Central Illinois Lincoln Logs

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Lincoln NWS 20th Anniversary Retrospective

By: Chris Geelhart, Meteorologist

Editor's Note: This is Part 2 of a 3-part series on the history of the National Weather Service in Lincoln, which marks its 20th year of operation in 2015.

Inside this issue:

Starting Up the Office

Rod Palmer, Meteorologist-in-Charge of the Springfield NWS office, stands in the midst of the operations area while the equipment is being moved, September 26, 1995.

The analysis conducted for the NWS Modernization and Associated Restructuring concluded that Lincoln was the best location for a new Weather Forecast Office (WFO) that would serve central Illinois. Construction of the WFO began in December 1993, and the office was completed in October 1994.

The initial office operations were largely administrative, as new staff was hired to support the office, and they were prepared for their new duties. For example, as the new meteorologists arrived, they spent about a month at a training center in Oklahoma to learn how to operate and interpret the data from the new Doppler radar. Also, since some of the staff of the Springfield and Peoria offices were hired as meteorologists in Lincoln or elsewhere, the new Lincoln staff was used to assist with staffing the old offices as needed.

The first significant aspect of operations was the installation of the radiosonde (weather balloon) tracking equipment, which occurred in mid February 1995. The tracking equipment was relocated from the NWS office in Paducah, KY, and the first balloon flight from Lincoln took place on the 15th. Previously, balloon flights were done at the Peoria office; that equipment was relocated to the new NWS office in Davenport, IA, around the same time. Balloon launches were done twice a day, a policy that continues to this day. Since the balloon launches were the only official function at the time, the office was not staffed 24/7.

(cont. on page 2)

Lincoln NWS 20th Anniversary Retrospective (cont.)

On September 27th, we began full-time operations at our office. Computer equipment was moved from the Springfield office to Lincoln, and the tape consoles that were used for NOAA Weather Radio were relocated from the Peoria and Springfield offices to Lincoln. These offices also transferred their severe weather warning responsibility to Lincoln, and several counties were also transferred from the offices in St. Louis and Evansville, IN. The net result was a County Warning Area consisting of 35 counties, which is still in the same configuration. The offices in Springfield and Peoria were officially closed on October 1st.

As part of their training, the station meteorologists began sending practice forecasts to the NWS office in Chicago, which at that point was responsible for Illinois forecasts. On April 1, 1996, aviation forecast responsibility for the airports in Peoria, Springfield, Decatur, and Champaign were officially transferred from the Chicago office to our office, and public weather forecasts began being issued from our office on July 6, 1999.

Once trained by staff from the Chicago NWS, meteorological technicians and interns at the Lincoln NWS also assumed operations of the cooperative observer (COOP) network for central and southeast Illinois. This required installing new stations, relocating others, and repairing weather equipment such as thermometers and rain gages.

Example of the 8-track tapes used for NOAA Weather Radio.

For the first few years, operations of the NOAA Weather Radio network were unchanged. We operated 3 stations (Peoria, Springfield, and Champaign). NWS staff had to manually record each message and replace the previous one; timing of new messages could be delayed depending on the weather (e.g. broadcasting a severe weather warning on one transmitter took priority over recording the hourly weather conditions on another). In the summer of 1998, installation began on the Console Replacement System, which would replace the manual 8-track tape recordings with an automated voice which could update as many as 13 transmitters at once. Once this occurred, expansion of the NWR network took place, and by fall 2001 we were operating 9 stations.

When we first opened, we used the same 1970's-vintage Automation of Field Operations and Services (AFOS) mainframe computer equipment as the previous offices. This was replaced in November 1998 by the Advanced Weather Information Processing System (AWIPS). AWIPS allowed for greatly increased monitoring capabilities of radar, satellite and computer model data. Previously this was done on separate computer systems, but with AWIPS it could be all displayed on the same workstation. We continue to use AWIPS, with its second generation software installed in April of this year.

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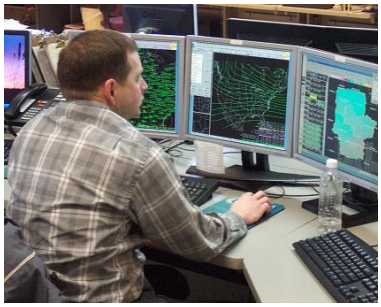
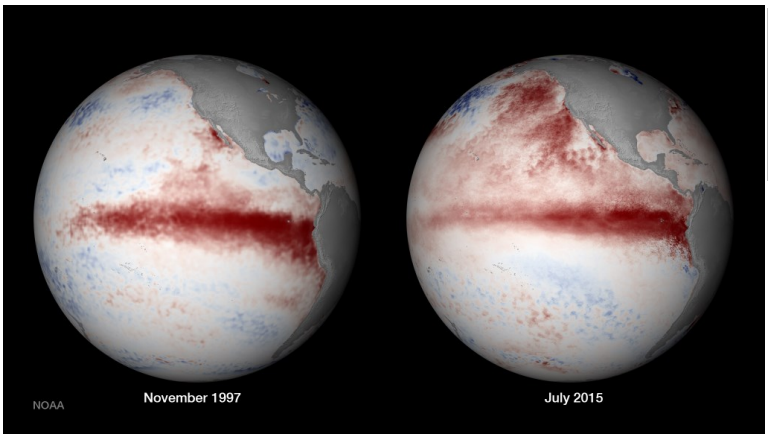
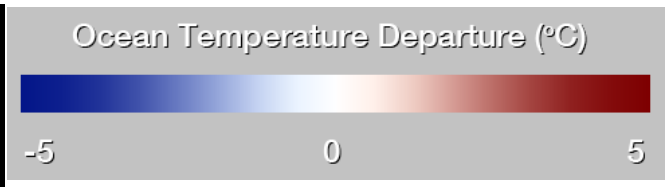


