Tropical Cyclone Report
Hurricane Sandy
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Sandy was a classic late-season hurricane in the southwestern Caribbean Sea. The cyclone made landfall as a category 1 hurricane (on the Saffir-Simpson Hurricane Wind Scale) in Jamaica, and as a 100-kt category 3 hurricane in eastern Cuba before quickly weakening to a category 1 hurricane while moving through the central and northwestern Bahamas. Sandy underwent a complex evolution and grew considerably in size while over the Bahamas, and continued to grow despite weakening into a tropical storm north of those islands. The system re-strengthened into a hurricane while it moved northeastward, parallel to the coast of the southeastern United States, and reached a secondary peak intensity of 85 kt while it turned northwestward toward the mid-Atlantic states. Sandy weakened somewhat and then made landfall as a post-tropical cyclone near Brigantine, New Jersey with 70-kt maximum sustained winds. Because of its tremendous size, however, Sandy drove a catastrophic storm surge into the New Jersey and New York coastlines. Preliminary U.S. damage estimates are near $50 billion, making Sandy the second-costliest cyclone to hit the United States since 1900[1]. There were at least 147 direct deaths[2] recorded across the Atlantic basin due to Sandy, with 72 of these fatalities occurring in the mid-Atlantic and northeastern United States. This is the greatest number of U.S. direct fatalities related to a tropical cyclone outside of the southern states since Hurricane Agnes in 1972.

a. Synoptic History

Sandy's origin is primarily associated with a tropical wave that left the west coast of Africa on 11 October. The wave encountered a large upper-level trough over the eastern Atlantic on 12-13 October and produced an extensive area of showers and thunderstorms, but the shear was too strong for development. Little convection occurred near the wave axis for the next several days, likely due to upper-level convergence over the tropical Atlantic to the east of Hurricane Rafael. During that time, the wave passed near a weak pre-existing disturbance in the Intertropical Convergence Zone, and the two systems became difficult to distinguish by 17 October. The wave entered the eastern Caribbean Sea early on 18 October, with only a weak wind shift and some showers noted in the Windward Islands. Disorganized convection then

[1] When not adjusted for inflation, population and wealth normalization. Sandy ranks sixth when accounting for those factors (records of costliest cyclones began in 1900).

[2] Deaths occurring as a direct result of the forces of the 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.

increased on 19 October over the east-central Caribbean Sea, within an environment of moderate westerly shear associated with a mid- to upper-level trough over the Greater Antilles.

Overall, however, the environment was becoming more conducive for development, and pressures were falling over much of the central Caribbean Sea, likely due to a well-defined rising branch of the Madden-Julian Oscillation passing through the area (Fig. 1). Primitive banding features formed early on 20 October, and the extent of deep convection greatly increased. The convection probably contributed to the formation of a broad low-pressure area located a few hundred miles south of Haiti late that day. The low moved slowly toward the west and southwest on 21 October while high pressure strengthened over the Gulf of Mexico and the southwestern Atlantic Ocean. Although some westerly shear was still affecting the system, the motion toward the southwest brought the low into a reduced shear environment associated with an upper-level anticyclone building over the southwestern Caribbean Sea. Surface and satellite data suggest that the circulation of the low became well defined about 200 n mi south of Jamaica by late on 21 October. Although convection briefly waned, a strong band of deep convection formed near and south of the center early on 22 October. This convective band was organized enough by 1200 UTC that day to mark the formation of a tropical depression in the southwestern Caribbean Sea, about 305 n mi south-southwest of Kingston, Jamaica. The "best track" chart of the cyclone's path is given in Fig. 2, with the wind and pressure histories shown in Figs. 3 and 4, respectively. The best track positions and intensities are listed in Table 1[3].

Thunderstorms increased near and north of the center, and data from an Air Force Reserve Hurricane Hunter aircraft indicated that the depression became a tropical storm 6 h after genesis. Further development of Sandy was initially rather slow while the storm completed a small cyclonic loop, with the cyclone's peak winds only increasing by 10 kt in the first 24 h. Strengthening occurred at a faster rate by late on 23 October, with the band becoming more prominent east and south of the center (Fig. 5b). A middle- to upper-level trough digging over the northwestern Caribbean Sea and Gulf of Mexico caused Sandy to accelerate north-northeastward. Aircraft data indicate that Sandy became a hurricane at 1200 UTC 24 October while centered about 80 n mi south of Kingston with an eye becoming apparent on visible and microwave satellite images (Fig. 5d). The hurricane then intensified at a faster pace with its center reaching the southeastern coast of Jamaica near the community of Bull Bay, about midway between Kingston and South Haven, at about 1900 UTC; at the time of landfall Sandy's intensity was 75 kt. The brief passage over Jamaica did not seem to affect Sandy much, and the cyclone rapidly intensified after it moved over the deep warm waters of the Cayman Trench to the south of Cuba (Fig. 5e). Data from an Air Force Reserve aircraft suggest that the cyclone became a major hurricane, with maximum sustained winds estimated at 100 kt, shortly before making landfall in Cuba (Fig. 6) at 0525 UTC 25 October about 10 n mi west of the city of Santiago de Cuba.

The center of Sandy spent about 5 h crossing eastern Cuba before emerging into the Atlantic Ocean south of Ragged Island in the Bahamas. The hurricane weakened slightly during its brief time over Cuba, but then weakened more quickly by late in the day as a result of strong

[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.

southwesterly shear. Shortwave ridging over the western Atlantic and a negatively tilted upper-level trough caused Sandy to slow and gradually turn toward the northwest. This pattern steered the cyclone through the Bahamas, with the center passing between Long Island and Great Exuma on 25 October, between Cat Island and Eleuthera early the next day, and skirting the east coast of Great Abaco late on 26 October. Although Sandy weakened below hurricane strength by 0000 UTC 27 October when it moved northward away from Great Abaco, the size of the storm had greatly increased, with the average radii of tropical-storm-force winds roughly doubling since the time of landfall in Cuba. This change in structure resulted from the interaction of Sandy with the aforementioned upper-level trough, including warm advection aloft and a considerable increase in upper-level divergence, in addition to the cyclone's movement into a modified continental air mass near and north of the Bahamas.

After passing the Bahamas, Sandy gradually turned toward the northeast and its forward speed increased in advance of a mid-tropospheric trough over the central United States. Sandy regained hurricane strength by 1200 UTC 27 October when the center was about 125 n mi north-northeast of Great Abaco (Fig. 7b). Although Sandy had become a hurricane again, the structure of the cyclone was quite unusual. Reconnaissance data indicated that the radius of maximum winds was very large, over 100 n mi, and the strongest winds were located in the western (left) semicircle of the cyclone. In addition, satellite, surface and dropsonde data showed that a warm front was forming a few hundred miles from the center in the northeast quadrant, with another weak stationary boundary to the northwest of the center (Fig. 8) serving to enhance the convection and strong winds there. However, the stationary front never reached the center of circulation, and the front weakened the following day as the hurricane moved northeastward away from the upper trough.

Sandy passed a few hundred miles southeast of North Carolina on 28 October, and the cyclone took on a more tropical appearance near its center with hints of an eye in microwave imagery (Fig. 7d). By early on 29 October, the hurricane's track bent toward the north when Sandy encountered an anomalous blocking pattern over the North Atlantic (Fig. 9), preventing the cyclone from moving out to sea. While the large mid-tropospheric high built into northeastern North America, the central United States trough deepened. A piece of this trough moved into the southeastern United States and provided baroclinic forcing for Sandy, along with a significant decrease in vertical wind shear. These factors, in addition to the cyclone's moving over the warm Gulf Stream waters (Fig. 10), caused Sandy to re-intensify early on 29 October, and the hurricane reached a secondary peak intensity of 85 kt near 1200 UTC (Fig. 11) about 220 n mi southeast of Atlantic City, New Jersey.

The trough over the southeastern United States helped to accelerate Sandy toward the northwest later on 29 October, and the cyclone moved at an average forward speed of 20 kt from the time of the secondary intensity peak until landfall. However, the hurricane moved over much cooler waters and into a cold air mass located over the eastern United States and northwestern Atlantic Ocean. These factors contributed to the system's weakening and hastened its loss of tropical characteristics. Surface, reconnaissance, and satellite data, discussed further in section b below, suggest that Sandy became extratropical[4] by 2100 UTC 29 October while the center of

[4] The primary distinction between tropical and extratropical cyclones is their energy source. Tropical cyclones derive their energy predominantly from the release of latent heat of condensation relatively close to the center, while

circulation was about 45 n mi southeast of Atlantic City. The center of Post-tropical Cyclone Sandy[5] then made landfall at about 2330 UTC near Brigantine, New Jersey, just to the northeast of Atlantic City, with an estimated intensity of 70 kt and a minimum pressure of 945 mb[6].

After landfall, the cyclone turned toward the west-northwest and slowed, gradually weakening while its center moved through southern New Jersey, northern Delaware and southern Pennsylvania. The center of the cyclone became ill defined over northeastern Ohio after 1200 UTC 31 October, and the remnants of Sandy moved northward to northeastward over Ontario, Canada for the next day or two before merging with a low pressure area over eastern Canada.

b. Meteorological Statistics

Observations in Sandy (Figs. 3 and 4) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the Satellite Analysis Branch (SAB), as well as the Advanced Dvorak Technique from the University of Wisconsin-Madison/Cooperative Institute for Meteorological Satellite Studies (UW-CIMSS). Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Tropical Rainfall Measuring Mission (TRMM), Defense Meteorological Satellite Program (DMSP) satellites and the European Advanced Scatterometer (ASCAT) satellite, among others, were also useful in constructing the best track of Sandy.

Twenty-four reconnaissance missions were flown in and around Sandy. These missions included flights of the C-130 aircraft from the Air Force Reserve 53rd Weather Reconnaissance Squadron, the NOAA WP-3D aircraft, and the NOAA G-IV jet. These aircraft provided data that were crucial in determining the intensity and structure of Sandy. National Weather Service (NWS) WSR 88-D radar data from Mt. Holly, NJ and radar data from the Institute of Meteorology of Cuba were used to make center fixes.

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

Winds / Pressure

Sandy made its first landfall in Jamaica as a category 1 hurricane on 24 October, and it was the first hurricane landfall there since Gilbert in 1988 (although Ivan in 2004 brought sustained hurricane-force winds to the island). Although there were no official reports of hurricane-force winds, these conditions likely occurred over a narrow swath over the far eastern part of Jamaica during the afternoon hours on 24 October, with widespread tropical-storm-force

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extratropical cyclones rely mainly on baroclinic processes (large-scale temperature contrasts between warm and cold air masses).

[5] The term "post-tropical" is used in NWS advisory products to refer to any closed low-pressure system that no longer qualifies as a tropical cyclone. However, such systems can continue carrying heavy rains and damaging winds. Post-tropical cyclones can be either frontal (extratropical) or non-frontal lows.

[6] Landfall is defined as the intersection of the surface center of a cyclone with a coastline. It is important to note that although Sandy made landfall as an extratropical low, its strong winds, heavy rains and storm surge had been felt onshore for many hours while Sandy was still a hurricane.

winds occurring elsewhere. The lowest pressure reported on land was 972.1 mb at the Kingston Airport during the eye passage.

Operationally, the peak intensity of Sandy was assessed to be 95 kt. The 100-kt analyzed peak intensity in post-analysis is based on a blend of a 700-mb flight-level wind of 117 kt (which normally corresponds to an intensity of about 105 kt) at 0409 UTC 25 October and peak stepped-frequency microwave radiometer (SFMR) values of 95 kt at 0502 UTC. The flight-level and SFMR winds were rapidly increasing in the few hours before landfall in Cuba at 0525 UTC, consistent with the marked increase in organization on satellite (Fig. 6) and radar (Fig. 12) images. Given that the 95-kt surface wind was measured in the south quadrant (not the east, where the maximum winds are typically located for a northward-moving cyclone) and the fact that a peak flight-level wind of 126 kt was observed about 6 h after landfall, it is estimated in post-analysis that Sandy had maximum sustained winds of about 100 kt at landfall in Cuba, making it a category 3 hurricane on the Saffir-Simpson Hurricane Wind Scale.

Winds of hurricane force likely occurred over a narrow stretch of eastern Cuba in Santiago de Cuba and Holguín provinces. A peak 1-min wind of 81 kt was observed in Cabo Lucrecia along the northeastern coast of Cuba, where wind gusts of over 100 kt were measured. Maximum 1-min winds of 78 kt with a gust to 99 kt were also recorded in the city of Santiago de Cuba before the anemometer failed. A wind gust of 143 kt from Gran Piedra indicates that extreme wind gusts occurred over elevated terrain near and east of the center. Figure 13 shows selected wind gusts for surface stations and buoys in the Caribbean Sea, western Atlantic Ocean and the southeastern coast of the United States.

The analyzed secondary peak intensity of 85 kt about 12 h before landfall in New Jersey (Fig. 11) is based on peak 700-mb winds of 94 kt at 1014 UTC 29 October and peak SFMR values of 84 kt at 1210 UTC that day.

Figure 14 shows selected sustained winds observed over the northeastern and Mid-Atlantic coasts and Fig. 15 shows peak wind gusts in those areas. There was one sustained hurricane-force wind reported: Great Gull Island, New York, between Long Island and Fishers Island, measured a 1-min mean wind of 65 kt at an elevation of 18 m at 2035 UTC 29 October. This observation suggests that sustained hurricane-force winds likely occurred onshore over a limited area while Sandy was still a hurricane. In addition, a Texas Tech University (TTU) measurement tower near Long Beach, New Jersey, reported a 1-min mean wind of 53 kt at a height of 2.25 m at 0000 UTC 30 October. This observation implies 10-m winds of about 68 kt using standard adjustment factors, as analyzed by TTU, and supports the estimated intensity of 70 kt at landfall. Sustained hurricane-force winds therefore almost certainly occurred in New Jersey, although these are believed to have occurred exclusively after Sandy's extratropical transition. The strongest observed peak wind gust (83 kt) from a reliable station was measured at Eaton's Neck by a WeatherFlow site at 24 m elevation along the northern shore of Long Island, at 2210 UTC 29 October. Several sites at 10-m elevation reported peak wind gusts of 75-78 kt in northern New Jersey and southern Long Island, and it is notable that gusts of hurricane force were reported in seven different states. Strong wind gusts primarily associated with the Sandy's post-tropical stage penetrated well inland, as far westward as Wisconsin and northward into Canada (Fig. 16).

The overall minimum central pressure of Sandy is estimated to be 940 mb, which occurred near 1800 UTC 29 October, a few hours before landfall. This value is based on a dropsonde that measured 941 mb with 15 kt of surface wind at 1917 UTC 29 October. The minimum central pressure at landfall in Cuba is estimated at 954 mb. This pressure is derived from an extrapolated central pressure of 955 mb from an Air Force Reserve reconnaissance report about 20 minutes before landfall. The minimum central pressure at landfall in New Jersey is estimated at 945 mb, based on National Ocean Service (NOS) station ACYN4 at Atlantic City that recorded 945.5 mb at 2224 UTC 29 October, along with one other station that reported 945.6 mb. The Atlantic City report has been noted by several agencies as the lowest sea-level pressure ever recorded north of North Carolina in the United States. The 1938 Great New England hurricane, however, is analyzed to have made landfall with a slightly lower central pressure (941 mb), although no pressure below 946 mb was recorded. Several sites across the mid-Atlantic region also recorded their all-time minimum pressures during the passage of Sandy (see Table 4). Among the lowest were Atlantic City with 948.5 mb and Philadelphia, PA, with 952.2 mb.

Structure

Sandy was an extraordinarily large hurricane, its size growing considerably from the time it reached the Bahamas until its final landfall as an extratropical cyclone along the mid-Atlantic coast. Data from a variety of observational platforms indicated that the extent (diameter) of tropical-storm-force (or gale-force) winds grew to about 870 n mi prior to landfall (e.g., Fig. 17), with most of the increase in size occurring on 25 and 26 October over the Bahamas. Sandy was the largest tropical cyclone in the extended best track record[7], which began in 1988. The extreme size of the cyclone was caused by several factors, discussed below.

The inner core of the storm was disrupted by both its passage over Cuba and its proximity to an upper-level trough over the northwestern Caribbean Sea and the eastern Gulf of Mexico (Fig. 18a). While baroclinic forcing associated with the trough was occurring, Sandy moved into modified continental air over the western Atlantic Ocean. This change in environment led to the initiation of extratropical transition when a warm front formed a few hundred miles northeast of the center and a weak stationary front formed on the northwest side of the circulation by early on 27 October (e.g. Fig. 8). While these factors contributed to Sandy's weakening into a tropical storm, they also caused its wind and pressure fields to grow considerably. In addition, while the storm moved through the Bahamas, nearly all of the inner-core deep convection briefly dissipated, with most of the remaining deep convection focused near the warm front.

The extratropical transition was incomplete, however, when Sandy moved north of the Bahamas and away from the upper trough and drier air on 27 October. The low-level environment became more moist and unstable, and the system redeveloped relatively deep convection near the center, allowing Sandy to maintain its status as a tropical cyclone. In addition, the upper-level trough became negatively tilted (Fig. 18c), which caused a decrease in wind shear near Sandy while it moved just south of the Gulf Stream, and Sandy became a hurricane again on that day. Although the cyclone regained hurricane strength, frontal structures

[7] Demuth, J., M. DeMaria, and J.A. Knaff, 2006: Improvement of advanced microwave sounder unit tropical cyclone intensity and size estimation algorithms. J. Appl. Meteor., 45, 1573-1581.

remained in the outer circulation, well away from the core. Sandy never lost its large wind field and large radius of maximum wind, and it retained those hybrid characteristics through landfall. It's worth noting that in all tropical cyclones, the storm environment contributes to the distribution and extent of the wind field. In our best-track analysis of Sandy's intensity and size, no attempt has been made to distinguish the relative contributions of Sandy's tropical core from its frontal environment.

From late on 28 October through the early afternoon on 29 October, Sandy intensified while it approached and passed over the warmer waters of the Gulf Stream (Fig. 10). A second and larger mid-latitude trough dove southeastward from the Great Lakes and took on a negative tilt (Figs. 19a-c). This configuration contributed to Sandy's strengthening due to decreased vertical wind shear and increased upper-level divergence. Interestingly, Sandy's satellite presentation and low-level temperature field somewhat resembled the warm seclusion that is sometimes observed in particularly intense extratropical cyclones.

While Sandy approached the coast of New Jersey, some fundamental changes occurred in the structure of the cyclone, resulting in its completion of post-tropical transition near 2100 UTC 29 October. Dropsondes during that day indicated that low-level temperatures within a few miles of the center of Sandy decreased significantly (Fig. 20), with surface temperatures dropping from 25°C at 1400 UTC to 17°C at 2100 UTC. This suggests that much cooler low-level air was penetrating the center of the cyclone, although it was still warmer than the air mass surrounding the cyclone. While an eye-like structure was still apparent on radar before 1800 UTC (Fig. 21a), aircraft data show that the center became embedded within the lower-tropospheric temperature gradient before 2200 UTC (Fig. 21b), with the warmest air well to the northeast of the center. In addition, southeasterly shear increased markedly before landfall, and the organized deep convection near the center ceased around 2100 UTC, leaving an exposed center with any remaining convection near a warm front (Fig. 21b). This cessation of central convection coincided with the passage of the cyclone over much colder shelf waters just offshore of the mid-Atlantic coast.

The NHC surface analyses for 1500 UTC and 2100 UTC 29 October, based on the available imagery and data, are presented in Figs. 22 and 23. No fronts are analyzed close to the center of Sandy at 1500 UTC, with an occlusion forming to the north, and a stationary front on the western side of the circulation. A central dense overcast was still present at 1500 UTC, however this feature had dissipated 6 h later (Fig. 23). The 2100 UTC analysis shows an occluded front wrapping into the core of the cyclone, with the temperature gradient increasing along the now-moving warm front to the west. By that time, Sandy no longer met the definition of a tropical cyclone[8] since it both lacked organized deep convection and had become a frontal cyclone. Consequently, the NHC best track denotes extratropical transition at 2100 UTC 29 October.

[8] NWS Directive 10-604 defines a tropical cyclone as a warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center.

Storm Surge[9]

Sandy caused water levels to rise along the entire east coast of the United States from Florida northward to Maine. The highest storm surges and greatest inundation on land occurred in the states of New Jersey, New York, and Connecticut, especially in and around the New York City metropolitan area. In many of these locations, especially along the coast of central and northern New Jersey, Staten Island, and southward-facing shores of Long Island, the surge was accompanied by powerful damaging waves. A list of the storm surge, storm tide and inundation calculations and observations is provided in Table 5. Maps of the inundation along the east coast of the United States (Fig. 24), and along the New Jersey, New York and Connecticut coasts (Fig. 25) are also provided.

New York

The highest storm surge measured by an NOS tide gauge in New York was 12.65 ft above normal tide levels at Kings Point on the western end of Long Island Sound. A storm surge of 9.56 ft above normal tide levels was reported on the northern side of Staten Island at Bergen Point West Reach, and 9.40 ft was reported at the Battery on the southern tip of Manhattan.

Record storm tides (the combination of the storm surge and astronomical tide) were measured by the NOS tide gauges in the New York City area. At the Battery (where water level records go back to 1920), the storm tide reached 14.06 ft above Mean Lower Low Water (MLLW), which was 4.36 ft higher than the previous record set in December 1992. This storm tide was also 4.55 ft higher than what occurred when Tropical Storm Irene affected the region in 2011. The storm tides of 14.58 ft above MLLW at Bergen Point West Reach and 14.31 ft above MLLW at Kings Point were 4.37 ft and 2.00 ft higher, respectively, than their previous highest levels set in Irene.

The following inundations, expressed *above ground level*, were prevalent along the coast due to the storm tide:

Staten Island and Manhattan	4 – 9 ft
Brooklyn and Queens	3 – 6 ft
The Bronx and Westchester County	2 – 4 ft
Long Island (Nassau and Suffolk Counties)	3 – 6 ft
Hudson River Valley	3 – 5 ft

[9] 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. Since 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, e.g. 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).

Surveyed high-water marks from the United States Geological Survey (USGS) indicate that the highest water levels in New York occurred on Staten Island. The highest direct measurement of inundation was 7.9 ft above ground level, obtained from a seed line found on a door frame of a house in the Oakwood neighborhood of Staten Island. A direct measurement of 4.7 ft above ground level was made at One World Trade Center in the Financial District in Lower Manhattan. Higher inundation values likely occurred in other parts of Manhattan that are at lower elevations. For example, several high-water marks around 11 ft above the North American Vertical Datum of 1988 (NAVD88) were made in the vicinity of the South Street Seaport near the Brooklyn Bridge, where ground elevations are as low as 3 ft above NAVD88. These data imply that as much as 8 ft of inundation could have occurred in that area. In Battery Park, the lowest portions of the promenade adjacent to New York Harbor sit at about 6 ft above NAVD88. Several high-water marks between 11 and 11.5 ft above NAVD88 were measured in the area, suggesting that the water could have been as deep as 5.5 to 6 ft immediately adjacent to the harbor on the promenade. However, water levels were not that deep in most areas of the park.

The NOS tide gauges at the Battery (in Manhattan) and at Bergen Point West Reach (on Staten Island) recorded storm tide values of 9.0 ft and 9.53 ft above Mean Higher High Water (MHHW), respectively. If a rise of the water level beyond the MHHW line is considered a proxy for inundation of normally dry land, then some areas bordering New York Harbor that are not protected by sea walls could have been inundated with as much as 9 ft of water.

In Queens, one measurement of 6.0 ft above ground level in Maspeth and two measurements of 5.4 ft were made in the Rockaways. The water inundated portions of the runways and tarmacs at both La Guardia and John F. Kennedy International Airports. The maximum inundation measurement in Brooklyn was 4.5 ft, and the highest in the Bronx was 3.4 ft in the Throgs Neck area.

In Nassau County on Long Island, a high-water mark of 4.6 ft above ground level was observed in Freeport in the Town of Hempstead. A high-water mark of 4.3 ft was observed in Inwood (near John F. Kennedy International Airport), and marks of 3 to 4 ft were measured in Long Beach, Jones Beach, and across the bay in Massapequa. In Suffolk County, the storm surge reached 5.89 ft above normal tide levels at a gauge in Montauk on the eastern tip of Long Island. A high-water mark of 5.6 ft above ground level was measured on Fire Island, and a mark of 5.5 ft was measured in Oak Beach-Captree. On the north shore adjacent to Long Island Sound, a high-water mark of 4.5 ft was obtained in Wading River in the Town of Riverhead.

Significant flooding due to storm surge (with some contribution from rainfall) occurred in parts of the Hudson River Valley as far north as Albany. Inundation as high as 4 to 5 ft above ground level occurred in many places along the banks of the river in Rockland, Orange, Ulster, Dutchess, Columbia, and Greene Counties, topped by a 5.1 ft high-water mark in Poughkeepsie and 4.9 ft in Kingston. Inundation levels of 2 to 4 ft occurred as far north as Columbia and Greene Counties, over 100 n mi upriver from New York Harbor.

New Jersey

The highest storm surge measured by an NOS tide gauge in New Jersey was 8.57 ft above normal tide levels at the northern end of Sandy Hook in the Gateway National Recreation Area. Since the station failed and stopped reporting during the storm, it is likely that the actual storm surge was higher. Farther south, the NOS tide gauges in Atlantic City and Cape May measured storm surges of 5.82 ft. and 5.16 ft, respectively.

The following inundations, expressed above ground level, were prevalent along the coast due to the storm tide:

Monmouth and Middlesex Counties	4 – 9 ft
Union and Hudson Counties	3 – 7 ft
Essex and Bergen Counties	2 – 4 ft
Ocean County	3 – 5 ft
Atlantic, Burlington, and Cape May Counties	2 – 4 ft

The deepest water occurred in areas that border Lower New York Bay, Raritan Bay, and the Raritan River. The highest high-water mark measured by the USGS was 8.9 ft above ground level at the U.S. Coast Guard Station on Sandy Hook. This high-water mark agrees well with data from the nearby NOS tide gauge, which reported 8.01 ft above MHHW before it failed. Elsewhere, a high-water mark of 7.9 ft above ground level was measured in Keyport on the southern side of Raritan Bay and a mark of 7.7 ft was measured in Sayreville near the Raritan River.

As storm surge from Sandy was pushed into New York and Raritan Bays, sea water piled up within the Hudson River and the coastal waterways and wetlands of northeastern New Jersey, including Newark Bay, the Passaic and Hackensack Rivers, Kill Van Kull, and Arthur Kill. Significant inundations occurred along the Hudson River in Weehawken, Hoboken, and Jersey City, where many high-water marks indicated that inundations were between 4 and 6.5 ft above ground level. Inundations of 4 to 6 ft were also measured across Newark Bay in Elizabeth and the area around Newark Liberty International Airport.

Water levels were highest along the northern portion of the Jersey Shore in Monmouth and Ocean Counties, north of where Sandy made landfall. Barrier islands were almost completely inundated in some areas, and breached in some cases, due to storm surge and large waves from the Atlantic Ocean meeting up with rising waters from back bays such as Barnegat Bay and Little Egg Harbor. The USGS surveyed high-water marks as high as 4 to 5 ft above ground level in locations such as Sea Bright in Monmouth County and Tuckerton, Seaside Park, and Long Beach Island in Ocean County. Farther south, measured inundations were as high as 2 to 4 ft in areas near Atlantic City and Cape May.

Connecticut

In Connecticut, an NOS gauge measured a storm surge of 9.83 ft above normal tide levels at Bridgeport while a gauge in New Haven measured a surge of 9.14 ft, which caused record water levels at those stations.

The following inundations, expressed above ground level, were prevalent along the coast due to the storm tide:

Fairfield and New Haven Counties	4 – 6 ft
Middlesex and New London Counties	3 – 5 ft

The highest storm tide and greatest inundation occurred along western sections of the Connecticut coast. The maximum high-water mark measurement was 5.5 ft above ground level at Milford in New Haven County. Other inundation measurements of at least 5 ft were made in other areas near the city of New Haven, and the maximum measurement in Fairfield County was 4.5 ft in Norwalk. The NOS tide gauges in Bridgeport and New Haven reported water levels of 5.82 ft and 5.54 ft above MHHW, respectively, suggesting that inundation values could have been as high as 6 ft above ground level in parts of Fairfield and New Haven Counties.

Farther east, the highest marks measured by the USGS in Middlesex and New London Counties were 3.8 ft and 3.2 ft above ground level in Clinton and Old Lyme, respectively. In addition, the NOS gauge in New London reported a water level of 4.95 ft above MHHW. The maximum inundation values along the eastern parts of the Connecticut coast are estimated to be 3 to 5 ft above ground level.

Rhode Island, Massachusetts, New Hampshire and Maine

Significant storm surge occurred up the New England coast into Rhode Island and Massachusetts, especially south of Cape Cod. The highest storm surges recorded by NOS tide gauges in each state were 6.20 ft above normal tide levels at Providence, Rhode Island, and 5.50 ft at Fall River, Massachusetts. Even north of Cape Cod, a storm surge of 4.57 ft was recorded at Boston.

The following inundations, expressed above ground level, were prevalent along the coast due to the storm tide:

Rhode Island	3 – 5 ft
Massachusetts	2 – 4 ft
New Hampshire and Maine	1 – 2 ft

The highest measured USGS high-water marks in Rhode Island by county were 4.4 ft above ground level in Jamestown in Newport County and 3.9 ft in Narragansett in Washington County. The maximum storm tides measured by NOS gauges were 4.52 ft above MHHW at

Providence and 4.48 ft at Conimicut Light. These data suggest that inundations were as high as 5 ft above ground level along some parts of the Rhode Island coast.

Farther to the northeast, the highest measured inundation was 2.0 ft above ground level in Swansea, which borders the part of Narragansett Bay that juts into Massachusetts. NOS gauges in Fall River and Woods Hole measured storm tides of 4.18 ft and 3.60 ft above MHHW, suggesting that inundation was at least 4 ft above ground level along parts of the southern coast of Massachusetts. Farther north, the NOS gauge in Boston Harbor recorded a storm tide of 2.64 ft above MHHW, suggesting that parts of the Massachusetts coast west and north of Cape Cod had inundation of at least 3 ft above ground level.

The highest storm surges recorded by NOS tide gauges in New Hampshire and Maine were 3.32 ft above normal tide levels at Fort Point, New Hampshire, and 3.53 ft at Wells, Maine. The NOS gauges at Fort Point and Portland, Maine, both measured storm tides at or near 2.0 ft above MHHW.

Delaware, Maryland, and Virginia

The highest storm surges recorded by NOS gauges in Delaware were 5.99 ft above normal tide levels at Delaware City and 5.80 ft at Reedy Point. In Lewes, the gauge recorded a surge of 5.34 ft. On the ocean side of the Maryland coast, the NOS gauge at Ocean City Inlet measured a storm surge of 4.33 ft. On the Chesapeake Bay side of Maryland, the NOS gauge in Chesapeake City recorded a storm surge of 4.88 ft. The maximum storm surge measured in Virginia was 4.95 ft at Wachapreague on the Eastern Shore, although a surge of 4.79 ft was also recorded at Money Point in the Norfolk area.

The following inundations, expressed above ground level, were prevalent along the coast due to the storm tide:

Delaware	3 – 5 ft
Maryland	2 – 4 ft
Virginia	2 – 4 ft

The NOS gauge in Lewes recorded a storm tide of 4.05 ft above MHHW, and data from a USGS pressure sensor also in Lewes suggested inundation of 4 to 5 ft above ground level. On the ocean side of Maryland, a storm tide of 3.59 ft above MHHW was recorded at Ocean City. On the eastern shore of Chesapeake Bay, the highest measured storm tide was 3.06 ft at Tolchester Beach.

Several measurements of storm tide along the Virginia coast indicated an inundation of as much as 4 ft above ground level. Two USGS pressure sensors, on Plum Tree Island and at Cape Charles, measured storm tides that would imply inundation of about 4 ft. In addition, the NOS gauges at Sewell Point and Money Point in the Hampton Roads area recorded storm tides of just under 4.1 ft above MHHW. On the Eastern Shore, storm tides of 3.88 and 3.89 ft above MHHW were measured by the NOS gauges at Wachapreague and Kiptopeke, respectively.

The Carolinas, Georgia, and Florida

Although Sandy did not make landfall along the southeastern coast of the United States, it did cause water levels to rise from Florida to the Carolinas. The highest storm surges recorded by NOS tide gauges in each state were 4.16 ft above normal tide levels at Duck, North Carolina (before the sensor failed); 3.55 ft at Clarendon Plantation, South Carolina; 2.89 ft at Fort Pulaski, Georgia; and 2.95 ft at Fernandina Beach, Florida.

The following inundations, expressed above ground level, were prevalent along the coast due to the storm tide:

North Carolina	3 – 5 ft
South Carolina and Georgia	1 – 2 ft
Florida	1 – 3 ft

The NOS gauge at the U.S. Coast Guard Station in Hatteras, North Carolina, measured a storm tide of 4.15 ft above MHHW due to water from Pamlico Sound being blown onto the western side of the Outer Banks. Storm tides were significantly lower in South Carolina and Georgia, where 1.57 ft was reported at Charleston and 1.53 ft was reported at Fort Pulaski. In Florida, a storm tide of 2.72 ft was recorded at Trident Pier on Cape Canaveral, and 2.29 ft was reported at Lake Worth Pier.

Rainfall

Sandy produced torrential rains across parts of Jamaica, eastern Cuba, and Hispaniola. A maximum storm total rainfall of 28.09 inches (713 mm) was reported at Mill Bank, Jamaica, with a few other reports of over 10 inches (~250 mm) of rain on the upslope side of the eastern part of that island. Widespread 4-8 inch (about 100-200 mm) rain accumulations were recorded over eastern Cuba, with a maximum storm total at Gran Piedra of 11.12 inches (282 mm). No rainfall reports are available from Hispaniola or the Bahamas.

In the United States, most of the rain from Sandy fell south and west of the track of the center (Fig. 26), and selected totals are listed in Table 6. The heaviest rainfall was reported in extreme eastern Maryland and Virginia, southern Delaware and extreme southern New Jersey, with a widespread area of 5-7 inches of rain, and a peak amount of 12.83 inches in Bellevue, Maryland. Although this rain caused rivers in the mid-Atlantic region to rise, only minor damage was reported due to this flooding. Rainfall did contribute, along with storm surge, to the flooding in New York and New Jersey adjacent to the Hudson River. Minor rainfall accumulations occurred in southeastern Florida as Sandy passed, with most stations reporting less than 3 inches.

Snowfall

Widespread heavy snow, exceptionally rare in association with a tropical cyclone or one having just lost tropical characteristics, was reported in the Appalachian Mountains from western North Carolina northeastward through southwestern Pennsylvania (Fig. 27 and Table 7), and it mostly fell after Sandy became extratropical. West Virginia was hardest hit by the blizzard, with a large area of over a foot of snow reported and a peak storm total of 36 inches near Richwood. North Carolina also had one report of 36 inches of snow on Wolf Laurel Mountain, but the overall geographic extent of heavy snow was much smaller than in West Virginia.

Tornadoes

Only one tornado was reported in association with Sandy, an F-0 (winds between 73-112 mph) that struck Somerset, Bermuda on 28 October (early media reports of F-1 were erroneous).

c. Casualty and Damage Statistics

The number of direct deaths caused by Sandy is estimated at 147; Table 8 records the deaths by country. In the United States, 72 direct deaths were noted, making Sandy the deadliest U.S. cyclone outside of the southern states since Agnes (1972). While NHC's direct death counts do not typically include fatalities that occur after extratropical transition, the non-tropical status of Sandy for 2.5 h prior to landfall had no effect on the surge experienced along the coast. In addition, it is nearly impossible to know exactly when these deaths occurred relative to the transition. Consequently, all deaths along the coast from the surge have been included in the final total. Table 9 lists the number of deaths by state, with New York having the most (48) of any state. The storm surge was responsible for most of the U.S. deaths, with 41 of the 72 fatalities (57%) attributable specifically to that hazard. Falling trees during the storm killed twenty people, a rather high number that again highlights that hazard in the northeastern and mid-Atlantic states[10], even in locations experiencing winds of less than hurricane force. The rest of the U.S. fatalities were due to other wind-related causes (5), inland freshwater flooding (2), unknown causes (2), near-shore waves (1) or drowning within coastal waters (1). One death was reported in a U.S. territory: a man perished in a rain-swollen river near Juana Diaz, Puerto Rico. Two offshore deaths occurred about 90 n mi southeast of Cape Hatteras, North Carolina, when the *H.M.S. Bounty* sank—14 other people were rescued by the Coast Guard.

At least 87 deaths, an even greater number than for direct deaths, were indirectly associated with Sandy or its remnants in the United States. About 50 of these deaths were the result of extended power outages during cold weather, which led to deaths from hypothermia, falls in the dark by senior citizens, or carbon monoxide poisoning from improperly placed generators or cooking devices. The remaining deaths were mostly from storm cleanup efforts, including removing falling trees, and car accidents.

Sandy's impacts in the United States were widespread. At least 650,000 houses were either damaged or destroyed as a result of the cyclone, with the vast majority of the damage caused by storm surge and/or waves. About 8.5 million customers lost power as a result of

[10] Rappaport, Edward N., 2000: Loss of Life in the United States Associated with Recent Atlantic Tropical Cyclones. *Bull. Amer. Meteor. Soc.*, **81**, 2065–2073.

Sandy or its remnants, with power out for weeks or even months in some areas. Preliminary estimates compiled from a variety of sources suggest that Sandy was responsible for at least 50 billion dollars in damage in the United States. This figure is highly uncertain and it will probably take several more months before a more accurate total is obtained. Sandy is expected to rank as the second-costliest cyclone on record, after Hurricane Katrina of 2005, and will probably be the sixth-costliest cyclone when adjusting for inflation, population and wealth normalization factors[11]. It is notable, however, that these preliminary estimates likely include damage from the non-tropical portion of Sandy's lifecycle, and this complicates the comparison of Sandy to previous tropical cyclones.

Caribbean, Bahamas and Bermuda

The first country to be significantly affected was Jamaica. The hurricane caused one death on that island; an elderly man was killed when a boulder crushed his house. The government of Jamaica estimates that Sandy caused about $100 million (USD) of damage there. The most severe impacts were in eastern Jamaica near the landfall location, with thousands of homes damaged.

Damage was especially severe in eastern Cuba (Fig. 28). Eleven people were killed (nine in Santiago de Cuba province and two in Guantánamo), and at least 1.3 million people were directly affected by storm damage or restrictions to food or water. More than 226,600 homes were damaged and at least 17,000 were destroyed by the high winds. The majority of the destroyed homes were located in Santiago de Cuba, close to the landfall point. Total losses are estimated at $2 billion (USD), making Sandy one of the costliest hurricanes in Cuba's history.

Heavy rains caused severe flooding and significant damage in Haiti, with reports of at least 54 deaths and 21 people missing. The Haitian government reported that agricultural losses are estimated to be greater than $100 million (USD), with 40% of the corn, beans, rice, banana and coffee crops lost, and at least 64,000 heads of cattle killed. Over 27,000 homes were flooded, damaged or destroyed in that country due to river flooding, with road damage also noted. Cholera outbreaks were significant after the storm, with over 12,000 cases reported, and at least 44 deaths from this disease have been indirectly linked to Sandy. Overall damage is estimated by the Haitian government to be over $750 million (USD).

In the Dominican Republic, three people were killed, and about 24,500 homes were damaged, displacing more than 30,000 people. Agricultural damage from rainfall-induced flooding was significant, estimated at more than $30 million (USD).

Across the Bahamas, two people were killed. One man died after falling off his roof while attempting to fix damage during the storm on New Providence, and another man drowned due to storm surge in the Queen's Cove area on Grand Bahama Island. Damage was generally

[11] NHC uses the methodology detailed in the following reference to normalize tropical cyclone damage: Pielke, Jr., R., J. Gratz, C. Landsea, D. Collins, M. Saunders, and R. Musulin, 2008: Normalized Hurricane Damages in the U.S.: 1900-2005. *Natural Hazards Review*, 9, 29-42.

not as severe as it was in Hurricane Irene of the previous year, with most of the effects confined to power outages, although five homes were damaged on Exuma Island.

In Bermuda, the only significant effects were caused by a tornado that struck Somerset early on 28 October and was estimated to be an F-0 by the Bermuda Weather Service. The tornado damaged the roofs of a few houses, smashed car windows, and capsized several boats in Mangrove Bay during its lifetime of about 15 minutes. There were no injuries reported.

Southeastern United States

The effects of Sandy across the United States were enhanced by the fall full moon period, in which some of the highest astronomical tides of the year occurred. Persistent northerly winds and the slow movement of Sandy caused very large swells along the east-central and southeastern coasts of Florida. These swells caused moderate to major beach erosion from central Florida southward to Miami-Dade County, along with flooded coastal roadways. Wave heights of up to 20 ft likely occurred over the Gulf Stream and near shore waters. Wave action caused damage to a stretch of Highway A1A in a portion of the Fort Lauderdale Beach area, and one lane is still closed at the time of this writing. In addition, piers, boat ramps and several coastal homes were damaged from a combination of waves and the high water levels. In southeastern Florida along the immediate coast, gusty winds caused fallen trees and led to about 160,000 customers losing power. Minor coastal flooding was reported in the Florida Keys, northeastern Florida and Georgia. The combined costs of beach erosion and damage to some structures in Florida are estimated to be between $50 and $75 million.

In the Carolinas, damage was mostly similar to what occurred in southeastern Florida. Moderate to major beach erosion occurred along a large part of the South Carolina coast. Severe erosion was reported at the Isle of Palms, with a total loss of the sand dunes and several piers destroyed. The effects were also severe in the North Carolina Outer Banks, with Dare County reporting damage to some infrastructure but sparing any residential or commercial structures. Highway 12 north of Rodanthe was closed due to the road buckling from a 3-5 ft storm surge, and major beach erosion occurred as a result of the large breaking waves.

Virginia, Maryland, Delaware and Pennsylvania

Across the region, high winds downed trees and power lines, and heavy rains caused several streams and creeks to rise and either approach or reach flood stage for a brief time, causing some flooding in localized areas. In Maryland, severe beach erosion occurred and a large portion of Ocean City's 100-ft fishing pier was destroyed. The storm surge in that city was considered the worst seen along the coast since Gloria in 1985, with up to 4 ft of inundation occurring. Heavy rains produced by the storm exacerbated storm surge flooding along Chesapeake Bay, and the Delaware River swelled to record levels. Hundreds of roads were either closed or impassable by fallen debris or flooding during the height of the storm, with many remaining closed for at least a couple of days. Widespread power outages affected many, with up to 1.2 million customers without power in Pennsylvania. Preliminary estimates suggest residential damage of less than $5 million in Maryland, due to several homes having been

flooded. Overall damage estimates are about $5.5 million in Delaware and $20 million in Pennsylvania.

New Jersey and New York

Sandy's storm surge, in addition to large and battering waves, devastated large portions of the coasts of New Jersey and New York. In fact, the extent of catastrophic damage along the New Jersey coast was unprecedented in the state's history, with the brunt of it occurring in Monmouth and Ocean Counties. Whole communities were inundated by water and sand, houses were washed from their foundations, boardwalks were dismantled or destroyed, cars were tossed about, and boats were pushed well inland from the coast. About 5 million residences lost electrical power across this region, with power outages commonly lasting for several weeks. The New Jersey Governor's office estimates that 346,000 housing units were damaged or destroyed in that state, with 22,000 of those units uninhabitable. Severe damage to small businesses occurred in New Jersey, with nearly 19,000 businesses sustaining damage of $250,000 or more, and total business losses estimated at $8.3 billion. The New Jersey Public Service Electric and Gas Company estimated that 48,000 trees had to be removed or trimmed in order to restore power. Breaks in natural gas lines, occurring as a result of the storm, caused fires in some locations, resulting in the destruction of many residences. Power and gas line repairs are expected to cost roughly $1 billion and repairs to the waste, water and sewer services are estimated to cost about $3 billion.

Sandy spared few parts of the central and northern New Jersey coast. The damage in the community of Mantoloking highlights the severity of the storm surge and waves across this region. A majority of structures there were flooded, badly damaged, or destroyed. The surge even carved a path through the barrier island, creating two new inlets (Fig. 29a). In Seaside Heights, the iconic Casino Pier and Funtown Pier were destroyed; the loss of the latter of caused the destruction of the local amusement park (Fig. 30a). Long Beach Island, a barrier island offshore of the central New Jersey coast, suffered catastrophic damage with nearly every house on the seaside shore extensively damaged. The communities of Union Beach and Sea Bright witnessed similar devastation. The storm surge also pushed water into New York Bay and up the Hudson River, causing massive flooding in Jersey City. The surge into Raritan Bay forced water up the Raritan River that resulted in flooding in nearby Sayreville. Rescue efforts by the National Guard were required to save residents stranded in the town. About half of the city of Hoboken was reportedly flooded, and at least 20,000 of its residents were surrounded by water at the peak of the surge. The community center in Hoboken, its public works garage, three or four fire houses, and more than 1,700 homes were flooded, with damage in the town estimated to be well over $100 million. In Salem County, the nuclear power plant automatically shut down when four of its six pumps failed. The rail operations center of the New Jersey Transit Authority in Kearny was flooded by up to 7 ft of water, damaging as many as 74 locomotives and 294 rail cars, and several weeks passed before rail services resumed. Overall damage estimates to the New Jersey Transit System are around $400 million, with estimates of total damage to the entire transit, road and bridge system in the state reaching $2.9 billion.

In New York, the governor's office estimates that 305,000 homes were destroyed in the state, mostly caused by storm surge. The New York City Office of Management and Budget estimated the total damage to the city to be $19 billion, inclusive of all private, public and indirect costs. About one quarter of that, $4.5 billion, was damage sustained to city agencies such as the New York City Housing Administration and the Health and Hospitals Corporation. The New York City Metropolitan Transit Authority (MTA) suffered extensive damage estimated at $5 billion due to storm surge flooding that inundated eight tunnels. The South Ferry-Whitehall Street station at the southern end of Manhattan was essentially destroyed and subway service between Manhattan and Brooklyn was unavailable for several weeks after the storm. The MTA declared that the overall damage caused by the storm created the worst disaster in the 108-year history of the subway system (e.g. Fig. 30b, 30d). The remainder of New York's transportation infrastructure suffered an estimated $2.5 billion of additional damage. The New York Stock Exchange experienced an historic two-day closure as a result of the storm, the longest closure since the Blizzard of 1888. Parts of the Manhattan waterfront (including the Battery), Red Hook in Brooklyn, and Long Island City in Queens were under several feet of water. Flood waters reached the corner of Canal and Hudson streets and portions of the East Village, partly because of overflow along the East River (Fig. 30c), and hundreds of buildings were flooded in Manhattan. In addition, a fire within the Breezy Point neighborhood, located at the tip of the Rockaways peninsula in Queens, destroyed at least 100 homes, with that peninsula also seeing a destructive storm surge (Fig. 29b).

