHW). In Louisiana, the highest recorded water level was 2.3 ft MHHW at the New Canal Station NOS gauge on the south shore of Lake Pontchartrain. Water levels were less than 2 ft MHHW at stations along the Florida Panhandle coast. Figure 4 shows storm tide observations above MHHW from NOS gauges, which provide rough approximations of inundation above normally dry ground.

Rainfall and Flooding

Olga's post-tropical remnants produced heavy rains, primarily over southeastern Louisiana, Mississippi, and western Alabama. Figure 5 depicts the rainfall totals, which reached to just over 10 inches in southeastern Louisiana. Flooding was mostly minor.

Tornadoes

Two EF1 tornadoes occurred late on 25 October in western Mobile County, Alabama, causing significant tree and roof damage. There was also an EF0 tornado in that area that produced only slight damage. An EF1 tornado was reported early on 26 October in Clarke County Alabama, causing significant roof damage to two homes as well as extensive tree damage.

CASUALTY AND DAMAGE STATISTICS

Post-tropical cyclone Olga's winds resulted in numerous downed trees and power lines, as well as some structural damage across Louisiana, Mississippi, and Tennessee. There was one fatality caused by a falling tree in Adamsville, Tennessee. About 130,000 customers were without power in Louisiana early on 26 October. The total damage estimate from NOAA's National Centers for Environmental Information is $400 million.

FORECAST AND WARNING CRITIQUE

Olga's genesis was not anticipated very far in advance, since it seemed likely that the system would quickly merge with a front over the Gulf of Mexico and not have much opportunity to develop. The wave from which the storm formed was first mentioned in the Tropical Weather Outlook (TWO) 60 h prior to genesis with a low (<30%) probability of formation within 120 h, and 42 h before formation within 48 h (Table 2). The 120-h and 48-h genesis probabilities were both increased to medium in a Special TWO 22 h prior to formation, and these probabilities were boosted to high 12 h prior to formation.

There were no NHC track or intensity forecasts for 12 h or longer to verify. The NHC did correctly anticipate that Olga would become extratropical very soon after formation.

No tropical cyclone warnings were issued for Olga, since it was anticipated that Olga would become post-tropical before reaching the Louisiana coast. However, several NWS Weather Forecast Offices issued warnings and advisories for high winds and coastal flood advisories associated with Olga's post-tropical remnants.

ACKNOWLEDGMENTS

John P. Cangialosi produced the track map. David Roth produced the rainfall map.

Table 1. Best track for Tropical Storm Olga, 25 October 2019, and its post-tropical remnants.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
25 / 1200	24.7	94.8	1004	35	tropical storm
25 / 1800	25.9	93.6	998	40	"
26 / 0000	27.0	92.5	996	45	extratropical
26 / 0600	28.8	91.2	994	45	"
26 / 1200	31.7	90.0	993	45	"
26 / 1800	36.2	89.3	993	40	"
27 / 0000	40.1	88.0	992	30	"
27 / 0600	42.5	87.0	992	30	"
27 / 1200	44.5	84.7	994	30	"
27 / 1800	46.0	80.3	998	30	"
28 / 0000					dissipated
25 / 1800	25.9	93.6	998	40	minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Tropical Storm Olga and its post-tropical remnants, 25 October 2019. Note that many wind observations are taken from anemometers located well above the standard 10-m observation height.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
24/1600	D5DY4	26.1	91.4	110 / 35	1012.0
25/0300	WMKN	28.7	93.7	200 / 35	1011.9
25/1600	C6CL6	26.8	94.8	340 / 45	1009.5
25/1800	TBWUK3	28.8	95.1	330 / 38	1013.4
26/0300	3EMB9	27.8	92.5	350 / 50	1005.3

Table 3. Selected surface observations for Tropical Storm Olga and its post-tropical remnants, 25 October 2019.

