

Blizzard the century

[Science](#), [Astronomy](#)



Blizzards, the most dangerous of all winter storms are characterized by 20 degrees Fahrenheit and winds of at least 35 miles per hour. Along with low temperatures and wind, blizzards also bring in heavy snowfall (Blizzards, 1999). The second week of March 1993 is a significant date in the history of the Eastern United States because it is the day when it was struck by one of the most intense blizzards ever known. Record low pressures, wind speeds, low temperatures and snowfall amounts guaranteed that this storm would win the title " Storm of the Century" even while it lasted.

Later, it came to be referred to as " Superstorm '93" or " The 1993 Superstorm" (Wendland, 1993). This was a highly devastating storm that killed over 250 people and resulted in the canceling of almost 25% of the United States flights for two days. It simultaneously affected the lives of 130, 000, 000 people in the United States. While it may not be the worst storm ever, it did affect a large area. On the Saffir-Simpson hurricane scale it would have been a category 3. The storm affected 26 states and 50% of the US population. Formation:

From March 12th to the 15th, 1993, the blizzard of the century caused huge damage to the Eastern United States. According to computerized information from the National Weather Service, an intense winter storm was beginning to form and grow significantly in the Gulf of Mexico. It was found that the storm was the outcome of three different atmospheric disturbances: a major cluster of thunderstorms in the Gulf of Mexico, a band of snow and rain from the Pacific, and gusty winds with light snow from the Arctic Circle (Sander and Conner, 2006). Weather forecasters described the phenomenon as a " disorganized area of low pressure".

As they observed it closely, they predicted that a terrible storm can bubble up from the Gulf of Mexico, if the low pressure area happens to meet colder air over the northern areas of the United States. This happened very soon. The low pressure area was met by an arctic high pressure system in the Midwestern Great Plains, brought into the mid-latitudes by an unusually steep southward jet stream. When the powerful high-pressure system entered the Great Plains through the unusually southward polar jet stream, the cold weather moved into the eastern part of the United States naturally.

Because of this temperatures dropped to below freezing point of water and snow fall occurred. A cyclonic low pressure system that happened to be spinning directly to the south of Nova Scotia added to the low temperatures and snowfall and this set the stage for the truly fearsome storm. By Thursday, March 12th, the storm became very perceptible on the Florida coast due to its high winds, tornadoes and a storm surge twelve feet above normal. The next day, the storm moved across the southeastern states, leaving destruction and total chaos all along its path and paralyzing Eastern Kentucky (Sander and Conner, 2006).

Description: The storm caused wide and varied effect across the nations. There were thunderstorms in Texas. Usually, Texas has only rain and not much snow. The blizzard of 1993 brought to Texas in March, a lot of snow fall. In the state of Florida the barometric pressure dropped to record lows, and as the thunderstorms swept across the state, eleven tornadoes claimed seven lives. A mild snowfall began over upstate New York and New England between 6: 00 and 7: 00 am Saturday, March 13. This increased in intensity and soon the blizzard raced through the Mid Atlantic states.

Snowflakes the size of a person's fist was reported for a time with the passage of one of the thunder snow bands at Bridgeport, CT (UCAR, 2006). Due to the combination of heavy snow and high winds, there was zero visibility at most places. New York and the six New England States all declared disaster emergencies during the height of the storm. Most of the major roads were closed to travel and these included the Northway, I-88, Thruway, and Massachusetts turnpike. Secondary roads were already blocked by snow.

Almost all airports were shut down. Snow piled up to record levels for many cities in the Northeast (UCAR, 2006). Impact of the Blizzard: The blizzard of 1993 was one that broke many records in the history of Kentucky, through the amount of snowfall and size. The travel department was the most affected and over 4, 000 motorists were stranded. To cope with this crisis situation, emergency shelters were set up over much of Eastern Kentucky. High school gyms and public facilities were opened up for stranded people to sleep in.

The National Guard was brought in for their services in order to clear roads, and to open twenty armories as additional shelters for motorists. There needed to be immediate disaster relief. Public Works met this challenge by plowing and removing snow, salting streets and checking for icy conditions (PPW, 2006). Crews worked around the clock to restore safe driving conditions, and Pittsburgh streets quickly returned to normal (PPW, 2006). Record low temperatures were predominant in the land area stretching from the Gulf Coast to Maine. Every major airport along the east coast was forced to close.