The devastation was widespread in Staten Island, especially along its southern shore where residences, businesses, cars and other property were heavily damaged. Whole blocks of houses were swept away by the surge in the communities of Midland, New Dorp, and Oakland Beach. Significant damage also occurred to the borough's electrical grid, rail, and ferry operations. The damage was so severe that media reports referred to it as Ground Zero for damage in New York City, and at least 21 people died in Staten Island from the storm surge.

On Long Island, damage in the 13 towns and two cities is estimated to be above half a billion dollars. Around 100,000 homes on Long Island were severely damaged or destroyed, primarily by storm surge and waves, with more than 2,000 homes deemed uninhabitable. The loss of Long Beach's boardwalk is estimated to cost $25 million to replace, and Ocean Beach's ferry terminal and boathouse were demolished. The Bay Park Sewage Treatment Plant in Nassau County was overwhelmed by the storm surge and sustained considerable damage.

Sandy's extensive storm surge inundated New York's 32-mile long Fire Island with water and sand, destroyed or washed away 200 homes, and obliterated protective sand dunes. Atlantic Ocean water breached the island in three places, but about 4,000 homes survived because of the protection offered by the dunes.

The fishing industry in the New Jersey and New York areas also suffered heavy losses, with millions of dollars of damage to the local docks, marinas, restaurants, and fish processing plants. BoatUS estimated that Sandy destroyed more than 65,000 boats and caused marine-related damage of about $650 million to New York, New Jersey and Connecticut.

New England

Sandy's high winds and storm surge also affected New England, with coastal sections from Connecticut through Massachusetts experiencing the worst of the conditions there. While the overall damage there was less than along the New York and New Jersey coasts, significant impacts occurred. Storm surge flooding severely affected coastal Connecticut, with approximately 3,000 homes damaged; preliminary estimates of damage in that state are about $360 million. Major coastal flooding in Rhode Island rivaled the impact from Hurricane Bob in 1991. The strong winds and rough seas sank a 50-ft barge in Bar Harbor, Maine, with another three vessels either sinking or being set adrift by the storm along coastal Maine. The most significant inland effects across the region were widespread power outages and downed trees.

Elsewhere in the United States

Blizzard conditions and heavy wet snow made roads impassable during the storm in West Virginia and western North Carolina, with the weight of the snow causing a number of structures to collapse. Strong winds caused many downed trees, and about 271,000 people lost electricity at some point in those areas. Damage related to the storm extended well inland as far west as the Ohio Valley and portions of the Midwest, with the main impact being power outages. Strong winds directly associated with the post-tropical cyclone occurred as far west as Wisconsin (e.g. Fig. 16), and generated rather large waves on Lake Michigan and some coastal flooding on its southern shore.

Canada

Sandy's far-reaching effects extended into Canada where a woman in Toronto died after a piece of a sign struck her in the head. One indirect death was also recorded due to an electrocution in Sarnia, Ontario. About 200,000 customers lost power at the height of the storm in Canada. Property Claim Services Canada estimates that insured property damage to be about $100 million (Canadian).

d. Forecast and Warning Critique

The genesis forecasts for Sandy were excellent. The precursor wave was introduced in the Tropical Weather Outlook (TWO) with a low chance (10%) of genesis 66 h prior to tropical cyclone formation and the probability was increased to a high chance (60%) 42 h prior to genesis. In addition to providing above-average lead times on genesis, the TWOs issued within 36 h of tropical cyclone formation indicated the threat of heavy rains that could produce life-threatening flash floods and mudslides across Jamaica, eastern Cuba and Hispaniola.

A verification of NHC official track forecasts for Sandy is given in Table 10a. Official forecast (OFCL) track errors were well below the mean official errors for the previous 5-yr period at all time periods, and about 50% better than the long-term mean from 48 to 96 h. The OCD5 (CLIPER) errors for this system were larger than the mean, suggesting these forecasts were more difficult than normal, likely because of Sandy's sinuous track, and as a consequence the OFCL forecasts displayed a substantial amount of skill. A homogeneous comparison of the

official track errors with selected guidance models is given in Table 10b. The GFS ensemble mean (AEMI), the Florida State Superensemble (FSSE) and the Atlantic Dynamical Model Consensus (TVCA) all performed a bit better than the official forecast through 48 h. Although the performance of the European Center for Medium-range Weather Forecasts (ECWMF) model (EMXI) was unremarkable through 72 h, its days four and five forecasts were superior by far, with extremely low errors. Most of the GFS-based guidance (including the HWFI and GHMI) was less skillful, although the GHMI did outperform the official forecast at day 5. The ECMWF model was one of the first to show the northwestward turn of Sandy at six and seven days (e.g. Fig. 31b), even while most of the rest of the guidance showed the cyclone staying offshore of the East Coast. Five days before landfall, the European ensemble guidance (Fig. 32) had a significant number of members correctly showing the track of Sandy bending back toward the United States, while the GFS ensemble members were mostly out to sea.

A verification of NHC official intensity forecasts for Sandy is given in Table 11a. Official forecast intensity errors were near the mean official errors for the previous 5-yr period at 12 and 24 h, and much below the long-term mean from 36 to 120 h. The OCD5 (Decay-SHIFOR) errors for this system were larger than the mean for Sandy except at 48 and 72 h. The OFCL forecasts were quite skillful, although the forecasts had a bit of a low bias. The higher OFCL errors in the 12-24 h time frame appear to be mostly due to a significant under-forecast of the intensity of Sandy at landfall in Cuba. Only a few model forecasts even showed Sandy reaching category 2 strength, with OFCL forecasts generally calling for a category 1 hurricane at Cuban landfall. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 11b. Overall, the official intensity forecasts were superior to much of the model guidance throughout the period, with the greatest exception being at 120 h. The HWRF was generally as good as or better than the official intensity forecasts, which is perhaps fortuitous since it struggled with the track forecast. It is of note that the EMXI and GFSI models beat the statistical-dynamical guidance (DSHP, LGEM) at 72-120 h, perhaps being able to better forecast the wind field of Sandy due to its large size being relatively well resolved and the importance of baroclinic influences with this cyclone.

The initial NHC storm surge inundation forecast of 4 to 8 ft above ground level for the New Jersey, New York, and Connecticut coastlines was issued in the 1500 UTC 27 October NHC public advisory, well over two days prior to landfall of the center of the cyclone. Later, the forecast values were gradually increased for Long Island Sound, Raritan Bay, and New York Harbor, to 5 to 10 ft at 0600 UTC 28 October (nearly 42 h before landfall) and to 6 to 11 ft at 1500 UTC 28 October (more than 32 h before landfall). These forecasts were quite good, given USGS high-water marks and NOS tide gauge data that suggest the highest inundation in areas bordering New York Harbor and Raritan Bay was about 9 ft. Maximum inundation was about 5 to 6 ft on the Jersey Shore and the Connecticut coastline, which also fell within the forecast range of 4 to 8 ft.

The NHC storm surge forecasts also verified well for the rest of the U.S. East Coast. For the New England coast, storm surge inundation forecasts were generally 3 to 6 ft above ground level for Rhode Island and southern Massachusetts, and the maximum inundation that occurred was 3 to 5 ft. The surge inundation forecast called for 2 to 4 ft for eastern Massachusetts and New Hampshire and 1 to 3 ft for Maine, both of which verified well.

To the south, the NHC storm surge inundation forecast was 2 to 4 ft above ground level for southeastern Virginia and parts of the Delmarva Peninsula and 4 to 8 ft north of Ocean City, Maryland. Actual inundation values were 3 to 5 ft for Delaware and 2 to 4 ft for Maryland and Virginia. These ranges verified reasonably well since they straddled the forecast ranges. In North Carolina, the storm surge inundation forecast was 3 to 5 ft, which verified well based on limited data in the region. The forecasts also verified well in Florida, where an inundation of 1 to 3 ft matched the NHC forecast.

Tropical cyclone watches and warnings associated with Sandy are listed in Table 12. A tropical storm watch was issued along the southeastern Florida coast at 1200 UTC 24 October and was extended northward to cover the remainder of the east coast of Florida and Lake Okeechobee by 2100 UTC that day. The tropical storm watch was modified to a warning for Sebastian Inlet southward at 2100 UTC 24 October and was extended northward through Flagler Beach at 0900 UTC 25 October. Tropical storm conditions, mainly confined to the immediate coast, arrived over extreme southeastern Florida as early as 0000 UTC 26 October and spread northward that morning, giving most areas a shorter-than-desired lead time of at least 36 h after the watch was issued and about 30 h after the warning. Tropical-storm-force winds reached the east-central Florida coast around 1800 UTC 26 October and spread northward along the northeastern coast of the state through about 0600 UTC 27 October, with the watch and warning providing about 48 h and 36 h of lead times, respectively.

A tropical storm watch was issued along a portion of the southeastern United States coast from the Savannah River through Oregon Inlet, North Carolina, including the Pamlico Sound, at 0900 UTC 26 October. The tropical storm watch was changed to a tropical storm warning from South Santee River, South Carolina, to Duck, North Carolina, including the Pamlico and Albemarle Sounds, at 2100 UTC that day. Tropical storm conditions began to affect portions of the south-central and central North Carolina coast about 36 h after the watch was issued and 24 h after the warning across these areas. The lead time was somewhat longer farther north along the Outer Banks, where tropical storm conditions did not begin until the early morning hours of 28 October.

In the mid-Atlantic and northeastern United States, Sandy posed unprecedented forecast and warning challenges. Not only was it a massive hurricane expected to affect a large portion of those states with a wide variety of hazards, it was also forecast to lose its tropical characteristics and evolve into a post-tropical cyclone at some point prior to making landfall. The implications for National Weather Service (NWS) products and warnings, the continuity of information, and potential options for dealing with the transition were discussed within the NWS, and between the NWS and emergency managers, beginning five days before landfall. After considering many approaches, three days before Sandy reached the U.S. coast the NWS decided to communicate Sandy's specific impacts in the landfall area with NHC advisories, and with high wind watches and warnings issued by local NWS Weather Forecast Offices (WFOs). These high wind watches and warnings for Sandy were issued over 60 h before the center made landfall. An overarching consideration was the NWS understanding of the preference of the emergency management (EM) community that the warning type not change once watches and

warnings were initiated, because that would cause an unacceptable level of confusion and disruption during critical periods of preparation that included evacuations.

At the time hurricane watches would have been issued, about two to three days before landfall, the timing of the expected offshore transition to a post-tropical cyclone was uncertain. Based on current NWS policy and procedures, had hurricane watches and warnings initially been used, and had Sandy become post-tropical well offshore, the NWS would have had to choose from one of three unacceptable options:

One option would have been to follow existing protocol and transfer forecast responsibility to other NWS offices, cancel the hurricane warning, and switch to local WFO warnings. NHC advisories would have ceased. This would have caused widespread confusion, potentially impeded preparations and evacuations, and directly contradicted the desires and efforts of the EMs.

Another option would have been to continue to call Sandy a hurricane when it really was not one (potentially for a full day or two) in order to maintain NHC advisories and the hurricane warning. Intentionally misrepresenting Sandy as a hurricane would have severely damaged the credibility of the NWS and undermined its ability to serve the public for years to come.

A third option would have been to properly call Sandy post-tropical but continue to issue NHC advisories and leave up the hurricane warning. However, a procedure for disseminating post-tropical advisories with tropical warnings had never been developed, tested, or publicized, and the NWS feared that hurriedly crafting and implementing untested procedures could easily break automated vendor software and disrupt the flow of information to users at a critical moment.

To avoid these possible outcomes and comply with EM preferences, the NWS decided to issue non-tropical warnings, communicating clearly this warning strategy to NWS partners, while placing special emphasis on Sandy's hazards, including via numerous interactions with federal, state, and local EMs and national and local media.

At the conclusion of each hurricane season NOAA conducts a review of operations and considers options to enhance its products and services. Following the annual post-season NOAA Hurricane Meeting that took place in November 2012, the NWS is exploring two proposals that, if adopted, would result in some changes to NWS products and warnings. The first proposal originates from the unique situation posed by Hurricane Sandy; it would give the NHC the option to continue issuing formal advisories on post-tropical cyclones as long as those systems pose a significant threat to life and property, and it would give the NWS the option to keep hurricane and tropical storm watches and warnings in place for those systems.

With this proposed change, the NWS would eliminate the product and warning dilemmas faced during Sandy, and have more options to handle any tropical or post-tropical cyclone in a more seamless fashion. The hurricane warning definition would be broadened to apply to systems after their tropical cyclone stage has ended, thus allowing hurricane or tropical storm watches and warnings to remain in effect for post-tropical cyclones. In addition, the NWS would

ensure the continuity of service in any situation by allowing the NHC to issue advisories through the post-tropical cyclone stage as long as the system poses a significant threat to life and property.

The second proposal would set a target date of 2015 for NOAA to implement explicit storm surge watches and warnings, a goal NOAA has been working toward for several years. Tropical cyclones have killed more than 25,000 people in the continental United States, with a majority of those deaths attributable to storm surge. Except for the 1940s, storm surge has claimed hundreds or even thousands of lives in at least one storm in each decade from at least as far back as the 1870s through the 1960s. More than a thousand lives again were lost in the decade just concluded, with most of these attributable to Katrina's storm surge. It was the storm surge hazard that caused numerous fatalities and most of the damage with Sandy, as well as the extensive evacuations necessary to prevent an even larger loss of life. Despite this history, multiple studies have shown significant confusion on the part of the public regarding their storm surge risk, and highlighted the need for improved communication of this hazard. With the implementation of a storm surge warning, the NWS will warn explicitly for the phenomenon that presents the greatest weather-related threat for a massive loss of life in a single day.

e. Acknowledgements

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Table 1. Best track for Hurricane Sandy, 22 – 29 October 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
21 / 1800	14.3	77.4	1006	25	low
22 / 0000	13.9	77.8	1005	25	"
22 / 0600	13.5	78.2	1003	25	"
22 / 1200	13.1	78.6	1002	30	tropical depression
22 / 1800	12.7	78.7	1000	35	tropical storm
23 / 0000	12.6	78.4	998	40	"
23 / 0600	12.9	78.1	998	40	"
23 / 1200	13.4	77.9	995	40	"
23 / 1800	14.0	77.6	993	45	"
24 / 0000	14.7	77.3	990	55	"
24 / 0600	15.6	77.1	987	60	"
24 / 1200	16.6	76.9	981	65	hurricane
24 / 1800	17.7	76.7	972	75	"
24 / 1900	17.9	76.6	971	75	"
25 / 0000	18.9	76.4	964	85	"
25 / 0525	20.0	76.0	954	100	"
25 / 0600	20.1	76.0	954	100	"
25 / 0900	20.9	75.7	960	95	"
25 / 1200	21.7	75.5	966	95	"
25 / 1800	23.3	75.3	963	90	"
26 / 0000	24.8	75.9	965	75	"
26 / 0600	25.7	76.4	968	70	"
26 / 1200	26.4	76.9	970	65	"
26 / 1800	27.0	77.2	971	65	"
27 / 0000	27.5	77.1	969	60	tropical storm
27 / 0600	28.1	76.9	968	60	"
27 / 1200	28.8	76.5	956	70	hurricane
27 / 1800	29.7	75.6	960	70	"
28 / 0000	30.5	74.7	960	65	"
28 / 0600	31.3	73.9	959	65	"
28 / 1200	32.0	73.0	954	65	"
28 / 1800	32.8	72.0	952	65	"
29 / 0000	33.9	71.0	950	70	"
29 / 0600	35.3	70.5	947	80	"
29 / 1200	36.9	71.0	945	85	"
29 / 1800	38.3	73.2	940	80	"
29 / 2100	38.8	74.0	943	75	extratropical
29 / 2330	39.4	74.4	945	70	"
30 / 0000	39.5	74.5	946	70	"

30 / 0600	39.9	76.2	960	55	"
30 / 1200	40.1	77.8	978	50	"
30 / 1800	40.4	78.9	986	40	"
31 / 0000	40.7	79.8	992	35	"
31 / 0600	41.1	80.3	993	35	"
31 / 1200	41.5	80.7	995	30	"
31 / 1800					dissipated
25 / 0525	20.0	76.0	954	100	maximum winds
29 / 1800	38.3	73.2	940	80	minimum pressure
24 / 1900	17.9	76.6	971	75	landfall near Bull Bay, Jamaica
25 / 0525	20.0	76.0	954	100	landfall about 10 n mi west of Santiago de Cuba, Santiago de Cuba.
29 / 2330	39.4	74.4	945	70	landfall near Brigantine, NJ (extratropical)

Table 2. Selected ship reports for Hurricane Sandy, 22-29 October 2012. Note that this table includes some reports from when Sandy was extratropical.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
24 / 0000	MHNN5	11.5	74.3	360 / 42	1004.3
24 / 0600	A8SF9	11.5	75.4	210 / 36	1004.0
25 / 0600	H3VU	23.4	74.7	080 / 35	1004.0
25 / 1000	H3GR	24.6	80.7	070 / 40	1013.0
25 / 1200	9VMG5	26.1	74.2	100 / 37	1004.0
25 / 2100	H3VC	24.7	80.0	050 / 37	1002.0
26 / 0100	C6FZ9	28.0	80.1	060 / 45	1008.0
26 / 0200	C6PZ8	24.9	79.6	040 / 60	1007.0
26 / 0300	3ETA7	20.8	73.9	190 / 51	998.0
26 / 0300	D5BI3	24.8	79.4	020 / 45	1001.5
26 / 0300	H3GS	29.2	80.3	080 / 41	1007.0
26 / 0300	H3VC	24.1	81.0	030 / 37	1004.0
26 / 0400	C6PZ8	25.2	79.5	040 / 62	1004.0
26 / 0600	C6PZ8	25.5	79.5	030 / 60	1004.0
26 / 0600	D5BI3	24.3	80.3	010 / 36	1000.9
26 / 0600	J8NW	24.5	73.3	340 / 64	993.5
26 / 0700	C6PZ8	25.7	79.5	030 / 60	1002.0
26 / 1000	C6PZ8	25.9	79.6	020 / 43	1000.0
26 / 1100	C6PZ8	25.8	79.8	350 / 47	1000.0
26 / 1200	9VMG5	25.5	79.5	040 / 37	996.0
26 / 1800	C6ZL6	24.6	79.4	270 / 45	989.0
26 / 1800	DGDD	32.6	78.3	040 / 45	1008.5
26 / 1800	H3VU	32.5	79.0	030 / 40	1010.0
26 / 2200	C6FM9	30.1	80.1	030 / 52	1003.0
27 / 0000	WKAW	28.7	79.6	010 / 60	998.5
27 / 0300	C6FM8	24.3	81.4	360 / 43	1002.0
27 / 0600	C6VG7	25.0	80.1	290 / 51	1002.4
27 / 0600	WJBJ	28.9	80.2	010 / 47	996.1
27 / 0900	WJBJ	27.9	80.0	330 / 38	994.1
27 / 0900	WKAW	31.0	79.2	010 / 56	994.0
27 / 1100	C6VG7	25.7	80.1	270 / 35	1001.0
27 / 1100	WDC673	31.6	80.4	020 / 44	999.0

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
27 / 1200	WRAH	32.0	79.8	020 / 37	1000.1
27 / 1400	C6PZ8	25.2	79.5	280 / 55	1004.0
27 / 1500	C6PZ8	25.3	79.5	280 / 55	1004.0
27 / 1500	WKAW	31.8	78.2	020 / 60	991.4
27 / 1600	C6PZ8	25.5	79.6	280 / 54	1004.0
27 / 1800	3EBL5	22.4	77.8	320 / 37	1003.0
27 / 1800	DGZN	24.4	80.1	320 / 40	1005.0
27 / 1800	PHCQ	32.5	79.3	360 / 55	999.1
27 / 1800	WKAW	32.1	77.8	020 / 72	988.0
27 / 2100	WKAW	32.4	77.5	020 / 63	987.0
28 / 0000	A8SG4	29.7	80.3	350 / 45	998.0
28 / 0000	C6UZ7	26.3	78.5	290 / 44	999.0
28 / 0000	WKAW	32.5	77.2	010 / 60	987.0
28 / 0300	H3GS	32.3	79.6	360 / 40	998.0
28 / 0300	WKAW	32.7	76.9	010 / 64	988.5
28 / 0300	H3GS	32.3	79.6	360 / 40	998.0
28 / 0400	C6FZ9	28.0	80.2	300 / 35	1003.0
28 / 0600	WKAW	35.6	75.1	320 / 55	986.0
28 / 0600	KIRH	33.3	66.2	100 / 42	997.1
28 / 0600	WDD612	28.0	80.0	320 / 40	1003.0
28 / 0800	C6FM9	29.0	80.3	330 / 40	1002.0
28 / 0900	WDD612	28.7	80.1	310 / 40	1003.0
28 / 0900	WKAW	33.2	76.6	020 / 63	987.0
28 / 1100	3FPS9	36.6	75.5	010 / 55	998.0
28 / 1500	WKAW	33.6	75.9	010 / 60	988.0
28 / 1800	DGSE	40.3	71.2	060 / 50	1004.0
28 / 1800	WKPN	38.2	71.0	080 / 37	993.8
28 / 1800	WRYD	38.4	69.1	100 / 44	996.5
29 / 0000	DHBN	40.4	66.2	050 / 37	1004.0
29 / 0000	WKAW	34.7	75.3	300 / 60	988.0
29 / 0300	WKAW	35.1	75.0	360 / 60	986.8
29 / 0600	WKAU	37.9	74.3	360 / 44	989.0
29 / 0600	WKPN	39.3	66.8	100 / 42	995.0
29 / 0800	ZCEF6	40.4	68.8	060 / 44	992.2
29 / 1000	H3VS	37.2	75.1	340 / 44	989.0

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
29 / 1200	3FPS9	34.0	76.3	320 / 50	994.0
29 / 1200	LAOW5	40.4	69.4	050 / 52	986.0
29 / 1200	WKAU	35.7	74.9	320 / 37	985.0
29 / 1200	WKPY	40.4	69.0	090 / 37	987.5
29 / 1800	WKPY	40.8	67.3	130 / 47	992.0
29 / 2100	WKAW	36.4	75.1	270 / 52	983.5
29 / 2200	WDB683	42.6	81.3	350 / 51	1004.1
29 / 2300	WDB683	42.6	81.3	350 / 40	1003.4
30 / 0200	VGJD	42.0	82.6	340 / 48	
30 / 0200	VGMV	41.9	82.6	350 / 45	
30 / 0300	WXU343	41.9	82.7	240 / 50	1006.4
30 / 0500	WCZ970	42.0	82.0	330 / 42	998.3
30 / 0800	WZD246	41.9	82.8	340 / 41	998.3
30 / 0900	VDFP	45.0	83.3	360 / 35	1005.5
30 / 1100	WZD246	41.9	82.8	340 / 42	
30 / 1200	VDWC	45.8	83.2	010 / 38	
30 / 1200	WDD612	35.9	75.2	250 / 40	996.5
30 / 1200	WE3806	45.8	83.1	010 / 40	1005.7
30 / 1800	WCV762	45.7	84.8	360 / 35	1005.7

Table 3. Selected surface observations for Hurricane Sandy, 22-29 October 2012. Note that this table includes reports from when Sandy was extratropical.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
International						
Buoy/CMAN						
Buoy 42058 14.92N 74.92W Height: 5.0 m	24/0559	996.7	24/0559	49[j]	64	
Settlement Point C-MAN (SPGF1) 26.70N 78.99W Height: 9.8 m	26/2100	992.0	26/2350	48[f]	64	
Cuba						
Cabo Lucrecia (78365)	25/1000	966.7	25/0910	81*	103*	3.47
Contramaestre (78363)	25/0700	978.4	25/0554	43	69	5.01
Gran Piedra (78366) Elevation: 1130 m			25/0555	86	143	11.12
Guantánamo (78368)	25/0700	990.4	25/0730	46	76	4.54
Guaro (78370)	25/0810	960.2	25/0640	65	86	3.56
Holguín (78372)	25/0800	986.1	25/0835	47	78	3.32
Jamal (78356) Elevation: 165 m	25/0710	992.8	25/0235	36	59	3.82
La Jíquima (78362)	25/0800	988.3	25/0830	40	54	4.22
Palenque de Yateras (78334) Elevation: 406 m	25/0900	991.2	25/0955	36	59	5.67
Pinares de Mayarí (78371) Elevation: 646 m			25/0925	73	119	7.06
Punta de Maisí (78369)	25/0810	993.8	25/0301	43	55	1.26
Santiago de Cuba (78364)			25/0517		99*	
Valle de Caujerí (78319) Elevation: 184.8 m	25/0608	988.8	25/0610	43	73	4.56
Velasco (78378)	25/0900	986.2	25/0740	39	53	3.30
El Cobre, Santiago de Cuba						9.39
La Majagua, Santiago de Cuba						9.84
Cruce de los Baños						9.74
Estación Hidrométrica La Virgen						7.55
Hatibonico						7.39
Jiguaní						6.74

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Banes						6.50
Potrerillo						6.42
San Antonio del Sur						6.42
Jamaica						
Barton Isles	24/2030	993.3				
Belvedere Estates			24/1830	32	59	16.01
Bunkers Hill	24/2100	994.9				4.06
Happy Grove	24/2000	977.6	24/1500	27	46	9.65
Fair Prospect			24/2000	38	81	11.57
Kingston (78397)	24/1926	972.1	24/2020	46	59	8.04
Mill Bank						28.09
Mitchell Town	24/1900	986.3	24/1500	16	32	5.99
Montego Bay (78388)						1.94
Morant Point (78399)						8.28
Negril (78387)			24/2302		35	1.20
Orange River			24/2100	22	51	
Passley Gardens			24/2000	27	65	12.17
Penlyne Castle			24/2200	22	51	21.42
Tulloch			24/1900	24	40	5.49
St. Mary Banana Estate			24/2000	32	54	12.72
Siri Mandeville			24/2000	22	49	3.11
Worthy Park			24/2000	22	57	4.06
Woodford	24/1900	975.0	24/1900	22	59	10.50
Bahamas/Turks & Caicos						
Nassau (MYNN)	26/1000	988.1	26/1000	40	43	
Providenciales (MBPV)	25/1900	1000.0			45	
Sans Souci, New Providence			25/2047		45	
Bermuda						
Bermuda Airport (TXKF)	29/0320	994.8	28/0200	32	50	
Commissioner's Point Elevation: 30 m			29/0050	35	51	
Marine Operations Center Elevation: 78 m			29/0200		52	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Marine Observations						
Esso Pier NOS (BEPB6) 32.37N 64.70W Height: 3.1 m	29/0324	993.9	29/1354	28	38	
Buoy 41047 27.47N 71.49W Height: 10.0 m	27/2036	993.2	28/0453	51[j]	56	
Buoy 41048 31.95N 69.50W Height: 5.0 m	28/2039	975.8	28/2311	50[j]	60	
United States						
Florida						
ICAO Sites						
Boca Chica NAS (KNQX)	26/1953	1002.9	25/1935	25	39	
Cape Canaveral AF Strip (KXMR)	27/0855	996.6	27/0323	24	35	1.51
Daytona Beach (KDAB)	27/0934	998.9	26/2351	33	43	1.56
Ft. Lauderdale Intl. (KFLL)	26/1753	999.0	26/0547	26	42	0.99
Fort Pierce/St. Lucie (KFPR)	27/0901	996.8	26/0416	23	35	1.33
Homestead Air Reserve (KHST)	26/1755	1000.8	25/2044	35	45	1.92
Jacksonville Naval Air Station (KNIP)	27/0953	1001.7	26/1653	25	34	
Kendall-Tamiami Executive Airport (KTMB)			25/2325		42	1.65
Leesburg Intl. (KLEE)	27/1011	1001.6	26/1744	26	36	0.04
Marathon Airport (KMTH)	26/1953	1001.6	25/1839	32	41	0.92
Mayport Naval Station (KNRB)	27/0952	1001.4	26/2052	23	35	
Melbourne Intl. (KMLB)	27/0905	996.8	26/1310	36	49	1.66
Miami Intl. (KMIA)			25/2206		35	1.61
Opa-Locka Executive Airport (KOPF)			25/2200		43	2.49
Orlando Executive (KORL)	27/0842	1000.2	26/1954	27	38	0.48
Orlando Intl. (KMCO)	27/0934	999.6	26/2011	32	40	0.30
Orlando/Sanford (KSFB)	27/0937	999.6	26/1646	29	37	0.98
Palm Beach Intl. (KPBI)			26/1838		45	1.87
Patrick AFB/Cocoa (KCOF)	27/0717	997.6	26/1814	33	48	1.35
Pompano Beach Air Park (KPMP)	26/1753	998.8	25/2142	29	45	1.24
Shuttle Landing Facility (KTTS)	26/2155	1001.4	26/1809	31	42	1.02

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
St. Augustine Airport (KSGJ)	27/0958	1000.8	26/2358	26	42	
Titusville Space Coast Regional (KTIX)			27/1747	25	41	
Vero Beach (KVRB)	27/0946	996.8	26/2040	30	46	1.03
Marine Observations						
Fowey Rocks C-MAN (FWYF1) 25.59N 80.10W Height: 43.9 m	26/1800	998.4	25/2250	46[f]	58	
Lake Worth NOS (LKWF1) 26.61N 80.03W Height: 6.0 m	27/0800	997.2	26/1400	39	49	
Long Key C-MAN (LONF1) 24.84N 80.86W Height: 7.0 m	26/2000	1001.4	26/0000	32[f]	42	
Mayport NOS (MYPF1) 30.40N 81.43W	27/1000	1003.2	26/1624	27[i]	34[i]	
Molasses Reef C-MAN (MLRF1) 25.01N 80.38W Height: 15.8 m	26/2000	999.7	25/1930	42[f]	59	
NW Florida Bay COMPS (NFBF1) 25.08N 81.92W Height: 5.5 m	26/2006	1001.3	26/1654	25*	34*	
Port Everglades ICON (PVGF1) 26.09N 80.11W Height: 3.5 m	26/1800	998.6	25/2148	36	46	
Saint Augustine C-MAN (SAUF1) 29.86N 81.26W Height: 16.5 m	27/1000	1000.7	26/2340	38[f]	46	
Sombrero Key C-MAN (SMKF1) 28.42N 81.11W Height: 48.5 m	26/0900	1002.1	25/1850	40[f]	48	
Trident Pier NOS (TRDF1) 28.42N 80.59W Height: 6.4 m	27/1948	1000.2	27/1424	25*	35*	
Vaca Key NOS (VCAF1) 24.71N 81.11W Height: 6.4 m	6/1954	1002.0	25/1842	33	41	
Virginia Key HANDAR (VIK) 25.73N 80.16W Height: 22.0 m	26/1747	999	25/1917	33	49	
Virginia Key NOS (VAKF1) 25.73 80.16W Height: 10.3 m	26/1930	997.4	25/1706	27	43	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Buoy 41009 28.52 N 80.18W Height: 5.0 m	27/0850	993.3	27/0020	41	51	
Buoy 41010 28.91N 78.47W Height: 5.0 m	27/0920	981.4	27/1250	54	68	
Buoy 41012 29.99N 80.60W Height: 5.0 m	27/1510	996.1	27/1450	38	47	
South Florida Water Management						
4 S Intersection U.S. 27 (S30) 25.95N 80.43W						2.88
Krome Detention Center (S335) 25.74N 80.49W						2.29
Krome Detention Center 5 S (S338) 25.67N 80.48W						2.18
Lake Okeechobee Center (LZ40) 26.09N 80.79W Height: 8 m			26/2100	31*	49*	
Lake Okeechobee North (L001) 27.14N 80.79W Height: 8 m			26/2000	29*	44*	
Lake Okeechobee South (L006) 26.82N 80.78W Height: 15 m			26/2115	35*	48*	
WeatherBug						
Boca Raton 26.41N 80.08W					41*[i]	
Coconut Grove 25.73N 80.24W					34*[i]	
Davie 26.08N 80.31W					48*[i]	
Delray Beach 26.46N 80.08W					41*[i]	
Deerfield Beach 26.31N 80.11W					35*[i]	
Hialeah 25.87N 80.33W					39*[i]	
Jupiter 26.94N 80.08W					44*[i]	
Kendale Lakes 25.72N 80.45W					40*[i]	
Miami Beach 25.81N 80.13W					41*[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Miami Beach 25.86N 80.13W					42*[i]	
Miramar 25.98N 80.35W					49*[i]	
Port Everglades 26.09N 80.12W					37*[i]	
Sunny Isles 25.94N 80.12W					36*[i]	
West Palm Beach 26.68N 80.06W					44*[i]	
WeatherFlow						
Biscayne (XBIS) 25.69N 80.17W Height: 22.0 m			25/1920	31*	44*	
Biscayne Bay Light 20 (XKBS) 25.66N 80.19W Height: 6 m	26/1730	998.4	25/2205	36	46	
Boca Raton (XBOC) 26.37N 80.09W Height: 21 m			25/2220	29*	48*	
Boynton Beach (XBOY) 26.55N 80.05W Height: 10 m	26/2040	996.3	26/0935	32	49	
Cocoa Beach Pier (XCCO) 28.37N 80.60W			26/1325	34*[i]	45*[i]	
Crandon (XCRN) 25.72N 80.15W Height: 8 m	26/1745	999.5	25/2250	39	49	
Cutler (XCUT) 25.63N 80.30W Height: 10 m	26/1720	999.4	25/1925	22	37	
Dinner Key (XDIN) 25.71N 80.21W Height: 5 m	26/1735	999.4	25/2235	35	44	
Egmont Channel Height: 14 m			27/0230	32	37	
Hobe Sound (XHOB) 27.05N 80.16W			26/2040	25*[i]	43*[i]	
Hollywood (XNHD) 26.02N 80.13W Height: 14 m	26/1740	996.3	25/2245	23	40	
Jacksonville Beach Pier 30.29N 81.38W Height: 10 m			27/0436	35	40	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Jensen Beach (XJEN) 27.22N 80.20W Height: 10 m			26/2030	34*	45*	
Jupiter (XJUP) 26.89N 80.06W Height: 6 m			26/2035	41*	58*	
Key Biscayne (XKBI) 25.69N 80.17W Height: 22 m			25/2305	30*	49*	
Key West USCG Sector (WF35504) 24.57N 81.80W			27/1950	27[i]	34[i]	
Marathon Key (WF504) 24.74N 80.98W			25/2340	24[i]	38[i]	
Mangonia Park (XMGN) 26.76N 80.07W Height: 21 m	27/0000	994.4	26/1500	25	40	
New Smyrna Beach (XNSB) 29.05N 80.90W Height: 10 m			27/0330	37*	48*	
North Miami (XNMI) 25.91N 80.16W Height: 17 m	26/1710	995.4	25/2310	30	47	
Pompano Beach (XPOM) 26.24N 80.09W Height: 9 m	26/1755	997.3	26/0135	42	51	
Port Everglades (XPEG) 26.09N 80.12W Height: 41 m			25/2215	44*	55*	
Rocky Point Height: 7 m			27/0045	33	41	
St. Lucie Plant (XSTL) 27.34N 80.24W			26/0415	39*[i]	51*[i]	
Smith Shoal Light (WF76402) 24.72N 81.92W			25/2210	35[i]	43[i]	
South Key Largo (WF102) 25.10N 80.43W Height: 18 m			25/2250	22	38	
Summer House Height: 6 m			27/0025	31	39	
Turkey Point (XTKY) 25.43N 80.35W Height: 20 m	26/0805	998.6	25/2310	37	52	
Upper Matecumbe Key (WF999) 24.92N 80.64W Height: 18 m			26/2210	28	42	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
West Palm Beach (XWPM) 26.65N 80.06W Height: 13 m			25/2125	21*	37*	
CWOP						
Curry Hammock State Park (DW507) 24.74N 80.98W	26/1943	1000.7	25/2323	22[i]	36[i]	
Cudjoe Key (CW0925) 24.65N 81.48W			25/1401	35[i]	50[i]	
Islamorada Fire Rescue Station 20 (DW1872) 24.92N 80.64W	26/1943	999.0	26/2203	24[i]	35[i]	
Long Key FKAA Pump Station (CW0922) 24.84N 80.79W Height: 15 m	26/1931	1000.1	25/1401	35	50	
Ramrod Key FKAA Pump Station (CW0924) 24.66N 81.41W	26/1951	1001.4	25/1911	20[i]	37[i]	
Ramrod Key 0.7 SE (DW8495) 24.65N 81.41W Height: 8 m			27/1852	24	36	
Georgia						
Marine Observations						
Fort Pulaski (FPKG1) 32.03N 80.90W Elevation: 6.7 m	27/1924	1000.8	30/0206	29	35	
South Carolina						
ICAO Sites						
North Myrtle Beach (KCRE)	30/0753	997.6	28/0453	21	39	0.45
Marine Observations						
Fort Johnson NERRS (FJXS1) 32.75N 79.90W	27/2030	1001.5	28/0915	28[i]	34[i]	
Lake Thurmond (CHDS1) 33.66N 82.20W Height: 2.1 m			29/2200		37	
Buoy 41004 32.50N 79.10W Height: 5.0 m	27/2000	995.2	27/1400	41	51	
Buoy 41008 31.40N 80.87W Height: 5.0 m	27/2050	1000.4	27/1250	31	39	
North Carolina						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
ICAO Sites						
Beaufort Airport (KMRH)	28/1856	993.0	28/1256	33	47	3.02
Bogue Air Field (KNJM)	29/2157	994.5	28/1309	20	38	2.20
Boone Watauga County Airport (KTNB) Elevation: 911 m			29/2335		52	
First Flight Airport (KFFA)	29/1935	986.1	29/2035	24	42	
Greensboro (KGSO)					40	
Hatteras Frisco Airport (KHSE)	29/2151	990.0	29/2251	24*	47*	8.09
Jacksonville Airport (KOAJ)	28/2035	997.3	28/0435	22	35	
Jefferson Ashe County Airport (KGEV) Elevation: 969 m			30/0615		61	
Manteo/Dare County Airport (KMQI)	29/1855	986.8	28/0935	33	49	
New Bern (KEWN)	29/2054	993.2	28/0849	22	38	2.35
New River Air Station (KNCA)	29/2156	995.0	28/1123	25	36	3.09
WFO Newport/Morehead City (KMHX)			28/1028	23	37	2.81
Piney Island Bombing Range (KNBT)	28/2056	992.0	29/0156	33	44	2.81
Wilmington (KILM)	29/2053	995.9	28/1153	24	33	2.08
Marine Observations						
Beaufort Tide Gauge NOS (BFTN7) 34.72N 76.67W Height: 7.0 m	28/1912	991.4	28/1048	33	46	
Cape Lookout C-MAN (CLKN7) 34.60N 76.52W Height: 9.8 m	28/1900	992.8	28/1100	39	48	
Cedar Island (CITN7) 35.10N 76.30W Height: 10.0 m	30/2100	993.0	29/1240	47	58	
Duck Field Research Facility - USACE 36.20N 75.80W Height: 19.4m			29/0450	49	60	
Duck Tide Gauge NOS (DUKN7) 36.18N 75.75W Height: 14.4 m	29/1842	985.1	28/2148	44	53	
Hatteras Tide Gauge NOS (HCGN7) 35.21N 75.70W Height: 9.0 m	29/0230	987.7	29/0224	45	56	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Ocean Crest Pier CORMP (OCPN7) 33.90N 78.10W Height: 12.2 m	28/0732	994.7	27/1817	25	40	
Oregon Inlet NOS (ORIN7) 35.77N 75.53W Height: 6.0 m	29/1830	986.6	28/1324	37	51	
Swanquarter (SWQN7) 35.39N 76.33W Height: 10.0 m	30/2100	990.0	29/0030	33	43	
Wrightsville Beach Johnny Mercer Pier NOS (JMPN7) 34.21N 77.79W Height: 7.0 m	29/2100	994.6	27/2254	32	43	
Buoy 41001 34.56N 72.63W Height: 5.0 m	28/2350	969.6*	29/0610	55*	74*	
Buoy 41002 31.86N 74.84W Height: 5.0 m	28/0822	969.2	28/1743	53[j]	60	
Buoy 41013 33.44N 77.74W Height: 5.0 m	28/0950	991.6	27/2030	44[f]	55	
Buoy 41036 34.21N 76.94W Height: 5.0 m	28/0920	991.9	27/2250	42[f]	56	
Buoy 41038 CORMP 34.10N 77.70W Height: 3.0 m	28/1100	994.2	27/2200	35	45	
RAWS						
Dare Bomb Range			28/1837		45	
Fort Bragg (FBRN7)					36	
Duke Forest (DKFN7)					34	
Hoffman (MKLN7)					34	
Laurel Springs (LRLN7) Elevation: 914 m			30/0710		49	
Lexington (LXFN7)					38	
Low Gap 4 S (RAVN7) Elevation: 396 m			30/1017		45	
New Bern (NBRN7)			28/1117		36	
WeatherBug						
Kill Devils Hills Dare County Water					55	8.16

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
South Nags Head Oregon Inlet Fishing Center					54	
WeatherFlow						
Alligator Bridge 35.00N 76.01W Height: 13 m	29/1900	987.7	28/1700	42	52	
Avon Sound 35.37N 76.33W Height: 7 m	29/0230	987.7	28/2145	44	53	
Avon Pier 35.35N 75.50W Height: 16 m	29/0215	986.7	28/0950	42	56	
Buxton 35.26N 75.52W Height: 10 m	29/0255	984.9	28/1920	31	51	
Fort Macon 34.69N 76.70W Height: 10 m	28/1905	989.4	28/1255	40	52	
Frisco Woods – Frisco 35.24N 75.63W Height: 6 m	29/0820	988.2	28/1345	41	50	
Hatteras High – Frisco 35.26N 75.55W Height: 20 m	29/0745	984.6	28/2240	43	57	
Jennette's Pier - Nags Head 35.91N 75.59W Height: 18 m	29/1900	985.8	28/1845	51	63	
Kitty Hawk Kites Resort – Salvo 35.78N 75.47W Height: 18 m	29/1735	986.7	28/2230	47	56	
Nag's Head Jockey's Ridge 35.95N 75.63W Height: 6 m	29/1810	986.7	29/1650	33	45	
Ocracoke 35.13N 76.00W Height: 7.0 m	29/0800	988.3	28/1805	40	49	
Oregon Inlet 35.79N 75.54W Height: 10 m	29/0855	982.7	29/0435	39	53	
Oregon Inlet Jetty USCG 35.77N 75.53W Height: 10.0 m	29/1720	985.8	28/1900	46	59	
Pamlico Sound 35.42N 75.83W Height: 14.0 m	29/0230	986.4	28/2140	45	55	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Waves 35.57N 75.47W Height: 11 m	29/1800	987.7	28/2230	43	53	
Waves - Real Slick 35.56N 75.49W Height: 6 m	29/0310	986.3	28/2220	42	53	
Public/Other						
Barrett (APRS) Elevation: 911 m					40	
Baldwin 2 ENE (APRS) Elevation: 1005 m					40	
Fosco 3 SSE (APRS) Elevation: 1097 m					41	
Laurel Springs 1 SSW			29/2010		43[i]	
Virginia						
ICAO Sites						
Blacksburg (KBCB)			30/0355		39	
WFO Blacksburg (KRNK)			30/0252		49	
Danville Regional (KDAN)			30/0337		37	0.34
Dublin (KPSK)			30/0035		41	
Fort Belvoir (KDAA)			30/0134	33	55	9.99
Fort Eustis (KFAF)	29/2255	982.2	29/1840	27	40	6.93
Galax-Hillsville (KHLX)			30/1015		47	
Helfa/Accomack Airport (KMFV)			29/1916	39	53	
Hot Springs Airport (KHSP)					44	
Ingalls Field (KHSP) Elevation: 1156 m			30/0015		47	
James City/Williamsburg Airport (KJGG)			29/2215	24	40	
Langley AFB (KLFI)	29/2226	982.2	29/2355	25	44	7.30
Marion/Wytheville (KRJK)			30/0055		45	
Newport News/Patrick Henry (KPHF)	29/2254	982.0	28/1754	28	41	7.47
Norfolk Intl. (KORF)	29/2151	982.6	29/0125	34	44	6.10
Norfolk NAS (KNGU)	29/2159	983.2	28/2259	35	43	4.97
Roanoke (KROA)			30/0150		52	0.10
Wallops Island (KWAL)	29/2154	969.5	29/2037	37	52	8.48
Wash/Dulles Intl. Airport (KIAD)	30/0305	971.2	30/0154	34	47	5.65

