

Southeast Region: (Information provided by the Southeast Regional Climate Center)

- Temperatures across the Southeast were warmer than normal in October. The warmest areas were along a band from southern Alabama through the coastal plain of Georgia and northeast into South Carolina, with some stations observing temperatures as much as 6 degrees F (3.3 degrees C) above normal. The areas that were closest to normal were northern counties in Alabama and Georgia and inland areas of the Carolinas and Virginia. In the first ten days of the month, temperatures averaged as much as 14 F (7.8 C) warmer than normal, but colder air dominated the inland areas of the Southeast in the last two weeks of the month, offsetting some of the extremely high temperatures observed earlier in October. Temperatures in Puerto Rico were slightly below normal across the island in October. Many stations reported one of their warmest Octobers on record, including Key West, FL (1871-2018; tied for 1<sup>st</sup> warmest), Plant City, FL (1892-2018; 1<sup>st</sup> warmest), Brunswick, GA (1947-2018; 1<sup>st</sup> warmest), Tampa, FL (1889-2018; 2<sup>nd</sup> warmest), Orangeburg, SC (1953-2018; 2<sup>nd</sup> warmest), and Childersburg, AL (1958-2018; 3<sup>rd</sup> warmest). Key West (1871-2018) reported a monthly average temperature of 83.5 F (28.6 F), which tied for their all-time warmest October with 2007. West Palm Beach, FL (1888-2018) observed a mean temperature of 80.6 F (27.0 C), tied for second warmest October on record and surpassed only by the record of 80.9 F (27.2 C) set in 1911. Alma and Brunswick, GA (both 1948-2018) observed mean temperatures of 72.2 F and 75.1 F (22.3 C and 23.9 C) respectively, which were second only to the warmest October in 1985. Many stations reported temperatures greater than 90 F (32.3 C) well into October; a number of National Weather Service offices noted that these were the latest occurrences of over 90 F in any year for their locations. The highest temperature reached at any station in the Southeast in October was 99 F (37.2 C), observed at Eufaula Wildlife Refuge, AL on October 2, Marion Junction, AL on October 7, and Ponce, PR on October 19. The warmest weather across much of the region occurred on October 5-6, as a strong ridge of high pressure brought clear skies and sinking air to the region. Athens, GA reported a high of 95 F (35 C), and many other stations in Alabama, Georgia, South and North Carolina and Virginia also exceeded 90 F (32.3 C) on October 5-6, except near the coast and in the higher elevations. The warmest temperatures in central Florida occurred in the period from October 16 to 18, ahead of a cold front moving into the region from the northwest. Jacksonville, FL reported a temperature of 94 F (34.4 C) on October 17, and Tampa and Gainesville, FL both reported high temperatures of 93 F (33.9 C) during that period. The lowest temperatures of the month were reported in northern and higher elevation locations of Alabama, North Carolina and Virginia, with numerous stations falling below freezing. Blacksburg and Washington Dulles Airport, VA reached 27 F and 29 F (-2.8 C and -17 C), respectively, on the morning of October 22, as a modified arctic high pressure settled over the region. Asheville, NC reached 32 F (0 C), and Blairsville, GA reached 28 F (-2.2 C) the same morning and the observatory on Mount Mitchell, NC reached 15 F (-9.4 C). Other stations in mountainous areas observed minimum temperatures as low as 21 F (-6.1 C) on the morning of October 22. By comparison, the coldest temperature in Puerto Rico during the month was 55 F (12.8 C), which occurred on October 31 at the Arecibo Observatory.

- Precipitation across the Southeast was highly variable in October. In Puerto Rico, rainfall amounts were generally much lower than normal at most locations, such as Juncos (1931-2018; 22<sup>nd</sup> driest) with 5.05 inches (128 mm), which was 3.2 inches (81 mm) drier than normal. In spite of the dryness, the Drought Monitor showed a reduction in abnormally dry conditions by the end of the month. A few scattered locations in the Florida peninsula received less than 0.50 inches (xx mm) of rain during the month as high pressure dominated the region. Scattered areas in eastern NC and western AL also received less than 25% of normal rainfall. La Belle, FL (1929-2018; 3<sup>rd</sup> driest) reported only 0.17 inches (4.3 mm) of rain during October. Port St. Lucie, FL (1902-2018; 5<sup>th</sup> driest) received 0.90 inches (23 mm)

and Sylacauga, AL (1962-2018; tied for 5<sup>th</sup> driest) received 0.84 inches (21 mm). By comparison, a number of stations in the mountainous areas of western North Carolina and in the Florida Panhandle received over ten inches, mainly from precipitation associated with Hurricane Michael. The highest amounts of rain measured in October occurred along the path of Hurricane Michael, as it made landfall near Mexico Beach, FL on October 10 and moved to the northeast. The highest rainfall in Florida in October was measured at Lynn Haven at 13.58 inches (345 mm); of that, 11.62 inches (295 mm) was observed in a 24-hour period ending on the morning of October 11. The highest rainfall in Georgia was an estimated 11.95 inches (304 mm) east of Fort Gaines, which included 11.11 inches (282 mm) on the morning of the 11<sup>th</sup>. The observer there noted that the hurricane-force winds blew the rain almost horizontally, suggesting that actual rainfall was greater. The highest rainfall in the Southeast was reported at Black Mountain, NC, where the observer reported 16.21 inches (412 mm) in October, including 12.81 inches (325 mm) from October 10 to 13. Mount Mitchell, NC (1980-2018; 4<sup>th</sup> wettest) reported 13.04 inches for the month, and Danville, VA (1945-2018; 1<sup>st</sup> wettest) reported 8.29 inches (211 mm), with 6.00 inches reported on October 11, the wettest one-day rainfall on record. Columbia, SC (1887-2018) reported 4.45 inches (113 mm) on the same date, the 14<sup>th</sup> wettest one-day period for that station. Rivers along the path of Michael experienced major flooding following the heavy rain, including sites in Florida, Georgia, South and North Carolina and Virginia. Water rescues were undertaken in several locations, and four people drowned in Virginia, including a firefighter, as flood waters washed them away. At least 1,200 roads were closed in Virginia due to a combination of high water and downed trees from Hurricane Michael.