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)				
Buoys									
42002 NOAA (26.06N 93.65W)	25/1900	1002.8	25/1953	39 (4 m, 1-min)	49				
42019 NOAA (27.91N 95.34W)	25/0930	1009.5	25/1022	41 (4 m, 1-min)	45				
42395 (26.40N 90.79W)	26/0140	1006.5	26/0140	29 (3 m, 8-min)	40				
Offshore Oil Platforms									
KGBK (27.20N 92.20W)			26/0315	43 (58 m)	57				
KGHB (27.84N 91.99W)			26/0355	56 (110 m)	70				
KVQT (28.27N 92.26W)			26/0535	44 (90 m)	50				
KEIR (28.63N 91.49W)			26/0655	39 (25 m)	46				
Main Pass 140b (KMIS) (29.30N 88.85W)			26/1115		45 (85 m)				
Main Pass 289c (KVKY) (29.25N 88.43W)			26/1235		41 (115 m)				
Mississippi Canyon 311a (KMDJ) (28.64N 89.79W)			26/0815	43 (90 m)	50				
Louisiana Offshore Oil Port (LOPL1) (28.89N 90.03W)	26/0725	1004.1	26/0725	43 (58 m)	51				
West Delta 27a (KDLP) (29.12N 89.55W)			26/0855		44 (35 m)				
United States									
Florida									
National Ocean Service (NOS) Sites									
Apalachicola (APCF1) (29.73N 84.98W)	26/2012	1010.3				1.56	2.46	1.6	
Cedar Key (CKYF1) (29.14N 83.03W)	26/2012	1010.5				1.85	3.26	1.7	
Pensacola (PCLF1) (30.40N 87.21W)	26/2006	1008.2				1.72	2.44	1.5	
Alabama									
International Civil Aviation Organization (ICAO) Sites									
Mobile (KMOB) (30.69N 88.25W)			26/1314		34				
NOS Sites									
Bayou La Batre (BLBA1) (30.41N 88.25W)						3.30	3.60	2.7	

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)				
Chickasaw Creek (CIKA1) (30.78N 88.07W)						3.02	3.28	1.9	
Coast Guard Sector Mobile (MCGA1) (30.65N 88.06W)	26/1036	1006.9				3.17	3.46	2.3	
Dauphin Island (DILA1) (30.25N 88.08W)	26/1024	1006.1				2.02	2.44	1.7	
Dog River Bridge (BYSA1) (30.57N 88.00W)						2.65		2.0	
East Fowl River Bridge (EFRA1) (30.44N 88.11W)						2.32	2.68	1.9	
Mobile State Docks (OBLA1) (30.70N 88.04W)	26/1036	1007.0				2.77	3.20	2.0	
Weeks Bay, Mobile Bay (WBYA1) (30.42N 87.83W)						2.57		2.2	
West Fowl River Bridge (WFRA1) (30.38N 88.16W)						2.89	3.14	2.2	
Meteorological Assimilation Data Ingest System (MADIS) Sites									
Dauphin Island (DPIA1) (30.25N 88.07W)			26/1430		39 (14 m)				
Louisiana									
International Civil Aviation Organization (ICAO) Sites									
Bogalusa (KBXA) (30.82N 89.87W)	26/1055	999.3	26/1035	33	42				
Boothville (KLNQ) (29.35N 89.43W)	26/0955	1005.1	26/0915		36				
Galliano (KGAO) (29.45N 90.27W)	26/0835	1000.3	26/0835	27	39				
Hammond (KHDC) (30.52N 90.42W)			26/1015	30	50				
Houma (KHUM) (29.56N 90.66W)	26/0715	1001.7	26/0715	16	33				
New Orleans International (KMSY) (30.00N 90.25W)	26/0905	997.6	26/0853	42	51				7.33
New Orleans Lakefront (KNEW) (30.04N 90.02W)	26/1015	1000.0	26/0946	34[I]	50				
New Orleans NAS (KNBG) (29.82N 90.02W)	26/0855	1000.3	26/0855	30[I]	57				
New Orleans Superdome (K7N0) (29.95N 90.07W)	26/0930	999.6	26/0950	31[I]	43				
Port Fourchon (KXPY) (29.12N 90.20W)	26/0755	1002.0	26/0755	30	43				
Reserve (KAPS) (30.08N 90.58W)	26/0915	995.9	26/0915	31	44				
Slidell (KASD) (30.35N 89.82W)	26/1045	1000.5	26/1025	33	49				
Coastal-Marine Automated Network (C-MAN) Sites									
N of Eugene Island (EINL1) (29.37N 91.38W)	26/0724	1000.0	26/0818	37 (4 m)	43	2.20		1.8	
Frenier Landing (FREL1) (30.11N 90.42W)	26/0942	996.6	26/0930	39 (10 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)				
Southwest Pass (BURL1) (28.91N 89.43W)			26/0840	33 (38 m,10-min)	43				
NOS Sites									
Amerada Pass (AMRL1) (29.45N 91.34W)	26/0736	1000.3	26/0830	28 (11 m)	38	1.93	2.42	1.6	
I-10 Bonnet Carre Floodway (BCFL1) (30.07N 90.39W)						2.00		2.1	
Freshwater Canal (FRWL1) (29.55N 92.31W)	26/0742	1006.1				2.26		2.2	
Grand Isle (GISL1) (29.27N 89.96W)			26/0924		34 (9 m)	1.78		1.4	
New Canal Station (NWCL1) (30.03N 90.11W)	26/0924	998.3	26/0930		41 (10 m)	2.23		2.3	
Pilottown (PILL1) (29.18N 89.26W)	26/0748	1005.3	26/0942	27	36 (10 m)	1.44		0.9	
Pilots Station East (PSTL1) (28.93N 89.41W)	26/0800	1005.8	26/0836	35 (20 m)	57	1.93		1.5	
Port Fouchon (PTFL1) (29.11N 90.20W)						1.74		1.4	
Shell Beach (SHBL1) (29.87N 89.67W)	26/0918	1002.1	26/0930	34 (16 m)	44	2.09	2.55	1.8	
West Bank 1 (BYGL1) (29.79N 90.42W)	26/0906	996.8	26/0830	33 (31 m)	41				
USGS Hydrometeorological Automated Data System Sites									
Caillou (DCLL1) (29.25N 90.92W)			26/0600	34					
LSU Coastal Studies Institute									
(SPLL1) (28.87N 90.48W)			26/0700	48 (10 m)	62				
Citizen Weather Observer Program (CWOP)									
Bourg (FW6044) (29.56N 90.60W)	26/0840	997.0	26/0825		35				
Chauvin (DW0358) (29.35N 90.63W)	26/0801	996.3							
Covington (EW9369) (30.44N 90.16W)	26/1001	998.3	26/1001		35				
Gretna (DW6888) (29.87N 90.04W)	26/0913	1000.0	26/1243		37[l]				
Hammond (EW5825) (30.49N 90.43W)	26/0958	995.0	26/0958		38				
Lockport (EW6903) (29.66N 90.54W)	26/0846	997.0	26/0816		37				
Kenner (FW1110) (30.03N 90.22W)	26/0915	998.0	26/0930		40				
New Orleans (EW6362) (29.97N 90.09W)	26/0926	999.0	26/0911		35				
Thibodaux (FW4663) (29.77N 90.79W)	26/0847	996.6	26/0832		37				
Other									