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Wash/Reagan National Airport (KDCA)	30/0243	969.2	30/0209	36	53	6.21
West Point Airport (KFJY)			30/0335	26	34	
Winchester Regional Airport (KOKV)			30/0035	35	52	
Marine Observations						
Cape Henry NOS (CHYV2) 36.91N 75.78W	29/2154	980.1	28/2012	46[i]	56[i]	
Chesapeake Bay Bridge Tunnel NOS (CBBV2) 36.97N 76.11W Height: 13.0 m	29/2136	980.7	29/0100	43	52	
Chesapeake Light C-MAN (CHLV2) 36.91N 75.71W Height: 43.3 m	29/2300	979.0	29/2100	49	59	
Dominion Terminal NOS (DOMV2) 36.96N 76.42W Height: 9.1 m	29/2230	982.0	29/1930	35	44	
Kiptopeke NOS (KPTV2) 37.17N 75.99W			30/0130	42[i]	52[i]	
Lewisetta NOS (LWTV2) 37.995N 76.465W Height: 10.0 m	30/0012	974.4	29/2000	35	46	
Money Point NOS (MNPV2) 36.78N 76.30W Height: 7.6 m	29/2154	983.4	29/2154		40	
Rappahannock Light Tower NOS (RPLV2) 37.54N 76.02W	29/2224	975.0	28/1912	47[i]	57[i]	
South Craney Island NOS (CRYV2) 36.89N 76.34W	29/2154	983.0	29/0224	32[i]	42[i]	
Wachapreague NOS (WAHV2) 37.61N 75.69W	29/2200	974.9	27/2348	27*[i]	38*[i]	
Willoughby Degaussing Station NOS (WDSV2) 36.98N 76.32W	29/2230	979.6	29/2106	42[i]	50[i]	
York River East NOS (YKRV2) 37.25N 76.33W	29/2212	978.4	28/2336	44[i]	53[i]	
Yorktown USCG NOS (YKTV2) 37.23N 76.48W Height: 9.6 m	29/2230	980.0	29/0100	35	42	
Buoy 44041 CBIBS 37.20N 76.78W Height: 3.0 m			29/1910	30	40	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Buoy 44058 CBIBS 37.55N 76.26W Height: 3.0 m	30/0110	978.3	30/0220	33	42	
Virginia DOT Mesonet						
Afton Mountain (VA005) 38.03N 78.86W			30/0419		45	
Danville Airport 1 W Elevation: 165 m			30/0648		35	
Dublin 1 NNE Elevation: 645 m			30/0820		42	
Marion-Wytheville 2 E Elevation: 796 m			30/0744		45	
Millboro 6 SSE Elevation: 583 m			30/0029		39	
near Roanoke Airport Elevation: 354 m			30/0402		36	
West Springfield (VA046) 38.74N 77.19W			30/0200		45	
WeatherBug						
Dale City Nova Woodbridge Campus 38.62N 77.29W			30/0204		50[i]	
Gainesville School for the Arts & Sciences 38.78N 77.60W			30/0150		46[i]	
Manassas Pennington School 38.75N 77.48W			30/0125		43[i]	
Oakton Providence ES 38.86N 77.32W			30/0219		53[i]	
Reston National Wildlife Federation 38.95N 77.35w			30/0025		52[i]	
Rollins Fork King George ES 38.25N 77.16W			29/1944		50[i]	
Round Hill ES 39.13N 77.77W			30/2255		49[i]	
Sterling Nova Loudon Campus 39.02N 77.38W			30/0039		49[i]	8.06
Strasburg Sandy Hook ES 38.98N 78.37W			30/0404		49[i]	
Warrenton Highland School 38.73N 77.80W			29/2215		50[i]	
Warrenton P. B. Smith ES 38.73N 77.74W			30/0030		44[i]	
Sperryyille Rappahannock Co. HS 38.68N 78.19W			29/2035		45[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Wintergreen Mountain 37.92N 78.95W Elevation: 1113 m			30/0130		63	
WeatherFlow						
Baber Point Height: 8 m			30/0015	39	52	
Cape Henry Height: 25 m			28/2315	46	55	
Chesapeake Bay Bridge Tunnel 3rd Island 37.03N 76.08W Height: 22 m	29/2120	979.0	29/1655	49	58	
Cuckold Creek Height: 8 m			29/1935	40	45	
Deltaville 37.56N 76.30W Height: 7 m	29/2316	979.0	29/1815	34	41	
Great Wicomico Light 37.80N 76.27W Height: 11 m	30/0100	975.0	29/1925	34	45	
Hampton Flats/Hampton 36.98N 76.35W Height: 7 m	29/2050	983.0	30/0035	36	46	
Lynnhaven Pier/Virginia Beach 36.92N 76.08W Height: 12 m	29/2205	981.0	28/2330	37	49	
Lafayette River/Norfolk 36.89N 76.32W			29/0125	24*[i]	39*[i]	
Mason Neck Height: 11 m			29/1940	32	42	
Messick Point Height: 11 m			28/2315	41	49	
Monroe Creek Height: 8 m			29/2225	34	45	
New Point Comfort 37.33N 76.27W Height: 15 m	29/2350	977.0	28/2045	42	50	
Onancock 37.66N 75.87W Height: 16 m	29/2156	974.0	29/1820	45	55	
Plantation Flats/Cape Charles 37.26N 76.03W Height: 7 m	29/2229	980.0	30/0045	39	48	
Potomac Light 33 Height: 10 m			29/2210	37	49	
Pylons Dah Height: 7 m			29/2105	40	52	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Rudee Inlet Height: 10 m			28/2040	40	48	
Sandbridge 36.70N 75.93W Height: 5 m	29/1830	984.0	29/0005	36	43	
Silver Beach Height: 13 m			30/0150	37	44	
South Norfolk Jordan Bridge Height: 50 m			29/0204	36	42	
Thimble Shoals/Chesapeake Bay 37.05N 76.26W Height: 7 m	30/0110	983.0	28/2245	38	48	
Tower 70 Height: 8 m			29/2330	34	42	
CWOP						
Bent Mountain 3 NNW (APRS)			30/0352		49	
Blacksburg (APRS)			30/0608		43	
Blacksburg 2 N (APRS) Elevation: 637 m			30/0144		36	
Fincastle 6 W (APRS) Elevation: 440 m			30/1110		38	
Lithia 2 E (APRS) Elevation: 414 m			30/0408		36	
Lovettsville (AU044) 39.28N 77.60W			30/0148		52	
Maurertown (C5286) 38.93N 78.52W			30/0046		48	
Merrimac 2 SW (APRS) Elevation: 628 m			30/0325		36	
Mount Solon (D6906) 38.30N 79.13W			30/0655		47	
Walton 2 SSE (APRS) Elevation: 611 m			30/0809		37	
Winchester (C5255) 39.22N 78.25W			29/2328		43	
Public/Other						
Chester Gap 3 NNE					69[i]	
Hacksheck 1 NW					52[i]	
Leesburg					46[i]	
Stewartsville 3 SSW Elevation: 283 m			30/0826		37	
Wallops Island					59[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Wintergreen 4 NNW					63[i]	
West Virginia						
ICAO Sites						
Bluefield Mercer County Airport (KBLF) Elevation: 875 m			30/1032		36	0.48
Martinsburg Airport (KMRB)					52	4.00
RAWS						
Upper Tract (UPTW2) 38.81N 79.28W			30/0917		43[i]	
WeatherBug						
Bunker Hill Musselman Middle School 39.33N 78.05W			30/0229		45[i]	
CWOP						
Alvon 2 NW (APRS) Elevation: 650 m			30/0937		48	
Harpers Ferry (C5204) 39.33N 77.79W			30/0024		46[i]	
Public/Other						
Keyser 2 SSW					56[i]	
Ranson 1 NNW					56[i]	
Delaware						
ICAO Sites						
Georgetown (KGED)	29/2354	962.5	29/2222	25	43	
Wilmington (KILG)	30/0151	954.6	30/0451	39	50	5.01
Marine Observations						
Brandywind Shoal Light NOS (BRND1) 38.99N 75.11W	29/1200	988.5*	29/1012	44*[i]	54*[i]	
Delaware City NOS (DELD1) 39.58N 75.59W	30/0130	954.2	29/2024	31[i]	45[i]	
Lewes NOS (LWSD1) 38.78N 75.12W Height: 12.2m	29/2206	959.0	29/2112	46	58	
Reedy Point NOS (RDYD1) 39.55N 75.57W	30/0130	954.5				
Texas Tech						
Station 106A 38.833 N 75.383 W	29/2358	959.5	30/0337	31	40	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Station 108A 38.781N 75.127 W	29/2153	960.0	29/2038	43	52	
Station 112A 39.115N 75.448W	30/0101	954.8	29/2050	31	40	
WeatherBug						
Lewes University of Delaware					53[i]	6.10
Rehoboth Beach Boardwalk Plaza Hotel					53[i]	
WeatherFlow						
Lewes Elevation: 16 m			29/1320	46	58	
Public/Other						
Reeves Crossing 1 SSE			29/1914		51	
Stones Throw			29/2203		58	
Washington, D.C.						
Marine						
Washington, D.C. NOS (WASD2) 38.870N 77.020W	30/0230	968.8	30/0118	32[i]	53[i]	
Maryland						
ICAO Sites						
Annapolis Lee Airport (KANP) 38.94N 76.57W			30/0055		51[i]	
Baltimore/Washington Intl. Airport (KBWI)	30/0242	964.4	30/0054	30	52	6.63
Easton (KESN)			29/1850	32	42	
Martin State Airport /Middle River (KMTN)			29/2245	33	51	
Ocean City (KOXB)	29/2053	963.4	29/2206	31	50	7.20
Patuxent River NAS (KNHK)			29/2238	30	50	8.20
St. Inigoes (KNUI)			29/2047	32	56	7.59
Salisbury (KSBY)	29/2154	967.2	29/2033	30	47	7.53
Marine Observations						
Baltimore NOS (BLTM2) 39.267N 76.578W	30/0300	962.8	29/1654	25[i]	47[i]	
Bishops Head NOS (BISM2) 38.220N 76.038W	30/0006	970.8	29/2318	48[i]	59[i]	
Cambridge NOS (CAMM2) 38.573N 76.068W Height: 6.1 m	30/0106	967.6	29/1818	33	48	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Chesapeake City NOS (CHCM2) 39.53N 75.81W	30/0200	956.3	29/2148	26[i]	41[i]	
Cove Point LNG Pier NOS (COVM2) 38.404N 76.386W	30/0100	969.5	29/1306	40[i]	47[i]	
Francis Scott Key Bridge NOS (FSKM2) 39.219N 76.528W	30/0242	961.5	29/2336	40[i]	50[i]	
Ocean City NOS (OCIM2) 38.33N 75.09W	29/2106	962.7	30/0300	37[i]	51[i]	
Piney Point NOS (PPTM2) 38.133N 76.533W			29/1954	50[i]	65[i]	
Thomas Point C-MAN (TPLM2) 38.898N 76.437W Height: 18.0 m	30/0100	963.5	30/0100	52[f]	69	
Tolchester Beach NOS (TCBM2) 39.213N 76.245W Height: 10.0 m	30/0218	960.9	29/2324	41	52	
Buoy 44042 CBIBS 38.033N 76.336W Height: 3.0 m			29/2230	41	53	
Buoy 44043 CBIBS 39.152N 76.391W Height: 3.0 m	30/1520	989.9	29/2320	39	51	
Buoy 44057 CBIBS 39.544N 76.075W Height: 3.0 m	30/0310	957.7	29/2150	34		
Buoy 44061 CBIBS 38.785N 77.036W Height: 3.0 m	30/0240	969.6	30/0210	25	39	
Buoy 44062 CBIBS 38.556N 76.415W Height: 3.0 m	30/0130	969.1	29/2130	37	49	
Buoy 44063 CBIBS 38.963N 76.448W Height: 3.0 m			30/0120	37	47	
Texas Tech						
Station 104A 38.153N 75.259W	29/2102	967.6	29/2116	30	44	
Maryland DOT Mesonet						
Anne Arundel Co - I-97 at Route 100 (MD027) 39.15N 76.64W			30/0212		55[i]	
Frederick County – U.S. Route 340 at Route 180 (MD016) 39.35N 77.58W			30/0457		53[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Harford County - Route 136 at Route 646 (MD042)			29/1959		50[i]	
WeatherBug						
Baltimore Oriole Park at Camden Yards 39.28N 76.62W			29/2100		51[i]	
Baltimore Robert W Coleman ES 39.31N 76.66W			29/2320		58[i]	
Baltimore Tide Point					55[i]	
Beltsville High Point HS 39.04N 76.94W			30/0325		48[i]	
Chesapeake Beach Resort 38.69N 76.53W			29/2130		47[i]	
Clarksburg Area HS 39.22N 77.26W			30/0419		50[i]	
Clear Spring HS 39.65N 77.93W			30/0039		48[i]	
Crisfield					58[i]	
Cumberland Allegany HS 39.65N 78.78W			30/0149		46[i]	
Edgewood Deerfield ES 39.42N 76.29W			29/2205		52[i]	
Ellicott City Our Lady of Perpetual Help School 39.23N 76.77W			30/0305		54[i]	
Frederick Ballenger Creek ES 39.37N 77.43W			30/0209		57[i]	
Frederick Earth and Space Science Laboratory 39.40N 77.42W			30/0339		49[i]	
Frederick Gov. Thomas Johnson MS 39.43N 77.40W			30/0229		54[i]	
Frostburg Beall ES 39.65N 78.93W			29/2109		47[i]	
Gaithersburg National Institute of Standards and Technology 39.13N 77.22W			30/0235		57[i]	
Galena Volunteer Fire Dept.					52[i]	8.32
Havre de Grace MS 39.54N 76.11W			29/2120		45[i]	
Helen Mother Catherine Spalding School 38.37N 76.77W			29/2059		41[i]	8.78
Ijamsville Oakdale HS 39.39N 77.31W			29/2325		53[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Manchester Valley HS 39.65N 76.88W			30/0010		49[i]	
Mount Airy Christian Academy 39.34N 77.10W			30/0120		53[i]	
Ocean City At the Beach Enterprises					65[i]	
Ocean City Emergency Management Planner					59[i]	
Ocean City Phillips Beach Plaza Hotel					55[i]	
Reisterstown MEMA 39.49N 76.83W			30/0040		49[i]	
Waldorf North Point HS 38.64N 76.94W			30/0135		43[i]	
WeatherFlow						
Assateague Height: 12 m			29/2039	36	47	
Bishop's Head 38.22 N 76.04 W Height: 15 m	29/2041	971.0	29/1845	54	66	
Blackwalnut Harbor Height: 8 m			29/1755	34	47	
Point Lookout Height: 11 m			29/2220	49	64	
Greenbury Point Height: 9 m			29/2254	36	47	
Gunpowder Height: 8 m			29/2350	34	50	
Herring Bay Height: 9 m			29/2140	33	48	
Kent Island Height: 5 m			29/2020	35	47	
Ocean City Height: 15 m			28/2150	41	48	
Ocean City Height: 15 m			28/2150	41	48	
Raccoon Point Height: 6 m			29/1722	33	43	
Tolly Point Height: 9 m			29/2301	37	48	
CWOP						
Crofton (C7344) 39.69N 76.30W			30/0725		50[i]	
Ellicott City (C3900) 39.29N 76.84W			29/2200		55[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Falling Waters (D3148) 39.60N 77.88W			30/0113		45[i]	
Halethorpe (C1550) 39.23N 76.70W			30/0110		59[i]	
Laytonsville (C2463) 39.20N 77.13W			30/0113		66[i]	
Public/Other						
Annapolis					60[i]	
Arbutus					59[i]	
Colesville 1 SSE					61[i]	
Crisfield			20/2029	44[i]	63[i]	
Crocheron 2 SSE					61[i]	
Ocean City					64[i]	
Saint Inigoes 2 W					56[i]	
New Jersey						
ICAO Sites						
Andover (K12N)	29/2254	968.4	29/1854	21	49	0.85
Atlantic City (KACY)	29/2154	951.9	29/2107	34	56	6.00
Belmar (KBLM)			29/2115	34	49	
Caldwell (KCDW)	29/2233	966.8*	29/2253	36*	61*	
Millville (KMIV)	29/2354	952.5	29/2054	25	38	5.77
Morristown (KMMU)			29/1251	21	38	
Mount Holly (KVAY)	29/2254	954.9	29/2054	33	48	2.75
Newark (KEWR)	29/2233	965.3	30/0151	45	68	1.39
Somerville (KSMQ)	29/2253	963.5	29/2205	28	48	
Sussex (KFWN)	29/2253	970.5	29/2053	33	65	0.86
Teterboro (KTEB)	29/2151	966.5	29/2359	39	63	0.87
Trenton (KTTN)	29/2253	958.1	29/2253	33	55	1.75
Wildwood (KWWD)			29/0655	24	35	
Wrightstown/McGuire AFB (KWRI)	29/2355	953.4	29/2055	37	60	2.57
Marine Observations						
Atlantic City NOS (ACYN4) 39.36N 74.42W	29/2224	945.5				
Burlington NOS (BDRN4) 40.08N 74.87W	30/0030	953.7	30/0112	36[i]	50[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Cape May NOS (CMAN4) 38.96N 74.96W Height: 12.2 m	29/2218	953.8	30/0000	52	65	
Jacques Cousteau NERRS (JCRN4) 39.54N 74.46W	30/0000	946.0				
Robbins Reef NOS (ROBN4) 40.65N 74.06W Height: 22.0 m	29/2218	962.2	30/0112	55	78	
Sandy Hook NOS (SDHN4) 40.46N 74.01W	29/2212	961.0	29/2218	39*[i]	60*[i]	
Ship John Shoal NOS (SJSN4) 39.30 N 75.38 W	29/2330	953.0	30/0418	51[i]	58[i]	
Buoy 44009 38.46N 74.70W Height: 5.0 m	29/2050	956.4	29/2050	46	66	
HADS/USGS						
Atlantic City Marina (ATLN4) 39.38N 74.42W	30/0015	946.6	29/2045	36[i]	58[i]	8.15
Barnegat Light (BGLN4) 39.76N 74.11W	30/0030	950.0	29/2030	49[i]	69[i]	6.55
Texas Tech						
Station 101A 40.073N 74.042 W				52	62	
Station 103A 40.312 N 73.978 W	29/2243	955.4	30/0000	53	66	
Station 107A 39.821 N 74.2012 W	29/2346	952.0	30/0108	30	47	
Station 109A 39.941 N 74.135 W			30/0030	41	53	
Station 110A 40.545N 74.125 W	29/2227	959.4	30/0048	47	60	
Station 111A 39.379N 74.455 W	29/2226	945.6	29/2012	45	58	
New Jersey Weather/Climate Net						
Atlantic City Marina (KQ25) 39.38N 74.42W	29/2325	947.5	29/2015	43[i]	67[i]	7.17
Harvey Cedars (KQ11) 39.7N 74.1W			29/1920		64*[i]	
High Point Monument (KQ61) 41.32N 74.66W	29/2335	969.9			69[i]	
Pittstown (KQ53) 40.56N 74.96W		961.1	30/0200		64[i]	2.47
Point Pleasant (KQ37) 40.07N 74.06W	29/2215	956.0	29/2055		64[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Sea Girt (KQ52) 40.12N 74.03W	29/2225	956.0	30/0050	60[i]	69[i]	2.56
WeatherBug						
Englishtown Wemrock Brook School					57[i]	
Fair Lawn Radburn ES					57[i]	
Flanders Mt. Olive HS					60[i]	
Jersey City Ollie Culbreth ES					57[i]	
Neptune Midtown Community ES					62[i]	
Wayne Passaic County Technical Institute					58[i]	
WeatherFlow						
Bayonne (XBYO) 40.67N 74.09W Height: 10 m			30/0110	44	67	
Brick Height: 10 m			29/2355	51	68	
Cape May Height: 10 m			29/2030	48	63	
Kite Island Height: 7 m			29/1930	51	62	
Monmouth Height: 10 m			29/2345	42	65	
Ocean City South Beach Height: 10 m			30/0305	47	61	
Perth Amboy (XPER) 40.50N 74.28W Height: 10 m			30/0210	46	63	
Sandy Hook Height: 19 m			30/0035	59	76	
Tuckerton Height: 10 m			29/1955	55	77	
CWOP						
Fairfield (C2504) 40.88N 74.29W Height: 53.6 m	29/2232	967.4	29/2342		63[*i]	
Teaneck 1 SSE (D2034) 40.88N 74.00W Height: 11.0 m	29/2201	966.8	30/0201	59[i]	66[i]	
Upper Montclair (D9739) 40.84N 74.21W Elevation: 82 m	29/2145	966.4	29/2225		76[i]	
Public/Other						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Brigantine (Wx Underground) 39.40N 74.37W	29/2330	946.2				
Dennisville					70[i]	
Galloway (Wx Underground) 39.46N 74.50W	30/0000	946.5				
Harrison			29/2320		59[i]	
Newport					76[i]	
North Arlington			29/2347		55[i]	
Surf City					77[i]	
Tompkinsville 2N			30/0024		78[i]	
Tuckerton					76[i]	
Wildwood Crest Elevation: 4.5 m			29/2200	35	61	
Pennsylvania						
ICAO Sites						
Allentown (KABE)	29/2351	964.8	30/0051	39	61	1.25
Altoona (KAOO)			29/2255		50	3.25
Clearfield Lawrence Airport (KFIG)			30/0115		52	2.79
Doylestown (KDYL)	29/2254	961.1	29/2304	27	44	1.34
Fort Indiantown Gap - Muir Army Airfield (KMUI)			29/2245		49	
Harrisburg Capital City Airport (KCXY)			30/0022		46	3.46
Harrisburg Intl. Airport (KMDT)			30/0044		45	3.60
Lancaster (KLNS)	30/0353	960.1	29/2353	29	45	
Mount Pocono (KMPO)	29/2353	969.8	29/2353	32	57	1.25
Northeast Philadelphia (KPNE)	30/0054	955.8	29/2340	41	57	
Penn Valley Airport (KSEG)			30/0031		47	
Philadelphia Intl. Airport (KPHL)	30/0132	952.6	30/0044	44	59	3.06
Philadelphia Wings Field (KLOM)			29/2355	20	36	
Pottstown (KPTW)	30/0154	959.0	30/0208	31	51	3.05
Quakertown (KUKT)			29/2055	28	45	
Reading (KRDG)	30/0054	962.8	29/2054	26	40	
University Park Airport – State College (KSCE)			29/1953		35	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Wilkes-Barre/Scranton Intl. Airport (KAVP)			30/0258		38	2.31
York Airport (KTHV)			29/2309		46	
Marine Observations						
Marcus Hook NOS (MRCP1) 9.81N 75.41W	30/0148	951.9				
Newbold NOS (NBLP1) 40.14N 74.75W	30/0018	955.3	30/0230	34[i]	51[i]	
Philadelphia NOS (PHBP1) 39.93N 75.14W	30/0124	952.0				
WeatherFlow						
Lake Nockamixon Elevation: 8 m			30/0045	38	54	
Marsh Creek Elevation: 8 m			29/2230	27	41	
Public/Other						
Allentown					70[i]	
Bear Creek 5 ENE 42.68N 75.50W			30/0053		52[i]	
Bensalem					66[i]	
Bushkill Center					61[i]	
Cashtown					54[i]	
Dimock			29/2200		36[i]	
Gouldsboro			30/0218		42[i]	
Jermyn			29/2200		37[i]	
Lakeview 1 ENE 41.87N 75.60W			29/2300		53[i]	
Lehman			29/2200		50[i]	
Loch Lomond			29/2244		43[i]	
Mount Aetna					56[i]	
Penobscot 41.17N 75.88W Elevation: 650 m			29/2220		58[i]	
Quicktown			30/0400		38[i]	
Springbrook Corner			30/0245		37[i]	
Wind Gap					54[i]	
Wrightsville			29/2145		43[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
New York						
ICAO Sites						
Albany Intl. Airport (KALY)	29/1951	984.1	29/1652	26	37	
Binghamton Regional Airport (KBHM)			30/0604		43	0.91
Buffalo Intl. Airport (KBUF)			30/0200		37	2.66
Dansville Municipal Airport (KDSV)			30/0600		37	2.26
Dunkirk Municipal Airport (KDKK)			30/0000		41	2.59
East Hampton (KHTO)			29/1955		57	
Elmira (KELM)			29/2108		53	1.68
Farmingdale (KFRG)	29/2126	966.0	29/2217	45	69	0.84
Fulton Oswego County Airport (KFZY)			30/0049		45	0.56
Glens Falls Airport (KGFL)	29/2053	988.1	29/1533	29	37	
Islip (KISP)	29/2120	967.1	29/2226	49	78	0.71
Jamestown Airport (KJHW)			30/0200		40	2.60
Massena Airport (KMSS)			30/0127		42	
Montauk Airport (KMTP)	29/1854	977.3*	29/1854	25*	49*	
Montgomery (KMGJ)	29/2229	973.4	29/2129	36	50	0.69
New York-Central Park (KNYC)	29/2203	965.7	29/1938	33	54	0.94
New York-Kennedy (KJFK)	29/2215	965.1	30/0003	49	74	0.55
New York-Laguardia (KLGA)	29/2151	966.3	29/2255	56	64	0.58
Newburgh (KSWF)	29/2145	975.3*	29/2345	37*	53*	
Ogdensburg Airport (KOGS)			30/0134		37	
Penn Yan Regional Airport (KPEO)			29/2236		44	
Plattsburgh Intl. Aiport (KPBG)			30/1038		34	
Potsdam Airport (KPTD)			29/2336		36	
Rome Griffiss Airfield (KRME)			30/0207		39	
Saranac Lake (KSLK)			29/2235		38	
Shirley/Brookhaven (KHWV)	29/2056	969.4*	30/0356	26*	52*	
Syracuse Hancock Airport (KSYR)			29/2054		35	
Watertown Airport (KART)			30/0139		50	
Wellsville Airport 1 W (KELZ)			30/0200		41	
Westhampton Beach (KFOK)	29/1702	980.3*	29/1553	33*	51*	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
White Plains (KHPN)	29/2156	969.7	29/2200	41	63	0.71
Marine Observations						
Bergen Point NOS (BGNN4) 40.64N 74.15W Height: 9.1 m	29/2154	963.8	29/1906	32	48	
Buffalo NOS (BUFN6) 42.88N 78.89W	30/0824	984.8	30/0254	27[i]	39[i]	
Dunkirk Light C-MAN (DBLN6) 42.49 N 79.35 W Height: 20 m	30/0800	980.2	30/0740	44[f]	52	
Kings Point NOS (KPTN6) 40.81N 73.77W Height: 10.0 m	29/2200	965.7	29/2106	25	41	
Niagara CG (YGNN6) 43.26N 79.06W Height: 10.0 m	30/0840	985.4	29/2330	34	46	
Oswego NOS (OSGN6) 43.46N 76.51W	30/0400	985.7	29/2242	39[i]	50[i]	
Rochester (RPRN6) 43.26N 77.59W Height: 10.0 m	30/0720	985.4	30/0040	42	52	
Buoy 44022 UCONN 40.88N 73.73W Height: 3.5 m	29/1445	988.4*	29/1845	35*	50*	
Buoy 44025 40.25N 73.17W Height: 5.0 m	29/2150	958.2	29/1830	49	64	
Buoy 44039 UCONN 41.13N 72.66W Height: 3.5 m			29/1830	37*	47*	
Buoy 44040 UCONN 40.95N 73.58W Height: 3.5 m			29/1845	37*	49*	
Buoy 44065 40.36N 73.70W Height: 5.0 m	29/2150	958.1	30/0010	48	64	
WeatherBug						
Averne Goldie Maple Academy					64[i]	
Brentwood Suffolk CC					59[i]	
Bronx Cardinal Spellman HS					62[i]	
Bronx In-Tech Academy M/HS					59[i]	
Bronx St. Barnabas ES					57[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Bronx St. Raymond HS for Boys					58[i]	
Brooklyn College Academy					57[i]	
Brooklyn Edward R. Murrow HS					67[i]	
Brooklyn IS 187 Christa McAuliffe					59[i]	
Brooklyn PS/IS 192 Magnet School for Math and Science					61[i]	
Brooklyn St. Bernadette School					61[i]	
Corona IS 61 Leonardo da Vinci					57[i]	
Jamaica HS					60[i]	
Long Beach HS					72[i]	
Mamaronek Beach Point Club					63[i]	
Mount Vernon Graham ES Magnet					61[i]	
New York City St. Elizabeth School					57[i]	
Orangeburg Rockland County Sewer District					57[i]	
Peekskill HS					64[i]	
Selden Suffolk County CC					62[i]	
Slate Hill Minisink Valley HS					57[i]	
Staten Island P.S. 32 Gifford					64[i]	
Staten Island P.S. 53 Bay Terrace					59[i]	
WeatherFlow						
Bayville (XBAY) 40.90N 73.63W Height: 14 m			29/2020	57	67	
Blue Point (XBLU) 40.73N 73.04W Height: 11 m			29/2110	52	65	
Breezy Point - Queens (XBRZ) 40.56N 73.93W Height: 10 m			29/2340	53	68	
Durand Beach Height: 10 m			29/2310	40	54	
East Moriches USCG (XMOR) 40.79N 72.75W Height: 10 m			29/2220	54	71	
Eaton's Neck (XEAT) 40.95N 73.40W Height: 24 m			29/2210	61	83	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Fire Island USCG (XFIR) 40.63N 73.26W			30/0100	48	65	
Great Gull Island (XGUL) 41.20N 72.12W Height: 18 m			29/2035	65	74	
Great South Bay (XHCK) 40.66N 73.40W Height: 12 m			29/2055	41	55	
Jones Beach USCG (XJON) 40.59N 73.56W Height: 10 m			29/2215	48	70	
Larchmont Harbor (XLAR) 40.92N 73.73W Height: 13 m			29/2304	51	64	
Kingston Height: 8 m			29/2120	31	42	
Mecox Bay (XMCX) 40.91N 73.32W Height: 10 m			29/1850	38	66	
Point of Woods Yacht Club (XPOW) 40.65N 73.14W Height: 7 m			29/2035	48	63	
Tappan Zee Light 14 (XTAP) 41.14N 73.88W Height 13 m			29/1800	34	56	
CWOP						
Middlefield (D3254) 41.52N 72.66W Height 65.2 m	29/2108	975.9	29/2248		50	
Jacksons Heights 1 E (D9152) 40.75N 73.87W Height: 28.0 m	29/2202	966.1*	29/2232	39*[i]	67*[i]	
Public/Other						
Albany WFO			30/0254		44[i]	
Arkport 1 SE			29/2141		38[i]	
Bayville			29/2121		67[i]	
Berlin			29/2252		41[i]	
Breezy Point			29/2340	53[i]	68[i]	
Canajoharie			30/0000		35[i]	
Cold Brook			29/2306		38[i]	
Coney Island			29/2242		60[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Dover Plains			29/2302		41[i]	
East Springfield			29/1535		38[i]	
Erin 2 SSE			29/1906		37[i]	
Flatbush			30/0105		50[i]	
Herkimer			29/1403		48[i]	
Hudson			29/2100		39[i]	
Hunter			29/2000		43[i]	
Johnson City			30/0654		36[i]	
Lake Luzerne			29/1920		35[i]	
Latham			29/2151		37[i]	
Long Lake			29/1850		41[i]	
Mount Holly			29/2357		34[i]	
Patchogue			29/2301		67[i]	
Ogdensburg			30/0100		41[i]	
Orange Lake			29/2345		53[i]	
Oyster Bay			29/1938		58[i]	
Pleasant Valley			30/0031		43[i]	
Port Byron			29/2200		36[i]	
Saratoga Springs			29/1948		40[i]	
Sherburne 42.68N 75.50W			30/0300		51[i]	
Stone Ridge			30/0140		52[i]	
Stottsville			29/2055		39[i]	
Syosset			29/2303		71[i]	
Upton Brookhaven National Lab Height: 85 m			29/1750		69	
Wyantskill			29/1512		37[i]	
Connecticut						
Bridgeport/Sikorski (KBDR)	29/2152	972.2	29/2104	51	66	0.43
Chester (KSNC)	29/2015	976.9	29/2055	29	45	
Danbury (KDXR)	29/2153	974.7	30/0056	35	59	0.73
Groton (KGON)	29/2029	976.8	29/1935	44	65	0.43
Hartford (KHFD)	29/2053	980.1	29/2034		47	0.49

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
New Haven (KHVN)	29/2051	974.2	29/1735	30*	43*	
Willimantic (KIJD)	29/2052	980.6	29/2215	33	46	1.44
Windsor Locks – Bradley Intl. (KBDL)	29/2151	981.5	29/2308	35	54	0.80
Marine Observations						
Bridgeport NOS (BRHC3) 41.17N 73.18W	29/2054	972.5	29/2106	37[i]	52[i]	
New Haven NOS (NWHC3) 41.28N 72.91W Height: 6.4 m	29/2036	973.9	29/2136	30	51	
New London Ledge (LDLC3) 41.31N 72.08W Height: 20 m	29/1900	976.1*	29/1900	46*	66*	
New London NOS (NLNC3) 41.36N 72.09W Height: 8.5 m	29/2012	976.9	29/2042	33	48	
WeatherBug						
Bridgeport Discovery Interdistrict Magnet School					60[i]	
Danbury Western Connecticut State University					59[i]	
Hamden Hall Country Day School					62[i]	
New Haven Cold Spring School					57[i]	
WeatherFlow						
Norwalk Light (XNOR) 41.08N 73.38W Height: 10 m			29/2243	52	64	
Fishers Island (XFSH) 41.25N 72.03W Height: 10 m			29/2230	49	68	
Public/Other						
Bristol			29/2153		61[i]	
Burlington			29/2022		58[i]	
Greenwich			29/2120		61[i]	
Groton 2 S			29/1900		66[i]	
Madison			29/2120		74[i]	
Middletown 3 SW			29/2243		50[i]	
New Hartford			29/2354		41[i]	
Norwalk			30/0030		60[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Stonington			29/1900		61[i]	
Torrington			29/2037		50[i]	
Torrington 3 SW			29/1825		40[i]	
Torrington 2 SE			29/2026		38[i]	
Trumbull			29/2240		59[i]	
Rhode Island						
ICAO Sites						
Newport (KUUU)	29/1953	982.3	29/1713		51	
Providence-Warwick (KPVD)	29/1951	984.2	29/2050	36	51	1.45
Smithfield (KSFZ)			29/2015		39	2.72
Westerly (KWST)	29/1953	979.2	29/1921		60	
Marine Observations						
Conimicut Light NOS (CPTR1) 41.72N 71.34W Heights: 4.3 m	29/2012	982.0	29/2042	46	61	
Fox Point/Providence NOS (FOXR1) 41.81N 71.40W	29/2112	983.1	29/2030	34[i]	47[i]	
Potter Cover NOS (PTCR1) 41.64N 71.34W	29/1948	982.2	29/1812	38[i]	54[i]	
Quonset Point NOS (QPTR1) 41.59N 71.41W Height: 6.4 m	29/2006	981.8	29/2048	43	55	
RAWS						
Ninigret (NINR1) 41.38N 71.58W			29/1925		65[i]	
WeatherBug						
Providence Harborside					62[i]	
WeatherFlow						
Beavertail Height: 13 m			29/1830	34	50	
Block Island Jetty Height: 12 m			29/1419	37	47	
Fogland Height: 28 m			29/1640	30	46	
Halfway Rock Height: 9 m			29/1905	44	58	
Point Judith Height: 18 m			29/1835	56	70	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Rose Island Height: 12 m			29/1915	38	59	
Sabin Point Height: 9 m			29/2107	31	49	
Sakonnet Vineyards Height: 10 m			29/1910	34	55	
University of Rhode Island Height: 10 m			29/1915	40	57	
CWOP						
Westerly (D5262) 41.32N 71.81W			29/1844	56[i]	75[i]	
Public/Other						
Barrington			29/1639		53[i]	
Burrillville			29/1836		42[i]	
Jamestown – Beavertail Park			29/1830		34[i]	
Warren			29/2010		63[i]	
Massachusetts						
ICAO Sites						
Bedford Hanscom Field (KBED)			29/2155	39	58	
Beverly (KBVY)			30/0142	35	51	1.72
Blue Hill - Milton (KMQE)			29/2122	42	64	3.39
Boston (KBOS)			30/0014	40	54	1.65
Chatham (KCQX)			29/1905	33	45	0.34
Chicopee (KCEF)			29/2047		46	
Falmouth (KFMH)			29/2015		54	
Hyannis (KHYA)			29/1939		53	
Lawrence (KLWM)			29/1826		53	
Nantucket (KACK)	29/2053	984.0	29/2017	37	52	2.06
New Bedford (KEWB)			20/2021	37	53	1.44
Norwood (KOWD)			29/2130		47	2.63
Orange (KORE)			29/2143		37	1.49
Pittsfield (KPSF)	29/1900	981.4	29/1542	30	50	
Plymouth (KPYM)			29/2111	34	49	1.78
Taunton (KTAN)			29/1950		41	2.54
Vineyard Haven (KMVY)	29/1853	983.3	29/1709	39	59	0.98

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Westfield (KBAF)	29/2053	983.7	29/1855		44	
Worcester (KORH)			29/2231	35	53	1.98
Marine Observations						
Buzzards Bay C-MAN (BUZM3) 41.40N 71.03W Height: 80 m	29/1900	981.7	29/1740	57[f]	72	
Nantucket NOS (NTKM3) 41.29N 70.10W Height: 8.5 m	29/1906	984.0	29/1936	40	52	
Buoy 44008 40.50N 69.25W Height: 5.0 m	29/1750	981.2	29/1640	43[f]	58	
Buoy 44013 42.35N 70.65W Height: 5.0 m	30/0050	988.2	29/1920	40	50	
Buoy 44020 41.44N 70.19W Height: 5.0 m	29/1950	983.3	29/1950	41	52	
Buoy 44029 NERACOOS 42.52N 70.67W Height: 4.0 m	30/0050	990.1	29/1940	38[i]	50[i]	
WeatherBug						
Blue Hill Observatory & Science Center					64[i]	
Boston Seaport Hotel					61[i]	
Brookline Dexter and Southfield Schools					60[i]	
Marion The Kittansett Club					58[i]	
Spencer Wire Village School					58[i]	
WeatherFlow						
Amelia Dam Height: 17 m			29/1820	37	57	
Carson Beach Height: 15 m			29/1940	44	57	
Chapin Height: 10 m			29/1835	36	51	
Chatham Height: 10 m			29/1820	39	54	
Children's Island Height: 10 m			29/1900	47	59	
Courageous Sailing Center Height: 24 m			29/1835	35	51	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Deer Island Height: 20 m			29/1745	47	57	
Dog Bar Breakwater Height: 16 m			30/0120	38	49	
Dread Ledge Height: 10 m			29/1755	44	54	
Duxbury Height: 13 m			29/2120	44	54	
Duxbury Bay Height: 15 m			29/2010	39	49	
Harvard Bridge Height: 8 m			29/1835	37	52	
Hatch Beach Height: 10 m			29/1915	38	53	
Hatch Beach Height: 10 m			29/1915	38	53	
Kalmus-Hyannis Height: 11 m			29/1925	46	63	
Lewis Wharf Height: 12 m			29/1740	30	44	
Longfellow Bridge Height: 18 m			29/1830	32	49	
Millennium Park Height: 7 m			29/1835	31	47	
North Alston Height: 11 m			29/1745	31	55	
Pleasure Bay Height: 10 m			29/1835	51	64	
Plum Island Height: 16 m			29/1940	35	48	
Revere Beach Height: 10 m			29/1945	47	58	
Sagamore Beach Height: 9 m			29/1825	43	52	
Scituate Height: 10 m			29/2025	43	56	
Squantum Height: 13 m			29/1930	43	57	
Vineyard Haven Height: 10 m			29/1910	39	57	
West Dennis Height: 14 m			29/1940	33	53	
West Falmouth Height: 11 m			29/1914	30	47	
West Island Height: 10 m			29/1935	51	70	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
CWOP						
Wrentham (AT213) 42.04N 71.41W			29/1915	33[i]	67[i]	
Public/Other						
Bridgewater			29/1734		48[i]	
Brookline			29/1954		60[i]	
Cuttyhunk					72[i]	
East Falmouth			29/1800	42[i]	63[i]	
Hyannis 2 NE 41.67N 70.27W					50[i]	
Milford			29/1748		58[i]	
Milton 3 SSW 42.21N 71.11W					51[i]	
Otis 3 SSE 42.16 N 73.05 W			29/2023		53[i]	
Pepperell					52[i]	
Pleasure Bay			29/1900		63[i]	
Plymouth			29/1314	39[i]		
Randolph					52[i]	
Southbridge			29/1915		47[i]	
Wellfleet					70[i]	
Ham Radio						
Barnstable			29/1701		69[i]	
Duxbury Height: 30.5 m					84	
Fairhaven			29/1726		54[i]	
Harwich			29/1410		49[i]	
New Bedford (KD1CY)			29/2000		54[i]	
Marstons Mills			29/2047		79[i]	
Mattapoisett					66[i]	
Wakefield			29/1941		54[i]	
New Hampshire						
ICAO Sites						
Berlin (KBML)			30/0228	19	41	1.92
Concord (KCON)	30/0043	992.2	29/2102	28*	48*	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Jaffrey (KAFN)			29/2055		46	4.82
Laconia (KLCI)	30/0215	993.6	30/0138	25	42	2.10
Manchester (KMHT)			30/0122	33	48	2.17
Mount Washington (KMWN) Elevation: 1910 m			30/0053	92	121	5.29
Nashua (KASH)			29/2251		41	3.54
Portsmouth (KPSM)	30/0155	993.2	29/1955	28	52	1.54
Rochester (KDAW)	30/0130	994.2	29/2000	26	47	2.05
Whitefield (KHIE)	30/0152	996.3	29/2100	20	34	
Marine Observations						
Isle of Shoals C-MAN (IOSN3) 43.97N 70.62W Height: 19 m	30/0100	990.0	29/2000	52	66	
Public/Other						
Clarksville			30/0206		42[i]	
Derry			29/2224		46[i]	
Dover			29/1937		34[i]	
Fremont			29/2206		43[i]	
Gilford			29/2027		35[i]	
Goshen					61[i]	
Hampstead			29/2120		40[i]	
Jackson			29/2114		37[i]	
Kensington			29/2341		36[i]	
Londonberry					54[i]	
Meredith			29/2103		45[i]	
Meredith 4 ENE			29/1919		52[i]	
Newington			30/0055		45[i]	
Newton			29/1944		36[i]	
Vermont						
ICAO Sites						
Barre Knapp State Airport (KMPV)			30/1200		30	
Bennington (KDDH)	29/1954	985.4	30/1046	27	38	
Burlington (KBTV)			30/0324		37	2.64

