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NOAA Research Yields New Tools For Lightning Prediction

ScienceDaily (July 15, 2005) — June 23, 2005 -- Forecasters at the NOAA Storm Prediction Center in Norman, Okla., now have additional tools to more accurately predict the occurrence of cloud-to-ground (CG) lightning flashes within thunderstorms. The lightning climatology and lightning prediction system helps meteorologists determine areas where these lightning flashes could threaten lives and property and start wildfires.

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Lightning that strikes the ground kills approximately 67 people each year and leaves hundreds of survivors with debilitating health effects. Each year, NOAA designates the last full week of June as Lightning Awareness Week to promote safe outdoor and indoor activities before, during and after lightning begins flashing.

CG lightning also causes many of the largest forest fires in the United States, especially in the West. These flashes are associated with dry thunderstorms that produce lightning but little rainfall. During the disastrous wildfire season of 2000 in the Northern Rockies, nearly all of the wildfires were started by lightning, according to the National

Interagency Fire Center. Better prediction of thunderstorms, days in advance, will allow for better positioning of resources, including firefighters and equipment, on the ground to fight lightning-sparked fires while they are still small.

CG lightning was the focus of an eight-year climatology study for the period from 1995 to 2002 completed by Phillip Bothwell, NOAA Storm Prediction Center senior development meteorologist. While most researchers develop climatologies over long periods of time (monthly or yearly), Bothwell broke up his observations into five-day blocks of time in an effort to see if more detailed patterns emerged from shorter time periods. He also derived the climatologies for every three hours to see how lightning patterns changed during the day.

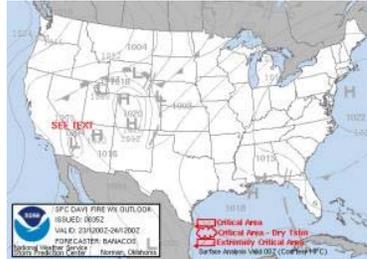
"A climatology serves as one type of objective guidance in predicting where lightning is more likely to occur," said Bothwell. "It serves as a predictor by giving forecasters an accurate sense of when and where storms tend to form so they can better advise people in that area."

Bothwell said one of the driving forces behind the climatology comes from his interest in extreme lightning events with a large number of flashes. With this lightning prediction system, forecasters can look at the probability of one or more lightning flashes in a 40 x 40 km grid box, equivalent to an average-sized county. They can also examine the probability of more extreme occurrences, such as 100 or more CG flashes in a grid box. These large flash events can be very dangerous and destructive to many types of electrical systems. In the United States, 20 to 25 million cloud-to-ground lightning flashes occur each year and many of these CG flashes come from extreme lightning events.

"These storms with large numbers of lightning flashes are dangerous and destructive by themselves," Bothwell said. "In addition, they are often associated with severe weather such as tornadoes, hail, wind and flooding."

Forecasters can use the lightning climatology information, along with other observed and model data, to better pinpoint when and where lightning will occur. The NOAA Storm Prediction Center is currently producing experimental lightning forecasts extending three days into the future.

The NOAA Storm Prediction Center issues forecasts and watches for severe thunderstorms and tornadoes over the contiguous United States. SPC also monitors fire weather



NOAA image of the NOAA Storm Prediction Center's fire weather outlook for the United States as of June 23, 2005. (Image courtesy of National Oceanic & Atmospheric Administration)

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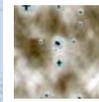
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hours a day, seven days a week. Established in Washington, D.C., in 1952, the center moved to Kansas City in 1954 and then to Norman in 1997.

NOAA, an agency of the U.S. Department of Commerce, is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and providing environmental stewardship of the nation's coastal and marine resources.

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