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)				
Bayou Bienvenue (30.00N 89.90W)			26/0927		59				
Boothville (29.32N 89.40W)			26/0904		42				
Dulac (29.35N 90.73W)			26/0753		52				
Jefferson Parish (29.94N 90.23W)			26/0849		44				
Mandeville (30.36N 90.09W)			26/0955		63				
Pontchartrain Causeway (30.20N 90.12W)			26/0947		53 (12 m)				
Mississippi									
ICAO Sites									
Biloxi (KBIX) (30.42N 88.92W)			26/1141		39				
Columbia-Marion Co AP (K0R0) (31.30N 89.81W)	26/1155	999.2	26/1235	26	39				
Corinth (KCRX) (34.92N 88.60W)	26/1740	997.6[l]	26/1740	28[l]	40[l]				
Gulfport (KGPT) (30.41N 89.08W)	26/1520	1004.1	26/1649	26	38				
Hattiesburg (KHBG) (31.27N 89.26W)	26/1145	1001.7	26/1145	33	46				3.79
Meridian (KMEI) (32.34N 88.75W)	26/1405	1003.4	26/1500	32	42				5.15
Starkville (KSTF) (33.43N 88.85W)	26/1535	1000.7	26/1555	29	46				
Tupelo (KTUP) (34.27N 88.77W)	26/1645	997.9	26/1708	40	62				
Winona-Montgomery Co AP (K5A6) (33.46N 89.73W)	26/1515	1000.3							
NOS Sites									
Pascagoula NOAA Lab (PNLM6) (30.37N 88.56W)						2.97	3.36	2.5	
Petit Bois Island (PTBM6) (30.21N 88.56W)	26/1012	1005.7	26/1242		40 (5 m)				
Waveland Yacht Club (WYCM6) (30.33N 89.33W)			26/1054	32	45	3.50	3.79	2.7	
RAWS Sites									
3 mi SE Iuka (TISM6) (34.78N 88.17W)			26/1814		61				
Bureau of Land Management									
Bienville (FSTM6) (32.30N 89.48W)			26/1406		39				
Covington (RHCM6) (31.75N 89.52W)			26/1109		41				
Neshoba (RNEM6) (32.80N 89.12W)			26/1513		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)				
Citizen Weather Observer Program (CWOP)									
Aberdeen (EW8549) (33.84N 88.74W)			26/1618		38				
Carriere (AU216) (30.64N 89.70W)	26/1100		26/1030		50				
Public/Other									
5 mi SE Ripley (34.68N 88.91W)			26/1640		64				
Ship Island (30.23N 88.98W)			25/1331		47				
Tennessee									
ICAO Sites									
Lexington (KPVE) (35.66N 88.20W)	26/1855	997.7	26/1855		49				
Selmer (KSZY) (35.20N 88.50W)	26/1825	999.2[I]	26/1825	25[I]	38[I]				
RAWS Sites									
4 mi W Camden (CMDT1) (36.07N 88.17W)			26/1907		50				
Shiloh (SHOT1) (35.16N 88.32W)			26/1907		43				
Citizen Weather Observer Program (CWOP)									
Parsons (C7890) (35.65N 88.13W)			26/1854		43[I]				