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Morrisville Airport (KMVL)			30/0419		48	
Newport Airport (KEFK)			29/1955		30	
Rutland Airport (KRUT) – North Clarendon			29/2255		46	
Springfield Airport (KVSF)			29/1954		36	
Public/Other						
Amsden 2 ESE			29/2200		33[i]	
Bolton			29/1849		30[i]	
Corinth Center 2 NNW			30/0415		37[i]	
Danby			30/0156		37[i]	
Derby Center 1 NNE			29/2016		30[i]	
Danby Four Corners 2 SSW			29/2314		35[i]	
Fair Haven 1 WSW			29/2110		32[i]	
Fairfax 2 NNE			30/0504		30[i]	
Jericho			29/1013		42[i]	
Jonesville 1 E			29/2100		30[i]	
Lyndon Center 1 WSW			29/2115		53[i]	
Lyndon State College			30/0459		35[i]	
Ludlow 3 NNE			30/0358		41[i]	
Mendon			29/2140		42[i]	
Mendon 3 ENE			30/1015		34[i]	
Nashville 1 E			29/2303		37[i]	
North Fairfax 1 WNW			29/2245		30[i]	
Richford 1 NW			30/0415		45[i]	
Shrewsbury			30/0057		32[i]	
Shrewsbury 3 ESE			29/2323		38[i]	
Stowe 8 NW					63[i]	
Swanton 5 SSE			29/2356		30[i]	
Thetford Center			29/1831		33[i]	
Underhill					52[i]	
Underhill Center 1 NE			30/1039		44[i]	
Walden 4 N			30/0411		36[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Weatherford			30/1756		36[i]	
West Bolton 1 W			30/0013		42[i]	
Westmore 1 SW			30/0924		31[i]	
Wilder			29/2101		30[i]	
Williston			29/2305		34[i]	
Woodford			29/2041		50[i]	
Wilmington			29/2141		37[i]	
Maine						
ICAO Sites						
Augusta (KAUG)			30/0353	20	38	1.66
Bangor Intl. Airport (KBGR)	30/0553	1003.7	30/0453	22	37	1.41
Bar Harbor Airport (KBHB)			30/0415	23	38	2.06
Greenville Airport (KGNR)	30/0756	1004.4	30/0256	24	38	4.43
Lewiston (KLEW)			30/0335	24	38	
Portland Jetport (KPWM)	30/0251	997.3	29/2351	32	55	1.11
Rockland (KRKD)			30/0255	28	43	
Sanford (KSFM)	30/0215	995.3	29/2018	35	46	
Wiscasset (KIWI)			29/2253	22	39	1.55
Marine Observations						
Bar Harbor NOS (ATGM1) 44.90N 66.99W Height: 7.8 m			30/0718	38	48	
Eastport NOS (PSBM1) 44.90N 66.99W Height: 7.3 m			29/2030	29	39	
Matinicus Rock C-MAN (MISM1) 43.78N 68.87W Height: 23 m	30/0600	998.8	30/0600	48	58	
Mount Desert Rock C-MAN (MDRM1) 43.97N 68.13W Height: 22.6 m	30/0600	1001.6	30/0610	43	53	
Wells NOS (WELM1) 43.32N 70.56W	30/0224	994.0	29/2130	34[i]	47[i]	
Buoy 44005 43.20N 69.13W Height: 5.0 m	30/0058	996.3	29/1950	35	45	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Buoy 44007 43.53N 70.14W Height: 5.0 m	30/0100	995.8	29/2100	35	47	
Buoy 44027 442.7N 67.31W Height: 5.0 m	30/0550	1004.3	29/1650	29	35	
Buoy 44021 NERACOOS 43.76N 69.98W Height: 4.0 m			29/2300		44	
Buoy 44030 NERACOOS 43.18N 70.42W Height: 4.0 m	30/0210	993.2	29/2040	36	44	
Buoy 44032 NERACOOS 43.72N 69.36W Height: 4.0 m	30/0350	998.4	30/0400	33	43	
Buoy 44033 NERACOOS 44.06N 69.00W Height: 4.0 m			30/0320	30	42	
Buoy 44034 NERACOOS 44.11N 68.11W Height: 4.0 m	31/2004	998.9	29/1804	29	40	
Buoy 44037 NERACOOS 43.48N 67.88W Height: 4.0 m			30/0220	35	45	
Public/Other						
Bath					66[i]	
Bristol			29/2210		46[i]	
Freeport			29/2305		35[i]	
WFO Gray			29/2300		48[i]	
Georgetown			29/2039		42[i]	
Harpswell 3 S			29/2300		44[i]	
Kennebunk 2 NE					54[i]	
Lewiston 2 E			30/0214		41[i]	
Rangeley			30/0024		38[i]	
Saco			29/2009		51[i]	
South Bristol			29/2320		50[i]	
Springvale			29/2128		41[i]	
Thomaston			29/1957		36[i]	
Wells			29/1900		40[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Ohio						
ICAO Sites						
Akron-Canton (KCAK)			30/0434		43	
Akron-Fulton (KAKR)			30/0840		43	
Ashtabula Co. (KHZY)			30/0103		42	5.08
Bolton Field Airport (KTZR)			30/0735		35	
Burke Lakefront (KBKL)			30/0125		58	
Butler County Regional Airport (KHAO)			30/0554		39	
Chillicothe Ross County Airport (KRZT)			30/0551		35	
Cincinnati – Lunken Field (KLUK)			30/0553		35	
Cleveland Hopkins (KCLE)			30/0325	53	59	5.63
Columbus OSU Airport (KOSU)			30/0727		40	
Cox Dayton Intl. (KDAY)			30/0356		40	
Darke County Airport (KVES)			30/0355		34	
Defiance Memorial Airport (KDFI)			29/2254		35	
Dayton-Weight Brothers Airport (KMGV)			30/0303		39	
Delaware Municipal Airport (KDPZ)			30/0817		39	
Erie Intl. Airport (KERI)			30/1009		45	
Fairfield County Airport (KLHQ)			30/0241		36	
Findlay Airport (KFDY)			30/0149		41	
Lebanon Warren County (KI68)			30/0414		36	
Lima Allen County Airport (KAOH)			30/0537		40	
Lorain Co. Airport (KLPR)			30/0545		55	
Mansfield-Lahm (KMFD)			30/0640		40	
Marion Airport (KMNN)			30/1453		36	
Middletown Hook Field Municipal Airport (KMWO)			30/0657		34	
Newark-Heath Airport (KVTA)			30/0846		37	
Port Columbus Intl. Airport (KCMH)			30/1051		38	
Port Meadville (KGKJ)			30/0318		40	
Rickenbacker Intl. Airport (KLCK)			30/0515		36	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Sidney Municipal Airport (KI12)			30/0459		35	
Springfield-Beckley Municipal Airport (KSGH)			30/0441		38	
Toledo Executive (KTDZ)			30/0248		40	
Toledo Express (KTDL)			30/0340		43	
Union County Airport (KMRT)			30/0834		35	
Wapakoneta Neil Armstrong Airport (KAXV)			30/0334		37	
Wayne Co. Airport (KBJJ)			30/0758		43	
Washington Courthouse Airport – Fayette County (KI23)			30/0759		34	
Wilmington Air Park (KILN)			30/0146		41	
Wright-Patternson Air Force Base (KFFO)			30/0157		36	
Youngstown-Warren Airport (KYNG)			30/0626		40	3.62
Marine Observations						
Cleveland NOS (CNDO1) 41.54N 81.64W Height: 7.8 m	30/1218	990.0	30/0206	48	59	
Conneaut Breakwater Light (CBLO1) 41.98N 80.56W Height: 11.8 m	30/0921	983.4	30/0340	43	53	
South Bass Island C-MAN (SBIO1) 41.63 N 82.84 W Height: 22 m	30/1400	993.3	30/0800	47[f]	59	
Huron Light (HHLO1) 41.40 N 82.55 W Height: 9.7 m			30/0300		54	
Fairport NOS (FAIO1) 41.76N 81.28W	30/1154	988.4	30/0518	49[i]	58[i]	
Marblehead NOS (MRHO1) 41.55N 82.73W	30/1436	994.1	30/0230	39[i]	51[i]	
Geneva on the Lake (GELO1) 41.86 N 80.97 W Height: 8 m			30/0520		50[i]	
Toledo NOS (THRO1) 41.69N 83.47W	30/1730	996.6	30/0830	24[i]	38[i]	
Toledo Light #2 NOAA/GLERL (THLO1) 41.83N 83.19W Height: 14.9 m			30/0030	39	48	
Public/Other						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Arctic 3 SSE			30/0630		36[i]	
Assumption 1 S			30/0400		39[i]	
Bellefontaine 1 NE			30/1032		34[i]	
Belmore 1 N			29/0320		35[i]	
Bowersville 1 ESE			30/0503		36[i]	
Centerville 2 ENE			29/2322		36[i]	
Delaware 3 NNW			30/0900		36[i]	
Dublin 2 N			30/0603		34[i]	
Five Points 4 SSW			30/0517		34[i]	
Fort Thomas 2 SE			30/0431		36[i]	
Georgetown 1 ESE			30/0601		35[i]	
Grove City 2 ENE			30/0450		35[i]	
Huber Ridge 3 E			30/0721		36[i]	
Kenton 1 SSW			30/0132		36[i]	
Kettering			30/0340		35[i]	
Liberty Center 4 SW			30/0400		37[i]	
Morenci 3 SSW			30/1050		36[i]	
New Bavaria 3 SE			30/0410		35[i]	
New Paris 2 SW			30/0341		36[i]	
Ney 2 W			30/0603		36[i]	
Park Layne 2 SW			30/0441		37[i]	
Pioneer 3 SSW			30/0440		38[i]	
Potsdam 3 WSW			30/0303		35[i]	
Springboro 2 N			29/2202		35[i]	
Vandalia 1 SSE			30/0522		35[i]	
Wauseon 2 SW			30/2103		50[i]	
Withamsville 2 NE			30/0530		46[i]	
Worthington 2 ENE			30/0940		42[i]	
Illinois						
ICAO Sites						
Chicago Midway Airport (KMDW)			30/1451		37	
Marine Observations						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Calumet NOS (CMTI2) 41.74N 87.54W Height: 9.1 m			30/1630	27	37	
Chicago, IL NOAA/GRERL (CHII2) 42.00N 87.50W Height: 25.9 m			30/1700	40	49	
Waukegan Harbor, IL (WHRI2) 42.36N 87.81W Height: 9.0 m			30/1432		36	
Chicago Harrison-Dever Crib Height: 26 m			30/1230		50	
4 NE East Chicago (unknown ship)			30/0900		47	
Public/Other						
Burnham 2 WNW			30/0500		41	
Chicago 2 W			30/1618		37	
Lakemoor 2 E			30/1135		38	
Lockport			30/1500		38	
South Chicago 1 SE			29/0312		36	
South Holland			30/1700		35	
Indiana						
ICAO Sites						
Fort Wayne Intl. Airport (KFWA)			30/0754		35	
Fulton County Airport (KRCR)			30/1015		37	
Galveston Airport (K5I6)			29/0327		38	
Gary Regional Airport (KGYY)			30/1645		52	
Goshen Municipal Airport (KGSH)			29/2204		35	
La Porte Municipal Airport (KPPO)			30/1115		45	
Michigan City-Philips Airport (KMGC)			30/1135		43	
Richmond Municipal Airport (KRID)			30/0648		37	
South Bend Regional Airport (KSBN)			30/1103		46	
Starke County Airport (KOXI)			30/1135		43	
Valparaiso Porter County Municipal Airport (KVPZ)			30/1207		43	
Marine Observations						
Burns Harbor (BHRI13) 41.65N 87.1W			30/1250		45[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Michigan City NOAA/GRERL (MCYI3) 41.73N 86.91W Height: 21.3m	30/1500	1008.1	30/1500	47	59	
Public/Other						
Argos 3 NW			30/0818		36[i]	
East Chicago			30/0542		39[i]	
East Chicago 1 WSW			30/0625		36[i]	
Hobart 2 SE			30/1216		38[i]	
Huntington 4 SSW			30/0901		35[i]	
Mentone 2 W			30/0838		35[i]	
Michigan City 1 W			30/0741		38[i]	
New Carlisle 3 S			30/1037		37[i]	
New Chicago 1 WNW			30/0643		44[i]	
Town of Pines 2 NNE					60[i]	
Upland 3 NW Elevation: 271 m			30/0832		35[i]	
Valparaiso 2 SW			30/1132		43[i]	
Waterford 2 WSW			30/1143		42[i]	
Michigan						
ICAO Sites						
Adrian (KADG)			30/0232		42	
Ann Arbor (KARB)			30/0748		40	
Bad Axe (KBAX)			30/0353		42	
Caro (KCFS)			30/0254		38	
Detroit City Airport (KDET)			30/1218		42	
Detroit Metropolitan Airport (KDTW)			30/0205		40	
Flint (KFNT)			30/0216		38	
Grand Rapids Airport (KGRR)					35	
Gross Ille (KONZ)			30/0214		41	
Hillsdale Municipal Airport (KJYM)			29/0254		36	
Howell (KOZW)			30/0354		44	
Kalamazoo Battle Creek Airport (KAZO)					31	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Lansing/Capital City Airport (KLAN)					34	
Ludington Mason County Airport (KLDM)					40	
Mackinac Island (KMCD)			30/0413		40	
Monroe (KTTF)			30/0233		40	
Muskegon Airport (KMKG)					40	
Phelps Collins Field (KAPX)			30/1054		41	
Pontiac (KPTK)			30/0036		41	
Port Hope (KP58) Elevation: 180 m			30/0229		49	
Port Huron (KPHN)			30/0600		41	
Saginaw (KMBS)			30/0312		34	
Southwest Michigan Airport (KBEH)			30/0400		39	
Marine Observations						
Big Bay (BIGM4) 46.83N 87.73W Height: 10.0 m			30/1603	28	36	
Big Sable Point (BSBM4) 44.06N 86.51W Height: 10.0 m			30/1240	34	45	
DeTour Village NOS (DTLM4) 45.99N 83.90W Height: 11.7 m			30/1236	32	38	
Fairport (FPTM4) 45.62N 86.66W Height: 10.1 m			30/1730		34	
Ft. Gratoit NOS (FTGM4) 43.01N 82.42W Height: 27.4 m	30/1830	995.3	30/0636	56	65	
Grand Marais (GRMM4) 46.68N 85.97W Height: 9.1 m			30/0910	37	44	
Grand Traverse Light (GTLM4) 45.21N 85.55W Height: 16.0 m			30/1000	36	46	
Gravelly Shoals Light (GSLM4) 44.02N 83.54W Height: 24.7 m	30/1840	1000.0	30/0638	38	47	
Harbor Beach NOS (HRBM4) 43.85N 82.64W Height: 9.1 m	30/1854	997.6	30/0824	43	52	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Holland NOS (HLNM4) 42.77N 86.21W Height: 10.0 m			30/0712	36	42	
Ludington NOS (LDTM4) 43.95N 86.44W			30/1748		38[i]	
Mackinaw City NOS (MACM4) 45.78N 84.73W Height: 10.4 m			30/0724	26	37	
Manistee Harbor (MEEM4) 44.25N 86.35W Height: 10.0 m			30/1120	39	50	
Menominee NOS (MNMM4) 45.10N 87.59W Height: 6.6 m			30/1454	33	41	
Muskegon NOAA/GLERL (MKGM4) 43.23N 86.34W Height: 24.4 m			30/1400	27	38	
Naubinway (NABM4) 46.09N 85.44W Height: 10.1 m			30/1515		41	
Port Inland NOS (PNLM4) 45.97N 85.87W Height:10.2 m			30/1512	27	38	
Port Sanilac (PSCM4) 43.42N 82.54W Height: 10.0 m	30/2010	995.3	30/0910	48	58	
Presque Isle Light (PRIM4) 45.36N 83.49W Height: 33.5 m			30/1306		51	
Rock of Ages C-MAN (ROAM4) 47.87N 89.31W Height: 46.9 m			30/1530	31[f]	35	
Saginaw Bay Light #1 (SBLM4) 43.81N 83.72W Height: 12.5 m	31/0530	995.3	30/0620	40	47	
St. Clair Shores (CLSM4) 42.47N 82.88W	30/1710	995.6	30/1230	29[i]	42[i]	
South Haven C-MAN (SVNM4) 42.40N 86.29W Height: 16.8 m					57	
Stannard Rock C-MAN (STDM4) 47.18N 87.23W Height: 35.2 m			30/2100	39	46	
Sturgeon Point Light (SPTM4) 44.71N 83.73W Height: 22.5 m			30/0408		52	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Thunder Bay Island NOAA/GLERL (TBIM4) 45.04N 83.19W			30.0900	29	44[i]	
Public/Other						
Bayshore 4 W			30/1201		47[i]	
Benzonia 2 S			30/1935		44[i]	
Berrien Springs			30/1500		34[i]	
Cadillac 2 E			30/0750		39[i]	
Lakeport 3 WSW			30/0400		43[i]	
Mount Clemens			30/0355		45[i]	
Rochester Hills			30/0439		43[i]	
Rudyard 4 SE			30/1150		43[i]	
St. Joseph Elevation: 183 m			30/1100		50	
Toledo Harbor					57[i]	
West Branch 2 SSE			30/1230		44[i]	
Ypsilanti			29/2325		43[i]	
Wisconsin						
ICAO Sites						
Door County-Cherryland Airport (KSUE)			30/1055		40	
Green Bay (KGRB)			30/1453		34	
Manitowac County Airport (KMTW)			30/0415		35	
Marine Observations						
Algona City (AGMW3) 44.61N 87.43W Height: 9.1 m			30/1811		41	
Chambers Island, WI (CBRW3) 45.20N 87.36W Height: 10.0 m			30/2100	34	42	
Death's Door, WI (NPDW3) 45.29N 86.98W Height: 10.0 m			30/2330	37	44	
Kenosha, WI (KNSW3) 42.59N 87.81W Height: 19.5 m			30/1350	30	38	
Kewaunee NOS (KWNW3) 44.47N 87.50W			30/1818		37[i]	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Sheboygan, WI (SGNW3) 43.75N 87.69W			30/1400	35[i]	46[i]	
Sister Bay, WI (SYWW3) 45.20N 87.12W Height: 3.0 m			30/2244	42	52	
APRS/Public/Other						
Sister Bay 2 NNW (APRS) Elevation: 180 m			30/2144		48[i]	
Great Lakes Buoys						
Buoy 45002 45.34 N 86.41 W Height: 5.0 m	31/1950	1005.5	30/1100	34[e]	43	
Buoy 45003 45.35 N 82.84 W Height: 3.2 m	30/1850	999.8	30/1130	36[e]	45	
Buoy 45004 47.58N 86.59W Height: 5.0 m			31/0250	29	36	
Buoy 45005 41.68 N 82.40 W Height: 5.0 m	30/1150	990.6	30/0720	39[f]	52[e]	
Buoy 45007 42.67 N 87.03 W Height: 5.0 m	31/0750	1006.2	30/1040	38[e]	48[e]	
Buoy 45008 44.28 N 82.42 W Height: 5.0 m	30/1950	997.1	30/0700	39[f]	49[e]	
Buoy 45012 43.62 N 77.42 W Height: 5.0 m	30/0450	985.6	30/0240	37[f]	48	
Kentucky						
ICAO Sites						
Cincinnati/Northern Kentucky Intl. Airport (KCVG)			30/0653		39	
Falmouth Gene Snyder Airport (KK62)			30/0104		42	
Wilder 1 SSE (KYMN)			30/0330		36[i]	
Public/Other						
Park Hills 1 NNE			30/0640		36[i]	
Canada						
Quebec						
ICAO Sites						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Beauport (CXBO)					43[i]	
Cap Rouge (CWQM)			30/0656		42[i]	
Quebec St. Francois (Orléans) (CWER)			30/0608		51[i]	
WeatherFlow						
La Baie Elevation: 10 m			30/0615	32[i]	40[i]	
St. Laurent d'Orléans Elevation: 12 m			29/2335	35[i]	45[i]	
St. Mathias Elevation: 52 m			30/0145	43[i]	42[i]	
Vaudreuil Elevation: 11 m			30/0435	32[i]	40[i]	
Quebec St. Francois (Orléans)			30/0608		51[i]	
Bois–Francis (St. Germaine)					43[i]	
Montréal (Laval)					47[i]	
Ontario						
ICAO Sites						
Burlington Pier (CWWB)			30/0355		51[i]	
Kitchener Waterloo-Wellington (CYKF)			30/0100		47[i]	
London Airport (CXYU)			30/0100		43[i]	
Oshawa (CYOO)					43[i]	
Point Petre (CWQP)			30/0416		50[i]	
Port Weller (CWWZ)			30/0615		44[i]	
Ridgetown (CXRG)					43[i]	
Sarnia (CZYR)			30/1118	42[i]	55[i]	
Toronto Island (CYTZ)			30/0616		49[i]	
Toronto Pearson Intl. (CYYZ)			30/0426		43[i]	
Western Island (CWMZ)			30/0729		58[i]	
WeatherFlow						
Belle River Elevation: 12 m			30/0725	47	57	
Hamilton Harbor Elevation: 10 m			30/0000	33	48	
Rondeau Bay Elevation: 15 m			30/0715	40	56	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)	
Sunset Point Elevation: 8 m			30/0145	33	38	
Public/Other						
Stoney Creek			30/0415		52[i]	
Buoys						
Buoy 44150 (Atlantic) 42.51N 64.02W Height: 5.0 m	29/2120	1007.0*	30/2220	29*	36*	
Buoy 45132 (Lake Erie) 42.47N 81.22W Height: 5.0 m			30/0431	35*	41*	
Buoy 45135 (Lake Ontario) 43.79N 76.87W Height: 5.0 m			30/0030	39*	49*	
Buoy 45136 (Lake Superior) 48.53N 89.95W Height: 5.0 m			30/1335	28*	34*	
Buoy 45137 (Georgian Bay) 45.55N 81.02W Height: 5.0 m			30/0632	39*	49*	
Buoy 45139 (Lake Ontario) 43.26N 79.54W Height 5.0 m			30/0250	33	44	
Buoy 45142 (Lake Erie) 42.74N 79.20W Height: 5.0 m			30/0639		41*	
Buoy 45153 (Georgian Bay) 44.95N 80.63W Height: 5.0 m			30/0351	38*	47*	
Buoy 45149 (Lake Huron) 43.54N 82.08W Height: 5.0 m			30/0402	37*	45*	

[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 ASOS reports are 2 min; buoy averaging period is 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] Storm tide is referenced above Mean Lower Low Water (MLLW). Bold numbers indicate that the maximum recorded water level exceeded historical maximum values.
[e] Anemometer height 5 m.
[f] Wind averaging period 10 min.
[g] Sensor reached physical limit on measurements and did not record a maximum value.
[h] Maximum storm tide/storm surge likely includes effects from freshwater runoff.
[i] station has unknown elevation
[j] Wind averaging period 1 min.
[*] incomplete record

Table 4. All-time minimum surface pressures listed by station set during Sandy.

Location	Minimum pressure in mb and (inches)
Atlantic City, NJ (ACY)	948.5 (28.01)
Philadelphia, PA (PHL)	952.2 (28.12)
Trenton, NJ (TTN)	958.7 (28.31)
Harrisburg, PA (MDT)	963.8 (28.46)
Baltimore, MD (BWI)	964.8 (28.49)
Scranton, PA (AVP)	971.6 (28.69)

Table 5. National Ocean Service (NOS) Tide Gauges, and United State Geological Survey (USGS) High-Water Marks and Storm Tide Pressure Sensors during Sandy.

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
National Ocean Service (NOS) Tide Gauges			
Maine			
Eastport (PSBM1 - 8410140) (44.90N 66.98W)	2.21	10.71	1.38
Cutler Farris Wharf (CFWM1 - 8411060) (44.66N 67.21W)	2.50		1.67
Bar Harbor (ATGM1 - 8413320) (44.39N 68.21W)	2.26		1.37
Portland (CASM1 - 8418150) (43.66N 70.25W)	3.27	6.65	1.99
Wells (WELM1 - 8419317) (43.32N 70.56W)	3.53		1.88
New Hampshire			
Fort Point (8423898) (43.07N 70.71W)	3.32	6.41	2.00
Massachusetts			
Boston (BHBM3 - 8443970) (42.35N 71.05W)	4.57	7.42	2.64
Fall River (FRVM3 - 8447386) (41.70N 71.16W)	5.50		4.18[R]
Chatham (8447435) (41.69N 69.95W)	4.20	5.87	2.85
Woods Hole (BZBM3 - 8447930) (41.52N 70.67W)	5.07	4.44	3.60
Nantucket Island (NTKM3 - 8449130) (41.29N 70.10W)	3.90		2.40
Rhode Island			
Newport (NWPR1 - 8452660) (41.51N 71.33W)	5.34	6.13	4.32
Conimicut Light (CPTR1 - 8452944) (41.72N 71.34W)	5.89		4.48[R]
Providence (FOXR1 - 8454000) (41.81N 71.40W)	6.20	6.89	4.52

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Quonset Point[I] (QPTR1 - 8454049) (41.59N 71.41W)	5.16		2.61
Connecticut			
New London (NLNC3 - 8461490) (41.36N 72.09W)	6.50	6.16	4.95
New Haven (NWHC3 - 8465705) (41.28N 72.91W)	9.14		5.54[R]
Bridgeport (BRHC3 - 8467150) (41.17N 73.18W)	9.83	9.30	5.82[R]
New York			
Montauk (MTKN6 - 8510560) (41.05N 71.96W)	5.89	5.55	4.59
Kings Point (KPTN6 - 8516945) (40.81N 73.76W)	12.65		6.51[R]
The Battery (BATN6 - 8518750) (40.70N 74.01W)	9.40	11.28	9.00[R]
Bergen Point West Reach (BGNN4 - 8519483) (40.64N 74.14W)	9.56		9.53[R]
New Jersey			
Sandy Hook[I] (SDHN4 - 8531680) (40.47N 74.01W)	8.57	10.42	8.01[R]
Atlantic City (ACYN4 - 8534720) (39.36N 74.42W)	5.82	6.28	4.29
Cape May (CMAN4 - 8536110) (38.97N 74.96W)	5.16	5.89	3.46[R]
Ship John Shoal (SJSN4 - 8537121) (39.31N 75.38W)	5.30		
Tacony-Palmyra Bridge (TPBN4 - 8538886) (40.01N 75.04W)	6.11		3.76
Burlington, Delaware River (BDRN4 - 8539094) (40.08N 74.87W)	6.29		3.84
Pennsylvania			
Marcus Hook (MRCP1 - 8540433) (39.81N 75.41W)	6.26		4.03[R]
Philadelphia (PHBP1 - 8545240) (39.93N 75.14W)	5.83	7.52	3.93[R]
Newbold (NBLP1 – 8548989) (40.14N 74.75W)	6.42		3.88
Delaware			
Delaware City (DELD1 - 8551762) (39.58N 75.59W)	5.99		3.74[R]
Reedy Point (RDYD1 - 8551910) (39.56N 75.57W)	5.80	6.13	3.26
Brandywine Shoal Light[I] (BRND1 - 8555889) (38.99N 75.11W)	4.22		
Lewes (LWSD1 - 8557380) (38.78N 75.12W)	5.34	6.08	4.05
Maryland			
Ocean City Inlet (OCIM2 - 8570283) (38.33N 75.09W)	4.33	4.42	3.59
Bishops Head (BISM2 - 8571421) (38.22N 76.04W)	3.10	3.05	2.25[R]
Cambridge (CAMM2 - 8571892) (38.57N 76.07W)	3.24	3.44	2.51
Tolchester Beach (TCBM2 - 8573364) (39.21N 76.25W)	3.54		3.06
Chesapeake City (CHCM2 - 8573927) (39.53N 75.81W)	4.88		2.72

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Baltimore (BLTM2 - 8574680) (39.27N 76.58W)	3.69	3.83	3.00
Annapolis (APAM2 - 8575512) (38.98N 76.48W)	3.35	3.11	2.45
Solomons Island[I] (SLIM2 - 8577330) (38.32N 76.45W)	2.57	2.08	1.45
District of Colombia			
Washington (WASD2 - 8594900) (38.87N 77.02W)	4.03	4.72	2.94
Virginia			
Wachapreague (WAHV2 - 8631044) (37.61N 75.69W)	4.95		3.88
Kiptopeke (KPTV2 - 8632200) (37.17N 75.99W)	3.76	4.92	3.89
Lewisetta (LWTV2 - 8635750) (38.00N 76.46W)	2.46	2.92	2.25
Windmill Point (8636580) (37.62N 76.29W)	2.77		2.99
Yorktown USCG Training Center (YKTV2 - 8637689) (37.23N 76.48W)	3.86		3.44
Sewells Point (SWPV2 - 8638610) (36.95N 76.33W)	4.57	5.17	4.05
Chesapeake Bay Bridge Tunnel (CBBV2 - 8638863) (36.97N 76.11W)	4.36		
Money Point (MNPV2 - 8639348) (36.78N 76.30W)	4.79		4.08
North Carolina			
Duck[I] (DUKN7 - 8651370) (36.18N 75.75W)	4.16	4.79	3.29
Oregon Inlet Marina (ORIN7 - 8652587) (35.80N 75.55W)	3.62	3.59	3.11
USCG Station Hatteras (HCGN7 - 8654467) (35.21N 75.70W)	4.00		4.15[R]
Beaufort (BFTN7 - 8656483) (34.72N 76.67W)	1.90		1.82
Wilmington (8658120) (34.23N 77.95W)	1.84		1.23
Wrightsville Beach (JMPN7 - 8658163) (34.21N 77.79W)	2.25	3.85	2.09
South Carolina			
Springmaid Pier (MROS1 - 8661070) (33.66N 78.92W)	2.02	3.95	1.51
Oyster Landing (N. Inlet Estuary) (8662245) (33.35N 79.19W)	2.91	3.92	1.51
Charleston (8665530) (32.78N 79.93W)	2.39	4.20	1.57
Clarendon Plantation (8667633) (32.50N 80.78W)	3.55		1.40
Georgia			
Fort Pulaski (FPKG1 - 8670870) (32.03N 80.90W)	2.89	4.98	1.53
Florida			
Fernandina Beach (FRDF1 - 8720030) (30.67N 81.47W)	2.95	4.24	1.50
Mayport (Bar Pilots Dock) (8720218) (30.40N 81.43W)	2.53	3.59	1.64

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
I-295 Bridge, St. Johns River (8720357) (30.19N 81.69W)	1.86	2.19	1.64
Trident Pier (TRDF1 - 8721604) (28.42N 80.59W)	2.49	3.77	2.72
Lake Worth Pier (LKWF1 - 8722670) (26.61N 80.03W)	2.29	2.84	2.29[R]
Virginia Key (VAKF1 - 8723214) (25.73N 80.16W)	1.61	2.17	1.96
Vaca Key (VCAF1 - 8723970) (24.71N 81.11W)	1.70	1.38	1.73
Key West (KYWF1 - 8724580) (24.56N 81.81W)	0.93	1.29	1.24
US Geological Survey (USGS) High-Water Marks			
Virginia			
Accomack County			
Parksley (VA-ACC-054) (37.79N 75.71W)		6.2	2.3
Wachapreague (VA-ACC-002) (37.61N 75.69W)		5.8	2.0
Sanford (VA-ACC-051) (37.93N 75.66W)		6.0	1.7
Sanford (VA-ACC-052) (37.93N 75.66W)		5.9	1.7
Chincoteague Island (VA-ACC-001) (37.94N 75.35W)		4.0	1.5
Harborton (VA-ACC-057) (37.67N 75.83W)		5.0	1.2
Onanock (VA-ACC-055) (37.72N 75.79W)		5.1	0.8
Gloucester County			
Hayes (VA-GLO-001) (37.28N 76.40W)		4.5	1.2
Hayes (VA-GLO-002) (37.28N 76.40W)		4.6	1.0
Mathews County			
Port Haywood (VA-MAT-003) (37.32N 76.27W)		4.6	1.8
Port Haywood (VA-MAT-004) (37.32N 76.27W)		4.7	0.8
Moon (VA-MAT-002) (37.45N 76.28W)		3.5	0.8
Moon (VA-MAT-001) (37.45N 76.28W)		3.5	0.5
Northampton County			
Franktown (VA-NOR-002) (37.48N 75.93W)		4.3	3.0
Virginia Beach County			
Virginia Beach (VA-VAB-001) (36.70N 75.93W)		7.9	1.0
Virginia Beach (VA-VAB-002) (36.74N 75.94W)		8.7	1.0
New Jersey			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Cape May County			
Avalon (NJ-CPM-008) (39.10N 74.72W)		6.9	2.9
Cape May Court House (NJ-CPM-004) (39.08N 74.80W)		6.9	2.0
Sea Isle City (NJ-CPM-006) (39.06N 74.66W)		6.8	1.4
Avalon (NJ-CPM-007) (39.08N 74.74W)		7.8	1.2
Cape May Court House (NJ-CPM-234) (39.12N 74.89W)		6.7	0.9
Stone Harbor (NJ-CPM-005) (39.06N 74.77W)		6.7	0.3
Atlantic County			
Atlantic City (NJ-ATL-103) (39.37N 74.42W)		7.7	3.8
Absecon (NJ-ATL-102) (39.40N 74.49W)		7.5	3.0
Absecon (NJ-ATL-100) (39.43N 74.52W)		7.6	2.4
Brigantine (NJ-ATL-107) (39.42N 74.36W)		8.0	2.4
Hammonton (NJ-ATL-232) (39.62N 74.62W)		7.4	2.4
Atlantic City (NJ-ATL-302) (39.35N 74.46W)		7.7	2.3
Brigantine (NJ-ATL-108) (39.41N 74.37W)		7.8	2.1
Atlantic City (NJ-ATL-300) (39.36N 74.45W)		7.3	2.0
Brigantine (NJ-ATL-105) (39.39N 74.40W)		7.6	1.9
Brigantine (NJ-ATL-106) (39.38N 74.41W)		7.8	1.9
Longport (NJ-ATL-305) (39.30N 74.54W)		8.4	1.8
Ventnor City (NJ-ATL-303) (40.33N 74.03)		6.9	1.7
Longport (NJ-ATL-304) (39.30N 74.54W)		8.3	1.3
Ocean City (NJ-ATL-306) (39.28N 74.57W)		8.5	0.7
Burlington County			
Hammonton (NJ-BUR-233) (39.64N 74.65W)		7.5	4.0
Ocean County			
Tuckerton (NJ-OCE-386) (39.60N 74.34W)		8.0	4.9
Tuckerton (NJ-OCE-390) (39.58N 74.33W)		7.8	4.8
Seaside Park (NJ-OCE-330) (39.92N 74.08W)		6.2	4.4
Long Beach (NJ-OCE-375) (39.58N 74.23W)		7.4	4.3
Little Egg Harbor Township (NJ-OCE-394) (39.55N 74.37W)		8.5	4.2
Manahawkin (NJ-OCE-382) (39.67N 74.22W)		7.5	4.1
Seaside Park (NJ-OCE-328) (39.91N 74.08W)		6.3	3.9

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Bay Head (NJ-OCE-228) (40.07N 74.04W)		6.8	3.5
Little Egg Harbor Township (NJ-OCE-392) (39.59N 74.35W)		7.9	3.2
Ocean Gate (NJ-OCE-323) (39.93N 74.14W)		6.5	3.1
Lavallette (NJ-OCE-332) (39.99N 74.07W)		6.9	2.8
Seaside Heights (NJ-OCE-334) (39.96N 74.07W)		8.7	2.8
Bayville (NJ-OCE-314) (39.91N 74.13W)		5.3	2.4
Mantoloking (NJ-OCE-336) (40.04N 74.05W)		7.0	2.3
Harvey Cedars (NJ-OCE-373) (39.61N 74.21W)		7.7	2.3
Brick (NJ-OCE-347) (40.06N 74.09W)		7.1	2.0
Borough of Point Pleasant (NJ-OCE-229) (40.07N 74.06W)		6.4	1.9
Long Beach (NJ-OCE-377) (39.54N 74.26W)		7.9	1.9
Harvey Cedars (NJ-OCE-319) (39.71N 74.14W)		5.2	1.8
Ship Bottom (NJ-OCE-371) (39.64N 74.19W)		5.5	1.7
West Creek (NJ-OCE-384) (39.64N 74.30W)		4.9	1.3
Surf City (NJ-OCE-379) (39.67N 74.16W)		5.6	1.2
Barnegat Light (NJ-OCE-321) (39.76N 74.11W)		5.3	0.8
Barnegat Township (NJ-OCE-303) (39.77N 74.20W)		4.4	0.7
Forked River (NJ-OCE-309) (39.83N 74.18W)		5.8	0.6
Waretown (NJ-OCE-306) (39.79N 74.18W)		7.3	0.2
Monmouth County			
USCG Station, Gateway National Recreation Area, Sandy Hook (NJ-MON-124) (40.47N 74.01W)		11.6	8.9
Keyport (NJ-MON-220) (40.45N 74.22W)		13.4	6.0
Keyport (NJ-MON-218) (40.45N 74.21W)		14.5	5.7
Union Beach (NJ-MON-217) (40.45N 74.16W)		13.0	5.6
Highlands (NJ-MON-205) (40.40N 73.98W)		11.0	5.5
Keyport (NJ-MON-219) (40.45N 74.21W)		14.5	5.5
Brielle (NJ-MON-363) (40.11N 74.05W)		9.3	5.5
Rumson (NJ-MON-119) (40.38N 74.01W)		10.9	5.2
Highlands (NJ-MON-204) (40.40N 73.98W)		11.1	5.2
Sea Bright (NJ-MON-122) (40.37N 73.97W)		10.6	5.1
Union Beach (NJ-MON-116) (40.45N 74.17W)		12.5	5.0

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Highlands (NJ-MON-202) (40.40N 73.99W)		11.0	4.8
Highlands (NJ-MON-206) (40.40N 73.98W)		10.6	4.8
Sea Bright (NJ-MON-207) (40.36N 73.97W)		10.0	4.7
Sea Bright (NJ-MON-208) (40.36N 73.97W)		10.2	4.5
Highlands (NJ-MON-203) (40.40N 73.98W)		10.9	4.3
Sea Bright (NJ-MON-209) (40.36N 73.97W)		10.1	4.1
Monmouth Beach (NJ-MON-314) (40.34N 73.98W)		9.5	4.1
Sea Bright (NJ-MON-123) (40.40N 73.98W)		10.9	4.0
Union Beach (NJ-MON-216) (40.44N 74.16W)		12.0	3.9
Little Silver (NJ-MON-316) (40.33N 74.03W)		9.7	3.3
Keansburg (NJ-MON-214) (40.44N 74.14W)		5.2	2.6
Keansburg (NJ-MON-215) (40.45N 74.15W)		5.1	2.5
Atlantic Highlands (NJ-MON-210) (40.42N 74.04W)		11.7	2.2
Port Monmouth (NJ-MON-211) (40.42N 74.10W)		9.6	2.2
Port Monmouth (NJ-MON-213) (40.43N 74.11W)		11.7	2.0
Long Branch (NJ-MON-315) (40.31N 74.00W)		9.6	2.0
Little Silver (NJ-MON-317) (40.33N 74.03W)		9.7	1.8
Keyport (NJ-MON-223) (40.44N 74.23W)		13.0	1.7
Point Pleasant Beach (NJ-MON-365) (40.10N 74.05W)		8.7	1.4
Oceanport (NJ-MON-121) (40.31N 74.01W)		9.6	1.3
Keansburg (NJ-MON-117) (40.45N 74.14W)		5.1	0.9
Leonardo (NJ-MON-212) (40.42N 74.06W)		11.7	0.4
Middlesex County			
Laurence Harbor (NJ-MID-408) (40.44N 74.23W)		12.8	7.9
Sayreville (NJ-MID-402) (40.48N 74.35W)		13.3	7.7
Perth Amboy (NJ-MID-404) (40.50N 74.28W)		13.6	4.4
South Amboy (NJ-MID-405) (40.49N 74.28W)		13.3	3.8
Perth Amboy (NJ-MID-205) (40.51N 74.26W)		12.7	3.7
Perth Amboy (NJ-MID-206) (40.54N 74.26W)		12.5	1.6
Carteret (NJ-MID-210) (40.57N 74.22W)		12.3	1.4
Perth Amboy (NJ-MID-204) (40.51N 74.29W)		12.9	1.1
Carteret (NJ-MID-150) (40.60N 74.24W)		12.2	0.7

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Union County			
Linden (NJ-UNI-209) (40.60N 74.21W)		12.1	5.7
Elizabeth (NJ-UNI-208) (40.66N 74.21W)		11.9	5.0
Elizabeth (NJ-UNI-207) (40.64N 74.20W)		11.7	2.8
Essex County			
Newark (NJ-ESS-102) (40.71N 74.13W)		11.6	3.5
Hudson County			
Weehawken (NJ-HUD-001) (40.76N 74.03W)		9.4	6.5
Weehawken (NJ-HUD-002) (40.76N 74.03W)		9.4	6.5
Weekawken (NJ-HUD-003) (40.76N 74.03W)		9.4	6.5
Weehawken (NJ-HUD-004) (40.76N 74.03W)		12.0	6.0
Weehawken (NJ-HUD-005) (40.76N 74.03W)		12.0	6.0
Weehawken (NJ-HUD-006) (40.76N 74.03W)		12.0	6.0
Hoboken (NJ-HUD-110) (40.74N 74.03W)		10.6	5.6
Jersey City (NJ-HUD-109) (40.72N 74.03W)		10.4	4.1
Weehawken (NJ-HUD-008) (40.76N 74.02W)		10.1	2.5
Hoboken (NJ-HUD-009) (40.74N 74.02W)		10.7	2.5
Weehawken (NJ-HUD-007) (40.76N 74.02W)		10.3	2.4
West New York (NJ-HUD-421) (40.78N 74.00W)		10.1	2.3
Bayonne (NJ-HUD-104) (40.65N 74.13W)		11.6	2.2
Jersey City (NJ-HUD-103) (40.73N 74.09W)		11.0	1.9
Weehawken (NJ-HUD-420) (40.76N 74.02W)		10.3	1.1
North Bergen (NJ-HUD-422) (40.80N 73.99W)		9.8	1.1
Hoboken (NJ-HUD-010) (40.74N 74.03W)		10.5	0.8
Bergen County			
Edgewater (NJ-BER-415) (40.84N 73.97W)		9.4	3.8
Hackensack (NJ-BER-413) (40.88N 74.04W)		8.2	3.5
Moonachie (NJ-BER-416) (40.84N 74.04W)		7.4	2.5
Kearny (NJ-BER-417) (40.79N 74.15W)		11.8	1.5
Edgewater (NJ-BER-423) (40.82N 73.98W)		9.5	0.3
New York			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Richmond County (Staten Island)			
Oakwood (NY-RIC-718) (40.56N 74.12W)		12.5	7.9
Tottenville (NY-RIC-703) (40.50N 74.24W)		13.2	5.5
Dongan Hills (NY-RIC-701) (40.58N 74.10W)		12.5	4.7
Arrochar (NY-RIC-719) (40.59N 74.07W)		12.7	2.5
Prince's Bay (NY-RIC-716) (40.51N 74.21W)		13.1	1.0
New York County (Manhattan)			
Financial District (Battery Park) (NY-NEW-101) (40.70N 74.02W)		11.4	5.5
One World Trade Center, Financial District (NY-NEW-127) (40.71N 74.01W)		9.7	4.7
Financial District (Pier 11 Wall St.) (NY-NEW-104) (40.70N 74.01W)		11.3	4.5
Battery Park City (NY-NEW-126) (40.72N 74.01W)		9.8	4.3
Randall's Island (NY-NEW-981) (40.80N 73.93W)		10.3	3.8
Financial District (NY-NEW-107) (40.71N 74.01W)		11.2	3.5
Financial District (NY-NEW-105) (40.71N 74.01W)		11.1	3.5
Financial District (NY-NEW-106) (40.71N 74.01W)		11.2	3.5
Financial District (NY-NEW-109) (40.71N 74.00W)		11.0	3.5
Randall's Island (NY-NEW-806) (40.80N 73.92W)		11.1	3.1
Two Bridges (NY-NEW-112) (40.71N 74.00W)		11.2	3
Financial District (Battery Park) (NY-NEW-100) (40.70N 74.02W)		11.6	2.5
Financial District (Battery Park) (NY-NEW-102) (40.70N 74.02W)		10.0	2.5
Inwood (NY-NEW-803) (40.87N 73.91W)		9.0	2.1
Financial District (Battery Park) (NY-NEW-103) (40.70N 74.02W)		11.0	2
Tribeca (NY-NEW-125) (40.72N 74.01W)		10.6	1.5
Tribeca (NY-NEW-124) (40.72N 74.01W)		10.9	1.0
Tribeca (NY-NEW-128) (40.72N 74.01W)		10.8	1.0
Financial District (NY-NEW-110) (40.71N 74.00W)		11.1	1
Financial District (NY-NEW-111) (40.71N 74.00W)		11.1	1
Kings County (Brooklyn)			
Brooklyn (NY-KIN-902) (40.66N 74.02W)		11.5	4.5
Dumbo, Brooklyn (NY-KIN-504) (40.70N 73.99W)		11.3	4.4
Red Hook, Brooklyn (NY-KIN-511) (40.67N 74.01W)		11.2	4.1

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Canarsie, Brooklyn (NY-KIN-003) (40.64N 73.89W)		11.0	4.1
Gerritsen Beach, Brooklyn (NY-KIN-906) (40.59N 73.93W)		10.9	4.0
Brooklyn (NY-KIN-908) (40.61N 73.90W)		11.2	3.6
Red Hook, Brooklyn (NY-KIN-724) (40.67N 74.01W)		11.3	3.6
Gowanus, Brooklyn (NY-KIN-725) (40.68N 73.99W)		9.8	3.2
Greenwood, Brooklyn (NY-KIN-901) (40.66N 74.01W)		11.2	3.0
South Side, Brooklyn (NY-KIN-510) (40.72N 73.97W)		9.72	2.6
East Williamsburg, Brooklyn (NY-KIN-002) (40.72N 73.92W)		10.9	2.2
Dumbo, Brooklyn (NY-KIN-604) (40.70N 73.99W)		11.0	1.6
Brooklyn (NY-KIN-904) (40.60N 74.00W)		9.2	1.1
Brooklyn (NY-KIN-909) (40.66N 73.86W)		10.0	1.1
Bronx County			
Throgs Neck, The Bronx (NY-BRO-809) (40.82N 73.84W)		10.7	3.4
Highbridge, The Bronx (NY-BRO-804) (40.84N 73.93W)		9.7	2.1
Hunts Point, The Bronx (NY-BRO-807) (40.80N 73.90W)		10.6	1.0
Queens County			
Maspeth, Queens (NY-QUE-001) (40.72N 73.92W)		10.9	6.0
Breezy Point, Queens (NY-QUE-729) (40.56N 73.93W)		12.7	5.4
Belle Harbor, Queens (NY-QUE-730) (40.58N 73.86W)		11.2	5.4
Long Island City, Queens (NY-QUE-505) (40.74N 73.96W)		11.3	5.0
Springfield Gardens, Queens (NY-QUE-210) (40.64N 73.75W)		10.6	4.6
Breezy Point, Queens (NY-KIN-907) (40.57N 73.88W)		11.0	4.2
Astoria, Queens (NY-QUE-506) (40.77N 73.94W)		10.9	4.0
Breezy Point, Queens (NY-QUE-728) (40.56N 73.91W)		9.7	3.6
Little Neck, Queens (NY-QUE-501) (40.78N 73.75W)		10.3	3.5
Howard Beach, Queens (NY-QUE-508) (40.65N 73.84W)		10.8	2.7
Howard Beach, Queens (NY-QUE-507) (40.66N 73.84W)		10.9	2.5
Little Neck, Queens (NY-QUE-502) (40.78N 73.75W)		10.3	2.1
Malba, Queens (NY-QUE-520) (40.80N 73.83W)		10.8	0.3
Nassau County			
Hempstead (Freeport) (NY-NAS-921) (40.63N 73.58W)		9.0	4.6
Hempstead (Inwood) (NY-NAS-911) (40.62N 73.76W)		10.2	4.3

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Oyster Bay (Laurel Hollow) (NY-NAS-923) (40.86N 73.46W)		9.7	3.7
Hempstead (Jones Beach State Park, Wantagh) (NY-NAS-224) (40.60N 73.50W)		8.0	3.6
Oyster Bay (Massapequa) (NY-NAS-416) (40.65N 73.46W)		7.9	3.5
East Massapequa (NY-NAS-901) (40.66N 73.43W)		7.5	3.5
Oyster Bay (Massapequa) (NY-NAS-903) (40.65N 73.46W)		8.0	3.3
Hempstead (Freeport) (NY-NAS-920) (40.64N 73.60W)		9.2	3.3
Oyster Bay (Mill Neck) (NY-NAS-929) (40.88N 73.55W)		9.6	3.1
Hempstead (Atlantic Beach) (NY-NAS-220) (40.59N 73.73W)		12.7	3.0
Hempstead (Lawrence) (NY-SUF-912) (40.61N 73.73W)		9.8	2.8
Hempstead (Merrick) (NY-NAS-922) (40.65N 73.55W)		8.4	2.8
Hempstead (Port Washington) (NY-SUF-517) (40.82N 73.70W)		10.0	2.5
Hempstead (Baldwin Harbor) (NY-NAS-919) (40.63N 73.61W)		9.3	2.5
Oyster Bay (Centre Island) (NY-NAS-933) (40.89N 73.53W)		10.0	2.3
Oyster Bay (Laurel Hollow) (NY-NAS-927) (40.88N 73.49W)		9.5	2.0
Oyster Bay (Oyster Bay Cove) (NY-NAS-925) (40.87N 73.50W)		9.3	1.9
Hempstead (Cedarhurst) (NY-NAS-910) (40.63N 73.73W)		10.4	1.8
Glen Cove (NY-NAS-938) (40.89N 73.64W)		10.0	1.8
Long Beach (NY-QUE-710) (40.59N 73.67W)		11.6	1.7
Oyster Bay (Bayville) (NY-NAS-935) (40.91N 73.56W)		11.1	1.7
Hemptead (Jones Beach State Park, Wantagh) (NY-NAS-225) (40.59N 73.55W)		8.7	1.5
Oyster Bay (Bayville) (NY-NAS-936) (40.91N 73.58W)		10.4	1.3
Tobay Beach Park (NY-NAS-954) (40.61N 73.43W)		7.1	1.3
Oyster Bay (Oyster Bay Cove) (NY-NAS-928) (40.87N 73.52W)		10.0	1.2
Long Beach (NY-NAS-707) (40.58N 73.64W)		10.7	1.1
Oyster Bay (Centre Island) (NY-NAS-932) (40.90N 73.51W)		9.7	1.1
Long Beach (NY-NAS-708) (40.59N 73.64W)		8.7	1.1
Hempstead (Seaford) (NY-NAS-905) (40.66N 73.50W)		5.0	1.0
Hempstead (Valley Stream) (NY-NAS-909) (40.65N 73.73W)		8.8	1.0
North Hempstead (Roslyn) (NY-NAS-940) (40.80N 73.65W)		10.2	0.9
Hempstead (Lido Beach) (NY-NAS-222) (40.59N 73.61W)		10.2	0.8
Oyster Bay (Oyster Bay) (NY-NAS-502) (40.88N 73.54W)		10.1	0.8

