

## **Climate and Weather- Part 2: Climatic Factors, Precipitation Patterns, and Seasonal Trends** <sup>[1]</sup>

### **Climate and Weather**

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**See also:**

[Climate and Weather Overview](#) <sup>[2]</sup> (from *NC Atlas Revisited*)

[Weather and Climate in a Snap!](#) <sup>[3]</sup>

**Related:** [Hurricanes](#) <sup>[4]</sup>; [Tornadoes](#) <sup>[5]</sup>; [Wet Year](#) <sup>[6]</sup>; [Year without a Summer](#) <sup>[7]</sup>

[Climate and Weather- Part 1: Introduction](#) <sup>[8]</sup>

[Climate and Weather- Part 2: Climatic Factors, Precipitation Patterns, and Seasonal Trends](#)

[Climate and Weather- Part 3: Droughts and Floods in North Carolina](#) <sup>[9]</sup>

### **Part 2: Climatic Factors, Precipitation Patterns, and Seasonal Trends**



**Snow Storm, April 2-3, 1915, Hillsborough Road, near A&M College, Raleigh, NC. From Carolina Power and Light Photograph Collection, North Carolina State Archives, call #: PhC68\_1\_490\_1.**

<sup>[10]</sup>

North Carolina is one of only three states in which a major mountain range is adjacent to a warm current of water. The proximity of the Atlantic Ocean's [Gulf Stream](#) <sup>[11]</sup> and the [Appalachian Mountains](#) <sup>[12]</sup> in the west is a primary causative factor in the state's climate and weather. Any time the wind blows from the east, moisture is transported inland from the Atlantic. This damp air is then forced to rise over higher terrain. Rising motion leads to cooling and eventual condensation, resulting in clouds and precipitation. The higher the mountains, the more dramatic the effect. When high pressure exists to the north and low pressure to the south, the combined circulation of these two systems creates an easterly flow of moist air and the possibility of heavy precipitation in the mountains.

The mountains also play a prominent role in the so-called sinking motion, which promotes warming and drying of the atmosphere. The same easterly winds that cause heavy precipitation on the western side of the Appalachians can lead to sunshine on the eastern side. This phenomenon occurs in central and eastern North Carolina when the wind emanates from the west, creating some of the hottest days in the [piedmont](#) <sup>[13]</sup> region of the state. Air starting at the top of the mountains sinks on its way to lower elevations, breaking up the clouds and allowing temperatures to rise.

During the winter months, cold, dense air pushes into North Carolina from the north and west, becoming trapped east of the mountains. If precipitation is falling, the result can be snow and/or ice for the central and western regions of the state. Snowstorms happen with some regularity only in the higher mountains, where the precipitation coming out of a cloud base does not have a chance to melt. In the piedmont and coastal plain regions, the precipitation may be snow when it leaves the base of the cloud but often becomes rain by the time it reaches the ground. Eastern North Carolina usually escapes frozen precipitation as a result of its proximity to the relatively warm ocean waters of the [Gulf Stream](#) <sup>[11]</sup>; longtime residents are aware of a consistent line between Roxboro and [Durham](#) <sup>[14]</sup> that regularly separates snow from rain.

Exceptions occur from time to time. A fast-moving depression coming in from the southwest may be sufficiently vigorous to suck cold air from the north. The low level of this cold stops the falling snow from melting, and the eastern part of the state may get a deep snowstorm.


The Gulf Stream is also important because of the tremendous temperature differences, zones of which are called fronts, that it can create between land and sea; even in the dead of winter, water temperatures just off of the North Carolina coast can be as warm as 70°. Because areas of low pressure originate in fronts, this natural phenomenon along North Carolina's coast provides a notorious breeding ground for the famous nor'easters, storms that then move northward and paralyze major metropolitan areas such as Washington, D.C., New York City, and Boston with heavy snow. If these storms develop quickly enough, snow can fall in North Carolina as well.

