

Tropical Cyclone Report  
Hurricane Sandy  
(AL182012)  
22 – 29 October 2012

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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<sup>1</sup>. There were at least 147 direct deaths<sup>2</sup> 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

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

<sup>2</sup> 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<sup>3</sup>.

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

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<sup>3</sup> 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 *bt* 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<sup>4</sup> by 2100 UTC 29 October while the center of

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<sup>4</sup> 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<sup>5</sup> 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<sup>6</sup>.

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 53<sup>rd</sup> 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).

<sup>5</sup> 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.

<sup>6</sup> 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<sup>7</sup>, 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

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<sup>7</sup> 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<sup>8</sup> 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.

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<sup>8</sup> 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<sup>9</sup>

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 |

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<sup>9</sup> 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<sup>10</sup>, 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

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<sup>10</sup> 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<sup>11</sup>. 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

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<sup>11</sup> 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,<br>Jamaica                                          |
| 25 / 0525 | 20.0 | 76.0 | 954 | 100 | landfall about 10 n mi<br>west of Santiago de<br>Cuba, Santiago de<br>Cuba. |
| 29 / 2330 | 39.4 | 74.4 | 945 | 70  | landfall near<br>Brigantine, NJ<br>(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       | WBJJ           | 28.9          | 80.2           | 010 / 47            | 996.1         |
| 27 / 0900       | WBJJ           | 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| <b>International</b>                                             |                            |             |                               |                             |           |                 |
| <b>Buoy/CMAN</b>                                                 |                            |             |                               |                             |           |                 |
| Buoy 42058<br>14.92N 74.92W<br>Height: 5.0 m                     | 24/0559                    | 996.7       | 24/0559                       | 49 <sup>j</sup>             | 64        |                 |
| Settlement Point C-MAN (SPGF1)<br>26.70N 78.99W<br>Height: 9.8 m | 26/2100                    | 992.0       | 26/2350                       | 48 <sup>f</sup>             | 64        |                 |
| <b>Cuba</b>                                                      |                            |             |                               |                             |           |                 |
| 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)<br>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)<br>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)<br>Elevation: 406 m                  | 25/0900                    | 991.2       | 25/0955                       | 36                          | 59        | 5.67            |
| Pinares de Mayarí (78371)<br>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)<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| Banes                                       |                            |             |                              |                             |           | 6.50            |
| Potrерillo                                  |                            |             |                              |                             |           | 6.42            |
| San Antonio del Sur                         |                            |             |                              |                             |           | 6.42            |
| <b>Jamaica</b>                              |                            |             |                              |                             |           |                 |
| 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           |
| <b>Bahamas/Turks &amp; Caicos</b>           |                            |             |                              |                             |           |                 |
| Nassau (MYNN)                               | 26/1000                    | 988.1       | 26/1000                      | 40                          | 43        |                 |
| Providenciales (MBPV)                       | 25/1900                    | 1000.0      |                              |                             | 45        |                 |
| Sans Souci, New Providence                  |                            |             | 25/2047                      |                             | 45        |                 |
| <b>Bermuda</b>                              |                            |             |                              |                             |           |                 |
| Bermuda Airport (TXKF)                      | 29/0320                    | 994.8       | 28/0200                      | 32                          | 50        |                 |
| Commissioner's Point<br>Elevation: 30 m     |                            |             | 29/0050                      | 35                          | 51        |                 |
| Marine Operations Center<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| <b>Marine Observations</b>                              |                            |             |                              |                             |           |                 |
| Esso Pier NOS (BEPB6)<br>32.37N 64.70W<br>Height: 3.1 m | 29/0324                    | 993.9       | 29/1354                      | 28                          | 38        |                 |
| Buoy 41047<br>27.47N 71.49W<br>Height: 10.0 m           | 27/2036                    | 993.2       | 28/0453                      | 51 <sup>j</sup>             | 56        |                 |
| Buoy 41048<br>31.95N 69.50W<br>Height: 5.0 m            | 28/2039                    | 975.8       | 28/2311                      | 50 <sup>j</sup>             | 60        |                 |
| <b>United States</b>                                    |                            |             |                              |                             |           |                 |
| <b>Florida</b>                                          |                            |             |                              |                             |           |                 |
| <b>ICAO Sites</b>                                       |                            |             |                              |                             |           |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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            |
| <b>Marine Observations</b>                                       |                            |             |                              |                             |                 |                 |
| Fowey Rocks C-MAN (FWYF1)<br>25.59N 80.10W<br>Height: 43.9 m     | 26/1800                    | 998.4       | 25/2250                      | 46 <sup>f</sup>             | 58              |                 |
| Lake Worth NOS (LKWF1)<br>26.61N 80.03W<br>Height: 6.0 m         | 27/0800                    | 997.2       | 26/1400                      | 39                          | 49              |                 |
| Long Key C-MAN (LONF1)<br>24.84N 80.86W<br>Height: 7.0 m         | 26/2000                    | 1001.4      | 26/0000                      | 32 <sup>f</sup>             | 42              |                 |
| Mayport NOS (MYPF1)<br>30.40N 81.43W                             | 27/1000                    | 1003.2      | 26/1624                      | 27 <sup>i</sup>             | 34 <sup>i</sup> |                 |
| Molasses Reef C-MAN (MLRF1)<br>25.01N 80.38W<br>Height: 15.8 m   | 26/2000                    | 999.7       | 25/1930                      | 42 <sup>f</sup>             | 59              |                 |
| NW Florida Bay COMPS (NFBF1)<br>25.08N 81.92W<br>Height: 5.5 m   | 26/2006                    | 1001.3      | 26/1654                      | 25*                         | 34*             |                 |
| Port Everglades ICON (PVGFI)<br>26.09N 80.11W<br>Height: 3.5 m   | 26/1800                    | 998.6       | 25/2148                      | 36                          | 46              |                 |
| Saint Augustine C-MAN (SAUF1)<br>29.86N 81.26W<br>Height: 16.5 m | 27/1000                    | 1000.7      | 26/2340                      | 38 <sup>f</sup>             | 46              |                 |
| Sombrero Key C-MAN (SMKF1)<br>28.42N 81.11W<br>Height: 48.5 m    | 26/0900                    | 1002.1      | 25/1850                      | 40 <sup>f</sup>             | 48              |                 |
| Trident Pier NOS (TRDF1)<br>28.42N 80.59W<br>Height: 6.4 m       | 27/1948                    | 1000.2      | 27/1424                      | 25*                         | 35*             |                 |
| Vaca Key NOS (VCAF1)<br>24.71N 81.11W<br>Height: 6.4 m           | 6/1954                     | 1002.0      | 25/1842                      | 33                          | 41              |                 |
| Virginia Key HANDAR (VIK)<br>25.73N 80.16W<br>Height: 22.0 m     | 26/1747                    | 999         | 25/1917                      | 33                          | 49              |                 |
| Virginia Key NOS (VAKF1)<br>25.73 80.16W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Buoy 41009<br>28.52 N 80.18W<br>Height: 5.0 m                  | 27/0850                    | 993.3       | 27/0020                       | 41                          | 51               |                 |
| Buoy 41010<br>28.91N 78.47W<br>Height: 5.0 m                   | 27/0920                    | 981.4       | 27/1250                       | 54                          | 68               |                 |
| Buoy 41012<br>29.99N 80.60W<br>Height: 5.0 m                   | 27/1510                    | 996.1       | 27/1450                       | 38                          | 47               |                 |
| <b>South Florida Water Management</b>                          |                            |             |                               |                             |                  |                 |
| 4 S Intersection U.S. 27 (S30)<br>25.95N 80.43W                |                            |             |                               |                             |                  | 2.88            |
| Krome Detention Center (S335)<br>25.74N 80.49W                 |                            |             |                               |                             |                  | 2.29            |
| Krome Detention Center 5 S (S338)<br>25.67N 80.48W             |                            |             |                               |                             |                  | 2.18            |
| Lake Okeechobee Center (LZ40 )<br>26.09N 80.79W<br>Height: 8 m |                            |             | 26/2100                       | 31*                         | 49*              |                 |
| Lake Okeechobee North (L001 )<br>27.14N 80.79W<br>Height: 8 m  |                            |             | 26/2000                       | 29*                         | 44*              |                 |
| Lake Okeechobee South (L006 )<br>26.82N 80.78W<br>Height: 15 m |                            |             | 26/2115                       | 35*                         | 48*              |                 |
| <b>WeatherBug</b>                                              |                            |             |                               |                             |                  |                 |
| Boca Raton<br>26.41N 80.08W                                    |                            |             |                               |                             | 41* <sup>i</sup> |                 |
| Coconut Grove<br>25.73N 80.24W                                 |                            |             |                               |                             | 34* <sup>i</sup> |                 |
| Davie<br>26.08N 80.31W                                         |                            |             |                               |                             | 48* <sup>i</sup> |                 |
| Delray Beach<br>26.46N 80.08W                                  |                            |             |                               |                             | 41* <sup>i</sup> |                 |
| Deerfield Beach<br>26.31N 80.11W                               |                            |             |                               |                             | 35* <sup>i</sup> |                 |
| Hialeah<br>25.87N 80.33W                                       |                            |             |                               |                             | 39* <sup>i</sup> |                 |
| Jupiter<br>26.94N 80.08W                                       |                            |             |                               |                             | 44* <sup>i</sup> |                 |
| Kendale Lakes<br>25.72N 80.45W                                 |                            |             |                               |                             | 40* <sup>i</sup> |                 |
| Miami Beach<br>25.81N 80.13W                                   |                            |             |                               |                             | 41* <sup>i</sup> |                 |

| Location                                                      | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                  | Total rain (in) |
|---------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|------------------|-----------------|
|                                                               | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Miami Beach<br>25.86N 80.13W                                  |                            |             |                               |                             | 42* <sup>i</sup> |                 |
| Miramar<br>25.98N 80.35W                                      |                            |             |                               |                             | 49* <sup>i</sup> |                 |
| Port Everglades<br>26.09N 80.12W                              |                            |             |                               |                             | 37* <sup>i</sup> |                 |
| Sunny Isles<br>25.94N 80.12W                                  |                            |             |                               |                             | 36* <sup>i</sup> |                 |
| West Palm Beach<br>26.68N 80.06W                              |                            |             |                               |                             | 44* <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                            |                            |             |                               |                             |                  |                 |
| Biscayne (XBIS)<br>25.69N 80.17W<br>Height: 22.0 m            |                            |             | 25/1920                       | 31*                         | 44*              |                 |
| Biscayne Bay Light 20 (XKBS )<br>25.66N 80.19W<br>Height: 6 m | 26/1730                    | 998.4       | 25/2205                       | 36                          | 46               |                 |
| Boca Raton (XBOC)<br>26.37N 80.09W<br>Height: 21 m            |                            |             | 25/2220                       | 29*                         | 48*              |                 |
| Boynton Beach (XBOY)<br>26.55N 80.05W<br>Height: 10 m         | 26/2040                    | 996.3       | 26/0935                       | 32                          | 49               |                 |
| Cocoa Beach Pier (XCCO)<br>28.37N 80.60W                      |                            |             | 26/1325                       | 34* <sup>i</sup>            | 45* <sup>i</sup> |                 |
| Crandon (XCRN)<br>25.72N 80.15W<br>Height: 8 m                | 26/1745                    | 999.5       | 25/2250                       | 39                          | 49               |                 |
| Cutler (XCUT )<br>25.63N 80.30W<br>Height: 10 m               | 26/1720                    | 999.4       | 25/1925                       | 22                          | 37               |                 |
| Dinner Key (XDIN)<br>25.71N 80.21W<br>Height: 5 m             | 26/1735                    | 999.4       | 25/2235                       | 35                          | 44               |                 |
| Egmont Channel<br>Height: 14 m                                |                            |             | 27/0230                       | 32                          | 37               |                 |
| Hobe Sound (XHOB)<br>27.05N 80.16W                            |                            |             | 26/2040                       | 25* <sup>i</sup>            | 43* <sup>i</sup> |                 |
| Hollywood (XNHD)<br>26.02N 80.13W<br>Height: 14 m             | 26/1740                    | 996.3       | 25/2245                       | 23                          | 40               |                 |
| Jacksonville Beach Pier<br>30.29N 81.38W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Jensen Beach (XJEN)<br>27.22N 80.20W<br>Height: 10 m         |                            |             | 26/2030                       | 34*                         | 45*              |                 |
| Jupiter (XJUP)<br>26.89N 80.06W<br>Height: 6 m               |                            |             | 26/2035                       | 41*                         | 58*              |                 |
| Key Biscayne (XKBI)<br>25.69N 80.17W<br>Height: 22 m         |                            |             | 25/2305                       | 30*                         | 49*              |                 |
| Key West USCG Sector (WF35504)<br>24.57N 81.80W              |                            |             | 27/1950                       | 27 <sup>i</sup>             | 34 <sup>i</sup>  |                 |
| Marathon Key (WF504)<br>24.74N 80.98W                        |                            |             | 25/2340                       | 24 <sup>i</sup>             | 38 <sup>i</sup>  |                 |
| Mangonia Park (XMGN )<br>26.76N 80.07W<br>Height: 21 m       | 27/0000                    | 994.4       | 26/1500                       | 25                          | 40               |                 |
| New Smyrna Beach (XNSB)<br>29.05N 80.90W<br>Height: 10 m     |                            |             | 27/0330                       | 37*                         | 48*              |                 |
| North Miami (XNMI)<br>25.91N 80.16W<br>Height: 17 m          | 26/1710                    | 995.4       | 25/2310                       | 30                          | 47               |                 |
| Pompano Beach (XPOM)<br>26.24N 80.09W<br>Height: 9 m         | 26/1755                    | 997.3       | 26/0135                       | 42                          | 51               |                 |
| Port Everglades (XPEG)<br>26.09N 80.12W<br>Height: 41 m      |                            |             | 25/2215                       | 44*                         | 55*              |                 |
| Rocky Point<br>Height: 7 m                                   |                            |             | 27/0045                       | 33                          | 41               |                 |
| St. Lucie Plant (XSTL)<br>27.34N 80.24W                      |                            |             | 26/0415                       | 39* <sup>i</sup>            | 51* <sup>i</sup> |                 |
| Smith Shoal Light (WF76402)<br>24.72N 81.92W                 |                            |             | 25/2210                       | 35 <sup>i</sup>             | 43 <sup>i</sup>  |                 |
| South Key Largo (WF102)<br>25.10N 80.43W<br>Height: 18 m     |                            |             | 25/2250                       | 22                          | 38               |                 |
| Summer House<br>Height: 6 m                                  |                            |             | 27/0025                       | 31                          | 39               |                 |
| Turkey Point (XTKY)<br>25.43N 80.35W<br>Height: 20 m         | 26/0805                    | 998.6       | 25/2310                       | 37                          | 52               |                 |
| Upper Matecumbe Key (WF999)<br>24.92N 80.64W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| West Palm Beach (XWPM )<br>26.65N 80.06W<br>Height: 13 m             |                            |             | 25/2125                       | 21*                         | 37*             |                 |
| <b>CWOP</b>                                                          |                            |             |                               |                             |                 |                 |
| Curry Hammock State Park (DW507)<br>24.74N 80.98W                    | 26/1943                    | 1000.7      | 25/2323                       | 22 <sup>i</sup>             | 36 <sup>i</sup> |                 |
| Cudjoe Key (CW0925)<br>24.65N 81.48W                                 |                            |             | 25/1401                       | 35 <sup>i</sup>             | 50 <sup>i</sup> |                 |
| Islamorada Fire Rescue Station 20 (DW1872)<br>24.92N 80.64W          | 26/1943                    | 999.0       | 26/2203                       | 24 <sup>i</sup>             | 35 <sup>i</sup> |                 |
| Long Key FCAA Pump Station (CW0922)<br>24.84N 80.79W<br>Height: 15 m | 26/1931                    | 1000.1      | 25/1401                       | 35                          | 50              |                 |
| Ramrod Key FCAA Pump Station (CW0924)<br>24.66N 81.41W               | 26/1951                    | 1001.4      | 25/1911                       | 20 <sup>i</sup>             | 37 <sup>i</sup> |                 |
| Ramrod Key 0.7 SE (DW8495)<br>24.65N 81.41W<br>Height: 8 m           |                            |             | 27/1852                       | 24                          | 36              |                 |
| <b>Georgia</b>                                                       |                            |             |                               |                             |                 |                 |
| <b>Marine Observations</b>                                           |                            |             |                               |                             |                 |                 |
| Fort Pulaski (FPKG1)<br>32.03N 80.90W<br>Elevation: 6.7 m            | 27/1924                    | 1000.8      | 30/0206                       | 29                          | 35              |                 |
| <b>South Carolina</b>                                                |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                                    |                            |             |                               |                             |                 |                 |
| North Myrtle Beach (KCRE)                                            | 30/0753                    | 997.6       | 28/0453                       | 21                          | 39              | 0.45            |
| <b>Marine Observations</b>                                           |                            |             |                               |                             |                 |                 |
| Fort Johnson NERRS (FJXS1)<br>32.75N 79.90W                          | 27/2030                    | 1001.5      | 28/0915                       | 28 <sup>i</sup>             | 34 <sup>i</sup> |                 |
| Lake Thurmond (CHDS1)<br>33.66N 82.20W<br>Height: 2.1 m              |                            |             | 29/2200                       |                             | 37              |                 |
| Buoy 41004<br>32.50N 79.10W<br>Height: 5.0 m                         | 27/2000                    | 995.2       | 27/1400                       | 41                          | 51              |                 |
| Buoy 41008<br>31.40N 80.87W<br>Height: 5.0 m                         | 27/2050                    | 1000.4      | 27/1250                       | 31                          | 39              |                 |
| <b>North Carolina</b>                                                |                            |             |                               |                             |                 |                 |

| Location                                                               | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |           | Total rain (in) |
|------------------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------|-----------------|
|                                                                        | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| <b>ICAO Sites</b>                                                      |                            |             |                               |                             |           |                 |
| 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)<br>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)<br>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            |
| <b>Marine Observations</b>                                             |                            |             |                               |                             |           |                 |
| Beaufort Tide Gauge NOS (BFTN7)<br>34.72N 76.67W<br>Height: 7.0 m      | 28/1912                    | 991.4       | 28/1048                       | 33                          | 46        |                 |
| Cape Lookout C-MAN (CLKN7)<br>34.60N 76.52W<br>Height: 9.8 m           | 28/1900                    | 992.8       | 28/1100                       | 39                          | 48        |                 |
| Cedar Island (CITN7)<br>35.10N 76.30W<br>Height: 10.0 m                | 30/2100                    | 993.0       | 29/1240                       | 47                          | 58        |                 |
| Duck Field Research Facility - USACE<br>36.20N 75.80W<br>Height: 19.4m |                            |             | 29/0450                       | 49                          | 60        |                 |
| Duck Tide Gauge NOS (DUKN7)<br>36.18N 75.75W<br>Height: 14.4 m         | 29/1842                    | 985.1       | 28/2148                       | 44                          | 53        |                 |
| Hatteras Tide Gauge NOS (HCGN7)<br>35.21N 75.70W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| Ocean Crest Pier CORMP (OCPN7)<br>33.90N 78.10W<br>Height: 12.2 m                   | 28/0732                    | 994.7       | 27/1817                       | 25                          | 40        |                 |
| Oregon Inlet NOS (ORIN7)<br>35.77N 75.53W<br>Height: 6.0 m                          | 29/1830                    | 986.6       | 28/1324                       | 37                          | 51        |                 |
| Swanquarter (SWQN7)<br>35.39N 76.33W<br>Height: 10.0 m                              | 30/2100                    | 990.0       | 29/0030                       | 33                          | 43        |                 |
| Wrightsville Beach Johnny Mercer Pier NOS (JMPN7)<br>34.21N 77.79W<br>Height: 7.0 m | 29/2100                    | 994.6       | 27/2254                       | 32                          | 43        |                 |
| Buoy 41001<br>34.56N 72.63W<br>Height: 5.0 m                                        | 28/2350                    | 969.6*      | 29/0610                       | 55*                         | 74*       |                 |
| Buoy 41002<br>31.86N 74.84W<br>Height: 5.0 m                                        | 28/0822                    | 969.2       | 28/1743                       | 53 <sup>j</sup>             | 60        |                 |
| Buoy 41013<br>33.44N 77.74W<br>Height: 5.0 m                                        | 28/0950                    | 991.6       | 27/2030                       | 44 <sup>f</sup>             | 55        |                 |
| Buoy 41036<br>34.21N 76.94W<br>Height: 5.0 m                                        | 28/0920                    | 991.9       | 27/2250                       | 42 <sup>f</sup>             | 56        |                 |
| Buoy 41038 CORMP<br>34.10N 77.70W<br>Height: 3.0 m                                  | 28/1100                    | 994.2       | 27/2200                       | 35                          | 45        |                 |
| <b>RAWS</b>                                                                         |                            |             |                               |                             |           |                 |
| Dare Bomb Range                                                                     |                            |             | 28/1837                       |                             | 45        |                 |
| Fort Bragg (FBRN7)                                                                  |                            |             |                               |                             | 36        |                 |
| Duke Forest (DKFN7)                                                                 |                            |             |                               |                             | 34        |                 |
| Hoffman (MKLN7)                                                                     |                            |             |                               |                             | 34        |                 |
| Laurel Springs (LRLN7)<br>Elevation: 914 m                                          |                            |             | 30/0710                       |                             | 49        |                 |
| Lexington (LXFN7)                                                                   |                            |             |                               |                             | 38        |                 |
| Low Gap 4 S (RAVN7)<br>Elevation: 396 m                                             |                            |             | 30/1017                       |                             | 45        |                 |
| New Bern (NBRN7)                                                                    |                            |             | 28/1117                       |                             | 36        |                 |
| <b>WeatherBug</b>                                                                   |                            |             |                               |                             |           |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| South Nags Head Oregon Inlet Fishing Center                      |                            |             |                               |                             | 54        |                 |
| <b>WeatherFlow</b>                                               |                            |             |                               |                             |           |                 |
| Alligator Bridge<br>35.00N 76.01W<br>Height: 13 m                | 29/1900                    | 987.7       | 28/1700                       | 42                          | 52        |                 |
| Avon Sound<br>35.37N 76.33W<br>Height: 7 m                       | 29/0230                    | 987.7       | 28/2145                       | 44                          | 53        |                 |
| Avon Pier<br>35.35N 75.50W<br>Height: 16 m                       | 29/0215                    | 986.7       | 28/0950                       | 42                          | 56        |                 |
| Buxton<br>35.26N 75.52W<br>Height: 10 m                          | 29/0255                    | 984.9       | 28/1920                       | 31                          | 51        |                 |
| Fort Macon<br>34.69N 76.70W<br>Height: 10 m                      | 28/1905                    | 989.4       | 28/1255                       | 40                          | 52        |                 |
| Frisco Woods – Frisco<br>35.24N 75.63W<br>Height: 6 m            | 29/0820                    | 988.2       | 28/1345                       | 41                          | 50        |                 |
| Hatteras High – Frisco<br>35.26N 75.55W<br>Height: 20 m          | 29/0745                    | 984.6       | 28/2240                       | 43                          | 57        |                 |
| Jennette’s Pier - Nags Head<br>35.91N 75.59W<br>Height: 18 m     | 29/1900                    | 985.8       | 28/1845                       | 51                          | 63        |                 |
| Kitty Hawk Kites Resort – Salvo<br>35.78N 75.47W<br>Height: 18 m | 29/1735                    | 986.7       | 28/2230                       | 47                          | 56        |                 |
| Nag’s Head Jockey’s Ridge<br>35.95N 75.63W<br>Height: 6 m        | 29/1810                    | 986.7       | 29/1650                       | 33                          | 45        |                 |
| Ocracoke<br>35.13N 76.00W<br>Height: 7.0 m                       | 29/0800                    | 988.3       | 28/1805                       | 40                          | 49        |                 |
| Oregon Inlet<br>35.79N 75.54W<br>Height: 10 m                    | 29/0855                    | 982.7       | 29/0435                       | 39                          | 53        |                 |
| Oregon Inlet Jetty USCG<br>35.77N 75.53W<br>Height: 10.0 m       | 29/1720                    | 985.8       | 28/1900                       | 46                          | 59        |                 |
| Pamlico Sound<br>35.42N 75.83W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Waves<br>35.57N 75.47W<br>Height: 11 m             | 29/1800                    | 987.7       | 28/2230                      | 43                          | 53              |                 |
| Waves - Real Slick<br>35.56N 75.49W<br>Height: 6 m | 29/0310                    | 986.3       | 28/2220                      | 42                          | 53              |                 |
| <b>Public/Other</b>                                |                            |             |                              |                             |                 |                 |
| Barrett (APRS)<br>Elevation: 911 m                 |                            |             |                              |                             | 40              |                 |
| Baldwin 2 ENE (APRS)<br>Elevation: 1005 m          |                            |             |                              |                             | 40              |                 |
| Fosco 3 SSE (APRS)<br>Elevation: 1097 m            |                            |             |                              |                             | 41              |                 |
| Laurel Springs 1 SSW                               |                            |             | 29/2010                      |                             | 43 <sup>i</sup> |                 |
| <b>Virginia</b>                                    |                            |             |                              |                             |                 |                 |
| <b>ICAO Sites</b>                                  |                            |             |                              |                             |                 |                 |
| 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 (KDAAB)                               |                            |             | 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)<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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               |                 |
| <b>Marine Observations</b>                                                  |                            |             |                               |                             |                  |                 |
| Cape Henry NOS (CHYV2)<br>36.91N 75.78W                                     | 29/2154                    | 980.1       | 28/2012                       | 46 <sup>i</sup>             | 56 <sup>i</sup>  |                 |
| Chesapeake Bay Bridge Tunnel NOS (CBBV2)<br>36.97N 76.11W<br>Height: 13.0 m | 29/2136                    | 980.7       | 29/0100                       | 43                          | 52               |                 |
| Chesapeake Light C-MAN (CHLV2)<br>36.91N 75.71W<br>Height: 43.3 m           | 29/2300                    | 979.0       | 29/2100                       | 49                          | 59               |                 |
| Dominion Terminal NOS (DOMV2)<br>36.96N 76.42W<br>Height: 9.1 m             | 29/2230                    | 982.0       | 29/1930                       | 35                          | 44               |                 |
| Kiptopeke NOS (KPTV2)<br>37.17N 75.99W                                      |                            |             | 30/0130                       | 42 <sup>i</sup>             | 52 <sup>i</sup>  |                 |
| Lewisetta NOS (LWTV2)<br>37.995N 76.465W<br>Height: 10.0 m                  | 30/0012                    | 974.4       | 29/2000                       | 35                          | 46               |                 |
| Money Point NOS (MNPV2)<br>36.78N 76.30W<br>Height: 7.6 m                   | 29/2154                    | 983.4       | 29/2154                       |                             | 40               |                 |
| Rappahannock Light Tower NOS (RPLV2)<br>37.54N 76.02W                       | 29/2224                    | 975.0       | 28/1912                       | 47 <sup>i</sup>             | 57 <sup>i</sup>  |                 |
| South Craney Island NOS (CRYV2)<br>36.89N 76.34W                            | 29/2154                    | 983.0       | 29/0224                       | 32 <sup>i</sup>             | 42 <sup>i</sup>  |                 |
| Wachapreague NOS (WAHV2)<br>37.61N 75.69W                                   | 29/2200                    | 974.9       | 27/2348                       | 27* <sup>i</sup>            | 38* <sup>i</sup> |                 |
| Willoughby Degaussing Station NOS (WDSV2)<br>36.98N 76.32W                  | 29/2230                    | 979.6       | 29/2106                       | 42 <sup>i</sup>             | 50 <sup>i</sup>  |                 |
| York River East NOS (YKRV2)<br>37.25N 76.33W                                | 29/2212                    | 978.4       | 28/2336                       | 44 <sup>i</sup>             | 53 <sup>i</sup>  |                 |
| Yorktown USCG NOS (YKTV2)<br>37.23N 76.48W<br>Height: 9.6 m                 | 29/2230                    | 980.0       | 29/0100                       | 35                          | 42               |                 |
| Buoy 44041 CBIBS<br>37.20N 76.78W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Buoy 44058 CBIBS<br>37.55N 76.26W<br>Height: 3.0 m          | 30/0110                    | 978.3       | 30/0220                       | 33                          | 42              |                 |
| <b>Virginia DOT Mesonet</b>                                 |                            |             |                               |                             |                 |                 |
| Afton Mountain (VA005)<br>38.03N 78.86W                     |                            |             | 30/0419                       |                             | 45              |                 |
| Danville Airport 1 W<br>Elevation: 165 m                    |                            |             | 30/0648                       |                             | 35              |                 |
| Dublin 1 NNE<br>Elevation: 645 m                            |                            |             | 30/0820                       |                             | 42              |                 |
| Marion-Wytheville 2 E<br>Elevation: 796 m                   |                            |             | 30/0744                       |                             | 45              |                 |
| Millboro 6 SSE<br>Elevation: 583 m                          |                            |             | 30/0029                       |                             | 39              |                 |
| near Roanoke Airport<br>Elevation: 354 m                    |                            |             | 30/0402                       |                             | 36              |                 |
| West Springfield (VA046)<br>38.74N 77.19W                   |                            |             | 30/0200                       |                             | 45              |                 |
| <b>WeatherBug</b>                                           |                            |             |                               |                             |                 |                 |
| Dale City Nova Woodbridge Campus<br>38.62N 77.29W           |                            |             | 30/0204                       |                             | 50 <sup>i</sup> |                 |
| Gainesville School for the Arts & Sciences<br>38.78N 77.60W |                            |             | 30/0150                       |                             | 46 <sup>i</sup> |                 |
| Manassas Pennington School<br>38.75N 77.48W                 |                            |             | 30/0125                       |                             | 43 <sup>i</sup> |                 |
| Oakton Providence ES<br>38.86N 77.32W                       |                            |             | 30/0219                       |                             | 53 <sup>i</sup> |                 |
| Reston National Wildlife Federation<br>38.95N 77.35w        |                            |             | 30/0025                       |                             | 52 <sup>i</sup> |                 |
| Rollins Fork King George ES<br>38.25N 77.16W                |                            |             | 29/1944                       |                             | 50 <sup>i</sup> |                 |
| Round Hill ES<br>39.13N 77.77W                              |                            |             | 30/2255                       |                             | 49 <sup>i</sup> |                 |
| Sterling Nova Loudon Campus<br>39.02N 77.38W                |                            |             | 30/0039                       |                             | 49 <sup>i</sup> | 8.06            |
| Strasburg Sandy Hook ES<br>38.98N 78.37W                    |                            |             | 30/0404                       |                             | 49 <sup>i</sup> |                 |
| Warrenton Highland School<br>38.73N 77.80W                  |                            |             | 29/2215                       |                             | 50 <sup>i</sup> |                 |
| Warrenton P. B. Smith ES<br>38.73N 77.74W                   |                            |             | 30/0030                       |                             | 44 <sup>i</sup> |                 |
| Sperryville Rappahannock Co. HS<br>38.68N 78.19W            |                            |             | 29/2035                       |                             | 45 <sup>i</sup> |                 |

