

LIGHTNING DATA CENTER MINUTES
May 10, 2013
ST. ANTHONY HOSPITAL WEST, LAKEWOOD, CO
On the Web at: www.stanthonyhosp.org/ldc

Monthly Quote: “Monthly Quote: “Choctaw Medicine Man Panther (Preston Scott) told of how he was designated to follow the path of the *heyoka* (sacred trickster). One day as a boy, his mother was walking him to school. A dark storming cloud came up from the west. His mother told him to run to his grandfather's house. He made it as far as his grandfather's yard when a lightning bolt struck so close to him that the heat and energy flipped him over. He landed on his feet still running and went up on his grandfather's porch. Being struck by lightning is Spirit designation as *heyoka*.” On the web at: <http://www.drboylan.com/strknrpt2.html>.

1. The meeting began at 11:50 PM and adjourned at 1:20 PM. Members Present: Clark, Elder, Schoessow, Collier and Gift. Clark moderated the meeting.
2. Following up on Greg Stewart's discussion of thundersnow from last month's meeting, Steve Clark received an e-mail from Allen Best, author of a monthly newsletter titled: Mountain Times News. Back in November 2002, Allen wrote about the gondola between Telluride, Colorado and Mountain Village, which is about 1500 feet higher than Telluride. The gondola is used as a form of public transportation between the two towns. The town of Mountain Village consulted with Lightning Eliminators (LE) in Colorado to design a lightning protection system for the gondola system. LE installed a dissipation array system on various components of the gondola system. Dissipation arrays work on the concept of spreading an electric potential away from a single point over hundreds of points over a broader area, which dilutes the charge and thus reduces the potential for a lightning strike. Prior to the installation of the protection system, any time lightning was within 52 miles of the gondola, services had to be suspended and people were redirected to buses, which took much longer and emitted pollutants into the atmosphere. After installing the system, the town applied for a variance from the Colorado Tramway Board. It is unknown if the Board granted the variance. Nowadays, if lightning is directly overhead, the gondola service is suspended, but not for nearly as long as it used to be.
3. Paul Schoessow presented a short bibliography of ball lightning literature from the American Physical Society's journals – mostly Physical Review Letters. He refereed one of the articles (“Production of Ball Lightning-Like Luminous Balls by Electrical Discharges in Silicon”. Pavia, et.al., Physical Review Letters, 24 January 2007), and he thinks he may have refereed another (“Structure of Laboratory Ball Lightning”. Tsuyohito, et.al., Physical Review E, 7 December 2009).
4. Robert Gift reports his wife is seeing relatives in China and says hopefully, she will return with some photographs of the lightning rods there.

5. Greg Also wanted us to know of three newsworthy items.

First, Tim Samaras, who has presented before to the LDC, now has a camera capable of capturing a whopping 1.4 million frames per second. That is not a typo. He hopes to capture lightning strikes to the ground, as seen at ground level.

Second, in 2012, scientists in Japan used phased array radar to analyze lightning in 10 storms. A form of lightning, known as “Narrow Bipolar Events” (NBEs), are extremely high-powered, short-distance lightning flashes, which tend to occur near the tops of thunderstorms. Using phased array radar and a lightning detection system, the scientists observed 232 positive NBE strikes and 10 negative NBE strikes. The positive NBEs tended to be deep inside the cloud, in or near the region of deepest convection. The negative NBEs tended to be almost exclusively near the cloud tops, at altitudes of 14 to 16 kilometers (8.5 to 10 miles). The scientists also discovered a critical storm height, below which negative NBEs would not occur, which suggests that detecting NBEs may allow meteorologists to measure thunderstorm heights remotely. Being able to determine their height may aid in assessing the strength, and thus the likely severity of a thunderstorm.

Third, the first of the next generation weather satellite, called GOES-R, will be launched in 2015. It will scan the Western Hemisphere and it will have higher-resolution imaging and shorter imaging intervals. Furthermore, it has lightning detection equipment on-board, that will detect all kinds of lightning: cloud-to-cloud, cloud-to-ground, and intra-cloud. The greatest potential for this device will be the monitoring of lightning associated with severe storms. Meteorologists know that increased flash rates are an indication of a strengthening storm. This means these satellites could become an important new tool for increasing tornado-warning times, especially at night.

6. There is updated information about the woman who came to our December 2012 meeting. She was driving a car in southern Colorado, when her car was hit by lightning. She noticed a burn mark on the left side of her neck the day after the strike. She later received her medical records, which indicated a burn mark, about the diameter of a pencil on her left arm, about halfway between her elbow and wrist. Strangely, the burn mark did not manifest itself until six days after the strike. Robert Gift thought the gold chain she was wearing might have saved her life, thinking the chain carried the current *around* her body, rather than allowing the current to flow through her.

Now to her car. There were two holes, both on the passenger side. One was in the door itself, about mid-height and the other was in the doorframe (same door). Previously, our physicists wanted to know what kind of steel it was and how thick it is. Steve Clark visited a local Chevy dealer's body shop. They told him two kinds of steel are used in the manufacture of a car: high-strength laminated steel and mild steel. The body shop man said because the metal was painted in the finish color of the car, it was most likely the mild steel. He said the laminated steel is used in places where strength and rigidity are needed and the laminated steel is almost always painted black. The body shop man gave Steve a chunk of mild steel to take to the meeting. Alan Elder thinks the metal is 3/16th inch thick and will bring a micrometer to the next meeting so we can measure the actual thickness. Rich Collier thinks the metal is about 1/16th inch thick. Rich commented he thought the lightning might have passed through the crack in the door. He reported he has also seen lightning pass through cracks at some of his DOE project work, though he could not recall in what context.

