NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

HURRICANE MILTON

(AL142024)

5–10 October 2024

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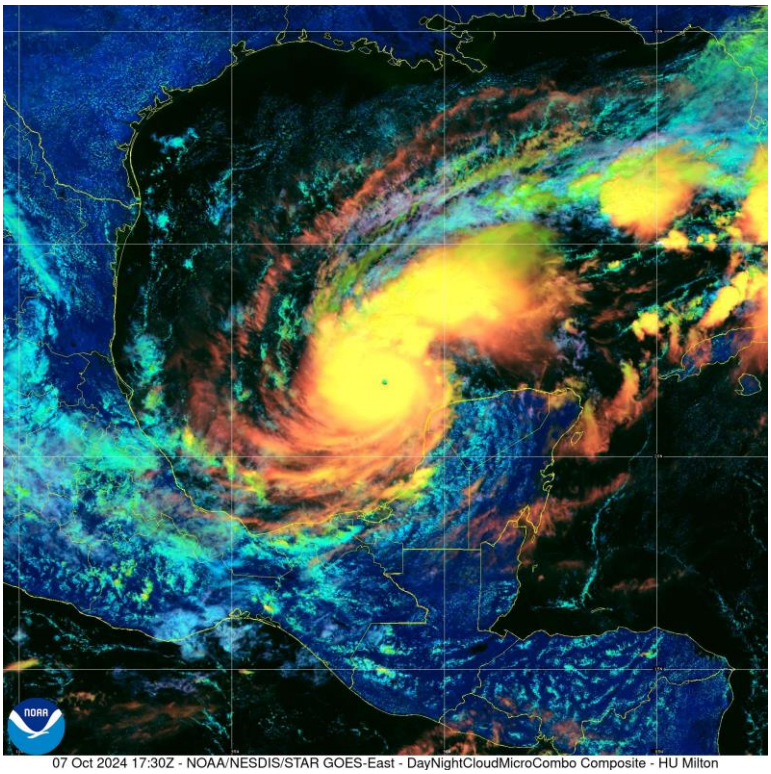

GOES-16 DAY CONVECTION IMAGE OF HURRICANE MILTON AT 1730 UTC 7 OCTOBER 2024. IMAGE COURTESY OF NOAA/NESDIS STAR.

Milton was one of the strongest hurricanes of record in the Atlantic basin, reaching category 5 intensity (on the Saffir-Simpson Hurricane Wind Scale) with a minimum central pressure below 900 mb. After an unusual eastward track across the Gulf of America, it made landfall on the west coast of the Florida peninsula as a category 3 hurricane, causing major damage in the Sarasota and Tampa Bay areas.

Hurricane Milton

5–10 OCTOBER 2024

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SYNOPTIC HISTORY

Milton had a complex genesis. A tropical wave moved off the west coast of Africa on 14 September, but it did not have any significant convection at that time. This wave appears to have interacted with a pre-existing low-level trough west of the Cabo Verde Islands, which resulted in a slowly moving system over the eastern Atlantic. A second tropical wave that emerged from the African coast on 18 September appears to have interacted with the earlier two systems, and the combination of the merged systems resulted in a better-defined tropical wave that moved westward across 40°W longitude on 22 September. The wave reached the Lesser Antilles on 26 September, accompanied by increased, but disorganized convection. Little development occurred while the system crossed the eastern and central Caribbean Sea on 27–28 September.

When the wave reached the western Caribbean Sea on 29 September, it interacted with a broad trough of low pressure – the remnants of a Central American Gyre[1] that had earlier helped spawn Hurricane Helene in the Caribbean and Hurricane John in the eastern Pacific. By 1 October, this synoptic pattern led to a low-level trough extending from the Bay of Campeche northeastward to the central Gulf of America which was interacting with a front over the eastern Gulf of America. By 3 October, a north-south oriented trough was located over the western Gulf waters with increasing convection and two vorticity centers. The northern center, located east of the Texas coast, weakened due to southwesterly shear and dry air entrainment. The southern center, located in a more favorable environment over the southwestern Gulf, developed further on 4 October, likely aided by interaction with the remnants of the Unnamed Tropical Storm (formerly Tropical Depression Eleven-E)[2] from the eastern Pacific, which moved northward across the Isthmus of Tehuantepec. The associated convection became better organized on 5 October, and it is estimated that this system became a tropical depression at 1200 UTC that day about 135 n mi east of Tampico, Mexico. The “best track” chart of the tropical cyclone’s (TCs) 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].

The depression initially moved slowly northward through the early hours of 6 October. An environment of light-to-moderate vertical wind shear and very warm sea surface temperatures allowed for intensification, and the cyclone became a tropical storm about 6 h after genesis. Later that day, surface pressures rose north of Milton, while the interaction of the aforementioned front and another vorticity center moving northwestward from the Caribbean caused the formation of a surface low over the northeastern Gulf of America. This evolution stopped Milton’s northward motion and caused the cyclone to move slowly eastward along the southern edge of the

[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. http://journals.ametsoc.org/doi/pdf/10.1175/MWR-D-16-0411.1

[2] The Unnamed Tropical Storm report is available at https://www.nhc.noaa.gov/data/tcr/EP112024_Unnamed.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.

mid-latitude westerlies – a motion that would continue until early on 7 October. Milton steadily strengthened during this time, with the cyclone reaching hurricane strength by 1800 UTC 6 October about 265 n mi west-northwest of Merida, Mexico.

Milton turned east-southeastward in the early hours of 7 October partly in response to the strengthening low and front to the northeast and north. At about the same time, explosive intensification began as Milton developed a small and well-defined inner core. Aircraft data indicated that Milton's central pressure was 977 mb around 0325 UTC but fell sharply to an estimated 895 mb by 2000 UTC, with the maximum sustained winds also increasing to an estimated peak intensity of 155 kt. At the time of peak intensity, Milton was centered about 85 n mi northwest of Merida. The hurricane subsequently weakened for roughly the next 12 hours as it underwent an eyewall replacement cycle, and while this occurred, the center was moving eastward about 35–50 n mi north of the northwestern coast of the Yucatan Peninsula of Mexico. While this track was close enough to bring tropical-storm conditions, storm surge, and destructive waves to the area, Milton's hurricane-force winds were confined to a small area near the eye and remained offshore.

Early on 8 October, the low over the northeastern Gulf of America moved across Florida into the western Atlantic. This allowed a low- to mid-level ridge to build northward across the northwestern Caribbean and the Florida Peninsula between the low and Milton, with the front moving northward to the central Florida Peninsula. This evolution caused the hurricane to move somewhat erratically east-northeastward. After Milton completed the eyewall replacement near 1200 UTC that day, it re-intensified from 125 kt to 145 kt between 1200–2205 UTC 8 October. Subsequent additional fluctuations in intensity that occurred into early 9 October could have been related to a second eyewall replacement cycle.

Around 0600 UTC 9 October, Milton entered an area of stronger deep-layer southwesterly flow, which significantly increased southwesterly shear over the system and caused the hurricane to accelerate northeastward, bringing the center over cooler sea surface temperatures in the eastern Gulf. The increasingly hostile environment caused Milton to rapidly weaken while it significantly increased in size during the approach to the west coast of the Florida Peninsula. The maximum sustained winds decreased to near 100 kt (category 3 on the Saffir-Simpson Hurricane Wind Scale) by the time the center made landfall on Siesta Key, Florida, at 0030 UTC 10 October (Fig. 4).

Milton subsequently moved east-northeastward across the Florida Peninsula, with the center emerging into the Atlantic near Cape Canaveral by 0800 UTC 10 October. The cyclone started extratropical transition as it interacted with the front while crossing Florida, and this process was complete by 1800 UTC that day, when Milton became a storm-force extratropical low about 185 n mi east of Daytona Beach, Florida. The extratropical low continued eastward and gradually lost its identity in the front, and the system dissipated by 0000 UTC 12 October a few hundred n mi south of Bermuda.

METEOROLOGICAL STATISTICS

Observations in Milton (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), 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, stepped frequency microwave radiometer (SFMR), and dropwindsonde observations from 9 flights of the 53rd Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command and 13 flights of the NOAA Aircraft Operations Center (9 flights by the P-3 aircraft and 4 synoptic surveillance missions by the G-IV aircraft, Fig. 5). 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), Defense Meteorological Satellite Program (DMSP) satellites, and the Time-Resolved Observations of Precipitation structure and storm Intensity with a Constellation of Smallsats (TROPICS) satellites, among others, were also useful in constructing the best track of Milton.

Ship reports of winds of tropical storm force associated with Milton are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3. Selected additional storm total rainfall reports are given in Table 4.

Winds and Pressure

Milton's peak intensity on 7 October is unusually uncertain due to the rapidly-intensifying hurricane reaching its peak between aircraft missions. An Air Force Reserve aircraft that made its last penetration of the eye near 1700 UTC reported maximum 700-mb flight-level winds of 158 kt, which supports surface winds of 140-145 kt. The aircraft also reported that the central pressure fell from 925 mb to 912 mb between its last two fixes. Satellite imagery suggests it is likely that Milton continued to strengthen until about 2000 UTC, when the eye started becoming less distinct. A subsequent NOAA Hurricane Hunter mission, which reached the eye after weakening began, reported maximum measured flight-level winds of 161 kt at 2221 UTC 7 October, which using the standard dropsonde-based reductions supports peak surface winds of near 145 kt. Based on these observations and the intensity trends in aircraft and satellite data, it is estimated that Milton briefly reached a peak intensity of 155 kt at 2000 UTC 7 October. It should be noted that: 1) two dropsondes from the NOAA aircraft reported surface winds of near 160 kt, and 2) estimates of stronger winds from the SFMR are not considered reliable.

The lowest observed pressure in Milton was 899 mb from a dropsonde at 2220 UTC 7 October which had a surface wind of 24 kt. Thus, the estimated pressure at the time is 897 mb. As the hurricane was weakening at that time, the pressure is estimated to have been 895 mb at the time of peak intensity. This ties Hurricane Rita of 2005 for the fourth-lowest minimum central pressure in an Atlantic hurricane. The lower central pressures include 882 mb in Wilma in 2005, 888 mb in Gilbert in 1988, and 892 mb in the Labor Day Hurricane of 1935. Given that there were no aircraft in the hurricane at the time of the estimated peak intensity, the analyzed minimum pressure of 895 mb is more uncertain than normal.

Milton's landfall intensity in Florida is also somewhat uncertain. As the center approached the Florida west coast, aircraft reported 700-mb flight-level winds near 115 kt, and data from Synthetic Aperture Radar (Fig. 4) showed an area of 100–110 kt surface winds[4] over water to the west of the center. This area of winds moved onshore about 90 minutes after the center made landfall, and as Milton rapidly weakened it is likely that the winds decreased before they reached the coast. Unfortunately, no wind observations were available in the area where these winds reached the coast. The maximum sustained winds reported in Florida were 79 kt (with a gust of 93 kt) at a University of Florida tower located at Venice Beach, which is possibly a little south of where the strongest winds reached the coast. The minimum pressure at landfall is estimated at near 958 mb based on reports of 959.7 mb at the Sarasota Airport, a nearby barometer reading from a storm chaser, and aircraft data prior to landfall. Based on the available data, the landfall intensity is set at 100 kt - category 3 on the Saffir-Simpson Hurricane Wind Scale. However, if these major hurricane winds occurred along the coast they were likely confined to a small area near Sarasota and Siesta Key.

In Florida, Milton caused hurricane conditions along the west coast from Clearwater Beach and Tampa southward across Sarasota to near Venice. Tropical storm conditions occurred elsewhere across the Florida Peninsula and portions of the Florida Keys south of a Cedar Key-Fernandina Beach line, with hurricane-force wind gusts reported in central Florida near the track of the center. The strongest reported sustained winds in this area were 60 kt at Ponce Inlet at 0906 UTC 10 October. Ponce Inlet also reported a peak gust of 86 kt. Tropical-storm conditions also occurred along portions of the Georgia coast, with a WeatherFlow station in Savannah reporting sustained winds of 37 kt and a gust to 45 kt at 1019 UTC 10 October. Wind gusts to tropical-storm-force were reported along portions of the southern coast of South Carolina.

Milton brought tropical-storm conditions to portions of the northern Yucatan Peninsula of Mexico. The strongest reported winds in this area were sustained 41 kt and a gust to 61 kt at a WeatherFlow station near Cancun and sustained 34 kt with a gust to 44 kt at a Mexican Navy Station at Isla Mujeres. Tropical-storm-force wind gusts occurred over portions of western Cuba, with the highest observed gust of 44 kt at La Palma.

Storm Surge[5]

Milton produced a damaging storm surge along the central to southwest Florida Gulf coast, as well as minor storm surge impacts on the northeast Florida Atlantic coast. Figure 6 shows the NHC storm surge analysis for Hurricane Milton, depicting the maximum inundation levels reached during the event. Figure 7 shows the available in situ maximum water level observations relative

[4] The validity of SAR data for estimating peak winds in tropical cyclones is still being evaluated.

[5] 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).

to Mean Higher High Water (MHHW, i.e. an approximation for inundation at the immediate coastline) along with the NWS Tampa Bay (TBW) radar highlighting the storm structure near the time of landfall. Observations in Fig. 7 include NOAA tide gauges and U.S. Geological Survey (USGS) water level sensors that were deployed prior to landfall. Note that the deployed USGS water level sensor data are wave-filtered (i.e., storm tide only) and measured relative to the North American Vertical Datum of 1988 (NAVD88) and then converted to MHHW using the vertical transformation tool (https://vdatum.noaa.gov/) provided by the National Geodetic Survey, Office of Coast Survey, and Operational Oceanographic Products and Services of NOAA.

Storm surge inundation of 6–9 ft above ground level (AGL) occurred from Venice southward to Boca Grande, with an isolated peak of up to 10 ft AGL estimated near Manasota Key (Fig. 6). A deployed USGS water level sensor measured 6.74 ft above MHHW (representing wave-filtered storm tide) near the Venice Fishing Pier (Fig. 7), with notable waves on top. However, no in situ observations were available from the hardest hit areas south of Venice. Moreover, the collection of stilled high-water marks along Manasota Key was further complicated by the damage that occurred, leading to greater than normal uncertainty in the estimated peak water levels. NOAA aerial imagery (not shown) indicates destructive storm surge impacts to the Manasota Key beach front community and significant coastal erosion, e.g. a new inlet was opened [termed Milton Pass]. NWS survey crews in the area found significant storm surge and wave impacts but could not identify a high confidence stilled high water mark in the hardest hit areas due to the extent of the damage (Figure 8). Survey crews concluded that the water was moving extremely fast and the wave action was tremendous, leading to “blowout” of the first floor of many structures. A hindcast using the final best track performed by the NHC Storm Surge Unit (not shown) was used to construct a more complete depiction of the storm surge flooding footprint to augment the data gaps. It depicts a maximum stilled water level of 10 ft above MHHW at Manasota Key. It should be noted, however, that the hindcast excludes the height of waves. Based on evidence collected from NWS survey crews in combination with unfiltered water level observations recorded by USGS water level sensors, wave crests atop the storm surge likely reached more than 1.5 times the height of the stilled water level. To complicate matters, the same area had a significant storm surge from Hurricane Helene, two weeks prior, and the erosion and debris from its aftermath compounded the damages incurred during Milton.

Maximum storm surge inundation of 5–8 ft AGL occurred in the northern portion of Charlotte Harbor and along the Peace River. Few in situ observations are available in this area, especially at the immediate coast. A USGS streamgage at Shell Creek near Punta Gorda measured 8.86 ft above NGVD29 (no conversion to MHHW), which is 1.42 ft higher than measured during Hurricane Helene, two weeks prior. Mark Sudduth and Matt Clemons (HurricaneTrack) captured video footage of a significant storm surge at the marina in Punta Gorda. The camera was mounted 6 ft above the concrete pad, in a shelter near the marina. Figure 9 shows still frames from before, during, and after Milton, highlighting the destructive power of the surge in Charlotte Harbor. Additionally, NWS crews found high water marks measuring 6 ft AGL in this area.

Near the landfall location, maximum storm surge inundation of 4–6 ft occurred from Longboat Key to Venice. A deployed USGS water level sensor on Longboat Key measured 5.04 ft above MHHW with significant waves on top. A sharp gradient in the surge occurred north of the landfall location where the winds were mostly offshore, including Tampa Bay, as 1–2 ft of

inundation occurred. Maximum storm surge inundation of 4–6 ft AGL also occurred south of Boca Grande through Bonita Beach, including the Caloosahatchee River. The National Ocean Service (NOS) tide gauge at Fort Myers reported 5.27 ft above MHHW, and a deployed USGS water level sensor measured 5.46 ft above MHHW on Sanibel Island near Blind Pass.

Maximum storm surge inundation of 3–5 ft AGL occurred from Bonita Beach through Marco Island. The NOS tide gauge in Naples Bay reported 5.08 ft above MHHW. South of Marco Island, 1–3 ft AGL of inundation occurred in remote areas of the Everglades, and 1–2 ft occurred in the Florida Keys where the NOS tide gauges at Key West and Vaca Key reported 1.23 and 2.02 ft above MHHW, respectively

On the U.S. East Coast, 1–3 ft of storm surge inundation occurred from Port Canaveral northward through the Georgia/Florida Border, with the NOS tide gauge at Trident Pier measuring 2.52 ft above MHHW. Farther north, the NOS tide gauge on the St. Johns River (Buckman Bridge) measured 3.01 ft above MHHW. In Fernandina Beach, Florida and Fort Pulaski, Georgia, NOS tide gauges showed that the highest storm surge occurred during low tide, measuring 4.29 and 3.16 ft above normal tide levels, respectively; however, the maximum water level was less than 2 ft above MHHW at both locations.

In Mexico, water levels reached 1–3 ft above normal tide levels along the northern and western coasts of the Yucatan Peninsula, with tide gauge data from near Celestún and Sisal, Mexico, measuring water levels of 2.3 ft and 2.6 ft, respectively. The storm surge resulted in the inundation of structures in low-lying areas near the coast.

Rainfall and Flooding

Milton produced a swath of heavy rain across portions of the central and northern Florida Peninsula, particularly from Tampa Bay to Daytona Beach where the circulation of the hurricane interacted with the front located north of the center (Fig. 10). The maximum reported storm total rainfall was 20.40 inches at a Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) site near St. Petersburg, while other storm totals include 17.20 inches at a CoCoRaHS site near Ormond Beach and 14.83 inches at an NWS Cooperative Observer site near Orlando. These rains caused widespread river and urban flooding, particularly in the St. Petersburg-Tampa area where record-high crests were recorded on the Hillsborough River. Lesser rainfall amounts occurred elsewhere farther north, with totals of 1–3 inches as far north as the northern Florida Peninsula and southeastern Georgia. Rainfall totals were generally lower south of the track, with totals of 1–3 inches occurring as far south as Lake Okeechobee. However, a pocket of heavier rain occurred along portions of the southeast Florida coast where a CoCoRaHS site near Vero Beach reported a storm total of 11.60 inches.

In Mexico, rainfall amounts of generally 4–6 inches occurred in the state of Yucatan, with a maximum storm total of 8.65 inches at Dzilam (Fig. 11). Rainfall totals elsewhere on the Yucatan Peninsula were generally in the 1–3 inch range.

Outer rain bands of Milton caused rainfalls of generally 1–3 inches over portions of western Cuba.

The other low-pressure area to the east and northeast of Milton produced locally heavy rainfall over the southern portion of the Florida Peninsula as it moved eastward across the area on 7–8 October. These rains are separate from those associated with Milton and are not included in Tables 3 and 4.

Tornadoes

Milton caused a significant tornado outbreak over the southern and central portions of the Florida Peninsula on 9 October which included 45 known tornadoes on land and a tornadic waterspout over Lake Okeechobee (location map shown in Fig. 12 and examples shown in Fig. 13). The outbreak included 3 EF-3 tornadoes, 6 EF-2 tornadoes, 25 EF-1 tornadoes, 7 EF-0 tornadoes, and 4 tornadoes of unknown intensity. Milton is the first tropical cyclone in the Storm Prediction Center's (SPC) tropical cyclone tornado database (dating back to 1995) to produce more than one EF-3 tornado. The most significant tornado was an EF-3 that killed six people near Fort Pierce and Vero Beach. There were 14 known injuries associated with the tornadoes.

It should be noted that Table 3 includes some strong wind gusts over southeastern Florida that were associated with tornadoes or mesocyclones during the tornado outbreak. The most notable of these was an 80-kt gust at the North Palm Beach County airport, which occurred as a tornado passed nearby during the afternoon of 9 October. The station reported 30-kt sustained winds with gusts to tropical storm force in the early morning hours of 10 October due to the main wind field of Milton.

CASUALTY AND DAMAGE STATISTICS

Milton is currently known to be responsible for 15 direct deaths[6] – 12 in the United States (all in Florida) and 3 in Mexico. In the U. S., six people died due to the tornado near Fort Pierce and Vero Beach. Four people were killed by falling trees, while there were two deaths due to freshwater flooding. There are no known storm surge fatalities in Florida as of this writing. In Mexico, media reports indicate two of the deaths were due to hurricane-related high surf, while the third was a man who fell from a fishing boat during the storm. Six other people were reported missing from another fishing boat.

Milton caused 27 indirect deaths in the United States, all in Florida. Ten of the deaths were due to health issues during storm preparations or post-storm clean-up, while 10 others were due to falls related to storm preparations, clean-up, or power failures. There were four indirect deaths

[6] 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.

due to auto accidents, one due to stepping on a downed power line, one due to a fire started by Milton's storm surge, and one due to a falling tree limb after the storm had passed.

The NOAA National Centers for Environmental Information (NCEI) estimated that Milton caused $34.3 billion in damage in the United Sates, almost exclusively in Florida. However, there are no details currently available about how many structures were destroyed or damaged by the storm. One prominent building damaged by the hurricane was the Tropicana Field stadium in St. Petersburg, where the fabric roof was ripped off by high winds followed by water damage from rain falling into the stadium (Fig. 14). It should be noted that the area of the Florida west coast most affected by Milton had also been affected by Hurricane Helene two weeks before, which complicates damage assessments.

FORECAST AND WARNING CRITIQUE

Genesis

The genesis of Milton was very poorly forecast. Temporally, the genesis area that covered the system that Milton developed from was first mentioned in the 7-day Tropical Weather Outlook (TWO) 210 h before genesis with a low chance (<40% probability) of development (Table 5). The probability of genesis was raised to the medium category (40–60% chance) 174 h before genesis, although Milton's genesis location still fell outside the specified area. At 60 h before genesis, the 7-day probabilities were reduced to the low category. This was followed by raising them back to the medium category 36 h before genesis. The genesis probability was finally raised to the high (>60% chance) category 12 h before genesis. In terms of the 2-day TWO, the probabilities reached the low category 114 h before genesis occurred. However, 90 h before genesis the probabilities were lowered to near 0%, and they were not raised above that level until 18 h before genesis. The 2-day probabilities were raised to the medium category 6 h before genesis, and they were not raised to the high category until the time of genesis.

Spatially, the location of Milton's genesis was also very poorly forecast (Fig. 15). At the time of the initial genesis area, the forecast formation area did not cover the portion of the Gulf of America where genesis occurred. The observed genesis location was not included in the genesis forecast area until 90 h before genesis occurred. Reasons for the poor forecasts included: 1) Early model forecasts showing genesis in the Caribbean Sea rather than the Gulf, 2) Model guidance showing two possible disturbances that could form in the area and being inconsistent about which one was going to develop, and 3) The presence of the front and associated upper-level westerlies; which made it uncertain how favorable the environment was for genesis over the Gulf.