[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. Cuban station averaging periods are 10 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
[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.
[I] Incomplete record

Table 4. 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%)	42	60
Medium (40%-60%)	22	22
High (>60%)	12	12

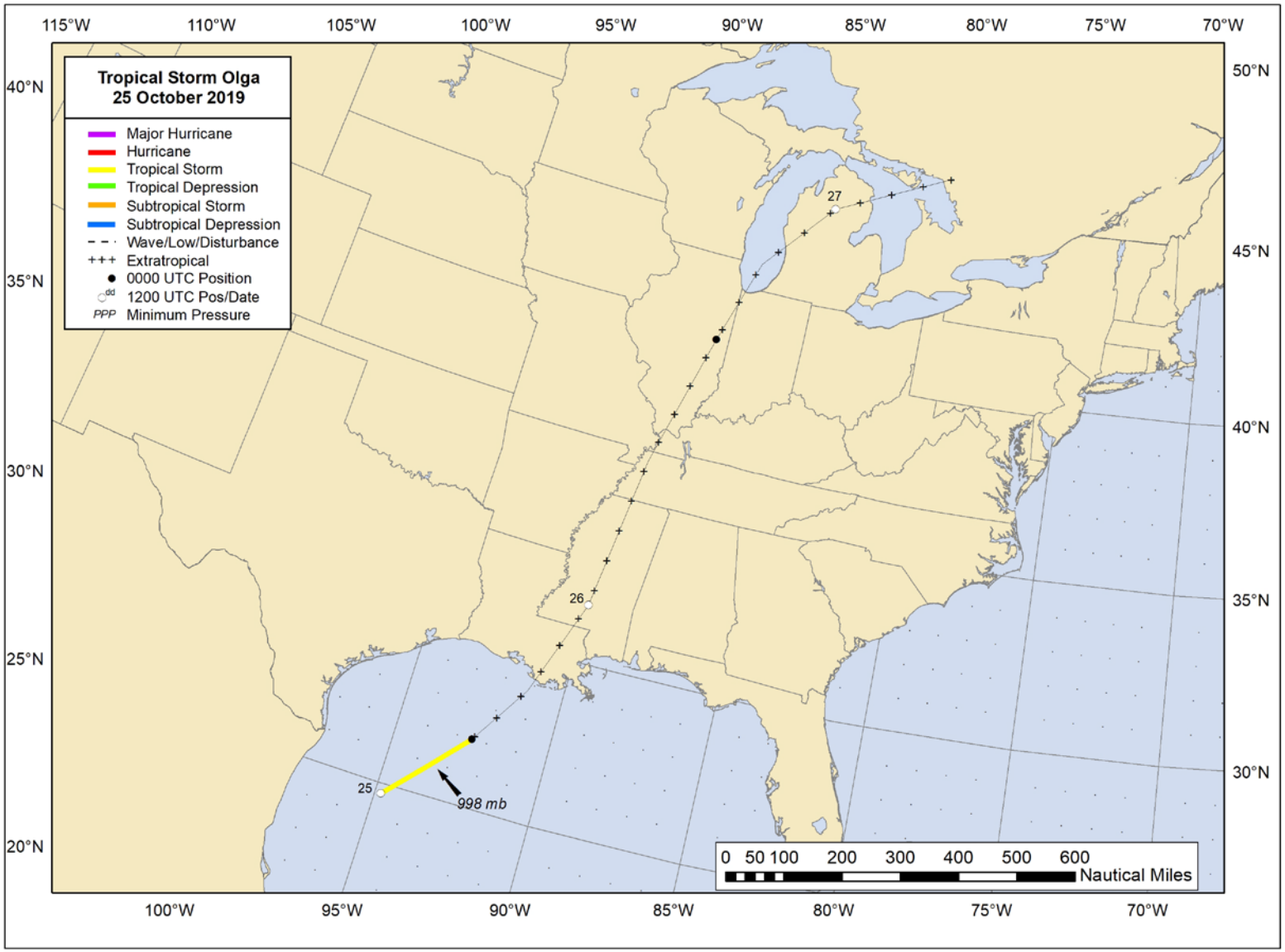

Figure 1. Best track positions for Tropical Storm Olga, 25 October 2019.

