



## Climate and Weather in Ohio

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Learn about the elements and their impact on daily life.

### Background

Whereas climate refers to the average conditions of a place, weather refers to the current conditions—the state of the air with respect to heat or cold, wetness or dryness, calm or storm, clearness or cloudiness. Both are determined by latitude, elevation, prevailing air currents, and proximity to oceans and lakes.

Meteorology is the study of weather. Tools commonly used to measure conditions include:

- anemometer: wind force or speed
- barometer: pressure
- hygrometer: humidity
- rain gauge: precipitation
- thermometer: temperature
- Doppler radar: precipitation in the earth's atmosphere
- radiosonde: temperature, pressure, and moisture in the upper air
- computers: remote sensing units send data to be compiled and analyzed

For a century after the first Europeans settled in Ohio, weather observations were recorded almost exclusively by private individuals. During the last part of the 19<sup>th</sup> century, however, meteorology became the concern primarily of educational institutions and governments. In 1882, the Ohio General Assembly enacted legislation creating a state bureau of meteorology. Members of its first board of directors were T. C. Mendenhall, professor of physics at Ohio State University; W. I. Chamberlain, secretary of the Ohio Board of Agriculture; and George H. Twiss, who was appointed by the governor. The bureau organized a series of observations at stations across the state and published monthly reports. The federal government took over the work of the bureau in 1896.

### Ohio's Climate

Because Ohio is located between 38 and 42 degrees north latitude, at low elevations, in the eastern interior of North America, and south of Lake Erie, Ohioans experience four distinct seasons, large seasonal temperature ranges, and frequent precipitation. Counties near Lake Erie record heavier snowfall than other parts of the state, averaging fifteen inches more than in southern Ohio. Proximity to the lake also prevents spring frosts, extending the growing season. The hills of southeastern Ohio affect the weather in that region, where frosts in spring and fall shorten the growing season.

Average temperatures for January in Ohio are less than 32°F. The lowest temperature recorded in the state prior to 1903 was –39°F at Milligan, Perry County, on February 10, 1899. In July, average temperatures exceed 75°F. Thermometers reached 113°F at Gallipolis on July 21, 1934, the highest temperature on record.



Precipitation for the state averages between 30 and 40 inches per year. 1990 was a record year in terms of precipitation, when 51.33 inches was the state average. By contrast, 1930 was the driest year, with a state average of just 26.59 inches.

## **Extreme Weather Conditions**

### **Droughts and Floods**

Droughts, or severe and persistent dry spells, occur about once a decade in Ohio. They often cause significant problems for Ohio farmers. Notable drought years in the 19<sup>th</sup> century were 1841, 1856, 1863, 1870-1872, and 1895. In the 20<sup>th</sup> century, 1931, 1934, 1954, 1961, 1987, and 1999 were particularly dry.

The opposite problem, flooding, results either from intense local rainstorms or prolonged periods of heavy rain across a wide area. Most frequent in winter and spring, floods inundate areas that are normally dry. Ohio has more than 3,000 named rivers and streams, including the Cuyahoga, Great Miami, Little Miami, Maumee, Ohio, Olentangy, and Scioto. The Ohio and Miamis are particularly likely to flood.

Toledo experienced particularly damaging floods of the Maumee River in 1867 and 1881. In 1883, the Cuyahoga River flooded, and the city of Cleveland at the same time had to contend with a fire on the river that started at the Standard Oil Works. Also in 1883, the Ohio River rose to a record height of 66.3 feet in Cincinnati. Its ordinary height is 50 feet. The following year was worse, setting a new record of 71.1 feet in Cincinnati, washing out bridges at Zanesville and McConnelville, and submerging Gallipolis, Ironton, Portsmouth, and Ripley.

In March 1913, massive flooding devastated the state. Columbus, Dayton, Hamilton, and Tiffin sustained some of the worst damage, but throughout the state nearly five hundred people lost their lives. The cost of the flood was estimated to be \$100 million. As a result of the events of 1913, the Miami Conservancy District was established to prevent future flooding by constructing dams and levees. Flood control efforts were also established in other parts of the state. For example, the Muskingum Watershed Conservancy District, headquartered in New Philadelphia, was established in 1933.