Track Forecast

A verification of NHC official track forecasts for Milton is given in Table 6a. Official track forecast errors were a little greater than the mean official errors for the previous 5-yr period for the 12–60 h forecast periods, and less than the 5-yr means for the 72–120 h periods. These forecasts had much lower errors than the Climatology-Persistence (OCD5) errors at all time

periods, which is not surprising given Milton's abnormal eastward and northeastward track across the Gulf of America. A homogeneous comparison of the official track errors with selected guidance models is given in Table 6b with the associated levels of forecast skill shown in Fig. 16. While the official track forecast errors are relatively low, several of the guidance models had lower errors at many of the forecast times, including the consensus models TVCA and the U.S. Navy's COAMPS-TC regional hurricane model (CTCI). It should be noted that for both sets of errors the sample size is small for the longer forecast times, with only one verifying forecast at 120 h. Examination of the individual NHC forecasts (Fig. 17) shows that these forecasts captured the general motion, but some of them had a northward bias, possibly due to the guidance underestimating the influence of the circulation of the second low over the Gulf on Milton's track. Despite this bias, official forecasts consistently indicated landfall in the Sarasota/Tampa Bay area near the actual landfall location at Siesta Key.

Intensity Forecast

A verification of NHC official intensity forecasts for Milton is given in Table 7a. Official intensity forecast errors were significantly greater than the mean official errors for the previous 5-yr period at all forecast times except 120 h, when there was only one verifying forecast. Once again, the associated OCD5 errors were much larger than the 5-yr averages, indicating that Milton was harder to forecast than normal. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 7b with the associated skill levels compared to OCD5 shown in Fig. 18. None of the intensity guidance performed well on Milton. However, the regional hurricane models (HWFI, HMNI, HFAI, and HFBI) and three of the consensus models generally had lower errors than the official forecasts between 12–72 h. Examination of the individual forecasts (Fig. 19) shows the main source of error was that Milton intensified far more and much faster than anticipated on 5–7 October. The poor forecasts were likely due to Milton's proximity to the front and an area of strong vertical shear, which led to an underestimation of how favorable the environment was for strengthening. The regional models did a better job of forecasting this part of the storm's life than the official forecast. When Milton encountered less favorable conditions starting on 9 October, the official intensity forecasts generally anticipated how much weakening would occur. Despite the intensity forecast difficulties, the NHC intensity forecasts were very consistent in forecasting and messaging the threat of a major hurricane landfall along the Florida west coast from the very first advisory.

Tropical Cyclone Wind Watches and Warnings

Tropical cyclone wind watches and warnings associated with Milton are given in Table 8a. In the United States, a Hurricane Watch was issued for the landfall area on the Florida west coast at 0900 UTC 7 October which was 54 h before the onset of tropical-storm-force winds in the area at 1500 UTC 9 October. A Hurricane Warning was issued for the landfall area at 2100 UTC 7 October, which was 42 h before the onset of tropical-storm-force winds. Along the Florida east coast, a Hurricane Watch was issued at 2100 UTC 7 October in anticipation of the center of Milton emerging into the Atlantic after crossing Florida. A Hurricane Warning was issued for portions of the Florida east coast at 1200 UTC 8 October, with the center of the hurricane reaching the Florida east coast near 0800 UTC 10 October.

In Mexico, the Government of Mexico issued an initial Tropical Storm Watch for portions of the coast of the Yucatan Peninsula at 0300 UTC 6 October, followed by a Tropical Storm Warning at 1500 UTC that day. A Hurricane Watch was first issued for portions of the Peninsula at 2100 UTC 6 October, followed by a Hurricane Warning at 0900 UTC 7 October. Due to the northward bias in the track forecasts mentioned above, these watches and warnings had to be extended southward and eastward along the coast of the Yucatan Peninsula later on 7–8 October.

Storm Surge Watches and Warnings

Storm surge watches and warnings associated with Milton are given in Table 8b. A Storm Surge Watch was first issued at 0900 UTC 7 October for the Florida Gulf Coast from Flamingo northward to the Suwannee River, including Charlotte Harbor and Tampa Bay. The entire area was upgraded to a Storm Surge Warning at 2100 UTC 7 October. At the same time, a Storm Surge Watch was issued for the U.S. East Coast from Sebastian Inlet, Florida to Edisto Beach, South Carolina, including the St. Johns River. A Storm Surge Warning was issued for the U.S. East Coast from the Volusia/Brevard County Line in Florida northward to the mouth of the St. Mary's River, including the St. Johns River at 1200 UTC 8 October, and was extended southward to Port Canaveral, Florida, three hours later. At 2100 UTC 8 October, the Storm Surge Warning on the U.S. East Coast was extended southward again to Sebastian Inlet, and also northward to the Altamaha Sound, Georgia. The Storm Surge Warning on the Florida Gulf Coast was trimmed prior to landfall, when the warning was discontinued north of Yankeetown at 0900 UTC 9 October.

Figure 20 shows the extent of the Storm Surge Watch and Warning in effect at 0900 UTC 9 October, overlaid with the maximum water levels from in situ observations greater than 3 ft above MHHW. On the Florida Gulf Coast, the warning area captures the hardest hit areas from Longboat Key southward through Naples. Due to the perpendicular approach of the storm relative to the coastline, a sharp gradient of storm surge occurred across the track, and areas north of the landfall location observed water levels below normal tide levels due to offshore winds. However, the uncertainty of the track forecast at actionable lead times to allow for life-safety actions such as evacuations necessitated the issuance of the warning for these areas. The lead time of the Storm Surge Watch and Warning based on the arrival time of tropical-storm-force wind at the coast was 54 h and 42 h, respectively.

The forecast scenario presented challenges given the extreme sensitivity of Tampa Bay to storm surge and the sharp gradient in surge north of the actual landfall point. The peak storm surge forecast was initially given as 8–12 ft AGL between Anclote River and Englewood including Tampa Bay coinciding with the first Storm Surge Watch issuance. The forecast for this area was increased to 10–15 ft AGL when the first Storm Surge Warning was issued. At 0300 UTC 9 October, both the northern and southern extent of the 10–15 ft area was modified. The southernmost breakpoint was moved from Englewood southward to Boca Grande, and the peak numbers for coastal Pinellas County (Anclote River to Egmont Key) were lowered to 9–13 ft AGL. Additional changes were needed in coastal Pinellas County (Anclote River to Anna Maria Island) as well as Tampa Bay where the peak storm surge forecast was lowered to 8–12 ft AGL at 1200 UTC 9 October, and ultimately decreased to 6–9 ft AGL at 2100 UTC 9 October just prior to landfall. These forecasts were lowered incrementally north of the ultimate landfall location as the likelihood of offshore winds increased, and it should be noted, a track shift of less than 30 n mi

north of the observed landfall location would have resulted in a significant storm surge into Tampa Bay. The forecast numbers of 10–15 ft from Anna Maria Island to Boca Grande were lowered to 9–13 ft AGL at 1800 UTC 9 October. The NHC storm surge analysis falls within this range.

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

Media and Social Media Summary

The NHC began producing short-form videos on 4 October with a quick overview as the area of interest was highlighted in the Tropical Weather Outlook, and the first livestream was provided on 5 October as the system quickly strengthened into a tropical storm. The livestreams continued through 10 October with a total of 10 being conducted. Since there was an imminent threat to the U.S., the NHC Media Pool was activated on 6 October and remained open through 10 October, with the NHC providing a total of 250 interviews for the event. A peak engagement was noted on 8 October, the day before Milton made landfall. All short-form content surpassed the records set by Hurricane Helene earlier this season with a total of 6.9 million views of all reels across Facebook and Instagram alone. One of the reels reached 2.8 million plays.

Communication with Emergency Management Summary

The NHC began communication with emergency managers on 5 October as Milton was forming in the southwestern Gulf of America. Twenty decision support briefings were provided to emergency managers and coordinated through the Federal Emergency Management Agency (FEMA) Hurricane Liaison Team embedded at the NHC. These briefings included video-teleconferences with FEMA Headquarters, FEMA Region 4, the state and counties of Florida, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians. Briefing support continued through 9 October as Milton crossed Florida. Additionally, in coordination with the Florida Division of Emergency Management and the NHC Storm Surge Unit, the Hurricane Liaison Team directly supported several counties on the west coast of Florida with evacuation planning and decision making.

NHC’s TAFB provided 16 live briefings to US Coast Guard Districts 7 and 8 starting on 6 October in support of their life-saving mission. In particular, the final two days of briefings were provided in-person by embedded TAFB forecasters at USCG D7's Area Command for Hurricane Milton set up at Air Station Miami.

ACKNOWLEDGEMENTS

Laura Alaka and Cody Fritz provided the storm surge data and forecast critique sections. The NHC Storm Surge Unit provided the storm surge graphics. Maria Torres and Michael Spagnolo (FEMA) provided the input for the IDSS section. The National Weather Service Forecast offices in Key West, Miami, Tampa Bay, Jacksonville, and Tallahassee, Florida, provided meteorological and impact data for their areas of responsibility, including the storm surge damage image from Manasota Key. The National Data Buoy Center and the National Ocean Service provided much of the coastal, oceanic, and tide gauge data used in the report. The United States Geological Survey provided streamgage and deployed tide gauge data. The Meteorological and Oceanographic Services of Mexico provided much of the data from Mexico. The Florida Automated Weather Network, the Kennedy Space Center, the South and Southwestern Florida Water Management Districts, Keys Energy, Coastal Carolina University, WeatherSTEM, Weather Underground, and WeatherFlow provided data from their stations. WeatherFlow provided the data from the University of Florida towers. Roger Edwards and Matt Mosier of the SPC provided the tornado statistics, while Dave Roth of the Weather Prediction Center provided the rainfall graphic and much of the rainfall data. Josh Morgerman/iCyclone contributed his data from the landfall area. Lisa Bucci created the aircraft data graphic, individual track forecast graphic, and individual intensity forecast graphic, while John Cangialosi created the tornado location map based on SPC data. Tropicana Field image courtesy of USA Today, Bryan R. Smith, and Getty Images. Mark Sudduth and Matt Clemons of HurricaneTrack provided the Punta Gorda storm surge image.

TABLES

Table 1. Best track for Hurricane Milton, 5–10 October 2024.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
04 / 1800	21.0	94.6	1009	30	low
05 / 0000	20.8	95.2	1008	30	"
05 / 0600	21.4	95.4	1008	30	"
05 / 1200	22.0	95.5	1008	30	tropical depression
05 / 1800	22.5	95.5	1006	35	tropical storm
06 / 0000	22.7	95.5	1004	35	"
06 / 0600	22.6	95.2	999	45	"
06 / 1200	22.5	94.8	991	55	"
06 / 1800	22.5	94.1	986	70	hurricane
07 / 0000	22.5	93.4	981	75	"
07 / 0600	22.1	92.9	972	90	"
07 / 1200	21.8	92.2	943	120	"
07 / 1800	21.7	91.3	908	150	"
07 / 2000	21.8	90.9	895	155	"
08 / 0000	21.8	90.4	902	145	"
08 / 0600	21.9	89.5	925	125	"
08 / 1200	22.5	88.8	929	125	"
08 / 1800	22.5	88.0	916	140	"
08 / 2205	22.8	87.2	902	145	"
09 / 0000	23.0	86.9	908	140	"
09 / 0205	23.3	86.6	916	135	"
09 / 0600	23.8	85.9	909	140	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
09 / 0825	24.3	85.4	907	140	"
09 / 1200	25.0	84.8	919	135	"
09 / 1800	26.3	84.0	945	115	"
10 / 0000	27.3	82.7	956	105	"
10 / 0030	27.4	82.6	958	100	"
10 / 0600	28.1	81.3	975	70	"
10 / 1200	29.0	79.5	983	65	"
10 / 1800	29.5	77.5	984	60	extratropical
11 / 0000	29.5	75.0	986	60	"
11 / 0600	29.5	72.4	993	55	"
11 / 1200	29.5	69.3	997	55	"
11 / 1800	29.3	65.9	999	50	"
12 / 0000					dissipated
07 / 2000	21.8	90.9	895	155	maximum winds and minimum pressure
10 / 0030	27.4	82.6	958	100	landfall at Siesta Key, Florida

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Milton, 5–10 October 2024.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/ speed (kt)	Pressure (mb)
07 / 2200	WGAE	19.2	95.5	330 / 38	1008.6
08 / 0700	WGAE	19.3	95.4	330 / 44	1010.9
09 / 0100	SVDA6	24.8	79.6	210 / 35	1005.0
09 / 0800	C6GY5	17.9	87.3	270 / 35	1009.4
10 / 0100	SVDA6	24.8	79.6	210 / 35	1005.0
10 / 1800	9HA537	25.6	76.3	200 / 45	1005.0
10 / 2000	9HA537	25.7	76.8	200 / 45	1005.0
11 / 1800	LAJS6	25.2	65.2	250 / 35	999.5

Table 3. Selected surface observations for Hurricane Milton, 5–10 October 2024.

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									
41002 NOAA (32.50N 79.10W) (4.1 m)	10/2050	1004.0	10/2045	37 (1-min)	43				
41004 NOAA (32.50N 79.10W) (4.1 m)	10/1140	1006.6	10/1742	39 (1-min)	47				
41008 NOAA (31.40N 80.87W) (3.8 m)	10/0900	1003.7	10/1251	40 (1-min)	46				
41009 NOAA (28.51N 80.19W) (3.8 m)	10/0910	981.7	10/0641	45 (1-min)	58				
41010 NOAA (28.88N 78.48W) (4.1 m)	10/1420	985.7	10/1753	49 (1-min)	58				
41029 CORMP (32.80N 79.62W) (3.0 m)	10/1208	1008.2	10/1208	33	45				
41033 CORMP (32.28N 80.41W) (3.0 m)	10/1008	1007.7	10/1008	27	43				
41047 NOAA (27.47N 71.45W) (4.1 m)	11/0900	999.6[i]	11/0652	40[i]	49[i]				
41066 CORMP (32.54N 79.66W) (3.0 m)	10/1108	1007.4	10/1208	35	49				
41069 CORMP (29.29N 80.80W) (3.0 m)	10/0908	989.4	10/0908	50	76				
42001 NOAA (25.93N 89.66W) (4.1 m)	08/0940	1002.3	08/0947	31 (1-min)	36				
42023 COMPS (26.01N 83.09W) (3.1 m)	09/1935	987.1	09/1835	45	62				
42026 COMPS (25.17N 83.48W) (3.2 m)	09/1605	992.2	09/1335	37	50				
42036 NOAA (28.50N 84.51W) (3.8 m)	09/2300	997.9	09/2214	44 (1-min)	51				
42055 NOAA (22.14N 94.11W) (4.1 m)	06/2010	997.5	06/1959	47 (1-min)	54				
Saildrones									
Saildrone 1042 (29.71N 75.17W)	10/2159	996.3	10/1106	32 (1-min)	48				
Saildrone 1057 (27.56N 84.41W)	09/1934	994.6	09/2031	54 (1-min)	69				
Saildrone 1083 (26.38N 83.27W)	09/1851	973.3	09/2202	74 (1-min)	99				
Mexico									
International Civil Aviation Organization (ICAO) Sites									
Campeche (MMCP) (19.83N 90.50W)	07/2040	1001.4	07/2220	20	40				
Merida (MMMD) (20.94N 89.66W)	08/0243	998.7	08/0140	26	30				

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)				
Mexican Navy/SEMAR Stations									
Cayo Arcas (20.20N 91.96W)	07/2120	1001.9	07/1820	31	46				
Isla Mujeres (IMUX4) (21.24N 86.74W)	08/2030	996.1	08/2250	34	44				
WeatherFlow									
Cancun-Ikarus TEMPEST (21.32N 86.81W)	08/2130	997.0	08/1745	41	61				
San Benito Yuc 27 TEMPEST (21.33N 89.42W)	08/0525	997.0	08/2055	27	55				
Other Mexican Stations									
Campeche (19.81N 90.59W)						2.43			
Celestun (CLSY1) (20.86N 90.38W)	07/2220	997.4	08/0300	24	38	2.66			
Ciudad del Carmen (18.64N 91.84W)	07/2210	1004.6	08/1240	27	37	0.85			
Conkal (21.08N 89.52W)									5.45
Dzilam (21.39N 88.90W)	08/0850	994.4	08/1840	31	41				8.65
Peto (20.13N 88.92W)									4.29
Progreso (21.30N 88.67W)	08/0410	992.1				1.31			
Sisal (21.16N 90.05W)						2.49			
Cuba									
International Civil Aviation Organization (ICAO) Sites									
Saint Lucia (MUSL) (22.67N 83.97W)			09/0305	22	37				1.22
San Juan Y Martinez (78314) (22.28N 83.83W)			09/0046	26	41				0.75
La Palma (78316) (22.77N 83.55W)			09/0300	26	44				1.00
Casablanca (78325) (23.17N 82.35W)					39				
United States									
Florida									
International Civil Aviation Organization (ICAO) Sites									
Palatka (K28J) (29.66N 81.69W)			10/0615	26	43				
Airglades Arpt. (K2IS) (26.74N 81.05W)			10/0015	29[i]	41[i]				
Keystone Airpark (K42J) (29.84N 82.05W)	10/0855	999.4	10/0655	22	35				

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)				
Naples (KAPF) (26.16N 81.78W)	09/2053	995.4	09/1610	29[i]	50[i]				
Boca Raton (KBCT) (26.38N 80.11W)			09/2053	25[i]	40[i]				
Brooksville (KBKV) (28.47N 82.45W)	10/0330	990.9	10/0222	44	66				6.49[i]
Bartow (KBOW) (27.94N 81.73W)	10/0215	977.5[i]	10/0215	42[i]	58[i]				
Crystal River (KCGC) (28.87N 82.57W)	10/0415	997.3	10/0315	25	45				3.99
Clearwater (KCLW) (27.98N 82.76W)	10/0035	985.7[i]	10/0035	26[i]	47i				
Patrick SFB (KCOF) (28.24N 80.61W)	10/0707	978.4	10/0357	43	62				
Jacksonville Craig (KCRG) (30.34N 81.51W)	10/0835	1000.7	10/0745	29	50				
Daytona Beach (KDAB) (29.18N 81.05W)	10/0753	988.8	10/0821	54	76				10.25
DeLand (KDED) (29.07N 81.28W)			10/0010	29[i]	43[i]				
Key West (KEYW) (24.56N 81.76W)	09/1853	1002.1	09/2017	35	51				
N Palm Beach Cnty. (KF45) (26.85N 80.22W)	10/0620	997.3	10/0710	30	80				
Fernandina Beach (KFHB) (30.62N 81.47W)	10/0835	1002.1	10/0755	33	40				
Flagler Cnty. Arpt. (KFIN) (29.47N 81.21W)			10/0455	33[i]	48[i]				
Ft. Lauderdale Intl. (KFLL) (26.08N 80.16W)	09/2253	1000.5	09/1910	27	41				
Ft. Myers Page Field (KFMY) (26.59N 81.86W)	10/0041	990.2	09/2027	26[i]	48[i]				2.54[i]
Ft. Pierce (KFPR) (27.49N 80.37W)	10/0630	988.8	10/0438	38[i]	58[i]				5.06
Perry (KFPY) (30.07N 83.58W)	10/0015	1005.5	10/0135	20	35				
Ft. Lauderdale Executive (KFXE) (26.20N 80.18W)	09/2240	1000.7	10/0520	28	45				
Winter Haven (KGIF) (28.06N 81.75W)	10/0210	976.3	10/0247	49[i]	76[i]				4.60[i]
Gainesville (KGNV) (29.69N 82.28W)	10/0753	1000.7	10/0525	26	43				
Homestead ARB (KHST) (25.48N 80.38W)	09/2030	1001.7	09/2030	24	37				
Hollywood (KHWO) (26.00N 80.24W)	09/2253	1001.1	09/1853	24	43				
Immokalee (KIMM) (26.43N 81.40W)	10/0035	995.3	10/0410	28	50				
Inverness (KINF) (28.80N 82.32W)	10/0335	995.6	10/0435	31	50				6.03
Kissimmee (KISM) (28.29N 81.44W)	10/0456	980.5	10/0728	42	49				
Ocean Reef (KK70) (25.32N 80.28W)	09/2035	1001.7	09/2055	20	35				
Lakeland (KLAL) (27.99N 82.02W)	10/0335	975.5	10/0355	42[i]	66[i]				13.13

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)				
Leesburg (KLEE) (28.82N 81.81W)	10/0415	992.2[i]	10/0431	43	72				
Palm Beach Cnty. Park Arpt. (KLNA) (26.59N 80.09W)	10/0455	1000.0	10/0535	33	49				
MacDill AFB (KMCF) (27.86N 82.52W)			10/0355	42[i]	58[i]				
Orlando Intl. Arpt. (KMCO) (28.43N 81.32W)	10/0553	981.4	10/0412	49	76				4.28
Miami Intl. Arpt. (KMIA) (25.79N 80.32W)	09/2253	1001.4	09/2153	24	44				
Melbourne Intl. Arpt. (KMLB) (28.10N 80.65W)	10/0530	981.0[i]	10/0530	47	69				3.09
Marathon (KMTH) (24.73N 81.05W)	09/2053	1002.0	09/1629	23	39				1.83
Jacksonville NAS (KNIP) (30.23N 81.67W)	10/0853	999.9	10/1231	25	47				
Key West NAS (KNQX) (24.58N 81.68W)	09/1953	1001.2	09/2217	28	49				2.14
Mayport (KNRB) (30.40N 81.42W)	10/0852	1000.4	10/0552	38	56				
Okeechobee (KOBE) (27.26N 80.85W)	10/0415	988.8	10/0355	36	60				
Ocala (KOCF) (29.17N 82.23W)	10/0351	998.4	10/0415	22	35				3.36
Orlando Executive (KORL) (28.55N 81.34W)	10/0555	983.4	10/0313	43	63				6.87
Opa Locka (KOPF) (25.91N 80.28W)	09/2253	1001.2	09/1910	28	45				
Palm Beach Intl. (KPBI) (26.69N 80.10W)	10/0453	999.0	10/0553	34	63				
Punta Gorda (KPGD) (26.91N 81.99W)	10/0132	982.7	10/0000	48	70				2.50
St. Petersburg Intl. (KPIE) (27.91N 82.69W)	10/0053	982.5	10/0040	47[i]	72[i]				9.18[i]
Pompano Beach (KPMP) (26.25N 80.11W)	09/2253	1000.7	09/2240	27	44				
Ft. Myers SW FL Intl. (KRSW) (26.54N 81.76W)	10/0145	992.2	10/0006	41[i]	56[i]				1.33
Sebring (KSEF) (27.46N 81.34W)	10/0315	982.3	10/0335	42	63				2.68
Sanford (KSFB) (28.78N 81.24W)	10/0659	985.4	10/0841	47	74				10.09
St. Augustine (KSGJ) (29.96N 81.34W)	10/0856	998.4	10/0556	45	52				
Albert Whitted Arpt. (KSPG) (27.76N 82.63W)	10/0126	975.9	10/0047	58	88				18.88
Sarasota Intl. (KSRQ) (27.40N 82.56W)	10/0023	959.7	10/0142	60[i]	89[i]				7.58[i]
Stuart (KSUA) (27.18N 80.23W)	10/0455	993.9	10/0835	38[i]	55[i]				
Tamiami Executive (KTMB) (25.64N 80.43W)	09/2253	1001.1	09/1953	24	46				
Tampa Intl. Arpt. (KTPA) (27.96N 82.54W)	10/0059	982.7	10/0306	53	83				11.73
Shuttle Landing Site (KTTS) (28.62N 80.70W)	10/0740	979.4	10/1055	35	60				