Thunderstorms occur frequently in North Carolina, especially in the spring and summer. They are created when warm, moist air in the lower levels of the atmosphere collides with cooler air at the higher levels. During the day in the mountains, the sun warms the elevated terrain more rapidly than the surrounding air. The result is a rising motion over the mountains and, with enough instability, the appearance of thunderstorms. Once in place, these storms can move eastward and affect other sections of North Carolina. The Atlantic breeze may also create thunderstorms. They develop when the land heats up more rapidly than the adjacent water, resulting in a cool breeze blowing from the water toward the land. While this airflow can be refreshing and peaceful at the beach, it can produce thunderstorms just inland, where the sea breeze converges with a different wind flow. Tornadoes <sup>[15]</sup> can develop from powerful thunderstorms, particularly in the spring.

Spring is often a fairly short season in North Carolina. Warm, humid, and cloudy days become more frequent, and cold spells grow less intense. Depressions still pass through the state, bringing periods of continuous rain or drizzle, but the possibility of thunderstorms-and, late in the season, tornadoes-increases. Commonly in spring the soil is full of water ready for the start of the growing season, although in years when the winter depressions are less active than usual, soil water may be in short supply. It is not unusual in early spring for an almost continuous series of rain-bearing depressions to pass over the state, removing problems with water supply but making it difficult for farmers to begin planting in their saturated fields. Some springs mimic summer, bringing high temperatures and little rain. Often these warm, dry springs have bursts of unusually high winds. Late frost, varying from early March to mid-April on the southern coast and from late April to early June in the western mountains, can also create agricultural problems.

When summer comes to the state, precipitation becomes unreliable and temperatures much less variable, changing by only a few degrees from day to day. The most characteristic feature of North Carolina summers is undoubtedly the almost continuous series of high temperature, high humidity days. While some steady rain may come from depressions, in many years North Carolinians rely on isolated thunderstorms, which may provide too much rain (and even floods) in one place while barely affecting another. Forest fires, commonly started by lightning, also reach their peak in summer. Maximum temperatures occur in the coastal plain, but sea breezes keep the coast itself relatively cool.

North Carolina's fall represents the peak hurricane season; the Outer Banks <sup>[16]</sup> are the most vulnerable coastal areas in the United States due to their eastward projection into the Atlantic Ocean. In years when hurricanes visit the state, fall is also the wettest season. In other years, however, it is often the driest season. The major depressions are still passing mainly to the north while the land surface is becoming cooler and less prone to creating the intense thunderstorms that could cause significant rainfalls. Occasional days still display summer heat, but they become rarer. By the beginning of November, practically all of the state has had at least one cold spell indicative of oncoming winter.

Keep reading >> Part 3: Droughts and Floods in North Carolina <sup>[9]</sup>  <sup>[9]</sup>

## References:

Jay Barnes, *North Carolina's Hurricane History* (3rd ed., 2001).

Charles B. Carney and Albert V. Hardy, *Weather and Climate in North Carolina* (1963).

William S. Powell, *North Carolina: The Story of a Special Kind of Place* (1987).

## Additional Resources:

"Geography of North Carolina," *North Carolina Department of Public Instruction*, <http://www.ncpublicschools.org/curriculum/socialstudies/elementary/studentsampler/20geography#maps> <sup>[17]</sup>

"North Carolina: Facts, Map, and State Symbol," *Enchanted Learning*, last modified 2010, <http://www.enchantedlearning.com/usa/states/northcarolina/> <sup>[18]</sup>

"North Carolina Geography and Climate," *Secretary of State/Kids Page*, "<http://www.secretary.state.nc.us/kidspg/>" <sup>[19]</sup>

## Image Credit:

Snow Storm, April 2-3, 1915, Hillsborough Road (Hillsborough Street?), near A&M College (NC State University?), Raleigh, NC. From Carolina Power and Light Photograph Collection, North Carolina State Archives, call #: PhC68\_1\_490\_1. Available from <https://www.flickr.com/photos/north-carolina-state-archives/2344844525/> <sup>[10]</sup> (accessed

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**Subjects:**

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