Homes also fell into the sea or received damage by wind or waves on the west coast of Florida, along the outer banks of North Carolina, and on Long Island. Fallen tree limbs and power lines left 3 million people along the storm's path in the dark (Sherman, 2006). The blizzard caused dramatic weather changes in many places such as Birmingham, Alabama, Atlanta, Georgia, and Chattanooga, Tennessee which were buried by paralyzing snows and frozen by unseasonable cold. The severe cold following the storm preserved much of the snow, prolonging travel nightmares for a couple days over the south where most roads were never plowed.

The combined effects of high wind and heavy wet snow downed thousands of miles of power lines leaving millions of people in the dark for up to a week in some cases over the south. Tornadoes struck Tennessee and Ohio valleys, as well as the Appalachians on Friday night March 12 (UCAR, 2006). The tornadoes along with highly powerful straight line winds from the parent severe thunderstorms, and the massive storm surge along the west coast, inflicted millions of dollars in property damage. During the peak of the storm, roughly 1/3 of the country was simultaneously being affected by harsh winter weather.

Insurance claims from Texas to Maine tallied damage estimates in the billions of dollars. The toll in human life was extensive. Approximately 285 fatalities nationwide can be directly attributed to the storm. The psychological impact in the Southern states, where average high temperatures in March tend to run into the 60s Fahrenheit, was magnified by the fact that it struck a week before spring. A NASCAR event at Atlanta Motor

Speedway had to be postponed a week due to the storm. Many factory roofs collapsed due to weight of the snow.

Snowdrifts on the leeward sides of buildings resulted in the falling of poorly anchored decks in houses. Many people had to be rescued from the Appalachians and many of them were on the Appalachian trail, or visiting cabins and lodges in remote locales. Boone, North Carolina was surprised by 24 hours of sub zero temperatures along with storm winds, which gusted as high as 110 miles per hour. Electricity was not restored to many isolated rural areas for a week or more. Farther to the South, numerous super cells developed over the state of Florida, leading tornadoes and lightning strikes.

Impact Data:

This blizzard was the largest in terms of the area it affected. More than half of the country's population in twenty-six different states was affected by the blizzard of 1993. 44 deaths in Florida were attributed either to the tornadoes or other severe weather (Lott, 1993). During the storm, school activities and government services in 30 counties were affected. In fact 73 out of Kentucky's 120 counties were found to be eligible for reimbursement for the cost of emergency snow removal. The massive March 1993 blizzard killed five people in Kentucky and over 270 people nationwide (Lott, 1993).

The damage costs exceeded 1.6 billion dollars. Hence, the blizzard of 1993 became the fourth costliest storm in U. S. history. At least 18 homes fell into the sea on Long Island due to the pounding surf. About 200 homes along North Carolina's Outer Banks were damaged and may be uninhabitable. Over 160 people were rescued at sea by the Coast Guard in the Gulf of Mexico and Atlantic. At least 1 freighter sank in the Gulf of Mexico (Lott, 1993).

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Scientific Data: The storm stretched from Canada to Central America. But the main impact was felt in the Eastern United States and Cuba.

Areas as far south as Atlanta, Georgia received 5 to 50 inches (13 to 130 cm) of snow, accompanied by hurricane-force wind gusts and record low barometric pressures. Prior to the storm, the record for a single day's snowfall had been 18 inches in Kentucky. This snowfall covered most of Eastern and Southeastern Kentucky with about 30 inches of snow. London, Kentucky measured a depth of 22 inches, while Jackson and Closplint both had 20 inches of snow on the ground. The maximum snowfall was measured at Perry County - 30 inches.

Powerful winds raged across Kentucky blocking any kind of relief effort put up by people. Winds up to 43 miles per hour were recorded in Pike Co. , and a 30-mph clip blew over much of the state. The heavy snows, coupled with high winds created large snow drifts - 8-10 feet in many places such as Pikeville and London - over roads and highways. I-75 from Lexington to the Tennessee border was shut down for two days, as was I-64 from Lexington eastward. All state and federal highways south of I-64 and east of I-75 were also closed.

The maximum snow depth recorded from the blizzard was 56 inches on Mt. Leconte in Tennessee. Millions of people woke up to snowfalls as deep and frequently deeper than 3 feet (1 meter), and in places high winds had heaped drifts to depths of 30 feet (9. 5 meters). It was later measured that the snowfall put down by the storm was nearly 12. 91 cubic miles (53. 96 cubic kilometers). As the storm moved northward, it became stronger and stronger and caused severe drops in pressure. The barometric pressure in

parts of New England dropped to record low levels - 28.35 inches Hg (960 mb).