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)				
Tampa Executive (KVDF) (28.01N 82.35W)	10/0155	980.7	10/0255	45	60				
Venice (KVNC) (27.02N 82.44W)	09/2255	972.6[i]	09/2215	43[i]	64[i]				
Vero Beach (KVRB) (27.66N 80.42W)	10/0659	986.8	10/0510	46	73				9.81
Titusville (KX21) (28.62N 80.84W)	10/0730	981.0	10/1035	29	51				
Sebastien (KX26) (27.81N 80.50W)	10/0655	984.8[i]	10/0435	36[i]	53[i]				
Williston (KX60) (29.35N 82.47W)	10/0535	999.3	10/0215	27	43				3.10
Cape Canaveral Skid Strip (KXMR) (28.47N 80.57W)	10/0755	976.9	10/0517	48	64				
Zephyrhills (KZPH) (28.23N 82.32W)	10/0135	984.8[i]	10/0135	37[i]	49[i]				
Coastal-Marine Automated Network (C-MAN) Sites									
Long Key (LONF1) (24.84N 80.86W) (6.3m)	09/2020	1000.1	08/1959	37 (10-min)	44				
Sand Key (SANF1) (24.46N 81.88W) (15m)	09/1910	1004.7	09/1639	45 (10-min)	51				
St. Augustine (SAUF1) (29.86N 81.26W) (16m)	10/0900	996.5	10/0700	53 (10-min)	65				
Tyndall AFB Tower (SGOF1) (29.41N 84.86W)	09/2000	1003.7							
Venice (VENF1) (27.07N 82.45W) (11.6m)	10/0000	962.7[i]	09/2340	68[i] (10-min)	84[i]				
National Ocean Service (NOS) Sites									
Apalachicola (APCF1) (29.72N 84.98W) (7.0m)	09/2106	1005.3	10/0006	26	35	1.20		1.04	
Buckman Bridge (BKBF1) (30.19N 81.69W) (9.7m)	10/0848	1000.2	10/0800	31	43	2.48	3.40	3.01	
Blount Island (BLIF1) (30.39N 81.52W) (8.6m)	10/0836	1001.0	10/0754	33	42				
Cedar Key (CKYF1) (29.13N 83.03W) (4.0m)	10/0442	997.8	10/0448	28	45	0.61	2.17	0.62	
Clearwater Beach (CWBF1) (27.98N 82.83W) (6.7m)	10/0048	985.7	10/0136	65	78	1.21	2.25	1.30	
Dames Point (DMSF1) (30.39N 81.56W)						3.04	3.66	2.25	
East Bay (EBEF1) (27.92N 82.42W)	10/0136	978.1				1.15	1.90	1.05	
Fort Myers (FMRF1) (26.65N 81.87W) (6.9m)	10/0030	990.2	10/0354	42	62	5.64	5.54	5.27	
Fernanda Beach (FRDF1) (30.67N 81.47W) (6.6m)	10/0848	1001.2	10/1100	21	34	4.29	4.54	1.81	
Gadsden Cut (GCTF1) (27.77N 82.52W)	10/0100	974.0[i]							
Key West (KYWF1) (24.56N 81.81W) (15m)	09/1924	1001.5	09/2324	33	45	1.44	1.28	1.23	

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)				
Lake Worth Pier (LKWF1) (26.61N 80.03W) (6.0m)	10/0512	1000.0	09/2224	38	46	1.09	1.58	1.02	
Southbank Riverwalk (MSBF1) (30.32N 81.66W)						2.32	3.21	2.57	
Middle Tampa Bay (MTBF1) (27.66N 82.60W) (5.7m)			10/0042	64	85				
Mayport (MYPF1) (30.40N 81.43W) (5.7m)	10/0830	1001.0	10/0554	40	50	3.45	3.88	1.91	
Naples Bay North (NBNF1) (26.14N 81.79W)						5.78	5.77	5.08	
Navy Fuel Depot (NFDF1) (30.40N 81.63W) (8.6m)	10/0854	1000.6	10/0618	23	37				
Old Port Tampa (OPTF1) (27.86N 82.55W) (6.7m)	10/0100	977.9	10/0200	64	80	1.00	1.82	1.03	
Port Everglades (PEGF1) (26.09N 80.12W) (45m)	09/2248	1000.6	09/2042	36	43	0.97	1.67	1.11	
Port Manatee (PMAF1) (27.64N 82.56W) (45m)	10/0054	969.5				1.83	1.95	1.37	
St. Petersburg (SAPF1) (27.76N 82.63W) (45m)	10/0036	977.4	09/2312	48	65	1.07	1.86	1.08	
TPA Cruise Term. (TPAF1) (27.93N 82.43W) (23m)			10/0148	35	59				
Trident Pier (TRDF1) (28.42N 80.59W) (6.7m)	10/0748	977.2	10/0554	40	58	3.71	3.62	2.52	
Virginia Key (VAKF1) (25.73N 80.16W) (10.2m)	10/2236	1002.0	10/0154	30	36	1.31	1.57	1.34	
Vaca Key (VAKF1) (24.71N 81.11W) (6.5m)			09/1448	24	33	1.95	1.66	2.02	
Remote Automated Weather Stations (RAWS)									
Avon Park (APRF1) (27.60N 81.21W)			10/0422	38	67				2.42
Avon Park North (AVZF1) (27.69N 81.33W)			10/0101	32	60				2.37
Chekika (CHKF1) (25.63N 80.58W) (6.1m)			09/2130	22	38				0.31
Central (CRAF1) (29.11N 81.63W) (6.1m)			10/0557		40				8.27
Brighton (GHTF1) (27.12N 81.08W) (6.1m)			10/0332		37				1.72
Lake George (LGRF1) (29.40N 81.81W) (6.1m)			10/0657		37				6.28
Cache (LPIF1) (25.39N 80.68W) (6.1m)			09/1930	20	35				0.46
Lake Wales (LWEF1) (27.44N 81.39W)			10/0346		50				2.33
Lake Woodruff (LWQF1) (29.10N 81.37W)			10/0917		43				10.75
Ochopee (OCOF1) (25.90N 81.32W) (6.1m)			09/2303	25	43				1.14
Panther East (PSTF1) (26.17N 81.36W) (6.1m)			09/1811		39				0.91
Raccoon Point (RACF1) (25.98N 80.90W) (6.1m)			10/0222		34				1.61

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Miles City (RKIF1) (26.25N 81.30W) (6.1m)			10/0245		37				1.12
Ding Darling NWR (TS755) (26.44N 82.10W) (6.1m)			10/0117	30	55				2.78
Paisley (TS959) (29.00N 81.54W)			10/0848		49				8.43
Lake Forestry Cntr. (TT686) (28.86N 81.80W)			10/0631	25	47				6.38
Hatchineha (TT750) (28.02N 81.48W)			10/0249		45				2.42
Kissimmee Bend (TT751) (27.48N 81.06W)			10/0349	25	52				1.56
WeatherFlow									
Alligator Reef (XALG) (24.85N 80.62W) (7.5m)	09/1943	1002.0	09/1948	33	43				
Belleair (XBLA) (26.37N 80.09W) (21m)			10/0133	30	57				
Boca Raton (XBOC) (26.37N 80.09W) (21m)			10/0823	27	39				
Boynton Beach (XBOY) (26.55N 80.05W) (11m)			09/1926	23	38				
Capri (XCAP) (26.04N 81.71W) (15m)			09/2045	27	46				
Clam Bayou (XCBN) (26.04N 81.71W) (10m)			10/0112	43	67				
Banana River (XCCB) (28.36N 80.65W) (4.9m)	10/0731	978.3	10/1056	46	61				
Carysfort Reef (XCFL) (25.23N 80.21W) (15m)			09/2048	40	45				
Charlotte Harbor YC (XCHL) (26.96N 82.08W) (10m)			09/2339	50	71				
Cocoa Beach (XCOA) (28.31N 80.63W) (10m)			10/1054	37	70				
Crandon (XCRN) (25.72N 80.15W) (7.9m)			09/2242	26	37				
Conservation (XCVN) (26.19N 80.30W) (10m)			10/0551	27	38				
Melbourne Dairy Rd. (XDAI) (28.04N 80.64W) (15m)			10/0533	33	52				
Dania Pier (XDAN) (26.06N 80.11W) (10m)			09/2302	34	42				
Biscayne Bay (XDGE) (25.77N 80.15W) (13m)			09/2301	24	35				
Desoto-Orange (XDSO) (25.77N 80.15W) (15m)			10/0407	33	55				
Dunedin Cswy. (XDUN) (28.06N 82.18W) (6.1m)	10/0021	986.6	09/2356	45	64				
Egmont Channel (XEGM) (28.06N 82.18W) (12m)			10/0149	75	91				
Miramar (XFLM) (25.97N 80.31W) (15m)			09/1915	23	39				
Griffin (XGRF) (28.08N 82.04W) (15m)			10/0524	40	70				

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Grove City (XGRV) (26.90N 82.31W) (20m)			10/0215	54	74				
Government Cut (XGVT) (25.75N 80.10W) (20m)			10/0037	39	49				
Hillsboro Inlet (XHBI) (26.26N 80.08W) (5.8m)			09/2245	33	43				
Hobe (XHOB) (27.05N 80.17W) (15m)			10/1041	27	55				
SummerHouse (XHSE) (29.72N 81.23W) (12m)	10/0811	996.2	10/0641	42	55				
Huguenot Park (XHUP) (30.42N 81.41W) (12m)			10/0352	35[i]	44[i]				
Indian River (XIND) (27.96N 80.53W) (4.9m)	10/0713	983.8	10/0533	43	61				
Jacksonville (XJAK) (30.39N 81.48W) (10m)			10/0743	39	51				
Jensen Beach (XJEN) (27.22N 80.20W) (4.9m)	10/0456	992.5	10/0831	38	55				
Juno Beach (XJUP) (26.89N 80.06W) (11m)			09/2215	40	53				
Biscayne Bay Light 20 (XKBS) (25.67N 80.19W) (6.1m)			09/2117	33	39				
Marathon Key (XKEY) (24.74N 80.98W) (13m)			09/2038	27	41				
Key West CG (XKYW) (24.57N 81.90W) (10m)			09/1530	26	40				
Land o' Lakes (XLOL) (28.19N 82.52W) (15m)			10/0338	31	54				
Lewis (XLWS) (29.92N 81.33W) (15m)			10/0655	38	56				
Melbourne Beach BIS (XMBI) (27.90N 80.47W) (10m)			10/0643	32	55				
Mangonia Park (XMGN) (26.76N 80.07W) (23m)			10/0723	29	49				
Melbourne South (XMLS) (28.07N 80.58W) (5.8m)			10/0512	46	63				
North Miami (XNMI) (25.91N 80.16W) (17m)			10/0441	21	39				
Naples Zoo (XNPZ) (26.17N 81.79W) (11m)			10/0346	26	49				
New Smyrna Beach (XNSB) (29.05N 80.90W) (10m)	10/0846	984.2	10/0936	56	75				
Oakes Substation (XOAK) (26.91N 80.07W) (41m)			10/0613	33	51				
Titusville Parrish Park (XPAR) (26.09N 80.12W) (5.5m)	10/0737	980.8	10/1037	50	66				
Port Everglades (XPEG) (26.09N 80.12W) (41m)			09/2103	33	43				
Port Everglades South (XPES) (26.06N 80.13W) (10m)			10/0551	21	35				
Reedy Lake (XRDY) (28.44N 81.63W) (15m)			10/0739	40	61				
Rocky Point (XRPT) (27.98N 80.55W) (5.7m)			10/0403	41	54				

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	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Sarasota (XSAR) (27.35N 82.51W) (20m)			09/2341	42	67				
Sanibel DB 4 (XSBI) (26.47N 82.05W) (4.9m)	10/0247	987.1	10/0327	52	68				
Skyway Fishing Pier (XSKY) (27.60N 82.65W) (16m)			10/0212	65	90				
Spring Lake (XSPR) (28.66N 81.41W) (15m)			10/0809	30	53				
St. George Island (XSTG) (29.67N 84.86W) (15m)	09/2039	1004.0	09/2229	27	40				
St. Lucie Plant (XSTL) (27.35N 80.24W) (10m)	10/0633	990.1	09/2108	36	51				
Tampa Bay Cut J (XTAM) (27.77N 82.57W) (15m)			10/2309	50[i]	61[i]				
Turkey Point (XTKY) (25.43N 80.35W) (19m)			09/2018	35	48				
Jacksonville Term. Channel (XTRM) (30.34N 81.63W) (9.1m)	10/0857	1000.0	10/0802	33	42				
Tarpon Point (XTRP) (26.54N 82.00W) (10m)			09/2306	40	62				
Urban (XURB) (25.86N 80.37W) (15m)			10/0419		35				
Vero City (XVER) (27.63N 80.39W) (10m)	10/0652	986.4	10/0532	28	63				
Weeki Wachee (XWKI) (28.52N 82.57W) (23m)			09/2338	30	55				
West Palm Beach (XWPB) (26.66N 80.14W) (11m)			10/0618		39				
Kennedy Space Center/Cape Canaveral Mesonet Sites									
Tower 714 (KSC08) (28.64N 80.75W) (16m)			10/1040	45	80				
Tower 1 (KSC09) (28.43N 80.57W) (16m)			10/0505	44	69				
Tower 3 (KSC10) (28.46N 80.53W) (16m)			10/0555	54	74				
Tower 2 (KSC13) (28.44N 80.56W) (16m)			10/0555	50	70				
Tower 6 (KSC18) (28.51N 80.56W) (16m)			10/0520	35	67				
Tower 108 (KSC19) (28.54N 80.57W) (16m)			10/1125	43	71				
Tower 211 (KSC20) (28.61N 80.62W) (16m)			10/0525	33	68				
Tower 303 (KSC22) (28.46N 80.57W) (16m)			10/1105	34	65				
Tower 403 (KSC28) (28.46N 80.59W) (16m)			10/1100	45	68				
Tower 412 (KSC29) (28.61N 80.67W) (16m)			10/1050	45	76				
Tower 415 (KSC30) (28.66N 80.70W) (16m)			10/1110	34	66				
Tower 506 (KSC33) (28.52N 80.64W) (16m)			10/1100	34	70				

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Tower 509 (KSC34) (28.56N 80.67W) (16m)			10/1100	34	70				
Tower 803 (KSC35) (28.56N 80.67W) (16m)			10/1100	46	74				
Tower 805 (KSC36) (28.52N 80.70W) (16m)			10/1025	30	45				
Tower 1102 (KSC42) (28.57N 80.59W) (16m)			10/1105	48	74				
Tower 3132 (KSC48) (28.63N 80.66W) (16m)			10/1050	51	72				
Florida Automated Weather Network (FAWN) Sites									
Clewiston (AIRGL) (26.74N 81.05W) (6m)			10/0615	35	63				
Arcadia (ARCAD) (27.22N 81.84W) (10m)			10/0045	38	63				3.54
Balm (BALM) (27.76N 82.22W) (10m)			10/0315	45	68				9.32
Brooksville South (BKSFL) (28.47N 82.44W)			10/0300		33				10.80
Belle Glade East (BLDF1) (26.66N 80.63W) (10m)			10/0715	31	55				0.33
Bronson (BRZF1) (29.40N 82.59W) (10m)			10/0330		34				2.61
Babson Park (BSPFL) (27.80N 81.55W) (10m)			10/0245	43	68				5.55
Ocklawaha (CKHF1) (29.02N 81.97W) (10m)			10/0245		38				3.27
Dade City (DACFL) (28.35N 82.20W) (10m)			10/0330	32	61				14.94
Dover (DOVF1) (28.02N 82.23W) (10m)			10/0400	32	47				0.32
Pierson (EPRF1) (29.22N 81.46W) (10m)			10/0430	21	42				7.10
Immokalee (IMKF1) (26.46N 81.44W) (10m)			10/0400	27	43				0.84
Jupiter (JPRFL) (26.98N 80.09W) (10m)			10/0745		43				
Joshua (JSHFL) (27.25N 81.61W) (10m)			10/0130	23	54				4.25
Lake Alfred (KALF1) (28.10N 81.71W) (10m)			10/0230	23	52				7.38
Okahumpka (KHPF1) (28.68N 81.89W) (10m)			10/0530	32	61				5.04
Kenansville (KNCF1) (27.96N 81.05W) (10m)			10/0400		44				
Lecanto (LECFL) (26.98N 80.09W) (10m)			10/0345	24	50				6.48
Ona (NNAF1) (27.40N 81.94W) (10m)			10/0100	41	71				2.93
North Port (NPORT) (27.14N 82.34W) (10m)			09/2345	37	70				3.50
Okeechobee (OKSF1) (27.33N 80.85W) (10m)			10/0730	29	50				

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Palmdale (PALF1) (26.92N 81.31W) (6m)			10/0600	21	45				
Ft. Pierce (PCEF1) (27.42N 80.40W) (10m)			10/0530	27	63				
Putnam Hall (PHAF1) (29.70N 81.99W) (10m)			10/0830		34				2.39
Poinciana (PNAFL) (28.08N 81.41W) (10m)			10/0400	26	54				
Apopka (POPF1) (28.64N 81.55W) (10m)			10/0445	29	55				
Sebring (SEBF1) (27.42N 81.40W) (10m)			10/0630	30	49				2.37
Homestead (STDF1) (29.69N 81.45W) (10m)			09/2130	22	36				0.39
Hastings (STNF1) (29.69N 81.45W)			10/0845	28	50				1.70
Tiger Creek (TGCFL) (29.69N 81.45W) (10m)			10/0745	26	54				3.22
Umatilla (UMLF1) (28.93N 81.65W)			10/0430	32	53				5.79
Avalon (VLNF1) (28.47N 81.65W)			10/0645	31	62				6.21
Wellington (WELF1) (26.68N 80.30W) (10m)			10/0630	34	59				
Yeehaw Junction (27.70N 80.92W) (10m)			10/0515	37	65				
South Florida Water Management District (SFWMD) Sites									
Lake Okeechobee North (L001) (27.14N 80.79W) (11m)	10/0415	990.2	10/0415	44	52				
Lake Okeechobee West (L005) (26.96N 80.94W) (11m)			10/0030	34[i]	45[i]				
Lake Okeechobee South (L006) (26.82N 80.78W) (11m)	10/0415	993.3	10/0600	44	53				
Lake Okeechobee Center (LZ40) (26.90N 80.79W) (11m)			10/0515	43	53				
Brighton (S75WX) (27.12N 81.13W) (11m)	10/0345	986.8	10/0330	36					
Ortona Lock (S78W) (26.79N 81.30W) (11m)	10/0300	993.3	10/0545	32	49				
WeatherSTEM/FSWN									
Bay Point MS (0040W) (27.71N 82.66W)	10/0035	975.9	10/0034		65				
Titusville PAC Academy (0063W) (25.73N 80.16W) (7.9m)	10/0725	980.6	101001	37	53				
Poinciana HS (0150W) (28.23N 81.49W) (16m)	10/0439	973.0	10/0732	49	54				
UM Rosenstiel (0234W) (25.73N 80.16W)	09/2240	1000.4	09/2110	37	52				
UM Health System (0235W) (25.78N 80.12W) (57m)			09/2320	37	42				

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U Central Florida (0280W) (28.59N 81.20W) (10m)			10/0831		37				
UM Hecht (0323W) (25.71N 80.28W) (57m)	09/2230	1001.0	09/2140	28	36				
Lake Placid ES (0394W) (27.29N 81.37W)	10/0246	981.6	10/0238		63				
Marathon HS (0468W) (24.70N 81.08W) (10m)	09/1910	1001.7	09/1650	27	37				
Key West HS (0470W) (24.55N 81.78W) (10m)	09/1830	1001.7	09/1600	29	35				
Pinellas Cnty. EOC (0503W) (27.89N 82.80W) (10m)	10/0046	979.8	10/0210		67				
Eastpoint 2.9S (0569W) (29.71N 84.89W)	09/2130	1003.8	09/1620	34	43				
Clearwater PCEM (0579W) (27.96N 82.80W)	10/0102	983.6	10/0100		70				
Ponce Inlet (0834W) (29.12N 80.95W) (9.1m)	10/0809	985.5	10/0906	60	86				
Port Canaveral (1145W) (28.41N 80.63W) (3.7m)	10/0735	977.8	10/0517	48	61				
Palm Coast 1.6E (1334W) (29.57N 81.19W)			10/0710	40	61				
Maitland FR 45 (1341W) (28.63N 81.36W) (9.1m)	10/0612	983.6	10/0842	44	50				
Coral Springs PSB (1353W) (26.26N 80.27W)	09/2240	1000.0	09/1930	32	39				
Indian River FS 5 (1431W) (27.71N 80.42W) (4.3m)	10/0709	985.4	10/0647	35	41				
Largo FRS 41 (1438W) (27.91N 82.79W)	10/0044	982.5	10/0223		57				
Oak Hill FS 22 (1452W) (28.87N 80.85W) (4.3m)	10/0735	984.9	10/0952	39	61				
Daytona Beach BSH (1455W) (29.22N 81.00W) (12m)	10/0826	985.5	10/0011	30	39				
Osceola Heritage Pk. (1466W) (28.30N 81.37W) (4.3m)	10/0516	979.0	10/0347	43	50				
Holopaw (1469W) (28.13N 81.08W) (4.3m)	10/0559	976.7	10/0317	42	51				
St. Lucie EOC (1499W) (27.37N 80.48W) (3.7m)	10/0614	990.1	10/0540	56	66				
Hutchinson Island (1500W) (27.49N 80.30W) (3.4m)			10/0620	31	37				
Martin Cnty. EOC (1515W) (27.17N 80.24W) (5.5m)	10/0635	994.0	10/0708	45	50				
Indiantown (1517W) (27.03N 80.48W) (5.5m)	10/0500	992.8	10/0807	33	42				
Palm City (1521W) (27.18N 80.38W) (3.1m)	10/0502	992.3	10/0852	41	47				
Hobe Sound (1524W) (27.06N 80.13W) (10m)	10/0549	995.0	10/0629	39	50				
Jensen Beach (1526W) (27.25N 80.20W) (7.9m)	10/0719	990.6	10/0818	49	58				
Martin Cnty. South (1527W) (26.99N 80.11W) (3.7m)	10/0537	995.8	10/0640	28	37				