| Location                                                                                | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                  | Total rain (in) |
|-----------------------------------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|------------------|-----------------|
|                                                                                         | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Wintergreen Mountain<br>37.92N 78.95W Elevation: 1113 m                                 |                            |             | 30/0130                       |                             | 63               |                 |
| <b>WeatherFlow</b>                                                                      |                            |             |                               |                             |                  |                 |
| Baber Point<br>Height: 8 m                                                              |                            |             | 30/0015                       | 39                          | 52               |                 |
| Cape Henry<br>Height: 25 m                                                              |                            |             | 28/2315                       | 46                          | 55               |                 |
| Chesapeake Bay Bridge Tunnel 3 <sup>rd</sup><br>Island<br>37.03N 76.08W<br>Height: 22 m | 29/2120                    | 979.0       | 29/1655                       | 49                          | 58               |                 |
| Cuckold Creek<br>Height: 8 m                                                            |                            |             | 29/1935                       | 40                          | 45               |                 |
| Deltaville<br>37.56N 76.30W<br>Height: 7 m                                              | 29/2316                    | 979.0       | 29/1815                       | 34                          | 41               |                 |
| Great Wicomico Light<br>37.80N 76.27W<br>Height: 11 m                                   | 30/0100                    | 975.0       | 29/1925                       | 34                          | 45               |                 |
| Hampton Flats/Hampton<br>36.98N 76.35W<br>Height: 7 m                                   | 29/2050                    | 983.0       | 30/0035                       | 36                          | 46               |                 |
| Lynnhaven Pier/Virginia Beach<br>36.92N 76.08W<br>Height: 12 m                          | 29/2205                    | 981.0       | 28/2330                       | 37                          | 49               |                 |
| Lafayette River/Norfolk<br>36.89N 76.32W                                                |                            |             | 29/0125                       | 24* <sup>i</sup>            | 39* <sup>i</sup> |                 |
| Mason Neck<br>Height: 11 m                                                              |                            |             | 29/1940                       | 32                          | 42               |                 |
| Messick Point<br>Height: 11 m                                                           |                            |             | 28/2315                       | 41                          | 49               |                 |
| Monroe Creek<br>Height: 8 m                                                             |                            |             | 29/2225                       | 34                          | 45               |                 |
| New Point Comfort<br>37.33N 76.27W<br>Height: 15 m                                      | 29/2350                    | 977.0       | 28/2045                       | 42                          | 50               |                 |
| Onancock<br>37.66N 75.87W<br>Height: 16 m                                               | 29/2156                    | 974.0       | 29/1820                       | 45                          | 55               |                 |
| Plantation Flats/Cape Charles<br>37.26N 76.03W<br>Height: 7 m                           | 29/2229                    | 980.0       | 30/0045                       | 39                          | 48               |                 |
| Potomac Light 33<br>Height: 10 m                                                        |                            |             | 29/2210                       | 37                          | 49               |                 |
| Pylons Dah<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Rudee Inlet<br>Height: 10 m                                   |                            |             | 28/2040                       | 40                          | 48              |                 |
| Sandbridge<br>36.70N 75.93W<br>Height: 5 m                    | 29/1830                    | 984.0       | 29/0005                       | 36                          | 43              |                 |
| Silver Beach<br>Height: 13 m                                  |                            |             | 30/0150                       | 37                          | 44              |                 |
| South Norfolk Jordan Bridge<br>Height: 50 m                   |                            |             | 29/0204                       | 36                          | 42              |                 |
| Thimble Shoals/Chesapeake Bay<br>37.05N 76.26W<br>Height: 7 m | 30/0110                    | 983.0       | 28/2245                       | 38                          | 48              |                 |
| Tower 70<br>Height: 8 m                                       |                            |             | 29/2330                       | 34                          | 42              |                 |
| <b>CWOP</b>                                                   |                            |             |                               |                             |                 |                 |
| Bent Mountain 3 NNW (APRS)                                    |                            |             | 30/0352                       |                             | 49              |                 |
| Blacksburg (APRS)                                             |                            |             | 30/0608                       |                             | 43              |                 |
| Blacksburg 2 N (APRS)<br>Elevation: 637 m                     |                            |             | 30/0144                       |                             | 36              |                 |
| Fincastle 6 W (APRS)<br>Elevation: 440 m                      |                            |             | 30/1110                       |                             | 38              |                 |
| Lithia 2 E (APRS)<br>Elevation: 414 m                         |                            |             | 30/0408                       |                             | 36              |                 |
| Lovettsville (AU044)<br>39.28N 77.60W                         |                            |             | 30/0148                       |                             | 52              |                 |
| Maurertown (C5286)<br>38.93N 78.52W                           |                            |             | 30/0046                       |                             | 48              |                 |
| Merrimac 2 SW (APRS)<br>Elevation: 628 m                      |                            |             | 30/0325                       |                             | 36              |                 |
| Mount Solon (D6906)<br>38.30N 79.13W                          |                            |             | 30/0655                       |                             | 47              |                 |
| Walton 2 SSE (APRS)<br>Elevation: 611 m                       |                            |             | 30/0809                       |                             | 37              |                 |
| Winchester (C5255)<br>39.22N 78.25W                           |                            |             | 29/2328                       |                             | 43              |                 |
| <b>Public/Other</b>                                           |                            |             |                               |                             |                 |                 |
| Chester Gap 3 NNE                                             |                            |             |                               |                             | 69 <sup>i</sup> |                 |
| Hacksheck 1 NW                                                |                            |             |                               |                             | 52 <sup>i</sup> |                 |
| Leesburg                                                      |                            |             |                               |                             | 46 <sup>i</sup> |                 |
| Stewartsville 3 SSW<br>Elevation: 283 m                       |                            |             | 30/0826                       |                             | 37              |                 |
| Wallops Island                                                |                            |             |                               |                             | 59 <sup>i</sup> |                 |

| Location                                                   | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed   |                             |                  | Total rain (in) |
|------------------------------------------------------------|----------------------------|-------------|------------------------------|-----------------------------|------------------|-----------------|
|                                                            | Date/time (UTC)            | Press. (mb) | Date/time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Wintergreen 4 NNW                                          |                            |             |                              |                             | 63 <sup>i</sup>  |                 |
| <b>West Virginia</b>                                       |                            |             |                              |                             |                  |                 |
| <b>ICAO Sites</b>                                          |                            |             |                              |                             |                  |                 |
| Bluefield Mercer County Airport (KBLF)<br>Elevation: 875 m |                            |             | 30/1032                      |                             | 36               | 0.48            |
| Martinsburg Airport (KMRB)                                 |                            |             |                              |                             | 52               | 4.00            |
| <b>RAWS</b>                                                |                            |             |                              |                             |                  |                 |
| Upper Tract (UPTW2)<br>38.81N 79.28W                       |                            |             | 30/0917                      |                             | 43 <sup>i</sup>  |                 |
| <b>WeatherBug</b>                                          |                            |             |                              |                             |                  |                 |
| Bunker Hill Musselman Middle School<br>39.33N 78.05W       |                            |             | 30/0229                      |                             | 45 <sup>i</sup>  |                 |
| <b>CWOP</b>                                                |                            |             |                              |                             |                  |                 |
| Alvon 2 NW (APRS)<br>Elevation: 650 m                      |                            |             | 30/0937                      |                             | 48               |                 |
| Harpers Ferry (C5204)<br>39.33N 77.79W                     |                            |             | 30/0024                      |                             | 46 <sup>i</sup>  |                 |
| <b>Public/Other</b>                                        |                            |             |                              |                             |                  |                 |
| Keyser 2 SSW                                               |                            |             |                              |                             | 56 <sup>i</sup>  |                 |
| Ranson 1 NNW                                               |                            |             |                              |                             | 56 <sup>i</sup>  |                 |
| <b>Delaware</b>                                            |                            |             |                              |                             |                  |                 |
| <b>ICAO Sites</b>                                          |                            |             |                              |                             |                  |                 |
| Georgetown (KGED)                                          | 29/2354                    | 962.5       | 29/2222                      | 25                          | 43               |                 |
| Wilmington (KILG)                                          | 30/0151                    | 954.6       | 30/0451                      | 39                          | 50               | 5.01            |
| <b>Marine Observations</b>                                 |                            |             |                              |                             |                  |                 |
| Brandywind Shoal Light NOS (BRND1)<br>38.99N 75.11W        | 29/1200                    | 988.5*      | 29/1012                      | 44* <sup>i</sup>            | 54* <sup>i</sup> |                 |
| Delaware City NOS (DELD1)<br>39.58N 75.59W                 | 30/0130                    | 954.2       | 29/2024                      | 31 <sup>i</sup>             | 45 <sup>i</sup>  |                 |
| Lewes NOS (LWSD1)<br>38.78N 75.12W<br>Height: 12.2m        | 29/2206                    | 959.0       | 29/2112                      | 46                          | 58               |                 |
| Reedy Point NOS (RDYD1)<br>39.55N 75.57W                   | 30/0130                    | 954.5       |                              |                             |                  |                 |
| <b>Texas Tech</b>                                          |                            |             |                              |                             |                  |                 |
| Station 106A<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Station 108A<br>38.781N 75.127 W                          | 29/2153                    | 960.0       | 29/2038                       | 43                          | 52              |                 |
| Station 112A<br>39.115N 75.448W                           | 30/0101                    | 954.8       | 29/2050                       | 31                          | 40              |                 |
| <b>WeatherBug</b>                                         |                            |             |                               |                             |                 |                 |
| Lewes University of Delaware                              |                            |             |                               |                             | 53 <sup>i</sup> | 6.10            |
| Rehoboth Beach Boardwalk Plaza Hotel                      |                            |             |                               |                             | 53 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                        |                            |             |                               |                             |                 |                 |
| Lewes<br>Elevation: 16 m                                  |                            |             | 29/1320                       | 46                          | 58              |                 |
| <b>Public/Other</b>                                       |                            |             |                               |                             |                 |                 |
| Reeves Crossing 1 SSE                                     |                            |             | 29/1914                       |                             | 51              |                 |
| Stones Throw                                              |                            |             | 29/2203                       |                             | 58              |                 |
| <b>Washington, D.C.</b>                                   |                            |             |                               |                             |                 |                 |
| <b>Marine</b>                                             |                            |             |                               |                             |                 |                 |
| Washington, D.C. NOS (WASD2)<br>38.870N 77.020W           | 30/0230                    | 968.8       | 30/0118                       | 32 <sup>i</sup>             | 53 <sup>i</sup> |                 |
| <b>Maryland</b>                                           |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                         |                            |             |                               |                             |                 |                 |
| Annapolis Lee Airport (KANP)<br>38.94N 76.57W             |                            |             | 30/0055                       |                             | 51 <sup>i</sup> |                 |
| 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            |
| <b>Marine Observations</b>                                |                            |             |                               |                             |                 |                 |
| Baltimore NOS (BLTM2)<br>39.267N 76.578W                  | 30/0300                    | 962.8       | 29/1654                       | 25 <sup>i</sup>             | 47 <sup>i</sup> |                 |
| Bishops Head NOS (BISM2)<br>38.220N 76.038W               | 30/0006                    | 970.8       | 29/2318                       | 48 <sup>i</sup>             | 59 <sup>i</sup> |                 |
| Cambridge NOS (CAMM2)<br>38.573N 76.068W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Chesapeake City NOS (CHCM2)<br>39.53N 75.81W                            | 30/0200                    | 956.3       | 29/2148                       | 26 <sup>i</sup>             | 41 <sup>i</sup> |                 |
| Cove Point LNG Pier NOS (COVM2)<br>38.404N 76.386W                      | 30/0100                    | 969.5       | 29/1306                       | 40 <sup>i</sup>             | 47 <sup>i</sup> |                 |
| Francis Scott Key Bridge NOS (FSKM2)<br>39.219N 76.528W                 | 30/0242                    | 961.5       | 29/2336                       | 40 <sup>i</sup>             | 50 <sup>i</sup> |                 |
| Ocean City NOS (OCIM2)<br>38.33N 75.09W                                 | 29/2106                    | 962.7       | 30/0300                       | 37 <sup>i</sup>             | 51 <sup>i</sup> |                 |
| Piney Point NOS (PPTM2)<br>38.133N 76.533W                              |                            |             | 29/1954                       | 50 <sup>i</sup>             | 65 <sup>i</sup> |                 |
| Thomas Point C-MAN (TPLM2)<br>38.898N 76.437W<br>Height: 18.0 m         | 30/0100                    | 963.5       | 30/0100                       | 52 <sup>f</sup>             | 69              |                 |
| Tolchester Beach NOS (TCBM2)<br>39.213N 76.245W<br>Height: 10.0 m       | 30/0218                    | 960.9       | 29/2324                       | 41                          | 52              |                 |
| Buoy 44042 CBIBS<br>38.033N 76.336W<br>Height: 3.0 m                    |                            |             | 29/2230                       | 41                          | 53              |                 |
| Buoy 44043 CBIBS<br>39.152N 76.391W<br>Height: 3.0 m                    | 30/1520                    | 989.9       | 29/2320                       | 39                          | 51              |                 |
| Buoy 44057 CBIBS<br>39.544N 76.075W<br>Height: 3.0 m                    | 30/0310                    | 957.7       | 29/2150                       | 34                          |                 |                 |
| Buoy 44061 CBIBS<br>38.785N 77.036W<br>Height: 3.0 m                    | 30/0240                    | 969.6       | 30/0210                       | 25                          | 39              |                 |
| Buoy 44062 CBIBS<br>38.556N 76.415W<br>Height: 3.0 m                    | 30/0130                    | 969.1       | 29/2130                       | 37                          | 49              |                 |
| Buoy 44063 CBIBS<br>38.963N 76.448W<br>Height: 3.0 m                    |                            |             | 30/0120                       | 37                          | 47              |                 |
| <b>Texas Tech</b>                                                       |                            |             |                               |                             |                 |                 |
| Station 104A<br>38.153N 75.259W                                         | 29/2102                    | 967.6       | 29/2116                       | 30                          | 44              |                 |
| <b>Maryland DOT Mesonet</b>                                             |                            |             |                               |                             |                 |                 |
| Anne Arundel Co - I-97 at Route 100 (MD027)<br>39.15N 76.64W            |                            |             | 30/0212                       |                             | 55 <sup>i</sup> |                 |
| Frederick County – U.S. Route 340 at Route 180 (MD016)<br>39.35N 77.58W |                            |             | 30/0457                       |                             | 53 <sup>i</sup> |                 |

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



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

| Location                                   | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed   |                             |                 | Total rain (in) |
|--------------------------------------------|----------------------------|-------------|------------------------------|-----------------------------|-----------------|-----------------|
|                                            | Date/time (UTC)            | Press. (mb) | Date/time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Falling Waters (D3148)<br>39.60N 77.88W    |                            |             | 30/0113                      |                             | 45 <sup>i</sup> |                 |
| Halethorpe (C1550)<br>39.23N 76.70W        |                            |             | 30/0110                      |                             | 59 <sup>i</sup> |                 |
| Laytonsville (C2463)<br>39.20N 77.13W      |                            |             | 30/0113                      |                             | 66 <sup>i</sup> |                 |
| <b>Public/Other</b>                        |                            |             |                              |                             |                 |                 |
| Annapolis                                  |                            |             |                              |                             | 60 <sup>i</sup> |                 |
| Arbutus                                    |                            |             |                              |                             | 59 <sup>i</sup> |                 |
| Colesville 1 SSE                           |                            |             |                              |                             | 61 <sup>i</sup> |                 |
| Crisfield                                  |                            |             | 20/2029                      | 44 <sup>i</sup>             | 63 <sup>i</sup> |                 |
| Crocheron 2 SSE                            |                            |             |                              |                             | 61 <sup>i</sup> |                 |
| Ocean City                                 |                            |             |                              |                             | 64 <sup>i</sup> |                 |
| Saint Inigoes 2 W                          |                            |             |                              |                             | 56 <sup>i</sup> |                 |
| <b>New Jersey</b>                          |                            |             |                              |                             |                 |                 |
| <b>ICAO Sites</b>                          |                            |             |                              |                             |                 |                 |
| 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            |
| <b>Marine Observations</b>                 |                            |             |                              |                             |                 |                 |
| Atlantic City NOS (ACYN4)<br>39.36N 74.42W | 29/2224                    | 945.5       |                              |                             |                 |                 |
| Burlington NOS (BDRN4)<br>40.08N 74.87W    | 30/0030                    | 953.7       | 30/0112                      | 36 <sup>i</sup>             | 50 <sup>i</sup> |                 |

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

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

| Location                                           | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                 | Total rain (in) |
|----------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------------|-----------------|
|                                                    | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Brigantine (Wx Underground)<br>39.40N 74.37W       | 29/2330                    | 946.2       |                               |                             |                 |                 |
| Dennisville                                        |                            |             |                               |                             | 70 <sup>i</sup> |                 |
| Galloway (Wx Underground)<br>39.46N 74.50W         | 30/0000                    | 946.5       |                               |                             |                 |                 |
| Harrison                                           |                            |             | 29/2320                       |                             | 59 <sup>i</sup> |                 |
| Newport                                            |                            |             |                               |                             | 76 <sup>i</sup> |                 |
| North Arlington                                    |                            |             | 29/2347                       |                             | 55 <sup>i</sup> |                 |
| Surf City                                          |                            |             |                               |                             | 77 <sup>i</sup> |                 |
| Tompkinsville 2N                                   |                            |             | 30/0024                       |                             | 78 <sup>i</sup> |                 |
| Tuckerton                                          |                            |             |                               |                             | 76 <sup>i</sup> |                 |
| Wildwood Crest<br>Elevation: 4.5 m                 |                            |             | 29/2200                       | 35                          | 61              |                 |
| <b>Pennsylvania</b>                                |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                  |                            |             |                               |                             |                 |                 |
| 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<br>Airfield (KMUI) |                            |             | 29/2245                       |                             | 49              |                 |
| Harrisburg Capital City Airport<br>(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<br>(KSCE)  |                            |             | 29/1953                       |                             | 35              |                 |

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

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



| Location                                                      | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                 | Total rain (in) |
|---------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------------|-----------------|
|                                                               | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Bronx St. Raymond HS for Boys                                 |                            |             |                               |                             | 58 <sup>i</sup> |                 |
| Brooklyn College Academy                                      |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| Brooklyn Edward R. Murrow HS                                  |                            |             |                               |                             | 67 <sup>i</sup> |                 |
| Brooklyn IS 187 Christa McAuliffe                             |                            |             |                               |                             | 59 <sup>i</sup> |                 |
| Brooklyn PS/IS 192 Magnet School for Math and Science         |                            |             |                               |                             | 61 <sup>i</sup> |                 |
| Brooklyn St. Bernadette School                                |                            |             |                               |                             | 61 <sup>i</sup> |                 |
| Corona IS 61 Leonardo da Vinci                                |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| Jamaica HS                                                    |                            |             |                               |                             | 60 <sup>i</sup> |                 |
| Long Beach HS                                                 |                            |             |                               |                             | 72 <sup>i</sup> |                 |
| Mamaronek Beach Point Club                                    |                            |             |                               |                             | 63 <sup>i</sup> |                 |
| Mount Vernon Graham ES Magnet                                 |                            |             |                               |                             | 61 <sup>i</sup> |                 |
| New York City St. Elizabeth School                            |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| Orangeburg Rockland County Sewer District                     |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| Peekskill HS                                                  |                            |             |                               |                             | 64 <sup>i</sup> |                 |
| Selden Suffolk County CC                                      |                            |             |                               |                             | 62 <sup>i</sup> |                 |
| Slate Hill Minisink Valley HS                                 |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| Staten Island P.S. 32 Gifford                                 |                            |             |                               |                             | 64 <sup>i</sup> |                 |
| Staten Island P.S. 53 Bay Terrace                             |                            |             |                               |                             | 59 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                            |                            |             |                               |                             |                 |                 |
| Bayville (XBAY)<br>40.90N 73.63W<br>Height: 14 m              |                            |             | 29/2020                       | 57                          | 67              |                 |
| Blue Point (XBLU)<br>40.73N 73.04W<br>Height: 11 m            |                            |             | 29/2110                       | 52                          | 65              |                 |
| Breezy Point - Queens (XBRZ)<br>40.56N 73.93W<br>Height: 10 m |                            |             | 29/2340                       | 53                          | 68              |                 |
| Durand Beach<br>Height: 10 m                                  |                            |             | 29/2310                       | 40                          | 54              |                 |
| East Moriches USCG (XMOR)<br>40.79N 72.75W<br>Height: 10 m    |                            |             | 29/2220                       | 54                          | 71              |                 |
| Eaton's Neck (XEAT)<br>40.95N 73.40W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)        |                 |
| Fire Island USCG (XFIR)<br>40.63N 73.26W                         |                            |             | 30/0100                       | 48                          | 65               |                 |
| Great Gull Island (XGUL)<br>41.20N 72.12W<br>Height: 18 m        |                            |             | 29/2035                       | 65                          | 74               |                 |
| Great South Bay (XHCK)<br>40.66N 73.40W<br>Height: 12 m          |                            |             | 29/2055                       | 41                          | 55               |                 |
| Jones Beach USCG (XJON)<br>40.59N 73.56W<br>Height: 10 m         |                            |             | 29/2215                       | 48                          | 70               |                 |
| Larchmont Harbor (XLAR)<br>40.92N 73.73W<br>Height: 13 m         |                            |             | 29/2304                       | 51                          | 64               |                 |
| Kingston<br>Height: 8 m                                          |                            |             | 29/2120                       | 31                          | 42               |                 |
| Mecox Bay (XMCX)<br>40.91N 73.32W<br>Height: 10 m                |                            |             | 29/1850                       | 38                          | 66               |                 |
| Point of Woods Yacht Club (XPOW)<br>40.65N 73.14W<br>Height: 7 m |                            |             | 29/2035                       | 48                          | 63               |                 |
| Tappan Zee Light 14 (XTAP)<br>41.14N 73.88W<br>Height 13 m       |                            |             | 29/1800                       | 34                          | 56               |                 |
| <b>CWOP</b>                                                      |                            |             |                               |                             |                  |                 |
| Middlefield (D3254)<br>41.52N 72.66W<br>Height 65.2 m            | 29/2108                    | 975.9       | 29/2248                       |                             | 50               |                 |
| Jacksons Heights 1 E (D9152)<br>40.75N 73.87W<br>Height: 28.0 m  | 29/2202                    | 966.1*      | 29/2232                       | 39* <sup>i</sup>            | 67* <sup>i</sup> |                 |
| <b>Public/Other</b>                                              |                            |             |                               |                             |                  |                 |
| Albany WFO                                                       |                            |             | 30/0254                       |                             | 44 <sup>i</sup>  |                 |
| Arkport 1 SE                                                     |                            |             | 29/2141                       |                             | 38 <sup>i</sup>  |                 |
| Bayville                                                         |                            |             | 29/2121                       |                             | 67 <sup>i</sup>  |                 |
| Berlin                                                           |                            |             | 29/2252                       |                             | 41 <sup>i</sup>  |                 |
| Breezy Point                                                     |                            |             | 29/2340                       | 53 <sup>i</sup>             | 68 <sup>i</sup>  |                 |
| Canajoharie                                                      |                            |             | 30/0000                       |                             | 35 <sup>i</sup>  |                 |
| Cold Brook                                                       |                            |             | 29/2306                       |                             | 38 <sup>i</sup>  |                 |
| Coney Island                                                     |                            |             | 29/2242                       |                             | 60 <sup>i</sup>  |                 |

| Location                                      | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed   |                             |                 | Total rain (in) |
|-----------------------------------------------|----------------------------|-------------|------------------------------|-----------------------------|-----------------|-----------------|
|                                               | Date/time (UTC)            | Press. (mb) | Date/time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Dover Plains                                  |                            |             | 29/2302                      |                             | 41 <sup>i</sup> |                 |
| East Springfield                              |                            |             | 29/1535                      |                             | 38 <sup>i</sup> |                 |
| Erin 2 SSE                                    |                            |             | 29/1906                      |                             | 37 <sup>i</sup> |                 |
| Flatbush                                      |                            |             | 30/0105                      |                             | 50 <sup>i</sup> |                 |
| Herkimer                                      |                            |             | 29/1403                      |                             | 48 <sup>i</sup> |                 |
| Hudson                                        |                            |             | 29/2100                      |                             | 39 <sup>i</sup> |                 |
| Hunter                                        |                            |             | 29/2000                      |                             | 43 <sup>i</sup> |                 |
| Johnson City                                  |                            |             | 30/0654                      |                             | 36 <sup>i</sup> |                 |
| Lake Luzerne                                  |                            |             | 29/1920                      |                             | 35 <sup>i</sup> |                 |
| Latham                                        |                            |             | 29/2151                      |                             | 37 <sup>i</sup> |                 |
| Long Lake                                     |                            |             | 29/1850                      |                             | 41 <sup>i</sup> |                 |
| Mount Holly                                   |                            |             | 29/2357                      |                             | 34 <sup>i</sup> |                 |
| Patchogue                                     |                            |             | 29/2301                      |                             | 67 <sup>i</sup> |                 |
| Ogdensburg                                    |                            |             | 30/0100                      |                             | 41 <sup>i</sup> |                 |
| Orange Lake                                   |                            |             | 29/2345                      |                             | 53 <sup>i</sup> |                 |
| Oyster Bay                                    |                            |             | 29/1938                      |                             | 58 <sup>i</sup> |                 |
| Pleasant Valley                               |                            |             | 30/0031                      |                             | 43 <sup>i</sup> |                 |
| Port Byron                                    |                            |             | 29/2200                      |                             | 36 <sup>i</sup> |                 |
| Saratoga Springs                              |                            |             | 29/1948                      |                             | 40 <sup>i</sup> |                 |
| Sherburne<br>42.68N 75.50W                    |                            |             | 30/0300                      |                             | 51 <sup>i</sup> |                 |
| Stone Ridge                                   |                            |             | 30/0140                      |                             | 52 <sup>i</sup> |                 |
| Stottsville                                   |                            |             | 29/2055                      |                             | 39 <sup>i</sup> |                 |
| Syosset                                       |                            |             | 29/2303                      |                             | 71 <sup>i</sup> |                 |
| Upton Brookhaven National Lab<br>Height: 85 m |                            |             | 29/1750                      |                             | 69              |                 |
| Wyantskill                                    |                            |             | 29/1512                      |                             | 37 <sup>i</sup> |                 |
| <b>Connecticut</b>                            |                            |             |                              |                             |                 |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| New Haven (KHAVN)                                         | 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            |
| <b>Marine Observations</b>                                |                            |             |                              |                             |                 |                 |
| Bridgeport NOS (BRHC3)<br>41.17N 73.18W                   | 29/2054                    | 972.5       | 29/2106                      | 37 <sup>i</sup>             | 52 <sup>i</sup> |                 |
| New Haven NOS (NWHC3)<br>41.28N 72.91W<br>Height: 6.4 m   | 29/2036                    | 973.9       | 29/2136                      | 30                          | 51              |                 |
| New London Ledge (LDLC3)<br>41.31N 72.08W<br>Height: 20 m | 29/1900                    | 976.1*      | 29/1900                      | 46*                         | 66*             |                 |
| New London NOS (NLNC3)<br>41.36N 72.09W<br>Height: 8.5 m  | 29/2012                    | 976.9       | 29/2042                      | 33                          | 48              |                 |
| <b>WeatherBug</b>                                         |                            |             |                              |                             |                 |                 |
| Bridgeport Discovery Interdistrict Magnet School          |                            |             |                              |                             | 60 <sup>i</sup> |                 |
| Danbury Western Connecticut State University              |                            |             |                              |                             | 59 <sup>i</sup> |                 |
| Hamden Hall Country Day School                            |                            |             |                              |                             | 62 <sup>i</sup> |                 |
| New Haven Cold Spring School                              |                            |             |                              |                             | 57 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                        |                            |             |                              |                             |                 |                 |
| Norwalk Light (XNOR )<br>41.08N 73.38W<br>Height: 10 m    |                            |             | 29/2243                      | 52                          | 64              |                 |
| Fishers Island (XFSH)<br>41.25N 72.03W<br>Height: 10 m    |                            |             | 29/2230                      | 49                          | 68              |                 |
| <b>Public/Other</b>                                       |                            |             |                              |                             |                 |                 |
| Bristol                                                   |                            |             | 29/2153                      |                             | 61 <sup>i</sup> |                 |
| Burlington                                                |                            |             | 29/2022                      |                             | 58 <sup>i</sup> |                 |
| Greenwich                                                 |                            |             | 29/2120                      |                             | 61 <sup>i</sup> |                 |
| Groton 2 S                                                |                            |             | 29/1900                      |                             | 66 <sup>i</sup> |                 |
| Madison                                                   |                            |             | 29/2120                      |                             | 74 <sup>i</sup> |                 |
| Middletown 3 SW                                           |                            |             | 29/2243                      |                             | 50 <sup>i</sup> |                 |
| New Hartford                                              |                            |             | 29/2354                      |                             | 41 <sup>i</sup> |                 |
| Norwalk                                                   |                            |             | 30/0030                      |                             | 60 <sup>i</sup> |                 |

