LIGHTNING DATA CENTER MINUTES

October 13, 2023
ST. ANTHONY HOSPITAL, LAKEWOOD, COLORADO

Monthly Quote: "The freaks of lightning are all past understanding." Pullman Herald, October 16, 1914.

Members present: Clark, Langford, Crow, Swanson and Yarnell. We met with a lightning survivor. Meeting began at 11:45 AM and ended at 1:00 PM.

1. The LDC is accepting donations, either as cash or check. If you donate via check, please make your check payable to Steve Clark at 755 S. Clinton Street, #2A; Denver, CO 80247. He will cash the check and keep the cash holdings specifically for the LDC. When the LDC incurs expenses, Steve will pay for services rendered through his bank account using the cash from LDC's cash holdings. A log will be maintained detailing the inflow and outflow of monies. LDC currently has $742.00 in cash.

2. In January 2022, the Hunga Volcano in Tonga erupted, producing lightning at the highest rates ever recorded in the Earth's atmosphere. Researchers monitoring the eruption estimate there were over 192,000 flashes that were produced, which reached heights of 20-30 kilometers (12-19 miles) in the air, which is higher than any traditional lightning. Researchers now know that volcanic ash clouds can generate the conditions for lightning far in excess of those seen in meteorological thunderstorms and the lightning is more extreme than any other kind of storm. Gravity waves inside the plume helped shape the lightning into concentric rings that expanded outwards to diameters up to 280 kilometers (168 miles). The volcano erupted for 11 hours and scientists were able to identify four phases of the eruption. Scientists hope the data collected will allow for better short-term prediction of volcanic hazards.

3. Carl Swanson brought to our attention a research article which discussed a possible cause of superbolt lightning. According to the article, superbolt lightning is high-energy lightning, with energies in excess of 1,000,000 Joules, which is 1000 times more energetic than a typical lightning flash. A global map of superbolt distribution shows three main clusters of superbolts with energies exceeding 2,000,000 Joules over the Mediterranean Sea, the northeast Atlantic Ocean and along the coast of Peru. The main finding from this study is the energy of lightning greatly increases when the distance between the charging zone (the area where electrification begins) and the ground decreases. The researchers think the reduced distance between the ground and the charging zone offers less electrical resistance, which allows for higher currents and higher energies.

4. Our meeting started informally with Ken Langford showing an Instagram video recorded in September 2023 showing what is claimed to be ball lightning. Link to video: https://www.instagram.com/reel/CxgDz6vhx7u/?igshid=MzRlODBiNWFlZA%3D%3D

5. We met with a lightning survivor. This fellow was employed by a maritime business and was on duty at the time he was hit. There were active storms in the area. He was on a boat that was docked in a marina, with two other boats docked side-by-side a short distance away. It was raining at the time and he was standing on the deck of the boat holding a corded microphone in his right hand that was attached to a VHF radio inside the cabin. The microphone also functioned as a speaker during inbound transmissions, which means he would hold it near his mouth when talking and near his ear when listening. At the time of the strike, he thinks lightning struck the second boat away from his, hit his boat and reached him through the radio. Ken speculated he might have been in an upward streamer. The man immediately felt hurt but remained conscious after the strike. Alarms were sounding, so he checked with his crew and there was no fire or water coming into the boat. He also checked to see if he had suffered any personal damage and determined there was no serious damage and that he was still functional. He continued on a four-day voyage. After the voyage, he had a blood draw taken which showed a high level of ferritin. About a week after the strike, health issues began to emerge, some of which are: a rash from the waist up on both sides of his body, headache, fatigue, blurry vision, pain in the eyes, tinnitus, dizziness, hearing damage, mood changes, overall soreness and loss of initiative. He had a bruise on the right arm between the elbow and shoulder. The radio and microphone were damaged along with some other equipment. There were other boats in the area that were damaged.

   Some recommendations were offered: Evaluate the antenna and radio for signs of damage, measure for latent magnetic fields using an ordinary hand-held compass, thoroughly document damage to his boat, get names of witnesses to the incident and take verbal statements, identify his challenges and devise workarounds. Dr. Phil Yarnell mentioned the Lightning Strike & Electric Shock Survivors International group.