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Sunrise FS 39 (1532W) (26.15N 80.24W) (10m)	09/2200	1001.4	09/1840	32	35				
St. Marks Lighthouse (1560W) (30.07N 84.18W)	10/0140	1005.5	09/2240	27	35				
FPR WXEL (1567W) (26.49N 80.09W)	10/0700	1000.7	10/0550	27	38				
Tampa WUSF (1569W) (28.06N 82.41W)	10/0131	981.0	10/0405		70				
FPR WGCU (1571W) (26.05N 81.70W) (6m)	09/2150	997.0	09/2330	24	37				
Orlando FAMU (1597W) (28.54N 81.38W) (9.1m)	10/0604	981.2	10/0924	28	34				
Land o' Lakes FHQ (1607W) (28.22N 82.46W)	10/0153	986.4	10/0156		59				
Merrill Barber Bridge (1633W) (27.65N 80.37W) (2.4m)	10/0643	986.5	10/0612	51	56				
Lake Okeechobee Lock 7 (1636W) (27.20N 80.83W) (7m)	10/0400	990.9	10/0350	42	57				
Okeechobee EOC (1637W) (27.25N 80.84W) (3.7m)	10/0409	989.5	10/0347	34	42				
Okeechobee North (1639W) (27.40N 80.81W) (3.7m)	10/0427	987.9	10/0220	51	57				
Kissimmee Prairie (1642W) (27.58N 81.04W) (3.7m)	10/0452	982.9	10/0828	43	47				
Zephyrhills (1667W) (28.23N 82.22W) (7.6m)	10/0328	984.9	10/0342		77				
Ft. Lauderdale Intl. (1694W) (26.08N 80.14W) (10m)	09/2300	1001.0	09/2000	30	45				
Raymond James Stadium (1754W) (27.98N 82.50W) (55m)	10/0148	977.0	10/0306		79				
Windermere Prep School (1761W) (28.48N 81.57W) (2.4m)	10/0538	983.7	10/0722	43	54				
Lake Louisa SP (1777W) (28.43N 81.73W) (3.1m)	10/0046	983.8	10/0402		43				
AlertTampa Downtown (1779W) (27.95N 82.45W) (43m)	10/0116	978.5	10/0313		59				
MDC Wolfson (1797W) (25.80N 80.10W)			10/0150	23	42				
MDC North (1800W) (25.88N 80.25W)			10/0110	30	37				
MDC Hialeah (1801W) (25.86N 80.32W)			10/0220	33	43				
Winter Springs HS (1805W) (28.70N 81.27W)	10/0620	984.3	10/0909	48	51				
MDC Homestead (1807W) (25.47N 80.47W)	09/1930	1001.4	09/2130	34	44				
Tampa Intl. Arpt. (1829W) (27.98N 82.53W)	10/0048	974.5	10/0246		79				
Sunny Isles Beach (1843W) (24.77N 80.91W) (25m)	09/2300	1001.7	10/0440	23	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)				
Duck Key (1846W) (24.77N 80.91W) (15m)	09/1930	1002.4	09/2000	29	36				
Delray Beach North (1847W) (26.47N 80.06W) (18m)			09/2120	40	47				
Idyllwilde ES (1909W) (28.79N 81.31W)	10/0623	986.1	10/0859	47	55				
Glades EOC (1915W) (26.84N 81.12W)	10/0250	993.6	10/0050	34	51				
Moore Haven Alvin Ward Park (1918W) (26.84N 81.08W) (10m)	10/0400	993.3	01/0540	44	49				
Buckhead Ridge (1920W) (27.14N 80.88W)	10/0410	990.6	10/0150	30	43				
Harvey Pond Park (1978W) (26.99N 81.07W) (11m)	10/0350	992.0	10/0430	34	50				
Palm Beach (1993W) (26.70N 80.04W) (7m)	10/0510	998.0	10/0620	31	49				
Pine Crest School (2000W) (26.20N 80.12W)	09/2250	1001.0	09/2030	23	37				
Istokpoga Marsh (2035W) (27.28N 81.27W)			10/0246		58				
Muse EMS 3 (2045W) (26.80N 81.43W) (12m)	10/0140	992.6	10/0550	36	50				
San Carlos Park F54 (2048W) (26.50N 81.81W)	10/0003	991.5	10/0316		60				
Yeehaw Junction (2052W) (27.72N 80.95W)	10/0542	982.0	10/0855	40	45				
Shingle Creek Rgnl. Park (2069W) (28.31N 81.45W)	10/0514	980.5	10/0850	38	41				
Kissimmee Lakefront Park (2073W) (28.29N 81.41W)	10/0515	980.1	10/0324	45	54				
Durbin Memorial Park (2077W) (28.31N 81.35W)	10/0535	980.3	10/0834	32	41				
Bonita Springs F24 (2112W) (26.34N 81.74W)	09/2328	992.7	10/0259		57				
Osceola Reunion (2115W) (28.26N 81.60W)	10/0451	979.1	10/0617	31	39				
Sarasota Exactech (2172W) (27.40N 82.55W)	10/0023	960.4	09/2344		67				
BTF North (2173W) (27.01N 80.19W)	09/2128	992.1	09/2128	50	61				
Hillsborough Cnty. TSP (2196W) (27.97N 82.35W)	10/0145	977.9	10/0147		63				
Osceola Cnty. EOC (2197W) (28.28N 81.34W)	10/0521	979.2	10/0927	39	46				
Wedgefield OF86 (2220W) (28.50N 81.07W)	10/0654	981.8	10/0440	27	35				
Lockhart OF40 (2221W) (28.63N 81.45W)	10/0607	984.7	10/0202	32	37				
Florida Mall OF53 (2222W) (28.44N 81.40W)	10/0559	982.6	10/0755	37	43				
S Goldenrod OF68 (2224W) (28.52N 81.28W)	10/0613	982.2	10/0757	31	41				
Lithia (2236W) (27.78N 82.16W)	10/0230	971.1	10/0353		59				

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)				
Ruskin (2237W) (27.71N 82.39W)	10/0118	971.1	10/0301		45				
E Lake Tohopekaliga (2265W) (28.33N 81.27W)	10/0553	980.3	10/0300	42	50				
Coconut Creek (2268W) (26.80N 81.43W)	09/2300	1001.0	10/0540	24	36				
Everglades Airpark (2303W) (25.85N 81.39W) (12m)	09/2220	998.7	09/2250	29	42				
Collier EOC (2308W) (26.11N 81.69W)			10/0250	39	51				2.16
Keys Energy Sites									
Big Coppit Key (KEYS13149) (24.60N 81.65W) (18m)			09/1740	39	48				
Big Pine Key (KEYS15149) (24.67N 81.35W) (18m)			09/1511	29	40				
Key West (KEYS4149) (24.56N 81.80W) (11m)			09/1250	22	38				
Stock Island (KEYS6149) (24.56N 81.73W) (10m)			09/1953	34	46				
Cudjoe Key (KEYSCKS) (24.66N 81.48W) (10m)			09/2146	27	40				
Coastal Carolina University (CCU) Sites									
Dania Beach (IRNS1) (26.06N 80.11W)	09/2247	998.7	09/2257	37					
Pahokee 11ENE (SSQPU) (26.86N 80.48W)	10/0527	996.0	10/0628	34					
USACE Lake Okeechobee (SSXGY) (26.80N 80.70W)	10/0534	993.3	10/0714	49					
LaBelle 13 SE (USS03) (26.66N 81.26W)	10/0140	991.9	10/0400	38					
Clewiston 4SE (USS04) (26.71N 80.90W)	10/0311	995.3	10/0331	43					
Pahokee 12E (USS05) (26.80N 80.48W)	09/2041	994.3	10/0713	40					
Belle Glade 5ENE (USS06) (26.71N 80.59W)	10/0411	997.0	10/0713	40					
Public/Other									
Goethe SF SRWMD (274) (29.20N 82.64W)									3.31
Tamarac (AP019) (26.22N 80.28W)	09/2240	1001.4	10/0525		34				
Cudjoe Key (C0925) (24.65N 81.48W) (10m)	09/1903	1003.4	09/1333	28	39				2.14
Boynton Beach (C4740) (26.53N 80.08W)	10/0702	1000.4	10/0822		34				
Boca Raton (C6162) (26.34N 80.21W)			10/0452		35				
Jupiter (C8019) (26.97N 80.10W)	10/0719	996.0	10/0719		38				

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)				
Royal Palm Beach (D6869) (26.80N 80.31W)	10/0514	997.3	10/0449		43				1.45
West Palm Beach (D7488) (26.72N 80.16W)	10/0446	998.0	10/0620	22	41				
Lauderdale by the Sea (E4311) (26.21N 80.09W)	09/2240	1002.7	09/2225		37				
Pembroke Pines (F1651) (26.02N 80.40W)	09/1955	1002.4	09/1950	29	38				
Alligator Point (F9222) (29.90N 84.40W)	09/2200	1004.4	09/2205	23	35				
Lake Worth (G0860) (26.60N 80.18W)	10/0444	999.0	10/0806	21	37				
WFO Key West (KKEY) (24.55N 81.79W) (19m)			09/2013		50				
WFO Ruskin (KTBW) (28.02N 82.35W)									10.44
Fort Pierce 8.0W (NCSF1) (27.47N 80.47W)									4.15
Port St. Lucie (PSLF1) (27.26N 80.36W)									3.11
Rookery Bay NERRS (RKXF1) (26.03N 81.70W) (19m)			09/2315	23	45				
Holmes Beach UF (UFS1) (27.50N 82.71W) (10m)	10/0021	965.3	10/0200	73	92				
Venice Beach UF (UFS2) (27.10N 82.46W) (10m)	10/0020	960.5	10/0155	79	93				
Lakewood Ranch (iCyclone) (27.39N 82.45W)	10/0025	960.4							
St. Petersburg (iCyclone) (27.79N 82.67W)	10/0028	977.6							
Sarasota (iCyclone) (27.38N 82.55W)	10/0021	959.7							
Tampa (iCyclone) (27.95N 82.52W)	10/0058	980.4							
US Geological Survey (USGS) Storm Tide Sensors									
FLLEE35747 (26.48N 82.18W)							5.86	5.46	
FLSAR25010 (27.36N 82.62W)							5.58	5.04	
FLSAR26282 (27.07N 82.45W)							7.32	6.74	
USGS Streamgages									
Punta Gorda Shell Creek (2298202) (26.98N 81.91W)							8.86 (NGVD29)		

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)				
Georgia									
National Ocean Service (NOS) Sites									
Fort Pulaski (FPKG1) (32.03N 80.90W) (6.5m)	10/1054	1007.5	10/1124	23	31	3.16	4.64	1.19	
Kings Bay (KBMG1) (30.79N 81.49W)	10/0848	1001.9				4.11		1.64	
WeatherFlow									
Jekyll Island (XJEK) (31.05N 81.41W) (10m)			10/0557	26	36				
Savannah (XSEL) (32.01N 80.81W) (11m)	10/1104	1006.0	10/1019	37	45				
Tybee North (XTYB) (32.02N 80.84W) (10m)	10/1111	1006.0	10/0956	28	37				
Public/Other									
Sapelo Island NERRS (XTYB) (32.02N 80.84W) (10m)	10/0915	1004.8	10/1415	25	35				
South Carolina									
International Civil Aviation Organization (ICAO) Sites									
Charleston (KCHS) (32.90N 80.04W)	10/0756	1009.9	10/1820	20	34				
Hilton Head (KHXD) (32.21N 80.70W)	10/0835	1008.5	09/1250	22	35				
National Ocean Service (NOS) Sites									
Charleston (CHTS1) (32.78N 79.92W) (16m)	10/1142	1009.8	10/0800	30	38	2.49	3.82	1.19	
WeatherFlow									
Calibogue Sound (XCLB) (32.10N 80.84W) (5.8m)	10/1056	1007.0	10/1101	31	39				
Folly South End (XFSE) (32.64N 79.97W) (11m)	10/1122	1008.0	10/1442	26	36				
Shutes Folly (XSHF) (32.77N 79.91W) (13m)	10/0808	1009.0	10/1633	28	36				
Fort Sumter (XSUM) (32.75N 79.87W) (12m)	10/1131	1009.0	10/1621	27	36				
Bahamas									
International Civil Aviation Organization (ICAO) Sites									
Freeport (MYGF) (22.14N 94.11W)	10/0706	1002.1	10/1200	24	38				

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)				
Coastal-Marine Automated Network (C-MAN) Sites									
Settlement Point (SPGF1) (26.70N 79.00W) (6.6m)	10/0800	1001.1	10/0920	41 (10-min)	53				
Weather Underground Sites									
Little Hog Cay (INORTHAB2) (26.95N 77.60W)	10/????	1004.8	10/1549	56	63				

[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 some USGS storm tide pressure sensors, inundation is estimated by subtracting the elevation of the sensor from the recorded storm tide. For other USGS storm tide sensors and USGS high-water marks, inundation is estimated by subtracting the elevation of the land derived from a Digital Elevation Model (DEM) from the recorded and measured storm tide. 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. Selected storm-total rainfall amounts from various sites for Hurricane Milton, 5–10 October 2024. When possible, stations are sorted by station identifier.

Location	Total Rainfall (in)	Location	Total Rainfall (in)
United States			
Florida			
Hydrometeorological Automated Data System (HADS) Sites (NWS)			
Fort Lonesome (ASPF1) (27.73N 82.07W)	3.66	Lakeland 6.0WNW (MCNF1) (28.03N 82.25W)	12.10
Bartow (BARF1) (27.90N 81.82W)	5.20	Myakka Head 8.0W (MKHF1) (27.47N 82.21W)	8.15
Oldsmar (BOLF1) (28.09N 82.69W)	13.68	Largo McKay Creek (MKYF1) (27.91N 82.82W)	16.88
Tarpon Springs (BTRF1) (28.14N 82.66W)	11.10	Thonotosassa 3.0N (MPRF1) (28.10N 82.31W)	13.62
Citrus Park (CPKF1) (28.07N 82.57W)	12.32	Tampa North Archie Creek (NACF1) (27.90N 82.35W)	13.75
Curlew Creek (CRCF1) (28.04N 82.79W)	13.05	North Port 6.0 NNE (NPOF1) (27.11N 82.20W)	4.31
Drexel Bexley Well (DREF1) (28.25N 82.51W)	12.17	Palm Harbor (PHBF1) (28.07N 82.67W)	12.52
Elfers (ELFF1) (28.21N 82.67W)	9.02	Clearwater Alligator Creek (PIAF1) (27.97N 82.73W)	12.67
Temple Terrace (FOWF1) (28.05N 82.36W)	8.20	Fiva 2W (PIFF1) (28.33N 82.54W)	10.24
Lorraine 2.0SW (FRUF1) (27.42N 82.43W)	5.28	Sulphur Spring Roy Haynes Park (RHPF1) (28.06N 82.49W)	13.61
Fort Meade (FTMF1) (27.75N 81.78W)	4.92	Riverview (RVWF1) (27.87N 82.33W)	11.91
Pinellas Park St. Joe Creek (JPCF1) (27.81N 82.72W)	14.49	Rye (RYEF1) (27.51N 82.37W)	6.90
Knights 4.0NW (KNTF1) (28.14N 82.15W)	11.50	Wesley Chapel 2.0SW (TRCF1) (28.21N 82.35W)	11.40
Lithia 4.0W (LITF1) (27.87N 82.21W)	9.67	Wimauma 4.0SW (WIMF1) (27.67N 82.35W)	7.47
New Port Richey 3.0NE (LWOF1) (28.28N 82.67W)	7.31	Richland (WRCF1) (28.27N 82.10W)	14.36
NWS Cooperative Observer Program (COOP) Sites			
Bartow (BABF1) (27.90N 81.84W)	6.28	Nettles Island (NETF1) (27.29N 80.22W)	5.01
Bradenton 5.0ESE (BRAF1) (27.45N 82.50W)	5.39	Ocala (OCAF1) (29.16N 82.08W)	3.90
Clermont 9.0S (CLRF1) (28.46N 81.72W)	6.14	Orlando West (ORWF1) (28.51N 81.55W)	14.83
Cross City 1.0E (CRSF1) (29.63N 83.11W)	12.50	Plant City (PLCF1) (28.02N 82.14W)	13.05
Fort Pierce (FPCF1) (27.44N 80.35W)	4.43	Mt. Plymouth (PLTF1) (28.80N 81.54W)	15.23
Hastings 4.0NE (HTGF1) (29.77N 81.47W)	9.81	Scottsmoor (SCMF1) (28.73N 80.88W)	7.34

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Inverness (INVF1) (28.80N 82.31W)	7.17	Stuart (STRF1) (27.19N 80.24W)	3.32
Kissimmee (KSSF1) (28.28N 81.42W)	3.98	St. Petersburg (SZPF1) (27.80N 82.73W)	10.77
Lisbon (LSBF1) (28.87N 81.78W)	7.25	Titusville (TITF1) (28.62N 80.82W)	8.33
Mountain Lake (LWLF1) (27.94N 81.60W)	4.77	Wauchula (WAUF1) (27.55N 81.80W)	4.64
Melbourne (MLBF1) (28.10N 80.63W)	3.55		
Southwest Florida Water Management District Sites			
Rock Ridge ROMP 88 (17530) (28.31N 81.91W)	10.99	Rutland ROMP 112 (23022) (28.88N 82.23W)	5.80
Combee WTP (17565) (28.11N 81.91W)	12.21	Sumter (23029) (28.86N 82.20W)	7.12
Cumpressco ROMP 89 (17588) (28.36N 82.04W)	8.45	Bushnell (23048) (28.66N 82.11W)	7.79
Lake Gibson (17620) (28.10N 81.95W)	12.21	Lake Okahumpka (23122) (28.81N 82.00W)	7.17
Old Polk City ROMP 76 (17657) (28.18N 81.83W)	11.62	Wildwood (23133) (28.89N 82.03W)	5.71
Four Corners ROMP 40 (18123) (27.65N 82.05W)	3.10	LP-6 Coleman (23149) (28.80N 82.09W)	8.58
Welcome Tower (18124) (27.75N 81.89W)	5.50	Chinsegut Hill (23402) (28.62N 82.37W)	9.25
Pierce (18128) (27.85N 81.97W)	6.20	Richloam Tower (23403) (28.50N 82.11W)	8.61
Starling ROMP 123 (18133) (27.68N 82.25W)	6.21	Leslie Heifner (23504) (28.75N 82.23W)	8.30
Thatcher ROMP 48 (18151) (27.74N 82.14W)	6.08	Trilby (23547) (28.48N 82.18W)	12.53
Balm Park ROMP 49 (18153) (27.76N 82.25W)	7.71	Spring Lake Boyett Grove (23571) (28.50N 82.30W)	9.32
Apollo Beach ROMP TR9-2 (18154) (27.77N 82.39W)	11.42	Johnson Pond (23583) (29.00N 82.38W)	4.59
Cristina ROMP 62 (18159) (27.86N 82.31W)	6.44	Tsala Apoka Outlow ROMP 116 (23597) (28.96N 82.34W)	5.33
Lake Medard ROMP 61 (18175) (27.91N 82.16W)	7.86	Fort Ogden ROMP 16.5 (24361) (27.06N 81.88W)	3.66
S-160 (18295) (27.96N 82.37W)	11.03	Lake Hamilton (25151) (28.03N 81.62W)	5.79
DV-1 Dover (18298) (27.99N 82.21W)	14.73	Coley (25155) (27.74N 81.53W)	3.55
BR-2 Lake Iola (18327) (28.39N 82.29W)	10.32	Lake Henry (25170) (28.08N 81.66W)	6.72
McIntosh (18684) (28.07N 82.14W)	14.81	Sunshine Foliage World (25172) (27.50N 81.75W)	3.26
Green Swamp (18828) (28.22N 82.02W)	15.69	Kuhlman ROMP 28 (25184) (27.37N 81.43W)	3.08
Alston Wet Prairie (18831) (28.18N 82.09W)	14.98	Bowling Green (25191) (27.64N 81.84W)	4.80

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Cypress Creek (18909) (28.26N 82.40W)	10.90	Ona ROMP 31 (25192) (27.45N 81.92W)	3.03
Blackwater Creek (19390) (28.13N 82.18W)	12.67	Zolfo Springs ROMP 30 (25195) (27.46N 81.80W)	4.86
Meadow Pointe Wetland (19417) (28.18N 82.30W)	11.36	Brownsville School ROMP 26 (25210) (27.30N 81.82W)	3.61
Fox Ridge Subdivision (19419) (28.22N 82.29W)	10.00	Shell Creek ROMP 11 (25225) (26.98N 81.94W)	3.78
Sulphur Springs (19436) (28.02N 82.45W)	13.73	Caspersen Beach ROMP TR4-1 (25600) (27.06N 82.44W)	5.19
S-155 (19437) (28.09N 82.35W)	9.28	Laurel Park ROMP TR5-1 (25605) (27.14N 82.45W)	4.75
S-163 (19447) (28.07N 82.35W)	11.01	Osprey ROMP 20 (25607) (27.19N 82.48W)	5.43
S-161 (19448) (28.02N 82.37W)	13.62	Myakka River SP (25608) (27.24N 82.31W)	3.78
S-159 (19471) (28.04N 82.34W)	7.68	Mac Arthur ROMP 19X (25604) (27.17N 82.25W)	3.10
S-162 (19474) (27.98N 82.35W)	10.06	Oak Knoll ROMP 39 (25611) (27.59N 82.25W)	4.92
Island Ford (19487) (28.15N 82.60W)	10.09	Bowlees Creek ROMP TR7-1 (25618) (27.42N 82.58W)	6.85
Crescent Lake (19488) (28.15N 82.59W)	10.51	Oneco ROMP 112 (25619) (27.44N 82.55W)	5.80
Race Track Road (19498) (28.07N 82.64W)	12.67	Myakka City ROMP 23 (25622) (27.32N 82.18W)	3.84
Bay Lake (19509) (28.07N 82.50W)	10.71	Waterbury ROMP 33 (25623) (27.46N 82.26W)	5.33
Eldridge-Wilde 2.0N (19526) (28.17N 82.65W)	10.12	Rubonia ROMP TR8-1 (25626) (27.58N 82.55W)	10.42
St. Pete Jackson 26A (19550) (28.13N 82.52W)	12.19	Payne Terminal ROMP TR SA-1 (25654) (27.58N 82.55W)	4.37
Ozello ROMP TR21-2 (20061) (28.85N 82.60W)	4.07	Flatford Swamp (25802) (27.39N 82.14W)	3.68
Starkey (20384) (28.25N 82.65W)	8.74	Falkner Farms (25812) (27.40N 82.21W)	4.15
Kent Grove (20442) (28.34N 82.52W)	9.92	Utopia ROMP 22 (25829) (27.58N 82.55W)	4.33
Cross Bar (20476) (28.41N 82.40W)	10.67	Knights Trail ROMP TR5-3 (26020) (27.16N 82.40W)	3.74
Summer Tree (20461) (28.33N 82.63W)	7.42	Lake Lowery (26344) (28.13N 81.70W)	5.60
Wolfe (20528) (28.38N 82.50W)	9.65	Webster City (670223) (28.61N 82.05W)	9.36
Engle Park (20546) (28.39N 82.63W)	7.74	Pana Vista (670224) (28.81N 82.14W)	8.06
Horse Lame ROMP 105 (20572) (28.56N 82.40W)	9.48	Davenport ROMP 74X (670225) (28.16N 81.57W)	4.07
Ringgold ROMP 107 (20728) (28.66N 82.46W)	7.33	Warm Mineral Springs ROMP 8 (670227) (27.08N 82.25W)	3.31
SWFWMD Headquarters (20882) (28.47N 82.45W)	9.97	FL-MB-550 Rain (727848) (28.08N 82.34W)	12.33
Buccaneer Bay (20912) (28.52N 82.58W)	8.05	Torrey ROMP 41 (749784) (27.60N 81.84W)	5.08