| Location                                                       | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed   |                             |                 | Total rain (in) |
|----------------------------------------------------------------|----------------------------|-------------|------------------------------|-----------------------------|-----------------|-----------------|
|                                                                | Date/time (UTC)            | Press. (mb) | Date/time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Stonington                                                     |                            |             | 29/1900                      |                             | 61 <sup>i</sup> |                 |
| Torrington                                                     |                            |             | 29/2037                      |                             | 50 <sup>i</sup> |                 |
| Torrington 3 SW                                                |                            |             | 29/1825                      |                             | 40 <sup>i</sup> |                 |
| Torrington 2 SE                                                |                            |             | 29/2026                      |                             | 38 <sup>i</sup> |                 |
| Trumbull                                                       |                            |             | 29/2240                      |                             | 59 <sup>i</sup> |                 |
| <b>Rhode Island</b>                                            |                            |             |                              |                             |                 |                 |
| <b>ICAO Sites</b>                                              |                            |             |                              |                             |                 |                 |
| 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              |                 |
| <b>Marine Observations</b>                                     |                            |             |                              |                             |                 |                 |
| Conimicut Light NOS (CPTR1)<br>41.72N 71.34W<br>Heights: 4.3 m | 29/2012                    | 982.0       | 29/2042                      | 46                          | 61              |                 |
| Fox Point/Providence NOS (FOXR1)<br>41.81N 71.40W              | 29/2112                    | 983.1       | 29/2030                      | 34 <sup>i</sup>             | 47 <sup>i</sup> |                 |
| Potter Cover NOS (PTCR1)<br>41.64N 71.34W                      | 29/1948                    | 982.2       | 29/1812                      | 38 <sup>i</sup>             | 54 <sup>i</sup> |                 |
| Quonset Point NOS (QPTR1)<br>41.59N 71.41W<br>Height: 6.4 m    | 29/2006                    | 981.8       | 29/2048                      | 43                          | 55              |                 |
| <b>RAWS</b>                                                    |                            |             |                              |                             |                 |                 |
| Ninigret (NINR1)<br>41.38N 71.58W                              |                            |             | 29/1925                      |                             | 65 <sup>i</sup> |                 |
| <b>WeatherBug</b>                                              |                            |             |                              |                             |                 |                 |
| Providence Harborside                                          |                            |             |                              |                             | 62 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                             |                            |             |                              |                             |                 |                 |
| Beavertail<br>Height: 13 m                                     |                            |             | 29/1830                      | 34                          | 50              |                 |
| Block Island Jetty<br>Height: 12 m                             |                            |             | 29/1419                      | 37                          | 47              |                 |
| Fogland<br>Height: 28 m                                        |                            |             | 29/1640                      | 30                          | 46              |                 |
| Halfway Rock<br>Height: 9 m                                    |                            |             | 29/1905                      | 44                          | 58              |                 |
| Point Judith<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Rose Island<br>Height: 12 m                |                            |             | 29/1915                       | 38                          | 59              |                 |
| Sabin Point<br>Height: 9 m                 |                            |             | 29/2107                       | 31                          | 49              |                 |
| Sakonnet Vineyards<br>Height: 10 m         |                            |             | 29/1910                       | 34                          | 55              |                 |
| University of Rhode Island<br>Height: 10 m |                            |             | 29/1915                       | 40                          | 57              |                 |
| <b>CWOP</b>                                |                            |             |                               |                             |                 |                 |
| Westerly (D5262)<br>41.32N 71.81W          |                            |             | 29/1844                       | 56 <sup>i</sup>             | 75 <sup>i</sup> |                 |
| <b>Public/Other</b>                        |                            |             |                               |                             |                 |                 |
| Barrington                                 |                            |             | 29/1639                       |                             | 53 <sup>i</sup> |                 |
| Burrillville                               |                            |             | 29/1836                       |                             | 42 <sup>i</sup> |                 |
| Jamestown – Beavertail Park                |                            |             | 29/1830                       |                             | 34 <sup>i</sup> |                 |
| Warren                                     |                            |             | 29/2010                       |                             | 63 <sup>i</sup> |                 |
| <b>Massachusetts</b>                       |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                          |                            |             |                               |                             |                 |                 |
| 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 (KMYV)                      | 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Westfield (KBAF)                                            | 29/2053                    | 983.7       | 29/1855                       |                             | 44              |                 |
| Worcester (KORH)                                            |                            |             | 29/2231                       | 35                          | 53              | 1.98            |
| <b>Marine Observations</b>                                  |                            |             |                               |                             |                 |                 |
| Buzzards Bay C-MAN (BUZM3)<br>41.40N 71.03W<br>Height: 80 m | 29/1900                    | 981.7       | 29/1740                       | 57 <sup>f</sup>             | 72              |                 |
| Nantucket NOS (NTKM3)<br>41.29N 70.10W<br>Height: 8.5 m     | 29/1906                    | 984.0       | 29/1936                       | 40                          | 52              |                 |
| Buoy 44008<br>40.50N 69.25W<br>Height: 5.0 m                | 29/1750                    | 981.2       | 29/1640                       | 43 <sup>f</sup>             | 58              |                 |
| Buoy 44013<br>42.35N 70.65W<br>Height: 5.0 m                | 30/0050                    | 988.2       | 29/1920                       | 40                          | 50              |                 |
| Buoy 44020<br>41.44N 70.19W<br>Height: 5.0 m                | 29/1950                    | 983.3       | 29/1950                       | 41                          | 52              |                 |
| Buoy 44029 NERACOOS<br>42.52N 70.67W<br>Height: 4.0 m       | 30/0050                    | 990.1       | 29/1940                       | 38 <sup>i</sup>             | 50 <sup>i</sup> |                 |
| <b>WeatherBug</b>                                           |                            |             |                               |                             |                 |                 |
| Blue Hill Observatory & Science Center                      |                            |             |                               |                             | 64 <sup>i</sup> |                 |
| Boston Seaport Hotel                                        |                            |             |                               |                             | 61 <sup>i</sup> |                 |
| Brookline Dexter and Southfield Schools                     |                            |             |                               |                             | 60 <sup>i</sup> |                 |
| Marion The Kittansett Club                                  |                            |             |                               |                             | 58 <sup>i</sup> |                 |
| Spencer Wire Village School                                 |                            |             |                               |                             | 58 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                                          |                            |             |                               |                             |                 |                 |
| Amelia Dam<br>Height: 17 m                                  |                            |             | 29/1820                       | 37                          | 57              |                 |
| Carson Beach<br>Height: 15 m                                |                            |             | 29/1940                       | 44                          | 57              |                 |
| Chapin<br>Height: 10 m                                      |                            |             | 29/1835                       | 36                          | 51              |                 |
| Chatham<br>Height: 10 m                                     |                            |             | 29/1820                       | 39                          | 54              |                 |
| Children's Island<br>Height: 10 m                           |                            |             | 29/1900                       | 47                          | 59              |                 |
| Courageous Sailing Center<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| Deer Island<br>Height: 20 m        |                            |             | 29/1745                       | 47                          | 57        |                 |
| Dog Bar Breakwater<br>Height: 16 m |                            |             | 30/0120                       | 38                          | 49        |                 |
| Dread Ledge<br>Height: 10 m        |                            |             | 29/1755                       | 44                          | 54        |                 |
| Duxbury<br>Height: 13 m            |                            |             | 29/2120                       | 44                          | 54        |                 |
| Duxbury Bay<br>Height: 15 m        |                            |             | 29/2010                       | 39                          | 49        |                 |
| Harvard Bridge<br>Height: 8 m      |                            |             | 29/1835                       | 37                          | 52        |                 |
| Hatch Beach<br>Height: 10 m        |                            |             | 29/1915                       | 38                          | 53        |                 |
| Hatch Beach<br>Height: 10 m        |                            |             | 29/1915                       | 38                          | 53        |                 |
| Kalmus-Hyannis<br>Height: 11 m     |                            |             | 29/1925                       | 46                          | 63        |                 |
| Lewis Wharf<br>Height: 12 m        |                            |             | 29/1740                       | 30                          | 44        |                 |
| Longfellow Bridge<br>Height: 18 m  |                            |             | 29/1830                       | 32                          | 49        |                 |
| Millennium Park<br>Height: 7 m     |                            |             | 29/1835                       | 31                          | 47        |                 |
| North Alston<br>Height: 11 m       |                            |             | 29/1745                       | 31                          | 55        |                 |
| Pleasure Bay<br>Height: 10 m       |                            |             | 29/1835                       | 51                          | 64        |                 |
| Plum Island<br>Height: 16 m        |                            |             | 29/1940                       | 35                          | 48        |                 |
| Revere Beach<br>Height: 10 m       |                            |             | 29/1945                       | 47                          | 58        |                 |
| Sagamore Beach<br>Height: 9 m      |                            |             | 29/1825                       | 43                          | 52        |                 |
| Scituate<br>Height: 10 m           |                            |             | 29/2025                       | 43                          | 56        |                 |
| Squantum<br>Height: 13 m           |                            |             | 29/1930                       | 43                          | 57        |                 |
| Vineyard Haven<br>Height: 10 m     |                            |             | 29/1910                       | 39                          | 57        |                 |
| West Dennis<br>Height: 14 m        |                            |             | 29/1940                       | 33                          | 53        |                 |
| West Falmouth<br>Height: 11 m      |                            |             | 29/1914                       | 30                          | 47        |                 |
| West Island<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| <b>CWOP</b>                       |                            |             |                               |                             |                 |                 |
| Wrentham (AT213)<br>42.04N 71.41W |                            |             | 29/1915                       | 33 <sup>i</sup>             | 67 <sup>i</sup> |                 |
| <b>Public/Other</b>               |                            |             |                               |                             |                 |                 |
| Bridgewater                       |                            |             | 29/1734                       |                             | 48 <sup>i</sup> |                 |
| Brookline                         |                            |             | 29/1954                       |                             | 60 <sup>i</sup> |                 |
| Cuttyhunk                         |                            |             |                               |                             | 72 <sup>i</sup> |                 |
| East Falmouth                     |                            |             | 29/1800                       | 42 <sup>i</sup>             | 63 <sup>i</sup> |                 |
| Hyannis 2 NE<br>41.67N 70.27W     |                            |             |                               |                             | 50 <sup>i</sup> |                 |
| Milford                           |                            |             | 29/1748                       |                             | 58 <sup>i</sup> |                 |
| Milton 3 SSW<br>42.21N 71.11W     |                            |             |                               |                             | 51 <sup>i</sup> |                 |
| Otis 3 SSE<br>42.16 N 73.05 W     |                            |             | 29/2023                       |                             | 53 <sup>i</sup> |                 |
| Pepperell                         |                            |             |                               |                             | 52 <sup>i</sup> |                 |
| Pleasure Bay                      |                            |             | 29/1900                       |                             | 63 <sup>i</sup> |                 |
| Plymouth                          |                            |             | 29/1314                       | 39 <sup>i</sup>             |                 |                 |
| Randolph                          |                            |             |                               |                             | 52 <sup>i</sup> |                 |
| Southbridge                       |                            |             | 29/1915                       |                             | 47 <sup>i</sup> |                 |
| Wellfleet                         |                            |             |                               |                             | 70 <sup>i</sup> |                 |
| <b>Ham Radio</b>                  |                            |             |                               |                             |                 |                 |
| Barnstable                        |                            |             | 29/1701                       |                             | 69 <sup>i</sup> |                 |
| Duxbury<br>Height: 30.5 m         |                            |             |                               |                             | 84              |                 |
| Fairhaven                         |                            |             | 29/1726                       |                             | 54 <sup>i</sup> |                 |
| Harwich                           |                            |             | 29/1410                       |                             | 49 <sup>i</sup> |                 |
| New Bedford (KD1CY)               |                            |             | 29/2000                       |                             | 54 <sup>i</sup> |                 |
| Marstons Mills                    |                            |             | 29/2047                       |                             | 79 <sup>i</sup> |                 |
| Mattapoisett                      |                            |             |                               |                             | 66 <sup>i</sup> |                 |
| Wakefield                         |                            |             | 29/1941                       |                             | 54 <sup>i</sup> |                 |
| <b>New Hampshire</b>              |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                 |                            |             |                               |                             |                 |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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)<br>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              |                 |
| <b>Marine Observations</b>                                    |                            |             |                              |                             |                 |                 |
| Isle of Shoals C-MAN (IOSN3)<br>43.97N 70.62W<br>Height: 19 m | 30/0100                    | 990.0       | 29/2000                      | 52                          | 66              |                 |
| <b>Public/Other</b>                                           |                            |             |                              |                             |                 |                 |
| Clarksville                                                   |                            |             | 30/0206                      |                             | 42 <sup>i</sup> |                 |
| Derry                                                         |                            |             | 29/2224                      |                             | 46 <sup>i</sup> |                 |
| Dover                                                         |                            |             | 29/1937                      |                             | 34 <sup>i</sup> |                 |
| Fremont                                                       |                            |             | 29/2206                      |                             | 43 <sup>i</sup> |                 |
| Gilford                                                       |                            |             | 29/2027                      |                             | 35 <sup>i</sup> |                 |
| Goshen                                                        |                            |             |                              |                             | 61 <sup>i</sup> |                 |
| Hampstead                                                     |                            |             | 29/2120                      |                             | 40 <sup>i</sup> |                 |
| Jackson                                                       |                            |             | 29/2114                      |                             | 37 <sup>i</sup> |                 |
| Kensington                                                    |                            |             | 29/2341                      |                             | 36 <sup>i</sup> |                 |
| Londonberry                                                   |                            |             |                              |                             | 54 <sup>i</sup> |                 |
| Meredith                                                      |                            |             | 29/2103                      |                             | 45 <sup>i</sup> |                 |
| Meredith 4 ENE                                                |                            |             | 29/1919                      |                             | 52 <sup>i</sup> |                 |
| Newington                                                     |                            |             | 30/0055                      |                             | 45 <sup>i</sup> |                 |
| Newton                                                        |                            |             | 29/1944                      |                             | 36 <sup>i</sup> |                 |
| <b>Vermont</b>                                                |                            |             |                              |                             |                 |                 |
| <b>ICAO Sites</b>                                             |                            |             |                              |                             |                 |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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              |                 |
| <b>Public/Other</b>                      |                            |             |                               |                             |                 |                 |
| Amsden 2 ESE                             |                            |             | 29/2200                       |                             | 33 <sup>i</sup> |                 |
| Bolton                                   |                            |             | 29/1849                       |                             | 30 <sup>i</sup> |                 |
| Corinth Center 2 NNW                     |                            |             | 30/0415                       |                             | 37 <sup>i</sup> |                 |
| Danby                                    |                            |             | 30/0156                       |                             | 37 <sup>i</sup> |                 |
| Derby Center 1 NNE                       |                            |             | 29/2016                       |                             | 30 <sup>i</sup> |                 |
| Danby Four Corners 2 SSW                 |                            |             | 29/2314                       |                             | 35 <sup>i</sup> |                 |
| Fair Haven 1 WSW                         |                            |             | 29/2110                       |                             | 32 <sup>i</sup> |                 |
| Fairfax 2 NNE                            |                            |             | 30/0504                       |                             | 30 <sup>i</sup> |                 |
| Jericho                                  |                            |             | 29/1013                       |                             | 42 <sup>i</sup> |                 |
| Jonesville 1 E                           |                            |             | 29/2100                       |                             | 30 <sup>i</sup> |                 |
| Lyndon Center 1 WSW                      |                            |             | 29/2115                       |                             | 53 <sup>i</sup> |                 |
| Lyndon State College                     |                            |             | 30/0459                       |                             | 35 <sup>i</sup> |                 |
| Ludlow 3 NNE                             |                            |             | 30/0358                       |                             | 41 <sup>i</sup> |                 |
| Mendon                                   |                            |             | 29/2140                       |                             | 42 <sup>i</sup> |                 |
| Mendon 3 ENE                             |                            |             | 30/1015                       |                             | 34 <sup>i</sup> |                 |
| Nashville 1 E                            |                            |             | 29/2303                       |                             | 37 <sup>i</sup> |                 |
| North Fairfax 1 WNW                      |                            |             | 29/2245                       |                             | 30 <sup>i</sup> |                 |
| Richford 1 NW                            |                            |             | 30/0415                       |                             | 45 <sup>i</sup> |                 |
| Shrewsbury                               |                            |             | 30/0057                       |                             | 32 <sup>i</sup> |                 |
| Shrewsbury 3 ESE                         |                            |             | 29/2323                       |                             | 38 <sup>i</sup> |                 |
| Stowe 8 NW                               |                            |             |                               |                             | 63 <sup>i</sup> |                 |
| Swanton 5 SSE                            |                            |             | 29/2356                       |                             | 30 <sup>i</sup> |                 |
| Thetford Center                          |                            |             | 29/1831                       |                             | 33 <sup>i</sup> |                 |
| Underhill                                |                            |             |                               |                             | 52 <sup>i</sup> |                 |
| Underhill Center 1 NE                    |                            |             | 30/1039                       |                             | 44 <sup>i</sup> |                 |
| Walden 4 N                               |                            |             | 30/0411                       |                             | 36 <sup>i</sup> |                 |

| Location                                                           | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                 | Total rain (in) |
|--------------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------------|-----------------|
|                                                                    | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Weatherford                                                        |                            |             | 30/1756                       |                             | 36 <sup>i</sup> |                 |
| West Bolton 1 W                                                    |                            |             | 30/0013                       |                             | 42 <sup>i</sup> |                 |
| Westmore 1 SW                                                      |                            |             | 30/0924                       |                             | 31 <sup>i</sup> |                 |
| Wilder                                                             |                            |             | 29/2101                       |                             | 30 <sup>i</sup> |                 |
| Williston                                                          |                            |             | 29/2305                       |                             | 34 <sup>i</sup> |                 |
| Woodford                                                           |                            |             | 29/2041                       |                             | 50 <sup>i</sup> |                 |
| Wilmington                                                         |                            |             | 29/2141                       |                             | 37 <sup>i</sup> |                 |
| <b>Maine</b>                                                       |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                                  |                            |             |                               |                             |                 |                 |
| 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            |
| <b>Marine Observations</b>                                         |                            |             |                               |                             |                 |                 |
| Bar Harbor NOS (ATGM1)<br>44.90N 66.99W<br>Height: 7.8 m           |                            |             | 30/0718                       | 38                          | 48              |                 |
| Eastport NOS (PSBM1)<br>44.90N 66.99W<br>Height: 7.3 m             |                            |             | 29/2030                       | 29                          | 39              |                 |
| Matinicus Rock C-MAN (MISM1)<br>43.78N 68.87W<br>Height: 23 m      | 30/0600                    | 998.8       | 30/0600                       | 48                          | 58              |                 |
| Mount Desert Rock C-MAN (MDRM1)<br>43.97N 68.13W<br>Height: 22.6 m | 30/0600                    | 1001.6      | 30/0610                       | 43                          | 53              |                 |
| Wells NOS (WELM1)<br>43.32N 70.56W                                 | 30/0224                    | 994.0       | 29/2130                       | 34 <sup>i</sup>             | 47 <sup>i</sup> |                 |
| Buoy 44005<br>43.20N 69.13W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Buoy 44007<br>43.53N 70.14W<br>Height: 5.0 m          | 30/0100                    | 995.8       | 29/2100                       | 35                          | 47              |                 |
| Buoy 44027<br>442.7N 67.31W<br>Height: 5.0 m          | 30/0550                    | 1004.3      | 29/1650                       | 29                          | 35              |                 |
| Buoy 44021 NERACOOS<br>43.76N 69.98W<br>Height: 4.0 m |                            |             | 29/2300                       |                             | 44              |                 |
| Buoy 44030 NERACOOS<br>43.18N 70.42W<br>Height: 4.0 m | 30/0210                    | 993.2       | 29/2040                       | 36                          | 44              |                 |
| Buoy 44032 NERACOOS<br>43.72N 69.36W<br>Height: 4.0 m | 30/0350                    | 998.4       | 30/0400                       | 33                          | 43              |                 |
| Buoy 44033 NERACOOS<br>44.06N 69.00W<br>Height: 4.0 m |                            |             | 30/0320                       | 30                          | 42              |                 |
| Buoy 44034 NERACOOS<br>44.11N 68.11W<br>Height: 4.0 m | 31/2004                    | 998.9       | 29/1804                       | 29                          | 40              |                 |
| Buoy 44037 NERACOOS<br>43.48N 67.88W<br>Height: 4.0 m |                            |             | 30/0220                       | 35                          | 45              |                 |
| <b>Public/Other</b>                                   |                            |             |                               |                             |                 |                 |
| Bath                                                  |                            |             |                               |                             | 66 <sup>i</sup> |                 |
| Bristol                                               |                            |             | 29/2210                       |                             | 46 <sup>i</sup> |                 |
| Freeport                                              |                            |             | 29/2305                       |                             | 35 <sup>i</sup> |                 |
| WFO Gray                                              |                            |             | 29/2300                       |                             | 48 <sup>i</sup> |                 |
| Georgetown                                            |                            |             | 29/2039                       |                             | 42 <sup>i</sup> |                 |
| Harpswell 3 S                                         |                            |             | 29/2300                       |                             | 44 <sup>i</sup> |                 |
| Kennebunk 2 NE                                        |                            |             |                               |                             | 54 <sup>i</sup> |                 |
| Lewiston 2 E                                          |                            |             | 30/0214                       |                             | 41 <sup>i</sup> |                 |
| Rangeley                                              |                            |             | 30/0024                       |                             | 38 <sup>i</sup> |                 |
| Saco                                                  |                            |             | 29/2009                       |                             | 51 <sup>i</sup> |                 |
| South Bristol                                         |                            |             | 29/2320                       |                             | 50 <sup>i</sup> |                 |
| Springvale                                            |                            |             | 29/2128                       |                             | 41 <sup>i</sup> |                 |
| Thomaston                                             |                            |             | 29/1957                       |                             | 36 <sup>i</sup> |                 |
| Wells                                                 |                            |             | 29/1900                       |                             | 40 <sup>i</sup> |                 |

| Location                                       | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |           | Total rain (in) |
|------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------|-----------------|
|                                                | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt) |                 |
| <b>Ohio</b>                                    |                            |             |                               |                             |           |                 |
| <b>ICAO Sites</b>                              |                            |             |                               |                             |           |                 |
| 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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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-Patterson Air Force Base (KFFO)                                |                            |             | 30/0157                       |                             | 36              |                 |
| Youngstown-Warren Airport (KYNG)                                      |                            |             | 30/0626                       |                             | 40              | 3.62            |
| <b>Marine Observations</b>                                            |                            |             |                               |                             |                 |                 |
| Cleveland NOS (CNDO1)<br>41.54N 81.64W<br>Height: 7.8 m               | 30/1218                    | 990.0       | 30/0206                       | 48                          | 59              |                 |
| Conneaut Breakwater Light (CBLO1)<br>41.98N 80.56W<br>Height: 11.8 m  | 30/0921                    | 983.4       | 30/0340                       | 43                          | 53              |                 |
| South Bass Island C-MAN (SBIO1)<br>41.63 N 82.84 W<br>Height: 22 m    | 30/1400                    | 993.3       | 30/0800                       | 47 <sup>f</sup>             | 59              |                 |
| Huron Light (HHLO1)<br>41.40 N 82.55 W<br>Height: 9.7 m               |                            |             | 30/0300                       |                             | 54              |                 |
| Fairport NOS (FAIO1)<br>41.76N 81.28W                                 | 30/1154                    | 988.4       | 30/0518                       | 49 <sup>i</sup>             | 58 <sup>i</sup> |                 |
| Marblehead NOS (MRHO1)<br>41.55N 82.73W                               | 30/1436                    | 994.1       | 30/0230                       | 39 <sup>i</sup>             | 51 <sup>i</sup> |                 |
| Geneva on the Lake (GELO1)<br>41.86 N 80.97 W<br>Height: 8 m          |                            |             | 30/0520                       |                             | 50 <sup>i</sup> |                 |
| Toledo NOS (THRO1)<br>41.69N 83.47W                                   | 30/1730                    | 996.6       | 30/0830                       | 24 <sup>i</sup>             | 38 <sup>i</sup> |                 |
| Toledo Light #2 NOAA/GLERL (THLO1)<br>41.83N 83.19W<br>Height: 14.9 m |                            |             | 30/0030                       | 39                          | 48              |                 |
| <b>Public/Other</b>                                                   |                            |             |                               |                             |                 |                 |

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



| Location                                                          | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed   |                             |                 | Total rain (in) |
|-------------------------------------------------------------------|----------------------------|-------------|------------------------------|-----------------------------|-----------------|-----------------|
|                                                                   | Date/time (UTC)            | Press. (mb) | Date/time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Calumet NOS (CMTI2)<br>41.74N 87.54W<br>Height: 9.1 m             |                            |             | 30/1630                      | 27                          | 37              |                 |
| Chicago, IL NOAA/GRERL (CHII2)<br>42.00N 87.50W<br>Height: 25.9 m |                            |             | 30/1700                      | 40                          | 49              |                 |
| Waukegan Harbor, IL (WHRI2)<br>42.36N 87.81W<br>Height: 9.0 m     |                            |             | 30/1432                      |                             | 36              |                 |
| Chicago Harrison-Dever Crib<br>Height: 26 m                       |                            |             | 30/1230                      |                             | 50              |                 |
| 4 NE East Chicago<br>(unknown ship)                               |                            |             | 30/0900                      |                             | 47              |                 |
| <b>Public/Other</b>                                               |                            |             |                              |                             |                 |                 |
| 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              |                 |
| <b>Indiana</b>                                                    |                            |             |                              |                             |                 |                 |
| <b>ICAO Sites</b>                                                 |                            |             |                              |                             |                 |                 |
| Fort Wayne Intl. Airport (KFWA)                                   |                            |             | 30/0754                      |                             | 35              |                 |
| Fulton County Airport (KRCR)                                      |                            |             | 30/1015                      |                             | 37              |                 |
| Galveston Airport (K5I6)                                          |                            |             | 29/0327                      |                             | 38              |                 |
| Gary Regional Airport (KGYG)                                      |                            |             | 30/1645                      |                             | 52              |                 |
| Goshen Municipal Airport (KGSB)                                   |                            |             | 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              |                 |
| <b>Marine Observations</b>                                        |                            |             |                              |                             |                 |                 |
| Burns Harbor (BHRI13)<br>41.65N 87.1W                             |                            |             | 30/1250                      |                             | 45 <sup>i</sup> |                 |

| Location                                                           | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                 | Total rain (in) |
|--------------------------------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------------|-----------------|
|                                                                    | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Michigan City NOAA/GRERL (MCYI3)<br>41.73N 86.91W<br>Height: 21.3m | 30/1500                    | 1008.1      | 30/1500                       | 47                          | 59              |                 |
| <b>Public/Other</b>                                                |                            |             |                               |                             |                 |                 |
| Argos 3 NW                                                         |                            |             | 30/0818                       |                             | 36 <sup>i</sup> |                 |
| East Chicago                                                       |                            |             | 30/0542                       |                             | 39 <sup>i</sup> |                 |
| East Chicago 1 WSW                                                 |                            |             | 30/0625                       |                             | 36 <sup>i</sup> |                 |
| Hobart 2 SE                                                        |                            |             | 30/1216                       |                             | 38 <sup>i</sup> |                 |
| Huntington 4 SSW                                                   |                            |             | 30/0901                       |                             | 35 <sup>i</sup> |                 |
| Mentone 2 W                                                        |                            |             | 30/0838                       |                             | 35 <sup>i</sup> |                 |
| Michigan City 1 W                                                  |                            |             | 30/0741                       |                             | 38 <sup>i</sup> |                 |
| New Carlisle 3 S                                                   |                            |             | 30/1037                       |                             | 37 <sup>i</sup> |                 |
| New Chicago 1 WNW                                                  |                            |             | 30/0643                       |                             | 44 <sup>i</sup> |                 |
| Town of Pines 2 NNE                                                |                            |             |                               |                             | 60 <sup>i</sup> |                 |
| Upland 3 NW<br>Elevation: 271 m                                    |                            |             | 30/0832                       |                             | 35 <sup>i</sup> |                 |
| Valparaiso 2 SW                                                    |                            |             | 30/1132                       |                             | 43 <sup>i</sup> |                 |
| Waterford 2 WSW                                                    |                            |             | 30/1143                       |                             | 42 <sup>i</sup> |                 |
| <b>Michigan</b>                                                    |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                                  |                            |             |                               |                             |                 |                 |
| 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 Ile (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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | 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)<br>Elevation: 180 m                             |                            |             | 30/0229                       |                             | 49        |                 |
| Port Huron (KPHN)                                                |                            |             | 30/0600                       |                             | 41        |                 |
| Saginaw (KMBS)                                                   |                            |             | 30/0312                       |                             | 34        |                 |
| Southwest Michigan Airport (KBEH)                                |                            |             | 30/0400                       |                             | 39        |                 |
| <b>Marine Observations</b>                                       |                            |             |                               |                             |           |                 |
| Big Bay (BIGM4)<br>46.83N 87.73W<br>Height: 10.0 m               |                            |             | 30/1603                       | 28                          | 36        |                 |
| Big Sable Point (BSBM4)<br>44.06N 86.51W<br>Height: 10.0 m       |                            |             | 30/1240                       | 34                          | 45        |                 |
| DeTour Village NOS (DTLM4)<br>45.99N 83.90W<br>Height: 11.7 m    |                            |             | 30/1236                       | 32                          | 38        |                 |
| Fairport (FPTM4)<br>45.62N 86.66W<br>Height: 10.1 m              |                            |             | 30/1730                       |                             | 34        |                 |
| Ft. Gratoit NOS (FTGM4)<br>43.01N 82.42W<br>Height: 27.4 m       | 30/1830                    | 995.3       | 30/0636                       | 56                          | 65        |                 |
| Grand Marais (GRMM4)<br>46.68N 85.97W<br>Height: 9.1 m           |                            |             | 30/0910                       | 37                          | 44        |                 |
| Grand Traverse Light (GTLM4)<br>45.21N 85.55W<br>Height: 16.0 m  |                            |             | 30/1000                       | 36                          | 46        |                 |
| Gravelly Shoals Light (GSLM4)<br>44.02N 83.54W<br>Height: 24.7 m | 30/1840                    | 1000.0      | 30/0638                       | 38                          | 47        |                 |
| Harbor Beach NOS (HRBM4)<br>43.85N 82.64W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Holland NOS (HLNM4)<br>42.77N 86.21W<br>Height: 10.0 m          |                            |             | 30/0712                       | 36                          | 42              |                 |
| Ludington NOS (LDTM4)<br>43.95N 86.44W                          |                            |             | 30/1748                       |                             | 38 <sup>i</sup> |                 |
| Mackinaw City NOS (MACM4)<br>45.78N 84.73W<br>Height: 10.4 m    |                            |             | 30/0724                       | 26                          | 37              |                 |
| Manistee Harbor (MEEM4)<br>44.25N 86.35W<br>Height: 10.0 m      |                            |             | 30/1120                       | 39                          | 50              |                 |
| Menominee NOS (MNMM4)<br>45.10N 87.59W<br>Height: 6.6 m         |                            |             | 30/1454                       | 33                          | 41              |                 |
| Muskegon NOAA/GLERL (MKGM4)<br>43.23N 86.34W<br>Height: 24.4 m  |                            |             | 30/1400                       | 27                          | 38              |                 |
| Naubinway (NABM4)<br>46.09N 85.44W<br>Height: 10.1 m            |                            |             | 30/1515                       |                             | 41              |                 |
| Port Inland NOS (PNLM4)<br>45.97N 85.87W<br>Height: 10.2 m      |                            |             | 30/1512                       | 27                          | 38              |                 |
| Port Sanilac (PSCM4)<br>43.42N 82.54W<br>Height: 10.0 m         | 30/2010                    | 995.3       | 30/0910                       | 48                          | 58              |                 |
| Presque Isle Light (PRIM4)<br>45.36N 83.49W<br>Height: 33.5 m   |                            |             | 30/1306                       |                             | 51              |                 |
| Rock of Ages C-MAN (ROAM4)<br>47.87N 89.31W<br>Height: 46.9 m   |                            |             | 30/1530                       | 31 <sup>f</sup>             | 35              |                 |
| Saginaw Bay Light #1 (SBLM4)<br>43.81N 83.72W<br>Height: 12.5 m | 31/0530                    | 995.3       | 30/0620                       | 40                          | 47              |                 |
| St. Clair Shores (CLSM4)<br>42.47N 82.88W                       | 30/1710                    | 995.6       | 30/1230                       | 29 <sup>i</sup>             | 42 <sup>i</sup> |                 |
| South Haven C-MAN (SVNM4)<br>42.40N 86.29W<br>Height: 16.8 m    |                            |             |                               |                             | 57              |                 |
| Stannard Rock C-MAN (STD4)<br>47.18N 87.23W<br>Height: 35.2 m   |                            |             | 30/2100                       | 39                          | 46              |                 |
| Sturgeon Point Light (SPTM4)<br>44.71N 83.73W<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Thunder Bay Island NOAA/GLERL (TBIM4)<br>45.04N 83.19W         |                            |             | 30.0900                       | 29                          | 44 <sup>i</sup> |                 |
| <b>Public/Other</b>                                            |                            |             |                               |                             |                 |                 |
| Bayshore 4 W                                                   |                            |             | 30/1201                       |                             | 47 <sup>i</sup> |                 |
| Benzonia 2 S                                                   |                            |             | 30/1935                       |                             | 44 <sup>i</sup> |                 |
| Berrien Springs                                                |                            |             | 30/1500                       |                             | 34 <sup>i</sup> |                 |
| Cadillac 2 E                                                   |                            |             | 30/0750                       |                             | 39 <sup>i</sup> |                 |
| Lakeport 3 WSW                                                 |                            |             | 30/0400                       |                             | 43 <sup>i</sup> |                 |
| Mount Clemens                                                  |                            |             | 30/0355                       |                             | 45 <sup>i</sup> |                 |
| Rochester Hills                                                |                            |             | 30/0439                       |                             | 43 <sup>i</sup> |                 |
| Rudyard 4 SE                                                   |                            |             | 30/1150                       |                             | 43 <sup>i</sup> |                 |
| St. Joseph<br>Elevation: 183 m                                 |                            |             | 30/1100                       |                             | 50              |                 |
| Toledo Harbor                                                  |                            |             |                               |                             | 57 <sup>i</sup> |                 |
| West Branch 2 SSE                                              |                            |             | 30/1230                       |                             | 44 <sup>i</sup> |                 |
| Ypsilanti                                                      |                            |             | 29/2325                       |                             | 43 <sup>i</sup> |                 |
| <b>Wisconsin</b>                                               |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                                              |                            |             |                               |                             |                 |                 |
| Door County-Cherryland Airport (KSUE)                          |                            |             | 30/1055                       |                             | 40              |                 |
| Green Bay (KGRB)                                               |                            |             | 30/1453                       |                             | 34              |                 |
| Manitowac County Airport (KMTW)                                |                            |             | 30/0415                       |                             | 35              |                 |
| <b>Marine Observations</b>                                     |                            |             |                               |                             |                 |                 |
| Algona City (AGMW3)<br>44.61N 87.43W<br>Height: 9.1 m          |                            |             | 30/1811                       |                             | 41              |                 |
| Chambers Island, WI (CBRW3)<br>45.20N 87.36W<br>Height: 10.0 m |                            |             | 30/2100                       | 34                          | 42              |                 |
| Death's Door, WI (NPDW3)<br>45.29N 86.98W<br>Height: 10.0 m    |                            |             | 30/2330                       | 37                          | 44              |                 |
| Kenosha, WI (KNSW3)<br>42.59N 87.81W<br>Height: 19.5 m         |                            |             | 30/1350                       | 30                          | 38              |                 |
| Kewaunee NOS (KWNW3)<br>44.47N 87.50W                          |                            |             | 30/1818                       |                             | 37 <sup>i</sup> |                 |

