

Facts about Thunder and Lightning

- Between 2004 and 2013, 329 people were killed by lightning, 70 of whom were under the age of 20.
- Lightning rarely occurs in a Hurricane's eyewall (the strongest part of the hurricane), because the freezing level is too high above the surface.
- Thunder is not separate from lightning. In fact, thunder is the sound created by lightning.
- "Heat lightning" is not lightning caused by heat. What people call "heat lightning" is just lightning that is too far away for thunder to be heard, because light travels much faster than sound.
- Thunder and Lightning NOT considered severe weather. However, they frequently occur in association with hail, strong winds, and tornadoes, which are considered severe weather.



Lightning even strikes historic baseball stadiums. This strike occurred at Fenway Park in Boston, MA.
Photo Credit: NWS Lightning Safety Website/Associated Press

Lightning Safety

- When you see lightning, even when it's not raining, you should go inside a sturdy building. Lightning can strike up to 15 miles away from a thunderstorm.
- When inside your house, stay off any electronics plugged into the wall, the phone, and stay away from doors and windows. If you need to communicate, use text messaging on your cell phone, that will leave telephone lines available for emergency personnel.
- If you're unable to get inside a building, you should go to a car or vehicle with a top. The sides and top of the vehicle will help protect you. Uncovered convertibles, mopeds, and motorcycles are not safe from lightning.
- The most important thing to remember when staying safe from lightning is:

**WHEN THUNDER ROARS,
GO INDOORS!**

To learn more about lightning and lightning safety, go to the National Weather Service lightning safety website:

<http://www.lightningsafety.noaa.gov/>

Cover Photo Credit: NWS Lightning Safety Website/Harald Edens

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Lightning and Thunder



Lightning in Socorro, New Mexico

What are thunder and lightning?
Where does lightning occur?
How do I stay safe from lightning?

StormReady in a Box
Supplemental Information Pamphlet

What are Thunder and Lightning?

Thunder is the sound created by the expansion of air created by lightning. **Lightning** is an electric discharge in the atmosphere. It represents a quick moving flow of charge between the clouds and the ground.

Lightning is typically about 3 miles (5 kilometers) long and about an inch (three centimeters) in diameter. The current (i.e. the flow of electrons) of a lightning strike is over 15,000 amperes and the temperature of a lightning strike can be as high as 50,000 degrees Fahrenheit. The electrical energy from a single lightning bolt could power a home for about six hours.

There is still great debate among scientists of the exact causes and mechanisms of lightning. Scientists, however, know that lightning is mainly caused by the distribution and separation of charge in a cloud and on the ground.

There are multiple theories about what causes the charge separation within the clouds. The most accepted and well-known are: interface charging, which is when charge is transferred between two conductors contact each other; the other is induction charging, where the atmosphere's natural electric field causes negative and positive charge to go to opposite sides of particles and transfer on contact with other particles.

Types of Lightning

There are multiple types of lightning: in-cloud, cloud-to-cloud, and cloud-to-ground. The overwhelming majority of lightning flashes are in-cloud and cloud-to-cloud.

In-Cloud Lightning

In-cloud lightning is simply discharge of electricity within a cloud. Therefore, this type of lightning does not hit the ground. This frequently occurs within cumulonimbus clouds and their anvils.

Cloud-to-Cloud Lightning

Cloud-to-cloud lightning is lightning that occurs between two independent clouds. This type of lightning also does not hit the ground.

Cloud-to-Ground Lightning

Cloud-to-ground lightning is lightning that stretches from the cloud deck to the ground. This type of lightning accounts for the traditional lightning bolt that makes contact with the ground as seen in the picture below.



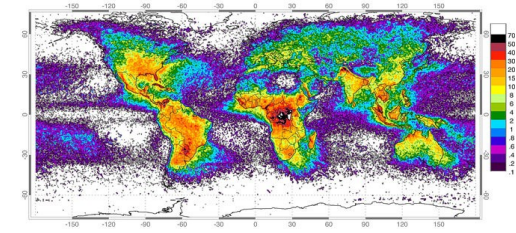
Cloud-to-Ground Lightning

Photo Credit: NWS Lightning Safety Website/Jesse Rudavski

Lightning Climatology

Lightning can occur anywhere in the United States, although it most commonly occurs in the southeast, especially in Florida, along the Gulf Coast, and through the High Plains region.

Around the world, lightning is most prevalent in the United States, Central Africa, part of the Caribbean, South Asia, and Latin America.



High Resolution Full Climatology Annual Flash Rate
Global distribution of lightning April 1995-February 2003 from the combined observations of the NASA OTD (4/95-3/00) and LIS (1/98-2/03) instruments

In the United States, lightning can occur year around, but is most prevalent from the Spring through early Fall concurrent with the prime severe thunderstorm season. But, it is still important to stay observant of conditions for lightning year around, particular for those in the southern Plains and the Deep South.



Cloud-to-Cloud Lightning over Mobile, Alabama
Photo Credits: Map- NWS Raleigh, Lightning- Nick Grondin