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Lecanto (20973) (28.85N 82.50W)	5.37	West Desoto ROMP 35 (781076) (27.29N 82.04W)	3.00
Chassahowitzka (21033) (28.72N 82.55W)	7.06	Peck Sink Preserve (802217) (28.54N 82.40W)	9.52
Sawgrass Lake (21191) (27.84N 82.67W)	11.84	Saddle Creek (838153) (27.94N 81.85W)	6.29
Safety Harbor ROMP TR14-1 (22878) (28.00N 82.69W)	11.63	Pretty Lake (906280) (28.10N 82.56W)	10.02
Gulfport (22894) (27.72N 82.69W)	14.48	Cone Ranch TP-2 (908513) (28.09N 82.08W)	14.60
S-551 (22898) (28.05N 82.71W)	8.94	Southern Comfort ROMP TR12-3 (948847) (28.00N 82.55W)	12.09
Floral City Pool (22907) (28.75N 82.28W)	7.74	Hackett White Trout Lake (954572) (28.04N 82.49W)	10.73
Holder (22926) (28.99N 82.35W)	4.77	Lake Hanna West (957575) (28.14N 82.45W)	9.95
Bird Creek (22970) (29.01N 82.75W)	3.08	Crews Lake East (958653) (28.41N 82.49W)	11.19
Romeo (22977) (29.22N 82.44W)	3.19		
Manatee County Rain Gauges			
Frog Creek (MCRG1) (27.58N 82.51W)	9.21	Frye Canal (MCRG25) (27.56N 82.37W)	6.09
Gamble Creek (MCRG4) (27.53N 82.40W)	4.93	Myakka Maintenance Yard (MCRG34) (27.35N 82.17W)	3.33
Wares Creek 9th St (MCRG5) (27.47N 82.57W)	8.54	Rattlesnake Slough (MCRG35) (27.42N 82.49W)	5.10
Government Hammock (MCRG7) (27.54N 82.50W)	6.48	Buffalo Canal (MCRG36) (27.59N 82.44W)	6.04
Palma Sola Drain (MCRG8) (27.47N 82.64W)	8.44	Pearce Drain Tallevast Rd (MCRG38) (27.40N 82.52W)	5.02
Sugarhouse (MCRG10) (27.48N 82.53W)	5.40	Cedar Hammock South (MCRG39) (27.43N 82.58W)	6.86
Aztec Cove (MCRG11) (27.52N 82.64W)	10.37	Curiosity Creek (MCRG40) (27.63N 82.45W)	8.52
Public Works Office (MCRG13) (27.48N 82.55W)	7.52	Cow Pen Slough Lindrick Ln (MCRG42) (27.39N 82.24W)	4.76
McMullen Creek (MCRG14) (27.57N 82.54W)	9.24	Lake Manatee (MCRG43) (27.47N 82.27W)	5.32
Slaughter Drain (MCRG15) (27.55N 82.48W)	5.32	Long Creek (MCRG44) (27.41N 82.13W)	3.11
Bowlees 44th Ave E (MCRG16) (27.46N 82.55W)	6.08	Fort Hammer Park (MCRG45) (27.53N 82.43W)	6.05
Canal Road Drain (MCRG19) (27.53N 82.55W)	6.63	Braden River 44th Ave E (MCRG47) (27.46N 82.49W)	5.20
Carr Drain (MCRG20) (27.53N 82.57W)	8.48	Clay Gully Bridge (MCRG48) (27.29N 82.25W)	3.96
Sarasota County Rain Gauges			

Location	Total Rainfall (in)	Location	Total Rainfall (in)
PH-5 Bahia Vista (400) (27.32N 82.48W)	9.85	WH-2 Myrtle Park (505) (27.37N 82.53W)	4.85
PH-4 Pine Craft (405) (27.32N 82.51W)	7.46	HUD-2 Arlington St (530) (27.32N 82.53W)	5.70
PH-2 Meadows GC (420) (27.37N 82.48W)	4.80	CAT-1 C Sarasota Pkwy (575) (27.23N 82.49W)	5.43
PH-3 B. Jones Golf (440) (27.35N 82.49W)	3.89	EL-1 Pinehurst St (600) (27.24N 82.51W)	5.42
PH-9 Red Bug Slough (450) (27.28N 82.51W)	6.29	Holiday B (610) (27.24N 82.50W)	5.20
WH-1 Tripar (500) (27.38N 82.53W)	6.20		
Lee County Rain Gauges			
Lake Fairways (18) (26.74N 81.94W)	3.80	Agualinda Water Plant (45) (26.59N 82.02W)	3.00
North Reservoir (21) (26.71N 81.84W)	3.36	Bokeelia Boat Ramp (47) (26.69N 82.15W)	3.44
Fort Myers Beach (26) (26.49N 81.93W)	3.20	St. James City (48) (26.51N 82.09W)	4.40
Cecil Webb RG-1 (27) (26.89N 81.96W)	3.08	Bowman's Beach (49) (26.46N 82.15W)	3.06
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) Sites			
Archer 5.5E (FL-AL-2) (29.53N 82.43W)	3.46	Oakland 2.6SSE (FL-OR-62) (28.52N 81.61W)	10.61
Micanopy 2.1NNE (FL-AL-51) (29.53N 82.27W)	3.27	Meadow Wood 1.1SSE (FL-OR-74) (28.37N 81.36W)	4.87
Gainesville 3.0WNW (FL-AL-97) (29.68N 82.39W)	3.00	Apoka 2.6ENE (FL-OR-81) (28.70N 81.47W)	10.30
Palm Shores 4.3NNW (FL-BV-20) (28.24N 80.68W)	5.63	Bithlo 0.8NW (FL-OR-85) (28.58N 81.12W)	7.81
Titusville 3.5NW (FL-BV-38) (28.63N 80.86W)	6.09	Campbell 1.4NNW (FL-OS-31) (28.27N 81.46W)	4.77
Rockledge 1.8NNE (FL-BV-47) (28.35N 80.72W)	8.56	St. Cloud 8.0E (FL-OS-36) (28.25N 81.16W)	4.87
Merritt Island 3.8N (FL-BV-54) (28.37N 80.66W)	6.96	Kissimmee 3.7SSW (FL-OS-41) (28.25N 81.43W)	3.00
Cocoa 4.6NW (FL-BV-85) (28.42N 80.80W)	6.49	Dundee 0.3E (FL-PK-60) (28.02N 81.85W)	5.33
Indialantic (FL-BV-107) (28.12N 80.58W)	4.96	Winter Haven 6.1SW (FL-PK-71) (27.98N 81.79W)	6.60
Melbourne 7.7WNW (FL-BV-111) (28.15N 80.72W)	5.61	Loughman 2.0ESE (FL-PK-78) (28.22N 81.54W)	4.96
West Melbourne 1.6WNW (FL-BV-137) (28.09N 80.70W)	4.10	Auburndale 3.1WSW (FL-PK-81) (28.05N 81.84W)	10.28
Palm Bay 1.0NNE (FL-BV-151) (28.01N 80.65W)	5.42	Bartow 1.9NW (FL-PK-84) (27.91N 81.87W)	7.39
Port Charlotte 4.0WSW (FL-CH-30) (26.96N 82.17W)	6.62	Lakeland 5.8NE (FL-PK-87) (28.10N 81.89W)	11.09

Location	Total Rainfall (in)	Location	Total Rainfall (in)
North Port 1.2SSE (FL-CH-35) (27.03N 82.19W)	3.64	Mulberry 0.4SW (FL-PK-94) (27.90N 81.98W)	7.49
Naples 5.7E (FL-CR-12) (26.10N 81.72W)	3.11	Crooked Lake Park 4.5WSW (FL-PK-98) (27.81N 81.66W)	3.10
Golden Gate 2.2SW (FL-CR-62) (26.16N 81.73W)	5.57	South Pasadena 1.0NE (FL-PN-6) (27.76N 82.73W)	12.78
Naples Manor 2.3ENE (FL-CR-71) (26.08N 81.69W)	3.84	Dunedin 2.8ESE (FL-PN-36) (28.03N 82.76W)	11.66
Crystal River 4.7ESE (FL-CT-8) (28.87N 82.53W)	6.57	St. Petersburg 2.5S (FL-PN-81) (27.72N 82.65W)	20.40
Beverly Hills 1.0ENE (FL-CT-49) (28.92N 82.45W)	6.55	Gulfport 0.6SSE (FL-PN-87) (27.74N 82.71W)	12.78
Homosassa 6.0SE (FL-CT-29) (28.73N 82.54W)	7.51	Pinellas Park 1.7ENE (FL-PN-90) (27.87N 82.68W)	15.03
Citrus Springs 1.3WNW (FL-CT-37) (29.01N 82.49W)	5.04	Largo 1.5SSW (FL-PN-104) (27.89N 82.79W)	12.11
Hernando 3.9WSW (FL-CT-38) (28.88N 82.43W)	6.42	Feather Sound 1.3S (FL-PN-105) (27.89N 82.66W)	11.01
Inverness 1.6SE (FL-CT-45) (28.82N 82.32W)	7.21	Tarpon Springs 3.1E (FL-PN-116) (28.15N 82.73W)	10.02
Keystone Heights 10.0NE (FL-CY-38) (29.86N 81.90W)	4.38	Seminole 0.9S (FL-PN-131) (27.83N 82.79W)	13.76
Green Cove Springs 2.6WNW (FL-CY-42) (30.01N 81.72W)	3.01	Palm Harbor 2.7SE (FL-PN-133) (28.06N 82.73W)	12.65
Fruit Cove 5.9E (FL-DV-98) (30.11N 81.52W)	3.57	Clearwater 3.1ENE (FL-PN-136) (27.92N 82.72W)	12.82
Bunnell 1.0ENE (FL-FL-19) (29.47N 81.24W)	10.25	Hudson 1.1ESE (FL-PS-1) (28.35N 82.68W)	7.93
Flagler Beach 1.3SE (FL-FL-33) (29.46N 81.12W)	8.51	Port Richey 2.0NNE (FL-PS-4) (28.30N 82.71W)	8.58
Palm Coast 8.3S (FL-FL-43) (29.45N 81.22W)	10.17	Lutz 3.4NE (FL-PS-6) (28.17N 82.42W)	12.02
Valrico 2.2SE (FL-HB-4) (27.91N 82.23W)	11.11	Zephyrhills North 2.3N (FL-PS-18) (28.28N 82.16W)	11.93
Tampa 5.1S (FL-HB-10) (27.89N 82.49W)	16.51	Trinity 3.0ENE (FL-PS-65) (28.19N 82.62W)	11.30
Sun City Center 1.0NE (FL-HB-17) (27.73N 82.34W)	9.08	Wesley Chapel 1.7ESE (FL-PS-73) (28.18N 82.34W)	13.90
Bloomingdale 7.6 ESE (FL-HB-33) (27.83N 82.15W)	7.97	Dade City 5.1W (FL-PS-81) (28.35N 82.28W)	12.29
Greater Northdale 0.4ENE (FL-HB-48) (28.11N 82.51W)	11.36	Zephyrhills 2.0SSE (FL-PS-84) (28.21N 82.16W)	11.15
Riverview 4.8SSW (FL-HB-98) (27.80N 82.34W)	9.88	Land O' Lakes 3.0WNW (FL-PS-88) (28.23N 82.50W)	10.16
Lutz 0.6WSW (FL-HB-116) (28.13N 82.47W)	10.78	New Port Richey 4.7S (FL-PS-89) (28.18N 82.71W)	9.00
Thonotosassa 3.6NE (FL-HB-123) (28.09N 82.27W)	13.35	Satsuma 4.0NE (FL-PT-7) (29.59N 81.61W)	8.58
Carrollwood Village 2.3W (FL-HB-168) (28.07N 82.56W)	12.27	East Palatka 3.5NNW (FL-PT-8) (29.70N 81.63W)	6.86
Apollo Beach 0.6W (FL-HB-173) (27.77N 82.42W)	8.20	Florahome 4.1NNE (FL-PT-12) (29.78N 81.85W)	5.35
Plant City 3.9SE (FL-HB-177) (27.97N 82.08W)	12.54	San Mateo (FL-PT-24) (29.59N 81.55W)	8.04

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Ruskin 3.2W (FL-HB-178) (27.71N 82.48W)	11.22	Interlachen 3.6NNE (FL-PT-26) (29.66N 81.87W)	4.69
Sefner 0.9W (FL-HB-184) (28.00N 82.29W)	11.61	Hollister 0.5NW (FL-PT-27) (29.63N 81.82W)	5.79
Lake Placid 3.6SW (FL-HL-46) (27.25N 81.40W)	3.54	Palatka 3.6W (FL-PT-29) (29.64N 81.72W)	6.59
Spring Hill 2.4NW (FL-HN-14) (28.50N 82.60W)	9.46	St. Augustine South 2.1SSW (FL-SJ-4) (29.81N 81.33W)	10.92
Weeki Wachee 7.1NNE (FL-HN-24) (28.61N 82.54W)	9.07	St. Augustine 3.4SW (FL-SJ-28) (29.85N 81.34W)	9.63
Brooksville 3.7SE (FL-HN-39) (28.51N 82.36W)	11.74	Sawgrass (FL-SJ-29) (30.19N 81.37W)	3.78
Sebastien 2.0SSW (FL-IR-19) (27.76N 80.50W)	7.94	Palm Valley 5.9SSW (FL-SJ-31) (30.12N 81.43W)	3.11
Vero Beach 5.4NNW (FL-IR-48) (27.71N 80.44W)	11.60	Tradition 5.6W (FL-SL-17) (27.27N 80.45W)	3.98
Fellsmere 4.3ESE (FL-IR-63) (27.74N 80.53W)	4.65	Jensen Beach 4.1NNE (FL-SL-54) (27.94N 80.21W)	3.36
Fort Myers 1.7WNW (FL-LE-72) (26.64N 81.88W)	4.52	Port St. Lucie 4.7N (FL-SL-58) (27.35N 80.36W)	5.68
North Fort Myers 2.8ESE (FL-LE-74) (26.68N 81.85W)	4.96	Fort Pierce 5.8SSE (FL-SL-59) (27.36N 80.30W)	4.55
Cypress Lake 1.2SE (FL-LE-79) (26.53N 81.88W)	3.75	Altamont Springs 1.4SE (FL-SM-27) (28.65N 81.38W)	5.26
Cape Coral 2.2WNW (FL-LE-80) (26.65N 82.03W)	4.14	Casselberry 2.3ESE (FL-SM-35) (28.65N 81.29W)	10.40
Oakland 3.4WSW (FL-LK-27) (28.54N 81.68W)	11.26	Chuluota 0.6WSW (FL-SM-37) (28.64N 81.13W)	9.47
Fruitland Park 0.8NNW (FL-LK-28) (28.87N 81.92W)	7.11	Winter Springs 1.8SSE (FL-SM-38) (28.69N 81.26W)	10.92
Lady Lake 5.5S (FL-LK-31) (28.85N 81.94W)	8.26	Longwood 2.8NW (FL-SM-39) (28.73N 81.38W)	10.07
Leesburg 5.5S (FL-LK-41) (28.73N 81.89W)	8.89	Maitland 1.4NE (FL-SM-44) (28.64N 81.35W)	6.28
Paisley 2.4E (FL-LK-44) (28.98N 81.50W)	9.78	Oviedo 3.2NNE (FL-SM-55) (28.70N 81.16W)	13.56
Tavares 0.4SSE (FL-LK-48) (28.80N 81.73W)	8.55	Sanford 2.2SW (FL-SM-60) (28.76N 81.30W)	11.04
Groveland 5.1NE (FL-LK-51) (28.61N 81.79W)	11.26	Englewood 2.0NNW (FL-SS-22) (26.99N 82.37W)	4.25
Clermont 6.1NNE (FL-LK-57) (28.62N 81.70W)	10.83	North Port 3.6ESE (FL-SS-56) (27.04N 82.14W)	4.83
Inglis 0.6N (FL-LV-15) (29.04N 82.66W)	3.88	Osprey 1.1ESE (FL-SS-88) (27.19N 82.47W)	5.11
Dunnellon 7.4W (FL-LV-18) (29.04N 82.57W)	4.55	Sarasota 3.8SSE (FL-SS-98) (27.29N 82.52W)	7.45
Bradenton 3.5WNW (FL-MA-20) (27.51N 82.63W)	13.05	Venice 4.2ESE (FL-SS-102) (27.07N 82.37W)	4.17
Lakewood Ranch 3.5E (FL-MA-29) (27.41N 82.37W)	6.03	Lady Lake 4.3SSW (FL-ST-9) (28.87N 81.95W)	11.71
The Meadows 6.2NE (FL-MA-32) (27.43N 82.40W)	6.24	The Villages 2.8ESE (FL-ST-26) (28.90N 81.95W)	8.78
Parrish 5.6SE (FL-MA-40) (27.52N 82.37W)	5.01	Oxford 0.8SW (FL-ST-35) (28.92N 82.05W)	9.36

Location	Total Rainfall (in)	Location	Total Rainfall (in)
Desoto Lakes 4.2NNE (FL-MA-43) (27.43N 82.46W)	3.88	Wildwood 2.2ENE (FL-ST-38) (28.88N 82.00W)	3.69
Micanopy 3.6SSW (FL-MR-13) (29.46N 82.30W)	4.06	New Smyrna Beach 1.5E (FL-VL-1) (29.03N 80.89W)	12.22
Belleview 4.8E (FL-MR-18) (29.06N 81.98W)	8.59	Edgewater 2.4N (FL-VL-6) (29.00N 80.91W)	9.42
The Villages 2.7NNW (FL-MR-20) (28.97N 82.00W)	7.25	Oak Hill 2.8 WSW (FL-VL-38) (28.86N 80.87W)	9.55
Ocala 14.3S (FL-MR-36) (28.98N 82.17W)	9.68	De Bary 1.7NE (FL-VL-51) (28.90N 81.29W)	14.98
Jensen Beach (FL-MT-15) (27.25N 80.26W)	6.08	Port Orange 0.2NNW (FL-VL-62) (29.11N 81.01W)	15.79
Stuart 5.9SSE (FL-MT-18) (27.19N 80.23W)	3.08	Ormond-by-the-Sea 0.8SSE (FL-VL-81) (29.33N 81.06W)	11.30
Indiantown 0.5SW (FL-MT-41) (27.03N 80.48W)	6.12	De Land 3.9SSE (FL-VL-83) (28.98N 81.28W)	12.28
Port Salerno (FL-MT-46) (27.12N 80.21W)	4.35	DeLeon Springs 1.6ESE (FL-VL-86) (29.11N 81.33W)	12.38
Union Park 3.8ENE (FL-OR-15) (28.58N 81.18W)	7.87	Lake Helen 0.9S (FL-VL-90) (28.97N 81.23W)	15.95
Orlando 4.8NNW (FL-OR-26) (28.57N 81.40W)	10.03	Ormond Beach 2.0ENE (FL-VL-99) (29.31N 81.06W)	17.20
Ocoee 1.4N (FL-OR-34) (28.59N 81.53W)	10.11	Orange City 1.4ENE (FL-VL103) (28.95N 81.27W)	12.26
St. Cloud 3.1E (FL-OR-37) (28.25N 81.24W)	3.65	Pierson 1.0ENE (FL-VL105) (29.24N 81.45W)	11.43
Windermere 1.2NW (FL-OR-40) (28.51N 81.55W)	4.75	Deltona 2.6SSW (FL-VL-114) (28.87N 81.22W)	14.08

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. Parentheses indicate when that category was reintroduced a second time.

	Hours Before Genesis	
	48-Hour Outlook	**168-Hour Outlook**
Low (<40%)	114 (18)	210
Medium (40%-60%)	6	174 (36)
High (>60%)	0	12

Table 6a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Milton, 5–10 October 2024. 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	25.8	43.0	52.5	69.8	**78.5**	**87.9**	**77.6**	**82.7**
OCD5	51.5	113.1	202.2	289.8	396.4	464.2	524.9	618.6
Forecasts	19	17	15	13	11	9	5	1
OFCL (2019-23)	23.9	36.5	49.3	63.4	79.2	93.4	132.9	190.4
OCD5 (2019-23)	45.7	97.1	153.0	205.4	254.9	297.8	372.7	439.1

Table 6b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Milton, 5–10 October 2024. 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	25.3	41.4	50.7	68.1	77.9	81.3	82.5	82.7
OCD5	50.9	116.6	199.3	287.2	400.8	471.1	542.6	618.6
GFSI	**22.5**	**35.8**	**50.2**	68.2	98.2	128.0	125.0	**79.6**
HWFI	27.8	43.6	61.6	79.7	91.2	105.1	132.0	84.7
HMNI	**21.9**	**36.1**	57.6	75.1	83.0	**79.5**	128.6	102.4
HFAI	28.4	46.5	57.2	**64.4**	**76.3**	91.0	143.0	196.7
HFBI	**25.1**	**39.1**	**48.8**	**65.7**	89.5	109.0	135.6	135.3
UEMI	29.0	57.5	82.7	90.3	**75.7**	83.4	92.3	**67.4**
EMXI	31.3	47.5	64.6	74.5	80.0	**69.9**	89.6	204.1
CMCI	29.0	42.7	61.9	83.6	118.3	176.9	249.3	436.3
CTCI	**20.3**	**33.4**	**38.5**	**44.1**	**38.5**	**51.8**	84.7	**79.2**
TVCA	**23.1**	**37.4**	**50.2**	**59.8**	**65.6**	**62.3**	**65.9**	**59.3**
TVCX	**23.1**	**37.2**	**49.3**	**61.1**	**63.7**	**60.5**	**65.2**	82.7
GFEX	26.1	**38.8**	52.9	**66.7**	80.3	94.8	99.8	126.8
TVDG	**23.3**	**37.7**	51.6	**62.8**	**65.4**	**64.1**	**70.4**	**78.9**
HCCA	**24.0**	**39.1**	51.6	**61.2**	**69.5**	**81.1**	99.7	144.5
AEMI	27.6	42.2	50.7	**63.6**	**76.5**	82.6	**63.9**	177.7
TABS	61.3	122.2	175.5	203.2	216.5	240.8	507.8	192.4
TABM	32.4	51.7	70.4	80.2	**71.0**	83.0	175.0	115.9
TABD	28.5	**36.2**	**38.9**	69.3	100.9	153.0	273.4	348.6
Forecasts	17	15	14	12	10	8	4	1

Table 7a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Milton, 5–10 October 2024. 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	9.7	17.9	19.7	27.7	26.4	22.8	17.0	**0.0**
OCD5	15.7	26.2	38.5	52.5	51.0	51.6	47.4	16.0
Forecasts	19	17	15	13	11	9	5	1
OFCL (2019-23)	5.0	7.3	8.5	9.7	10.4	10.9	12.9	15.5
OCD5 (2019-23)	6.6	10.2	13.1	15.6	17.2	18.6	21.8	22.6

Table 7b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Milton, 5–10 October 2024. Errors smaller than the NHC official forecast are shown in boldface type.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	9.7	17.9	19.7	27.7	26.4	22.8	17.0	0.0
OCD5	15.7	26.2	38.5	52.5	51.0	51.6	47.4	16.0
HWFI	12.4	**17.3**	21.1	**23.5**	26.7	**18.8**	20.2	5.0
HMNI	14.1	**16.7**	**19.1**	**22.1**	**22.4**	**18.8**	17.2	1.0
HFAI	13.2	**17.1**	**18.3**	**17.5**	**13.2**	**12.1**	24.8	8.0
HFBI	11.5	**14.1**	**14.3**	**22.0**	**17.1**	**15.7**	24.4	12.0
DSHP	14.4	19.8	27.9	32.1	32.3	36.6	39.4	10.0
LGEM	14.3	21.8	27.9	32.5	32.2	33.9	36.4	14.0
ICON	13.2	18.5	23.7	**27.2**	27.9	26.2	19.8	4.0
IVCN	12.6	**16.6**	**18.6**	**24.5**	**24.4**	23.7	21.6	1.0
IVDR	12.8	**16.8**	**17.9**	**24.4**	**24.6**	23.0	21.0	1.0
CTCI	15.3	22.1	27.2	39.9	42.7	45.6	27.2	7.0
GFSI	18.0	25.7	32.0	42.6	42.6	37.0	27.4	5.0
EMXI	21.9	34.9	46.0	55.3	58.0	54.6	46.4	12.0
HCCA	11.8	**15.4**	**17.4**	**23.8**	**24.6**	25.8	23.2	10.0
Forecasts	19	17	15	13	11	9	5	1

Table 8a. Tropical cyclone wind watch and warning summary for Hurricane Milton, 5–10 October 2024.