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

| Location                                 | Minimum Sea Level Pressure |             | Maximum Surface Wind Speed    |                             |                 | Total rain (in) |
|------------------------------------------|----------------------------|-------------|-------------------------------|-----------------------------|-----------------|-----------------|
|                                          | Date/ time (UTC)           | Press. (mb) | Date/ time (UTC) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Beauport (CXBO)                          |                            |             |                               |                             | 43 <sup>i</sup> |                 |
| Cap Rouge (CWQM)                         |                            |             | 30/0656                       |                             | 42 <sup>i</sup> |                 |
| Quebec St. Francois (Orléans) (CWER)     |                            |             | 30/0608                       |                             | 51 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                       |                            |             |                               |                             |                 |                 |
| La Baie<br>Elevation: 10 m               |                            |             | 30/0615                       | 32 <sup>i</sup>             | 40 <sup>i</sup> |                 |
| St. Laurent d'Orléans<br>Elevation: 12 m |                            |             | 29/2335                       | 35 <sup>i</sup>             | 45 <sup>i</sup> |                 |
| St. Mathias<br>Elevation: 52 m           |                            |             | 30/0145                       | 43 <sup>i</sup>             | 42 <sup>i</sup> |                 |
| Vaudreuil<br>Elevation: 11 m             |                            |             | 30/0435                       | 32 <sup>i</sup>             | 40 <sup>i</sup> |                 |
| Quebec St. Francois (Orléans)            |                            |             | 30/0608                       |                             | 51 <sup>i</sup> |                 |
| Bois-Francis (St. Germaine)              |                            |             |                               |                             | 43 <sup>i</sup> |                 |
| Montréal (Laval)                         |                            |             |                               |                             | 47 <sup>i</sup> |                 |
| <b>Ontario</b>                           |                            |             |                               |                             |                 |                 |
| <b>ICAO Sites</b>                        |                            |             |                               |                             |                 |                 |
| Burlington Pier (CWWB)                   |                            |             | 30/0355                       |                             | 51 <sup>i</sup> |                 |
| Kitchener Waterloo-Wellington (CYKF)     |                            |             | 30/0100                       |                             | 47 <sup>i</sup> |                 |
| London Airport (CXYU)                    |                            |             | 30/0100                       |                             | 43 <sup>i</sup> |                 |
| Oshawa (CYYO)                            |                            |             |                               |                             | 43 <sup>i</sup> |                 |
| Point Petre (CWQP)                       |                            |             | 30/0416                       |                             | 50 <sup>i</sup> |                 |
| Port Weller (CWWZ)                       |                            |             | 30/0615                       |                             | 44 <sup>i</sup> |                 |
| Ridgetown (CXRG)                         |                            |             |                               |                             | 43 <sup>i</sup> |                 |
| Sarnia (CZYR)                            |                            |             | 30/1118                       | 42 <sup>i</sup>             | 55 <sup>i</sup> |                 |
| Toronto Island (CYTZ)                    |                            |             | 30/0616                       |                             | 49 <sup>i</sup> |                 |
| Toronto Pearson Intl. (CYYZ)             |                            |             | 30/0426                       |                             | 43 <sup>i</sup> |                 |
| Western Island (CWMZ)                    |                            |             | 30/0729                       |                             | 58 <sup>i</sup> |                 |
| <b>WeatherFlow</b>                       |                            |             |                               |                             |                 |                 |
| Belle River<br>Elevation: 12 m           |                            |             | 30/0725                       | 47                          | 57              |                 |
| Hamilton Harbor<br>Elevation: 10 m       |                            |             | 30/0000                       | 33                          | 48              |                 |
| Rondeau Bay<br>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) <sup>a</sup> | Sustained (kt) <sup>b</sup> | Gust (kt)       |                 |
| Sunset Point<br>Elevation: 8 m                               |                            |             | 30/0145                      | 33                          | 38              |                 |
| <b>Public/Other</b>                                          |                            |             |                              |                             |                 |                 |
| Stoney Creek                                                 |                            |             | 30/0415                      |                             | 52 <sup>i</sup> |                 |
| <b>Buoys</b>                                                 |                            |             |                              |                             |                 |                 |
| Buoy 44150 (Atlantic)<br>42.51N 64.02W<br>Height: 5.0 m      | 29/2120                    | 1007.0*     | 30/2220                      | 29*                         | 36*             |                 |
| Buoy 45132 (Lake Erie)<br>42.47N 81.22W<br>Height: 5.0 m     |                            |             | 30/0431                      | 35*                         | 41*             |                 |
| Buoy 45135 (Lake Ontario)<br>43.79N 76.87W<br>Height: 5.0 m  |                            |             | 30/0030                      | 39*                         | 49*             |                 |
| Buoy 45136 (Lake Superior)<br>48.53N 89.95W<br>Height: 5.0 m |                            |             | 30/1335                      | 28*                         | 34*             |                 |
| Buoy 45137 (Georgian Bay)<br>45.55N 81.02W<br>Height: 5.0 m  |                            |             | 30/0632                      | 39*                         | 49*             |                 |
| Buoy 45139 (Lake Ontario)<br>43.26N 79.54W<br>Height 5.0 m   |                            |             | 30/0250                      | 33                          | 44              |                 |
| Buoy 45142 (Lake Erie)<br>42.74N 79.20W<br>Height: 5.0 m     |                            |             | 30/0639                      |                             | 41*             |                 |
| Buoy 45153 (Georgian Bay)<br>44.95N 80.63W<br>Height: 5.0 m  |                            |             | 30/0351                      | 38*                         | 47*             |                 |
| Buoy 45149 (Lake Huron)<br>43.54N 82.08W<br>Height: 5.0 m    |                            |             | 30/0402                      | 37*                         | 45*             |                 |

<sup>a</sup> Date/time is for sustained wind when both sustained and gust are listed.

<sup>b</sup> Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging period is 8 min.

<sup>c</sup> Storm surge is water height above normal astronomical tide level.

<sup>d</sup> Storm tide is referenced above Mean Lower Low Water (MLLW). Bold numbers indicate that the maximum recorded water level exceeded historical maximum values.

<sup>e</sup> Anemometer height 5 m.

<sup>f</sup> Wind averaging period 10 min.

<sup>g</sup> Sensor reached physical limit on measurements and did not record a maximum value.

<sup>h</sup> Maximum storm tide/storm surge likely includes effects from freshwater runoff.

<sup>i</sup> station has unknown elevation

<sup>j</sup> 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <b>National Ocean Service (NOS) Tide Gauges</b>       |                               |                              |                                        |
| <b>Maine</b>                                          |                               |                              |                                        |
| 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                                   |
| <b>New Hampshire</b>                                  |                               |                              |                                        |
| Fort Point (8423898) (43.07N 70.71W)                  | 3.32                          | 6.41                         | 2.00                                   |
| <b>Massachusetts</b>                                  |                               |                              |                                        |
| 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 <sup>R</sup>                      |
| 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                                   |
| <b>Rhode Island</b>                                   |                               |                              |                                        |
| 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 <sup>R</sup>                      |
| Providence (FOXR1 - 8454000) (41.81N 71.40W)          | 6.20                          | 6.89                         | 4.52                                   |

| Location                                                              | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| Quonset Point <sup>1</sup> (QPTR1 - 8454049) (41.59N 71.41W)          | 5.16                          |                              | 2.61                                   |
| <b>Connecticut</b>                                                    |                               |                              |                                        |
| 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 <sup>R</sup>                      |
| Bridgeport (BRHC3 - 8467150) (41.17N 73.18W)                          | 9.83                          | 9.30                         | 5.82 <sup>R</sup>                      |
| <b>New York</b>                                                       |                               |                              |                                        |
| 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 <sup>R</sup>                      |
| The Battery (BATN6 - 8518750) (40.70N 74.01W)                         | 9.40                          | 11.28                        | 9.00 <sup>R</sup>                      |
| Bergen Point West Reach (BGNN4 - 8519483) (40.64N 74.14W)             | 9.56                          |                              | 9.53 <sup>R</sup>                      |
| <b>New Jersey</b>                                                     |                               |                              |                                        |
| Sandy Hook <sup>1</sup> (SDHN4 - 8531680) (40.47N 74.01W)             | 8.57                          | 10.42                        | 8.01 <sup>R</sup>                      |
| 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 <sup>R</sup>                      |
| 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                                   |
| <b>Pennsylvania</b>                                                   |                               |                              |                                        |
| Marcus Hook (MRCPI - 8540433) (39.81N 75.41W)                         | 6.26                          |                              | 4.03 <sup>R</sup>                      |
| Philadelphia (PHBPI - 8545240) (39.93N 75.14W)                        | 5.83                          | 7.52                         | 3.93 <sup>R</sup>                      |
| Newbold (NBLPI - 8548989) (40.14N 74.75W)                             | 6.42                          |                              | 3.88                                   |
| <b>Delaware</b>                                                       |                               |                              |                                        |
| Delaware City (DELD1 - 8551762) (39.58N 75.59W)                       | 5.99                          |                              | 3.74 <sup>R</sup>                      |
| Reedy Point (RDYD1 - 8551910) (39.56N 75.57W)                         | 5.80                          | 6.13                         | 3.26                                   |
| Brandywine Shoal Light <sup>1</sup> (BRND1 - 8555889) (38.99N 75.11W) | 4.22                          |                              |                                        |
| Lewes (LWSD1 - 8557380) (38.78N 75.12W)                               | 5.34                          | 6.08                         | 4.05                                   |
| <b>Maryland</b>                                                       |                               |                              |                                        |
| 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 <sup>R</sup>                      |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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 <sup>1</sup> (SLIM2 - 8577330) (38.32N 76.45W)  | 2.57                          | 2.08                         | 1.45                                   |
| <b>District of Columbia</b>                                     |                               |                              |                                        |
| Washington (WASD2 - 8594900) (38.87N 77.02W)                    | 4.03                          | 4.72                         | 2.94                                   |
| <b>Virginia</b>                                                 |                               |                              |                                        |
| 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                                   |
| <b>North Carolina</b>                                           |                               |                              |                                        |
| Duck <sup>1</sup> (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 <sup>R</sup>                      |
| 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                                   |
| <b>South Carolina</b>                                           |                               |                              |                                        |
| 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                                   |
| <b>Georgia</b>                                                  |                               |                              |                                        |
| Fort Pulaski (FPKG1 - 8670870) (32.03N 80.90W)                  | 2.89                          | 4.98                         | 1.53                                   |
| <b>Florida</b>                                                  |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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 <sup>R</sup>                      |
| 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                                   |
|                                                         |                               |                              |                                        |
| <b>US Geological Survey (USGS) High-Water Marks</b>     |                               |                              |                                        |
| <b>Virginia</b>                                         |                               |                              |                                        |
| <i>Accomack County</i>                                  |                               |                              |                                        |
| 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                                    |
| <i>Gloucester County</i>                                |                               |                              |                                        |
| Hayes (VA-GLO-001) (37.28N 76.40W)                      |                               | 4.5                          | 1.2                                    |
| Hayes (VA-GLO-002) (37.28N 76.40W)                      |                               | 4.6                          | 1.0                                    |
| <i>Mathews County</i>                                   |                               |                              |                                        |
| 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                                    |
| <i>Northampton County</i>                               |                               |                              |                                        |
| Franktown (VA-NOR-002) (37.48N 75.93W)                  |                               | 4.3                          | 3.0                                    |
| <i>Virginia Beach County</i>                            |                               |                              |                                        |
| 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                                    |
|                                                         |                               |                              |                                        |
| <b>New Jersey</b>                                       |                               |                              |                                        |

| Location                                                | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <i>Cape May County</i>                                  |                               |                              |                                        |
| 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                                    |
| <i>Atlantic County</i>                                  |                               |                              |                                        |
| 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                                    |
| <i>Burlington County</i>                                |                               |                              |                                        |
| Hammonton (NJ-BUR-233) (39.64N 74.65W)                  |                               | 7.5                          | 4.0                                    |
| <i>Ocean County</i>                                     |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| <i>Monmouth County</i>                                                                  |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| <i>Middlesex County</i>                           |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|--------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <i>Union County</i>                        |                               |                              |                                        |
| 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                                    |
| <i>Essex County</i>                        |                               |                              |                                        |
| Newark (NJ-ESS-102) (40.71N 74.13W)        |                               | 11.6                         | 3.5                                    |
| <i>Hudson County</i>                       |                               |                              |                                        |
| 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                                    |
| <i>Bergen County</i>                       |                               |                              |                                        |
| 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                                    |
|                                            |                               |                              |                                        |
| <i>New York</i>                            |                               |                              |                                        |



| Location                                                                | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-------------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <i>Richmond County (Staten Island)</i>                                  |                               |                              |                                        |
| 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                                    |
| <i>New York County (Manhattan)</i>                                      |                               |                              |                                        |
| 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                                      |
| <i>Kings County (Brooklyn)</i>                                          |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|----------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| <i>Bronx County</i>                                      |                               |                              |                                        |
| 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                                    |
| <i>Queens County</i>                                     |                               |                              |                                        |
| 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                                    |
| <i>Nassau County</i>                                     |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|--------------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| Hempstead (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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| <i>Suffolk County</i>                                           |                               |                              |                                        |
| 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 (Quogue) (NY-SUF-412) (40.82N 72.62W)               |                               | 6.4                          | 2.7                                    |

| Location                                                       | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|----------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|----------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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 Riverhead) (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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|----------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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)<br>(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                                    |
| <i>Westchester County</i>                                            |                               |                              |                                        |
| 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                                    |
| <i>Rockland County</i>                                               |                               |                              |                                        |
| 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                                    |
| <i>Orange County</i>                                                 |                               |                              |                                        |
| 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                                    |
| <i>Ulster County</i>                                                 |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <i>Dutchess County</i>                                    |                               |                              |                                        |
| 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                                    |
| <i>Columbia County</i>                                    |                               |                              |                                        |
| 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                                    |
| <i>Greene County</i>                                      |                               |                              |                                        |
| 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                                    |
| <i>Connecticut</i>                                        |                               |                              |                                        |
| <i>Fairfield County</i>                                   |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                    |
| <i>New Haven County</i>                                   |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| New Haven (Mill River) (CT-NHV-323) (41.30N 72.91W)        |                               |                              | 0.3*                                   |
| <i>Middlesex County</i>                                    |                               |                              |                                        |
| 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*                                   |
| <i>New London County</i>                                   |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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*                                   |
|                                                               |                               |                              |                                        |
| <b>Rhode Island</b>                                           |                               |                              |                                        |
| <i>Washington County</i>                                      |                               |                              |                                        |
| 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*                                   |
| <i>Newport County</i>                                         |                               |                              |                                        |

| Location                                                       | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|----------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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*                                   |
| <i>Kent County</i>                                             |                               |                              |                                        |
| Warwick (RI-KEN-645) (41.65N 71.44W)                           |                               |                              | 2.3*                                   |
| <i>Bristol County</i>                                          |                               |                              |                                        |
| 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*                                   |
| <i>Providence County</i>                                       |                               |                              |                                        |
| East Providence (RI-PRO-644) (41.80N 71.38W)                   |                               |                              | 3.0*                                   |
|                                                                |                               |                              |                                        |
| <b>Massachusetts</b>                                           |                               |                              |                                        |
| <i>Bristol County</i>                                          |                               |                              |                                        |
| 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*                                   |
| <i>Plymouth County</i>                                         |                               |                              |                                        |
| Wareham (Wareham Center) (MA-PLY-626) (41.76N 70.71W)          |                               |                              | 0.3*                                   |
|                                                                |                               |                              |                                        |
| <b>US Geological Survey (USGS) Storm Tide Pressure Sensors</b> |                               |                              |                                        |
| <b>Virginia</b>                                                |                               |                              |                                        |

| Location                                                           | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|--------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| <i>Accomack County</i>                                             |                               |                              |                                        |
| 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                                    |
| <i>City of Poquoson</i>                                            |                               |                              |                                        |
| Plumb Tree Island (VA-YOR-003) (37.11N 76.32W)                     |                               | 5.08                         | 4                                      |
| <i>City of Virginia Beach</i>                                      |                               |                              |                                        |
| Lynnhaven Inlet (VA-VAB-001) (36.91N 76.09W)                       |                               | 5.49                         | 2                                      |
| <i>Hampton County</i>                                              |                               |                              |                                        |
| Hampton (Buckroe Beach) (VA-HAM-002) (37.02N 76.32W)               |                               | 5.30                         | 3                                      |
| <i>Mathews County</i>                                              |                               |                              |                                        |
| Hudgins (Gwynns Island) (VA-MAT-001) (37.49N 76.31W)               |                               | 3.54                         | 0.5                                    |
| <i>Northampton County</i>                                          |                               |                              |                                        |
| 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                                    |
|                                                                    |                               |                              |                                        |
| <b>Maryland</b>                                                    |                               |                              |                                        |
| <i>Anne Arundel County</i>                                         |                               |                              |                                        |
| Annapolis (MD-ANN-003) (38.97N 76.48W)                             |                               | 3.41                         | 1.5                                    |
| Annapolis (MD-ANN-001) (38.98N 76.49W)                             |                               | 3.61                         | 1.5                                    |
| <i>Baltimore County</i>                                            |                               |                              |                                        |
| Baltimore (Pier 5) (MD-BAL-001) (39.28N 76.61W)                    |                               | 6.70                         | 2.5                                    |
|                                                                    |                               |                              |                                        |
| <b>Delaware</b>                                                    |                               |                              |                                        |
| <i>Sussex County</i>                                               |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|-----------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| 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                                      |
| <i>Kent County</i>                                                    |                               |                              |                                        |
| 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                                      |
| <i>New Castle County</i>                                              |                               |                              |                                        |
| Smyrna (Duck Creek) (DE-NEW-001) (39.31N 75.61W)                      |                               | 7.09                         | 1                                      |
|                                                                       |                               |                              |                                        |
| <b>New Jersey</b>                                                     |                               |                              |                                        |
| <i>Cape May County</i>                                                |                               |                              |                                        |
| Marmora (Great Egg Harbor Bay) (NJ-CPM-010) (39.29N 74.63W)           |                               | 6.97                         | 3.5                                    |
| <i>Cumberland County</i>                                              |                               |                              |                                        |
| 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                                      |
| <i>Atlantic County</i>                                                |                               |                              |                                        |
| Port Republic (Mullica River) (NJ-ATL-005) (39.55N 74.46W)            |                               | 7.62                         | 4.5                                    |
| <i>Middlesex County</i>                                               |                               |                              |                                        |
| South Amboy (Old Bridge Waterfront Park) (NJ-MID-001) (40.46N 74.25W) |                               | 11.71                        | 6                                      |
| <i>Union County</i>                                                   |                               |                              |                                        |
| Rahway (Rahway River) (NJ-UNI-002) (40.60N 74.27W)                    |                               | 12.06                        |                                        |
| Elizabeth (Elizabeth River) (NJ-UNI-208) (40.66N 74.21W)              |                               | 12.20                        |                                        |
| <i>Hudson County</i>                                                  |                               |                              |                                        |
| East Rutherford (Hackensack River) (NJ-HUD-001) (40.76N 74.03W)       |                               | 8.80                         |                                        |
|                                                                       |                               |                              |                                        |
| <b>New York</b>                                                       |                               |                              |                                        |
| <i>Richmond County</i>                                                |                               |                              |                                        |
| 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                        |                                        |
| <i>New York County</i>                                                |                               |                              |                                        |

| Location                                                                           | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|------------------------------------------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| Uptown, Manhattan (Harlem River, Inwood Hill Park)<br>(NY-NEW-124) (40.72N 74.01W) |                               | 9.50                         |                                        |
| <i>Kings County</i>                                                                |                               |                              |                                        |
| Brooklyn (East River @ Manhattan Bridge)<br>(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                        |                                        |
| <i>Queens County</i>                                                               |                               |                              |                                        |
| Broad Channel, Far Rockaway, Queens<br>(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                        |                                        |
| <i>Nassau County</i>                                                               |                               |                              |                                        |
| 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                        |                                        |
| <i>Suffolk County</i>                                                              |                               |                              |                                        |
| 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                         |                                        |
| <i>Westchester County</i>                                                          |                               |                              |                                        |



| Location                                         | Storm surge (ft) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|--------------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
| Mamaroneck (NY-WES-001) (40.94N 73.72W)          |                               | 10.92                        |                                        |
| New Rochelle (NY-WES-003) (40.89N 73.78W)        |                               | 10.44                        |                                        |
|                                                  |                               |                              |                                        |
| <b>Connecticut</b>                               |                               |                              |                                        |
| <i>Fairfield County</i>                          |                               |                              |                                        |
| 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                         |                                        |
| <i>New Haven County</i>                          |                               |                              |                                        |
| 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                         |                                        |
| <i>Middlesex County</i>                          |                               |                              |                                        |
| 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                         |                                        |
| <i>New London County</i>                         |                               |                              |                                        |
| 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) <sup>a</sup> | Storm tide (ft) <sup>b</sup> | Estimated Inundation (ft) <sup>c</sup> |
|---------------------------------------------|-------------------------------|------------------------------|----------------------------------------|
|                                             |                               |                              |                                        |
| <b>Rhode Island</b>                         |                               |                              |                                        |
| <i>Washington County</i>                    |                               |                              |                                        |
| 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                         |                                        |
| <i>Bristol County</i>                       |                               |                              |                                        |
| Warren (RI-BRI-013) (41.73N 71.29W)         |                               | 6.27                         |                                        |
| <i>Newport County</i>                       |                               |                              |                                        |
| Portsmouth (RI-NEW-014) (41.62N 71.24W)     |                               | 6.42                         |                                        |
| Little Compton (RI-NEW-015) (41.46N 71.19W) |                               | 6.36                         |                                        |
|                                             |                               |                              |                                        |
|                                             |                               |                              |                                        |

<sup>a</sup> Storm surge is water height above normal astronomical tide level.

<sup>b</sup> Storm tide is water height above the North American Vertical Datum of 1988 (NAVD88).

<sup>c</sup> 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.

<sup>1</sup> Incomplete

<sup>R</sup> Exceeded historical maximum value.

\* preliminary

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

| <b>Florida</b>                                    | <b>Precipitation (inches)</b> |
|---------------------------------------------------|-------------------------------|
| Daytona Beach Intl. 1 NE (DIAF1)<br>29.19N 81.06W | 4.30                          |
| Scottsmoor 2 NNW (SCMF1)<br>28.78N 80.88W         | 3.58                          |
| Suntree 2 W (FL-BV-2)<br>28.20N 80.70W            | 3.27                          |
| North Miami Beach Coop (NMBF1)<br>25.93N 80.16W   | 3.17                          |
| Chuluota 1 N (FL-SM-8)<br>28.65N 81.12W           | 2.52                          |
| Suntree 1 WSW (FL-BV-1)<br>28.21N 80.70W          | 2.51                          |
| Rockledge 1 WSW (FL-B-1)<br>28.31 N 80.75 W       | 2.45                          |
| Edgewater 3 NE (FL-VL-2)<br>28.99N 80.87W         | 2.43                          |
| Lake Mary Jane 2 NE (WELF1)<br>28.40N 81.16W      | 2.42                          |
| Mims 1 WNW (FL-BV-4 )<br>28.66N 80.86W            | 2.25                          |
| Rockledge 1 NE (FL-BV-3 )<br>28.33N 80.72W        | 2.20                          |
| Hialeah Coop (HIAF1)<br>25.82N -80.28W            | 2.19                          |
| <b>North Carolina</b>                             |                               |
| Avon 0.7 NE<br>35.34 N 75.49 W                    | 8.20                          |
| Salvo 0.9 NNE<br>35.55 N 75.47 W                  | 8.18                          |
| Corolla 3.2 SSE                                   | 7.66                          |
| Duck 0.3 SE<br>36.16 N 75.75 W                    | 7.54                          |
| Kill Devil Hills 2.5 NNW<br>36.04 N 75.69 W       | 6.98                          |
| Kill Devil Hills 0.9 WNW<br>36.02 N 75.68 W       | 6.96                          |
| 1.1 SSE Duck<br>36.15 N 75.75 W                   | 6.57                          |
| Ocracoke<br>35.10 N 75.98 W                       | 6.50                          |
| Kitty Hawk 4.0 NNW<br>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                          |
| <b>Virginia</b>                                   |                               |
| 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)<br>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)<br>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)<br>38.85 N 77.29 W                        | 6.25 |
| Urbanna 6.20 NNE                                                | 6.20 |
| Williamsburg 1.40 ENE                                           | 6.12 |
| Manassas 1 ESE (MSS02)<br>38.74 N 77.47 W                       | 6.06 |
| Franconia 1 SSE (VA-FX-3)<br>38.74 N 77.14 W                    | 6.03 |
| Centreville 1 SE (FXW106)<br>38.83 N 77.43 W                    | 6.02 |
| Lovettsville 2 ENE (LOE84)<br>39.28 N 77.60 W                   | 5.98 |
| Lorton 1 NE (VA-FX-5)<br>38.71 N 77.23 W                        | 5.70 |
| City of Norfolk 30 S                                            | 5.64 |
| Dulles International Airport 1 NNE (X390077)<br>38.96 N 77.45 W | 5.62 |
| Hampton 1.90 NW                                                 | 5.59 |
| Suffolk 13 NE                                                   | 5.54 |
| Middleburg 2 NW (LOC14)<br>38.99 N 77.77 W                      | 5.50 |
| Rose Hill (AX066)<br>38.79 N 77.10 W                            | 5.42 |
| Manassas (X387077)<br>38.74 N 77.48 W                           | 5.40 |
| Williamsburg 1.30 SSW                                           | 5.33 |

|                                             |       |
|---------------------------------------------|-------|
| Woolsey 3 NNW (PWN18)<br>38.90 N 77.67 W    | 5.30  |
| Burke (X388077)<br>38.78 N 77.27 W          | 5.15  |
| Stanley (X386078)<br>38.57 N 78.50 W        | 5.15  |
| Lydia 2 SE (GRC24)<br>38.31 N 78.47 W       | 5.11  |
| Frostburg (ALW63)<br>39.64 N 78.92 W        | 5.10  |
| Honeyville 1 ESE (PES02)<br>38.57 N 78.54 W | 5.10  |
| Sterling (KLWX)                             | 5.03  |
| Wakefield (KAKQ)                            | 3.18  |
| Hanover (KOFK)                              | 3.13  |
| <b>West Virginia</b>                        |       |
| Maysville (GN003) 5 S<br>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  |
| <b>Delaware</b>                             |       |
| Indian Rivert Inlet DEOS<br>38.63N 75.97W   | 10.98 |
| Rehoboth Beach DEOS<br>38.71 N 75.08 W      | 10.60 |
| Georgetown<br>38.69 N 75.39 W               | 10.20 |
| Viola DEOS<br>39.04 N 75.57 W               | 9.69  |
| Dover 6.4 NNW                               | 9.62  |
| Milford<br>38.91 N 75.43 W                  | 9.55  |
| Indian River Acres                          | 9.49  |
| Dover DEOS<br>39.15 N 75.52 W               | 9.38  |
| Milford DEOS<br>38.88N 75.44W               | 9.38  |
| Ellendale DEOS<br>38.80 N 75.42 W           | 9.33  |
| Selbyville DEOS<br>38.45 N 75.22 W          | 9.28  |
| Greenwood DEOS<br>38.80 N 75.59 W           | 9.07  |
| Seaford DEOS<br>38.64 N 75.62 W             | 8.80  |

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

|                                           |       |
|-------------------------------------------|-------|
| Middletown 1 SSW<br>39.43 N 75.71 W       | 6.44  |
| Greenville DEOS<br>39.80N 75.61W          | 6.42  |
| Newark DEOS AG Farm<br>39.67 N 75.76 W    | 6.12  |
| Newark DEOS<br>39.67 N 75.76 W            | 6.05  |
| Hockessin Chesapeake Bay Girl Scouts (WB) | 6.03  |
| Newport 2 WNW<br>39.72 N 75.64 W          | 5.83  |
| New Castle DEOS<br>39.66 N 75.57 W        | 5.73  |
| Wilmington<br>39.63 N 75.74 W             | 5.73  |
| Wilmington DEOS<br>39.78 N 75.53 W        | 5.52  |
| 2 S Newark<br>39.64 N 75.76 W             | 5.36  |
| Claymont DEOS<br>39.80 N 75.46 W          | 5.21  |
| Wilmington<br>39.73 N 75.53 W             | 5.20  |
| Newark<br>39.67 N 75.76 W                 | 5.02  |
| <b>Washington, D.C.</b>                   |       |
| Washington 5.1 NW                         | 5.83  |
| <b>Maryland</b>                           |       |
| 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 Cornner                          | 10.55 |
| Easton 2 SE<br>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<br>38.76 N 76.07 W           | 9.97  |
| Greensboro<br>38.97 N 75.81 W             | 9.93  |
| Queenstown<br>38.98 N 76.16 W             | 9.89  |
| Trappe 3.5 NE                             | 9.78  |
| Columbia Howard Community College (WB)    | 9.76  |
| Trappe<br>38.65 N 76.06 W                 | 9.60  |
| Churchton 1 ENE<br>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)<br>39.00N 76.88W            | 9.30 |
| Denton 5.8 WSW                                      | 9.28 |
| Princess Anne 4.4 WSW                               | 9.08 |
| Denton<br>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)<br>38.61N 77.04W       | 8.51 |
| Burtonsville Banneker MS (WB)                       | 8.50 |
| Chestertown Kent County EMA (WB)                    |      |
| Easton 1 SW<br>38.76 N 76.08 W                      | 8.50 |
| Ridge (SMS08)<br>38.12N 76.36W                      | 8.42 |
| Dundalk 1 SW (BL021)<br>39.25N 76.51W               | 8.40 |
| Parkville (BLS28)<br>39.38N 76.56W                  | 8.38 |
| Laurel St. Vincent Pallotti HS (WB)                 | 8.38 |
| Goldsboro VFC (WB)                                  | 8.26 |
| Seaford 2 SSE<br>38.08 N 75.34 W                    | 8.14 |
| Crofton 1 NNE (MD-AA-1)<br>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)<br>39.33N 76.50W             | 7.82 |
| Perry Hall MS (WB)                                  | 7.82 |
| Tracy's Landing 2 WSW (CT04 )<br>38.76N 76.64W      | 7.78 |
| Boonsboro HS (WB)                                   | 7.76 |
| Baltimore Youth in Transition School                | 7.55 |
| Pimlico 1 NE (MD-BC-3)<br>39.37N 76.6W              | 7.52 |
| Oella 1 E (BLS92)<br>39.27N 76.77W                  | 7.46 |
| Olney ES (WB)                                       | 7.45 |
| Eckhart Mines (ALW28)<br>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)<br>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)<br>38.98N 76.75W         | 7.00 |
| Worton                                       | 6.93 |
| Columbia 3 ENE (HWC03)<br>39.21N 76.81W      | 6.90 |
| Gaithersburg 2 SE (MD-HW-2)<br>39.34N 76.97W | 6.82 |
| Stevensville<br>38.99 N 76.31 W              | 6.77 |
| Manchester 1 SSW (CLC12)<br>39.65N 76.89W    | 6.64 |
| Savage 1 WSW (HWS04)<br>39.13N 76.84W        | 6.59 |
| North Beach (X387076)<br>38.70N 76.53W       | 6.54 |
| Glenmont 1 NNE (MOE01 )<br>39.07N 77.04W     | 6.37 |
| Stevensville 3 N<br>39.0 N 76.31W            | 6.40 |
| Catonsville 1 ENE (BLS93)<br>39.27N 76.73W   | 6.24 |
| Westminster 1 W (X396077)<br>39.57N -77.03W  | 6.19 |
| Germantown 2 ESE (MO182)<br>39.17N 77.23W    | 6.19 |
| Cavetown 1 WSW (WAS03)<br>39.63 N 77.60 W    | 6.15 |
| Aspen Hill 2 ENE (MD-MG-5)<br>39.09N 77.05W  | 6.14 |
| Gaithersburg 1 ENE (MO060)<br>39.14 N 77.20W | 6.13 |
| Bowleys Quarters (MD-BL-4)<br>39.31N 76.38W  | 6.08 |
| Pimlico (BCN02)<br>39.35N 76.67W             | 6.01 |
| Cloverly 1 E (MOS117)<br>39.10N -76.96W      | 6.00 |
| Hagerstown 1 ENE (MD-WH-3)<br>39.64N 77.70W  | 5.99 |
| Elkton<br>39.60 N 75.82W                     | 5.95 |
| Dentsville 1 SW (CHC34 )<br>38.46N 76.91W    | 5.94 |
| College Park 1 SW (PGN172)<br>38.98N 76.94W  | 5.85 |
| Norbeck 1 ESE (MO035)<br>39.10 N 77.06 W     | 5.81 |
| Hampton 1 W (BLC20)<br>39.41 N 76.59 W       | 5.71 |
| Elkton 7 NNW<br>39.69 N 75.87 W              | 5.77 |