Such low reading is usually seen only in the centers of extraordinarily strong hurricanes. Across many parts of New England, temperatures on the worst blizzard day (March 13, 1993) failed to exceed 14°F (-10°C), which was an unusual phenomenon in this region. Birmingham recorded a record low of 2 degrees Fahrenheit during the storm. Fifteen tornadoes in Florida killed 44 while 6 inches of snow fell on the Florida Panhandle. Mount LeConte in Tennessee received 56 inches of snow. 43 inches fell at Syracuse, NY, 27 in Albany, NY, 20 inches at Chattanooga, TN, 16 in Roanoke, VA.

Winds over 100 were reported on the Dry Tortugas (west of Key West, FL), in North Carolina on Flattop Mountain while winds over hurricane force were reported from Louisiana and Florida to New York and New England (Sherman, 2006). The storm also set records for snowfall in places such as Birmingham, Alabama, where 33 centimeters fell, and Cooperstown, New York, which had 71 centimeters. Powerful winds that were stronger than many hurricane forces smashed the Gulf coast, Appalachians, and eastern seaboard. Equipment on oil drilling platforms off the Louisiana coast measured the wind power as close to 99 mph on Friday evening, March 12.

Winds estimated up to 120 mph blasted the Florida west coast early Saturday, March 13, producing a six to ten foot storm surge. Winds up to 100 mph were measured over the mountains of North Carolina Saturday afternoon, March 13. And, 81 mph winds measured at Boston's Logan International airport Saturday evening, March 13, closed the facility and

aided in the shut down of the city. Snowfall Records: The incredible data can be summarized as follows (UCAR, 2006):

1. 35. 6 inches of snow in twenty four hours (10am Saturday - 10am Sunday.)
2. The previous record was 27. 2 inches set in January 1925.
3. 22. 1 inches of snow on Saturday, March 13, breaking the old snowfall record for that date which was 4. 1 inches set in 1961.
4. 19. 9 inches of snow on Sunday, March 14, breaking the old snowfall record for that date which was 8. 6 inches set in 1956.
5. Seasonal snowfall by March 14 measured 174. 8 inches making the 1992-'93 season the snowiest on record, breaking the old record of 166. 9 inches set in the winter of 1991-'92
6. March snowfall totaled 49. 3 inches as of March 14 making March 1993 the snowiest on record at Syracuse breaking the old record of 41.

4 inches set in 1932. Thunderstorms and Lightning: On Saturday morning, March 13, 1993, people in the Eastern United States heard the raging sound of strong wind and the crashing sounds of thunder. They could see flashes of light amidst heavy blowing snow. They were perplexed. How could there be thunder and lightning in the middle of a blizzard. Although it is an unusual occurrence, thunderstorms can accompany a snowstorm. This weather phenomenon is known as thundersnow. Snow falls are produced when warm rising moist air meets too cold air close to the earth's surface.

Most snowstorms do not produce thunder and lightning because the dynamics in the atmosphere are not unstable enough to create this interesting phenomenon. Only an extremely powerful winter storm system, if

accompanied by intensely cold air in the upper regions of the troposphere, can produce thundersnow. The blizzard of 1993 also produced an unusually large number of lightning flashes - up to 5000 an hour. Richard Orville, of Texas A & M University, has studied this blizzard lightning (Orville, 1993)), examining data from a network of magnetic direction finders.

These devices were used to record the characteristics of lightning flashes from cloud to ground across the US. Each of the flashes recorded in Orville's survey was reported by at least two direction finders within 600 kilometers of the flash. At this range, the detectors can distinguish between flashes carrying negative charge downwards, which accounts for most of them, and those carrying positive charge downwards which produce the remaining 13 per cent. There was maximum lightning near Florida, probably because of the warmth of the waters of the Gulf Stream.

Overall, the storm produced 59 000 cloud-to-ground flashes, with a peak of 5100 flashes an hour and a maximum density of strikes of 0. 16 per square kilometer just south of Tampa, Florida. Orville in the New Scientist, dated 11 September 1993 said: " The reasons for the high flash rates [and] the apparent rapid cessation of cloud-to-ground lightning as the storm propagated north of the Carolinas is still to be determined. " Subtropical Derecho: In addition to the blizzard, a serial derecho occurred in the U. S. state of Florida on March 12 and 13, 1993.