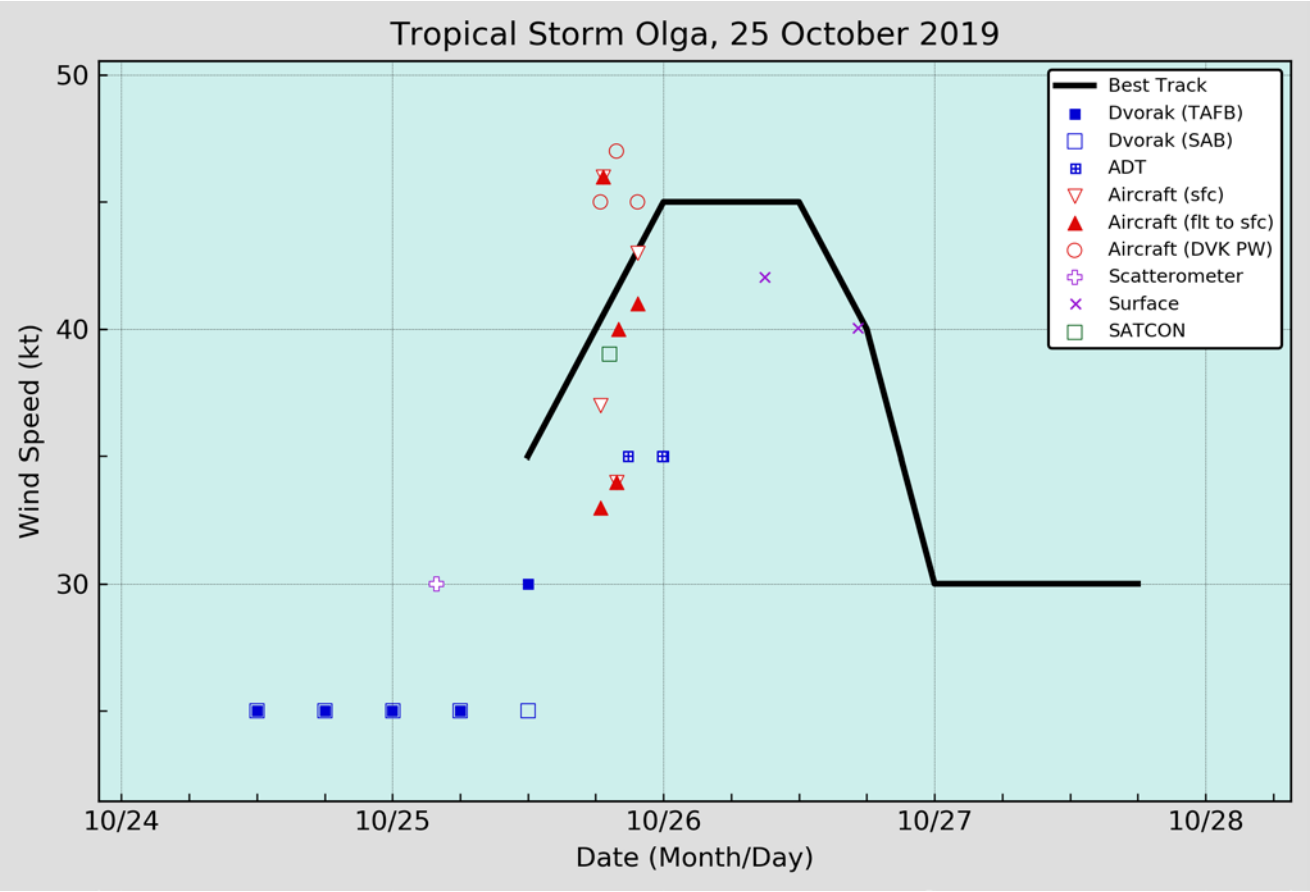

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Olga, 25 October 2019. Aircraft observations have been adjusted for elevation using 80% adjustment factors for observations from about 1500 ft. Advanced Dvorak Technique estimates represent 