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Oyster Bay (Massapequa) (NY-NAS-904) (40.66N 73.47W)		8.4	0.8
Glen Cove (NY-NAS-939) (40.90N 73.63W)		9.9	0.8
Long Beach (NY-NAS-709) (40.59N 73.67W)		9.3	0.8
North Hempstead (Glenwood Landing) (NY-NAS-941) (40.82N 73.65W)		10.2	0.8
Oyster Bay (Bayville) (NY-NAS-934) (40.91N 73.54W)		8.1	0.7
Hempstead (East Atlantic Beach) (NY-NAS-221) (40.59N 73.71W)		10.6	0.6
Hempstead (Point Lookout) (NY-NAS-223) (40.59N 73.58W)		9.3	0.6
Suffolk County			
Brookhaven (Fire Island) (NY-SUF-418) (40.63N 73.22W)			5.6*
Babylon (Oak Beach-Captree) (NY-SUF-950) (40.64N 73.29W)			5.5*
Riverhead (Wading River) (NY-SUF-506) (40.96N 72.86W)		8.3	4.5
Southold (East Marion) (NY-SUF-957) (41.12N 72.34W)			4.5*
Babylon (Gilgo) (NY-SUF-952) (40.62N 73.39W)			4.3*
Brookhaven (Mastic Beach) (NY-SUF-401) (40.75N 72.85W)		5.7	3.9
Babylon (Amityville) (NY-SUF-417) (40.66N 73.41W)			3.8*
Brookhaven (Mastic Beach) (NY-SUF-415) (40.77N 72.82W)			3.7*
Islip (Ocean Beach) (NY-SUF-419) (40.64N 73.16W)			3.7*
Southampton (Shinnecock Hills) (NY-SUF-421) (40.88N 72.45W)			3.7*
Brookhaven (Mt. Sinai) (NY-SUF-611) (40.96N 73.02W)			3.4*
Islip (Brightwaters) (NY-SUF-624) (40.70N 73.25W)			3.4*
Huntington (Huntington Bay) (NY-SUF-604) (40.91N 73.40W)			3.4*
Islip (Bayshore) (NY-SUF-625) (40.71N 73.24W)			3.2*
Brookhaven (Mastic Beach) (NY-SUF-618) (40.76N 72.83W)			3.1*
Brookhaven (Blue Point) (NY-SUF-631) (40.73N 73.04W)			3.1*
Southold (Laurel) (NY-SUF-961) (40.96N 72.55W)			3.1*
Islip (West Islip) (NY-SUF-405) (40.69N 73.28W)			2.9*
Riverhead (Wading River) (NY-SUF-507) (40.96N 72.86W)		8.5	2.8
Brookhaven (Mt. Sinai) (NY-SUF-510) (40.95N 73.03W)		8.6	2.8
Babylon (Lindenhurst) (NY-SUF-621) (40.67N 73.37W)			2.8*
Smithtown (Head of the Harbor) (NY-SUF-944) (40.88N 73.19W)			2.8*
Southampton (Quiogue) (NY-SUF-412) (40.82N 72.62W)		6.4	2.7

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Southampton (Bridgehampton) (NY-SUF-423) (40.90N 72.32W)			2.7*
Brookhaven (Center Moriches) (NY-SUF-414) (40.79N 72.80W)			2.6*
Brookhaven (Hamlet of Brookhaven) (NY-SUF-636) (40.76N 72.91W)			2.6*
Riverhead (South Jamesport) (NY-SUF-962) (40.94N 72.58W)			2.6*
East Hampton (Montauk) (NY-SUF-426) (41.05N 71.96W)		6.0	2.5
Huntington (Asharoken) (NY-SUF-606) (40.93N 73.36W)		9.8	2.5
Southold (Peconic) (NY-SUF-614) (41.05N 72.47W)			2.5*
Southampton (Noyack) (NY-SUF-432) (40.99N 72.36W)		6.5	2.4
Huntington (Lloyd Harbor) (NY-SUF-602) (40.91N 73.48W)			2.4*
Babylon (Oak Beach-Captree) (NY-SUF-945) (40.65N 73.26W)			2.4*
Southampton (Remsenburg-Speonk) (NY-SUF-633) (40.80N 72.70W)			2.4*
Islip (Fire Island) (NY-SUF-420) (40.63N 73.20W)			2.3*
Brookhaven (Mastic) (NY-SUF-617) (40.80N 72.83W)			2.3*
Brookhaven (Shirley) (NY-SUF-619) (40.74N 72.88W)			2.3*
Southampton (Hampton Bays) (NY-SUF-515) (40.91N 72.56W)			2.3*
Southampton (Hampton Bays) (NY-SUF-516) (40.91N 72.56W)		7.4	2.2
Southampton (North Haven) (NY-SUF-429) (41.01N 72.30W)		6.4	2.1
Southampton (North Sea) (NY-SUF-434) (40.92N 72.44W)		6.7	2.1
Southampton (Shinnecock Hills) (NY-SUF-435) (40.90N 72.47W)			2.1*
Islip (Oakdale) (NY-SUF-628) (40.73N 73.14W)			2.1*
Southold (Orient) (NY-SUF-302) (41.13N 72.26W)			2.0*
East Hampton (Napeague) (NY-SUF-424) (41.01N 72.04W)		5.2	1.9
Islip (West Sayville) (NY-SUF-629) (40.72N 73.09W)			1.9*
Smithtown (Kings Park) (NY-SUF-609) (40.90N 73.22W)			1.9*
Southampton (North Haven) (NY-SUF-430) (41.04N 72.32W)		6.5	1.9
Southampton (Noyack) (NY-SUF-431) (40.99N 72.32W)		6.3	1.8
Brookhaven (Port Jefferson) (NY-SUF-508) (40.95N 73.07W)		8.8	1.8
Brookhaven (Port Jefferson) (NY-SUF-509) (40.95N 73.07W)		8.8	1.8
Huntington (Asharoken) (NY-SUF-607) (40.95N 73.40W)		10.0	1.8
Islip (Brightwaters) (NY-SUF-406) (40.71N 73.25W)			1.8*
Babylon (Village of Babylon) (NY-SUF-622) (40.68N 73.33W)			1.8*
Southampton (East Quogue) (NY-SUF-411) (40.84N 72.57W)			1.7*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Brookhaven (Stony Brook) (NY-SUF-610) (40.92N 73.15W)			1.7*
Brookhaven (Patchogue) (NY-SUF-402) (40.75N 73.01W)		5.8	1.6
Riverhead (Hamlet of Riverhead) (NY-SUF-513) (40.92N 72.66W)		8.2	1.6
Southold (East Marion) (NY-SUF-306) (41.13N 72.33W)			1.6*
Southampton (Hampton Bays) (NY-SUF-410) (40.85N 72.50W)			1.5*
Brookhaven (Bellport) (NY-SUF-620) (40.75N 72.93W)			1.5*
East Hampton (Northwest Harbor) (NY-SUF-427) (41.00N 72.19W)		6.1	1.4
Southold (Mattituck) (NY-SUF-613) (40.99N 72.54W)			1.4*
Huntington (Centerport) (NY-SUF-605) (40.89N 73.37W)			1.4*
Babylon (Fire Island) (NY-SUF-948) (40.63N 73.27W)			1.4*
Brookhaven (East Patchogue) (NY-SUF-632) (40.75N 72.98W)			1.4*
Southampton (Westhampton Beach) (NY-SUF-637) (40.79N 72.66W)			1.4*
Brookhaven (Hamlet of Brookhaven) (NY-SUF-635) (40.77N 72.90W)			1.4*
Brookhaven (East Moriches) (NY-SUF-413) (40.79N 72.75W)		6.3	1.3
Riverhead (Hamlet of Riverrhead) (NY-SUF-612) (40.99N 72.62W)			1.3*
Babylon (Gilgo) (NY-SUF-951) (40.64N 73.34W)			1.3*
Southold (New Suffolk) (NY-SUF-307) (40.99N 72.47W)			1.3*
Southold (East Marion) (NY-SUF-305) (41.13N 72.33W)			1.2*
Islip (Bayport) (NY-SUF-630) (40.73N 73.06W)			1.2*
Southold (Greenport) (NY-SUF-301) (41.10N 72.36W)			1.2*
Riverhead (Hamlet of Riverhead) (NY-SUF-512) (40.92N 72.66W)		8.1	1.1
Brookhaven (Center Moriches) (NY-SUF-616) (40.79N 72.80W)		6.5	1.1
Islip (Bay Shore) (NY-SUF-407) (40.71N 73.24W)			1.1*
Babylon (Oak Beach-Captree) (NY-SUF-946) (40.64N 73.25W)			1.1*
Southold (Hamlet of Southold) (NY-SUF-960) (41.04N 72.43W)			1.1*
Southold (Mattituck) (NY-SUF-511) (41.01N 72.56W)		7.8	1.0
Southold (Greenport West) (NY-SUF-958) (41.08N 72.39W)			1.0*
Babylon (Gilgo) (NY-SUF-953) (40.62N 73.42W)			1.0*
Southampton (Westhampton Beach) (NY-SUF-638) (40.80N 72.63W)			1.0*
Huntington (Northport) (NY-SUF-608) (40.92N 73.30W)			0.8*
Southampton (Riverside) (NY-SUF-408) (40.92N 72.66W)			0.8*
Southold (Hamlet of Southold) (NY-SUF-959) (41.04N 72.39W)			0.8*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Babylon (Fire Island) (NY-SUF-947) (40.62N 73.28W)			0.6*
Smithtown (Hamlet of Smithtown) (NY-SUF-943) (40.86N 73.21W)			0.6*
Riverhead (Flanders) (NY-SUF-409) (40.90N 72.62W)		7.7	0.5
Southampton (Village of Southampton) (NY-SUF-422) (40.87N 72.39W)		7.9	0.5
East Hampton (Sag Harbor) (NY-SUF-428) (41.00N 72.29W)		6.3	0.5
Southampton (Quogue) (NY-SUF-639) (40.82N 72.57W)			0.5*
Riverhead (Hamlet of Riverhead) (NY-SUF-514) (40.92N 72.66W)		7.9	0.3
Westchester County			
New Rochelle (NY-WES-801) (40.89N 73.78W)		10.2	3.1
Rye (NY-WES-815) (40.98N 73.67W)		9.8	3.0
Mamaroneck (NY-WES-800) (40.94N 73.72W)		10.5	2.7
Rye (NY-WES-814) (40.96N 73.69W)		10.2	2.5
Ossining (NY-WES-002) (41.16N 73.87W)		9.0	2.4
Hastings-on-Hudson (NY-WES-003) (41.00N 73.88W)		8.9	1.9
Southwest Yonkers (NY-WES-006) (40.94N 73.90W)		9.2	1.1
Rockland County			
Piermont (NY-ROC-006) (41.04N 73.90W)		9.7	4.1
Stony Point (NY-ROC-002) (41.23N 73.98W)		9.4	2.0
Stony Point (NY-ROC-003) (41.23N 79.98W)		8.6	1.5
Orange County			
West Point (NY-ORA-004) (41.38N 73.96W)		8.6	4.2
Newburgh (NY-ORA-002) (41.50N 74.00W)		8.9	3.0
Newburgh (NY-ORA-001) (41.50N 74.01W)		8.9	1.9
Ulster County			
Kingston (NY-ULS-004) (41.93N 73.97W)		9.3	4.9
Saugerties (NY-ULS-002) (42.07N 73.94W)		9.4	4.3
Kingston (NY-ULS-005) (41.93N 73.97W)		9.3	4.0
Saugerties (NY-ULS-003) (42.07N 73.94W)		9.4	3.8
Kingston (NY-ULS-006) (41.93N 73.97W)		9.2	3.1
Saugerties (NY-ULS-001) (42.07N 73.94W)		9.4	3.0
Kingston (NY-ULS-007) (41.93N 73.97W)		9.2	1.5

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Dutchess County			
Poughkeepsie (NY-DUT-007) (41.65N 73.94W)		9.1	5.1
Poughkeepsie (NY-DUT-006) (41.65N 73.94W)		9.1	4.1
Poughkeepsie (NY-DUT-001) (41.71N 73.94W)		9.0	4.0
Poughkeepsie (NY-DUT-003) (41.71N 73.94W)		9.1	2.9
Poughkeepsie (NY-DUT-005) (41.71N 73.94W)		9.0	2.7
Poughkeepsie (NY-DUT-004) (41.71N 73.94W)		9.1	2.4
Columbia County			
Castle-on-Hudson (NY-COL-001) (42.53N 73.76W)		10.0	2.6
Castle-on-Hudson (NY-COL-003) (42.53N 73.76W)		10.1	2.2
Greene County			
Coxsackie (NY-GRE-002) (42.35N 73.79W)		9.7	4.0
Catskill (NY-GRE-009) (42.21N 73.85W)		9.6	3.9
Catskill (NY-GRE-012) (42.21N 73.85W)		9.6	3.5
Catskill (NY-GRE-011) (42.21N 73.85W)		9.6	3.4
Catskill (NY-GRE-010) (42.21N 73.85W)		9.5	3.1
Catskill (NY-GRE-008) (42.21N 73.85W)		8.5	3.1
Coxsackie (NY-GRE-001) (42.35N 73.79W)		9.6	1.9
Connecticut			
Fairfield County			
Norwalk (Marvin Beach) (CT-FFD-422) (41.09N 73.39W)			4.5*
Fairfield (CT-FFD-632) (41.12N 73.26W)			4.3*
Westport (CT-FFD-513) (41.14N 73.36W)		10.2	4.1
Southport (CT-FFD-628) (41.13N 73.30W)			4.0*
Norwalk (CT-FFD-412) (41.10N 73.42W)		10.6	3.6
Bridgeport (South End) (CT-FFD-724) (41.17N 73.18W)			3.5*
Greenwich (CT-FFD-121) (41.02N 73.62W)			3.4*
Norwalk (CT-FFD-411) (41.10N 73.42W)		10.5	3.3
Bridgeport (South End) (CT-FFD-723) (41.17N 73.19W)			3.2*
Bridgeport (Enterprise Zone) (CT-FFD-722) (41.19W 73.19W)			3.1*
Bridgeport (South End) (CT-FFD-726) (41.15N 73.21W)			3.0*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Westport (Green Farms) (CT-FFD-522) (41.11N 73.33W)			2.9*
Westport (CT-FFD-515) (41.15N 73.36W)		10.2	2.8
Stamford (CT-FFD-223) (41.04N 73.52W)			2.8*
Stratford (Lordship) (CT-FFD-811) (41.16N 73.11W)		8.6	2.8
Old Greenwich (CT-FFD-123) (41.00N 73.58W)			2.6*
Greenwich (CT-FFD-111) (41.00N 73.66W)		11.7	2.4
Fairfield (CT-FFD-624) (41.14N 73.25W)			2.4*
Riverside (CT-FFD-122) (41.02N 73.59W)			2.3*
Darien (CT-FFD-321) (41.05N 73.49W)			2.2*
Fairfield (CT-FFD-621) (41.14N 73.24W)			2.2*
Stamford (Waterside) (CT-FFD-221) (41.03N 73.54W)			2.1*
Westport (Green Farms) (CT-FFD-521) (41.11N 73.33W)			2.1*
Westport (CT-FFD-523) (41.10N 73.35W)			2.0*
Stratford (Lordship) (CT-FFD-822) (41.15N 73.13W)			2.0*
Stamford (Shippan Point) (CT-FFD-222) (41.03N 73.52W)			1.8*
Greenwich (CT-FFD-112) (41.00N 73.66W)		11.7	1.7
Fairfield (CT-FFD-625) (41.14N 73.25W)			1.7*
Fairfield (CT-FFD-623) (41.14N 73.24W)			1.6*
Fairfield (CT-FFD-622) (41.14N 73.24W)			1.4*
Stratford (CT-FFD-821) (41.17N 73.12W)			1.4*
Norwalk (South Norwalk) (CT-FFD-421) (41.10N 73.42W)			1.3*
Bridgeport (Black Rock) (CT-FFD-729) (41.15N 73.24W)			1.3*
Fairfield (CT-FFD-631) (41.13N 73.25W)			1.2*
Stratford (Lordship) (CT-FFD-812) (41.16N 73.11W)		8.3	1.2
Bridgeport (Enterprise Zone) (CT-FFD-721) (41.19N 73.19W)			0.7*
Fairfield (CT-FFD-626) (41.12N 73.27W)			0.5*
Westport (CT-FFD-514) (41.14N 73.36W)		10.3	0.2
New Haven County			
Milford (CT-NHV-128) (41.21N 73.06W)			5.5*
West Haven (CT-NHV-222) (41.27N 72.94W)			5.2*
East Haven (CT-NHV-521) (41.25N 72.88W)			5.1*
Milford (CT-NHV-123) (41.21N 73.02W)			5.0*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Guilford (CT-NHV-711) (41.27N 72.67W)			4.9*
Branford (CT-NHV-628) (41.27N 72.77W)			4.7*
Madison (Madison Center) (CT-NHV-832) (41.27N 72.61W)			4.4*
Madison (Madison Center) (CT-NHV-833) (41.27N 72.59W)			4.1*
Milford (CT-NHV-112) (41.21N 73.05W)		9.5	3.8
West Haven (CT-NHV-223) (41.27N 72.94W)			3.6*
Milford (CT-NHV-127) (41.21N 73.06W)			3.2*
Guilford (CT-NHV-713) (41.27N 72.67W)		8.4	3.0
New Haven (CT-NHV-329) (41.25N 72.90W)			2.5*
Branford (CT-NHV-629) (41.26N 72.75W)			2.5*
Milford (CT-NHV-125) (41.19N 73.09W)			2.3*
Guilford (CT-NHV-712) (41.27N 72.67W)			2.1*
New Haven (Fair Haven) (CT-NHV-321) (41.31N 72.89W)			1.5*
East Haven (CT-NHV-524) (41.25N 72.86W)			1.4*
Branford (CT-NHV-627) (41.26N 72.80W)			1.4*
New Haven (City Point) (CT-NHV-324) (41.28N 72.93W)			1.3*
East Haven (CT-NHV-522) (41.27N 72.87W)			1.3*
East Haven (CT-NHV-523) (41.26N 72.85W)			1.3*
Madison (Madison Center) (CT-NHV-834) (41.28N 72.59W)			1.3*
Branford (CT-NHV-611) (41.26N 72.82W)		9.7	1.2
Branford (Branford Center) (CT-NHV-625) (41.29N 72.80W)			1.2*
Branford (CT-NHV-624) (41.27N 72.81W)			1.1*
Milford (CT-NHV-113) (41.21N 73.06W)			1.0*
Milford (CT-NHV-121) (41.21N 73.03W)			1.0*
West Haven (CT-NHV-224) (41.26N 72.96W)			1.0*
New Haven (CT-NHV-318) (41.27N 72.90W)			1.0*
Branford (CT-NHV-626) (41.26N 72.80W)			0.9*
West Haven (CT-NHV-221) (41.27N 72.93W)			0.8*
Branford (CT-NHV-613) (41.27N 72.82W)		9.4	0.7
Madison (Madison Center) (CT-NHV-831) (41.27N 72.62W)			0.6*
Milford (CT-NHV-122) (41.21N 73.03W)			0.5*
New Haven (Hill) (CT-NHV-325) (41.30N 72.95W)			0.5*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
New Haven (Mill River) (CT-NHV-323) (41.30N 72.91W)			0.3*
Middlesex County			
Clinton (CT-MSX-111) (41.27N 72.53W)		8.0	3.8
Westbrook (CT-MSX-223) (41.27N 72.47W)			2.7*
Clinton (CT-MSX-113) (41.28N 72.52W)		6.8	2.6
Old Saybrook (Saybrook Manor) (CT-MSX-330) (41.28N 72.41W)			2.5*
Clinton (CT-MSX-112) (41.29N 72.53W)		7.1	1.4
Clinton (CT-MSX-131) (41.27N 72.50W)			1.4*
New London County			
Old Lyme (CT-NLD-112) (41.28N 72.28W)			3.2*
Old Lyme (CT-NLD-123) (41.29N 72.31W)			3.1*
Groton (Groton Long Point) (CT-NLD-523) (41.31N 72.01W)			2.9*
Mystic (CT-NLD-524) (41.34N 71.98W)			2.6*
Old Lyme (CT-NLD-124) (41.29N 72.32W)			2.4*
Waterford (CT-NLD-330) (41.33N 72.17W)			2.3*
Niantic (CT-NLD-222) (41.30N 72.24W)			2.0*
Pawcatuck (CT-NLD-622) (41.33N 71.84W)			2.0*
Stonington (CT-NLD-627) (41.34N 71.92W)			2.0*
Old Lyme (CT-NLD-125) (41.31N 72.34W)			1.9*
New London (CT-NLD-421) (41.31N 72.10W)			1.9*
Mystic (CT-NLD-632) (41.35N 71.96W)			1.8*
Stonington (CT-NLD-629) (41.34N 71.93W)			1.7*
Mystic (CT-NLD-631) (41.34N 71.96W)			1.6*
Mystic (CT-NLD-634) (41.36N 71.96W)			1.5*
Mystic (CT-NLD-522) (41.36N 71.97W)			1.4*
Mystic (CT-NLD-612) (41.35N 71.97W)		6.0	1.2
Stonington (CT-NLD-628) (41.33N 71.93W)			1.2*
Mystic (CT-NLD-635) (41.35N 71.96W)			1.1*
Groton (CT-NLD-515) (41.33N 71.99W)		6.7	1.0
Old Lyme (CT-NLD-111) (41.31N 72.35W)			1.0*
Groton (CT-NLD-517) (41.32N 72.06W)		5.7	0.9
Pawcatuck (CT_NLD-623) (41.34N 71.88W)			0.8*

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Stonington (CT-NLD-611) (41.34N 71.91W)		6.0	0.7
Mystic (CT-NLD-633) (41.36N 71.97W)			0.6*
Stonington (CT-NLD-626) (41.33N 71.91W)			0.5*
Rhode Island			
Washington County			
Narragansett (RI-WAS-227) (41.46N 71.45W)			3.9*
Westerly (Misquamicut) (RI-WAS-234) (41.32N 71.82W)			3.4*
Westerly (Watch Hill) (RI-WAS-232) (41.31N 71.86W)		5.8	3.1
Westerly (RI-WAS-235) (41.33N 71.79W)			3.1*
Westerly (Misquamicut) (RI-WAS-233) (41.32N 71.82W)			2.9*
Wakefield (RI-WAS-247) (41.37N 71.56W)			2.7*
Narragansett (Narragansett Pier) (RI-WAS-228) (41.45N 71.45W)			2.5*
Charlestown (Quonochontaug) (RI-WAS-238) (41.33N 71.72W)			2.5*
Wakefield (RI-WAS-245) (41.37N 71.61W)			2.5*
Wakefield (RI-WAS-246) (41.37N 71.57W)			2.3*
Charlestown (RI-WAS-240) (41.36N 71.68W)			2.0*
Narragansett (RI-WAS-226) (41.47N 71.42W)			1.8*
Westerly (Weekapaug) (RI-WAS-236) (41.33N 71.77W)			1.8*
Wakefield (RI-WAS-650) (41.43N 71.50W)			1.8*
Westerly (RI-WAS-230) (41.38N 71.83W)			1.5*
Narragansett (Narragansett Pier) (RI-WAS-229) (41.43N 71.46W)			1.2*
Charlestown (RI-WAS-243) (41.36N 71.63W)			1.1*
Wakefield (RI-WAS-653) (41.38N 71.52W)			1.1*
Westerly (RI-WAS-231) (41.35N 71.83W)			1.0*
Saunderstown (RI-WAS-224) (41.53N 71.42W)		8.4	0.7
Charlestown (Quonochontaug) (RI-WAS-239) (41.34N 71.70W)			0.7*
Charlestown (RI-WAS-241) (41.38N 71.64W)			0.4*
Westerly (RI-WAS-237) (41.34N 71.73W)			0.3*
Charlestown (RI-WAS-242) (41.36N 71.64W)			0.3*
Narragansett (Point Judith) (RI-WAS-648) (41.37N 71.49W)			0.2*
Newport County			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Jamestown (RI-NEW-223) (41.51N 71.37W)			4.4*
Newport (RI-NEW-219) (41.46N 71.33W)			4.3*
Jamestown (RI-NEW-222) (41.49N 71.40W)			4.2*
Middletown (RI-NEW-215) (41.49N 71.25W)			3.1*
Jamestown (RI-NEW-220) (41.50N 71.37W)			3.0*
Newport (RI-NEW-218A) (41.46N 71.31W)			2.9*
Tiverton (RI-NEW-209) (41.56N 71.21W)			1.9*
Tiverton (RI-NEW-210) (41.58N 71.21W)			1.3*
Little Compton (RI-NEW-207) (41.47N 71.19W)			0.9*
Little Compton (RI-NEW-208) (41.47N 71.19W)			0.4*
Portsmouth (RI-NEW-214) (41.55N 71.24W)			0.4*
Kent County			
Warwick (RI-KEN-645) (41.65N 71.44W)			2.3*
Bristol County			
Warren (RI-BRI-637) (41.73N 71.26W)			1.0*
Warren (RI-BRI-640) (41.72N 71.29W)		6.2	0.7
Bristol (RI-BRI-639) (41.67N 71.28W)			0.4*
Barrington (RI-BRI-641) (41.75N 71.35W)			0.3*
Providence County			
East Providence (RI-PRO-644) (41.80N 71.38W)			3.0*
Massachusetts			
Bristol County			
Swansea (Ocean Grove) (MA-BRI-631) (41.73N 71.22W)			2.0*
South Dartmouth (MA-BRI-202) (41.54N 70.97W)			1.4*
Westport (MA-BRI-204) (41.50N 71.04W)			1.1*
Westport (MA-BRI-205) (41.51N 71.10W)			0.9*
Plymouth County			
Wareham (Wareham Center) (MA-PLY-626) (41.76N 70.71W)			0.3*
US Geological Survey (USGS) Storm Tide Pressure Sensors			
Virginia			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Accomack County			
Chincoteague (VA-ACC-001) (37.90N 75.41W)		5.00	3.5
Parksley (Metompkin Bay) (VA-ACC-002) (37.73N 75.59W)		5.98	2.5
Onancock (Holly Cove) (VA-ACC-003) (37.72N 75.79W)		5.38	1.5
City of Poquoson			
Plumb Tree Island (VA-YOR-003) (37.11N 76.32W)		5.08	4
City of Virginia Beach			
Lynnhaven Inlet (VA-VAB-001) (36.91N 76.09W)		5.49	2
Hampton County			
Hampton (Buckroe Beach) (VA-HAM-002) (37.02N 76.32W)		5.30	3
Mathews County			
Hudgins (Gwynns Island) (VA-MAT-001) (37.49N 76.31W)		3.54	0.5
Northampton County			
Cape Charles (Wise Point) (VA-NOR-004) (37.13N 75.95W)		5.71	4
Cape Charles (Cape Charles Marina) (VA-NOR-003) (37.26N 76.02W)		5.02	2
Marionville (Red Bank) (VA-NOR-001) (37.45N 75.84W)		5.46	1.5
Maryland			
Anne Arundel County			
Annapolis (MD-ANN-003) (38.97N 76.48W)		3.41	1.5
Annapolis (MD-ANN-001) (38.98N 76.49W)		3.61	1.5
Baltimore County			
Baltimore (Pier 5) (MD-BAL-001) (39.28N 76.61W)		6.70	2.5
Delaware			
Sussex County			
Lewes (Roosevelt) (DE-SUS-008) (38.79N 75.16W)		8.20	4.5
Bethany Beach (DE-SUS-014) (38.51N 75.06W)		4.74	2.5
Lewes (Old Mill Creek) (DE-SUS-057) (38.77N 75.20W)		5.47	2.5
Fenwick Island (Little Assawoman Bay) (DE-SUS-015) (38.45N 75.06W)		4.06	2
Millsboro (Indian Creek) (DE-SUS-033) (38.59N 75.21W)		6.17	2

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Rehoboth Beach (Dewey Bridge) (DE-SUS-010) (38.69N 75.08W)		4.84	2
Millsboro (Massey Landing) (DE-SUS-032) (38.63N 75.10W)		2.93	1.5
Lewes (Love Creek @ Hwy 24) (DE-SUS-030) (38.70N 75.16W)		3.86	1
Kent County			
Smyrna (Woodland Beach) (DE-KEN-051) (39.33N 75.47W)		5.63	4
Dover (Little Creek) (DE-KEN-053) (39.16N 75.45W)		5.38	1
New Castle County			
Smyrna (Duck Creek) (DE-NEW-001) (39.31N 75.61W)		7.09	1
New Jersey			
Cape May County			
Marmora (Great Egg Harbor Bay) (NJ-CPM-010) (39.29N 74.63W)		6.97	3.5
Cumberland County			
Millville (Maurice River) (NJ-CUM-020) (39.40N 75.04W)		6.31	2.5
Bridgeton (Cohansey River) (NJ-CUM-025) (39.43N 75.24W)		5.50	1
Atlantic County			
Port Republic (Mullica River) (NJ-ATL-005) (39.55N 74.46W)		7.62	4.5
Middlesex County			
South Amboy (Old Bridge Waterfront Park) (NJ-MID-001) (40.46N 74.25W)		11.71	6
Union County			
Rahway (Rahway River) (NJ-UNI-002) (40.60N 74.27W)		12.06	
Elizabeth (Elizabeth River) (NJ-UNI-208) (40.66N 74.21W)		12.20	
Hudson County			
East Rutherford (Hackensack River) (NJ-HUD-001) (40.76N 74.03W)		8.80	
New York			
Richmond County			
Tottenville, Staten Island (NY-RIC-003) (40.50N 74.23W)		16.00	
Great Kills, Staten Island (NY-NEW-101) (40.54N 74.13W)		13.33	
Arrochar, Staten Island (NY-RIC-001) (40.59N 74.06W)		15.02	
New York County			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Uptown, Manhatten (Harlem River, Inwood Hill Park) (NY-NEW-124) (40.72N 74.01W)		9.50	
Kings County			
Brooklyn (East River @ Manhatten Bridge) (NY-KIN-001) (40.70N 73.99W)		7.48	
Gowanus, Brooklyn (NY-KIN-003) (40.68N 73.99W)		11.08	
Sea Gate, Brooklyn (NY-KIN-001) (40.58N 74.01W)		13.32	
Queens County			
Broad Channel, Far Rockaway, Queens (NY-QUE-005) (40.61N 73.82W)		10.38	
Howard Beach, Queens (NY-QUE-002) (40.65N 73.84W)		11.16	
Astoria, Queens (Flushing Bay) (NY-QUE-001) (40.76N 73.86W)		10.35	
Whitestone, Queens (NY-QUE-004) (40.80N 73.83W)		10.57	
Nassau County			
Long Beach (NY-NAS-006) (40.58N 73.64W)		17.48	
Oyster Bay (Hamlet of Oyster Bay) (NY-NAS-003) (40.88N 73.53W)		10.12	
Suffolk County			
Islip (Ocean Beach) (NY-SUF-014) (40.64N 73.16W)		13.41	
Huntington (Northport) (NY-SUF-003) (40.90N 73.35W)		9.48	
Brookhaven (Port Jefferson) (NY-SUF-009) (40.95N 73.07W)		8.81	
Riverhead (Wading River) (NY-SUF-010) (40.96N 72.86W)		8.19	
Southampton (Flanders) (NY-SUF-008) (40.92N 72.64W)		7.86	
Southold (Mattituck) (NY-SUF-011) (41.01N 72.56W)		7.86	
Islip (West Islip) (NY-SUF-001) (40.69N 73.28W)		7.35	
Southampton (Hampton Bays) (NY-SUF-018) (40.85N 72.50W)		7.32	
Brookhaven (East Moriches) (NY-SUF-017) (40.79N 72.75W)		6.83	
Southampton (Hampton Bays) (NY-SUF-019) (40.89N 72.50W)		6.53	
Brookhaven (Patchogue) (NY-SUF-016) (40.75N 73.01W)		6.39	
Southampton (Sag Harbor) (NY-SUF-021) (41.00N 72.29W)		6.33	
East Hampton (Montauk) (NY-SUF-026) (41.07N 71.93W)		6.08	
Brookhaven (Mastic Beach) (NY-SUF-028) (40.75N 72.86W)		5.68	
Babylon (Oak Beach-Captree) (NY-SUF-002) (40.66N 73.26W)		5.57	
Islip (Fire Island) (NY-SUF-013) (40.63N 73.20W)		4.09	
Westchester County			

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Mamaroneck (NY-WES-001) (40.94N 73.72W)		10.92	
New Rochelle (NY-WES-003) (40.89N 73.78W)		10.44	
Connecticut			
Fairfield County			
Westport (CT-FFD-005) (41.15N 73.36W)		10.31	
Byram (CT-FFD-001) (41.00N 73.66W)		10.27	
Westport (CT-FFD-006) (41.12N 73.37W)		10.15	
South Norwalk (CT-FFD-003) (41.10N 73.42W)		9.92	
Stratford (CT-FFD-009) (41.25N 73.09W)		9.65	
New Haven County			
Milford (CT-NHV-020) (41.21N 73.05W)		9.84	
New Haven (CT-NHV-013) (41.27N 72.90W)		9.50	
New Haven (CT-NHV-019) (41.27N 72.90W)		9.23	
Guilford (CT-NHV-015) (41.27N 72.66W)		8.56	
Branford Center (CT-NHV-018) (41.26N 72.82W)		8.77	
North Haven (CT-NHV-014) (41.37N 72.88W)		7.20	
Middlesex County			
Old Saybrook Center (CT-MSX-020) (41.28N 72.35W)		7.86	
Old Saybrook Center (CT-MSX-019) (41.28N 72.35W)		7.73	
Clinton (CT-MSX-018) (41.27N 72.53W)		7.63	
New London County			
Niantic (CT-NLD-018) (41.32N 72.20W)		11.72	
Old Lyme (CT-NLD-023) (41.28N 72.28W)		8.41	
Old Lyme (CT-NLD-019) (41.28N 72.28W)		8.26	
Groton (CT-NLD-025) (41.32N 72.06W)		6.55	
Noank (CT-NLD-016) (41.33N 71.98W)		6.42	
Noank (CT-NLD-015) (41.33N 71.98W)		6.35	
Mystic (CT-NLD-027) (41.38N 71.97W)		6.16	
Groton (CT-NLD-026) (41.33N 72.04W)		5.98	
Mystic (CT-NLD-029) (41.35N 71.97W)		5.96	
Stonington (CT-NLD-030) (41.34N 71.91W)		5.83	

Location	Storm surge (ft)[a]	Storm tide (ft)[b]	Estimated Inundation (ft)[c]
Rhode Island			
Washington County			
Wakefield (RI-WAS-003) (41.36N 71.61W)		8.43	
Wakefield (RI-WAS-008) (41.38N 71.51W)		6.59	
Westerly (RI-WAS-005) (41.33N 71.77W)		6.39	
Saunderstown (RI-WAS-012) (41.53N 71.42W)		6.35	
Westerly (RI-WAS-001) (41.31N 71.86W)		5.86	
Charlestown (RI-WAS-007) (41.38N 71.64W)		3.97	
Bristol County			
Warren (RI-BRI-013) (41.73N 71.29W)		6.27	
Newport County			
Portsmouth (RI-NEW-014) (41.62N 71.24W)		6.42	
Little Compton (RI-NEW-015) (41.46N 71.19W)		6.36	

[a] Storm surge is water height above normal astronomical tide level.
[b] Storm tide is water height above the North American Vertical Datum of 1988 (NAVD88).
[c] Estimated inundation is the maximum depth of water on land. 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
R Exceeded historical maximum value.
* preliminary

Table 6. Selected precipitation totals in the United States associated with Sandy.

Florida	Precipitation (inches)
Daytona Beach Intl. 1 NE (DIAF1) 29.19N 81.06W	4.30
Scottsmoor 2 NNW (SCMF1) 28.78N 80.88W	3.58
Suntree 2 W (FL-BV-2) 28.20N 80.70W	3.27
North Miami Beach Coop (NMBF1) 25.93N 80.16W	3.17
Chuluota 1 N (FL-SM-8) 28.65N 81.12W	2.52
Suntree 1 WSW (FL-BV-1) 28.21N 80.70W	2.51
Rockledge 1 WSW (FL-B-1) 28.31 N 80.75 W	2.45
Edgewater 3 NE (FL-VL-2) 28.99N 80.87W	2.43
Lake Mary Jane 2 NE (WELF1) 28.40N 81.16W	2.42
Mims 1 WNW (FL-BV-4) 28.66N 80.86W	2.25
Rockledge 1 NE (FL-BV-3) 28.33N 80.72W	2.20
Hialeah Coop (HIAF1) 25.82N -80.28W	2.19
North Carolina	
Avon 0.7 NE 35.34 N 75.49 W	8.20
Salvo 0.9 NNE 35.55 N 75.47 W	8.18
Corolla 3.2 SSE	7.66
Duck 0.3 SE 36.16 N 75.75 W	7.54
Kill Devil Hills 2.5 NNW 36.04 N 75.69 W	6.98
Kill Devil Hills 0.9 WNW 36.02 N 75.68 W	6.96
1.1 SSE Duck 36.15 N 75.75 W	6.57
Ocracoke 35.10 N 75.98 W	6.50
Kitty Hawk 4.0 NNW 36.12 N 75.75 W	6.35
Trent Woods 1.3 SSE	4.11
Jamesville 6.1 SW	3.84
Jacksonville 2.0 E	3.75
Holly Ridge 4.8 ENE	3.63
Elizabeth City 10.5 NNW	3.56
Merry Hill 3.8 E	3.51
Elizabeth City (KECG)	3.44
Virginia	
Reedville	9.90
Virginia Beach	9.58

Pungo	9.58
Oceana/Soucek	9.57
Cashville 0.1S	9.38
Oceana (KNTU)	9.38
City of Hampton Emergency Management (WB)	9.37
White Stone 8.0 SSW	8.96
Greenbackville 0.4 WNW	8.64
Port Haywood 1.00 SE	8.59
Onley 0.6 SE	8.47
Onancock 3.90 SW	8.39
Virginia Beach 1.70 NE	7.99
Chantilly HS (WB)	7.95
Purcellville (LO036) 39.13 N 77.71 W	7.89
Centreville ES (WB)	7.82
Isle of Wright Smithfield HS (WB)	7.79
Maysville 5 S	7.75
Yorkstown 0.8 SE	7.73
Alexandria Franconia ES (WB)	7.64
Newport News 5.80 NE	7.63
Sterling Park 1 NW (LOE41) 39.00 N 77.42 W	7.50
Fairfax Providence ES (WB)	7.01
Hampton 8.10W	6.91
Lottsburg 2.30 NNE	6.77
Newport News 2.70 ESE	6.74
Smithfield 2.0 SE	6.25
Fairfax 1 ENE (FCC05) 38.85 N 77.29 W	6.25
Urbanna 6.20 NNE	6.20
Williamsburg 1.40 ENE	6.12
Manassas 1 ESE (MSS02) 38.74 N 77.47 W	6.06
Franconia 1 SSE (VA-FX-3) 38.74 N 77.14 W	6.03
Centreville 1 SE (FXW106) 38.83 N 77.43 W	6.02
Lovettsville 2 ENE (LOE84) 39.28 N 77.60 W	5.98
Lorton 1 NE (VA-FX-5) 38.71 N 77.23 W	5.70
City of Norfolk 30 S	5.64
Dulles International Airport 1 NNE (X390077) 38.96 N 77.45 W	5.62
Hampton 1.90 NW	5.59
Suffolk 13 NE	5.54
Middleburg 2 NW (LOC14) 38.99 N 77.77 W	5.50
Rose Hill (AX066) 38.79 N 77.10 W	5.42
Manassas (X387077) 38.74 N 77.48 W	5.40
Williamsburg 1.30 SSW	5.33

Woolsey 3 NNW (PWN18) 38.90 N 77.67 W	5.30
Burke (X388077) 38.78 N 77.27 W	5.15
Stanley (X386078) 38.57 N 78.50 W	5.15
Lydia 2 SE (GRC24) 38.31 N 78.47 W	5.11
Frostburg (ALW63) 39.64 N 78.92 W	5.10
Honeyville 1 ESE (PES02) 38.57 N 78.54 W	5.10
Sterling (KLWX)	5.03
Wakefield (KAKQ)	3.18
Hanover (KOFP)	3.13
West Virginia	
Maysville (GN003) 5 S 39.04 N 79.17 W	7.75
Shenandoah Junction	4.46
Falling Waters 2.4 NW	4.36
Slanesville 2.1 SE	3.99
Morgantown/Hart Field (KMGW)	3.97
McMechen 6.0 E	3.56
Charles Town 2.5 NE	3.15
Bunker Hill 0.8 WNW	3.06
Springfield 2.3 ESE	3.04
Huntington/Tri-State Airport (KHTS)	2.94
Boothsville 1.4 SE	2.83
Delaware	
Indian Rivert Inlet DEOS 38.63N 75.97W	10.98
Rehoboth Beach DEOS 38.71 N 75.08 W	10.60
Georgetown 38.69 N 75.39 W	10.20
Viola DEOS 39.04 N 75.57 W	9.69
Dover 6.4 NNW	9.62
Milford 38.91 N 75.43 W	9.55
Indian River Acres	9.49
Dover DEOS 39.15 N 75.52 W	9.38
Milford DEOS 38.88N 75.44W	9.38
Ellendale DEOS 38.80 N 75.42 W	9.33
Selbyville DEOS 38.45 N 75.22 W	9.28
Greenwood DEOS 38.80 N 75.59 W	9.07
Seaford DEOS 38.64 N 75.62 W	8.80

Harrington DEOS 38.92 N 75.57 W	8.74
Harbison DEOS 38.68N 75.25W	8.71
Clayton 6.6 W	8.62
Bridgeville DEOS 38.74 N 75.60 W	8.48
Dover AFB (KDOV) 39.13 N 75.47 W	8.47
Seaford 2.3 SSE	8.45
Blackbird DEOS 39.40N 75.63W	8.39
Delaney Corner	8.33
Milton 38.77 N 75.31 W	8.30
Smyrna 2.7 SSE	8.30
Felton 3.6 NE	8.20
Smyrna DEOS 39.29 N 75.61 W	8.12
Dover 39.15 N 75.52 W	7.98
Smyrna 3 SSE 39.25 N 75.59 W	7.96
Seaford 1 SW 38.63 N 75.63 W	7.95
Felton 4 NE 39.04 N 75.52 W	7.94
Georgetown 5.8 W	7.94
Georgetown DEOS 38.69 N 75.39 W	7.92
Viola DEOS 39.04 N 75.57 W	7.84
Bethany Beach DEOS 38.53 N 75.06 W	7.83
Ellendale 38.80 N 75.42 W	7.80
Georgetown 6 W 38.68 N 75.50 W	7.73
Laurel DEOS 38.55 N 75.57 W	7.62
Townsend DEOS 39.39 N 75.69 W	7.57
Selbyville 38.45 N 75.22 W	7.53
Newport 39.71 N 75.61 W	7.30
Greenwood 38.80 N 75.59 W	7.18
Bridgeville 38.74 N 75.60 W	6.92
Glasgow DEOS 39.61N 75.73W	6.80
Seaford 38.64 N 75.62 W	6.48

Middletown 1 SSW 39.43 N 75.71 W	6.44
Greenville DEOS 39.80N 75.61W	6.42
Newark DEOS AG Farm 39.67 N 75.76 W	6.12
Newark DEOS 39.67 N 75.76 W	6.05
Hockessin Chesapeake Bay Girl Scouts (WB)	6.03
Newport 2 WNW 39.72 N 75.64 W	5.83
New Castle DEOS 39.66 N 75.57 W	5.73
Wilmington 39.63 N 75.74 W	5.73
Wilmington DEOS 39.78 N 75.53 W	5.52
2 S Newark 39.64 N 75.76 W	5.36
Claymont DEOS 39.80 N 75.46 W	5.21
Wilmington 39.73 N 75.53 W	5.20
Newark 39.67 N 75.76 W	5.02
Washington, D.C.	
Washington 5.1 NW	5.83
Maryland	
Bellevue	12.83
Easton 0.7 NNW	12.55
New Market Deer Crossing ES (WB)	11.68
Cavetown 3 ESE	11.15
Greensboro 1.4 ENE	10.70
Ridgely 0.2 ESE	10.68
American Corrner	10.55
Easton 2 SE 38.75 N 76.05 W	10.52
Ridge 1.0 N	10.36
Queenstown 2.6 S	10.29
Mount Airy Summit Ridge (WB)	10.28
Columbia Oakland Mills MS (WB)	10.08
Stevensville Bayside ES (WB)	10.00
Easton 1 SSW 38.76 N 76.07 W	9.97
Greensboro 38.97 N 75.81 W	9.93
Queenstown 38.98 N 76.16 W	9.89
Trappe 3.5 NE	9.78
Columbia Howard Community College (WB)	9.76
Trappe 38.65 N 76.06 W	9.60
Churchton 1 ENE 38.80 N 76.52W	9.50

Sykesville Piney Ridge ES (WB)	9.49
Germantown Sally Ride ES (WB)	9.49
Bishopville 3.1 E	9.48
St. Michaels 0.7 SE	9.38
Greenbelt 1 NNE (PGW69) 39.00N 76.88W	9.30
Denton 5.8 WSW	9.28
Princess Anne 4.4 WSW	9.08
Denton 38.88 N 75.82 W	8.93
Pasadena 2.6 ESE	8.70
Easton Talbot County EMA (WB)	8.69
Easton Saints Peter and Paul HS (WB)	8.68
Westminister East MS (WB)	8.61
Bryans Road 2 ESE (X386077) 38.61N 77.04W	8.51
Burtonsville Banneker MS (WB)	8.50
Chestertown Kent County EMA (WB)	
Easton 1 SW 38.76 N 76.08 W	8.50
Ridge (SMS08) 38.12N 76.36W	8.42
Dundalk 1 SW (BL021) 39.25N 76.51W	8.40
Parkville (BLS28) 39.38N 76.56W	8.38
Laurel St. Vincent Pallotti HS (WB)	8.38
Goldsboro VFC (WB)	8.26
Seaford 2 SSE 38.08 N 75.34 W	8.14
Crofton 1 NNE (MD-AA-1) 39.02N 76.67W	7.99
Clarksburg Little Bennett ES (WB)	7.90
Olney St. Peter's School (WB)	7.90
Rosedale 1 NNE (BL017) 39.33N 76.50W	7.82
Perry Hall MS (WB)	7.82
Tracy's Landing 2 WSW (CT04) 38.76N 76.64W	7.78
Boonsboro HS (WB)	7.76
Baltimore Youth in Transition School	7.55
Pimlico 1 NE (MD-BC-3) 39.37N 76.6W	7.52
Oella 1 E (BLS92) 39.27N 76.77W	7.46
Olney ES (WB)	7.45
Eckhart Mines (ALW28) 39.65N 78.90W	7.22
Baltimore Maryland Science Center (WB)	7.21
Upper Marlboro County Administration Building (WB)	7.21
Potomoc Bells Mills ES (WB)	7.20
Downtown Baltimore 1 SSE (X393076) 39.28N 76.61W	7.13
Annapolis US Naval Academy	7.09