Date/Time (UTC)	Action	Location
06 / 0300	Tropical Storm Watch issued	Coast of the Yucatan Peninsula of Mexico from Celestun to Cancun
06 / 1500	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico from Celestun to Cabo Catoche
06 / 2100	Hurricane Watch issued	Coast of the Yucatan Peninsula of Mexico from Celestun to Cancun
06 / 2100	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico from Cabo Catoche to Cancun
07 / 0900	Hurricane Warning issued	Coast of the Yucatan Peninsula of Mexico from Celestun to Rio Lagartos
07 / 0900	Hurricane Watch issued	The Dry Tortugas and the Gulf coast of Florida from Chokoloskee northward to the mouth of the Suwanee River, including Tampa Bay
07 / 0900	Tropical Storm Watch issued	Florida Gulf Coast west of the Suwannee River to Indian Pass
07 / 0900	Tropical Storm Watch issued	Florida Gulf Coast south of Chokoloskee to Flamingo
07 / 0900	Tropical Storm Watch issued	Florida Keys including Florida Bay
07 / 1200	Hurricane Watch issued	Coast of the Yucatan Peninsula of Mexico south of Celestun to Campeche
07 / 1200	Tropical Storm Warning issued	Coast of the Yucatan Peninsula of Mexico south of Celestun to Campeche
07 / 1500	Hurricane Watch issued	Lake Okeechobee
07 / 2100	Hurricane Warning issued	Florida Gulf Coast from Bonita Beach northward to the mouth of the Suwannee River, including Tampa Bay
07 / 2100	Hurricane Watch issued	East coast of the Florida Peninsula from the St. Lucie/Indian River County Line northward to the mouth of the St. Mary's River
07 / 2100	Tropical Storm Warning issued	Florida Gulf Coast south of Bonita Beach to Flamingo, including Lake Okeechobee
07 / 2100	Tropical Storm Warning issued	Florida Gulf Coast north of the mouth of the Suwannee River northward and westward to Indian Pass
07 / 2100	Tropical Storm Warning issued	Florida Keys, including the Dry Tortugas and Florida Bay
07 / 2100	Tropical Storm Watch issued	East coast of the Florida Peninsula south of the St. Lucie/Indian River County Line southward to Flamingo

Date/Time (UTC)	Action	Location
07 / 2100	Tropical Storm Watch issued	Coast of Georgia and South Carolina from north of the mouth of the St. Mary's River to South Santee River, South Carolina
08 / 1200	Hurricane Warning issued	East coast of the Florida Peninsula from the Indian River/St. Lucie County Line northward to Ponte Vedra Beach
08 / 1200	Tropical Storm Warning issued	Southeast coast of the Florida Peninsula south of the Indian River/St. Lucie County Line to Flamingo
08 / 1200	Tropical Storm Warning issued	Northeast coast of the Florida Peninsula north of Ponte Vedra Beach to the mouth of the St. Mary's River
08 / 1200	All watches and warnings discontinued	Coast of the Yucatan Peninsula of Mexico south of Celestun
08 / 1500	Tropical Storm Watch issued	Extreme northwestern Bahamas, including Grand Bahama Island, the Abacos, and Bimini
08 / 2100	Hurricane Warning issued	East coast of the Florida Peninsula from the Indian River/St. Lucie County Line southward to the St. Lucie/Martin County Line
08 / 2100	Hurricane Watch issued	East coast of the Florida Peninsula from the St. Lucie/Martin County Line to the Palm Beach/Martin County Line
08 / 2100	Tropical Storm Warning issued	Georgia coast from the mouth of the St. Mary's River to the Altamaha Sound
08 / 2100	Tropical Storm Warning issued	Extreme northwestern Bahamas, including Grand Bahama Island, the Abacos, and Bimini
08 / 2100	Hurricane Warning discontinued	Coast of the Yucatan Peninsula of Mexico west of Dzilam
08 / 2100	Hurricane Watch discontinued	Coast of the Yucatan Peninsula of Mexico from Rio Lagartos to Cabo Catoche
08 / 2100	Hurricane Warning changed to Tropical Storm Warning	Coast of the Yucatan Peninsula of Mexico from Dzilam to Rio Lagartos
09 / 0300	Tropical Storm Warning discontinued	Coast of the Yucatan Peninsula of Mexico from Dzilam to Cancun
09 / 0900	Tropical Storm Warning issued	Georgia coast from the Altamaha Sound to the Savannah River
09 / 2100	Tropical Storm Warning issued	U. S. east coast north of the Savannah River, Georgia, to Edisto Beach, South Carolina
09 / 2100	Hurricane Watch discontinued	Dry Tortugas and the west coast of the Florida Peninsula south of Bonita beach to Chokoloskee
09 / 2100	Hurricane Watch discontinued	East coast of the Florida peninsula north of Ponte Vedra Beach to the mouth of the St. Mary's River
09 / 2100	Tropical Storm Watch discontinued	U. S. east coast north of Edisto Beach, South Carolina

Date/Time (UTC)	Action	Location
10 / 0900	All watches and warnings discontinued	Florida Gulf coast
10 / 0900	Tropical Storm Warning discontinued	Florida Keys and the southeast coast of the Florida Peninsula south of the Palm Beach/Broward County Line
10 / 0900	Hurricane Watch discontinued	Lake Okeechobee and the east coast of the Florida peninsula in Martin County.
10 / 1200	Hurricane Warning changed to Tropical Storm Warning	East coast of the Florida peninsula south of Sebastien Inlet and north of the Flagler/Volusia County Line
10 / 1200	Tropical Storm Warning discontinued	Southeast coast of the Florida Peninsula south of the Palm Beach/Martin County Line
10 / 1500	Hurricane Warning changed to Tropical Storm Warning	East coast of the Florida peninsula from Sebastien Inlet to the Flagler/Volusia County Line
10 / 1500	Tropical Storm Warning discontinued	Lake Okeechobee and the east coast of the Florida Peninsula south of Sebastien Inlet
10 / 1500	Tropical Storm Warning discontinued	Bimini
10 / 1800	Tropical Storm Warning discontinued	East coast of the Florida Peninsula south of the Flagler/Volusia County line
10 / 1800	Tropical Storm Warning discontinued	Extreme northwestern Bahamas
10 / 2100	All watches and warnings discontinued	U. S. coast

Table 8b. Storm surge watch and warning summary for Hurricane Milton, 5–10 October 2024.

Date/Time (UTC)	Action	Location
07 / 0900	Storm Surge Watch issued	Florida Gulf Coast from Flamingo northward to the Suwannee River, including Charlotte Harbor and Tampa Bay.
07 / 2100	Storm Surge Warning issued	Florida Gulf Coast from Flamingo northward to the Suwannee River, including Charlotte Harbor and Tampa Bay.
07 / 2100	Storm Surge Watch issued	U.S. east coast from Sebastian Inlet, Florida, to Edisto Beach, South Carolina, including the St. Johns River
08 / 1200	Storm Surge Warning issued	East coast of the Florida Peninsula from the Volusia/Brevard County Line northward to the mouth of the St. Mary's River, including the St. Johns River
08 / 1500	Storm Surge Warning issued	East coast of the Florida Peninsula from the Volusia/Brevard County Line southward to Port Canaveral
08 / 2100	Storm Surge Warning issued	East coast of the Florida Peninsula from Port Canaveral southward to Sebastien Inlet
08 / 2100	Storm Surge Warning issued	Georgia coast from the mouth of the St. Mary's River to the Altamaha Sound
09 / 0900	Storm Surge Warning discontinued	Florida Gulf coast west of Yankeetown
09 / 1800	Storm Surge Watch discontinued	U. S. east coast north of Altamaha Sound, Georgia, to Edisto Beach, South Carolina
10 / 0300	Storm Surge Warning discontinued	Florida Gulf coast north of the Anclote River
10 / 0900	Storm Surge Warning discontinued	Florida Gulf coast from the Anclote River to the middle of Longboat Key, including Tampa Bay
10 / 0900	Storm Surge Warning discontinued	Florida Gulf coast from Bonita Beach to Flamingo
10 / 1200	Storm Surge Warning discontinued	Florida Gulf coast
10 / 1800	Storm Surge Warning discontinued	East coast of the Florida Peninsula south of the Flagler/Volusia County line
10 / 2100	All watches and warnings discontinued	U. S. coast

FIGURES

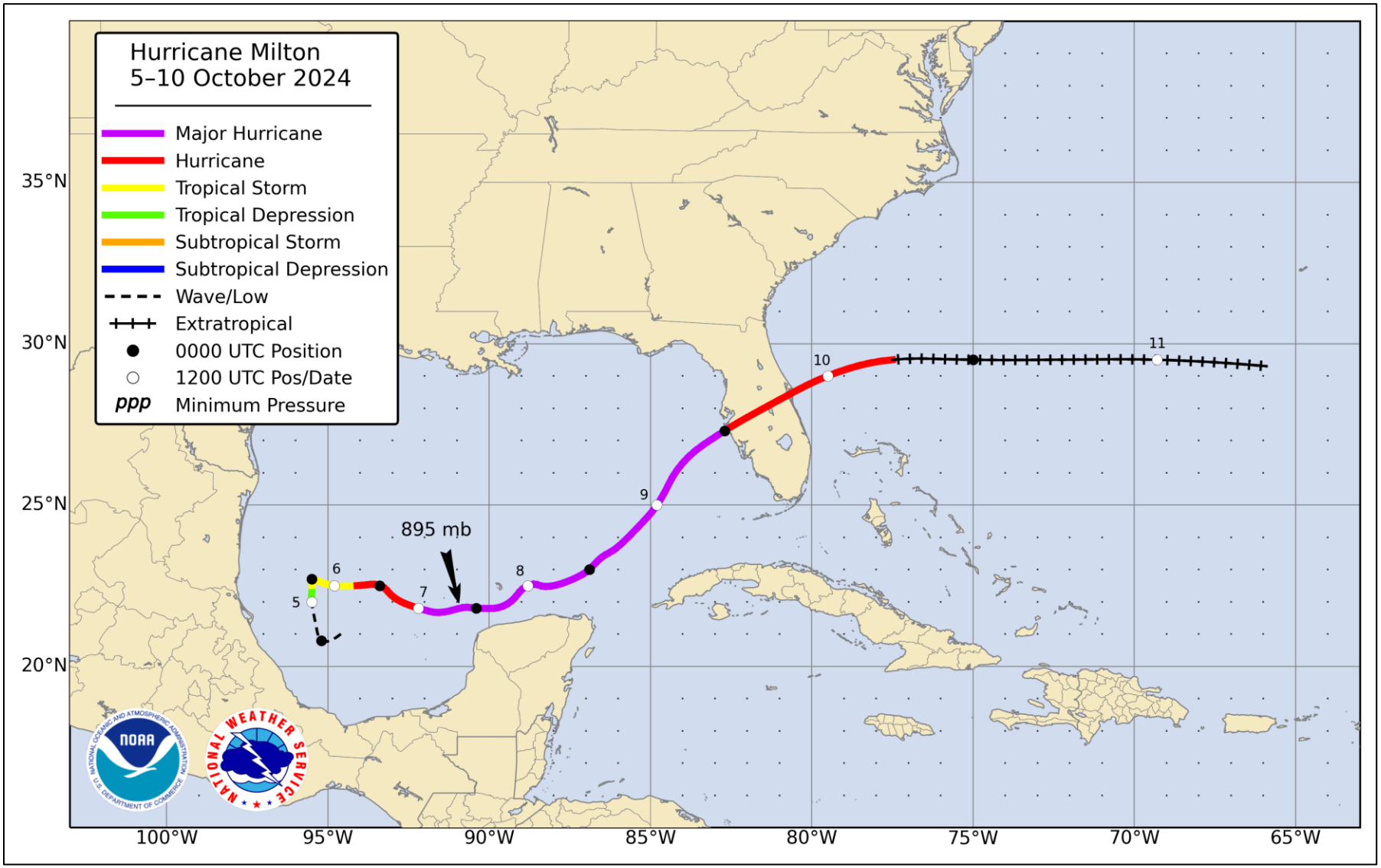

Figure 1. Best track positions for Hurricane Milton, 5–10 October 2024.

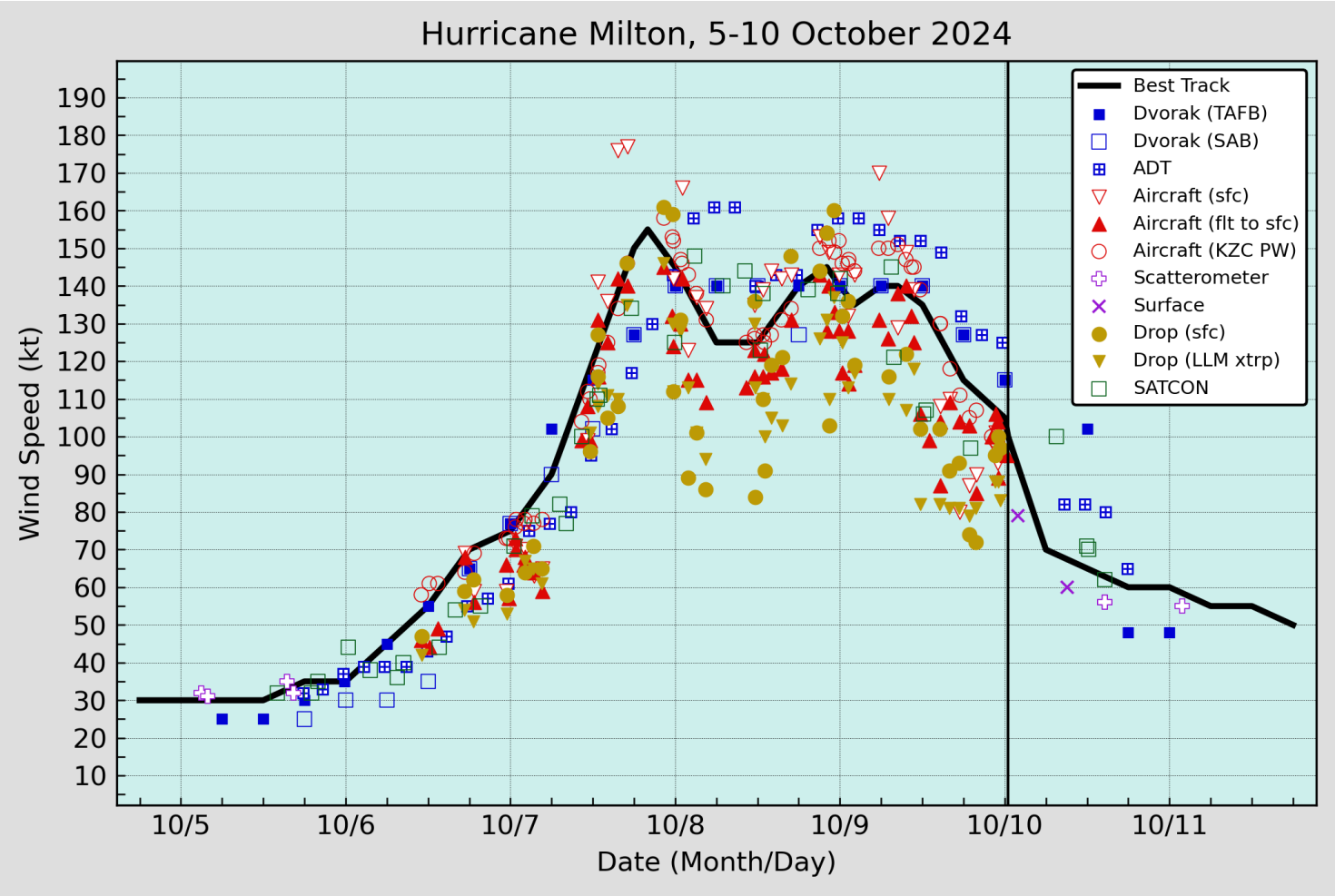

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Milton, 5–10 October 2024. Aircraft observations have been adjusted for elevation using 90%, 80%, and 75% adjustment factors for observations from 700 mb, 850 mb, and 925 mb, respectively. Dropwindsonde observations include actual 10 m winds (sfc), as well as surface estimates derived from the mean wind over the lowest 150 m of the wind sounding (LLM). 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 solid vertical lines correspond to landfalls.

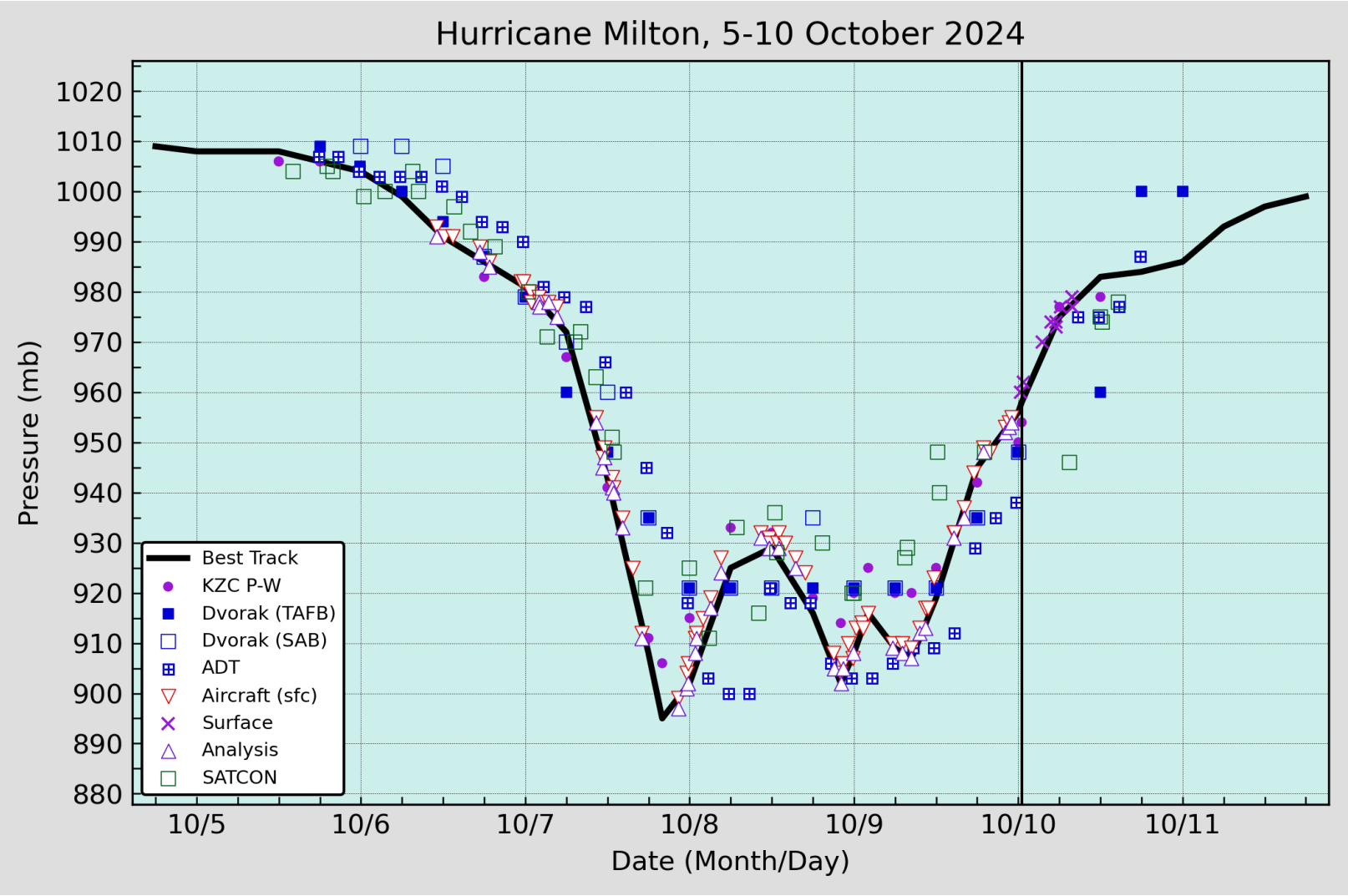

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Milton, 5–10 October 2024. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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 solid vertical lines correspond to landfalls.

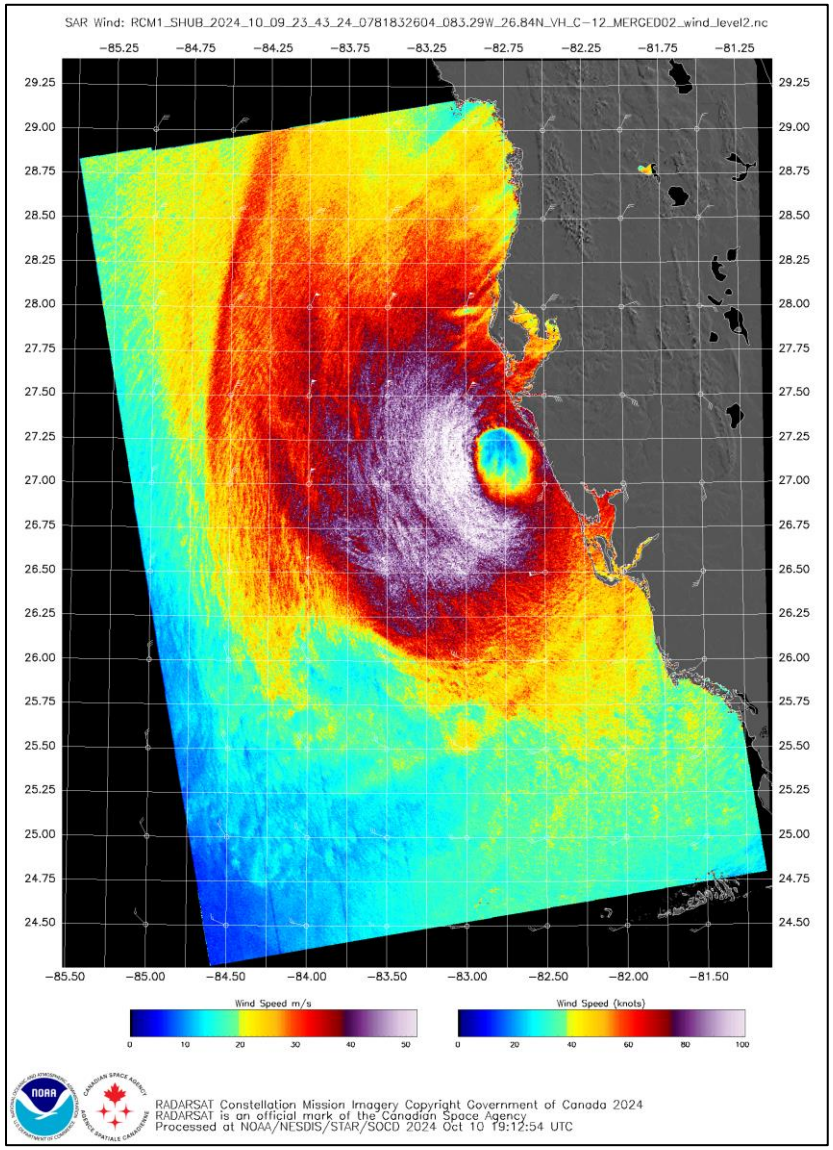

Figure 4. Synthetic aperture radar image showing estimated surface winds in Milton just before landfall in Florida. Data is from the Canadian RADARSAT (RCM-1) at 2343 UTC 9 October 2024 with image courtesy of NESDIS STAR and the Canadian Space Agency.