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.

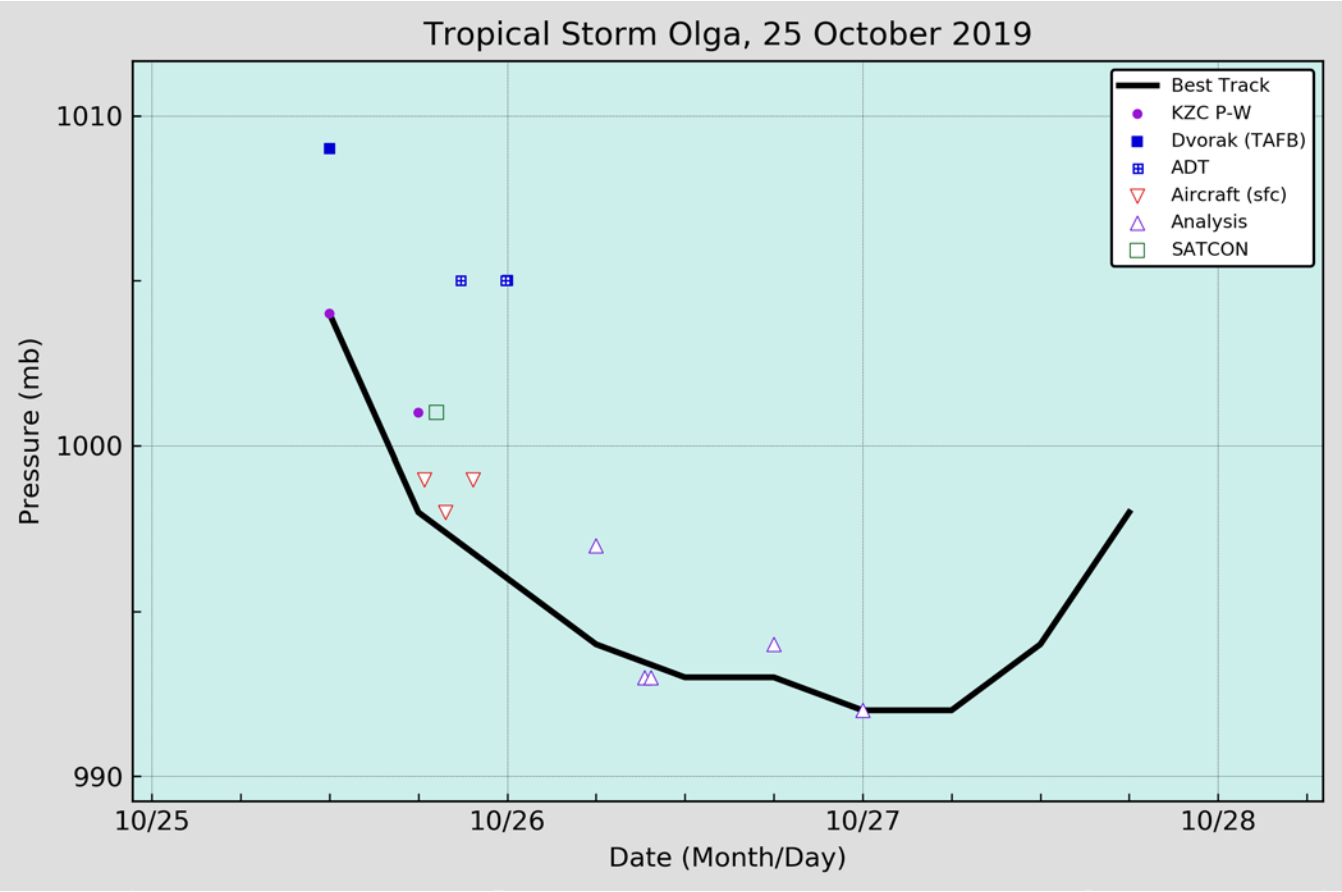

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Olga, 25 October 2019. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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.