7. We watched a story, which aired on CBS's "60 Minutes" on May 5, 2013, titled "Invisible Wounds". It showed how some of the veterans of the Gulf Wars were dealing with brain injuries resulting from active combat. Their stories are similar to those told by lightning strike survivors. Because they were combat soldiers, most would get up and fight the next day, similar to football players continuing to play after taking a big hit. When they got home, their families knew the soldiers had changed, but did not know why. When the soldier would go to a doctor, they would be told that he had PTSD, and if there was not any improvement after counseling, it was "the soldier's fault". Even worse, a soldier might be told he was lying about his condition. According to the story, Traumatic Brain Injury (TBI) and Post-Traumatic Stress are the two largest forms of disabling injury along veterans of the Afghanistan and Iraq wars. They account for 36% of the reported disabilities, whereas, amputations account for approximately 10% of disabling injuries. As of late 2009, troops suffering concussions are taken out of action until fully recovered, just as pro football players nowadays must undergo a battery of concussion testing before being cleared to play again. According to Pete Correlli, the Army's second-in-command, if a second concussion occurs before the first is healed, then the patient will begin to have cognitive issues, similar to those faced by former NFL players.

There is hope. Thanks to Arnold Fisher, head of one of New York's most successful construction companies, The National Intrepid Center of Excellence (NICoE) was built near Bethesda, Maryland, aimed at using cutting-edge technology and treatment methods to help service members of the Afghanistan and Iraq wars in the treatment of TBI and Psychological Health (PH) conditions. The brain imaging technology at NICoE is capable of capturing about 41,000 images, versus between 300 to 400 images for conventional MRI. Furthermore, the newer technology detects actual brain damage in about one-third to one-half of the patients that conventional MRI misses. Unfortunately, there is no cure for TBI. All physicians can do is help patients cope with the reality of their injury.

Prior to the May meeting, Ken Langford saw this segment and wondered if we might be able, somehow, to get one of our lightning patients to this facility, have their brain be scanned, and then have Phil do some kind of a research paper showing his findings.

8. Next meeting: Friday, June 14, 2013 at 11:45 AM at St. Anthony Hospital West. Conference Room TBA. This will be a round table meeting.

Respectfully Submitted,

Steven E. Clark, Consulting Meteorologist

In Case You Missed It...Lightning Links

This is a monthly listing of news, articles, 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!

“Jon Kedrowski Spends a Night on All of Colorado’s Fourteeners”, in the Denver Post, May 7, 2013.

http://www.denverpost.com/extremes/ci_23185876/jon-kedrowski-spends-night-all-colorados-fourteeners?IADID=Search-www.denverpost.com-www.denverpost.com

“LEC Lightning Protection for Public Transportation Boosts Productivity and Commerce in Resort Towns”. A case study brochure from Lightning Eliminators.

<http://www.lightningprotection.com/pdfs/resources/knowledge-transfer/case-studies/transportation-recreation-gondola-system-mountain-village.pdf>

“Spatial Relationship Between Lightning Narrow Bipolar Events and Parent Thunderstorms as Revealed by Phased Array Radar” in Geophysical Research Letters, Vol. 40, Issue 3, pages 618-623, 16 February 2013. This is the article abstract.

<http://onlinelibrary.wiley.com/doi/10.1002/grl.50112/abstract>

Article about Tim Samaras

“Weather Researcher Hopes to Capture Elusive Images of Lightning Striking the Ground” in The Wichita Eagle, March 10, 2013, by Stan Finger. NOTE: To access this article, you’ll need to set up an account, which should be free of charge. Clicking on the link below will direct you accordingly.

[http://nl.newsbank.com/nl-search/we/Archives?p_product=WE&p_theme=we&p_action=search&p_maxdocs=200&s_dispstr=tim%20samaras%20AND%20date\(all\)&p_field_advanced-0=&p_text_advanced-0=\(tim%20samaras\)&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no](http://nl.newsbank.com/nl-search/we/Archives?p_product=WE&p_theme=we&p_action=search&p_maxdocs=200&s_dispstr=tim%20samaras%20AND%20date(all)&p_field_advanced-0=&p_text_advanced-0=(tim%20samaras)&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no)

NOAA GOES-R Homepage: <http://www.goes-r.gov/>

For the Curious – a couple of Phased-Array Radar websites:

From the National Severe Storms Lab:

<http://www.nssl.noaa.gov/tools/radar/mpar/>

“Phased-Array Radar Could Increase Tornado Prediction Times”

<http://spectrum.ieee.org/energy/environment/phasedarray-radar-could-improve-tornado-prediction-times>

From CBS’s 60 Minutes: “Invisible Wounds of War”

<http://www.cbsnews.com/video/watch/?id=50146231n>

Information about the National Intrepid Center of Excellence (NICoE)

http://www.bethesda.med.navy.mil/new_directions/NICoE.pdf

A Wikipedia article about SWI – “Susceptibility Weighted Imaging”, noted in the 60 Minutes story.

http://en.wikipedia.org/wiki/Susceptibility_weighted_imaging