Along the Ohio River, from Gallipolis to the Ohio-Indiana border, January 1937 was a terrible month. New high water marks were set at every town. Portsmouth and Cincinnati were particularly affected. In the Queen City, waters rose to nearly 80 feet, a new record. Flooding extended beyond Ohio, too, impacting the lives of more than a million people and causing hundreds of millions of dollars in damage. Dayton and the Miami Valley were spared, however, as successful flood control efforts in the region protected them from harm.

### **Tornadoes**

Tornadoes are violent whirlwinds that form during thunderstorms. They occur in all parts of the world and at any time of day or year, but they are most common in the central United States during spring and summer afternoons and evenings. Usually of short duration, an average tornado travels along a narrow path for only a few miles. Occasionally, however, tornadoes are more intense and cause damage across a wider area. Intensity of tornadoes is



measured on the Fujita scale, which assigns a ranking from F0 to F5 based on maximum wind speed. Most tornadoes are classified as F0 or F1, meaning that they have maximum wind speeds of less than 100 miles per hour. Only a very small number rank as F4 or F5, with wind speeds exceeding 207 miles per hour.

One of Ohio's first recorded tornadoes happened in Dayton in June 1812. In January 1854, a twister struck in Miller Township, Knox County, that uprooted nearly 50,000 trees. Miami University professor Orange N. Stoddard studied the storm and estimated a maximum wind speed of 173 miles per hour. Another well-documented storm occurred in April 1884. Two tornadoes formed in the Dayton area; one traveled across Greene County and into Fayette County. Jamestown, at the end of the tornado's path, suffered most of the damage and seven fatalities. At the request of T.C. Mendenhall, director of the Ohio Meteorological Bureau, a survey of the tornado's path and destructiveness was made and a report produced. Washington Court House in Fayette County experienced a tornado in September 1885 that destroyed much of the city and killed six. A violent F4 storm hit Sandusky County in April 1896, causing extensive damage and three fatalities.

Lorain and Sandusky experienced one of the worst violent storms ever recorded in Ohio in 1924. Damage was extensive, as the winds hit heavily-populated areas. It is estimated that 85 people died, 7,000 homes were destroyed, and \$30 million worth of property was lost. On Palm Sunday in April 1965, 48 tornados touched down in the Midwest, 19 of which were deadly F4 and F5 twisters. In Ohio, six tornado families hit across the state, and 57 people died.

April 1974 witnessed a "superoutbreak" of tornadoes, totaling 148 in 13 states. The worst blasted Xenia, Ohio, obliterating half of the buildings in the city. The storm was so strong that even well-built houses were blown apart and people in appropriate shelters were killed. Other counties that recorded tornados in April 1974 were Franklin, Hamilton, Warren, Adams, Brown, Pickaway, and Paulding. In Ohio, 36 people died, more than 2,000 were injured, and thousands of homes and businesses were severely damaged.

### **Snow Storms**

Six or more inches of snowfall in one day constitutes a heavy snow in Ohio. In northern Ohio, particularly along the shore of Lake Erie, heavy snows are expected several times a year, although they occur less frequently in other parts of the state.

Marietta experienced the most extreme storm of the early settlement period in February 1818, when 26 inches of snow fell. In Cincinnati in January 1863, 20 inches accumulated in 24 hours, a record that still stands. 22 inches of snow blanketed Cleveland in January 1878. The same amount fell on Toledo in February 1900. In April 1901, Gratiot, near Zanesville, got 42 inches of snow in 56 hours.

The whole state was affected by the Blizzard of 1918, during which temperatures dropped rapidly into negative numbers and high gusting winds blew heavy snowfall into drifts. In January 1978, an even more severe blizzard struck the state, bringing average winds of 45-60 miles per hour with gusts exceeding 100 miles per hour, heavy snows, and wind chill



temperatures down to -60°F. Power, water, telephones, and transportation routes were disrupted for up to five days. Snowdrifts were high enough to cover houses and collapse roofs. The Red Cross, Ohio National Guard, Army Corps of Engineers, and federal troops were called in to help with relief efforts.

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