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

|                                           |       |
|-------------------------------------------|-------|
| Franklin                                  | 5.23  |
| Malaga                                    | 5.22  |
| <b>Pennsylvania</b>                       |       |
| Easton<br>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<br>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<br>39.95 N 75.61 W      | 6.18  |
| Littlestown 0.8 NNW                       | 6.05  |
| Atglen DEOS<br>39.94 N 75.97 W            | 6.00  |
| West Chester 1.8 SE                       | 5.96  |
| Kennett Square<br>39.84 N 75.71 W         | 5.93  |
| Landenburg                                | 5.90  |
| West Chester<br>39.95 N 75.61 W           | 5.78  |
| Kennett Square DEOS<br>39.84 N 75.71 W    | 5.68  |
| Exton<br>40.03 N 75.63 W                  | 5.59  |
| West Grove DEOS<br>39.82 N 75.83 W        | 5.12  |
| Unionville                                | 5.12  |
| Media<br>39.91 N 75.39 W                  | 5.02  |
| <b>New York</b>                           |       |
| 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 |
| <b>Rhode Island</b>      |      |
| Woonsocket 1.3 ESE       | 2.98 |
| Manville 0.2 NE          | 2.83 |
| Little Compton 1.7 NW    | 2.40 |
| <b>Massachusetts</b>     |      |
| 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 |
| <b>New Hampshire</b>     |      |
| 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 |
| <b>Maine</b>             |      |
| 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 |
| <b>Ohio</b>              |      |
| 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

| <b>West Virginia</b> | <b>Snowfall (in inches)</b> |
|----------------------|-----------------------------|
| 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                        |
| Fayetteville 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                         |
| <b>Kentucky</b>      |                             |
| 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  |
| <b>North Carolina</b>     |      |
| 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  |
| <b>Virginia</b>           |      |
| 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  |
| <b>Maryland</b>           |      |
| 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  |
| <b>Ohio</b>            |      |
| Bellefontaine          | 4.5  |
| Washington Court House | 3.0  |
| Mansfield              | 2.5  |
| <b>Pennsylvania</b>    |      |
| Champion 4 SE          | 13.0 |
| Laurel Summit          | 10.0 |
| Mount Davis            | 9.0  |
| Farmington             | 8.8  |
| Stahlstown             | 6.0  |
| Chalkhill 2 ENE        | 5.1  |
| <b>Tennessee</b>       |      |
| 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             |
| <b>Total</b>                                         | <b>147</b>    |

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             |
| <b>Total</b>  | <b>72</b>     |



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           | <b>23.9</b>         | <b>33.2</b> | <b>39.6</b> | <b>41.6</b> | <b>61.3</b> | <b>88.3</b> | <b>148.9</b> |
| 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        | <b>38.3</b> | 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  | <b>71.4</b>  |
| AEMI      | <b>20.5</b>         | <b>27.1</b> | <b>34.5</b> | <b>34.5</b> | <b>55.4</b> | 108.6 | 164.4        |
| TVCA      | <b>21.1</b>         | <b>29.1</b> | <b>36.6</b> | <b>31.2</b> | <b>54.3</b> | 96.0  | 181.3        |
| FSSE      | <b>20.1</b>         | <b>24.8</b> | <b>33.9</b> | <b>29.1</b> | <b>56.1</b> | 87.3  | 142.2        |
| BAMD      | 69.7                | 129.3       | 185.0       | 226.7       | 202.1       | 190.6 | <b>119.1</b> |
| 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                 | <b>10.6</b> | <b>11.0</b> | <b>10.9</b> | <b>10.3</b> | <b>8.9</b> | <b>14.5</b> |
| 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                 | <b>10.7</b> | 13.2        | 13.1       | 9.2  | 8.8        | <b>7.1</b>  |
| HWFI      | 9.8                 | 12.6        | <b>10.5</b> | <b>9.3</b> | 9.8  | <b>7.3</b> | <b>9.6</b>  |
| 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       | <b>12.4</b> |
| EMXI      | 9.5                 | 14.5        | 16.7        | 18.1       | 13.0 | 9.0        | <b>3.4</b>  |
| 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                         | Camaguëy 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                                                             |

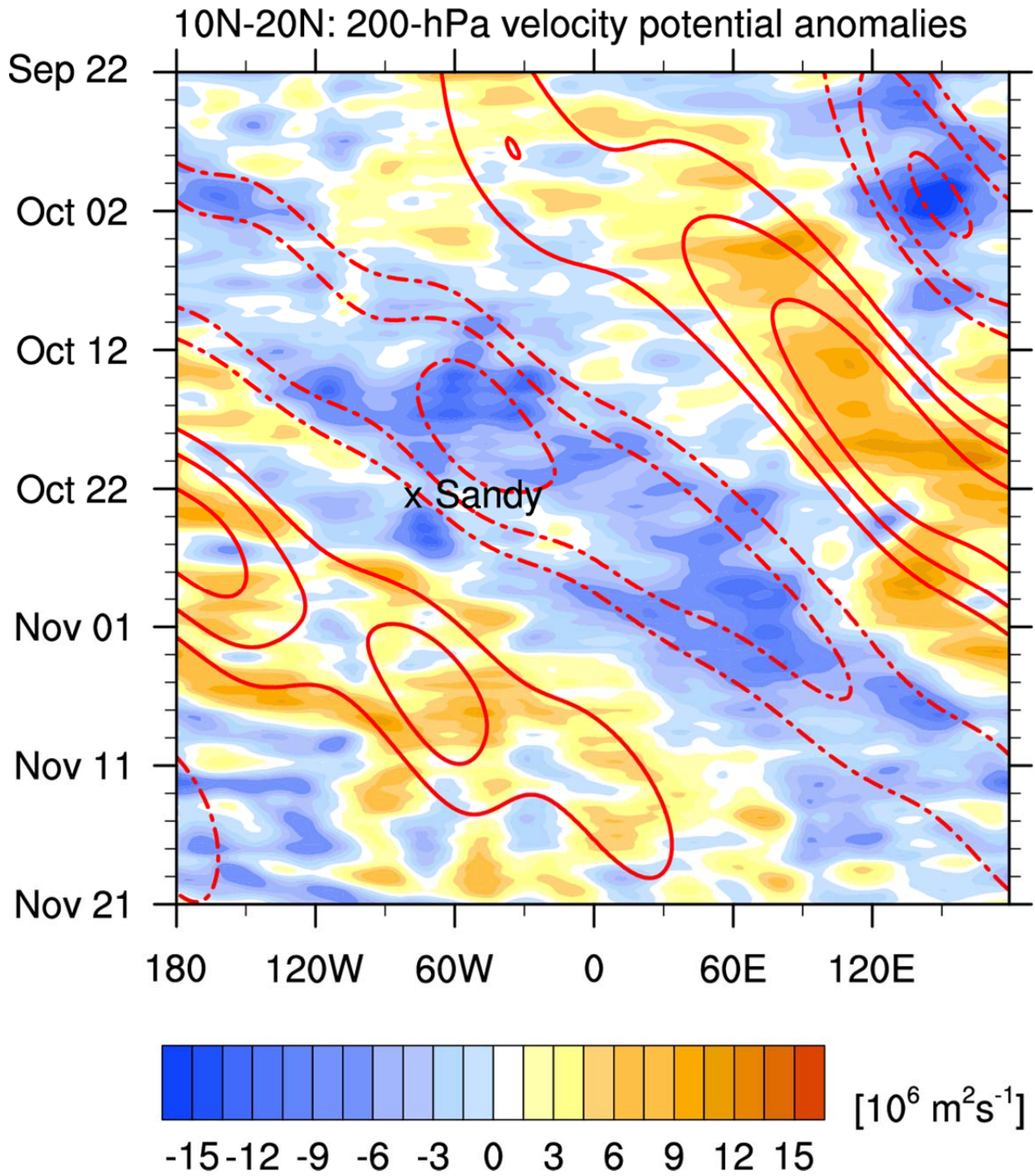


Figure 1. Velocity potential anomalies at 200 mb (VP200) from 10°N-20°N. The shading shows unfiltered VP200 anomalies (negative values [in blue] represent mass divergence). Red contours show MJO-filtered VP200 anomalies; dashed lines represent the upper-level divergent (convectively active) phase of 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).

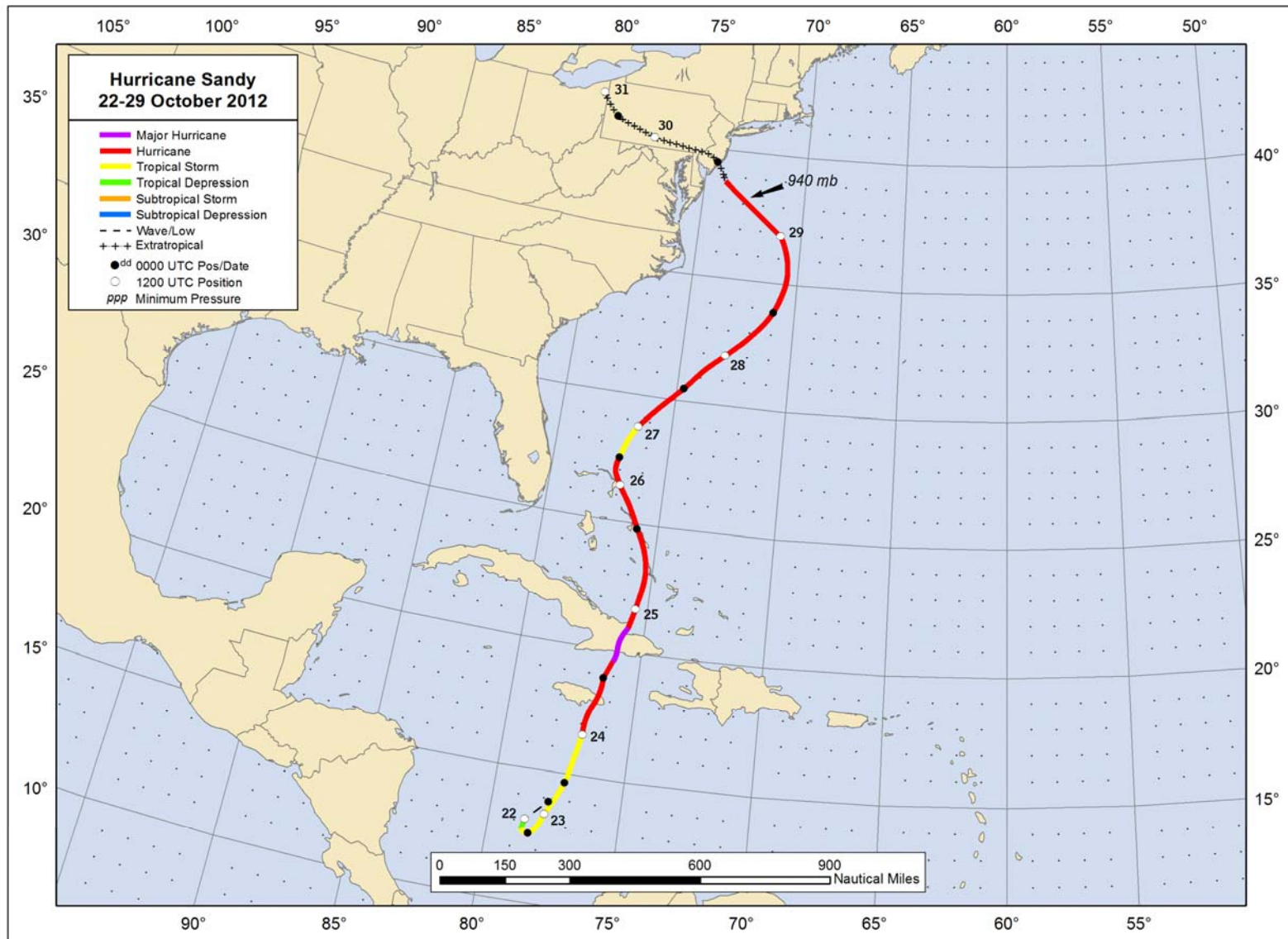


Figure 2. Best track positions for Hurricane Sandy, 22 - 29 October 2012.

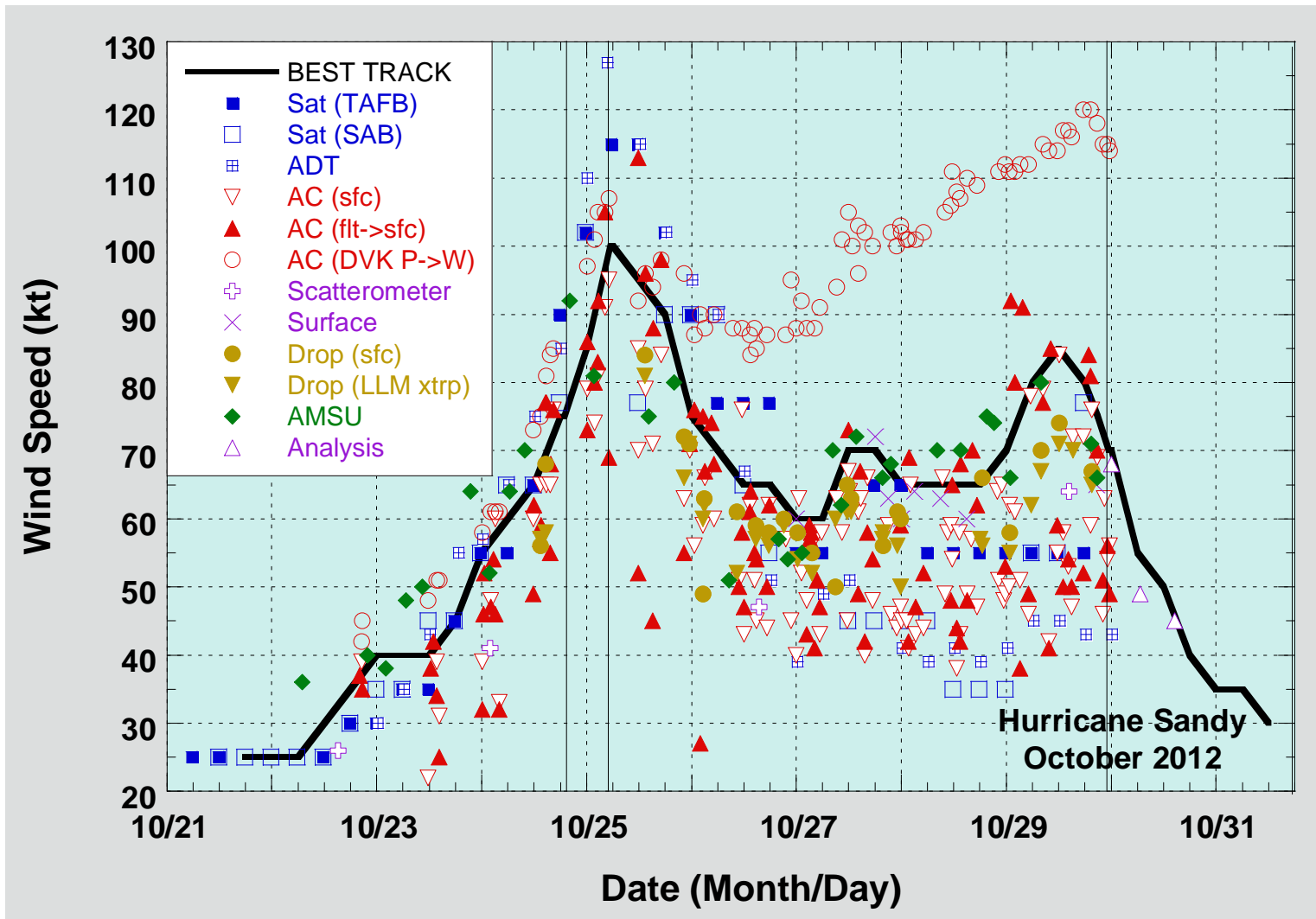


Figure 3. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Sandy, 22 – 29 October 2012. Advanced Dvorak Technique (ADT) estimates courtesy of UW-CIMSS. AMSU estimates are derived from the UW-CIMSS technique. Dashed vertical lines correspond to 0000 UTC.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



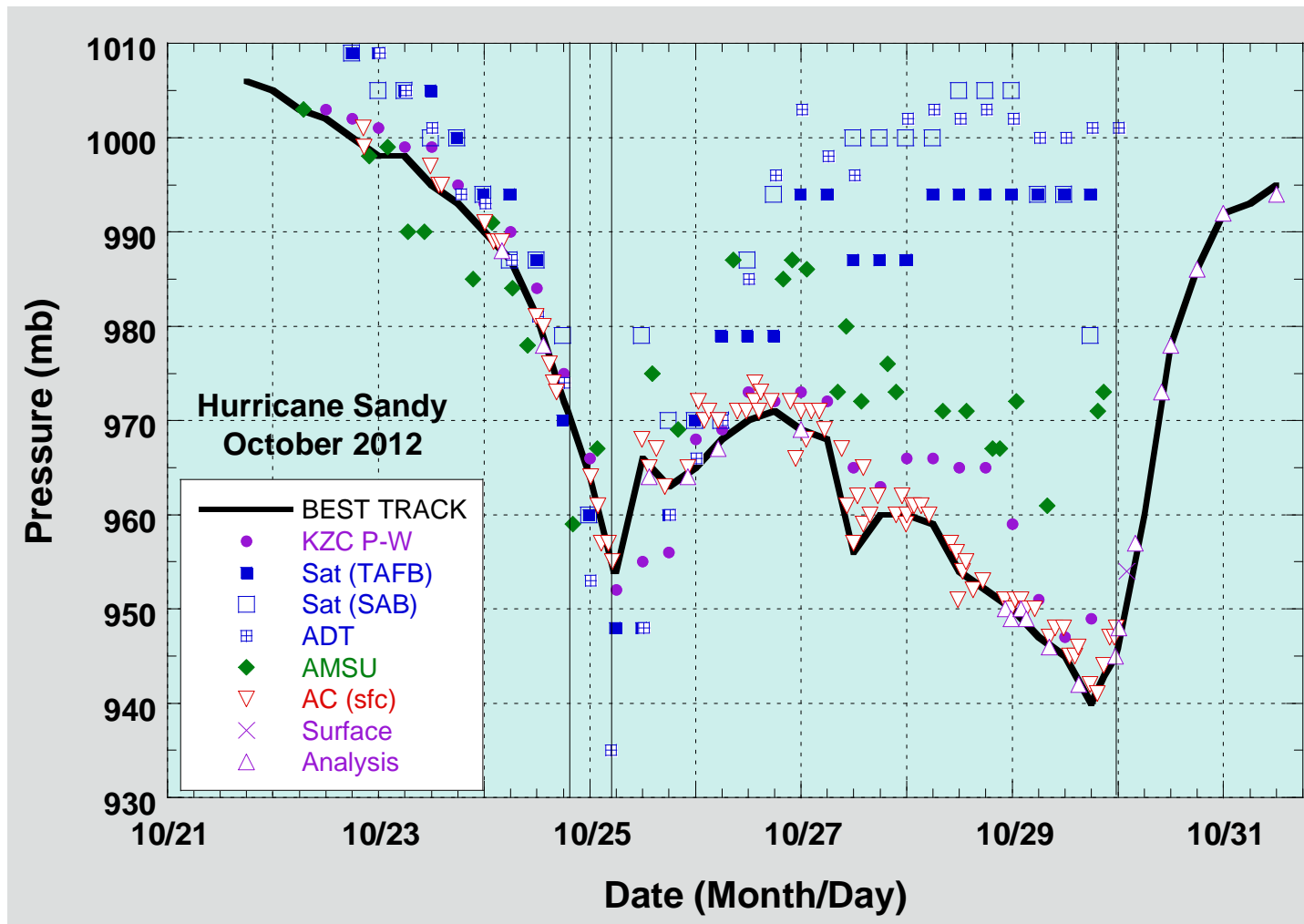


Figure 4. Selected pressure observations and best track minimum central pressure curve for Hurricane Sandy, 22 – 29 October 2012. Advanced Dvorak Technique (ADT) estimates courtesy of UW-CIMSS. Dashed vertical lines correspond to 0000 UTC. KZC P-W refers to pressure estimates derived by applying the 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.

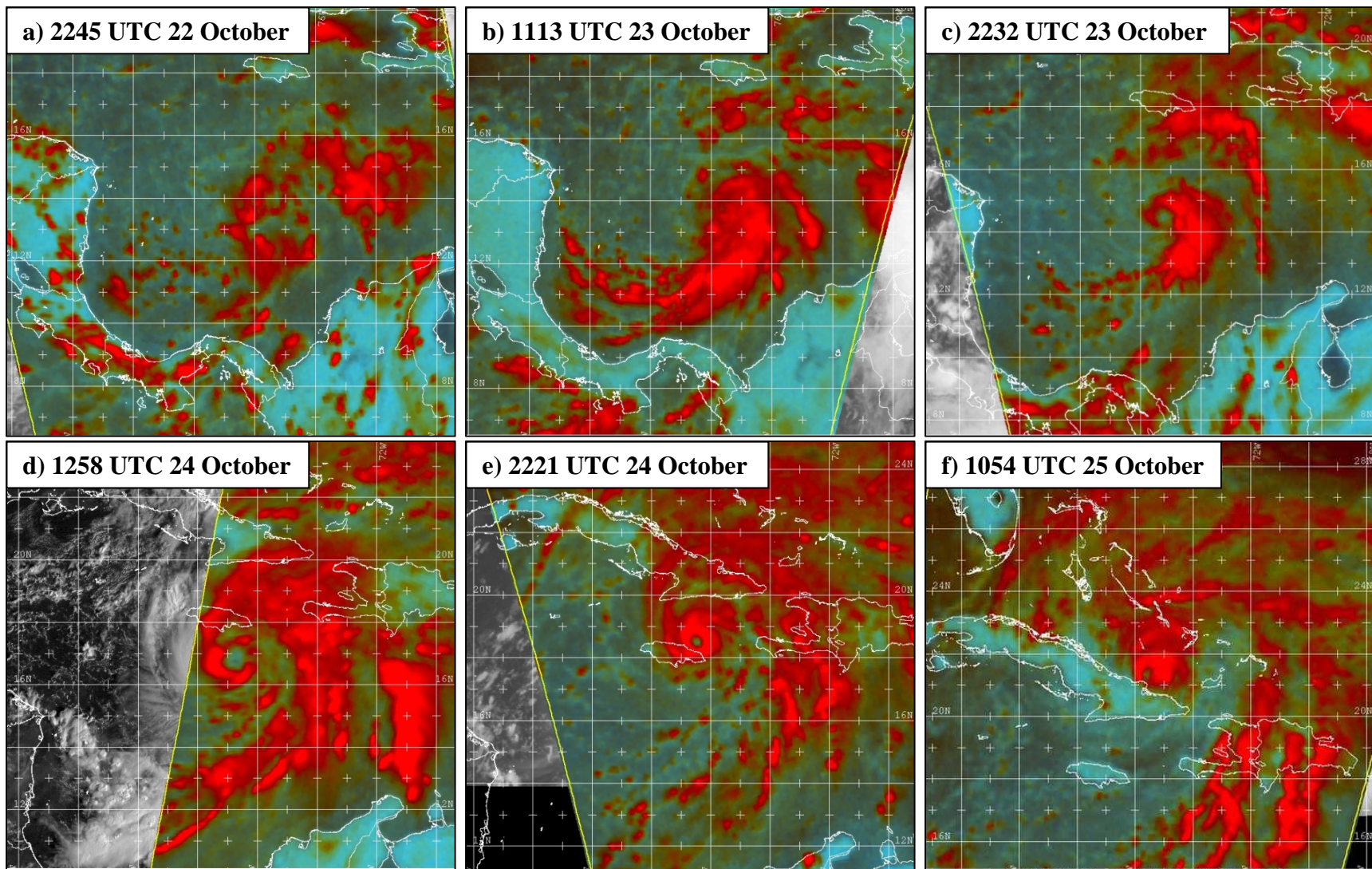


Figure 5. Series of 85-gHz microwave images showing the gradual and then rapid development of Sandy during its time in or near the Caribbean Sea, 22-25 October. Images courtesy of the Naval Research Lab in Monterey, California.

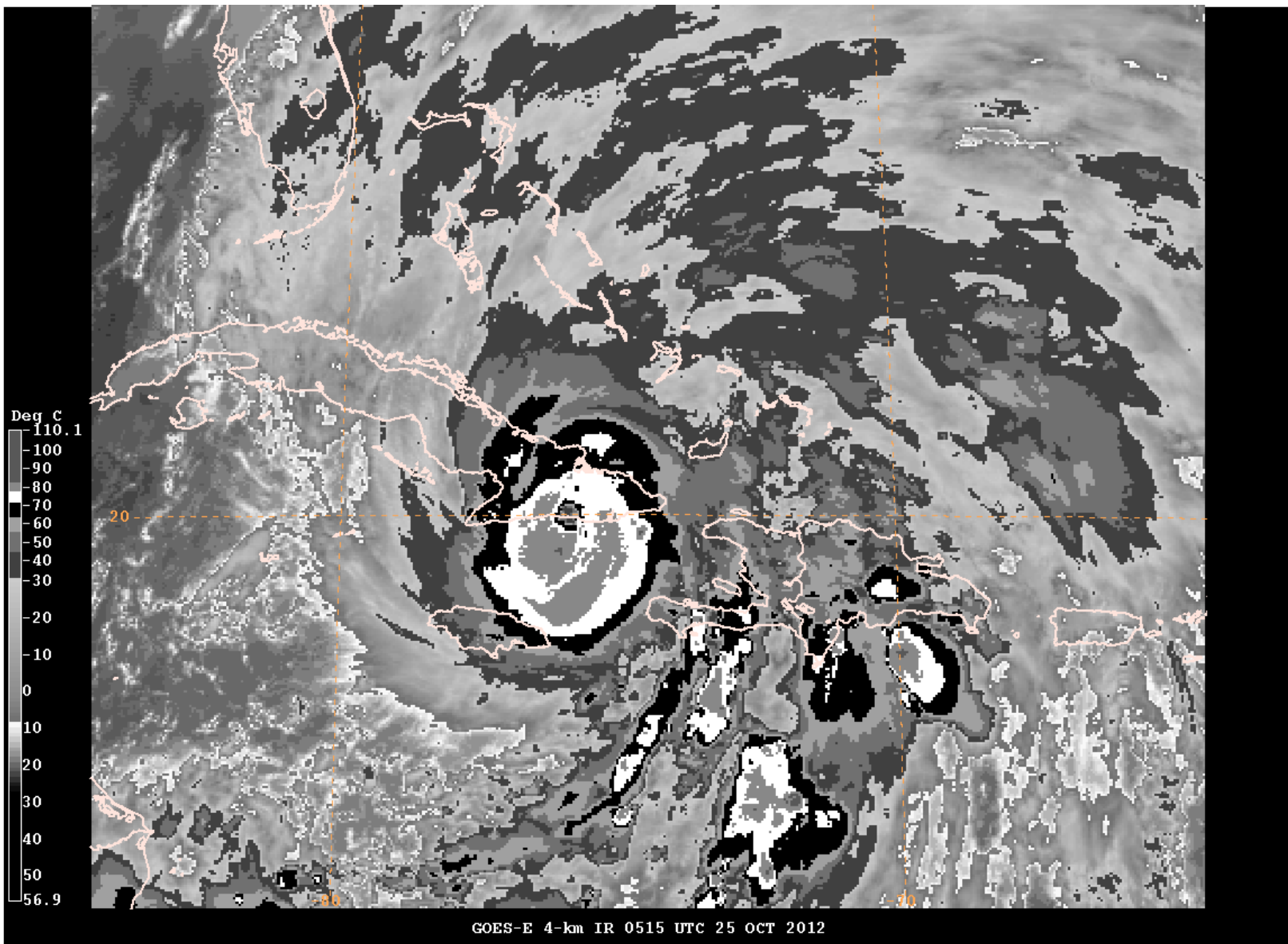


Figure 6. GOES-E infrared satellite image of Sandy at 0515 UTC 25 October, close to the time of peak intensity and landfall.