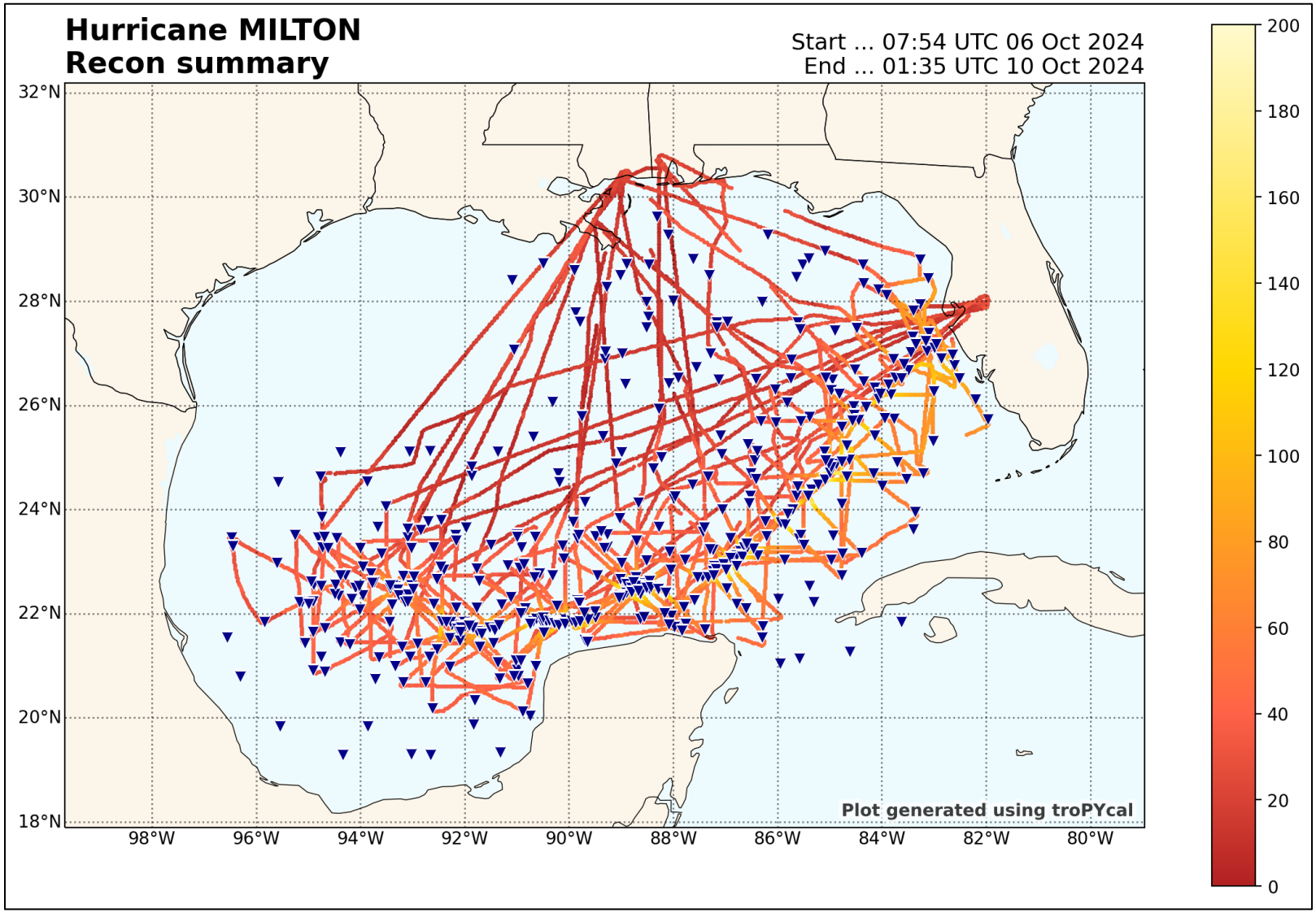

Figure 5. Air Force Reserve and NOAA Hurricane Hunter aircraft flight tracks (red) from reconnaissance missions into Milton. The black markers denote center fixes, and the blue triangles indicate dropsonde locations. The color coding of the flight tracks is based on the observed flight-level wind speed with the color legend to the right of the map representing the color associated with the various wind speeds in knots. Dropsondes with no flight tracks are from the NOAA G-IV aircraft.

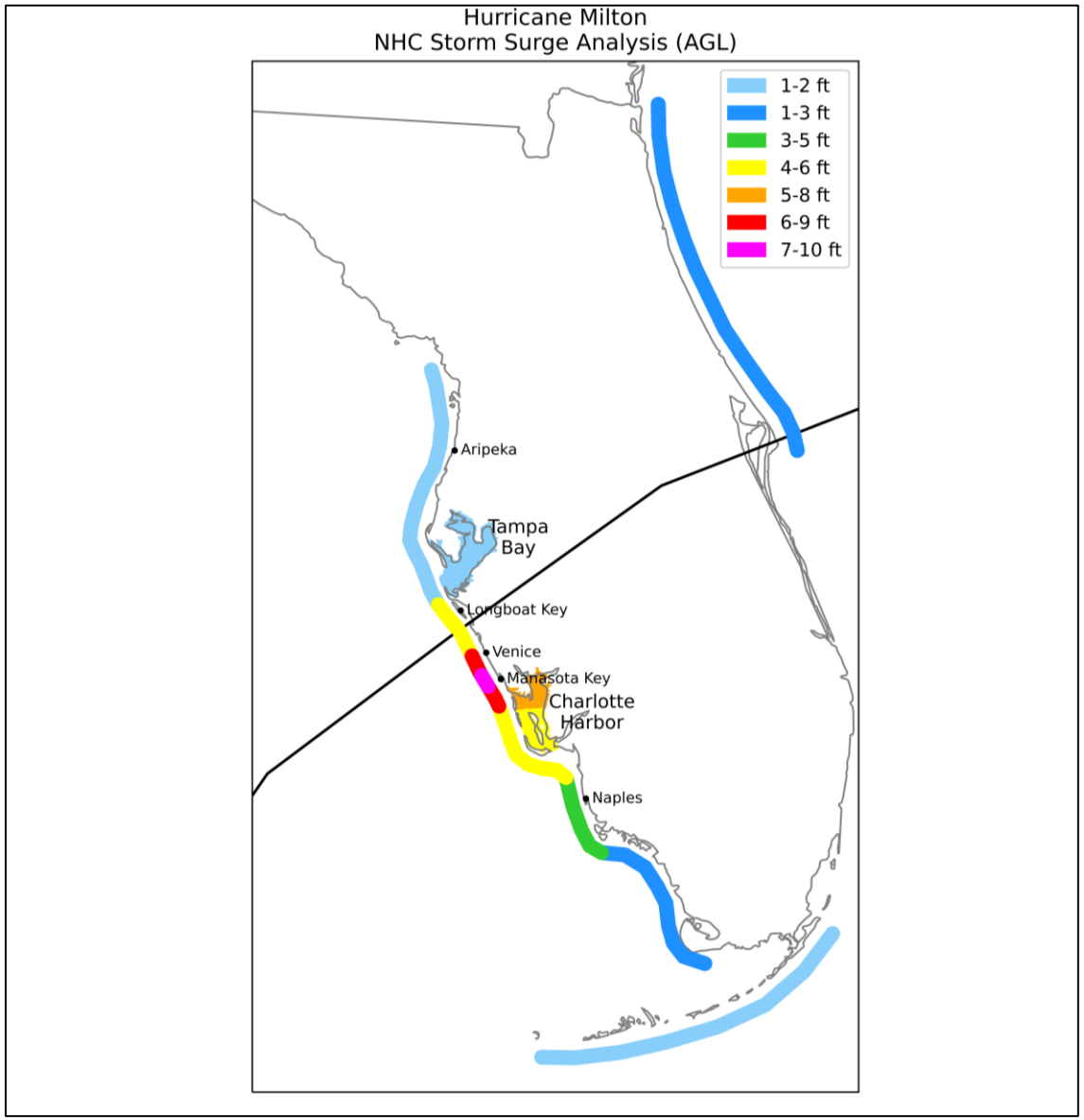

Figure 6. Analyzed storm surge inundation (feet above ground level) along the coast of Florida from Hurricane Milton. Milton's track is overlaid (black line).

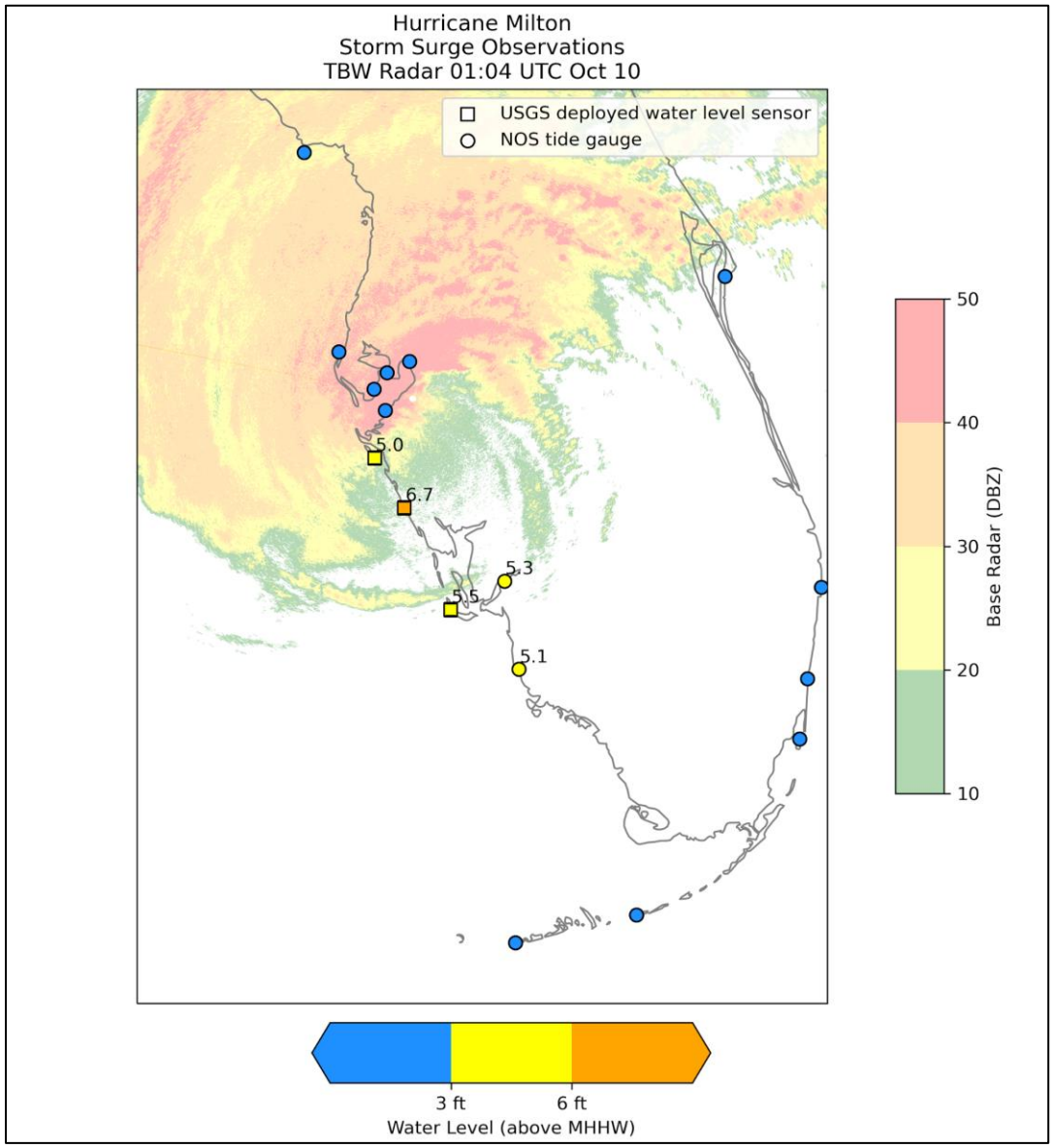

Figure 7. Maximum water levels (ft above MHHW) during Hurricane Milton measured by the NOS tide gauge network and deployed USGS water level sensors, overlaid with TBW radar reflectivity at 0104 UTC 10 October.

Figure 8. Storm surge damage due to Hurricane Milton on Manasota Key, Florida. Images taken by NWS survey crews on Manasota Key.

Figure 9. Before (upper left), during, (upper right), and after (bottom) images of storm surge damage due to Hurricane Milton at Punta Gorda, Florida. Images courtesy of Mark Sudduth and Matt Clemons of HurricaneTrack.

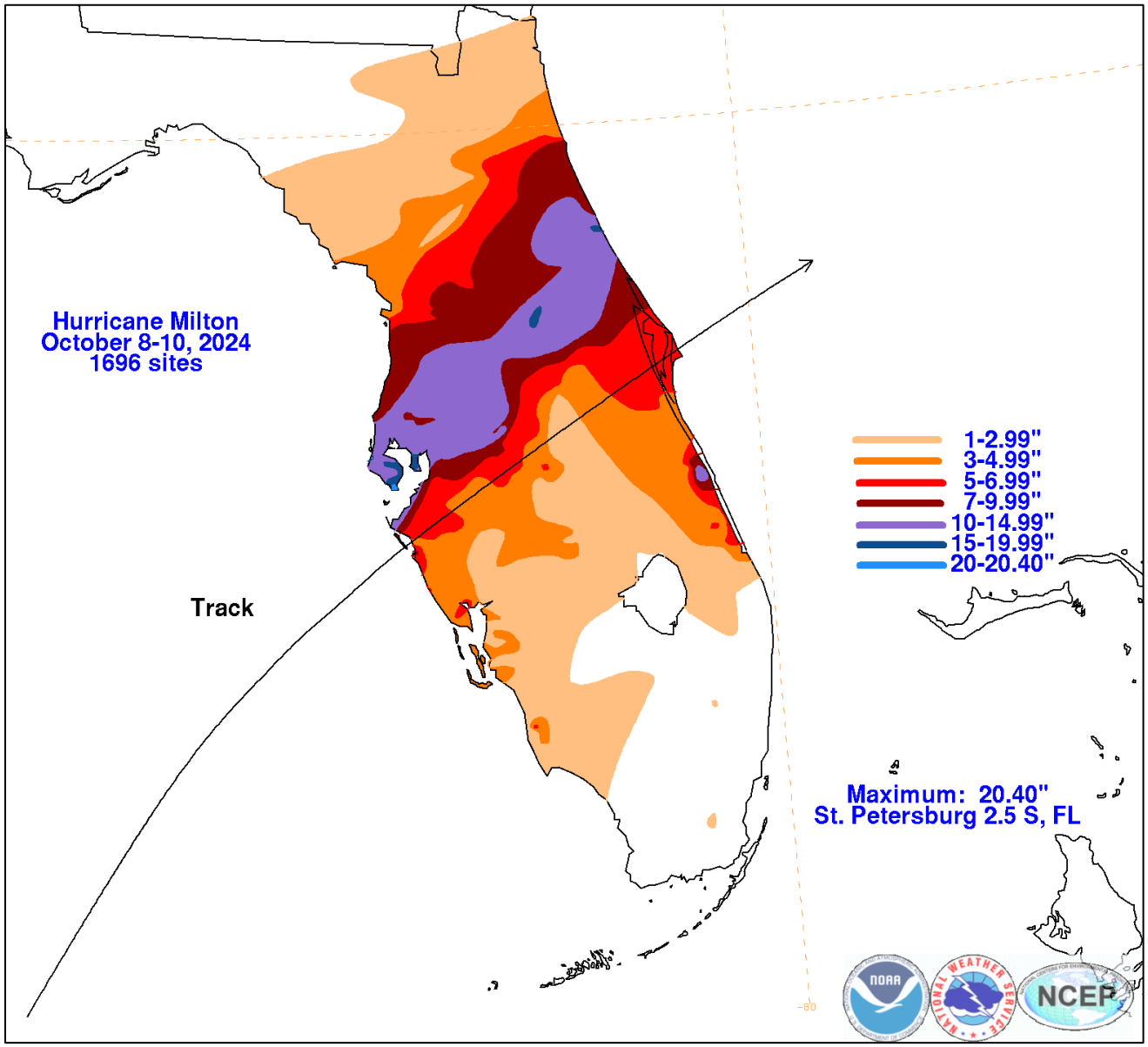

Figure 10. Rainfall totals for the United States during the passage of Hurricane Milton. Image courtesy of Dave Roth at the Weather Prediction Center.

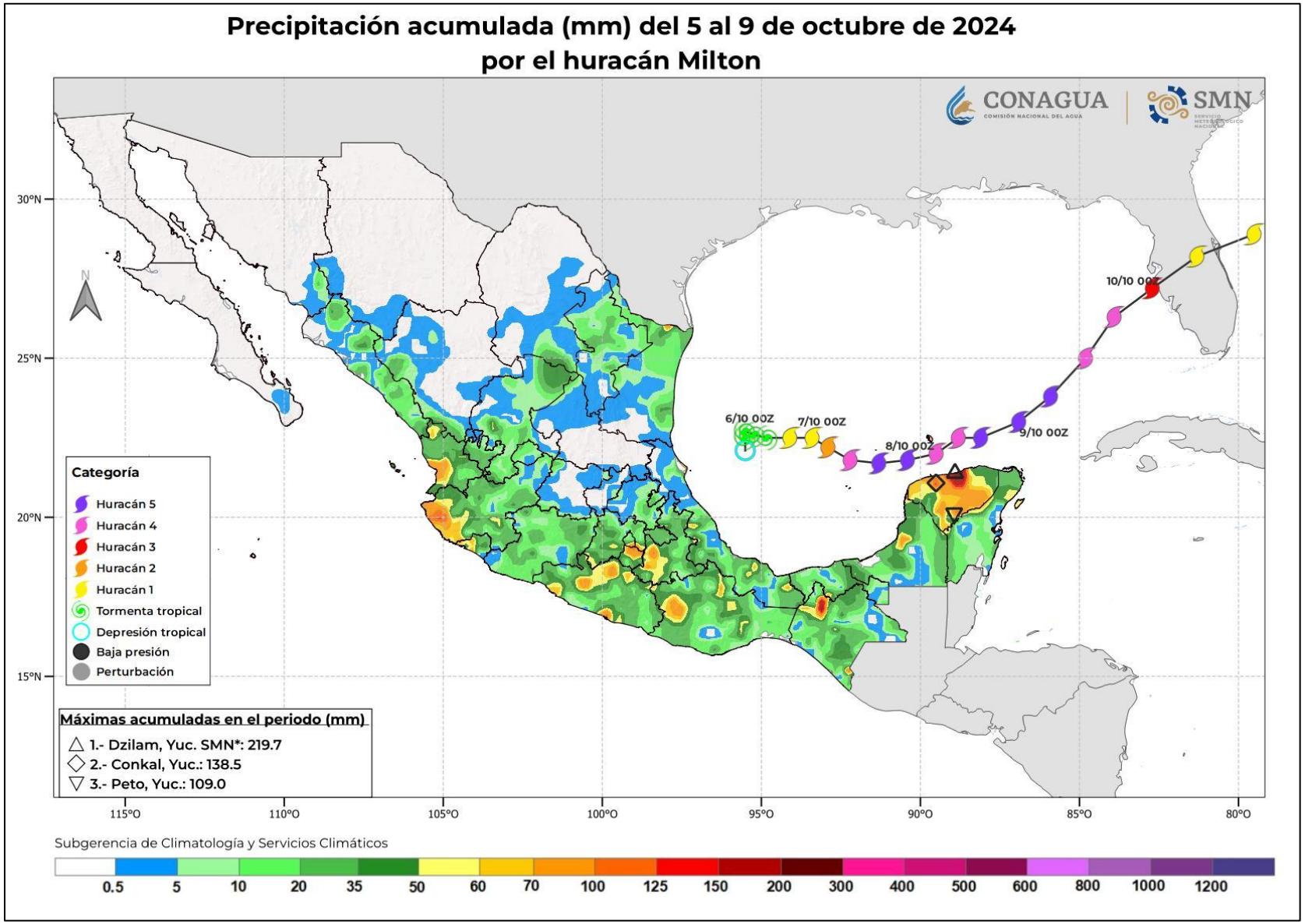

Figure 11. Rainfall totals for Mexico from 5–9 October 2024 including the passage of Hurricane Milton. Not all of the rain depicted is directly related to Milton. Image courtesy of the Servicio Meteorológico Nacional of Mexico. The track and intensity are from NHC operational values.

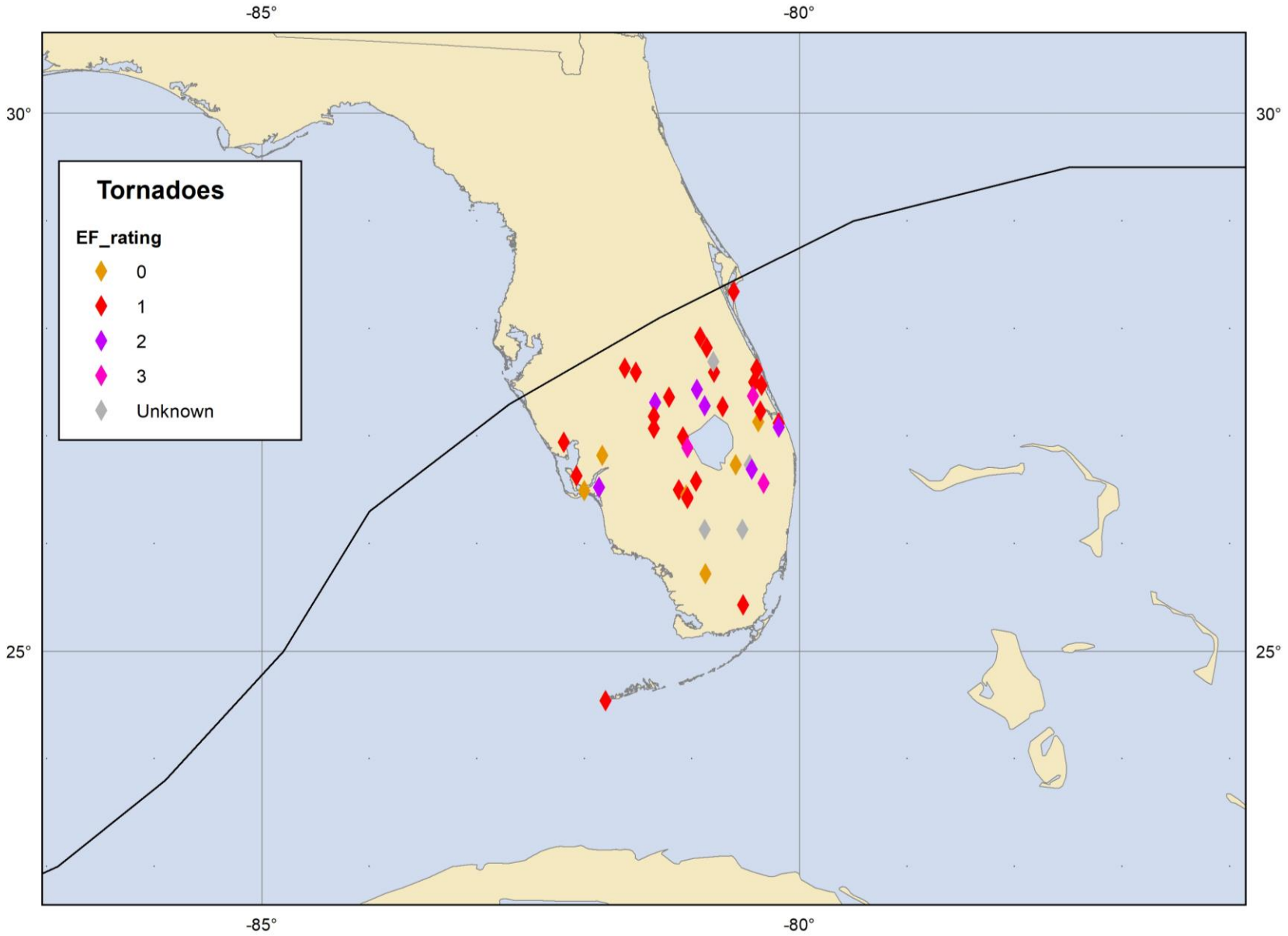

Figure 12. Locations of tornadoes associated with Hurricane Milton on 9–10 October 2024. Data courtesy of the NOAA Storm Prediction Center.