Annapolis St. Mary's ES (WB)	7.08
Myersville ES (WB)	7.07
Darlington ES (WB)	7.03
Bowie 2 NNW (PGE12) 38.98N 76.75W	7.00
Worton	6.93
Columbia 3 ENE (HWC03) 39.21N 76.81W	6.90
Gaithersburg 2 SE (MD-HW-2) 39.34N 76.97W	6.82
Stevensville 38.99 N 76.31 W	6.77
Manchester 1 SSW (CLC12) 39.65N 76.89W	6.64
Savage 1 WSW (HWS04) 39.13N 76.84W	6.59
North Beach (X387076) 38.70N 76.53W	6.54
Glenmont 1 NNE (MOE01) 39.07N 77.04W	6.37
Stevensville 3 N 39.0 N 76.31W	6.40
Catonsville 1 ENE (BLS93) 39.27N 76.73W	6.24
Westminster 1 W (X396077) 39.57N -77.03W	6.19
Germantown 2 ESE (MO182) 39.17N 77.23W	6.19
Cavetown 1 WSW (WAS03) 39.63 N 77.60 W	6.15
Aspen Hill 2 ENE (MD-MG-5) 39.09N 77.05W	6.14
Gaithersburg 1 ENE (MO060) 39.14 N 77.20W	6.13
Bowleys Quarters (MD-BL-4) 39.31N 76.38W	6.08
Pimlico (BCN02) 39.35N 76.67W	6.01
Cloverly 1 E (MOS117) 39.10N -76.96W	6.00
Hagerstown 1 ENE (MD-WH-3) 39.64N 77.70W	5.99
Elkton 39.60 N 75.82W	5.95
Dentsville 1 SW (CHC34) 38.46N 76.91W	5.94
College Park 1 SW (PGN172) 38.98N 76.94W	5.85
Norbeck 1 ESE (MO035) 39.10 N 77.06 W	5.81
Hampton 1 W (BLC20) 39.41 N 76.59 W	5.71
Elkton 7 NNW 39.69 N 75.87 W	5.77

Myersville (X395077) 39.50 N 77.56 W	5.30
Owings 1 NNE (AAS06) 38.73 N 76.59 W	5.03
Belvedere Heights (AAC04) 39.05 N 76.50 W	5.00
Glenn Dale 3 ENE (PGE08) 39.00 N 76.75 W	5.00
New Jersey	Rainfall (inches)
Wildwood Crest 38.97 N 74.84 W	11.91
Middle Township 4.4 SW	11.41
Green Creek	11.40
North Wildwood 39.00 N 74.80 W	10.24
Seaville	10.06
Rio Grande 39.02 N 74.88 W	9.51
Milford 38.91 N 75.43 W	9.38
West Cape May 38.94 N 74.94 W	9.37
Dover 6 WNW 40.91 N 74.67 W	9.14
Dennisville 2.2 NE Lower Township	8.41
Erma	8.20
Cape May 38.94 N 74.91 W	8.10
Woodbine 0.8 NNW	7.87
Upper Township 3.2 SE	7.82
Woodbine 39.22 N 74.81 W	7.82
Cape May Courthouse 38.94 N 74.91 W	7.69
Newark 4 SSW 39.62 N 75.78 W	7.65
Hamilton Township 2.1 SE	7.57
Newport	7.30
Vineland 2.6 WSW	7.07
Estell Manor	7.06
Cedarville	7.00
Egg Harbor Township	6.83
Upper Deerfield	6.20
Barnegat 39.75 N 74.22 W	6.14
The Estell Manor School – Estell Manor (WB)	6.08
Bivalve	5.93
Folsom 3 SE 39.85 N 75.29 W	5.74
Pittsgrove Township	5.56
Hammonton 39.63 N 74.82 W	5.46
Pitman 39.73 N 75.13 W	5.31

Franklin	5.23
Malaga	5.22
Pennsylvania	
Easton 40.68 N 75.22 W	12.49
Myerstown ELCO MS (WB)	9.23
Dallastown Area HS (WB)	8.81
Hanover Clearview ES(WB)	8.71
Hanover 5.4 S	8.15
Schellsburg 2.6 WNW	7.94
Fleetwood 2.0 ESE	7.26
Dillsburg ES (WB)	7.24
Grantham Messiah College (WB)	7.19
Lampeter Martin Meylin MS (WB)	7.15
Newtown BioClinica (WB)	7.02
Nottingham DEOS 39.74N 76.05W	6.97
Carlise Lamberton MS (WB)	6.90
Glen Rock 2.2 ESE	6.82
New Salem 0.3 WSW	6.47
Landenberg 1.8 ENE	6.38
Malvern 0.5 NNE	6.32
West Chester DEOS 39.95 N 75.61 W	6.18
Littlestown 0.8 NNW	6.05
Atglen DEOS 39.94 N 75.97 W	6.00
West Chester 1.8 SE	5.96
Kennett Square 39.84 N 75.71 W	5.93
Landenburg	5.90
West Chester 39.95 N 75.61 W	5.78
Kennett Square DEOS 39.84 N 75.71 W	5.68
Exton 40.03 N 75.63 W	5.59
West Grove DEOS 39.82 N 75.83 W	5.12
Unionville	5.12
Media 39.91 N 75.39 W	5.02
New York	
Warsaw ES (WB)	7.07
Riverhead MS (WB)	6.52
Whitesville	4.83
Hamburg 1 S	4.59
Perrysburg	4.41
Dunkirk 1 SW	4.09
Lockport 0.8 NE	3.87
Batavia Genessee	3.80
Sherman 0.4 ENE	3.50
Niagara Falls International Aiport (KIAG)	3.32
Lancaster 4.1 ENE	3.26

Alcott Center	3.25
West Almond 3.6 SW	3.14
Dansville 1.0 ENE	3.06
Elma Center 0.7 SE	3.06
Rhode Island	
Woonsocket 1.3 ESE	2.98
Manville 0.2 NE	2.83
Little Compton 1.7 NW	2.40
Massachusetts	
Leominster 1.5 S	4.40
Foxborough 0.4 S	3.91
Fitchburg	3.86
North Ashburnham	3.70
Natick 1.7 NNE	3.56
Action 1.3 SW	3.49
Norwood 1.3 NW	3.47
East Milton	3.39
Andover 1.5 W	3.34
Pepperell	3.30
Ashburnham	3.20
Ayer	3.11
Norton 1.8 NNE	2.80
Millis 0.6 SSE	2.65
Northborough 0.6 SSE	2.60
New Hampshire	
Gorham 3.1 S	8.45
Randolph 1.4 NE	6.11
Center Sandwich 4.9 E	5.19
New Ipswich 0.8 S	4.72
Unity 3.2 ENE	4.14
Greenville 1.1 ENE	4.06
Newbury 1.6 NW	4.00
Hillsborough 2.1 NNW	3.51
Brooksfield 0.9 WSW	3.50
Hollis 2.9 ENE	3.50
Maine	
Kingbury 2 SSE	4.60
Greenville 2 E	4.24
Pembroke 5.4 SSE	3.30
Norway 11.5 WNW	3.26
Old Town 1 SE	3.24
Whiting 3 NNE	3.00
New Sharon 2.0 NW	2.95
Acton 2.7 NW	2.69
Lubec 4.1 W	2.65
Belmont 2.7 SSE	2.62
Blanchard	2.58
Shirley	2.52
Ohio	
Kirtland 0.9 SW	7.04
North Ridgeville 2.8 W	6.79
Painesville 3.8 SSW	6.51
Broadview Heights 1.5 NW	6.33

Elyria 0.4 SE	5.80
Brunswick 0.5 NE	5.57
Wakeman 4.6 NNE	5.50
South Russell 2.0 W	5.42

Table 7. Selected snowfall totals associated with Sandy and its post-tropical remnants, 28-31 Oct. 2012

West Virginia	**Snowfall (in inches)**
1 SE Richwood	36.0
2 NNW Clayton	33.0
Quinwood	29.0
Summerville	28.0
Flat Top	28.0
Davis	28.0
Huttonsville 5 WSW	28.0
Craigsville	26.0
Alpine Lake	24.0
Alexander	24.0
Mingo 2 SSE	24.0
Nettie	24.0
Terra Alta	24.0
2 E Kitzmiller	24.0
Bayard	22.3
Beverly	21.0
French Creek	18.5
Runa 0.1 W	18.1
Beaver	18.0
MacArthur 1 E	18.0
Snowshoe 1 S	18.0
Webster Springs	17.0
1 SSW Valley Head	17.0
Hazelton	16.0
Buckhannon	15.0
Fayatteville 11 E	15.0
Princeton	15.0
1 SW Bluefield	14.5
Elkins	14.0
Crawley	13.0
Lashmeet	12.0
5 SW Nebo	11.0
Bluefield	11.0
3 WSW Cherry Grove	10.0
Athens	9.5
2 N Athens	9.0
2 SSW Mullens	7.0
1 SE Buckhannon	6.0
Pipestem	6.0
Hinton	5.0
Kentucky	
Whitesburg 4 SE	18.0

Payne Gap	14.0
Lynch 3 S	14.0
Kingdom Come S.P.	10.2
Elko 1 NW	9.0
Vicco 4 SE	7.0
Benham 3 S	6.0
Viper	6.0
Harlan 5 N	6.0
North Carolina	
Cove Creek 10 NW	24.0
Faust	24.0
Newfound Gap	22.0
Clifton	14.0
Elk Park	14.0
Buladean	12.0
Beech Mountain	12.0
Bakersville 5 N	11.0
Boone	11.0
Beech Mountain 1 SE	10.0
Grayson Highlands	10.0
Flat Springs	9.8
Ashland	9.0
Lansing	9.0
4 NW Sugar Grove	7.0
Flat Springs	7.0
1 WSW Rominger	6.0
Deep Gap	6.0
Virginia	
Norton 2 S	24.0
Tazewell 2 N	15.0
Wise 6 E	14.0
Big Meadows	12.0
Lebanon	12.0
Tazewell	10.0
Grayson Highlands Station	10.0
Richlands	9.0
Burkes Garden	8.4
Honaker	8.0
Mouth of Wilson	8.0
Richlands	8.0
Bland	7.0
Mountain Lake	7.0
Marion 2.4 ENE	6.0
Flat Ridge	5.0
1 W McMullin	5.0
Ceres	5.0
Maryland	
Redhouse	29.0
Deep Creek Lake	26.0
Finzel	24.0
Oakland	24.0
Champoin 4 SE	13.0
Grantsville	12.0

Frostburg	6.0
Ohio	
Bellefontaine	4.5
Washington Court House	3.0
Mansfield	2.5
Pennsylvania	
Champion 4 SE	13.0
Laurel Summit	10.0
Mount Davis	9.0
Farmington	8.8
Stahlstown	6.0
Chalkhill 2 ENE	5.1
Tennessee	
Gatlinburg 5 SE	34.0
Roan Mountain	19.0
Newfound Gap	18.0
Mount Leconte	17.0

Table 8. Direct deaths associated with Sandy by country.

Country	Direct Deaths
United States	72
Haiti	54
Cuba	11
Dominican Republic	3
Bahamas	2
Atlantic Ocean (~90 n mi offshore of North Carolina)	2
Canada	1
Jamaica	1
Puerto Rico	1
Total	147

Table 9. Direct U.S. deaths associated with Sandy by state.

State	Direct Deaths
New York	48
New Jersey	12
Connecticut	5
Pennsylvania	2
Virginia	2
New Hampshire	1
West Virginia	1
Maryland	1
Total	72

Table 10a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Sandy. Mean errors for the 5-yr period 2007-11 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	72	96	120
OFCL	**23.9**	**33.2**	**39.6**	**41.6**	**61.3**	**88.3**	**148.9**
OCD5	56.7	118.2	189.7	252.1	360.8	477.9	647.3
Forecasts	28	26	24	22	18	14	10
OFCL (2007-11)	30.4	48.4	65.9	83.1	124.4	166.5	213.4
OCD5 (2007-11)	46.9	95.2	151.7	211.6	316.8	404.3	485.2

Table 10b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Sandy. 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 10a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	21.7	30.6	37.9	40.2	58.7	74.5	139.7
OCD5	57.3	119.8	190.8	239.0	324.5	434.0	613.0
GFSI	21.9	31.2	43.5	**38.3**	76.7	142.9	241.9
GHMI	25.9	38.6	52.8	66.5	74.6	108.6	146.7
HWFI	29.6	48.4	62.1	54.3	91.0	206.1	374.2
EMXI	23.2	32.1	46.5	53.6	101.9	79.8	**71.4**
AEMI	**20.5**	**27.1**	**34.5**	**34.5**	**55.4**	108.6	164.4
TVCA	**21.1**	**29.1**	**36.6**	**31.2**	**54.3**	96.0	181.3
FSSE	**20.1**	**24.8**	**33.9**	**29.1**	**56.1**	87.3	142.2
BAMD	69.7	129.3	185.0	226.7	202.1	190.6	**119.1**
BAMM	41.0	69.5	76.6	54.8	62.0	164.4	225.8
BAMS	72.2	123.7	154.6	157.1	131.2	229.8	310.0
Forecasts	25	23	21	19	16	12	8

Table 11a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Sandy. Mean errors for the 5-yr period 2007-11 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	72	96	120
OFCL	8.0	**10.6**	**11.0**	**10.9**	**10.3**	**8.9**	**14.5**
OCD5	10.6	14.0	16.9	17.2	18.0	22.9	27.9
Forecasts	28	26	24	22	18	14	10
OFCL (2007-11)	7.1	10.8	13.0	15.0	16.9	17.1	18.1
OCD5 (2007-11)	8.4	12.4	15.4	17.7	20.5	21.5	21.2

Table 11b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Sandy. 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 11a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	8.3	11.3	11.8	11.0	6.6	8.3	12.5
OCD5	10.6	14.6	16.7	16.1	13.7	21.9	30.8
GHMI	8.8	**10.7**	13.2	13.1	9.2	8.8	**7.1**
HWFI	9.8	12.6	**10.5**	**9.3**	9.8	**7.3**	**9.6**
DSHP	9.8	13.6	15.0	13.9	12.1	15.3	33.1
LGEM	9.5	14.2	16.3	17.8	17.8	21.9	29.1
IVCN	8.8	11.8	12.7	12.6	7.8	9.8	18.1
FSSE	8.5	12.0	13.0	13.5	13.4	15.8	17.3
GFSI	9.8	13.0	14.7	15.5	11.4	11.0	**12.4**
EMXI	9.5	14.5	16.7	18.1	13.0	9.0	**3.4**
Forecasts	26	24	22	20	16	12	8

Table 12. Tropical cyclone watches and warnings for Hurricane Sandy, 22 – 29 Oct 2012.

Date/Time (UTC)	Action	Location
22 / 1500	Tropical Storm Watch issued	Jamaica
23 / 0900	Tropical Storm Watch changed to Tropical Storm Warning	Jamaica
23 / 0900	Hurricane Watch issued	Jamaica
23 / 0900	Tropical Storm Watch issued	Haiti
23 / 1500	Tropical Storm Warning changed to Hurricane Warning	Jamaica
23 / 1500	Tropical Storm Watch issued	Southeastern and Central Bahamas
23 / 1500	Hurricane Watch discontinued	Jamaica
23 / 1500	Hurricane Watch issued	Camagüey to Guantánamo
23 / 1800	Tropical Storm Watch changed to Tropical Storm Warning	Haiti
23 / 2100	Hurricane Watch changed to Hurricane Warning	Camagüey to Guantánamo
23 / 2100	Tropical Storm Watch issued	Northwestern Bahamas
24 / 0300	Tropical Storm Warning issued	Central Bahamas
24 / 0900	Tropical Storm Watch issued	Jupiter Inlet to Ocean Reef
24 / 0900	Tropical Storm Watch issued	Ocean Reef to Craig Key
24 / 1200	Tropical Storm Watch changed to Tropical Storm Warning	Northwestern Bahamas
24 / 1200	Tropical Storm Watch modified to	Jupiter Inlet to Ocean Reef
24 / 1500	Tropical Storm Watch modified to	Volusia/Brevard County Line to Ocean Reef
24 / 1500	Tropical Storm Watch modified to	Volusia/Brevard County Line to Ocean Reef
24 / 1500	Hurricane Watch issued	Central and Northwestern Bahamas
24 / 1800	Tropical Storm Watch modified to	Volusia/Brevard County Line to Ocean Reef
24 / 2100	Tropical Storm Warning changed to Hurricane Warning	Central and Northwestern Bahamas
24 / 2100	Tropical Storm Watch modified to	Ocean Reef to Craig Key
24 / 2100	Tropical Storm Watch issued	Sebastian Inlet to Flagler Beach
24 / 2100	Tropical Storm Warning issued	Ocean Reef to Sebastian Inlet
24 / 2100	Hurricane Watch discontinued	All
25 / 0300	Tropical Storm Watch changed to Tropical Storm Warning	Southeastern Bahamas
25 / 0300	Tropical Storm Warning issued	Lake Okeechobee
25 / 0300	Hurricane Warning issued	Ragged Islands
25 / 0900	Tropical Storm Watch modified to	Flagler Beach to Fernandina Beach
25 / 0900	Tropical Storm Warning modified to	Ocean Reef to Flagler Beach
25 / 0900	Hurricane Warning discontinued	Jamaica
25 / 1500	Tropical Storm Warning discontinued	Haiti

25 / 1500	Hurricane Warning discontinued	Camagüey to Guantánamo
26 / 0300	Hurricane Warning changed to Tropical Storm Warning	Central Bahamas
26 / 0300	Tropical Storm Warning discontinued	Southeastern Bahamas
26 / 0300	Hurricane Warning discontinued	Ragged Islands
26 / 0300	Hurricane Warning issued	Northwestern Bahamas
26 / 0600	Tropical Storm Warning issued	Andros Island
26 / 0900	Tropical Storm Watch issued	Savannah River to Oregon Inlet
26 / 1500	Hurricane Warning changed to Tropical Storm Warning	Northwestern Bahamas except Great Abaco and Grand Bahama
26 / 1500	Tropical Storm Watch discontinued	Ocean Reef to Craig Key
26 / 1500	Tropical Storm Watch issued	Bermuda
26 / 1500	Tropical Storm Warning discontinued	Central Bahamas
26 / 1500	Tropical Storm Warning discontinued	Andros Island
26 / 1500	Hurricane Warning changed to Tropical Storm Warning	Great Abaco to Grand Bahama Island
26 / 1800	Hurricane Warning changed to Tropical Storm Warning	Great Abaco to Grand Bahama Island
26 / 1800	Tropical Storm Warning modified to	Deerfield Beach to Flagler Beach
26 / 1800	Tropical Storm Warning discontinued	Northwestern Bahamas except Great Abaco and Grand Bahama Island
26 / 2100	Tropical Storm Watch modified to	St. Augustine to Fernandina Beach
26 / 2100	Tropical Storm Watch modified to	Savannah River to South Santee River
26 / 2100	Tropical Storm Warning modified to	Deerfield Beach to St. Augustine
26 / 2100	Tropical Storm Warning discontinued	Lake Okeechobee
26 / 2100	Tropical Storm Warning issued	South Santee River to Duck
27 / 0000	Tropical Storm Warning modified to	Jupiter Inlet to St. Augustine
27 / 0900	Tropical Storm Warning modified to	Sebastian Inlet to St. Augustine
27 / 1500	Tropical Storm Watch discontinued	St. Augustine to Fernandina Beach
27 / 1500	Tropical Storm Warning discontinued	Sebastian Inlet to St. Augustine
27 / 2100	Tropical Storm Watch changed to Tropical Storm Warning	Bermuda
27 / 2100	Tropical Storm Warning discontinued	Great Abaco to Grand Bahama Island
28 / 0300	Tropical Storm Watch discontinued	All
28 / 0900	Tropical Storm Warning modified to	Cape Fear to Duck
28 / 2100	Tropical Storm Warning modified to	Surf City to Duck
29 / 1500	Tropical Storm Warning discontinued	Bermuda
29 / 2100	Tropical Storm Warning discontinued	All

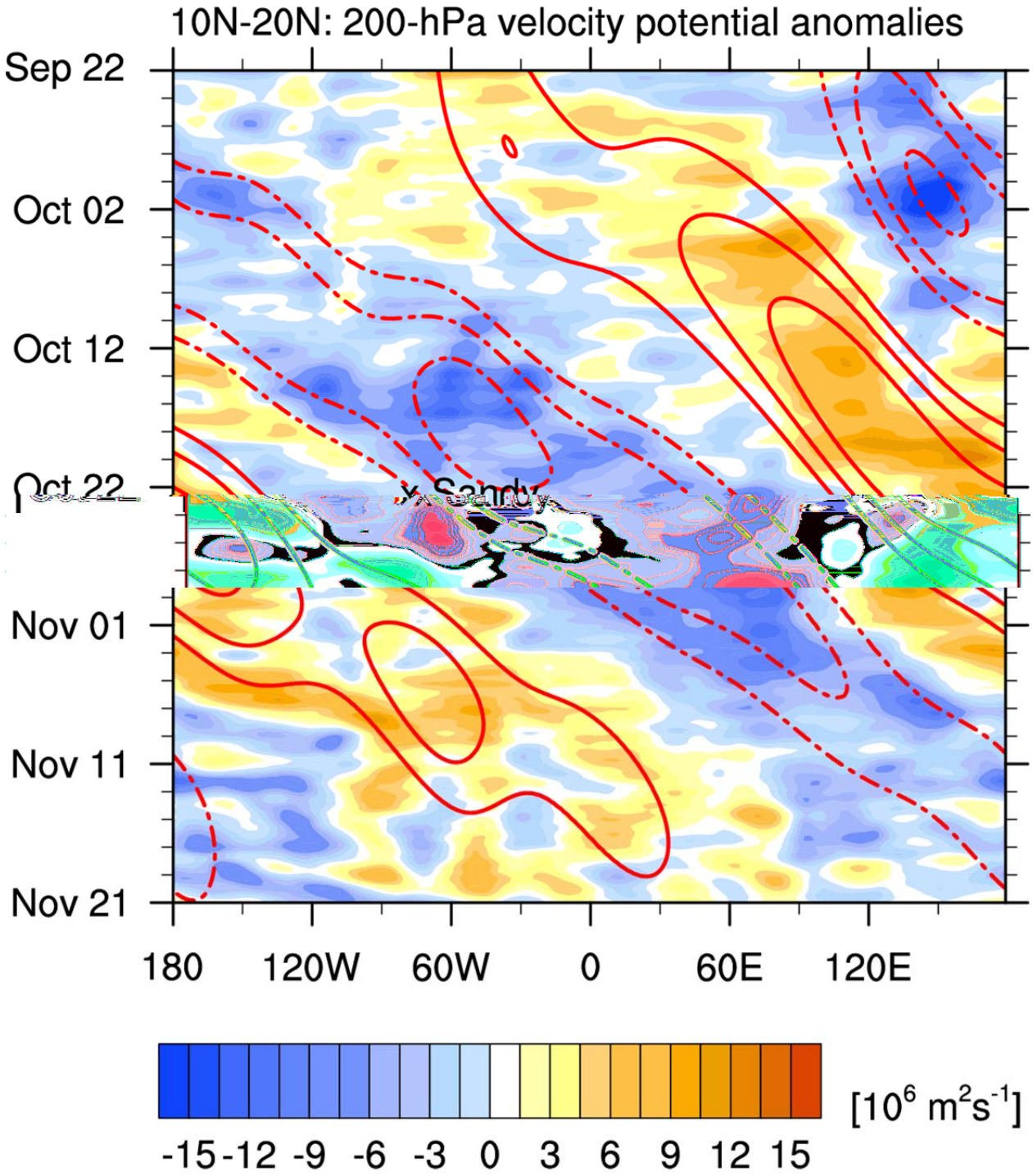

Figure 1. Velocity potential anomalies at 200 mb (VP200) from 10°N-20°N. The shading shows unfiltered VP200 anomalies (negative values [in blue] represent mass divergence). Red contours show MJO-filtered VP200 anomalies; dashed lines represent the upper-level divergent (convectively active) phase of the MJO. The contour interval begins at 1 standard deviation and is in 0.5 standard deviation increments thereafter. Figure courtesy of Michael Ventrice (SUNY-Albany).

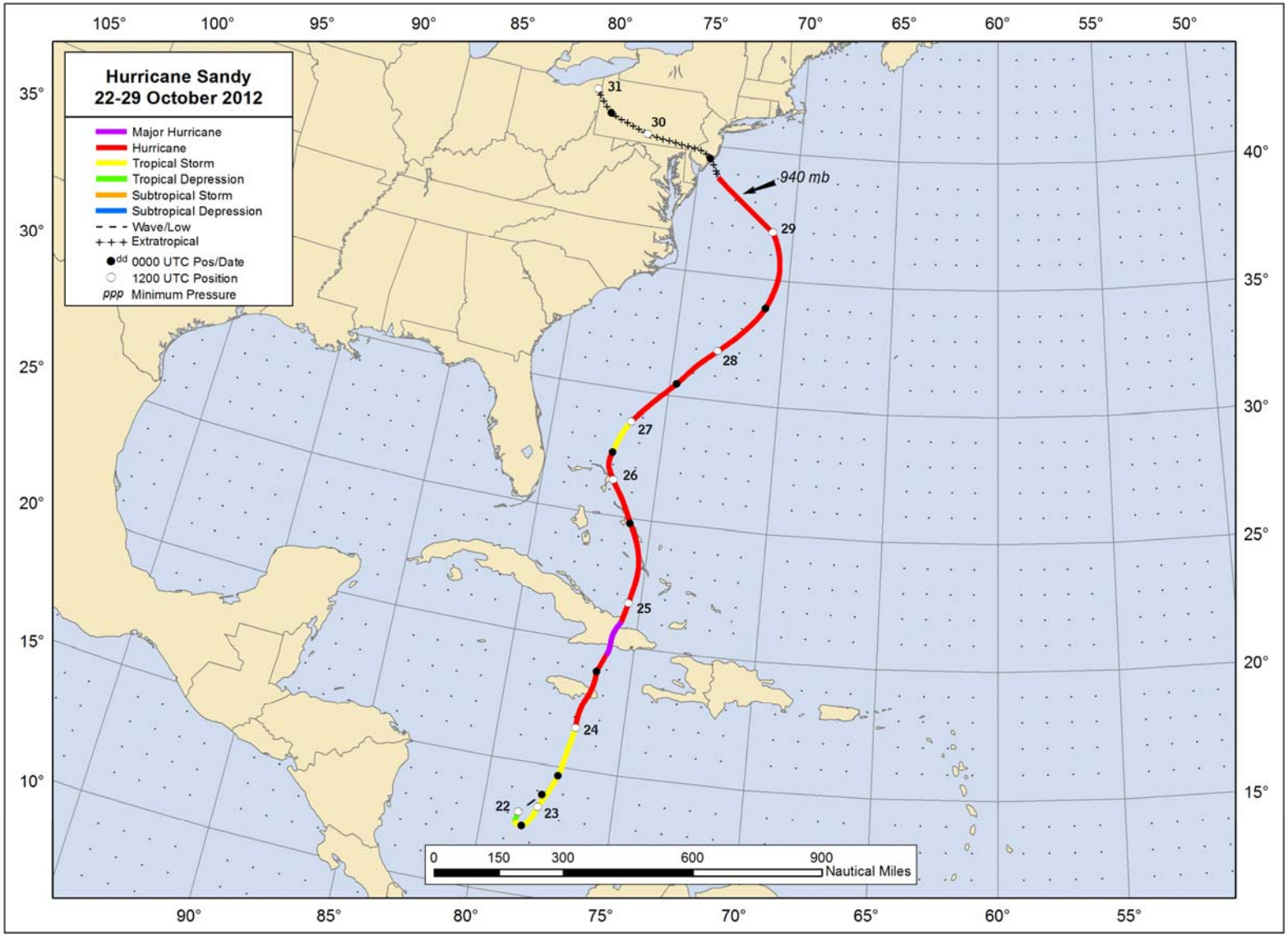

Figure 2. Best track positions for Hurricane Sandy, 22 - 29 October 2012.

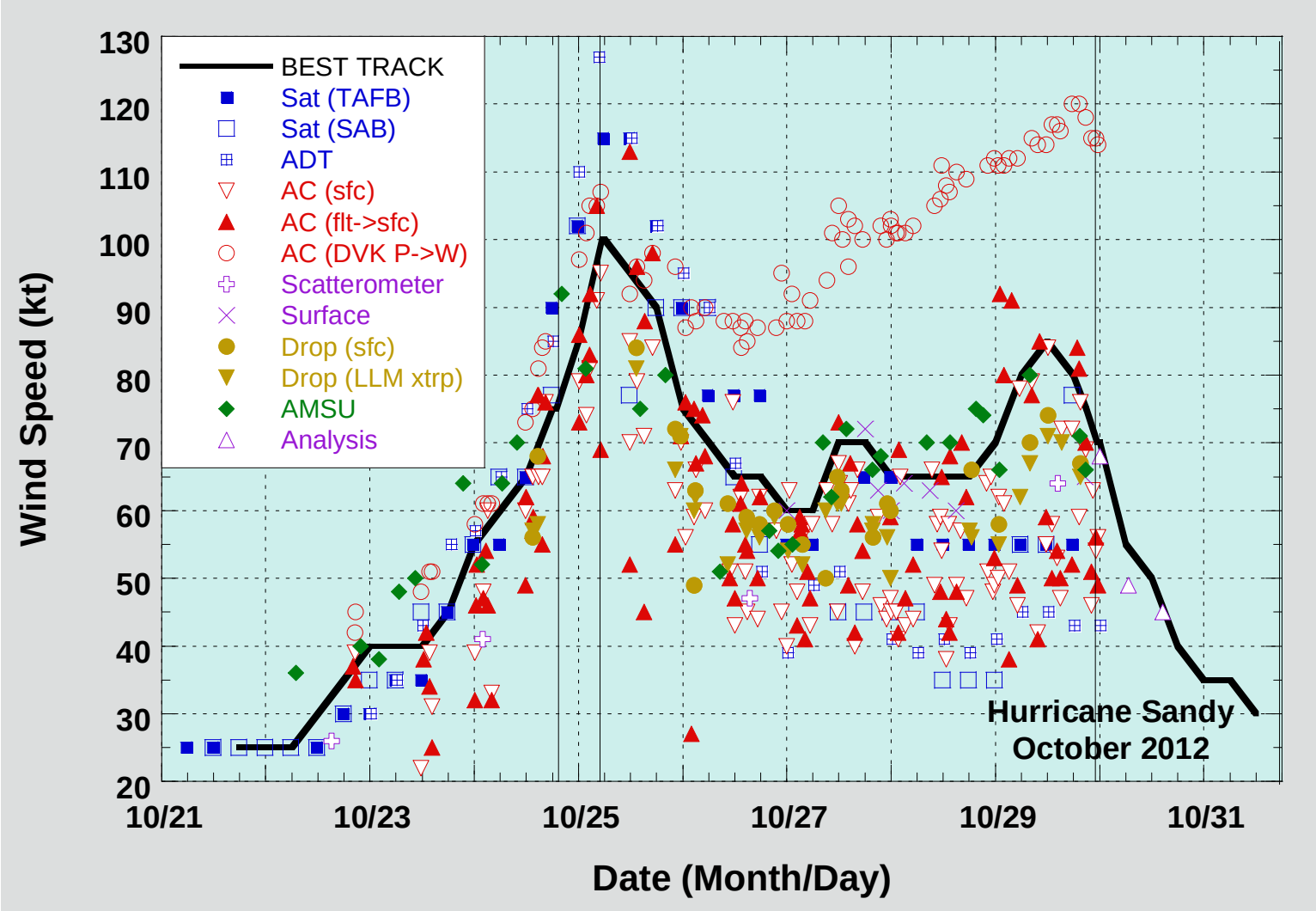

Figure 3. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Sandy, 22 – 29 October 2012. Advanced Dvorak Technique (ADT) estimates courtesy of UW-CIMSS. AMSU estimates are derived from the UW-CIMSS technique. Dashed vertical lines correspond to 0000 UTC. The solid vertical lines correspond to the times of landfall.

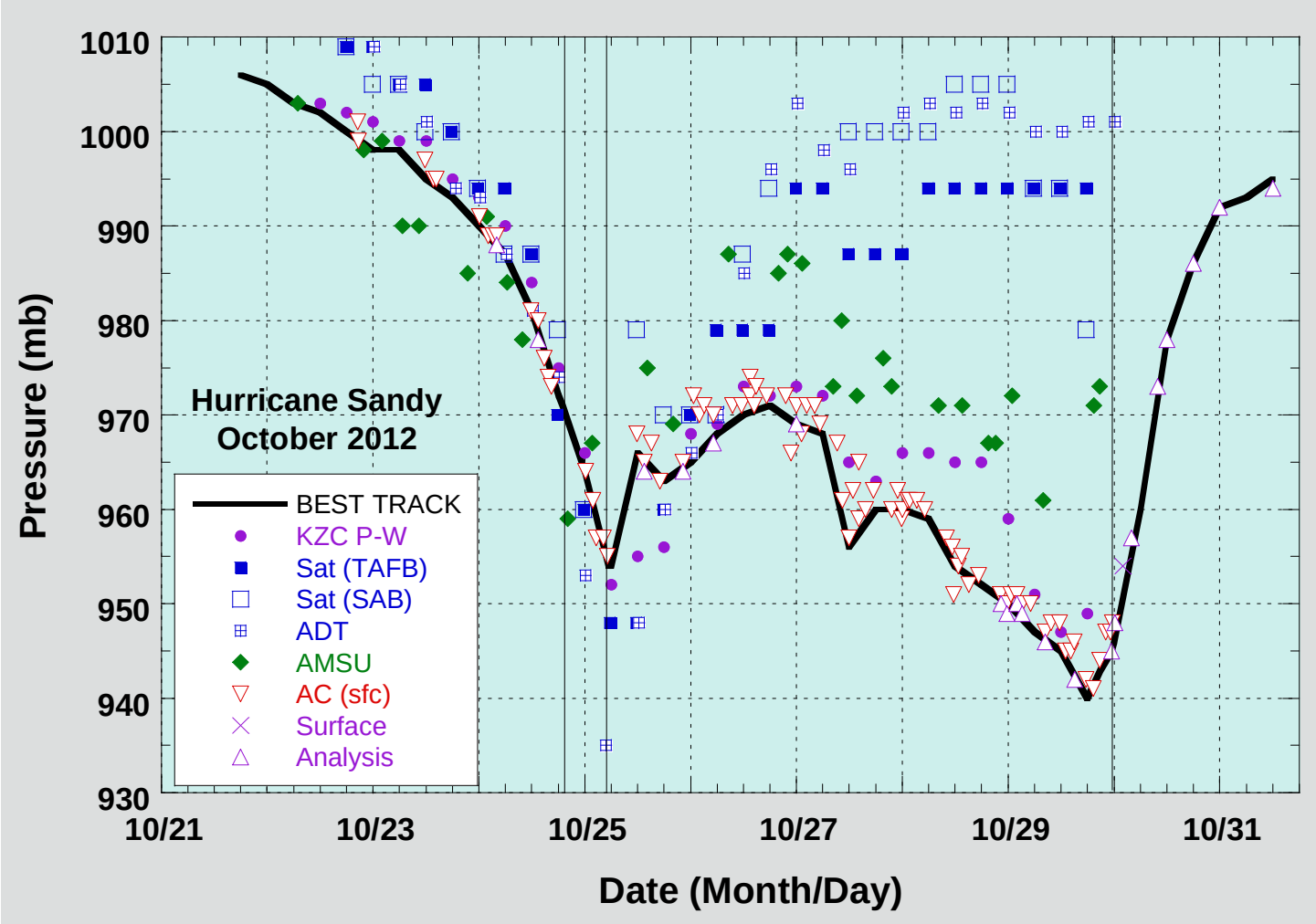

Figure 4. Selected pressure observations and best track minimum central pressure curve for Hurricane Sandy, 22 – 29 October 2012. Advanced Dvorak Technique (ADT) estimates courtesy of UW-CIMSS. Dashed vertical lines correspond to 0000 UTC. KZC P-W refers to pressure estimates derived by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind speeds. AMSU estimates are derived from the UW-CIMSS technique. The solid vertical lines correspond to the times of landfall.

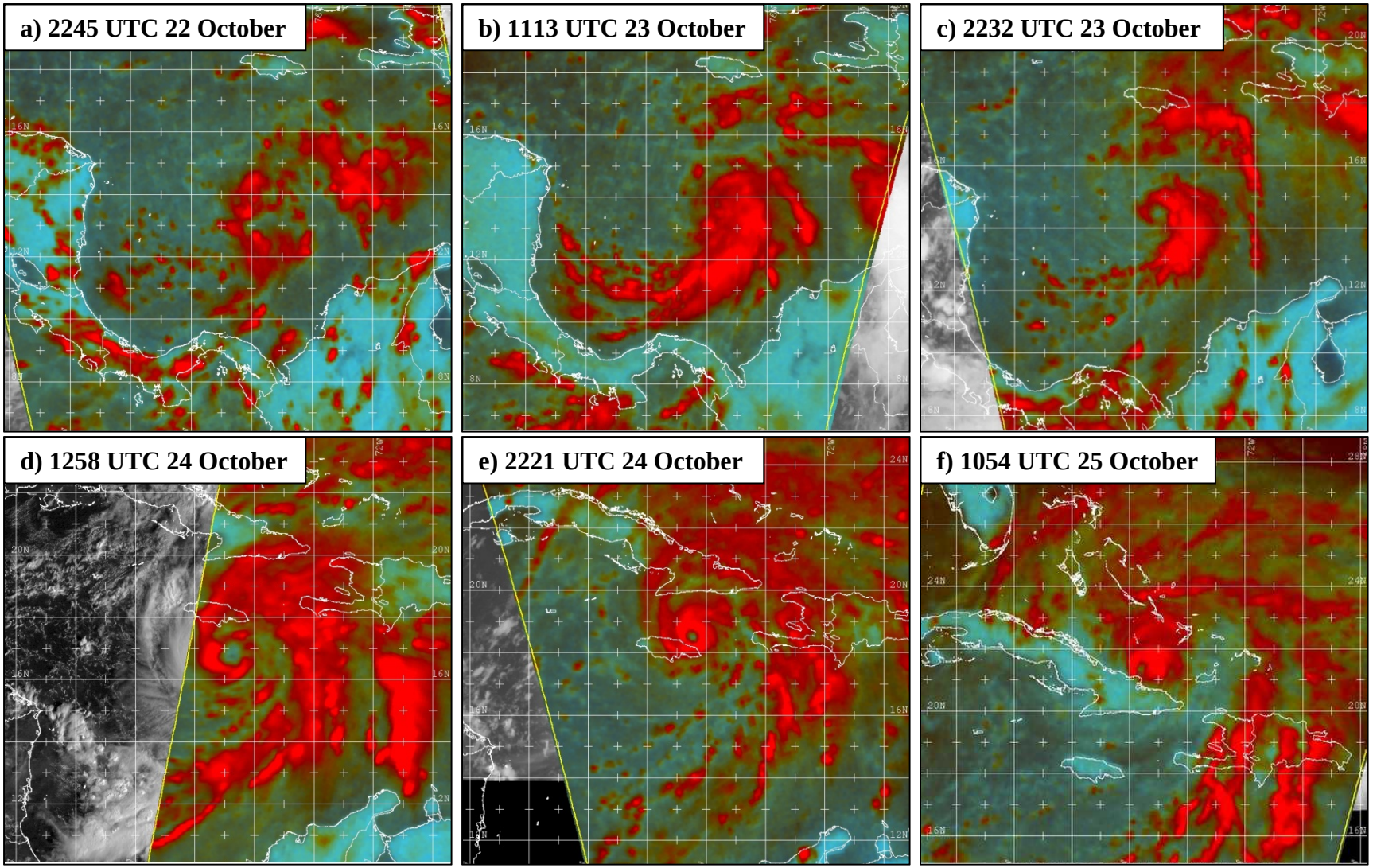

Figure 5. Series of 85-gHz microwave images showing the gradual and then rapid development of Sandy during its time in or near the Caribbean Sea, 22-25 October. Images courtesy of the Naval Research Lab in Monterey, California.

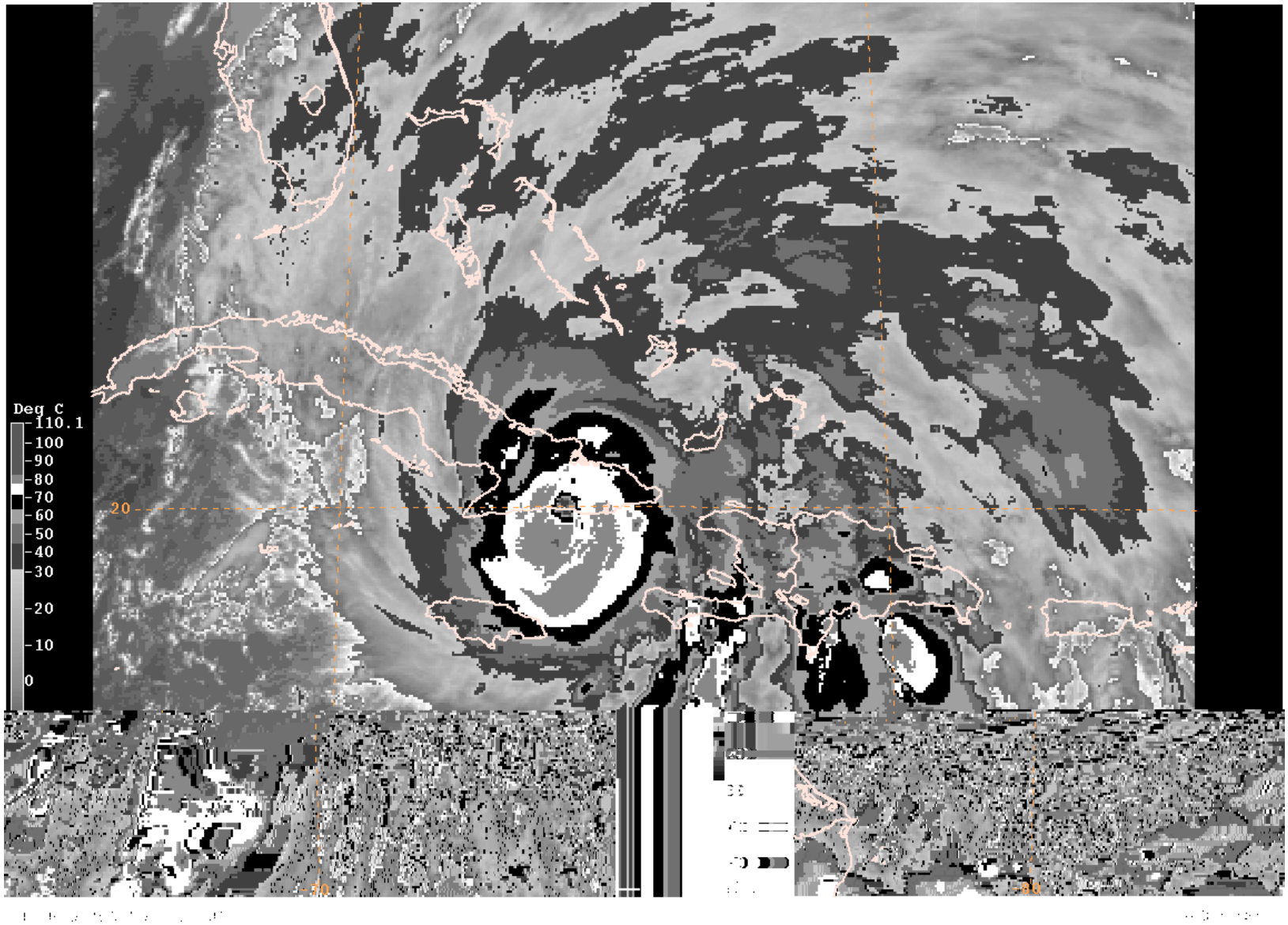

Figure 6. GOES-E infrared satellite image of Sandy at 0515 UTC 25 October, close to the time of peak intensity and landfall.

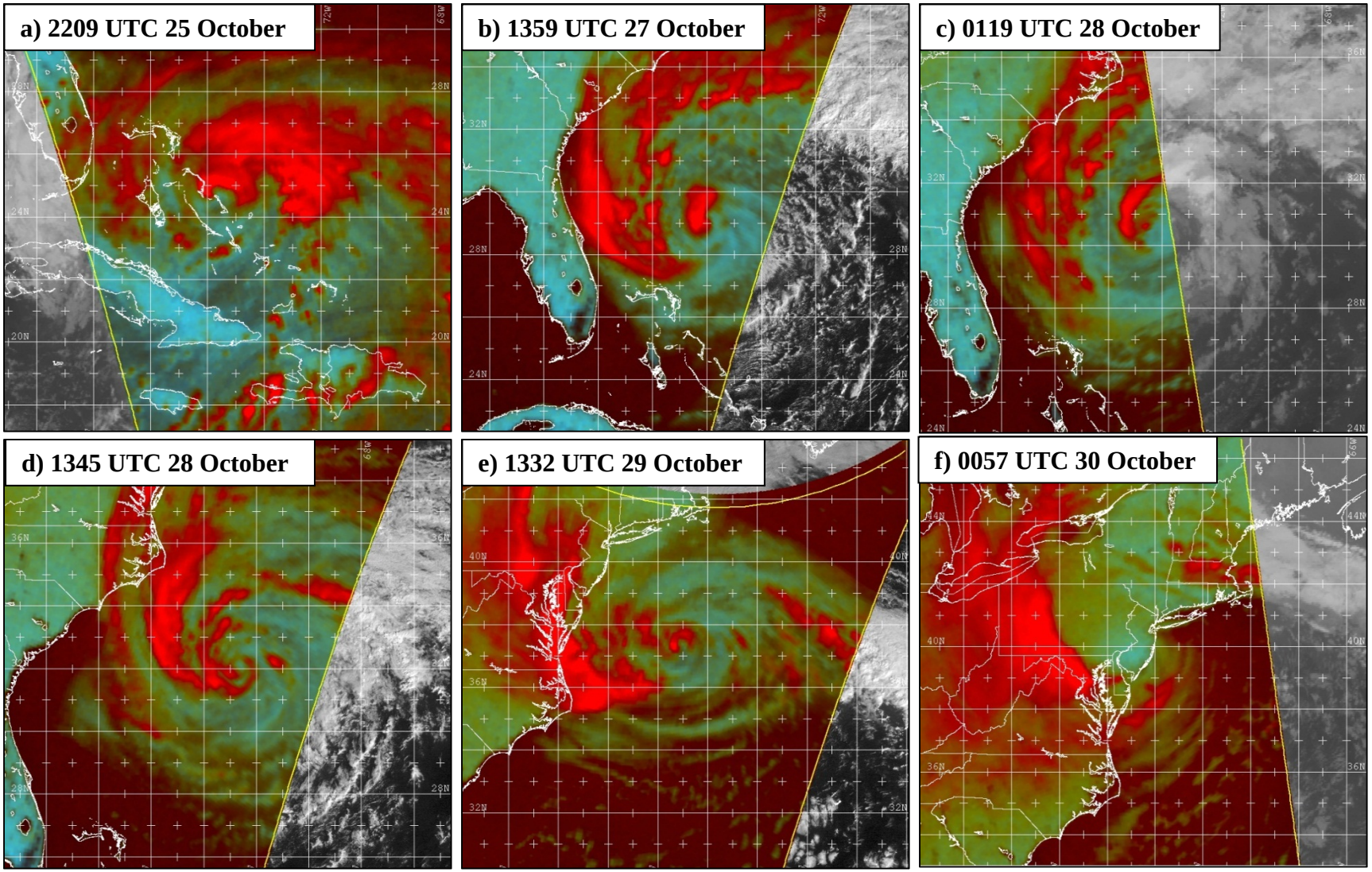

Figure 7. Series of 85-GHz microwave images showing the structural evolution of Hurricane Sandy during its track from the Bahamas until its landfall in New Jersey. Images courtesy of the Naval Research Lab in Monterey, California.