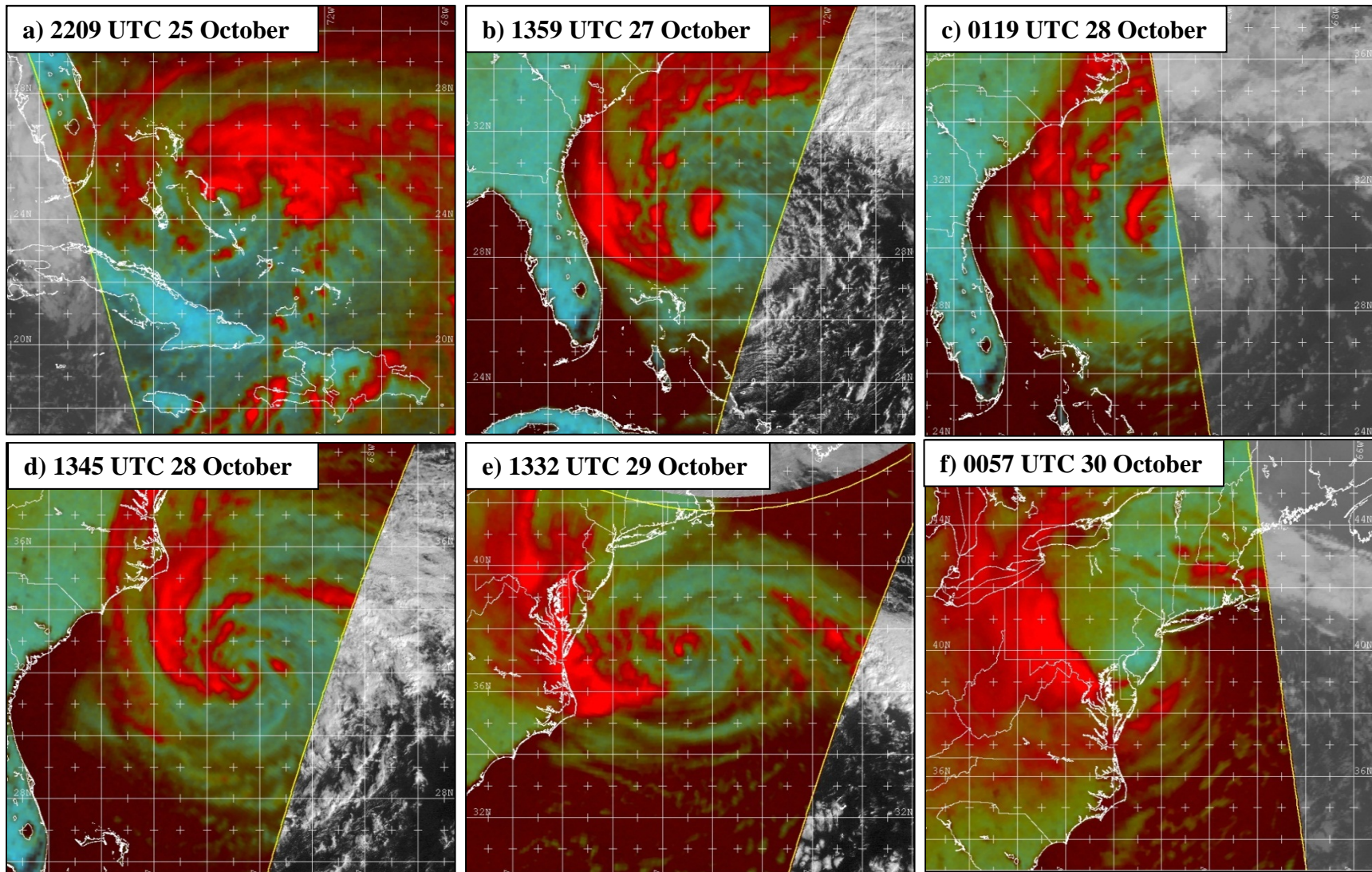


Figure 7. Series of 85-GHz microwave images showing the structural evolution of Hurricane Sandy during its track from the Bahamas until its landfall in New Jersey. Images courtesy of the Naval Research Lab in Monterey, California.

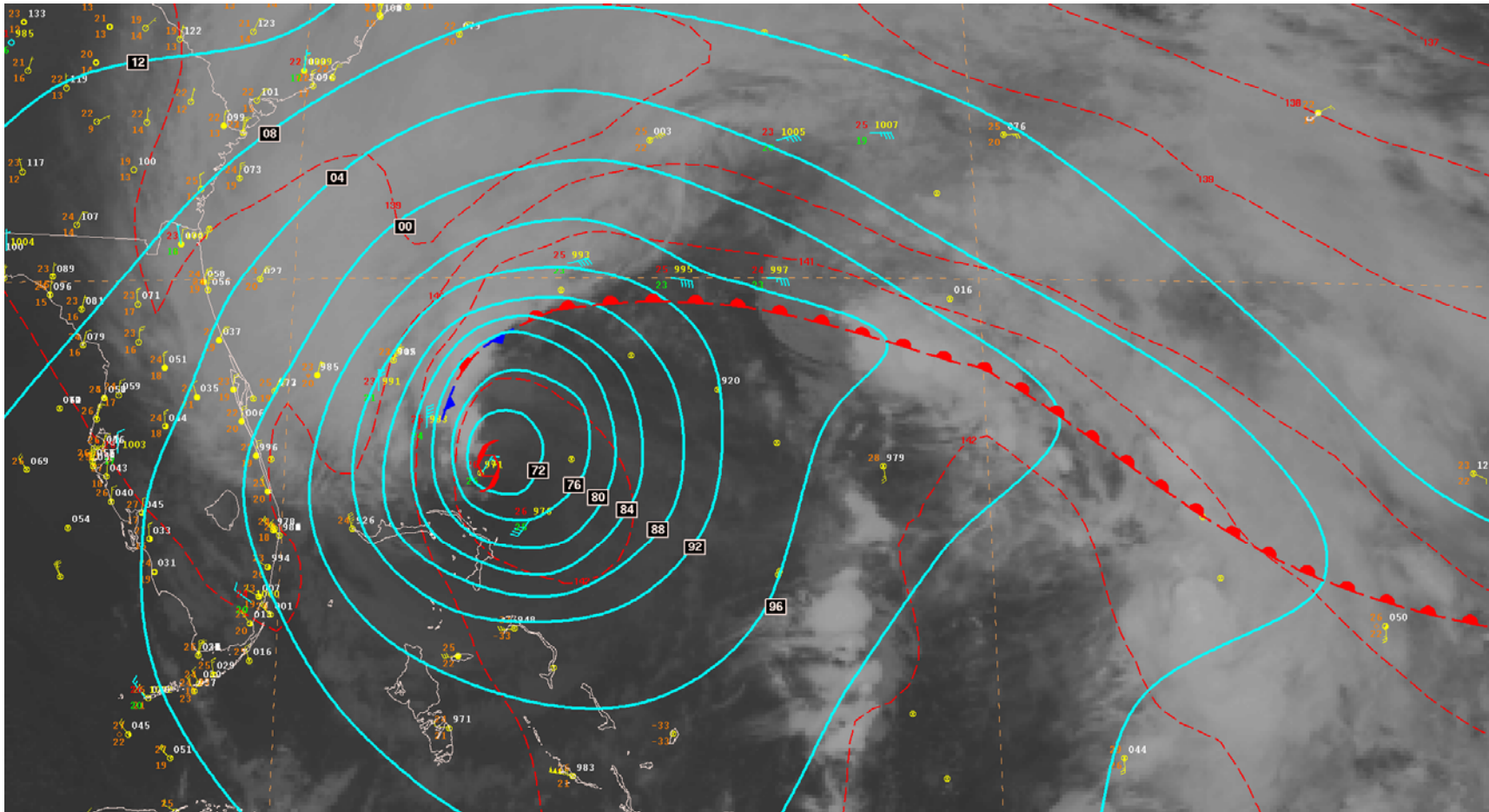


Figure 8. NHC surface post-analysis of Sandy north of the Bahamas valid at 0000 UTC 27 October, superimposed on with the GOES-E infrared satellite picture at 2345 UTC 26 October. Isobars (blue lines, 4-mb contours), and the 1000-850 mb thickness (red dashed lines, in dekameters) values are from the GFS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

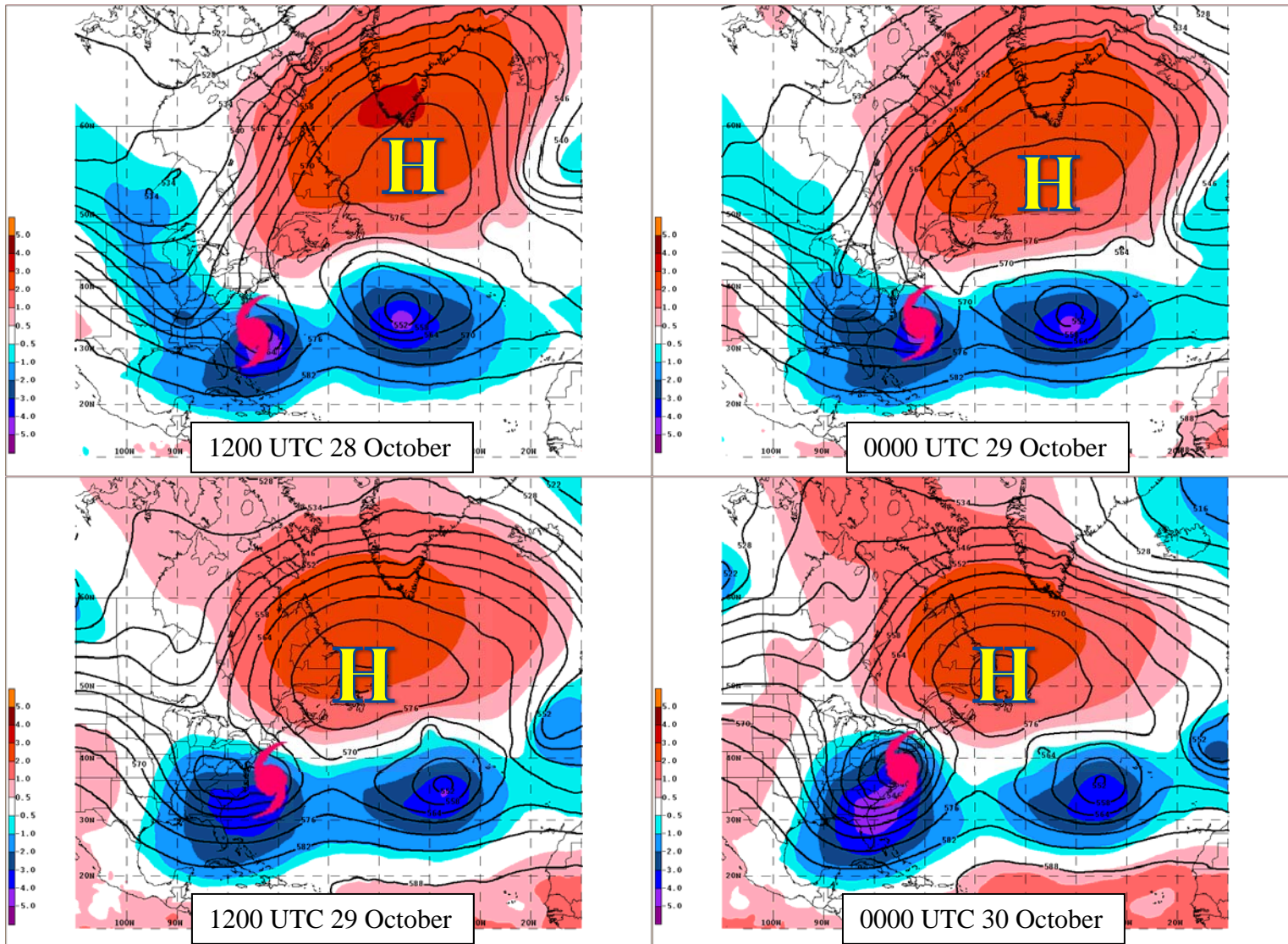


Figure 9. GFS analyses of 500-mb geopotential heights (contours) and standardized anomalies (shaded in standard deviations relative to a 1948-2011 mean) from 28-30 Oct. 2012. Red shaded regions indicate anomalously high heights and blue shaded areas represent anomalously low heights. Sandy is denoted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

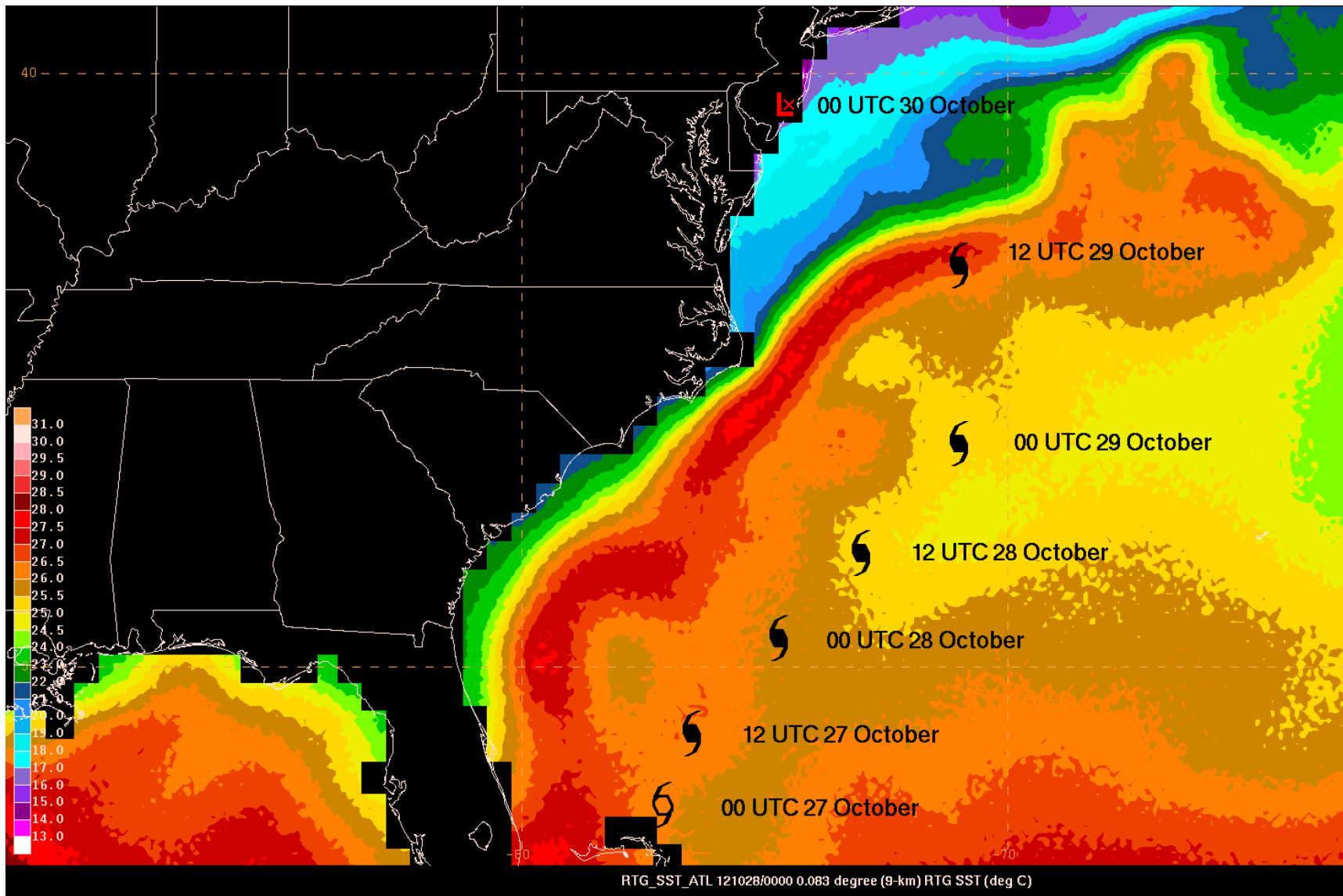


Figure 10. SSTs (°C) on 28 Oct 2012 from the NCEP real-time global 1/12° analysis, with the best track of Sandy plotted at 12-h intervals.

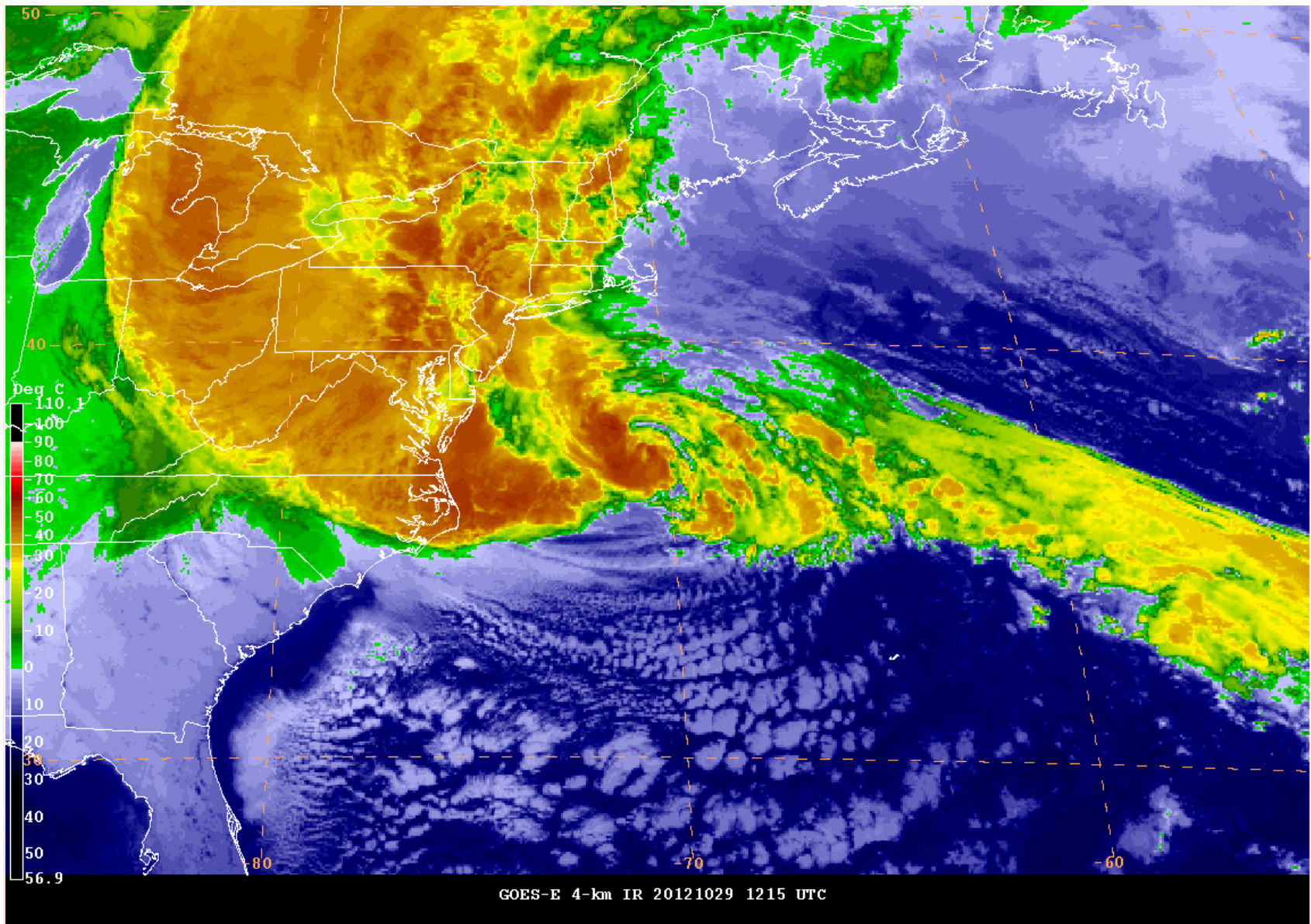


Figure 11. GOES-E infrared satellite image of Sandy at 1215 UTC 29 October 2012, near its secondary peak intensity.



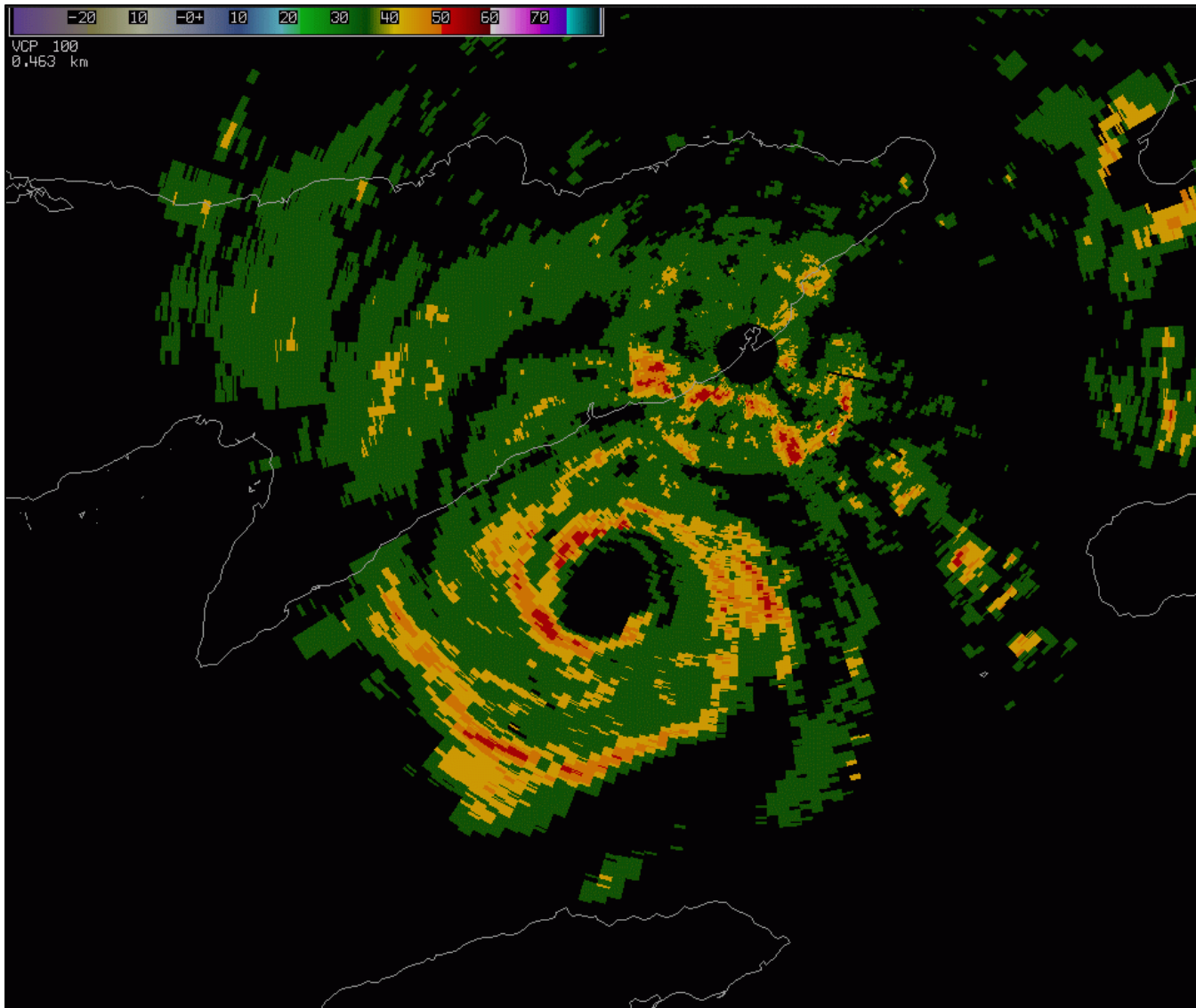


Figure 12. Guantánamo Bay Naval Base ARSR-4 FAA ATC Doppler radar reflectivity image showing the eye of Sandy approaching Santiago de Cuba at 0332 UTC 25 October 2012.

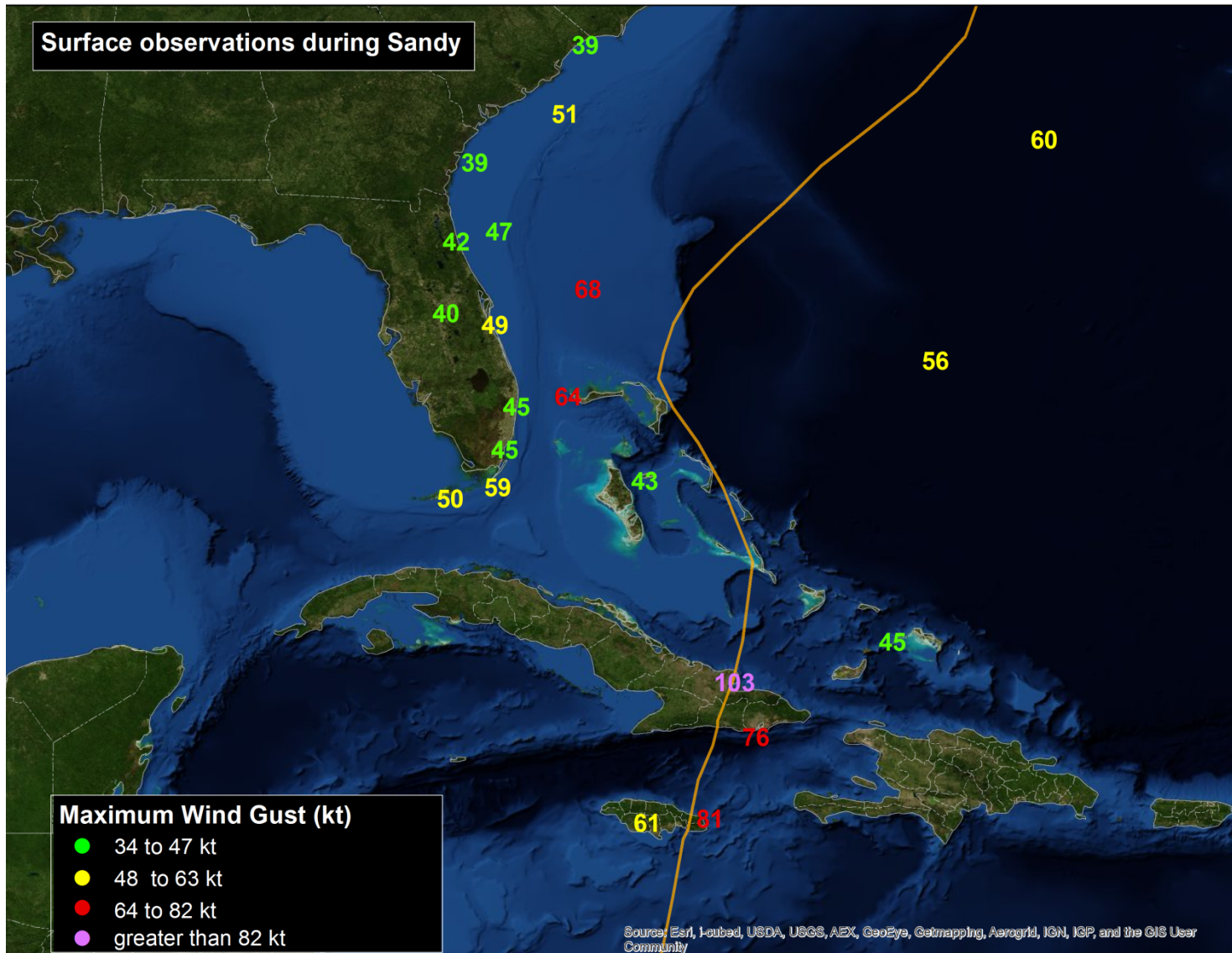


Figure 13. Selected observations of wind gusts of 34 kt or greater from surface stations and buoys during Sandy in the Caribbean Sea, western Atlantic Ocean and southeastern coast of the United States.

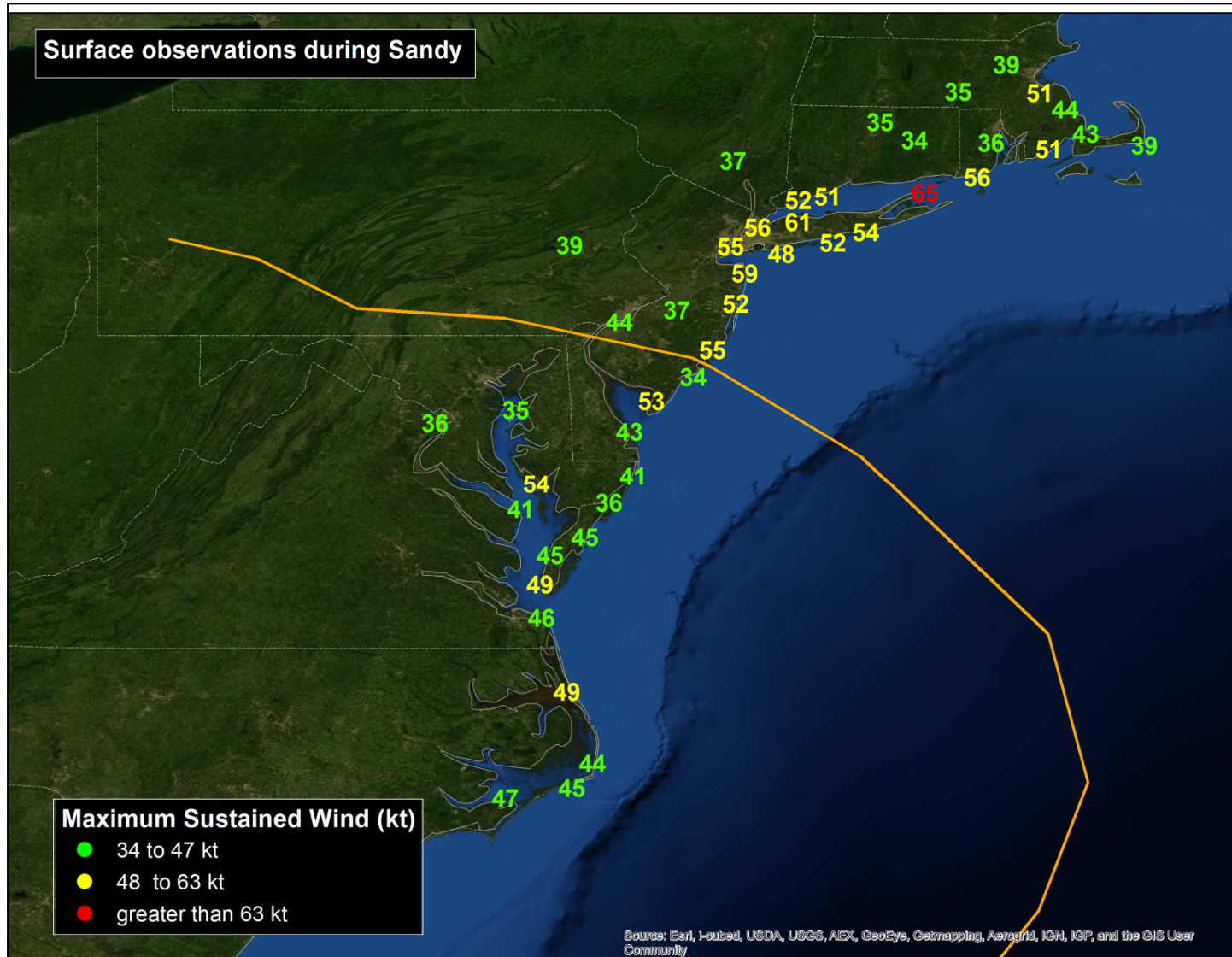


Figure 14. Selected observations of sustained winds of 34 kt or greater along the mid-Atlantic and New England coasts associated with Sandy. All the observations shown were taken from an elevation of 24 m or less.