   Steve Clark will determine if lightning data are available from the time and location of the strike.

6. LDC welcomes your questions. Please send them via e-mail to Steve Clark at sclarktoto@gmail.com. Your medical questions will be forwarded to Dr. Phil Yarnell for his review and will usually be taken up for discussion in the next month's meeting. Please be advised any questions posed are for the general consideration by the group and any answers given do not constitute a formal medical opinion. If a formal evaluation is requested, arrangements can be made directly with Dr. Yarnell. If you have a medical emergency, please call 911 or your local EMS.

7. Questions, comments, error notifications, and critiques of these minutes are welcome. Please send them to Steve Clark. Please keep the communications professional and respectful. They will be forwarded to the appropriate author(s) of the minutes and addressed accordingly.

8. 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 product or service 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.

9. Next meeting: Friday, November 10, 2023, from 11:45 AM to 1:00 PM MST.

Respectfully Submitted,
Steven E. Clark, Consulting Meteorologist

Lightning Links

This is a monthly listing of periodicals, websites, and videos about lightning and allied areas from a variety of sources. 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.

Unknown Author, 2023: Flash-Tastic!, *Bulletin of the American Meteorological Society*, September 2023. Link: https://cdn.coverstand.com/43726/803075/600c181428244335007d43cb342e1b988f0ad42a.4.pdf (PDF Page 23).

Press Release, 2023: Tonga's Hunga Eruption Produced the Most Intense Lightning Ever Recorded. *American Geophysical Union Press Release*. June 20, 2023. Link: https://news.agu.org/press-release/tongas-hunga-eruption-produced-the-most-intense-lightning-ever-recorded/

Van Eaton, A., J. Lapierre, S. Behnke, C. Vagasky, C. Schultz, M. Pavolonis, K Bedka and K. Khlopenkov, 2023: Lightning Rings and Gravity Waves: Insights Into the Giant Eruption Plume from Tonga's Hunga Volcano on 15 January 2022. *Geophysical Research Letters*. June 20, 2023. Link: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022GL102341

Chasan, A., 2023: Florida Teen Struck by Lightning While Hunting With Her Dad Has Died. *CBS News*. September 28, 2023.
Link: https://www.aol.com/florida-teen-struck-lightning-while-190800040.html

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Yablonski, S., 2023: Video Shows Biologist Getting Struck by Lightning While Filming in Florida. *Fox Weather via AOL News*. October 2, 2023.
Link: https://www.aol.com/news/video-shows-biologist-getting-struck-175831489.html
NOTE: The video does NOT show anyone being hit by lightning. Rather, it is a quick discussion of the aftereffects of the strike. SC

Emerson, E., 2023: Flight to Hawaii Returns to Las Vegas After It Was Struck by Lightning. *KVVU-TV*. October 2, 2023. Link: https://www.fox5vegas.com/2023/10/02/flight-hawaii-returns-las-vegas-after-it-was-struck-by-lightning/

Lopez, L., 2023: Lightning Strikes With 278 Passengers On Board. *KHON2*. October 2 and 3, 2023.
Link: https://www.khon2.com/local-news/lightning-strikes-plane-with-278-passengers-on-board/

Nuttle. M., 2023: Lightning Strike Forces Honolulu-Bound Hawaiian Airlines Flight to Return to Las Vegas. *KITV*. October 3, 2023. Link: https://www.kitv.com/news/local/lightning-strike-forces-honolulu-bound-hawaiian-airlines-flight-to-return-to-las-vegas/article_fc52cfea-61c2-11ee-8e3c-cf98f30a15d3.html

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Lewis, G, 2023: Scientists Figured Out What Causes Earth's Strongest Lightning. *AGU Newsroom*. September 28, 2023. Link: https://news.agu.org/press-release/scientists-figured-out-what-causes-earths-strongest-lightning/

Ephraim, A., D. Rosenfeld, R. Holzworth and J. Thornton, 2023: A Possible Cause for Preference of Super Bolt Lightning Over the Mediterranean Sea and the Antiplano. *JGR Atmospheres*. September 19, 2023. Link: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022JD038254