Figure 13. (Left) Tornado in western Broward County, Florida, near the I-75/US-27 interchange around 1410 UTC 9 October 2024. Image courtesy of Matt Onderlinde, NHC. (Right) Tornadic waterspout over Lake Okeechobee, Florida, around 1905 UTC 9 October 2024. Image courtesy of John Beven, NHC.

Figure 14. Roof damage to Tropicana Field in St. Petersburg, FL caused by Hurricane Milton. Image courtesy of USA Today, Bryan R. Smith, and Getty Images.

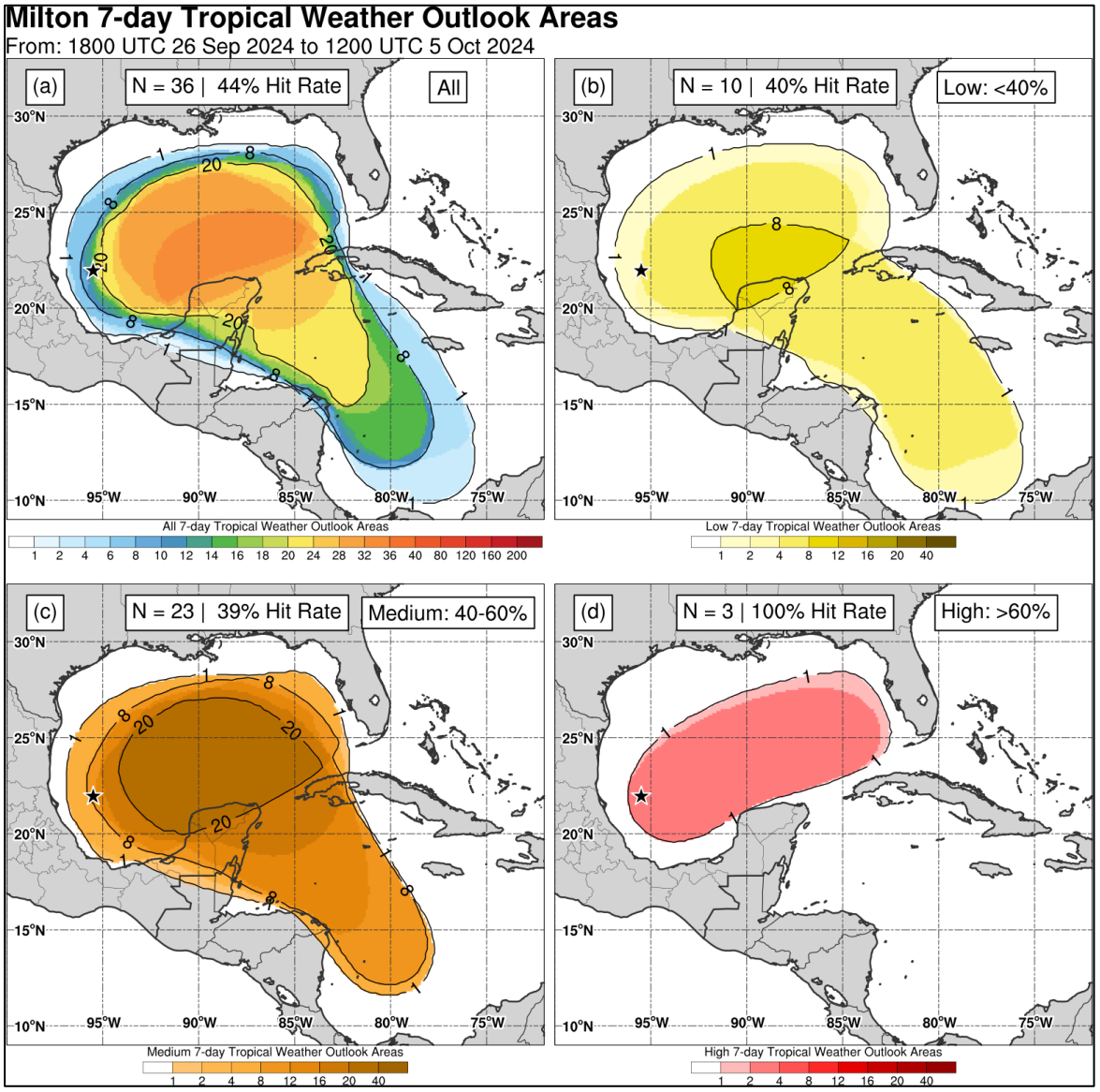

Figure 15. Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Milton for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.

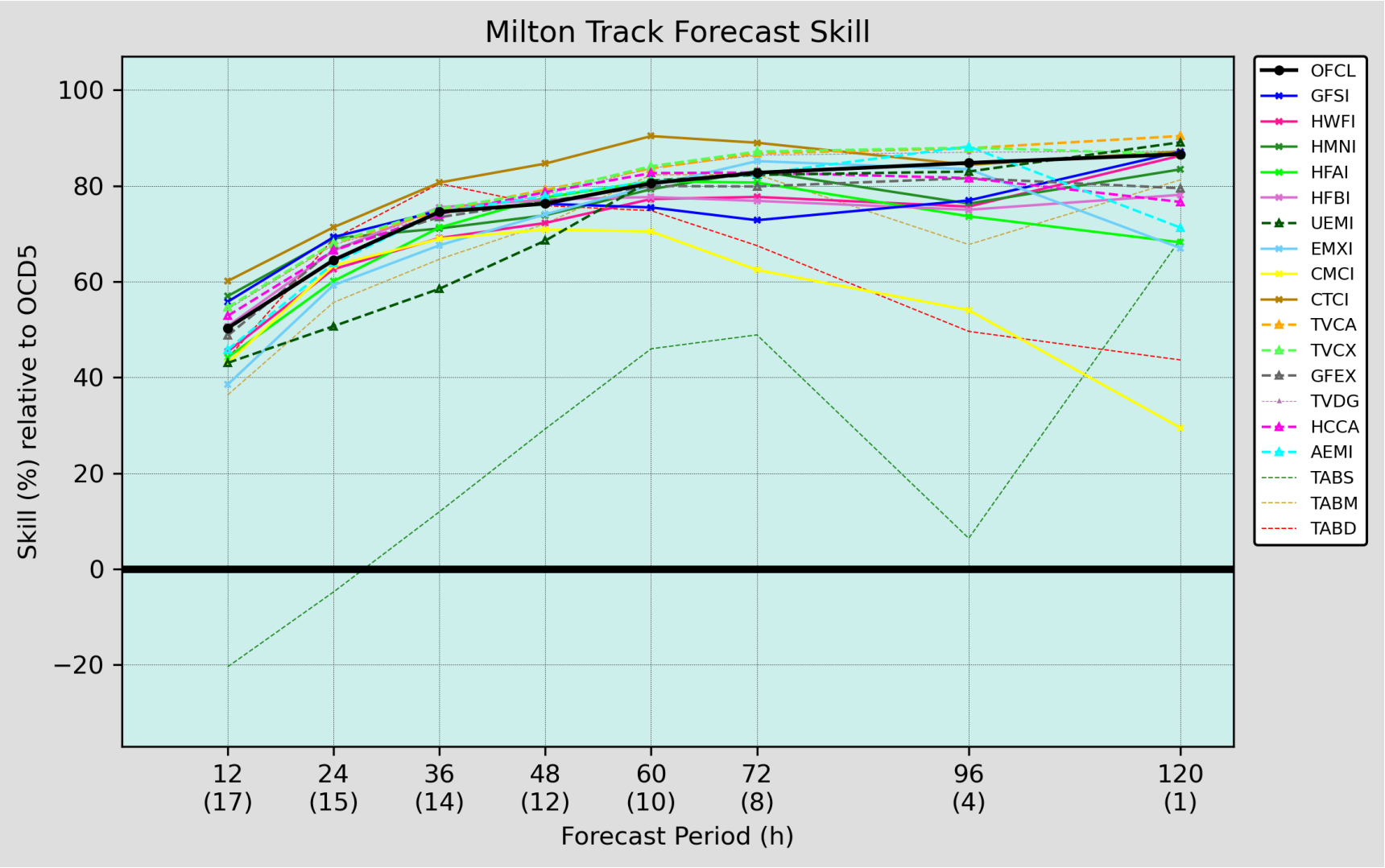

Figure 16. Skill diagram for selected track forecast models (homogenous sample) in percent relative to OCD5 for Hurricane Milton, 5–10 October 2024. The number of forecasts at each time period is shown in parentheses below the horizontal axis.

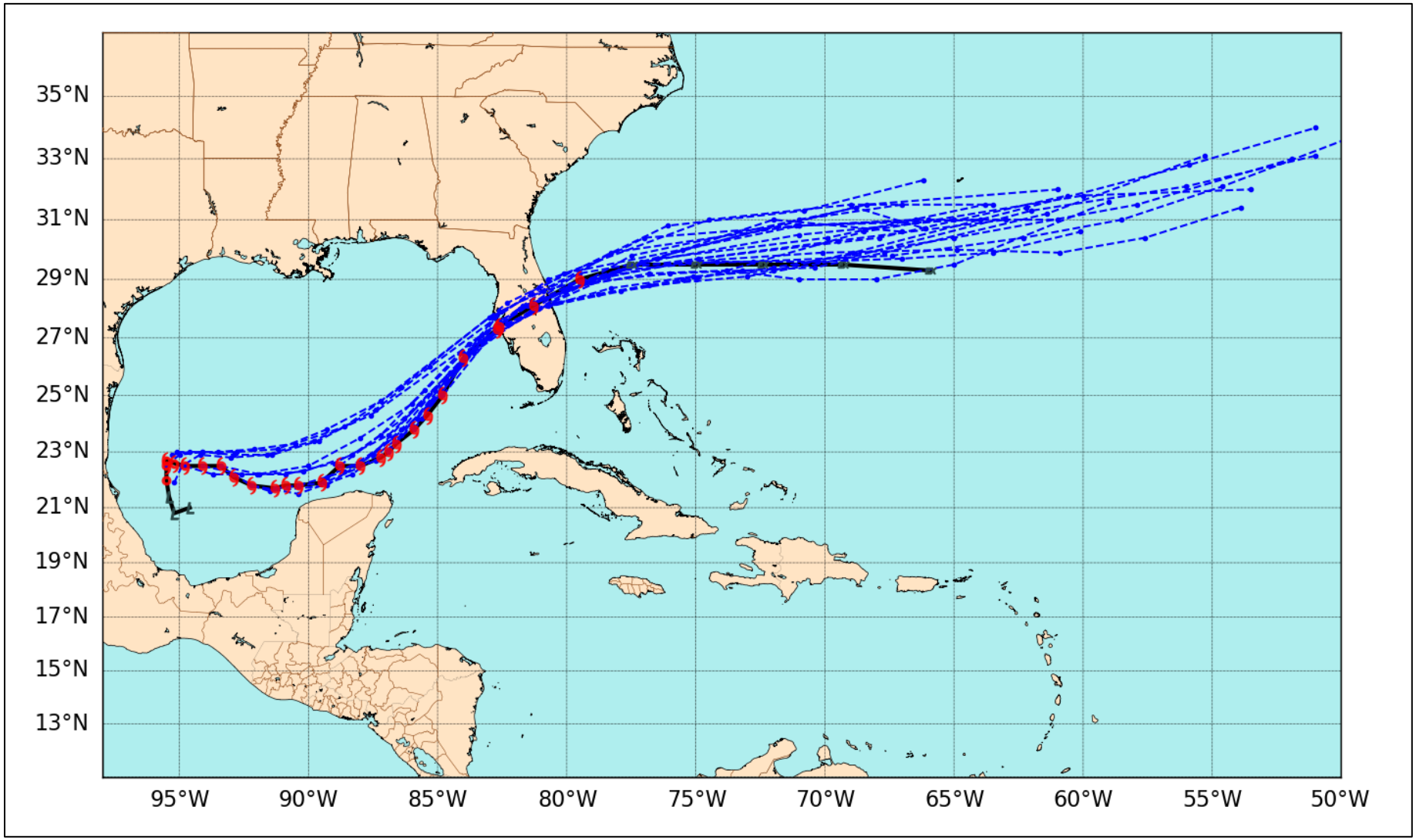

Figure 17. Selected official track forecasts (blue dashed lines, with 0, 12, 24, 36, 48, 60, 72, 96, and 120 h positions indicated) for Hurricane Milton, 5–10 October 2024. The best track is given by the black line with red symbol showing positions typically at 6-h intervals.

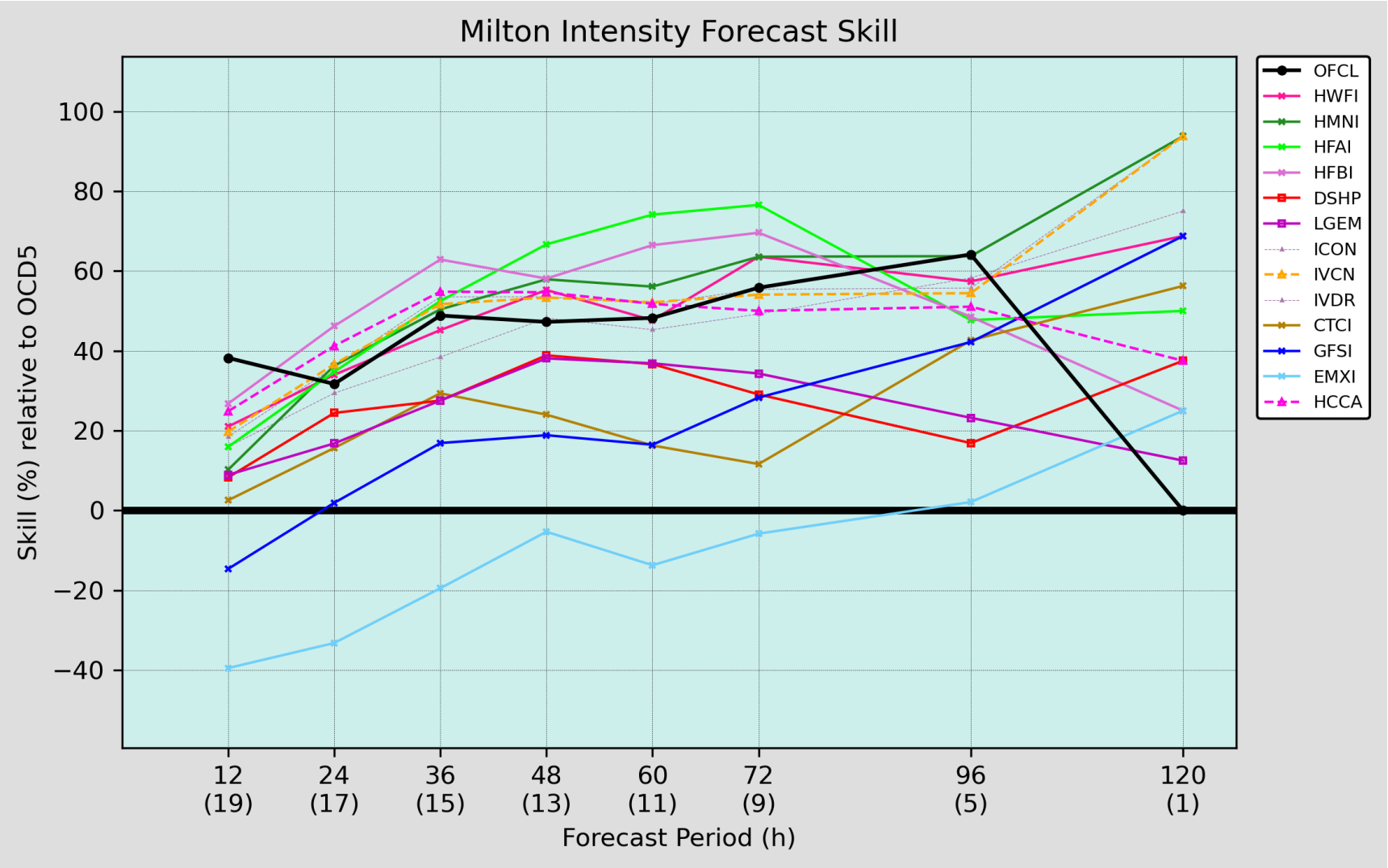

Figure 18. Skill diagram for selected intensity forecast models (homogenous sample) in percent relative to OCD5 for Hurricane Milton, 5–10 October 2024. The number of forecasts at each time period is shown in parentheses below the horizontal axis.

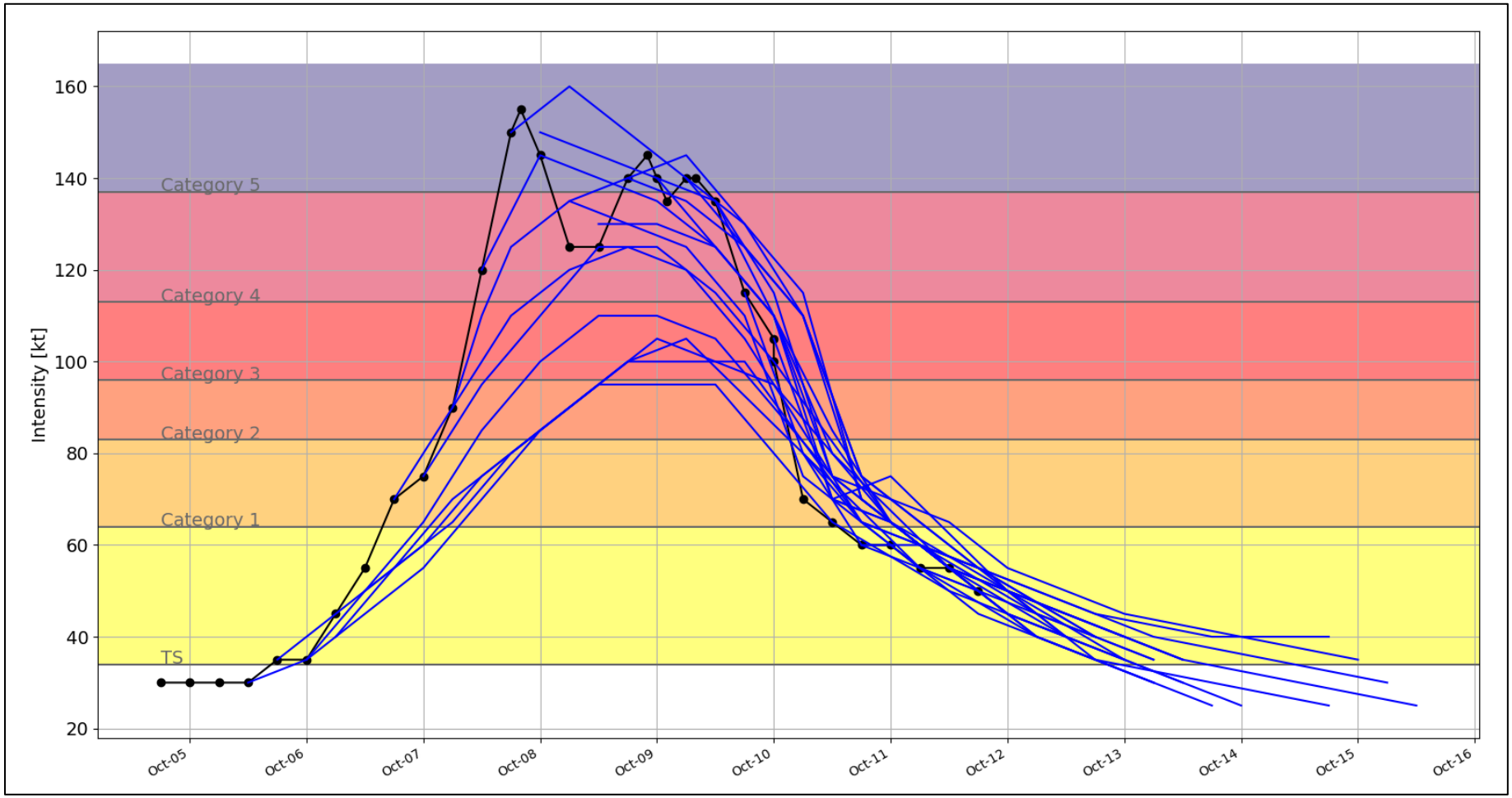

Figure 19. Selected intensity track forecasts (blue lines) for Hurricane Milton, 5–10 October 2024. The best track is given by the black line with intensities typically at 6-h intervals.

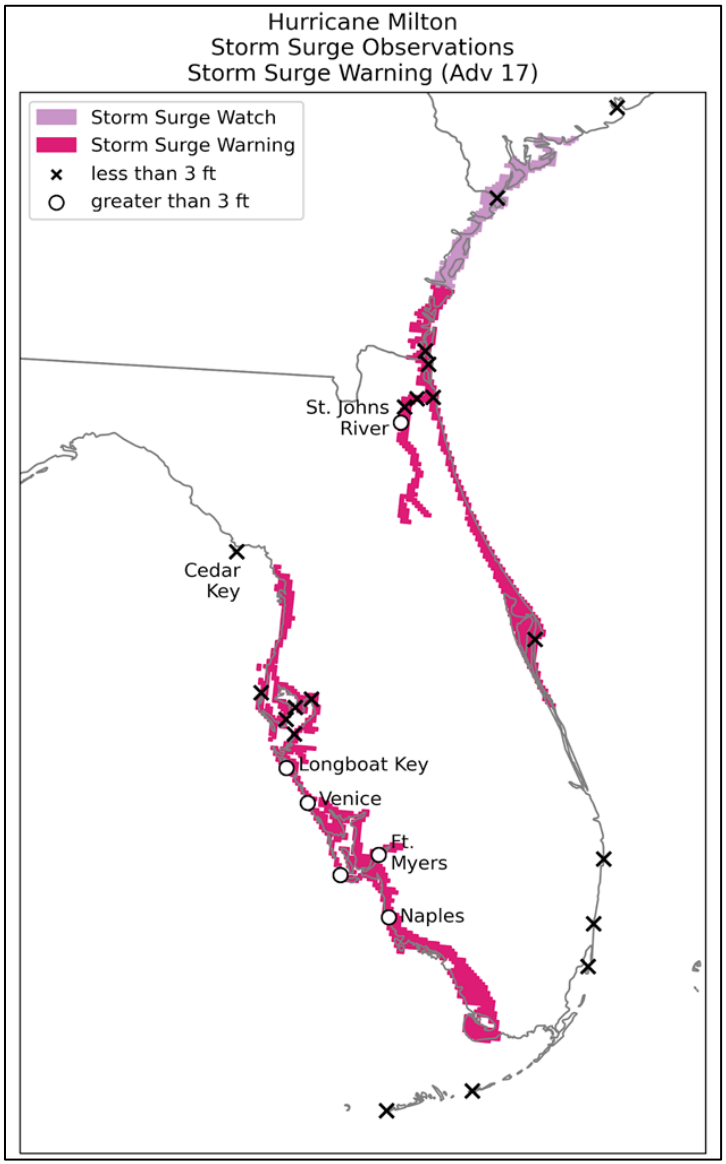

Figure 20. The Storm Surge Warning (magenta) from 0900 UTC 9 October (Adv. 17) and maximum water levels measured from NOS tide gauges and deployed USGS water level sensors. Water levels greater than 3 ft above MHHW are designated as a white “o” and water levels less than 3 ft above MHHW as a black “x”.