

LIGHTNING DATA CENTER MINUTES
December 12, 2014
ST. ANTHONY HOSPITAL WEST, LAKEWOOD, CO

SEASON'S GREETINGS AND HAPPY HOLIDAYS!

1. Meeting began at 11:45 AM and adjourned at 1:05 PM: Members Present: Clark, Swanson, Yarnell (Phil & Barbara), Gift, Wachtel (Clara and Howard), Elder, Stewart, Johnson, Wells, Patrick, Perry, Brown, Nibbe and Bedow. Clark moderated the meeting.
2. The LDC will be launching a new website sometime in late January or early February of 2015. It appears the website will be simpler in terms of adding content. Stay tuned for that.
3. Greg Stewart discussed a few items.

First, he addressed the question of blunt vs. sharp tips for lightning rods, which had been discussed previously. He had met Grayden Aulich, an atmospheric scientist at Langmuir Lab, during a trip to New Mexico. Aulich coauthored a paper with Charles Moore and William Rison, which showed blunt-tipped rods were struck more than sharp-tipped rods. The optimum rod shape was found to be hemispheric.

Next, Greg presented an article written in Science magazine which noted 50% more lightning strikes could occur over the coming decades due to global warming. A team of researchers, led by David Romps, of U.C. Berkeley, found the frequency of lightning strikes would increase 12% for every 1 Deg. C increase in temperature. At the current rate of global warming, that would be a 50% increase in strikes here in the U.S. by the end of the 21st century. Sarah Zhang, author, noted this could have a significant impact on wildfire frequency. Greg also showed a time-lapse video of lightning strikes over the continental U.S. during the year 2011.

To close, Greg showed us a video of a close-range lightning strike with multiple strokes over the ocean. In his Ph. D thesis, Stan Heckman, asked the question: "Why does a lightning flash have multiple strikes?" The answer, he found, was dependent upon the rate of charge of the lightning channel. Specifically, he noted: "...if, between strokes, the rate at which charge is provided to the top of the lightning channel exceeds the minimum stable current, this charge is carried to ground as a long continuing current. If the rate is less than the critical current, this charge is carried to ground in discrete strokes..."

4. Dr. Phil Yarnell was our featured speaker. He gave us a good “Lightning 101” slide show, with an emphasis on some of the neurological issues that lightning patients are faced with. Some of the things he touched on included: the lightning discharge, lightning safety, the inception of the LDC, and a few case histories. He closed with the “Denver 3”, the three classes of lightning injury according to Dr. Michael Cherington. They are:

Immediate & Transient – Examples of sequelae include Lichtenberg Figures (ferning) and keuranoparalysis.

Immediate & Prolonged – Examples of sequelae include cardiac arrest, basal ganglia, facial palsy, myelopathy, complex regional pain syndrome (CRPS).

Delayed – Examples of sequelae include cognitive problems, sleeping and eating disorders, emotional issues, and other CNS problems.

There was some discussion of a possible fourth mechanism for injury due to blast effects, that is, injury resulting from being “thrown” or “tossed” by a nearby lightning flash. Plenty of survivors report being thrown or tossed some distance from where they were prior to the strike. There was some debate over whether this was being caused by the acoustic shock wave or if the movement was being caused by the involuntary contraction/push-off of the leg muscles in response to the nearby flash.

5. And finally, some old news. During the September 2014 meeting, we discussed Elsom and Webb's 2014 paper about lightning injuries and fatalities in the U.K. One of the mechanisms for injury was coming into contact with a stored potential, after the lightning discharge. Howard Wachtel said he thought a charge would be in place after the flash, but only for a fraction of a second. We had asked if anyone was aware of anyone being hurt or killed after contacting an apparently charged surface after a lightning strike. Following the release of those minutes, Dr. Mary Ann Cooper responded:

“It is quite possible for an isolated (non-grounded) metal object to hold a charge for a considerable period of time. I think this is the cause of many lightning 'shocks' that are reported by people (and who often write me) when they touch their van or vehicle after a storm or to roll up the windows and get a static charge. These are not lightning strikes or injuries, merely static discharge similar to what builds up from walking across the carpet in the winter.

Additionally, when we were using capacitors on my lightning experiments, we were cautioned not to touch the capacitors and to always ground them out before beginning because capacitors can gather charge simply from being exposed to air.”

6. Questions, comments, notification of errors, and critiques of these minutes are welcome. Please forward those to Steve Clark at: sclarktoto@gmail.com. Please keep your communications professional and respectful. Communications will be forwarded to the appropriate author(s) of the minutes and addressed accordingly.
7. LDC Disclaimer: These minutes do not represent official positions of the LDC or its members. They simply reflect the comments made at the meeting. Furthermore, the LDC does not implicitly or explicitly recommend or endorse any product or service. Any service or product presented in these minutes is done so for purposes of discussion and analysis. The merit (or lack thereof) is open for the consideration and review by the entire membership.
8. Next meeting: Friday, January 9, 2015 at 11:45 AM at St. Anthony Hospital West. Conference Room TBA.

Respectfully Submitted,
Steven E. Clark, Consulting Meteorologist

In Case You Missed It...Lightning Links

This is a monthly listing of periodicals, websites, and videos about lightning and allied areas as reported in the media. A headline or description is listed, followed by the link. Please note that some of the links are perishable, which means you'll need to go to the source for the information. Enjoy!

Moore, C.B., G.D. Aulich and William Rison (2004), "The Case for Using Blunt-Tipped Lightning Rods as Strike Receptors", *Journal of Applied Meteorology*, Volume 42, Issue 7 (July 2003) pp. 984-993. <http://journals.ametsoc.org/doi/pdf/10.1175/1520-0450%282003%29042%3C0984%3ATCFUBL%3E2.0.CO%3B2>

Romps, D.A., J.T. Seeley, David Vollaro and John Molanari (2014), "Projected Increase in Lightning Strikes in the United States Due to Global Warming", *Science*, Volume 346, No. 6211, pp. 851-854. Link to article abstract:
<http://www.sciencemag.org/content/346/6211/851>

Zhang, Sarah (2014), "Climate Change Could Mean We See A Lot More Lightning Strikes" Article include time lapse of CONUS lightning strikes in 2011.
<http://gizmodo.com/climate-change-could-mean-we-see-a-lot-more-lightning-s-1658538675>

Close-Range Video of Multiple-Stroke Lightning Over Ocean
<http://jukinvideo.com/videos/focus/news/1080p/250/51340>

Heckman, Stan (1992), "Why Does A Lightning Flash Have Multiple Strokes?", Ph. D Thesis, Massachusetts Institute of Technology. Department of Earth, Atmospheric, and Planetary Sciences. Link to article at bottom of webpage.
<http://dspace.mit.edu/handle/1721.1/17300#files-area>