The derecho moved into Florida and Cuba around midnight on March 13 and moved out of Cuba just before sunrise. During its stay, the derecho resulted in ten tornadoes one of which killed three people when it struck a home. In Cuba wind gusts ranged between 100 to 130 mph according to a research <https://assignbuster.com/blizzard-the-century/>

team from the Institute of Meteorology of Cuba. The derecho resulted in 10 deaths in Cuba and caused US\$1 billion in damage in Cuba alone (Wikipedia, 2006). The Human Angle: Media reporting on the Blizzard of 1993 have helped to keep the memories of that historical day alive.

"... The Blizzard of '93 is about to commence ... All preparations should have been made ... I wonder what the forecaster who sat here 105 years ago today [was thinking]. " - Warren Snyder, Senior Forecaster for the National Weather Service Office in Albany, New York typed these words in his early morning state forecast discussion on March 13, 1993 (Smith, 2006). Eric Thomas on WBTV-Charlotte declared that "... this may not be just the storm of the century... but the strongest storm in the history of mankind.

" The New York Times reported: " The Blizzard of 1993 became a blizzard in the metropolitan region during a three-hour stretch at midday yesterday when visibility dropped below a quarter of a mile from falling and blowing snow and winds blew at least 35 miles an hour" (NYT, 1993) Apart from media reporting, citizens have also shared their experiences on that historic day. Emily Flowers remembers marching in the St. Patrick's parade of 1993 with the Brashear High School marching band. She recollects that there was really no one to witness the parade and the marchers were covered in snow by parade's end.

She was then stuck up at her boyfriend's house for three days. Terry Griffith recollects that on that stormy day, " the busses and streetcars stopped running. The taxi cabs stopped service. The parkway and all ways out of the city were closed. All the hotels were booked and if you were still downtown by 4 pm you were really stuck" (Griffith, 2006). Conclusion: The Blizzard of

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1993 was truly the Storm of the Century in terms of its intensity, area covered and record snowfalls. Such natural disasters as the blizzard of 1993 awaken man to his own vulnerability in the face of nature's immense powers. These disasters also enable the growth of science and help in bringing mankind together to study, understand and learn coping strategies for the future.

Bibliography:

1. Lott, Neal (1993). The Big One! A Review of the March 12-14, 1993 " Storm of the Century".
2. National Climatic Data Center: Research Customer Service Group. May 14, 1993. <ftp://ftp.ncdc.noaa.gov/pub/data/techrpts/tr9301/tr9301.pdf> PPW (2006).
3. Blizzard of 1993. Pittsburgh Public Works. http://www.city.pittsburgh.pa.us/pw/html/blizzard_of_1993.html Griffith, Terry (2006). The Pittsburgh St.
4. Patrick's Day Parade remembers the blizzard of 1993. <http://www.pittsburghirish.org/parade/Blizzard/index.htm>. Orville, E. Richard (1993). Cloud-to-ground lightening in the blizzard of 1993.
5. Geophysical Research Letters, Volume 20, Issue 13, p. 1367-1370. <http://adsabs.harvard.edu/abs/1993GeoRL..20.1367O> Sander, David and Conner, Glen (2006). Fact Sheet: Blizzard of 1993.
6. <http://kyclim.wku.edu/factSheets/blizzard.htm> Wendland, Wayne. Weather and Climate Impacts in the Midwest. March 1993: Midwestern Climate Center.

7. Vol. III, No. 4. "Blizzards". http://www.weather.com/breaking_weather/encyclopedia/winter/blizzard.html. (October 21, 1999).
8. Sherman (2006). Storm of the Century. <http://snrs.unl.edu/amet498/sherman/blizzard93.html> UCAR (2006). The Blizzard of 93. <http://eo.ucar.edu/webweather/blizzardstory.html> NYT (1993).
9. THE BLIZZARD OF '93; It Was, Indeed, Blizzard of '93. <http://query.nytimes.com/gst/fullpage.html?res=9F0CE3D81F39F937A25750C0A965958260> Smith, Tony (2006).
10. Storm of the Century. <http://www.valdostamuseum.org/hamsmith/thunderflood.html#blizzard> Wikipedia (2006).
11. 1993 North American Storm Complex. <http://en.wikipedia.org/wiki/The>