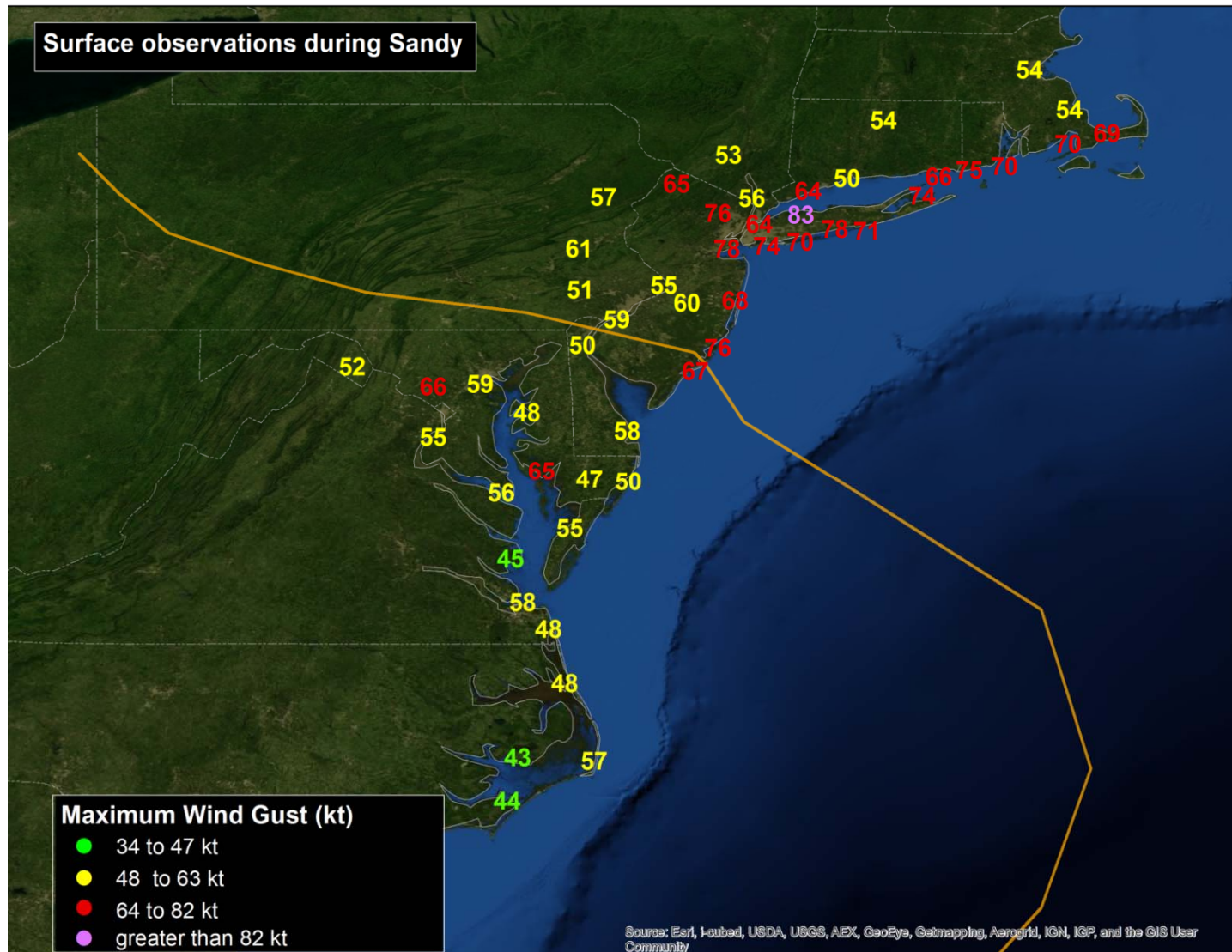


Figure 15. Selected observations of wind gusts of 34 kt or greater along the mid-Atlantic and New England coasts associated with Sandy. All the observations shown were taken from an elevation of 24 m or less.

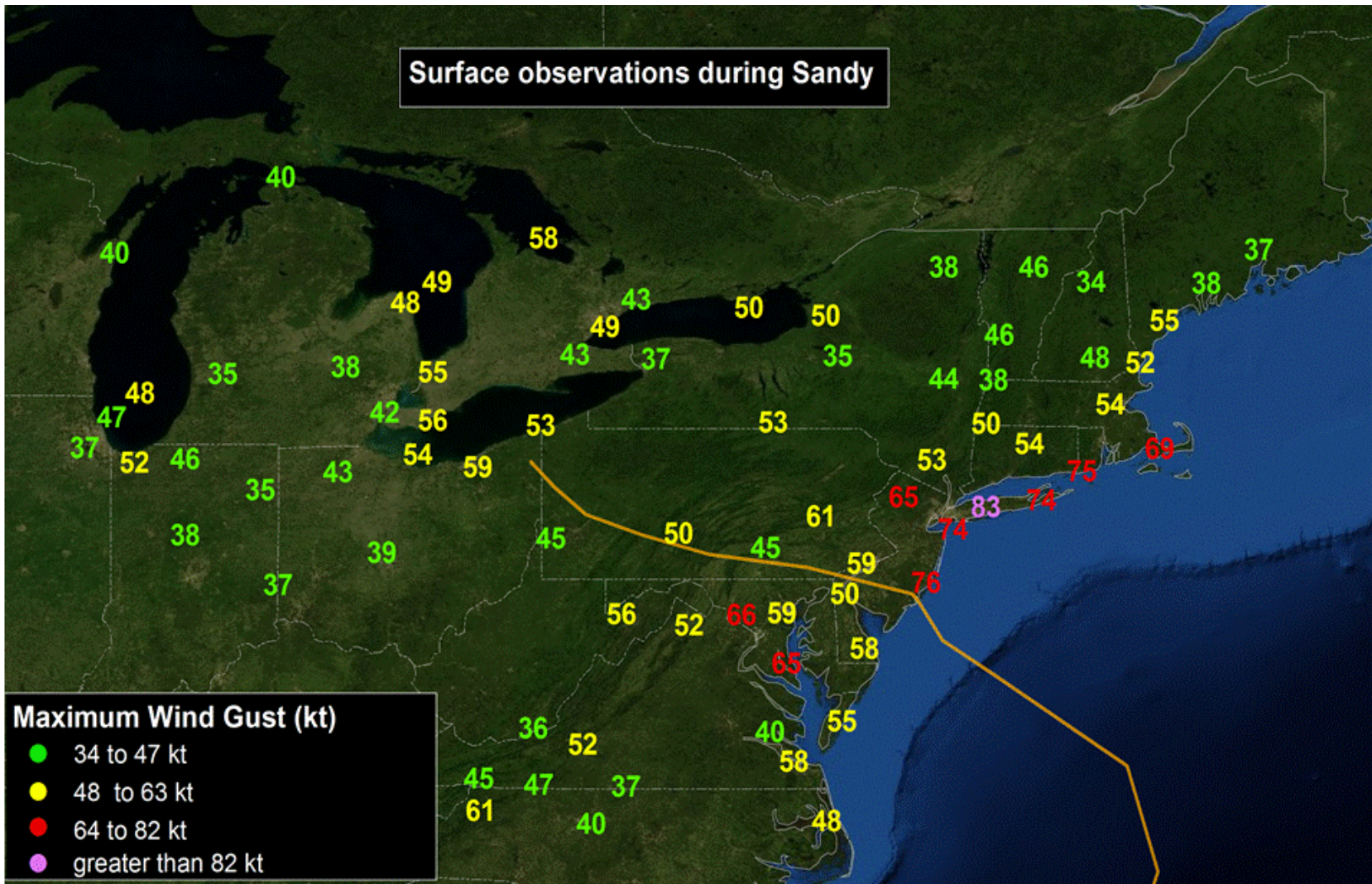


Figure 16. Selected observations of wind gusts of 34 kt or greater wind gusts associated with Sandy as a tropical or post-tropical cyclone. Some of these stations were elevated.

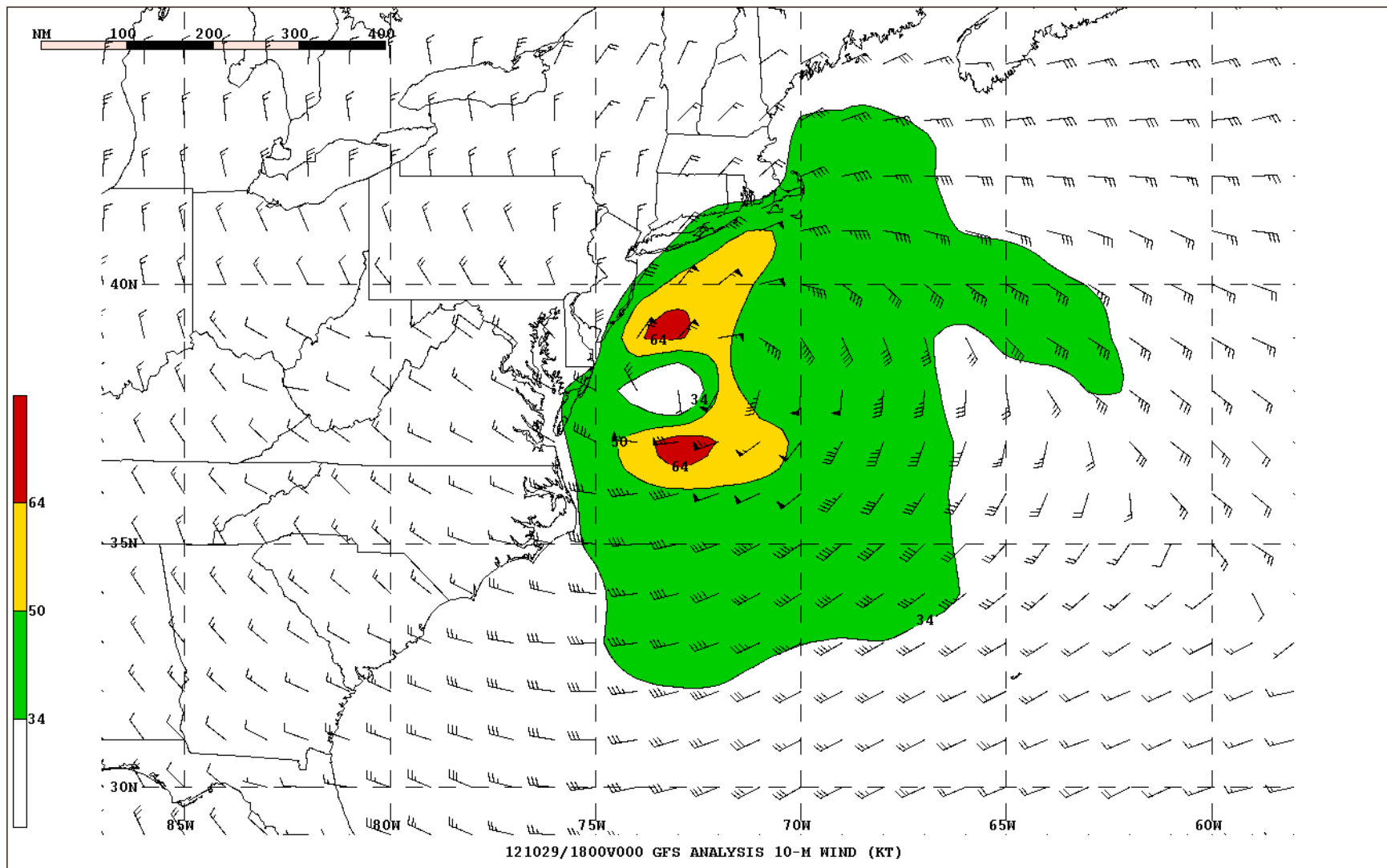


Figure 17. GFS model analysis (1° resolution) from 1800 UTC 29 October 2012 of Hurricane Sandy's wind field. 10-m wind barbs are shown in black. Shaded colors are isotachs representing wind thresholds at 34, 50, and 64 kt.

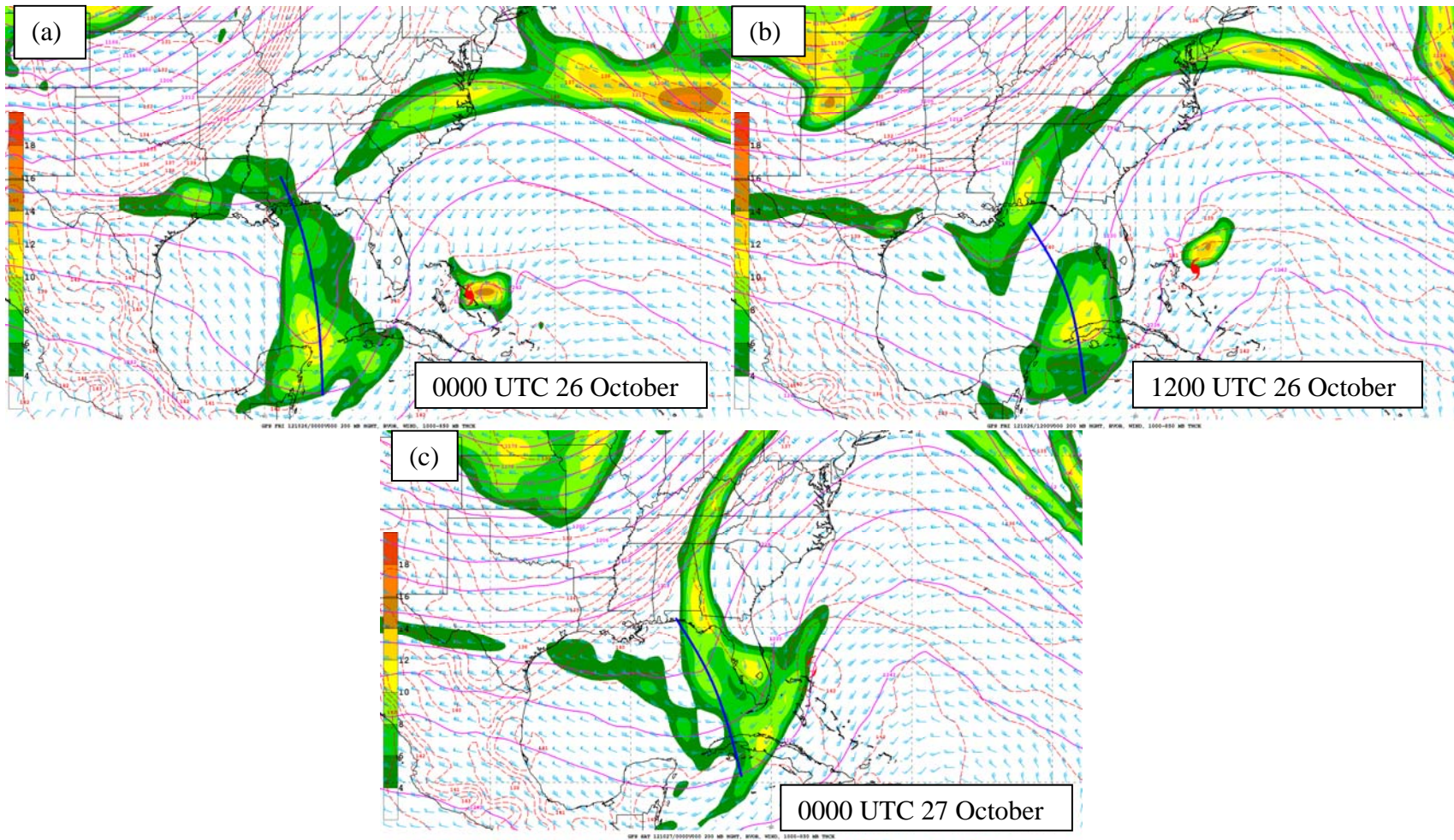


Figure 18. GFS model analyses from 26-27 October 2012, showing the interaction of Sandy with an upper-level trough to its west. The plot features 200-mb geopotential heights (solid magenta contours), relative vorticity (shaded), and winds (barbs, kt), with 1000-850 mb thickness (red dashed) contours 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.

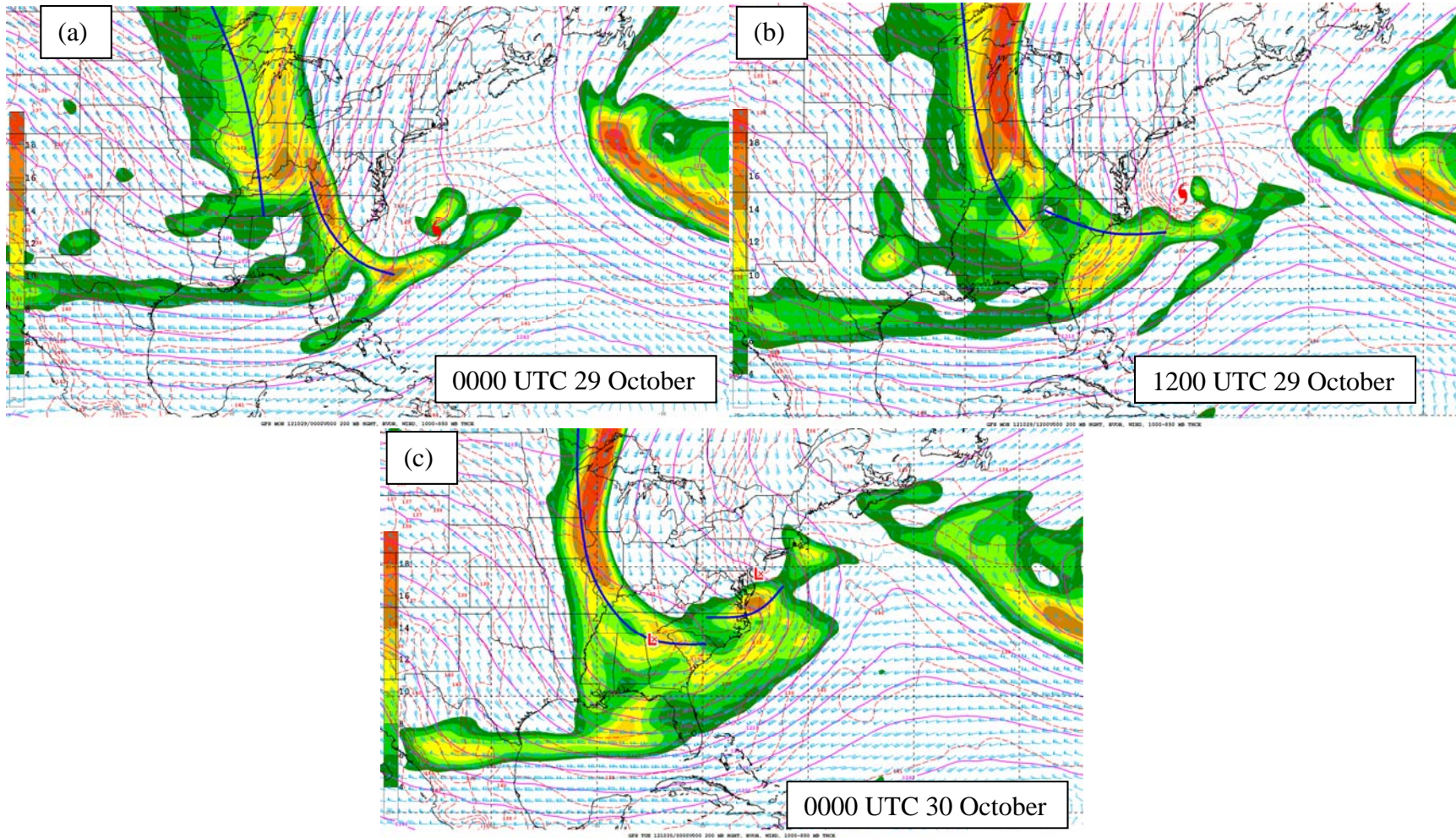


Figure 19. GFS model analyses from 29-30 Oct., showing the interaction of Sandy with a large upper-level trough over the east-central United States prior to landfall. The plot features 200-mb geopotential heights (solid magenta contours), relative vorticity (shaded), and winds (barbs, kt), with 1000-850 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).



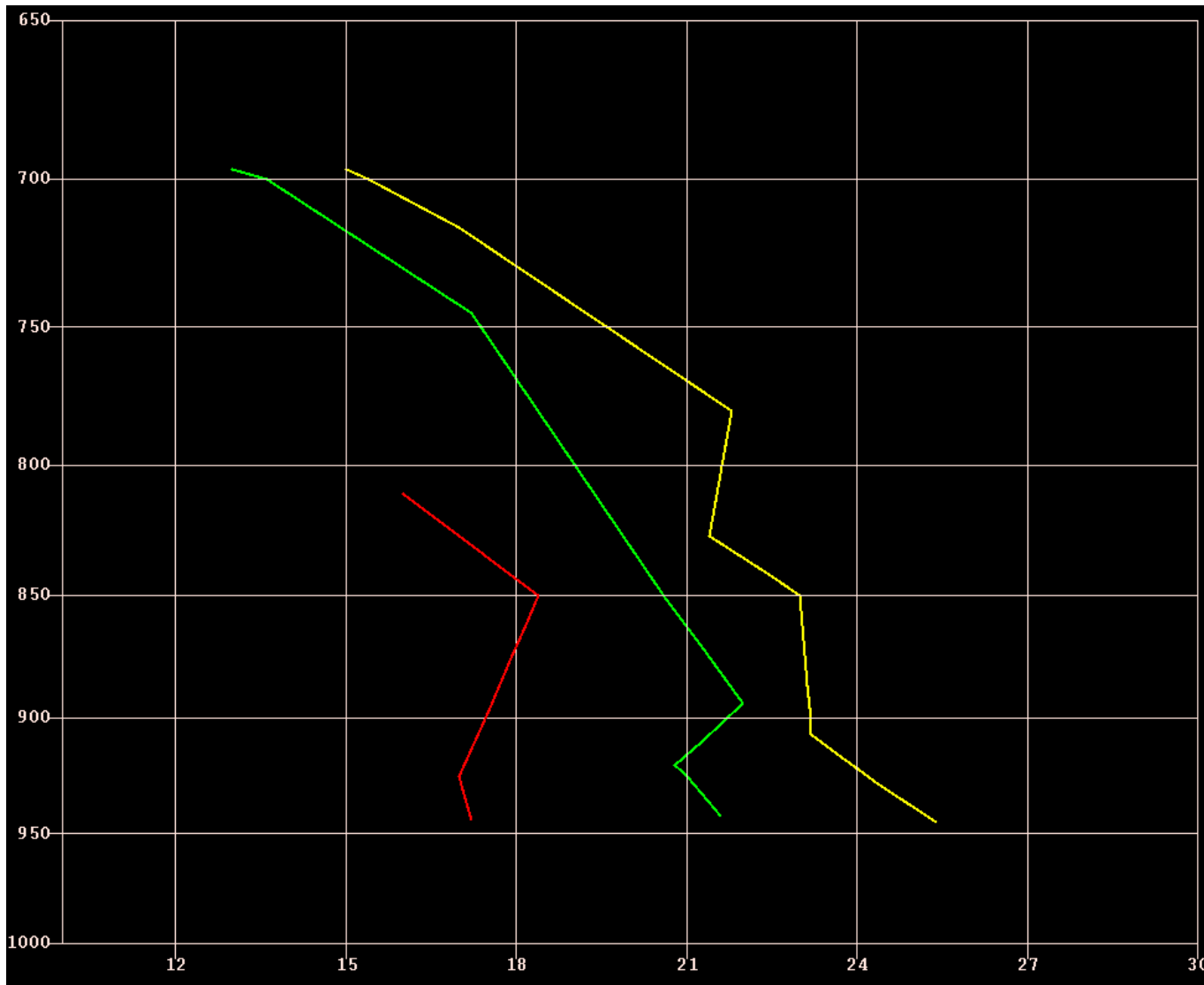


Figure 20. Dropsonde temperature profiles within a few miles of the center of Sandy from 29 October at 1420 UTC (yellow), 1749 UTC (green) and 2052 UTC (red), showing the large lower-tropospheric cooling. The x-axis is temperature (in °C) and the y-axis is pressure (in mb).

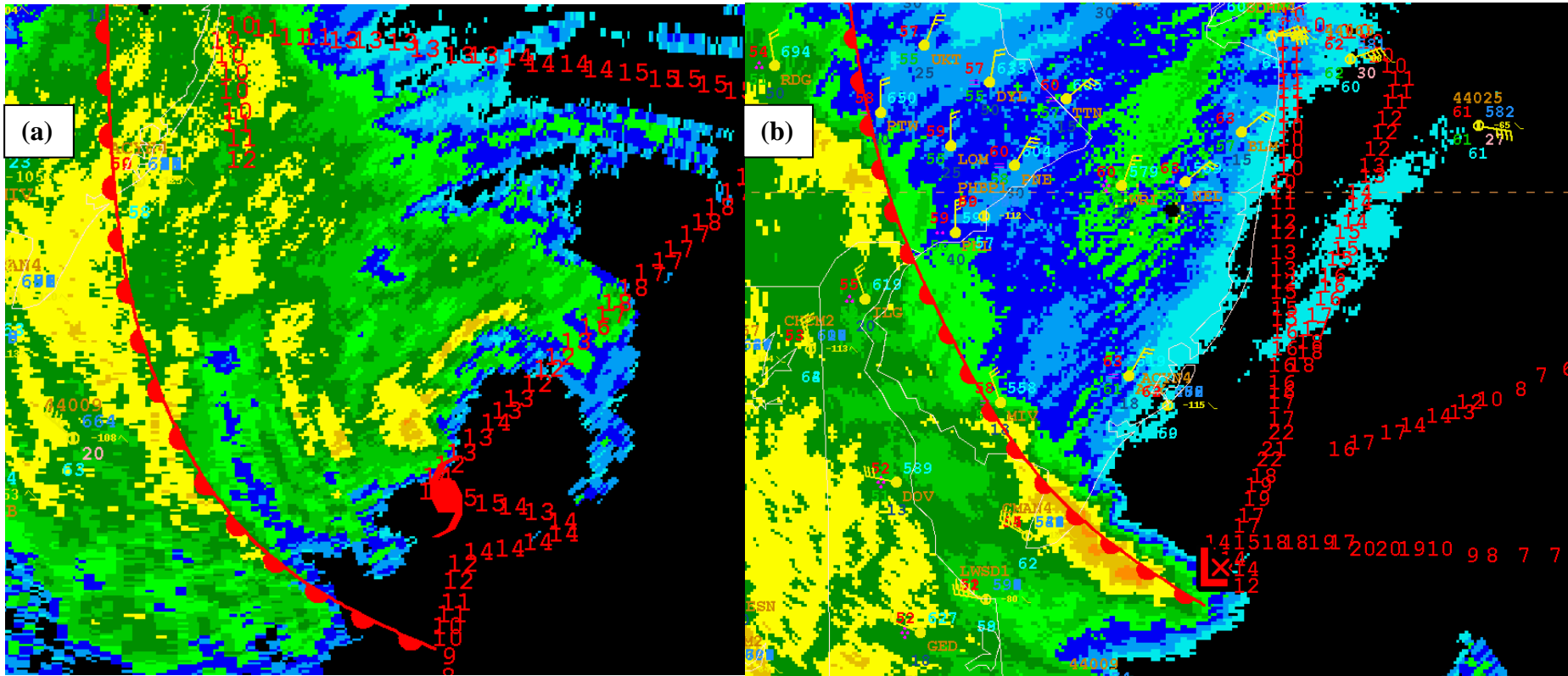


Figure 21. NHC surface analysis, with aircraft 850-mb temperatures (red, °C), radar from Mt. Holly, NJ, and surface observations from 29 October 2012. Panel (a) is centered at 1730 UTC (aircraft observations within 1 h of valid time), panel (b) is centered at 2134 UTC. Note the dissipation of the eye 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.

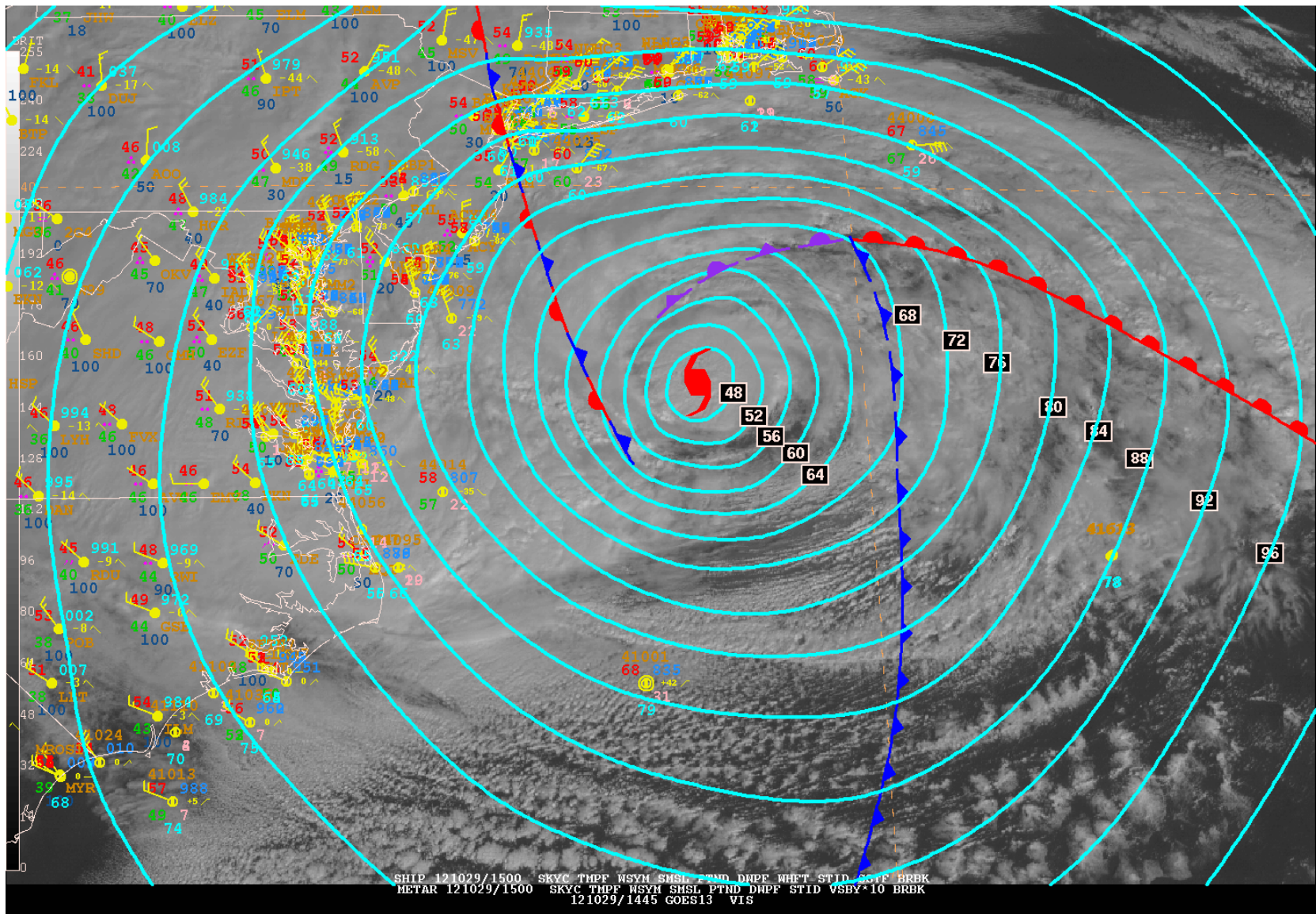


Figure 22. NHC analysis of fronts and isobars (4-mb contours) at 1500 UTC 29 October 2012, plotted with 1500 UTC surface observations and a GOES-E visible satellite image at 1445 UTC 29 October.