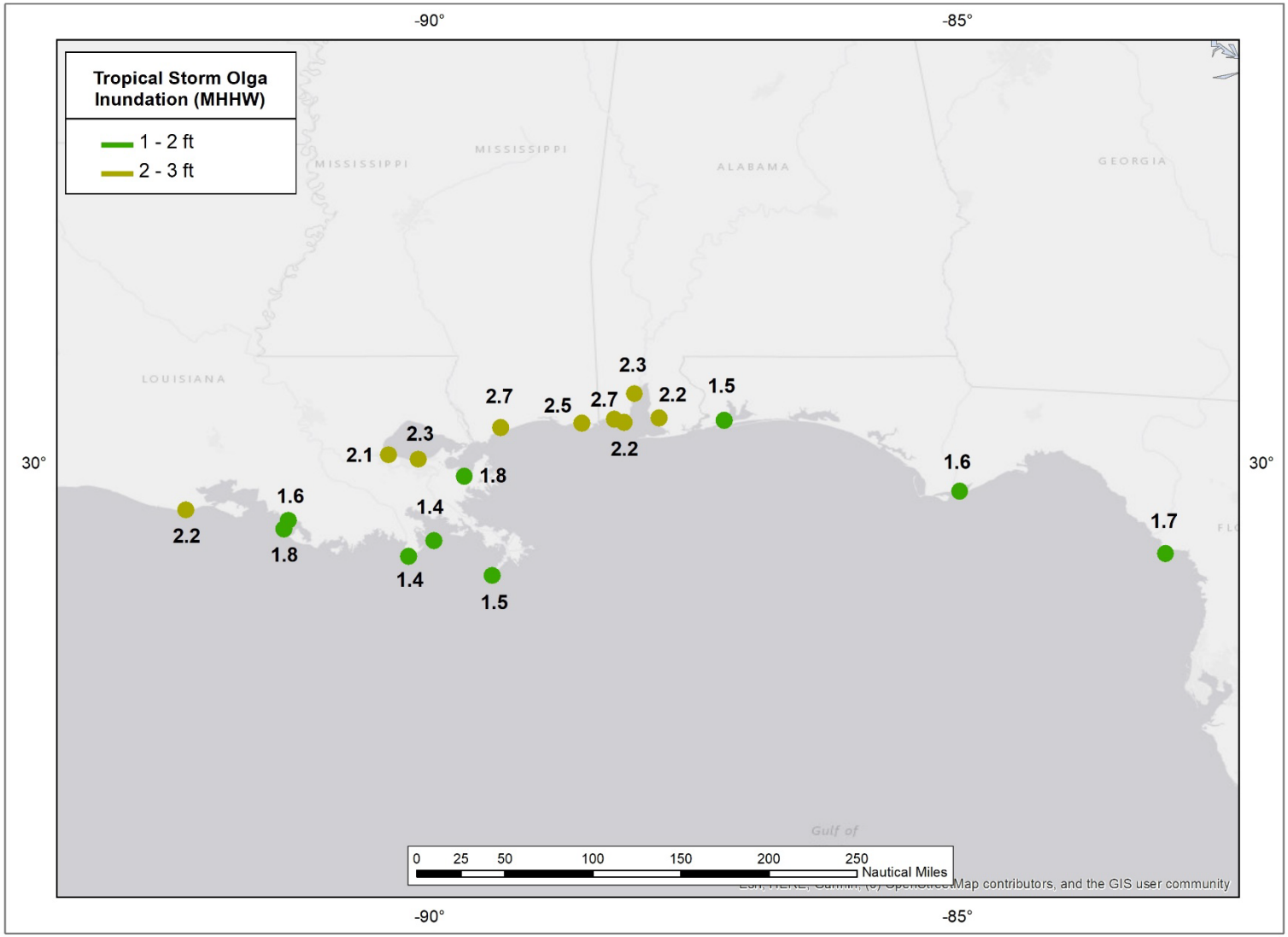

Figure 4. Maximum water levels measured from tide gauges along the northern Gulf Coast during Tropical Storm Olga and its post-tropical remnants. Water levels are referenced as feet above Mean Higher High Water (MHHW), which is used as a proxy for inundation (above ground level) on normally dry ground along the immediate coastline.

