

Lightning

by KI5LNM

This is an extremely simplistic quick look at some information about lightening. My sources will follow at the end.

Within thunderstorms there is separation of powerful positive and negative pools of electrical charges. Lightening is born in the space between these two oppositely charged fields. Leaders start channeling a path between these opposite areas. The leaders attempt to neutralize the charge of the separation.

Much of this lightning is called cloud or intracloud lightning and does not reach the ground. It is between these two areas of positive and negative air within the clouds.

Often we find large storm systems that cover and travel across several states. These charged systems will have horizontal charge regions. These can cause lightening to travel over 100 kilometers horizontally. If these do touch the ground they are generally always positively charged and cause electric fields to change and trigger other lightening flashes in a domino effect.

But we all know that lightning does not stay in the clouds even as some that do start horizontally find their way down. There is also what is called Ground Flash or cloud-to-ground lightening. This is also known as CG.

This CG lightning can be when a negative charged step leader is moving toward the ground. As it nears the positive electrically charged ground, the electric field strengthens and the positive leader from the ground will reach up to the negative leader. More than one leader may reach up from the ground but only the first one to reach the downward step leader and completes the circuit makes it. Electrons then rapidly travel down from the cloud to the earth. this causes extreme heating of the channel. The brightest flash of the event is the return stroke of the connection.

It is the rare photos that show this happening but in the video I watched, it shows some where the failed leader does not reach the downward stroke before one beside it does. These upward strokes just end as short strikes up into the air.

Have you ever seen a lightening flash flicker? This happens with a negative CG return stroke but then multiples of other return strokes can follow up the same channel.

Now a positive CG seldom to never flickers. Why? One reason is that they generally come from higher up in the thunderstorm and thus have a much longer path to travel down and back up. So these strikes are often much hotter than negative charged lightening, and they are much brighter and the flash lasts longer. At the point of their highest charge, these positive CGs can be 10 times more powerful than negative CGs and as a result much more dangerous.

With this we can see that positive CGs have the ability to kill you if you get in the way of them. Negative CGs you have a possibility of surviving. Or as said, one will kill you, the other may kill you. So, if you know someone who survived a lightening strike, you can guess whether it was positive or negatively charged. Oh, and if you need that one more bit of information, a positive charged CG can reach temperatures of 30,000 celsius. Yep, I think that would kill me.

So as this all happens rather quickly, we may then ask where does the thunder come from?

The air that surrounds the lightning is heated up to super hot. It then explodes as a supersonic shock wave that then turns into an acoustic wave within a few yards. This all is part of the very quick expansion of the air molecules and they create sound waves. These sound waves travel approximately one mile every 5 seconds. That sound is what we hear as thunder.

Can I give you one more item to think on or look up. There is such a thing as upward lightning. But we are short of time.

As to lightning safety, I think we are mostly aware of what to do. From Tom Warner's website here are some thoughts

One, of course, is the best advice is to be inside a building or vehicle. Try not to be outside in it.

Also most lightning injuries happen when a lightning strike is nearby and not that a person is struck directly.

If outside be careful of what you are touching. Do not touch anything that is conductive. Also, I find interesting that while standing outside, you should keep your legs close together.

The old advice of getting close to the ground is safer than standing up is out the window. If you think of it, how far has that lightning traveled to get near you and will the two or three feet you are closer to the ground make much difference at all? This can be a false sense of safety.

For more information, here are two to check out.

Pecos Hank - How Lightning Works - Weird World of Lightning

He has many lightning videos. Some just beautiful film and some informational. Check out The Ultimate Lightning Storm - In Slow Motion. Also if you haven't heard of red sprites or blue jets or green ghost, check them out. Would be special to see them sometime. Oh, by the way he writes his own music for his videos. A unique feature of his videos and fits.

www.youtube.com/watch?v=JXhif3E312s

Z T Research

This site has so many pages and information. Tom Warner has studies lightning for some time and also has information and video from others. Interesting information on being safe in lightning from those who spend time out in it. Learn a bit there. One could spend considerable time reading and viewing.

<https://ztresearch.blog>