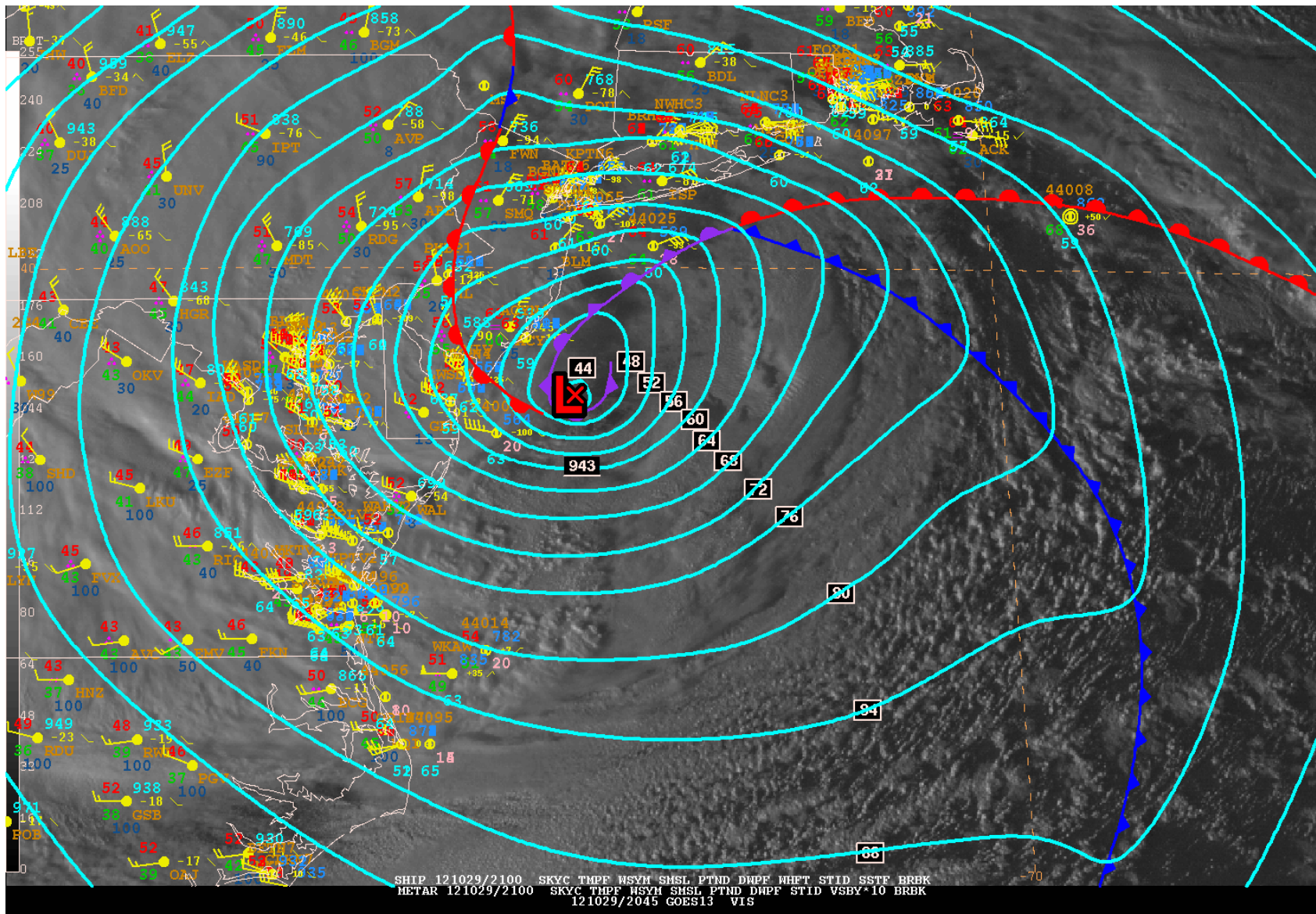


Figure 23. NHC analysis of fronts and isobars (4-mb contours) at 2100 UTC 29 October 2012, plotted with 2100 UTC surface observations and a GOES-E visible satellite image at 2045 UTC 29 October.

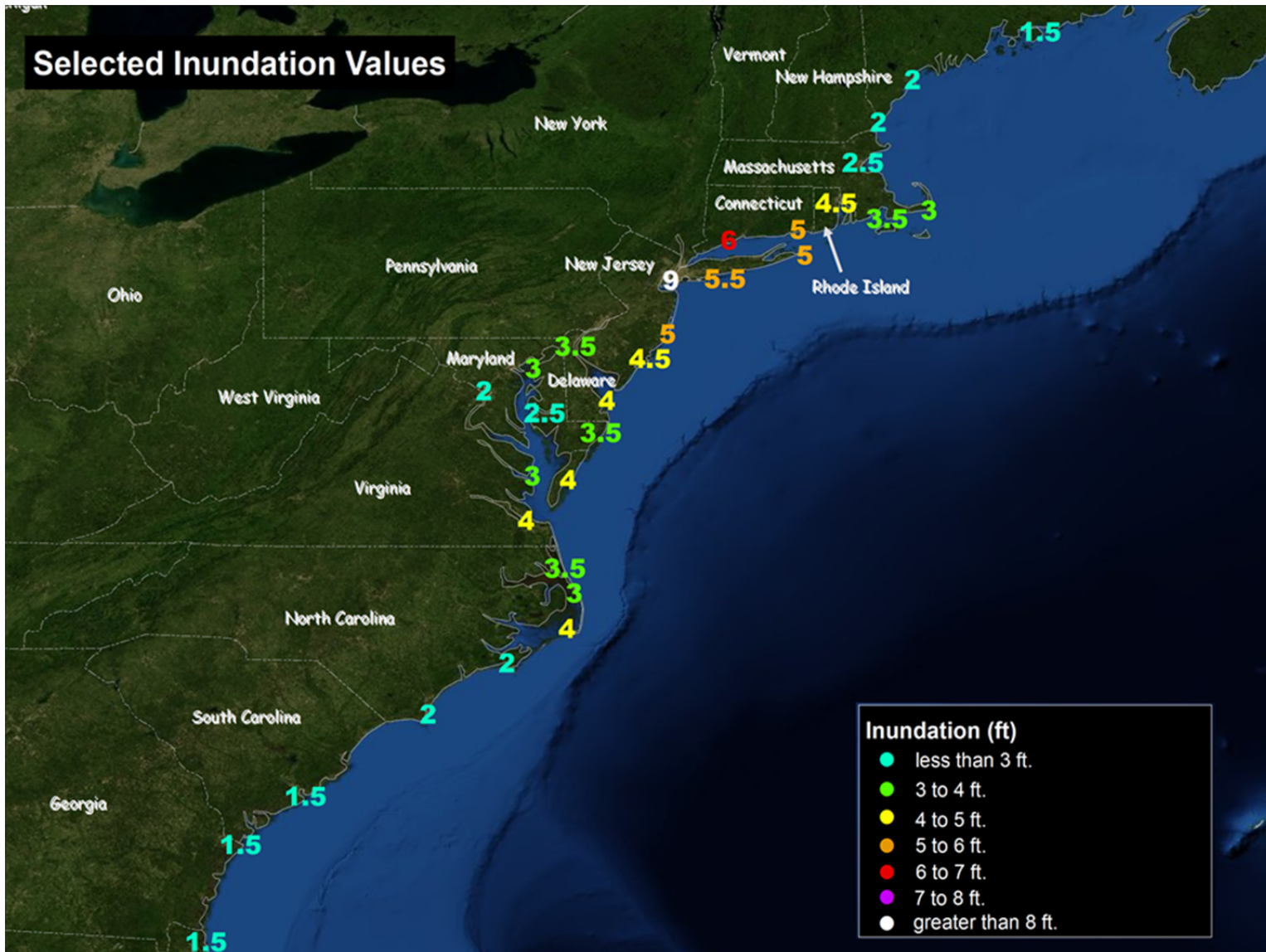


Figure 24. Estimated inundation (feet above ground level) calculated from USGS high-water marks and NOS tide gauges along the U.S. East Coast from Sandy. Values are rounded to the nearest half-foot.

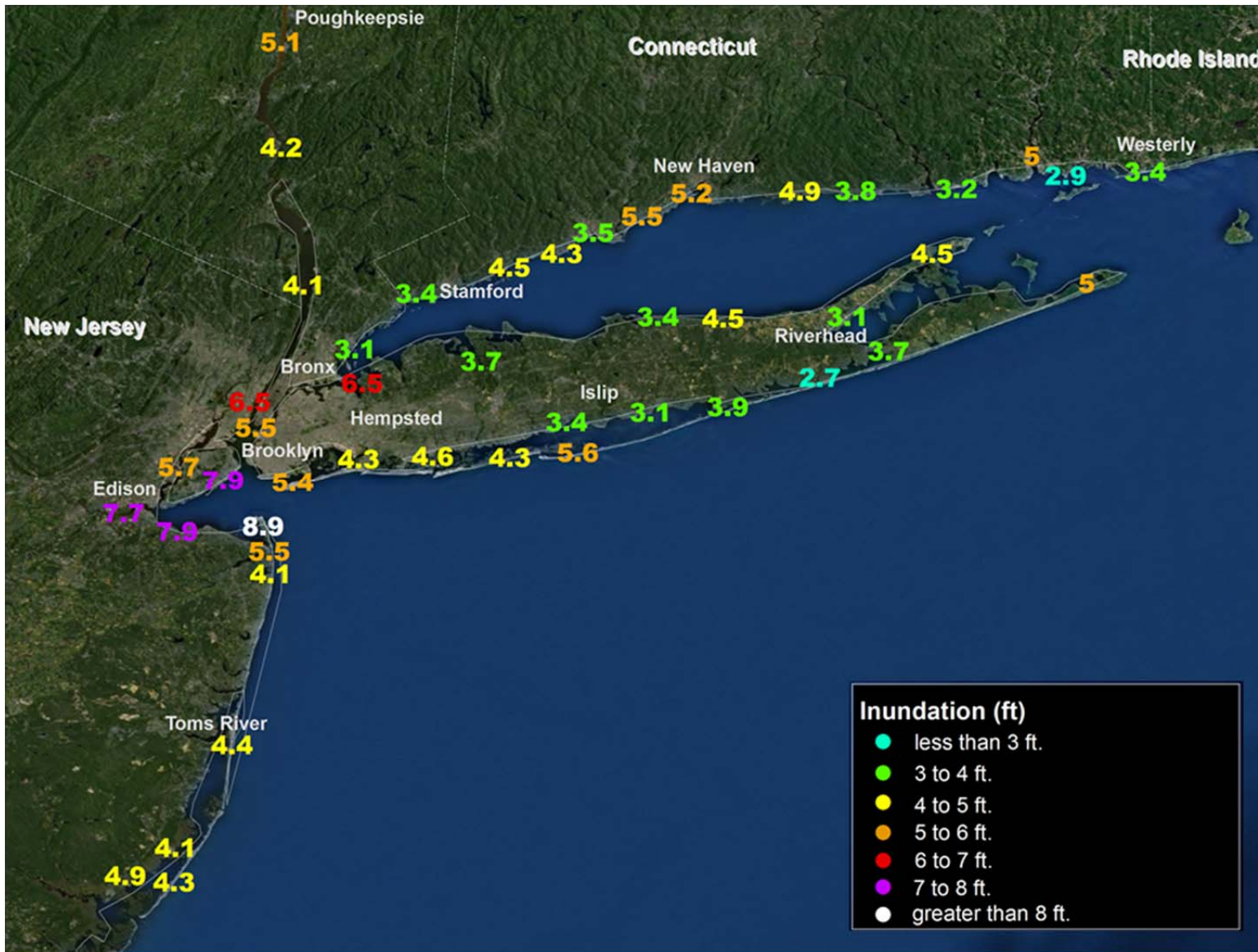


Figure 25. Estimated inundation (feet above ground level) calculated from USGS high-water marks and NOS tide gauges in New Jersey, New York, and Connecticut from Sandy.

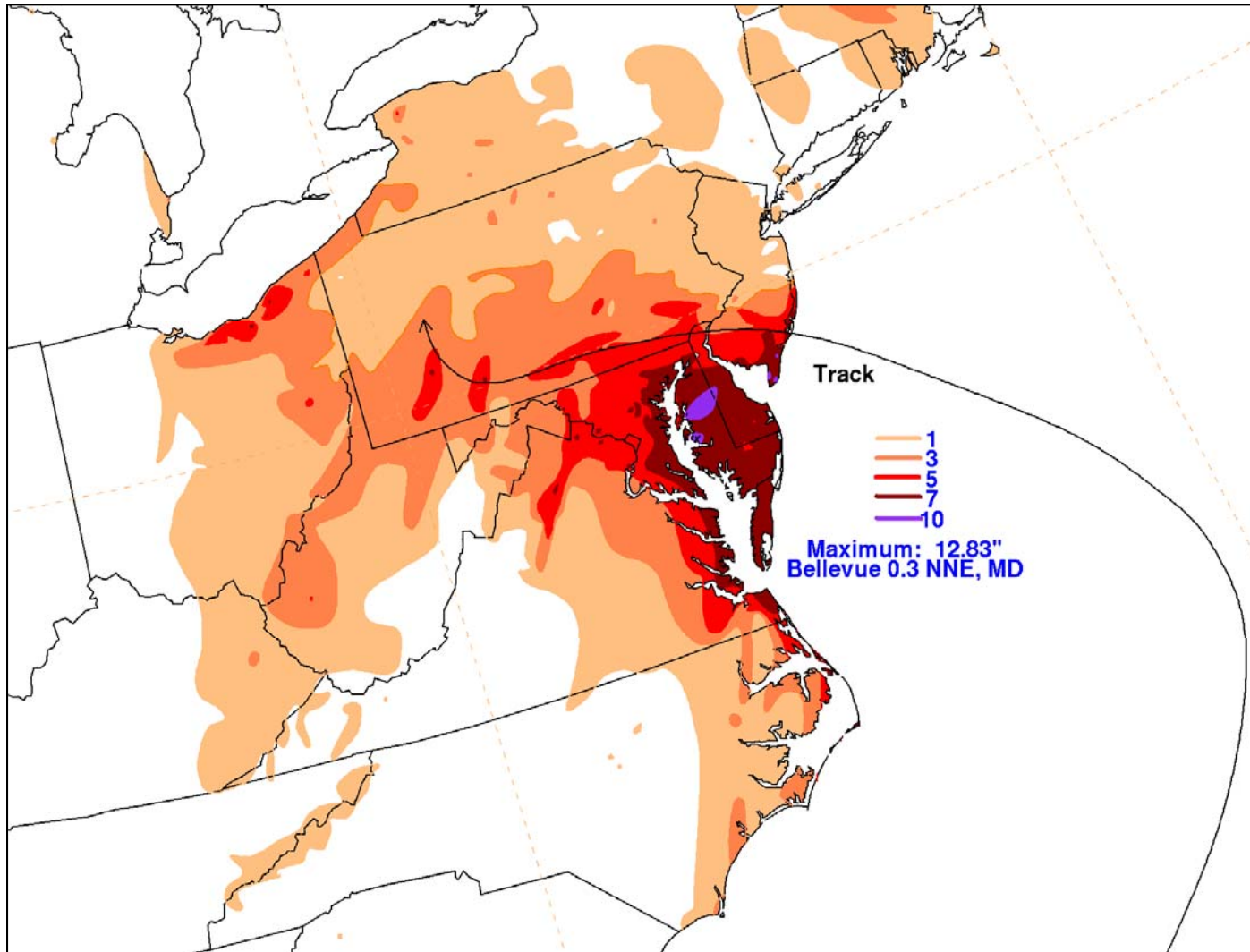


Figure 26. Rainfall (in inches) associated with Hurricane Sandy and its extratropical remnants from 27-31 October 2012. Figure courtesy of the Hydrometeorological Prediction Center.

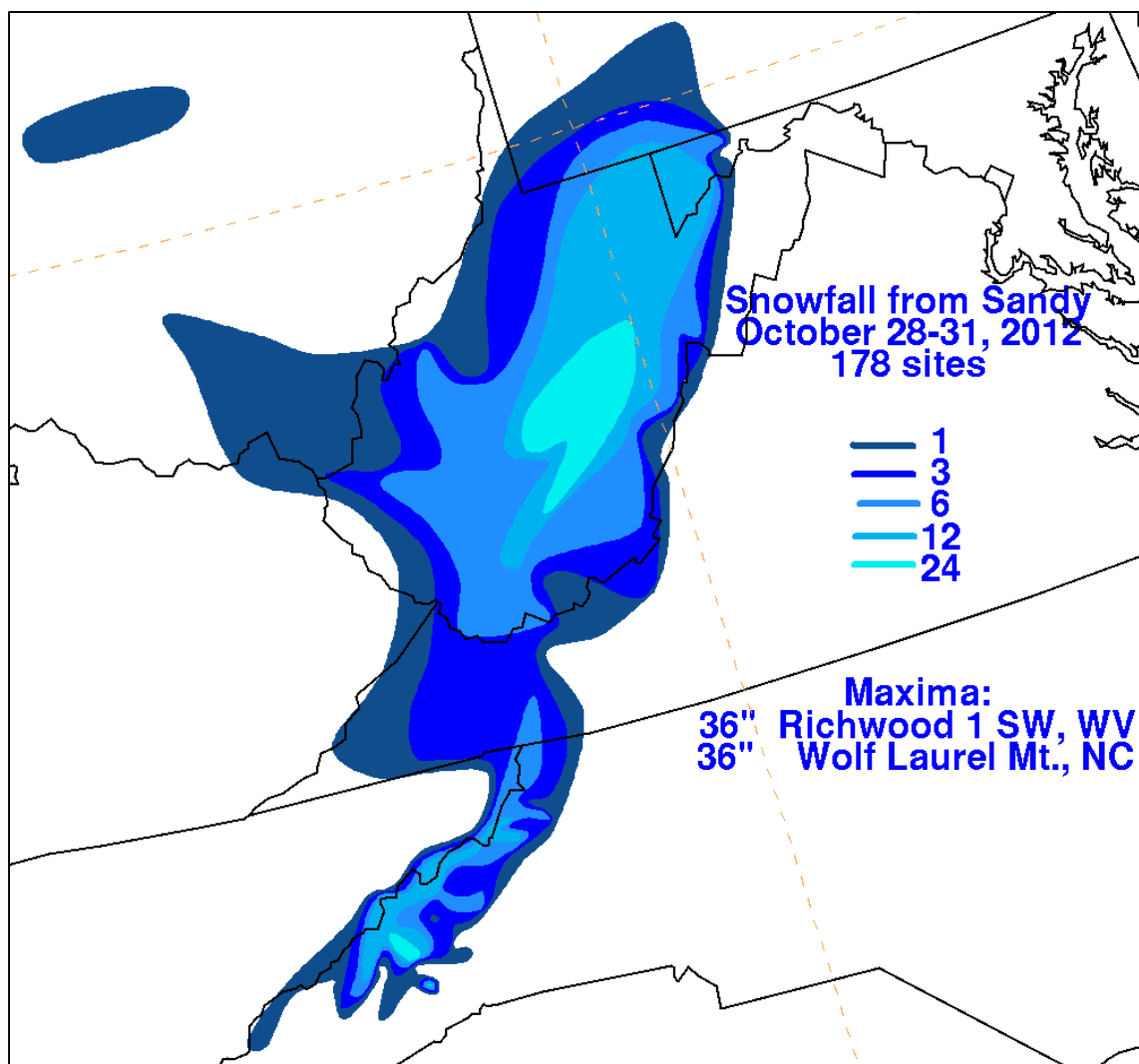


Figure 27. Snowfall (in inches) associated with Hurricane Sandy and its extratropical remnants from 28-31 October 2012. Figure courtesy of the Hydrometeorological Prediction Center.





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.

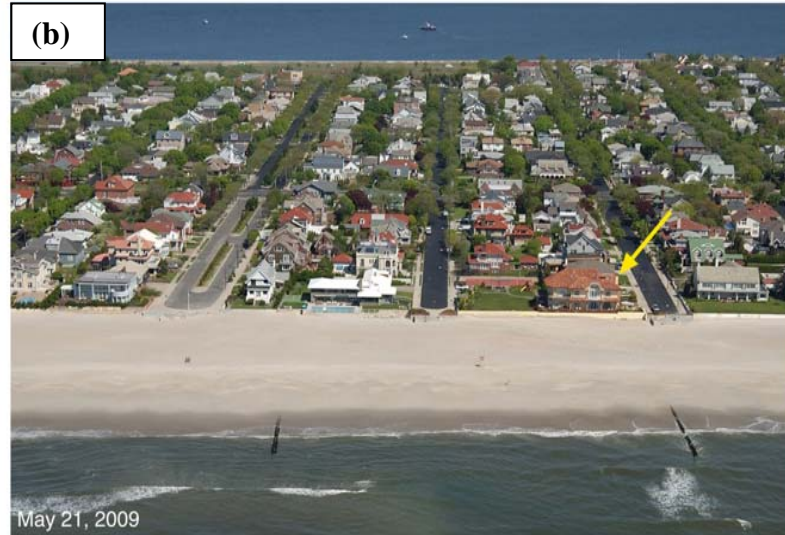


Figure 29. (a) Before and after images of a portion of the coast in Mantoloking, NJ, showing the effect of storm surge flooding. (b) Before and after image of a portion of the coast near Rockaway, New York, in Queens County, showing the inland extent of storm surge flooding. All images are courtesy of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

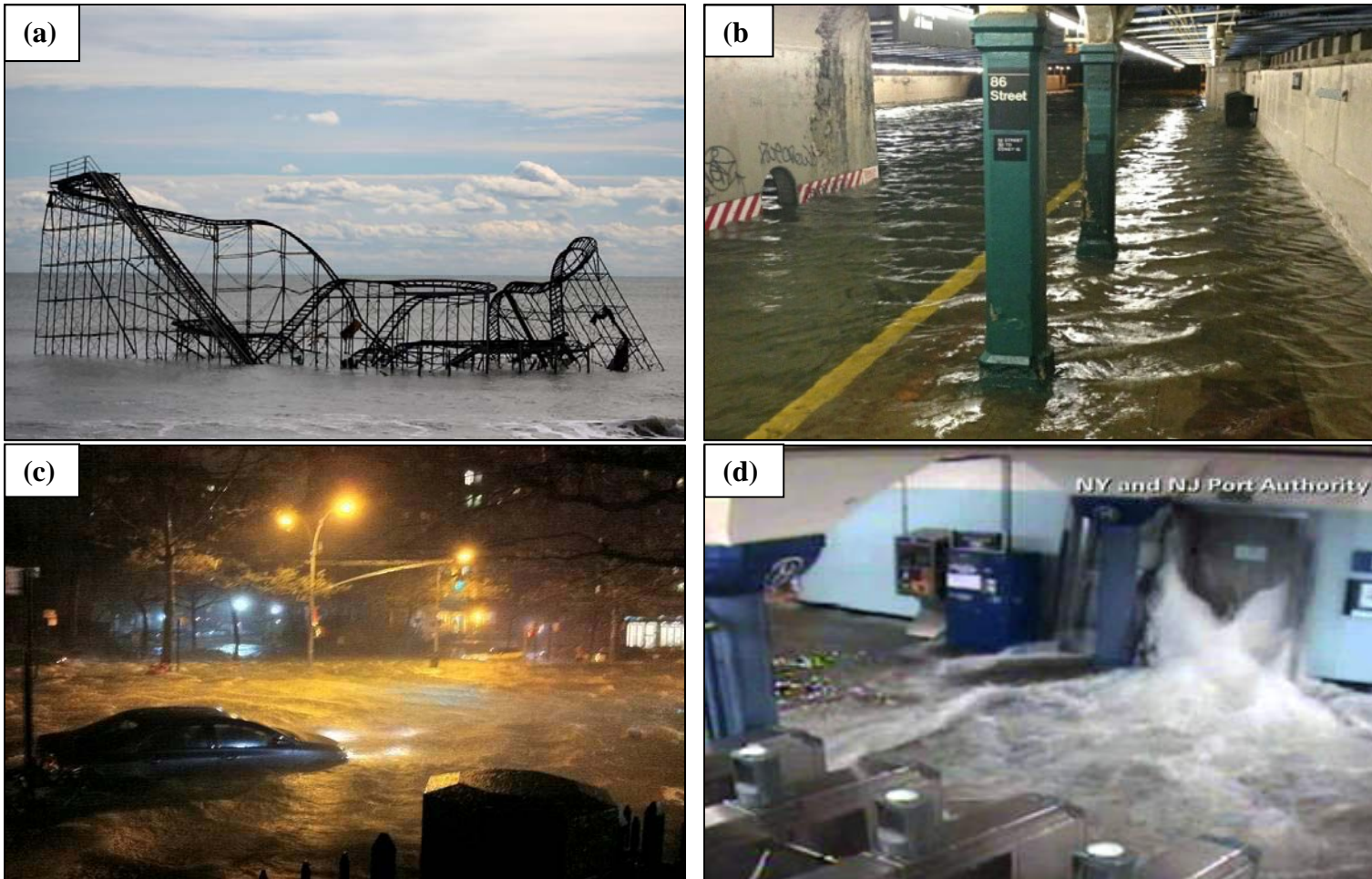


Figure 30. a) Image of a rollercoaster sitting in the Atlantic Ocean in NJ after the Fun Town pier it sat on was destroyed by the storm surge associated with Sandy (*courtesy of Getty Images*), b) photo showing the Lexington Avenue subway station flooded during Sandy (*courtesy Wzohaib/Flickr*) c) storm 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*).

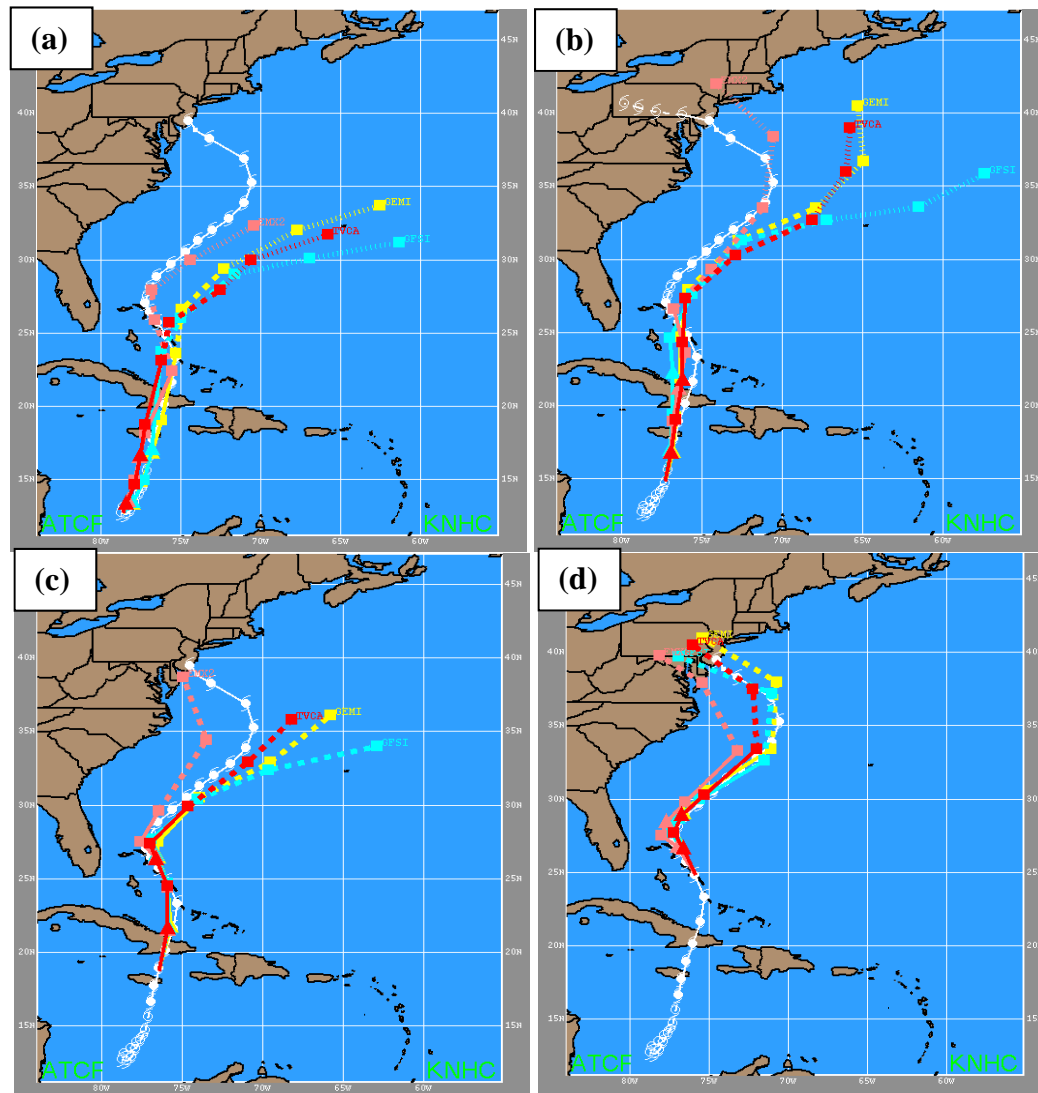


Figure 31. Model forecast tracks for Sandy at 0000 UTC 23 October (a), 0000 UTC 24 October (b), 0000 UTC October 25 (c), and 0000 UTC 26 October (d). Solid color lines are the forecasts through 72 h, while dashed lines are from 72-120 h, and dotted lines represent the 120-168 h forecasts (top panels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

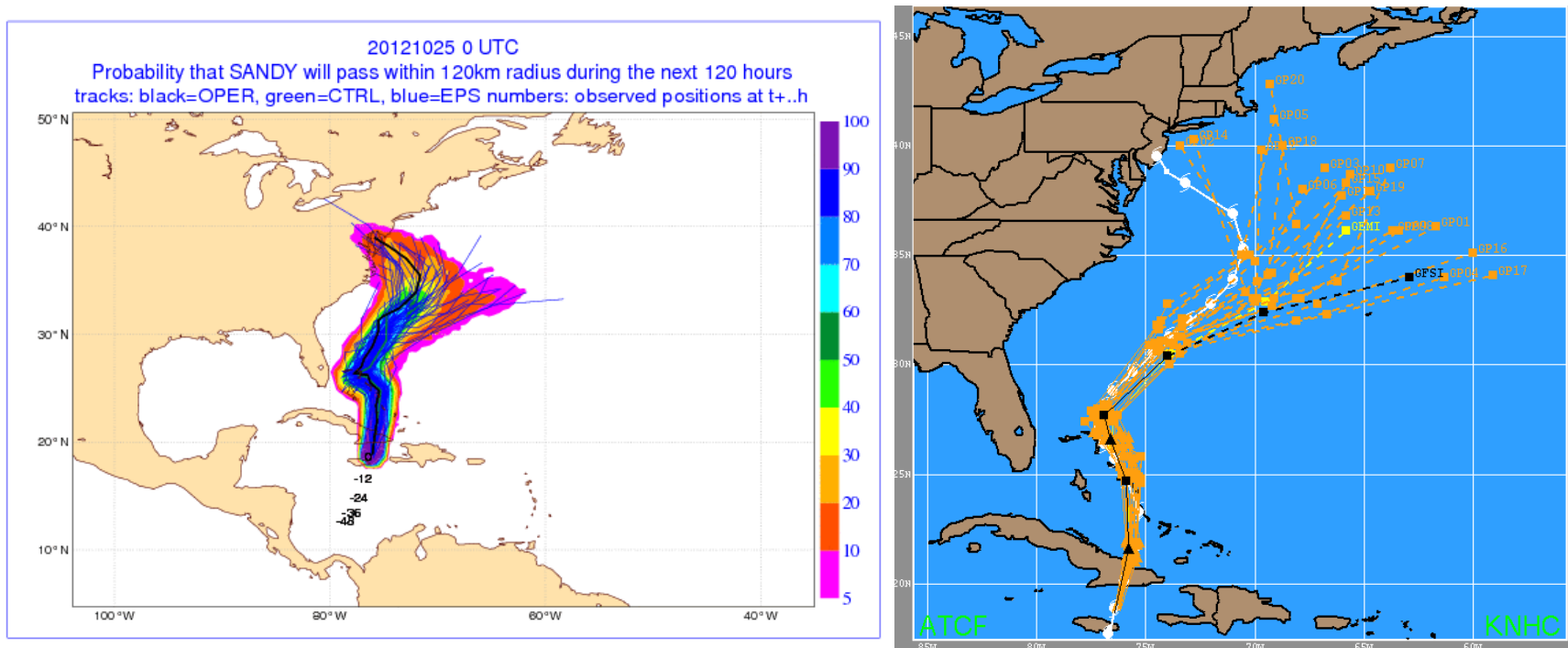


Figure 32. Five-day ECMWF ensemble tracks and probabilities (left) and GFS ensemble tracks (right) in orange issued 0000 UTC 25 October 2012. Note that a majority of ECMWF ensemble members showed a threat to the United States, while most of the GFS ensemble members were well out to sea (with the deterministic 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.