- There were 36 severe weather reports across the Southeast in October, which is 77% of the median monthly frequency of 47 reports during 2000-2016. There were no hail reports during October. Nearly all of the severe weather reports were associated with the passage of Hurricane Michael across the region on October 10-12, but West Palm Beach did report a thunderstorm wind gust of 54 mph (24.1 m/s) on October 8, and Key West reported a gust of 56 mph (25.0 m/s) on the same day while the storm was still developing to the south. Widespread damage occurred from Michael, as the center of circulation passed over the Southeast. Fourteen confirmed tornadoes were reported by National Weather Service Forecast Offices in the path of Michael, as it moved northeastward across the region, including 3 in Georgia, 4 in South Carolina and 7 in Virginia. This is about 127% above the October median frequency of 11 tornadoes observed from 2000 to 2016. An EF-1 tornado in Norge, VA caused \$1.8 million in damage to 32 homes. Hurricane Michael attained peak winds of 155 mph (69.3 m/s), as it made landfall near Mexico Beach, FL on October 10, becoming the first system to do so in the region as a Category 4 hurricane. A maximum wind gust of 129 mph (57.7 m/s) was measured at Tyndall Air Force Base near the point of landfall. When Michael hit land, it had a central pressure of 919 mb (hPa; 27.14 inHg), the most intense landfalling U. S. Hurricane since Camille in 1969 and the second-most intense hurricane to hit Florida by pressure after the 1935 Labor Day Hurricane. Catastrophic damage occurred along the Florida coast at Mexico Beach and Panama Beach due to the extreme winds and storm surge. The 9 to 14 feet (2.7 to 4.3 m), storm surge wiped out nearly every structure along the coast near the point of landfall. The storm tracked northeast across southwest Georgia as a major hurricane and weakened to a tropical storm early in the morning on October 11 just south of Macon, GA. The highest gust reported in Georgia was 115 mph (51.4 m/s) by a University of Georgia weather station at the Donalsonville airport near the border with Alabama and Florida. Michael then continued over South and North Carolina and parts of Virginia before transitioning to an extra-tropical cyclone off the East Coast. By October 31, an estimated 45 deaths were attributed to Michael in the United States alone, and many people were still unaccounted for. Utility companies estimated that over 3.1 million people were affected by loss of power due to the storm, with a peak outage of 1.6 million customers at 3 AM on October 12. Michael caused an estimated \$11.2 billion losses in all, including \$6 million in destroyed

fighter jets at Tyndall Air Force Base, close to \$2 billion in insured losses to buildings and businesses, and up to \$6 billion in agricultural losses across the region, including the loss of 4 million acres of timber worth well over \$2 billion in Florida and Georgia alone.

- Dry conditions were found in many areas not affected by Hurricane Michael during the month of October. An area of abnormally dry conditions expanded by the end of the month in Georgia and Alabama, as the absence of rain and the warm temperatures increased evaporation rates in the first two weeks. Rainfall from Hurricane Michael reduced dry conditions along the path of the storm but led to tremendous damage to agriculture, including livestock, timber, crops and the infrastructure needed to support agriculture, including storage facilities and barns. Damage to agriculture in Florida, Alabama and Georgia was particularly extensive because the storm hit at peak harvest time for many crops. Georgia was the worst hit, with an estimated \$4 billion in agricultural losses. These losses included \$1 billion in the loss of pine plantations and another \$500 million in losses to pecan production and the loss of many orchards that were flattened by the strong winds. Cotton production in many fields was a complete loss, as the fields had already been defoliated for harvest and were swept clean by the high winds. Losses in Alabama were estimated at \$204 million, led by losses in cotton at \$108 million. Florida's agricultural losses were estimated at \$1 to 2 billion, including the loss of over 3 million acres of timber valued at \$1.3 billion and crop losses of \$158 million. Cotton along the path of the storm in Florida was considered nearly a total loss. Peanuts fared better than other crops since they were still in the ground in many fields. However, farmers were concerned about loss from over-mature plants, since the peanuts are more likely to separate from the plants when over-ripe. Another concern was the loss of storage for the peanuts, since many peanut facilities were destroyed by Hurricane Michael, leaving a shortage in grading and storage sheds. The total economic impact from the storm is likely to be much higher than the direct costs listed here, since many farmers lost their entire crops and, in some cases, houses and barns, and those farmers may be forced to stop farming after the total loss of their livelihood.