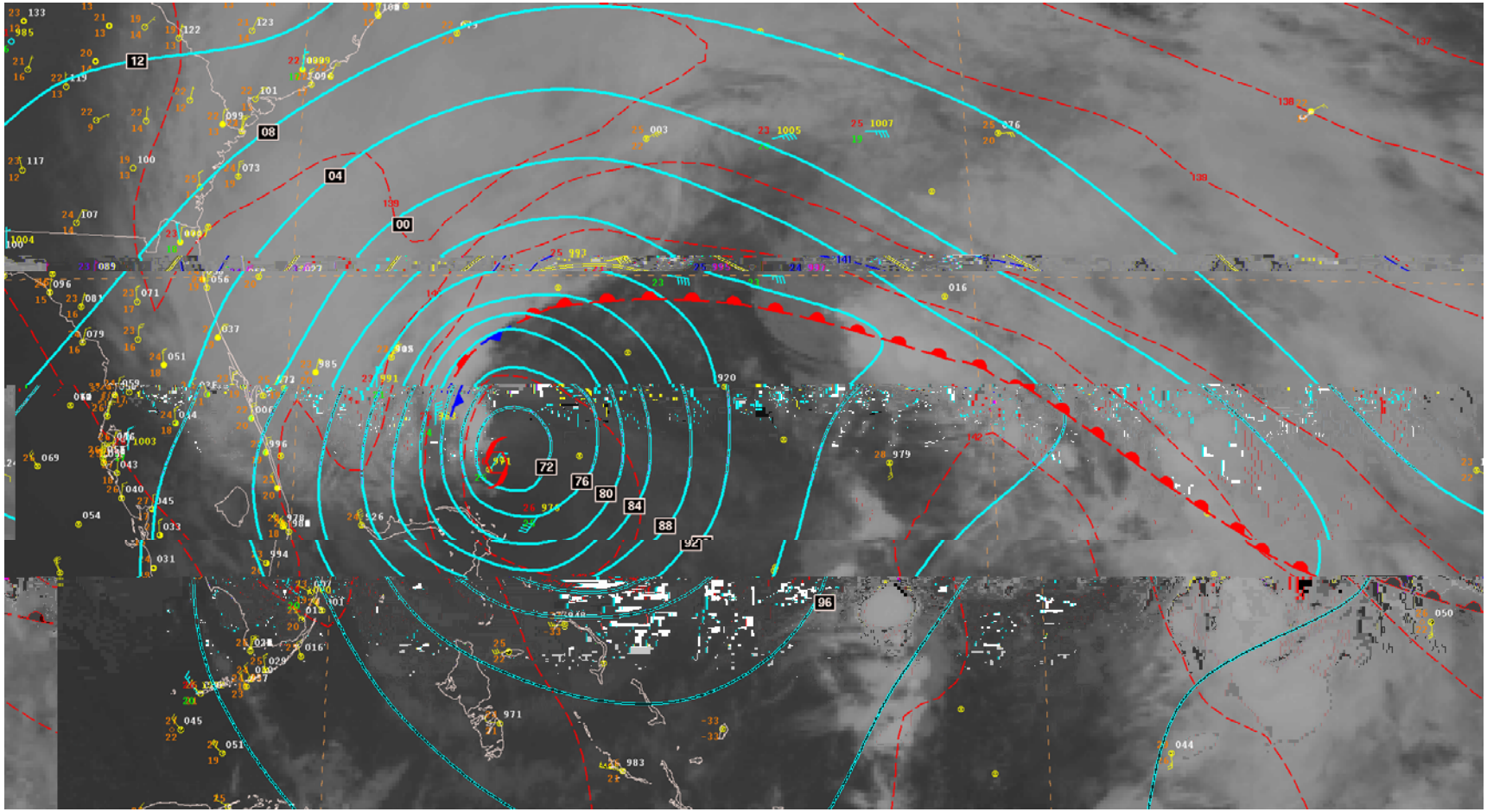

Figure 8. NHC surface post-analysis of Sandy north of the Bahamas valid at 0000 UTC 27 October, superimposed on with the GOES-E infrared satellite picture at 2345 UTC 26 October. Isobars (blue lines, 4-mb contours), and the 1000-850 mb thickness (red dashed lines, in dekameters) values are from the GFS analysis at 0000 UTC 27 October.

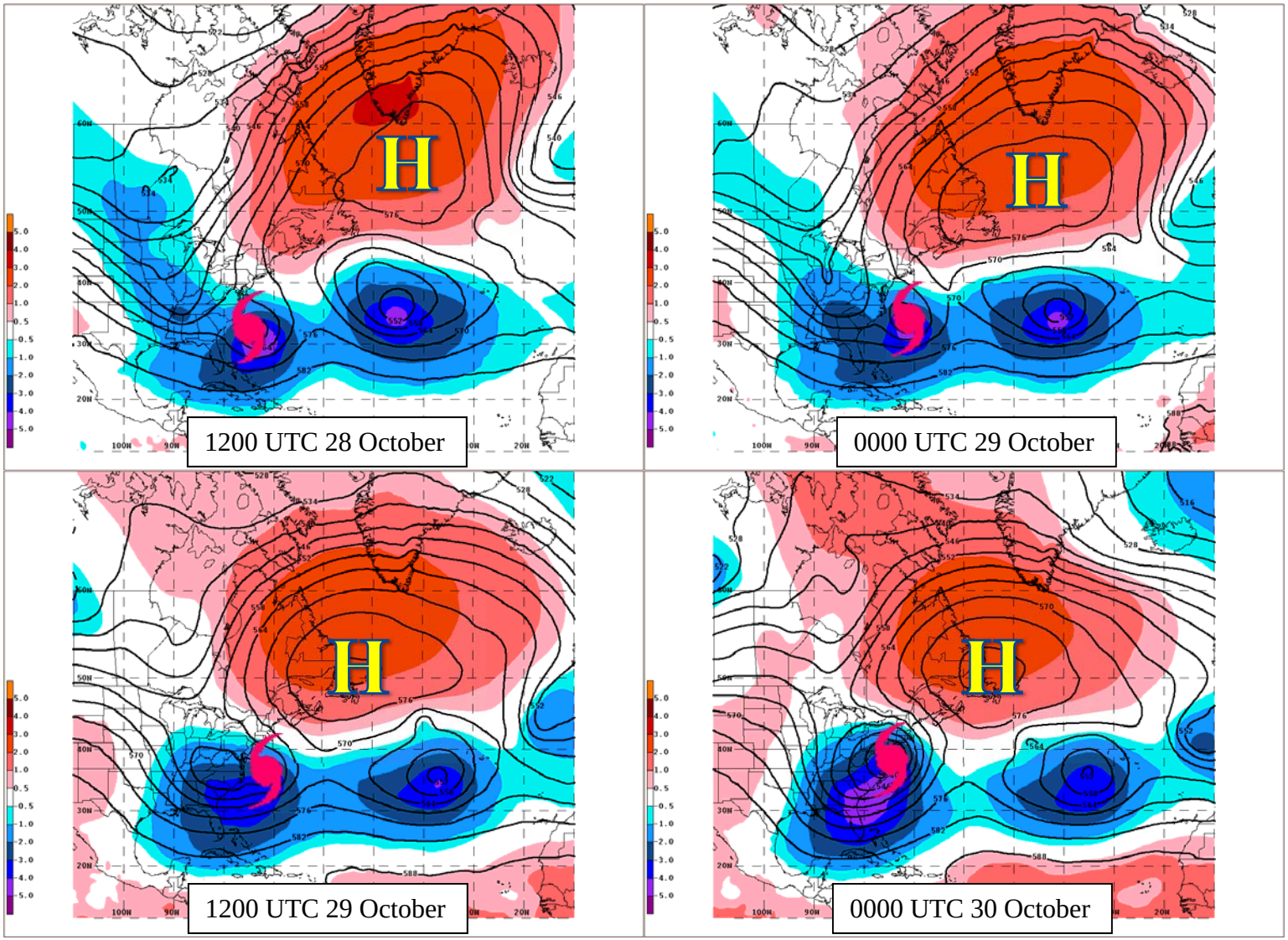

Figure 9. GFS analyses of 500-mb geopotential heights (contours) and standardized anomalies (shaded in standard deviations relative to a 1948-2011 mean) from 28-30 Oct. 2012. Red shaded regions indicate anomalously high heights and blue shaded areas represent anomalously low heights. Sandy is denoted by the hurricane symbol.

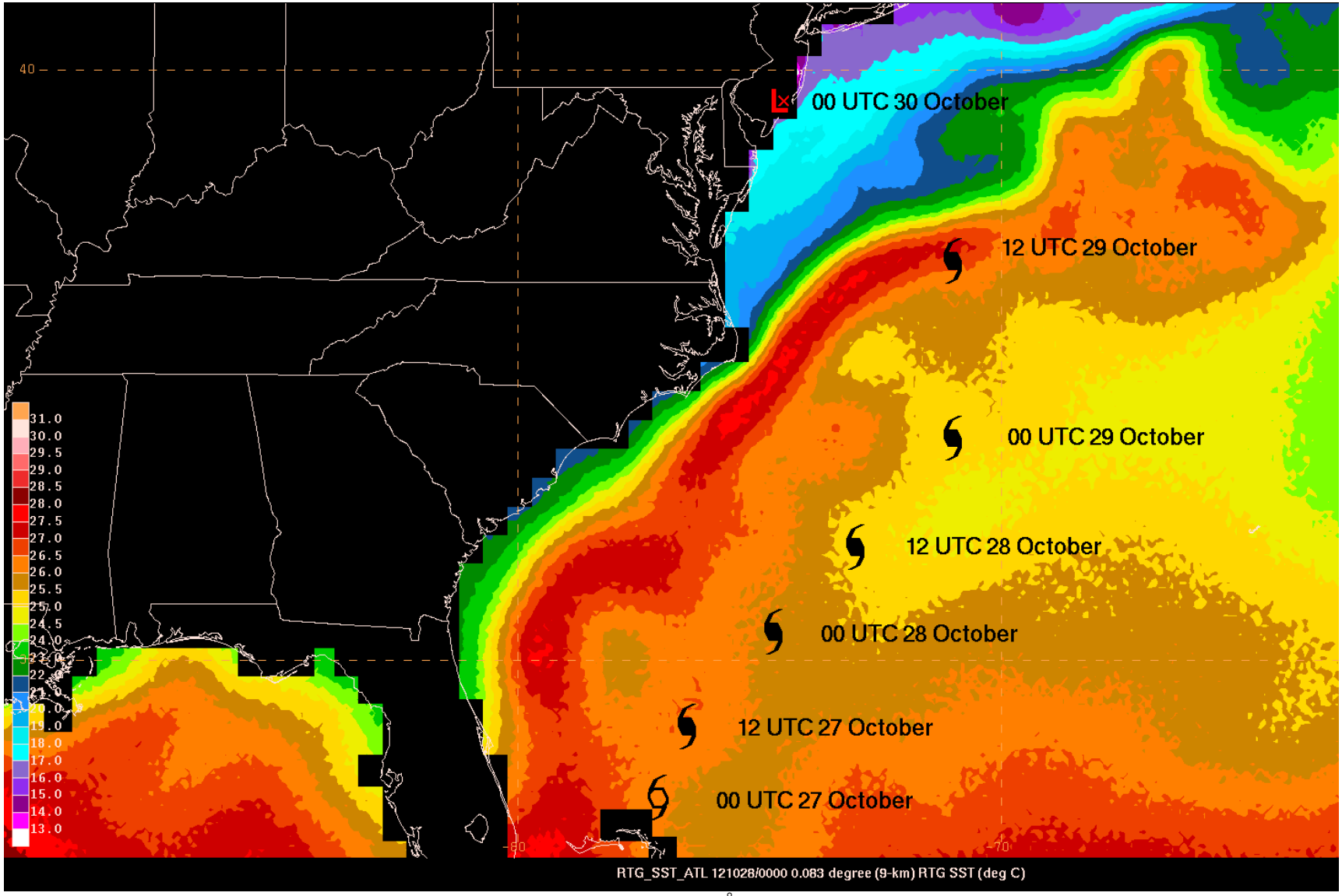

Figure 10. SSTs (°C) on 28 Oct 2012 from the NCEP real-time global 1/12° analysis, with the best track of Sandy plotted at 12-h intervals.

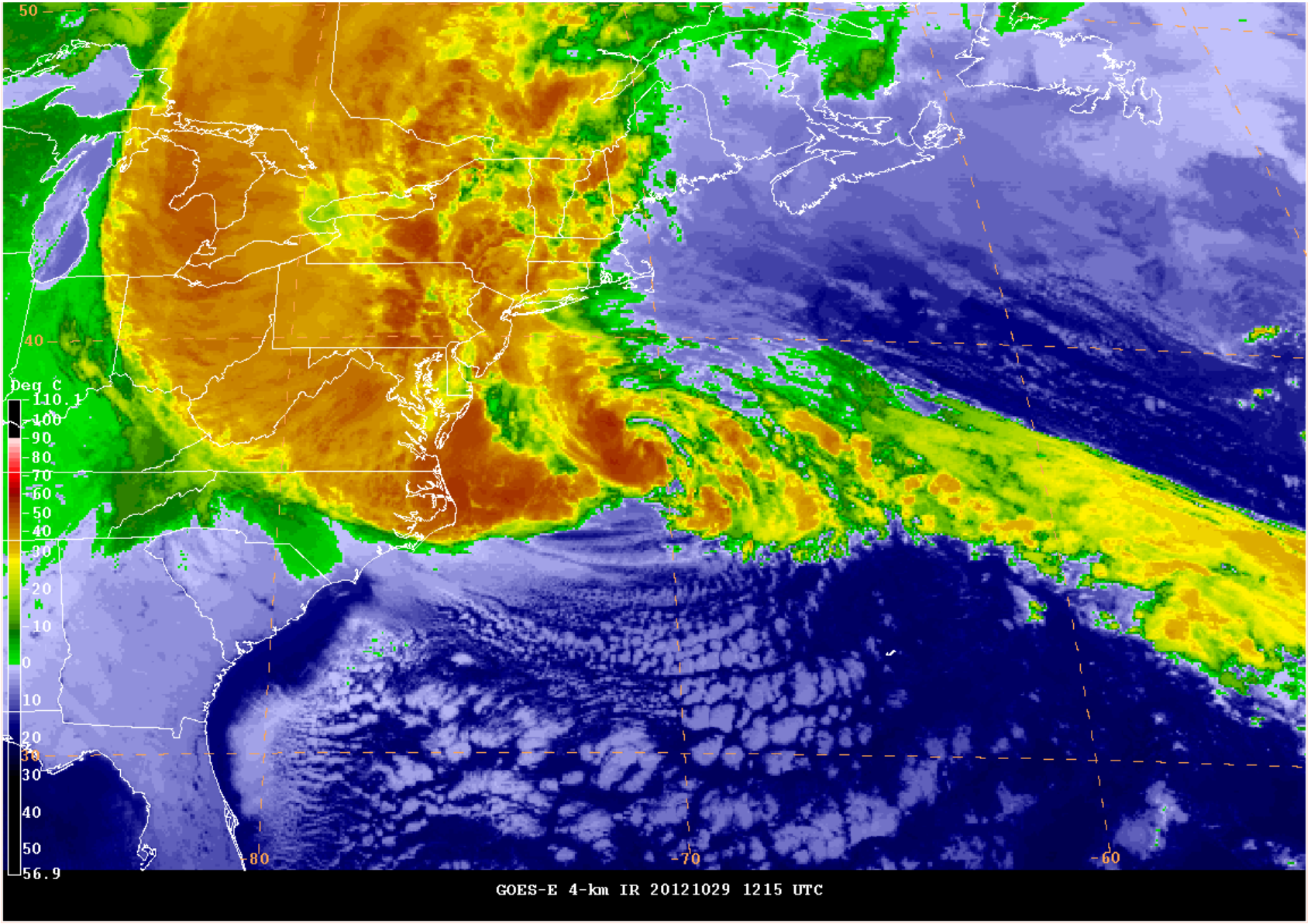

Figure 11. GOES-E infrared satellite image of Sandy at 1215 UTC 29 October 2012, near its secondary peak intensity.

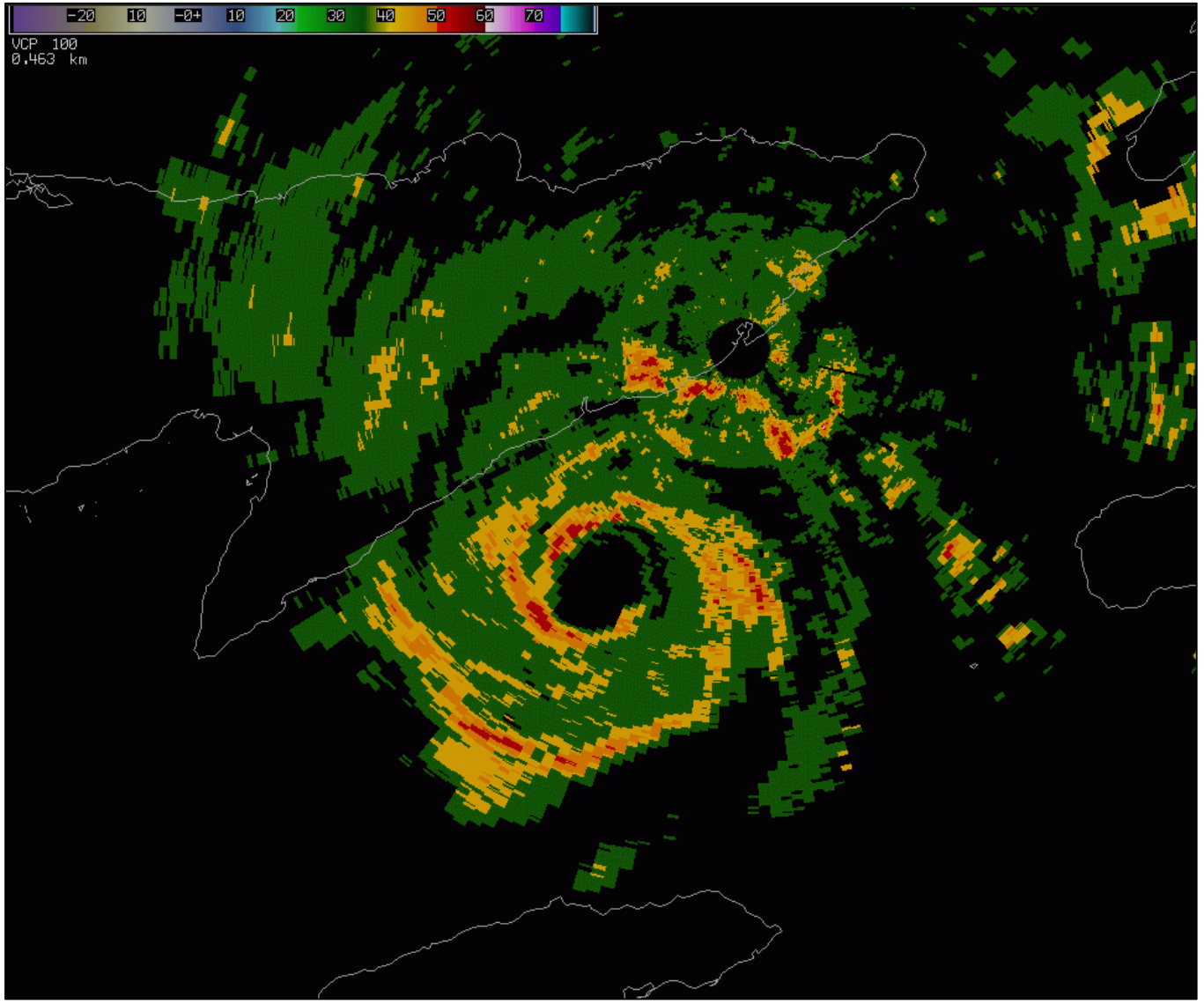

Figure 12. Guantánamo Bay Naval Base ARSR-4 FAA ATC Doppler radar reflectivity image showing the eye of Sandy approaching Santiago de Cuba at 0332 UTC 25 October 2012.

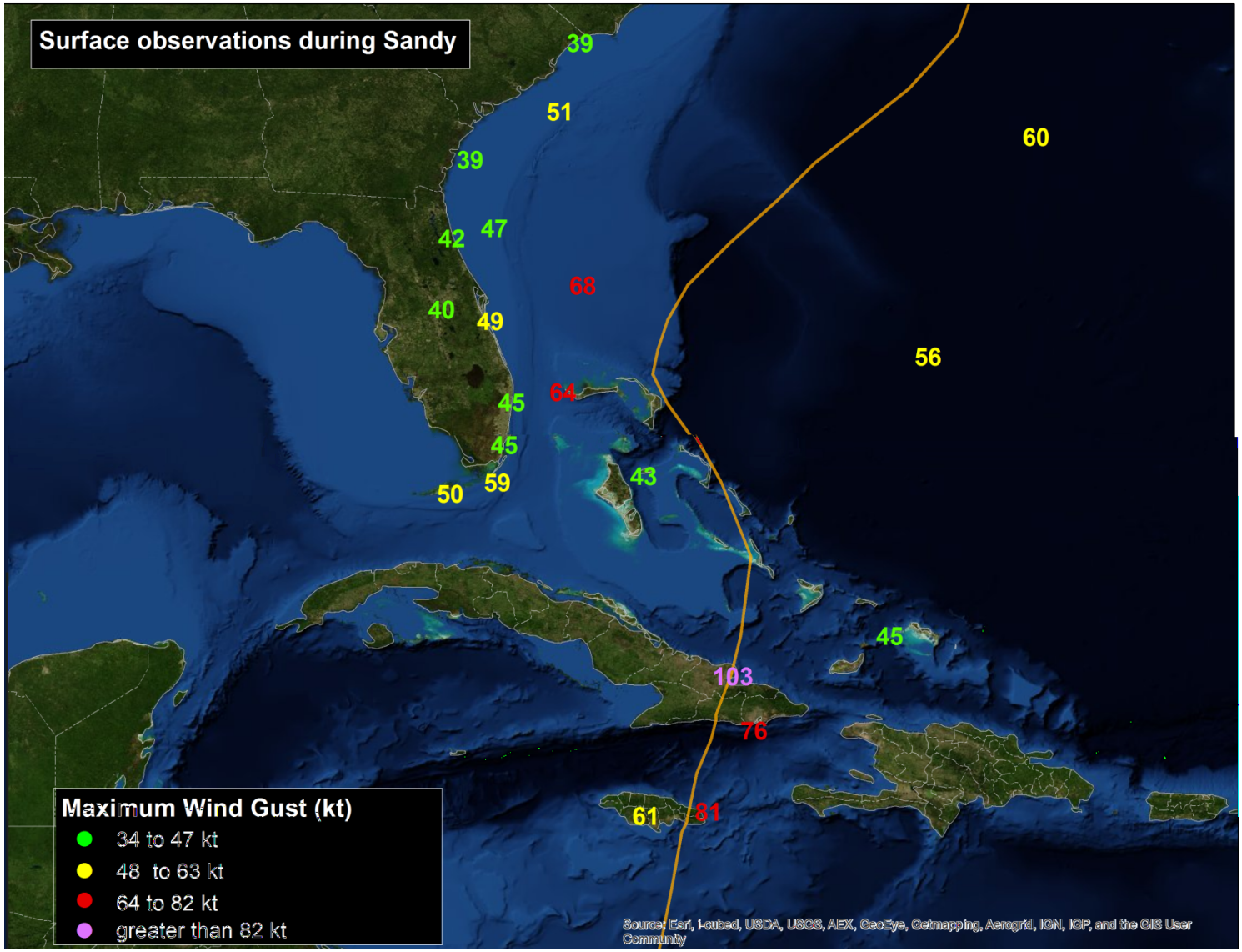

Figure 13. Selected observations of wind gusts of 34 kt or greater from surface stations and buoys during Sandy in the Caribbean Sea, western Atlantic Ocean and southeastern coast of the United States.

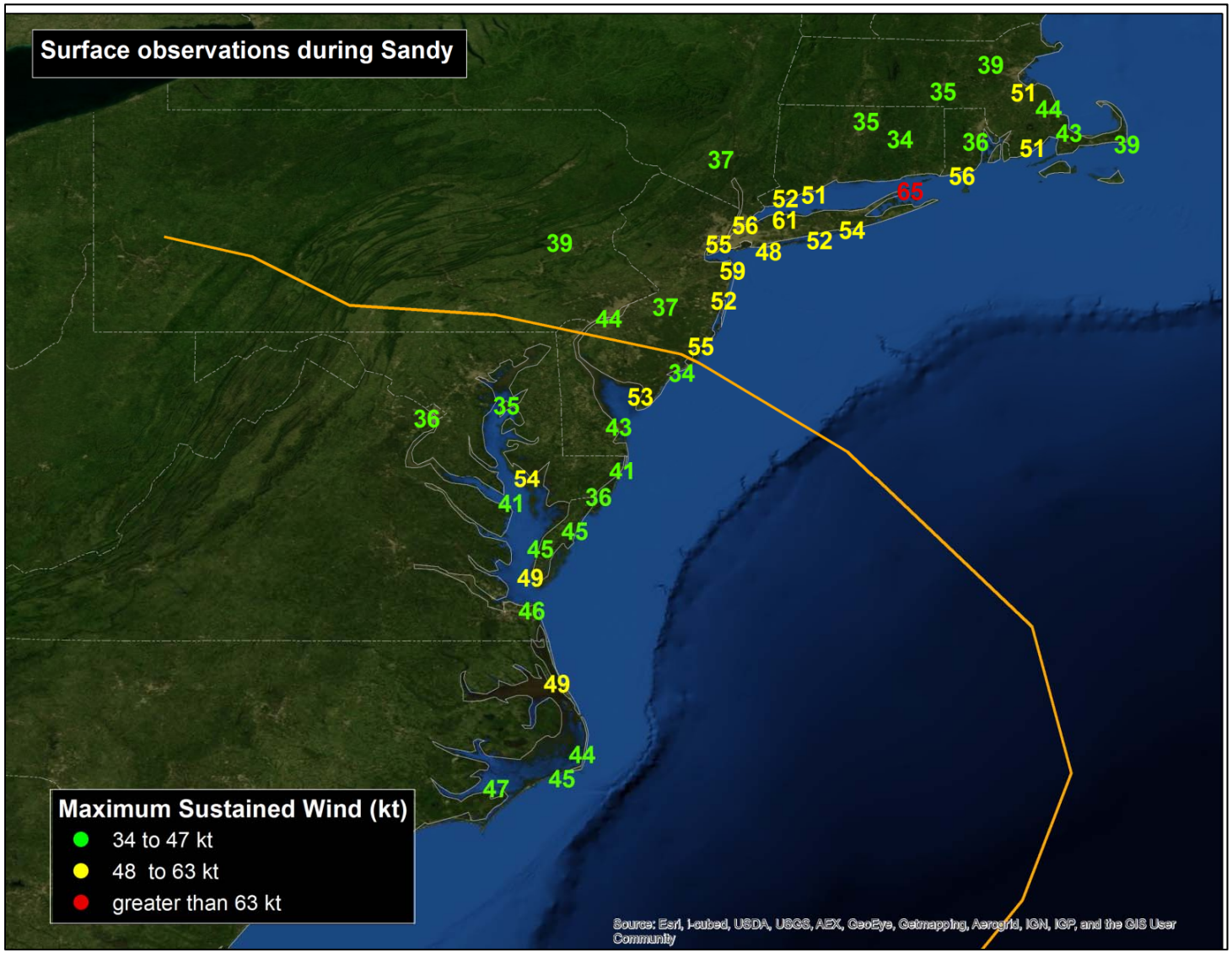

Figure 14. Selected observations of sustained winds of 34 kt or greater along the mid-Atlantic and New England coasts associated with Sandy. All the observations shown were taken from an elevation of 24 m or less.

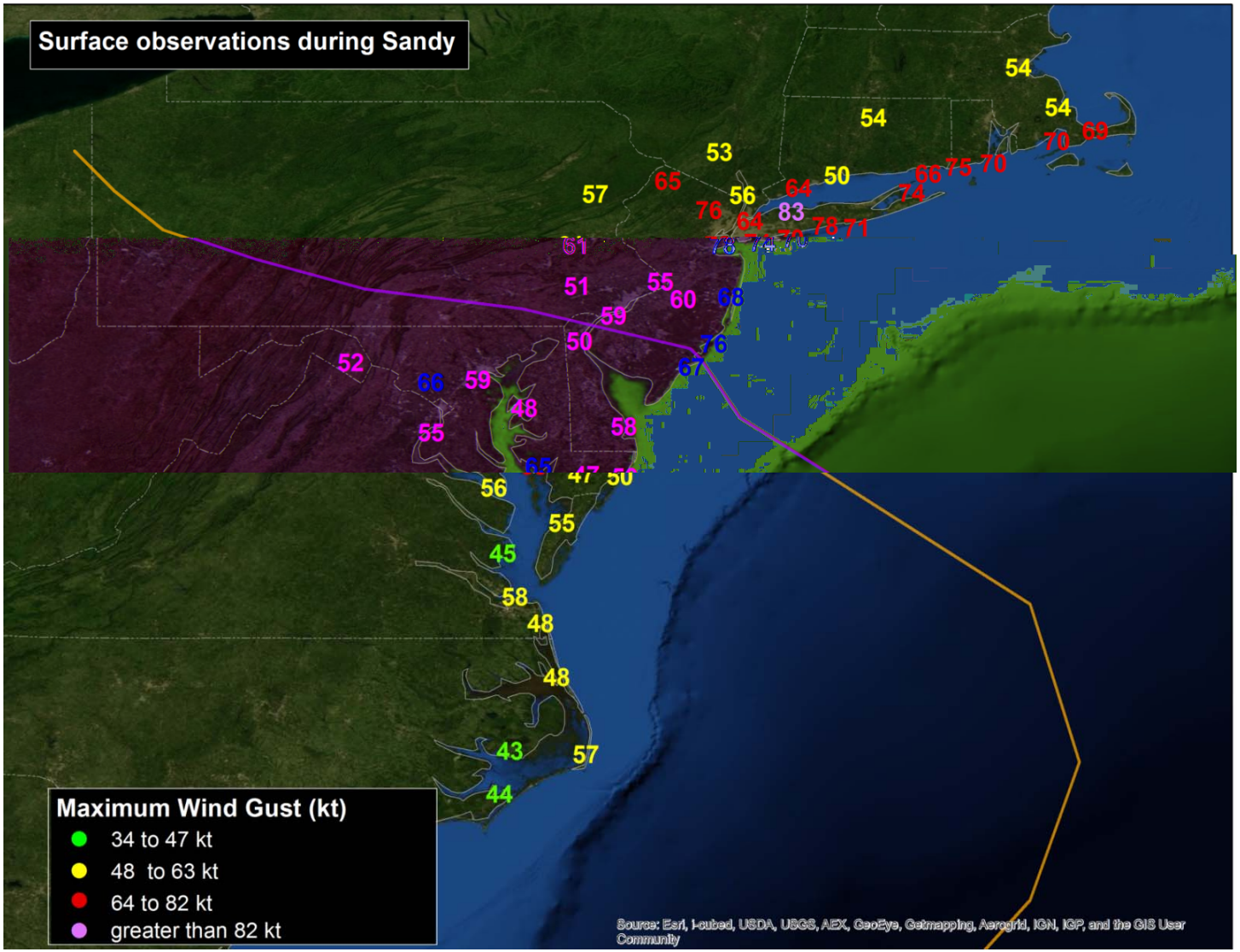

Figure 15. Selected observations of wind gusts of 34 kt or greater along the mid-Atlantic and New England coasts associated with Sandy. All the observations shown were taken from an elevation of 24 m or less.

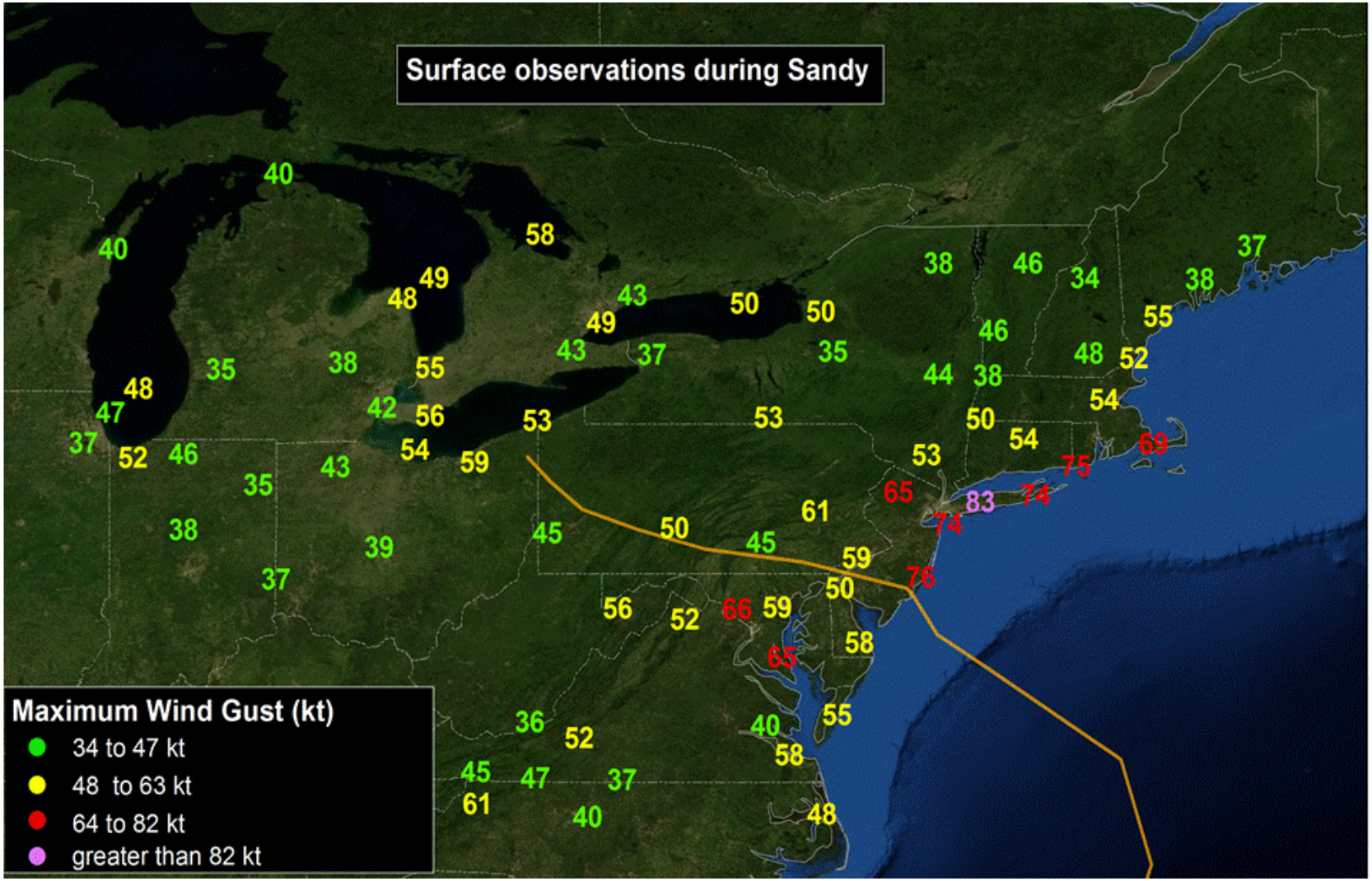

Figure 16. Selected observations of wind gusts of 34 kt or greater wind gusts associated with Sandy as a tropical or post-tropical cyclone. Some of these stations were elevated.

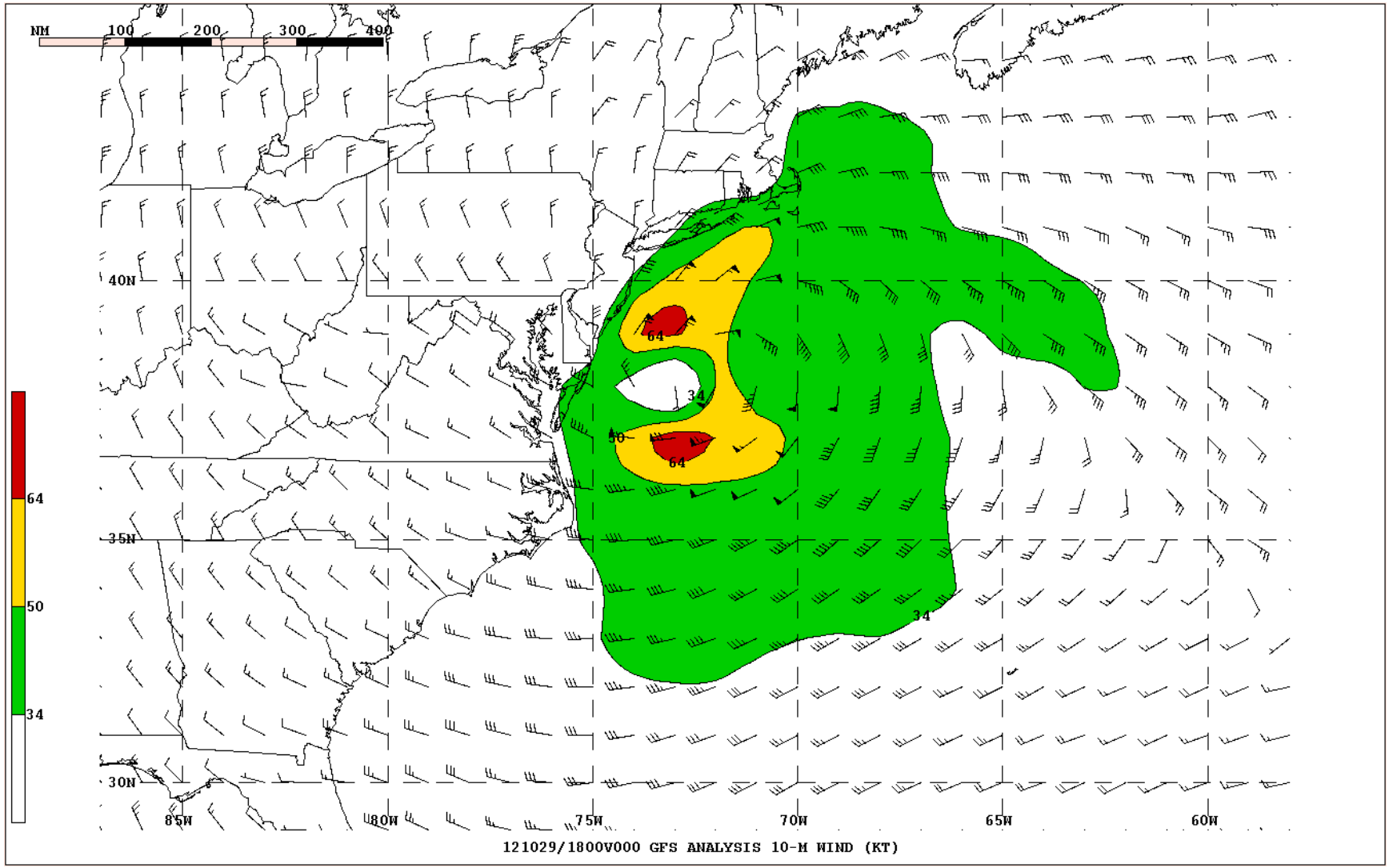

Figure 17. GFS model analysis (1° resolution) from 1800 UTC 29 October 2012 of Hurricane Sandy's wind field. 10-m wind barbs are shown in black. Shaded colors are isotachs representing wind thresholds at 34, 50, and 64 kt.

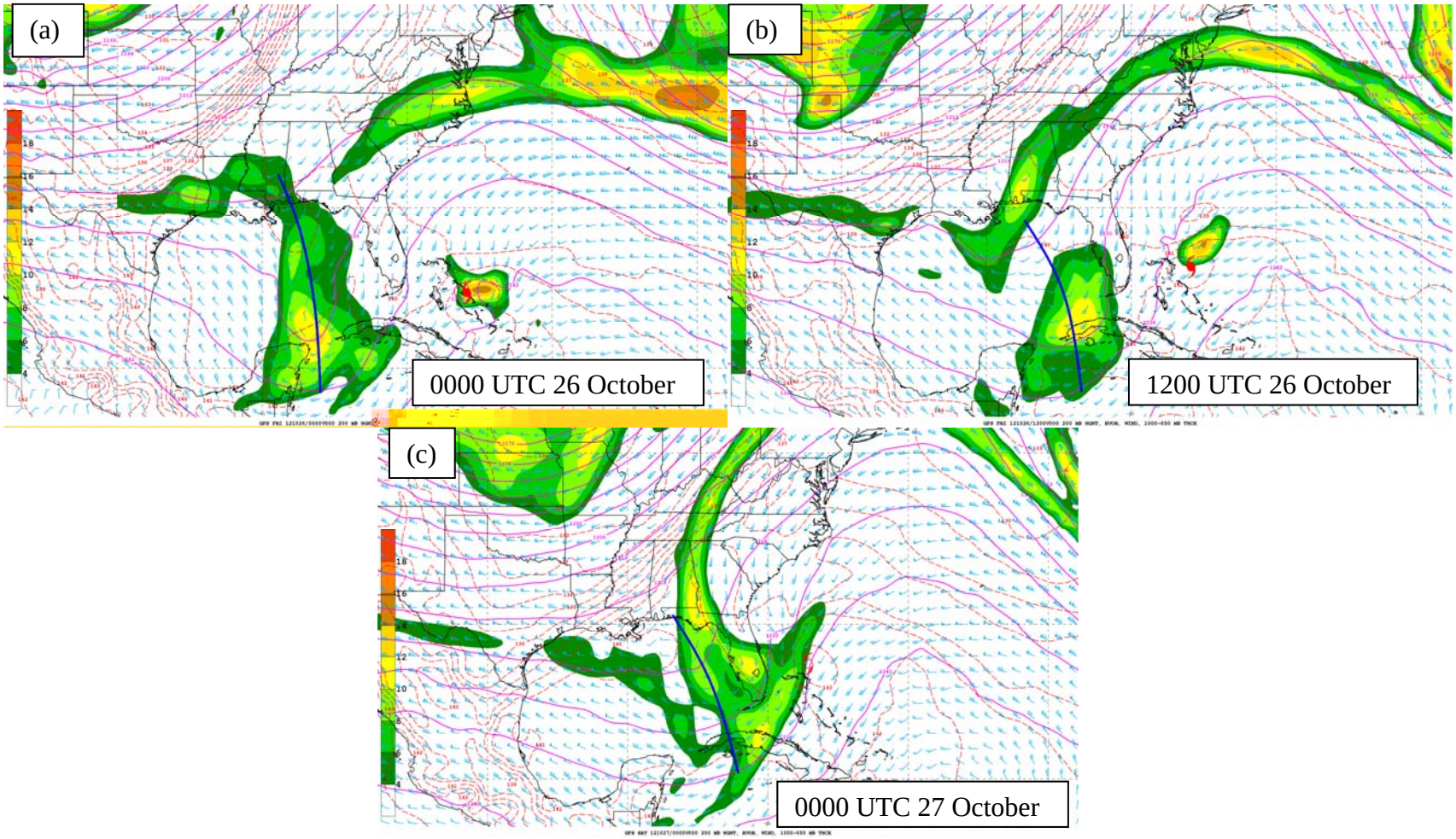

Figure 18. GFS model analyses from 26-27 October 2012, showing the interaction of Sandy with an upper-level trough to its west. The plot features 200-mb geopotential heights (solid magenta contours), relative vorticity (shaded), and winds (barbs, kt), with 1000-850 mb thickness (red dashed) contours superimposed. The upper-level trough axis is denoted by a blue line, and the center of Sandy is shown by the hurricane or tropical storm symbol.

