

NOAA: 2011 a year of climate extremes in the United States

NOAA announces two additional severe weather events reached \$1 billion damage threshold, raising 2011's billion-dollar disaster count from 12 to 14 events

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Selected Annual Climate Records for 2011 - Green dots show the wettest, yellow dots the driest, red dots the warmest and blue dots the coolest records.

High Resolution (Credit: NOAA)

According to NOAA scientists, 2011 was a record-breaking year for climate extremes, as much of the United States faced historic levels of heat, precipitation, flooding and severe weather, while La Niña events at both ends of the year impacted weather patterns at home and around the world.

NOAA's annual analysis of U.S. and global conditions, conducted by scientists at NOAA's National Climatic Data Center, reports that the average temperature for the contiguous U.S. was 53.8 degrees F, 1.0 degree F above the 20th century average, making it the 23rd warmest year on record. Precipitation across the nation averaged near normal, masking record-breaking extremes in both drought and precipitation.

On a global scale, La Niña events helped keep the average global temperature below recent trends. As a result, 2011 tied with 1997 for the 11th warmest year on record. It was the second coolest year of the 21st century to date, and tied with the second warmest year of the 20th century.

Key highlights of the report include:

U.S. weather and climate disasters

- NOAA has identified two additional events in 2011 that caused an economic impact of \$1 billion or greater, bringing the total number of major billion-dollar weather and climate disasters to 14 (not including the pre-Halloween snowstorm in the Northeast, which is still being analyzed).



From extreme drought, heat waves and floods to unprecedented tornado outbreaks, hurricanes, wildfires and winter storms, a record 14 weather and climate disasters in 2011 each caused \$1 billion or more in damages — and most regrettably, loss of human lives and property.

High Resolution (Credit: NOAA)

- Tropical Storm Lee, which made landfall on the Gulf Coast on September 2, caused wind and flood damage across the Southeast, but considerably more damage to housing, business and infrastructure from record flooding across the Northeast states, especially Pennsylvania and New York. The storm occurred in an area that had experienced high rainfall from Hurricane Irene barely a week earlier.
- A Rockies and Midwest severe weather outbreak, which occurred July 10-14, included tornadoes, hail and high winds. Much of the damage was from wind, hail, and flooding impacts to homes, business, and agriculture.
- Together, these two events resulted in the loss of 23 lives (21 from Tropical Storm Lee, 2 from the Rockies/Midwest outbreak).

Nationally

- Warmer-than-normal temperatures were anchored across the South, Mid-Atlantic and the Northeast. Delaware had its warmest year on record, while Texas had its second warmest year on record. The U.S. has observed a

long-term temperature increase of about 0.12 degrees F per decade since 1895.

- Summer (June-August) 2011 was the second warmest on record for the Lower 48, with an average temperature of 74.5 degrees F, just 0.1 degree F below the record-warm summer of 1936. The epicenter of the heat was the Southern Plains, where Louisiana, New Mexico, Oklahoma and Texas all had their warmest summer on record. The 3-month average temperatures for both Oklahoma (86.9 degrees F) and Texas (86.7 degrees F) surpassed the previous record for warmest summer in any state.
- With the exception of Vermont, each state in the contiguous U.S. had at least one location that exceeded 100 degrees F. Summertime temperatures have increased across the U.S. at an average rate of 0.11 degrees F per decade. Much of this trend is due to increases in minimum temperatures (“overnight lows”), with minimum temperature extremes becoming increasingly commonplace in recent decades.
- Despite a “near normal” national precipitation average, regional precipitation outcomes varied wildly. Texas, ravaged by exceptional drought for most of 2011, had its driest year on record. In contrast, seven states in the Ohio Valley and Northeast — Connecticut, Indiana, Kentucky, New Jersey, New York, Ohio, and Pennsylvania — had their wettest year on record.
- The past nine years have been particularly wet across the Northeast region - since 2003, the annual precipitation for the region is 48.96 inches, 7.88 inches above the 20th century average. Precipitation averaged across the U.S. is increasing at a rate of about 0.18 inches per decade.
- Precipitation extremes and impacts were most prevalent during spring (March - May) 2011. Across the northern U.S., ten states were record wet, and an additional 11 states had spring precipitation totals ranking among their top ten wettest. These precipitation extremes, combined with meltwater from a near-record snow pack, contributed to historic flooding along several major rivers across the central United States.
- Meanwhile, drought rapidly intensified in the southern Plains, where Texas had only 2.66 inches of precipitation, its driest spring on record. This led to record breaking drought and wildfires, which devastated the southern Plains. Following 2010, during which drought across the country was nearly erased, the 12 percent of the continental U.S. in the most severe category of drought (D4) during July 2011 was the highest in the U.S. Drought Monitor era (1999-2011).
- The spring brought a record breaking tornado season to the United States. Over 1,150 tornadoes were confirmed during the March-May period. The 551 tornado-related fatalities during the year were the most in the 62-year period of record. The deadliest tornado outbreak on record (April 25-28th) and the deadliest single tornado (Joplin, Missouri) contributed to the high fatality count.

Globally

- This year tied 1997 as the 11th warmest year since records began in 1880. The annual global combined land and ocean surface temperature was 0.92 degrees F above the 20th century average of 57.0 degrees F. This marks the 35th consecutive year, since 1976, that the yearly global temperature was above average. The warmest years on record were 2010 and 2005, which were 1.15 degrees F above average.
- Separately, the 2011 global average land surface temperature was 1.49 degrees F above the 20th century average of 47.3 degrees F and ranked as the eighth warmest on record. The 2011 global average ocean temperature was 0.72 degrees F above the 20th century average of 60.9 degrees F and ranked as the 11th warmest on record.
- Including 2011, all eleven years of the 21st century so far (2001-2011) rank among the 13 warmest in the 132-year period of record. Only one year during the 20th century, 1998, was warmer than 2011.
- La Niña, which is defined by cooler-than-normal waters in the eastern and central equatorial Pacific Ocean that affects weather patterns around the globe, was present during much of 2011. A relatively strong phase of La Niña opened the year, dissipated in the spring before re-emerging in October and lasted through the end of the year. When compared to previous La Niña years, the 2011 global surface temperature was the warmest observed.
- The 2011 globally-averaged precipitation over land was the second wettest year on record, behind 2010. Precipitation varied greatly across the globe. La Niña contributed to severe drought in the Horn of Africa and to Australia's third wettest year in its 112-year period of record.
- Arctic sea ice extent was below average for all of 2011, and has been since June 2000, a span of 127 consecutive months. Both the maximum ice extent (5.65 million square miles on March 7th) and the minimum extent (1.67 million square miles on September 9th) were the second smallest of the satellite era.
- For the second year running, NCDC asked a panel of climate scientists to determine and rank the year's ten most significant climate events, for both the United States and for the planet, to include record drought in East Africa and record flooding in Thailand and Australia. The results are at <http://www.ncdc.noaa.gov/climate-monitoring>.

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