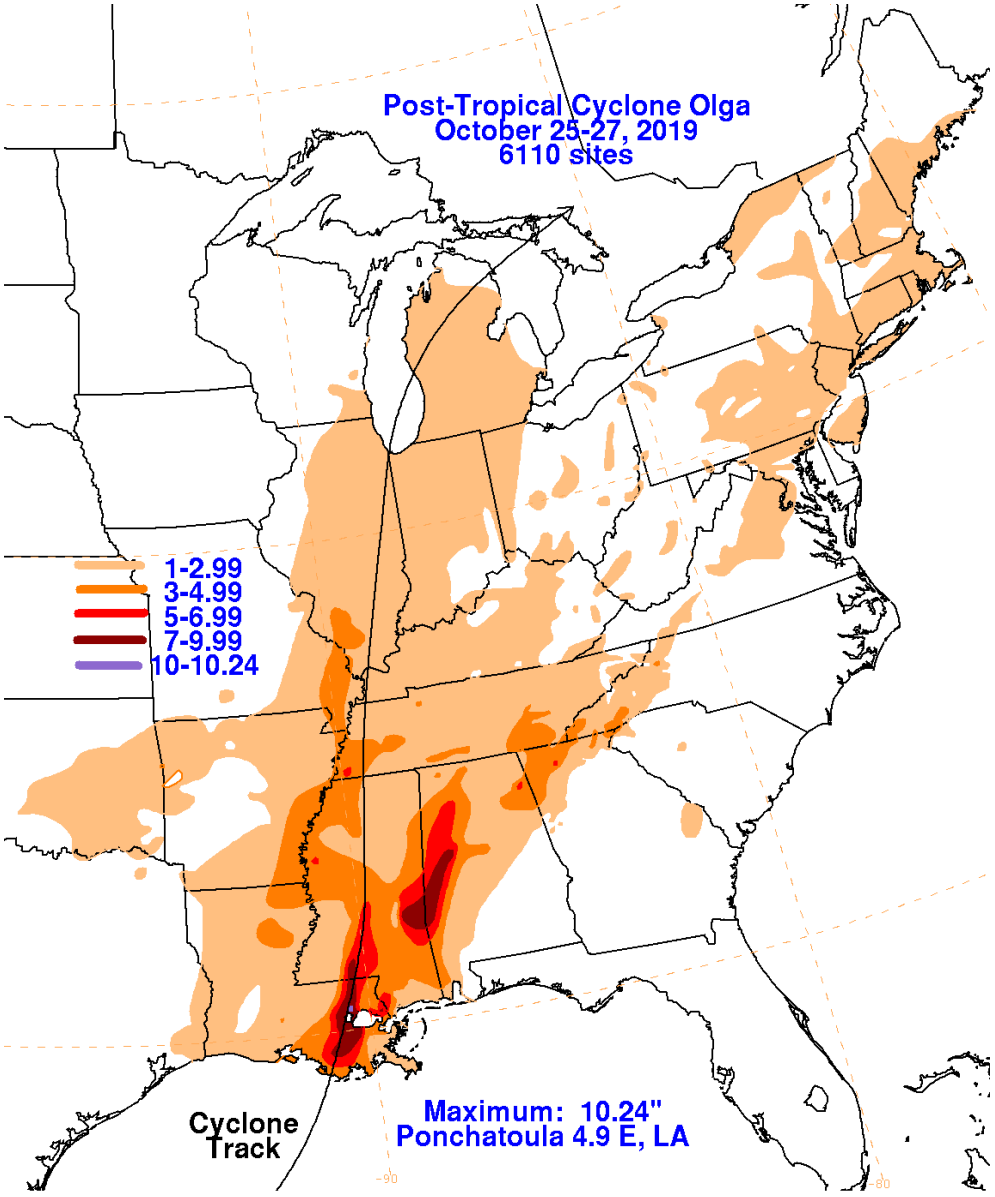

Figure 5. Rainfall totals (inches) associated with Olga and its post-tropical remnants. Figure courtesy of David Roth, NOAA/NWS Weather Prediction Center.