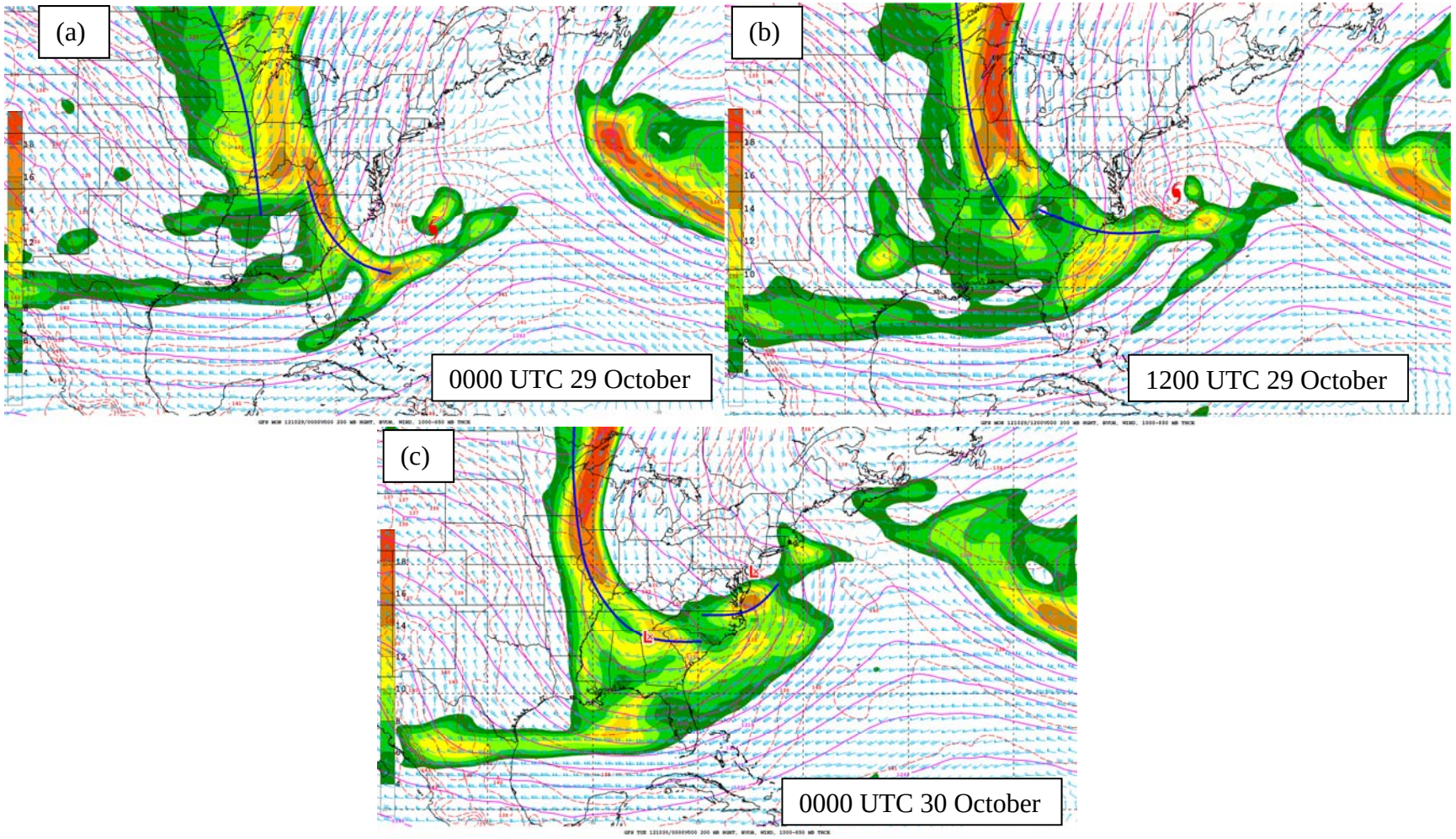

Figure 19. GFS model analyses from 29-30 Oct., showing the interaction of Sandy with a large upper-level trough over the east-central United States prior to landfall. The plot features 200-mb geopotential heights (solid magenta contours), relative vorticity (shaded), and winds (barbs, kt), with 1000-850 mb thickness (red dashed) contours superimposed. The upper-level trough axis is denoted by a blue line, and the center of Sandy is shown by the hurricane symbol (or "L" in last panel).

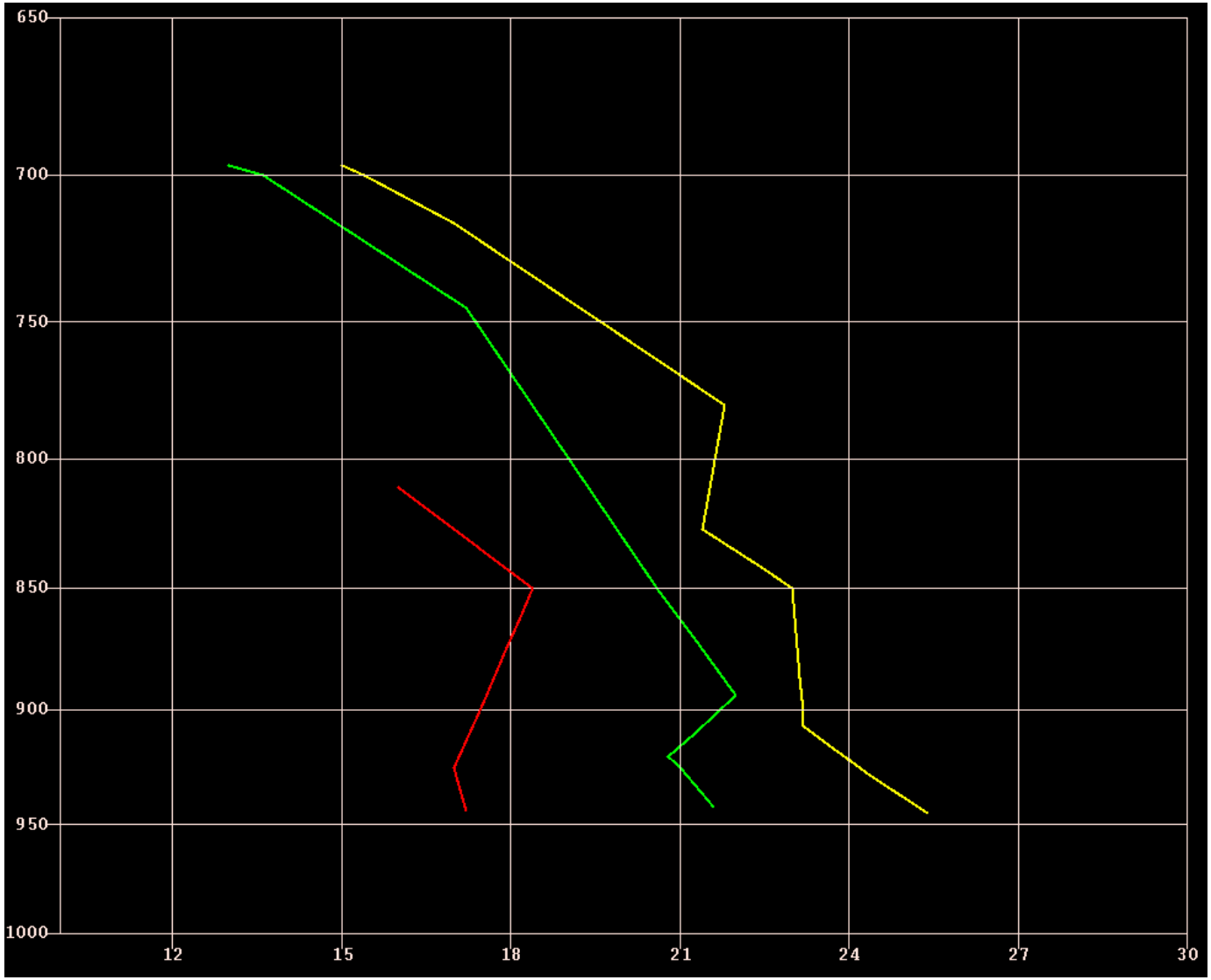

Figure 20. Dropsonde temperature profiles within a few miles of the center of Sandy from 29 October at 1420 UTC (yellow), 1749 UTC (green) and 2052 UTC (red), showing the large lower-tropospheric cooling. The x-axis is temperature (in °C) and the y-axis is pressure (in mb).

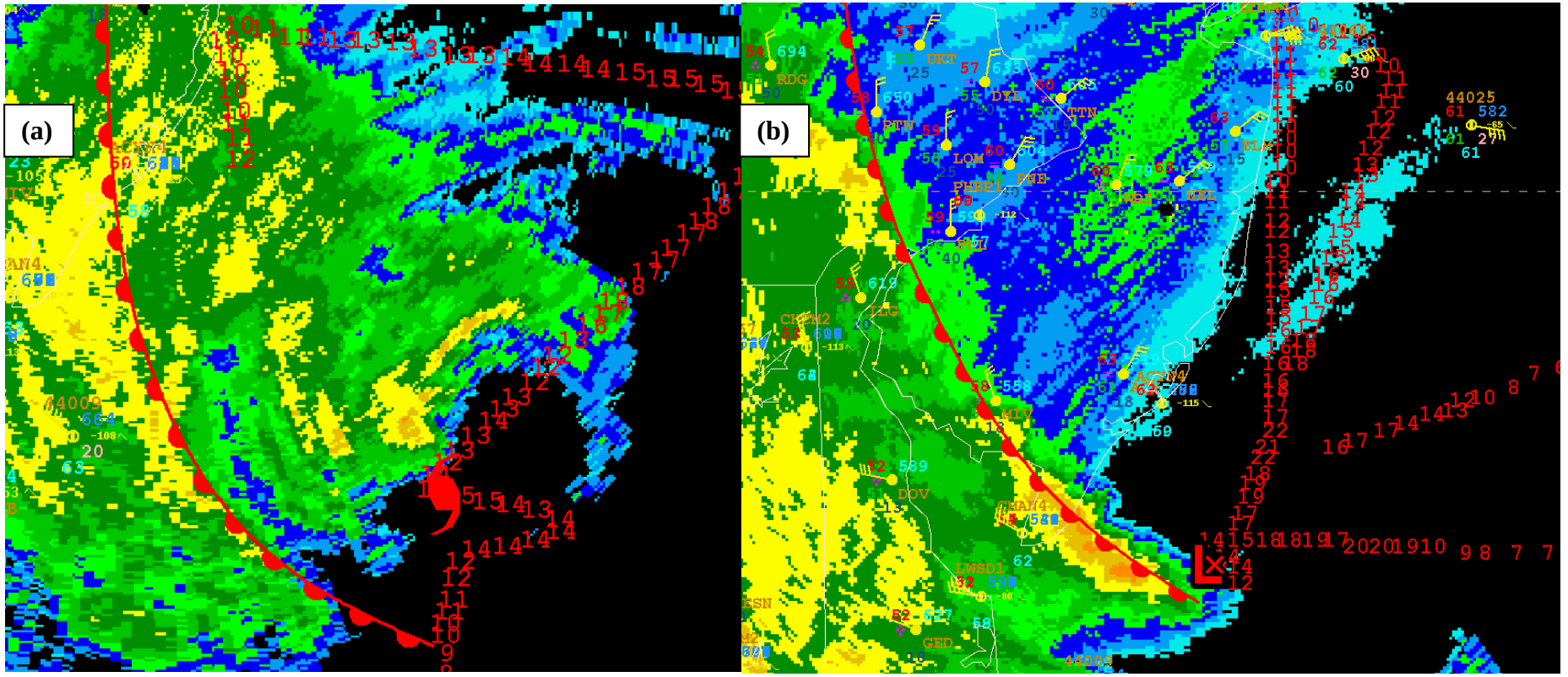

Figure 21. NHC surface analysis, with aircraft 850-mb temperatures (red, °C), radar from Mt. Holly, NJ, and surface observations from 29 October 2012. Panel (a) is centered at 1730 UTC (aircraft observations within 1 h of valid time), panel (b) is centered at 2134 UTC. Note the dissipation of the eye feature in the radar reflectivity between these times, along with the center becoming embedded within cooler air, and just northeast of a warm front extending near the reflectivity gradient extending to the northwest into extreme southern New Jersey. The center of circulation is indicated by the hurricane symbol and "L" in panels (a) and (b), respectively. An occluded front in panel b has been omitted for legibility.

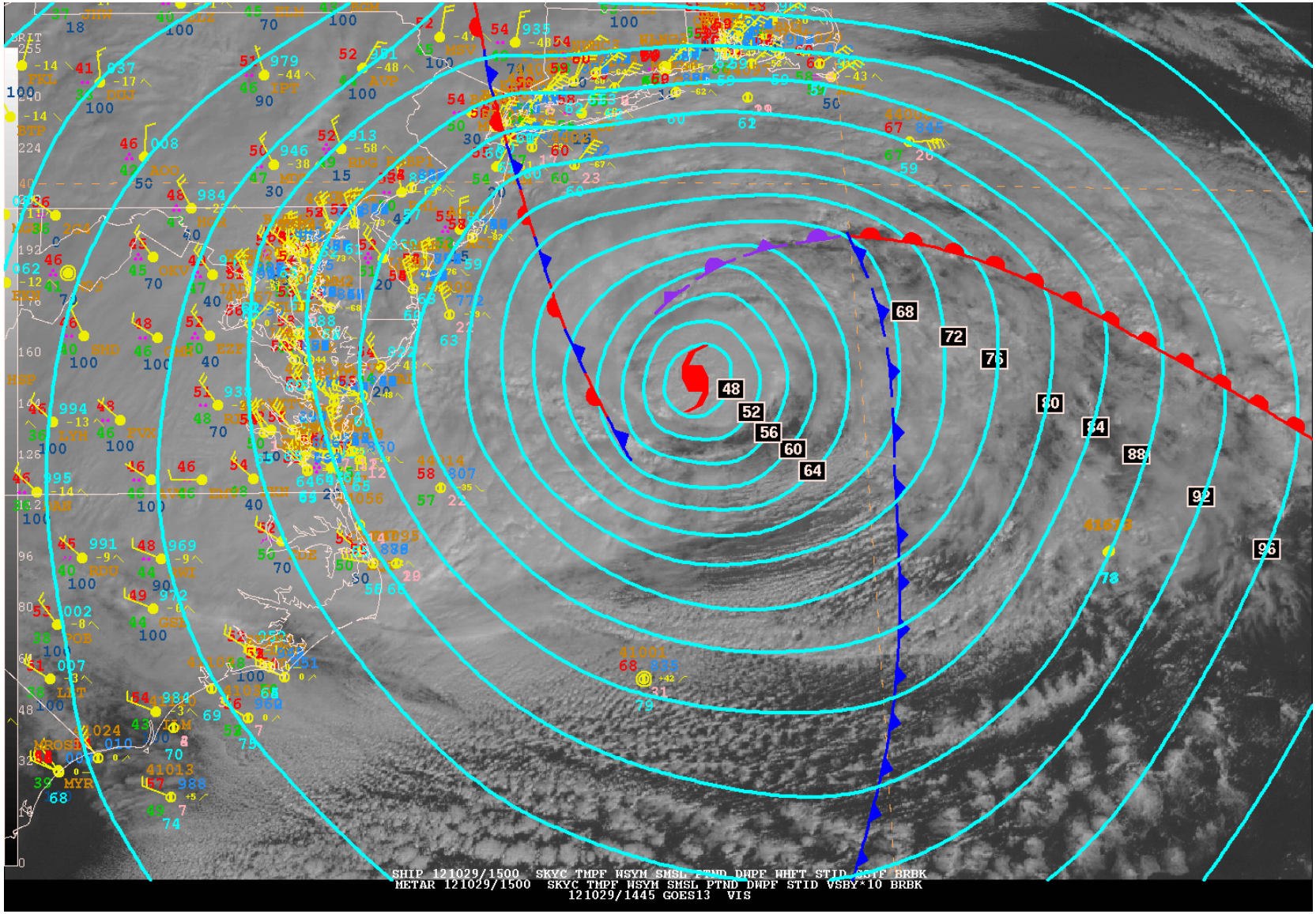

Figure 22. NHC analysis of fronts and isobars (4-mb contours) at 1500 UTC 29 October 2012, plotted with 1500 UTC surface observations and a GOES-E visible satellite image at 1445 UTC 29 October.

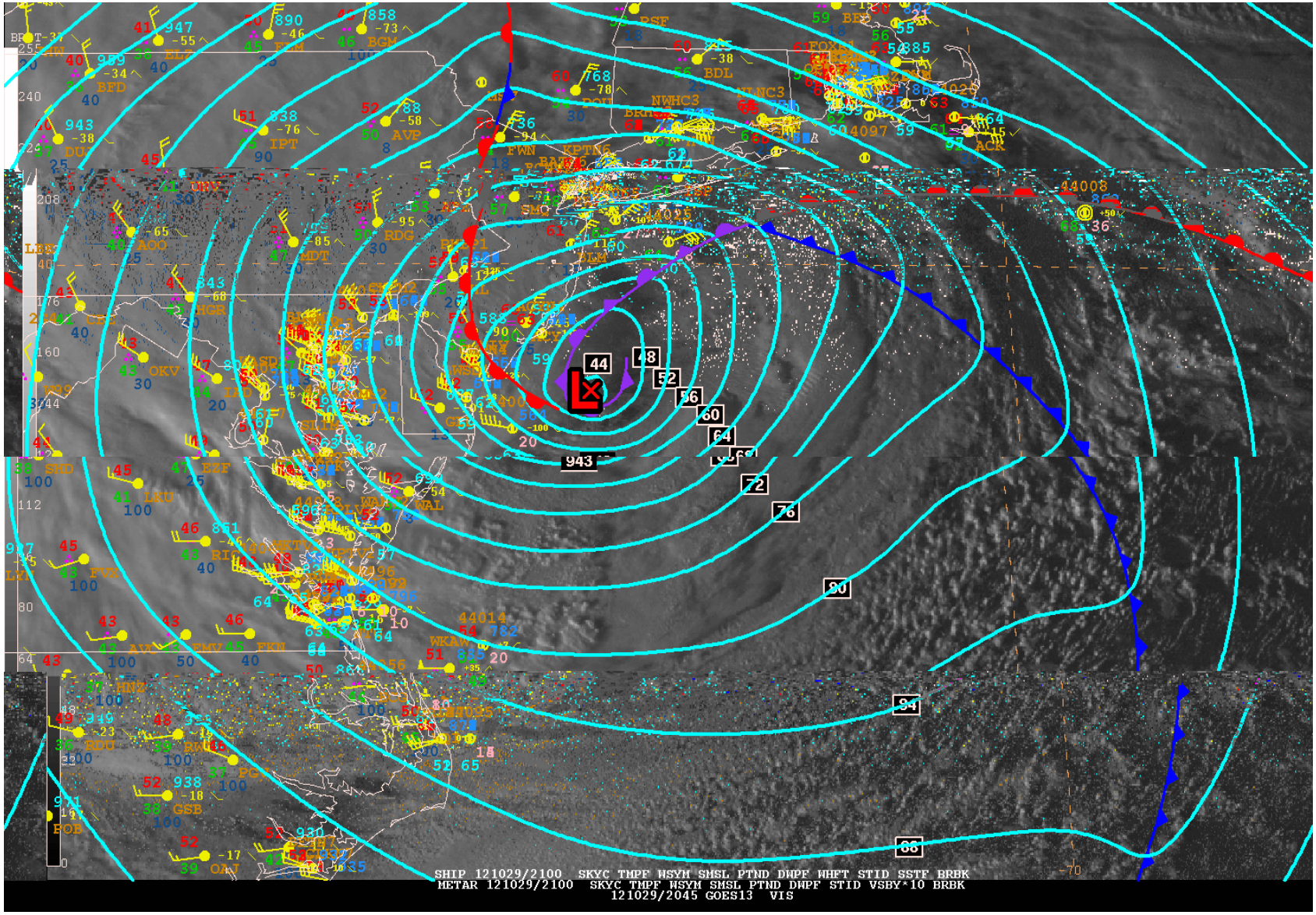

Figure 23. NHC analysis of fronts and isobars (4-mb contours) at 2100 UTC 29 October 2012, plotted with 2100 UTC surface observations and a GOES-E visible satellite image at 2045 UTC 29 October.

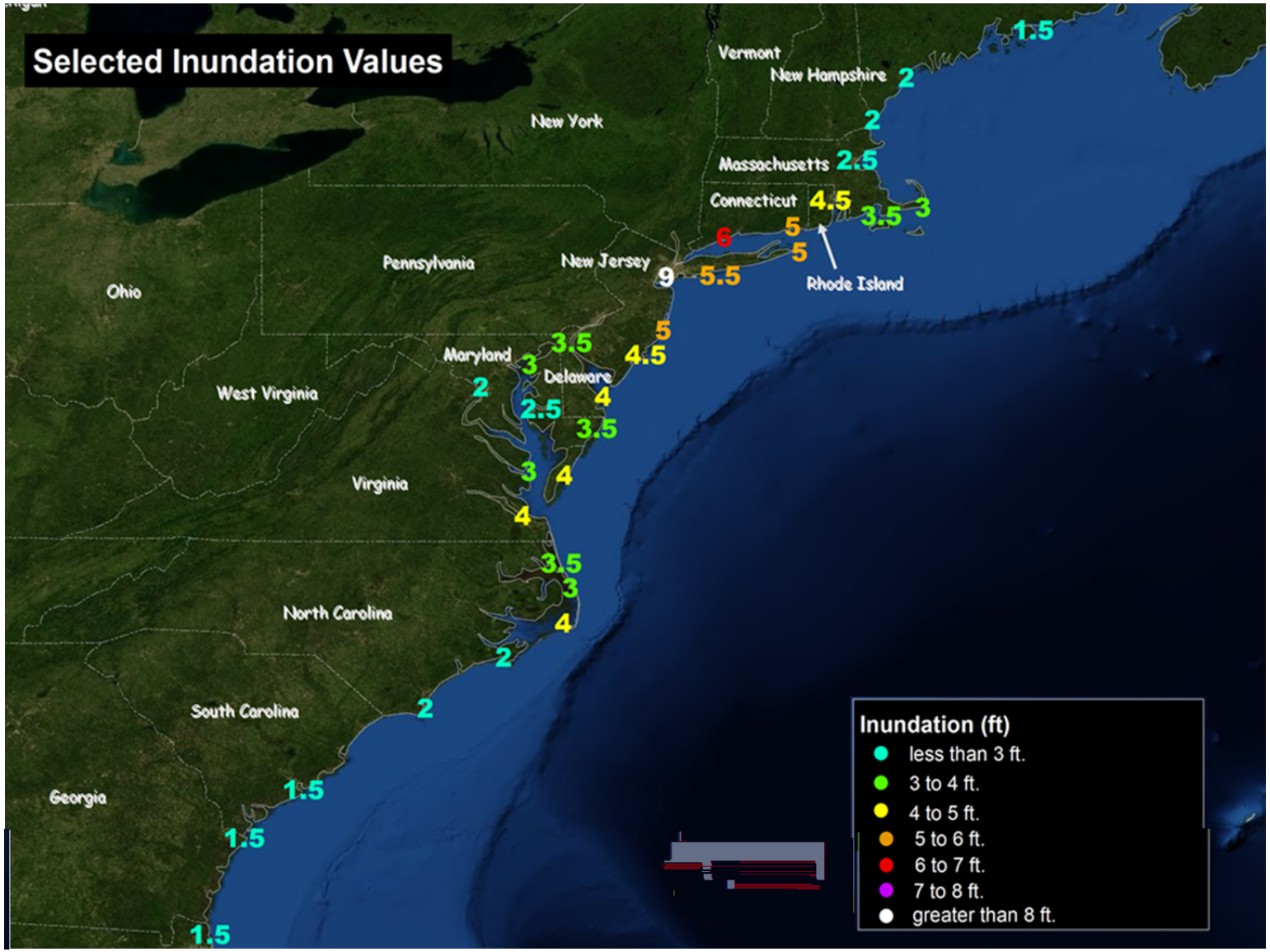

Figure 24. Estimated inundation (feet above ground level) calculated from USGS high-water marks and NOS tide gauges along the U.S. East Coast from Sandy. Values are rounded to the nearest half-foot.

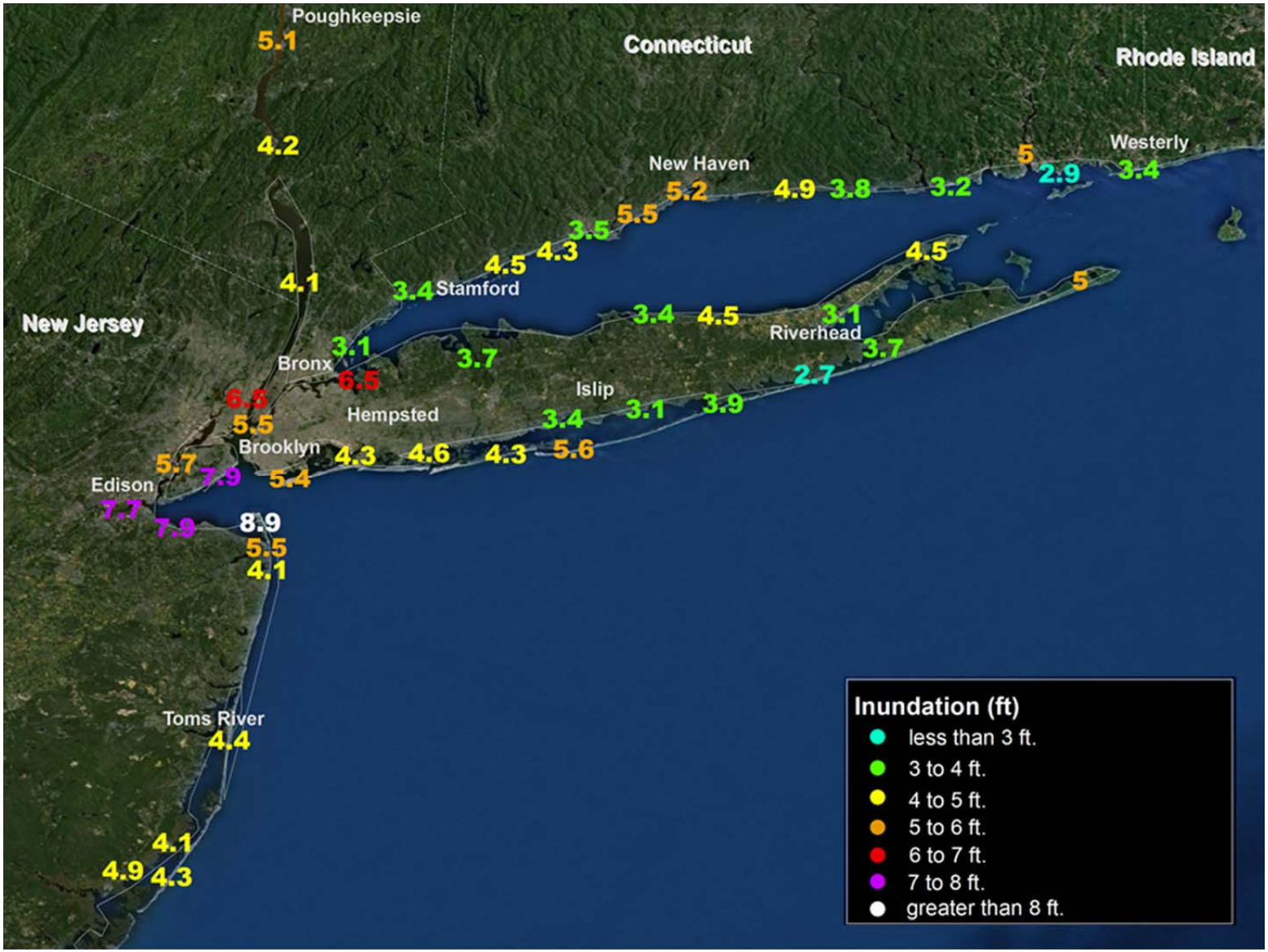

Figure 25. Estimated inundation (feet above ground level) calculated from USGS high-water marks and NOS tide gauges in New Jersey, New York, and Connecticut from Sandy.

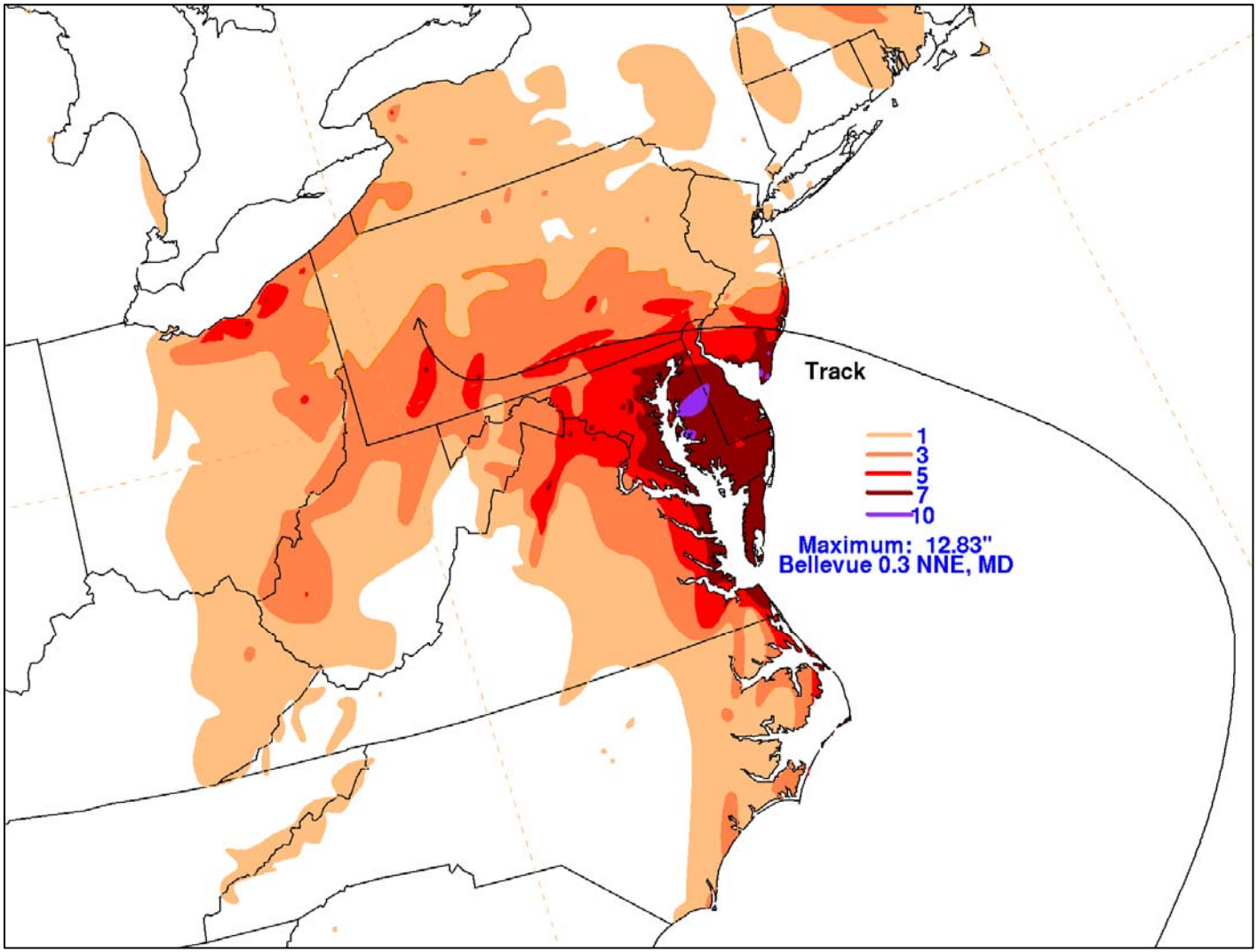

Figure 26. Rainfall (in inches) associated with Hurricane Sandy and its extratropical remnants from 27-31 October 2012. Figure courtesy of the Hydrometeorological Prediction Center.

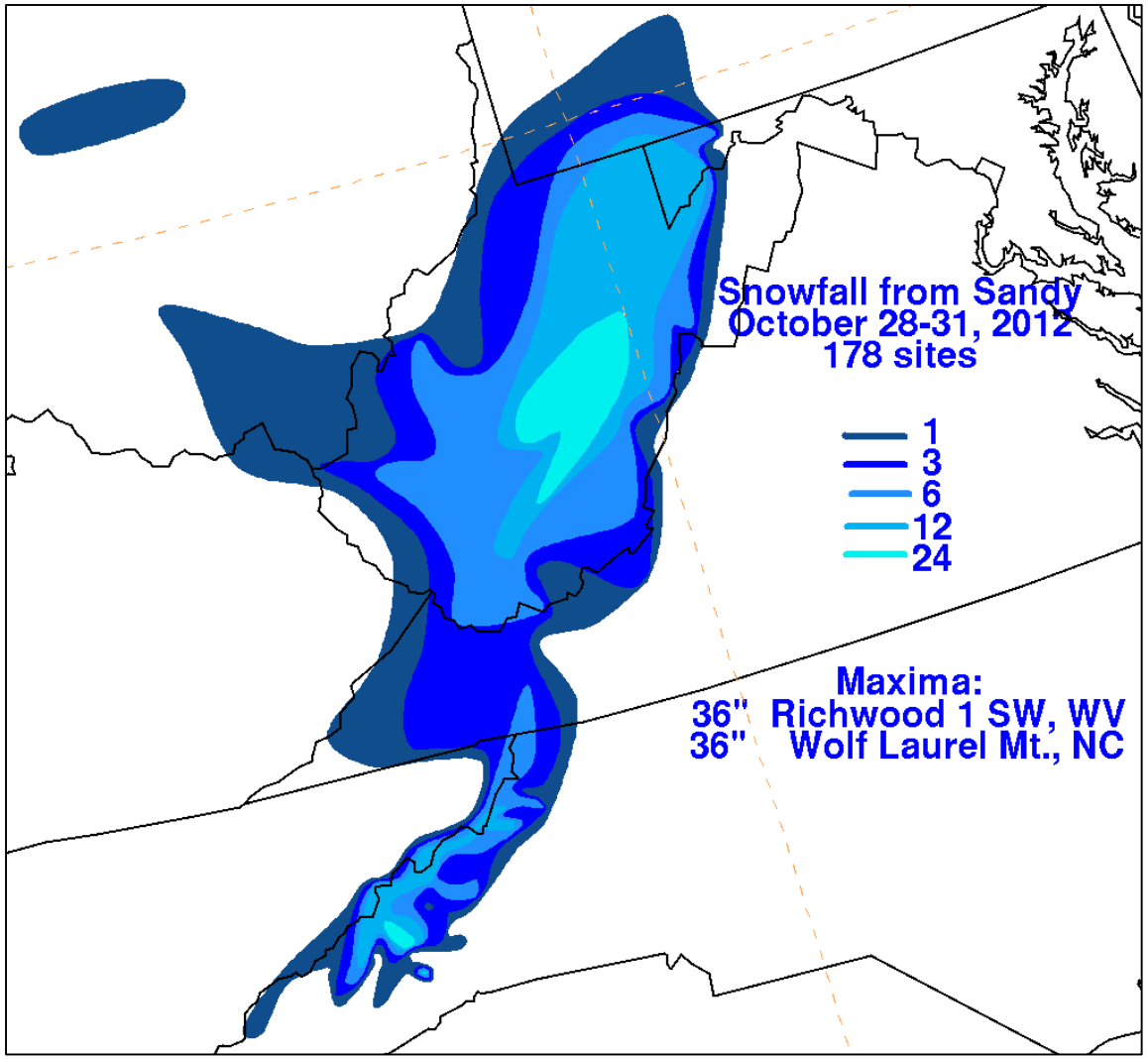

Figure 27. Snowfall (in inches) associated with Hurricane Sandy and its extratropical remnants from 28-31 October 2012. Figure courtesy of the Hydrometeorological Prediction Center.

Figure 28. a) House in Holguin destroyed by Sandy's strong winds, b) severe structural damage in Holguin, c) roof damage to a residence in Holguin, and d) storm surge flooding at the Hotel Baconao near Santiago de Cuba. Images courtesy of the Cuban Meteorological Service.

Figure 29. (a) Before and after images of a portion of the coast in Mantoloking, NJ, showing the effect of storm surge flooding. (b) Before and after image of a portion of the coast near Rockaway, New York, in Queens County, showing the inland extent of storm surge flooding. All images are courtesy of the U.S. Geological Survey.

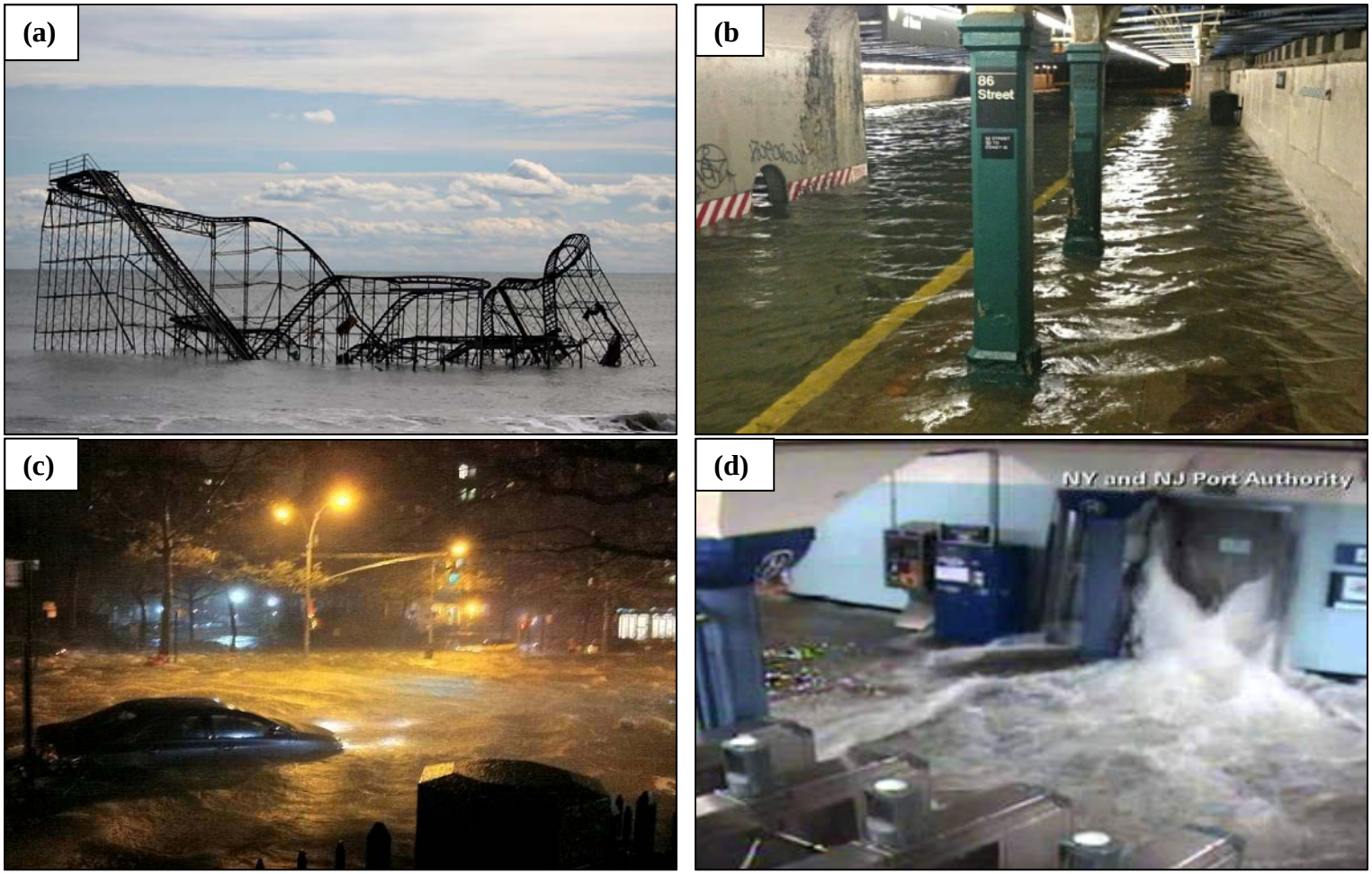

Figure 30. a) Image of a rollercoaster sitting in the Atlantic Ocean in NJ after the Fun Town pier it sat on was destroyed by the storm surge associated with Sandy (*courtesy of Getty Images*), b) photo showing the Lexington Avenue subway station flooded during Sandy (*courtesy Wzohaib/Flickr*) c) storm surge penetrating the lower East Side in Manhattan, New York City, on 29 October 2012 (*courtesy Twitter/nycarecs*) , d) photo from a surveillance camera that shows a PATH station in Hoboken, New Jersey, as it is flooded around 9:30 p.m. EDT 29 October 2012 (*courtesy AP/Port Authority of New York and New Jersey*).

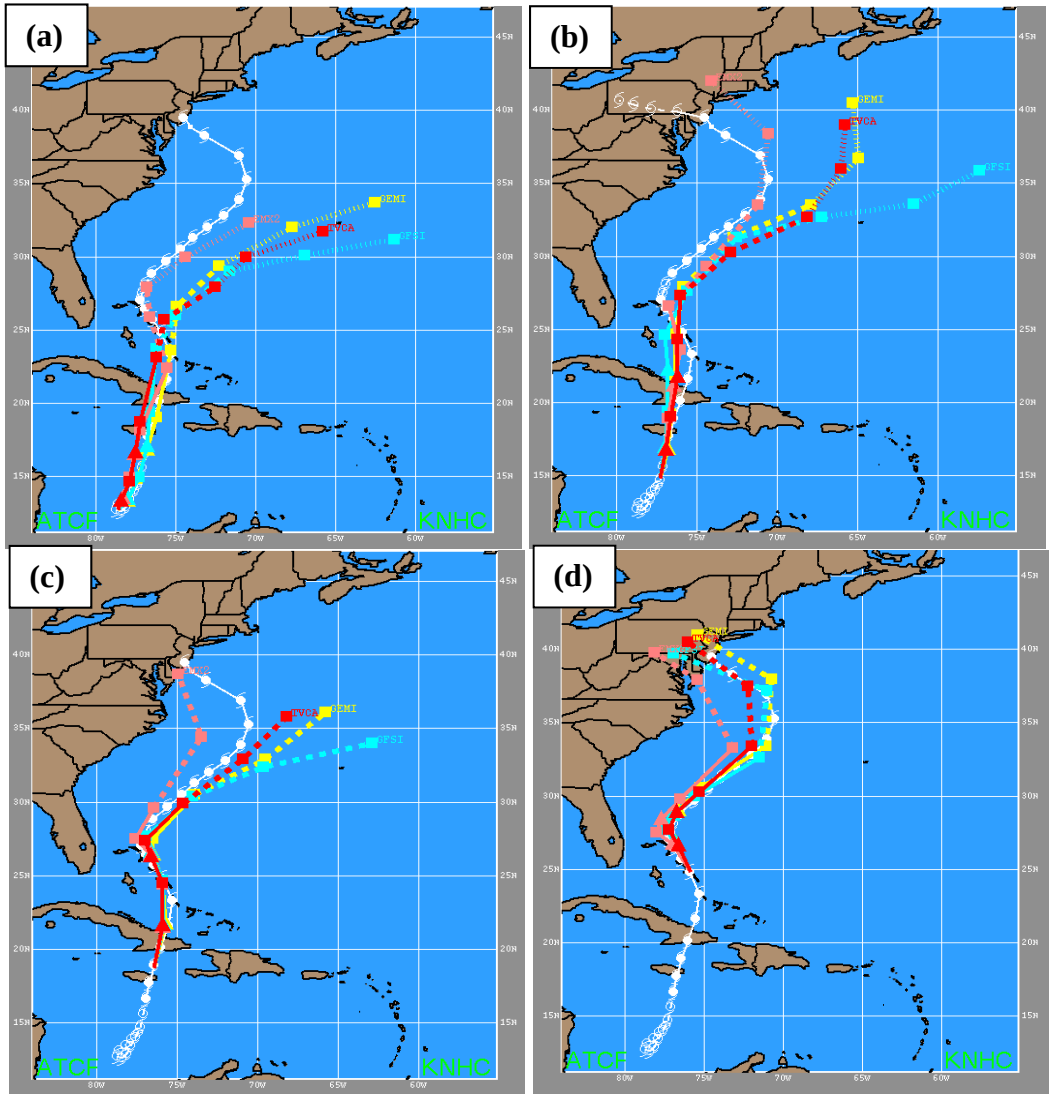

Figure 31. Model forecast tracks for Sandy at 0000 UTC 23 October (a), 0000 UTC 24 October (b), 0000 UTC October 25 (c), and 0000 UTC 26 October (d). Solid color lines are the forecasts through 72 h, while dashed lines are from 72-120 h, and dotted lines represent the 120-168 h forecasts (top panels only). The ECMWF is in coral, the GFS ensemble in yellow, the GFS is in cyan, and the TVCA model consensus is in red.

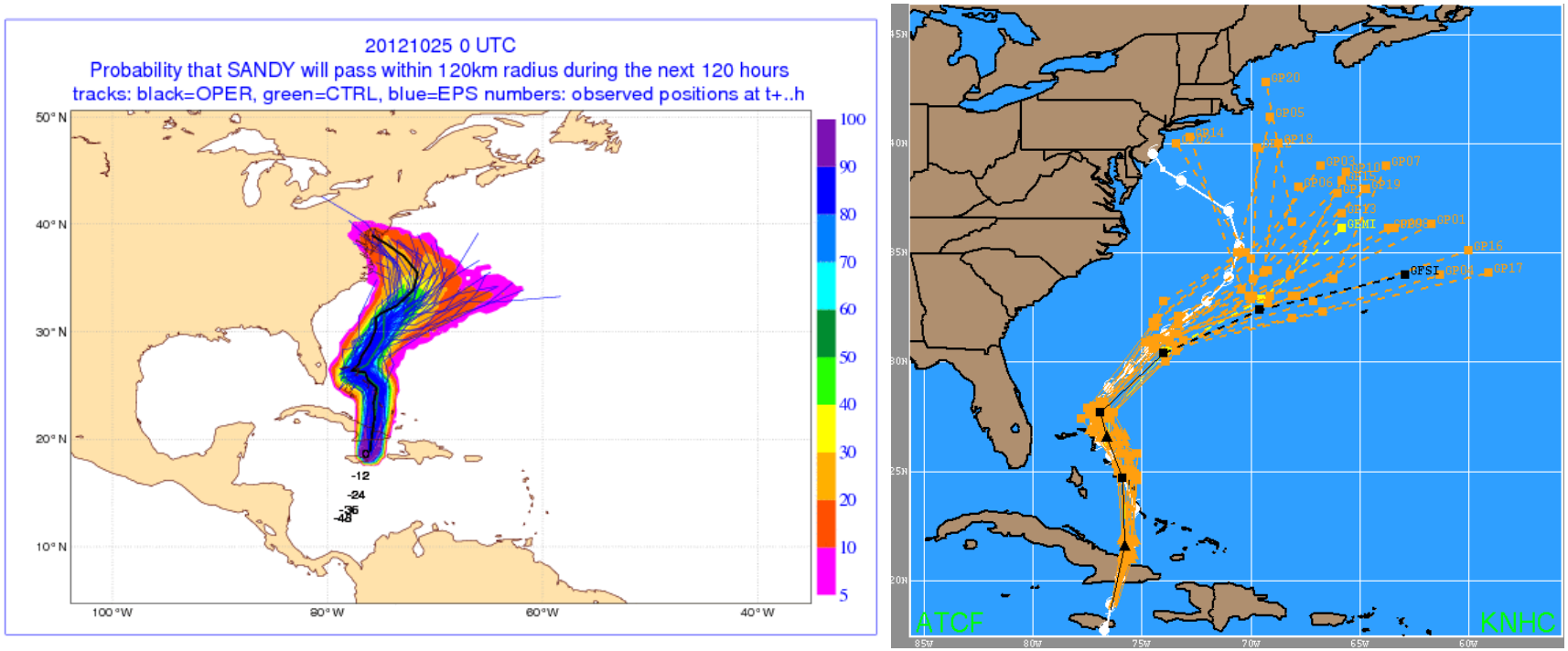

Figure 32. Five-day ECMWF ensemble tracks and probabilities (left) and GFS ensemble tracks (right) in orange issued 0000 UTC 25 October 2012. Note that a majority of ECMWF ensemble members showed a threat to the United States, while most of the GFS ensemble members were well out to sea (with the deterministic GFS in black). The verifying position is in southern New Jersey (last white hurricane symbol in the right panel). Left panel image courtesy of ECMWF.