(left): 1970's era AFOS workstation, containing displays for text and monochrome imagery

(right): Late 1990's era AWIPS workstation with text and color displays

El Niño Has Arrived



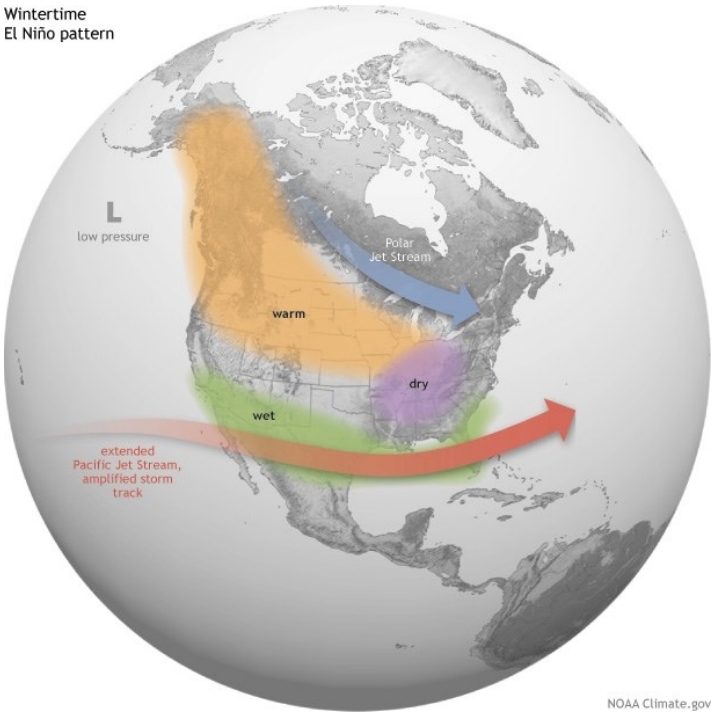


Comparison of east Pacific sea-surface temperature departures from normal during the 1997-98 El Niño, and the current (as of July 22) departure from normal. Areas in red have departures above normal. Image courtesy NOAA Environmental Visualization Laboratory.

After several months of hinting, El Niño's arrival was finally seen by early March, and it continues to strengthen. According to guidance from the Climate Prediction Center, there is a 90% chance El Niño conditions will persist through the upcoming winter, and an 80% chance it will continue into next spring.

El Niño is a warming of the ocean sea-surface temperatures over the central and eastern tropical Pacific Ocean. The name was derived from South American fishermen, who noticed the phenomena developing around Christmas (the capitalized term "El Niño" in Spanish refers to the Christ child). El Niño conditions can greatly affect the agriculture and fishing industries due to changes in associated weather patterns across the globe.

The image below shows the typical pattern exhibited by El Niño conditions over North America during the winter months. As the polar jet stream tends to stay well to the north, warmer than normal conditions are generally favored across a large part of the lower 48 states. The southern branch of the jet stream favors wet and cooler conditions across the southern states. Much of the Midwest tends to be dry.



Research from the Midwestern Regional Climate Center in Champaign has shown that during the most recent 8 strong El Niño events, there is a significant reduction in winter snowfall over the Midwest. Some parts of northern Illinois and Indiana, western and upper Michigan, west central Minnesota, southeast North Dakota, and northeast South Dakota saw totals 10-20" below normal, with other parts of the Midwest up to 10" below normal.

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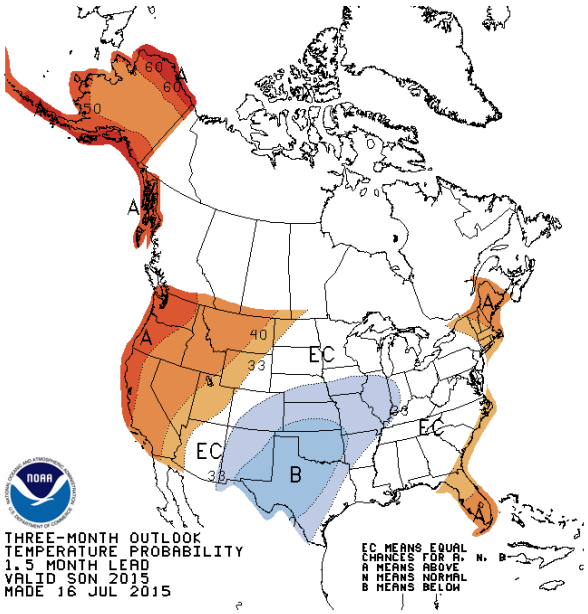
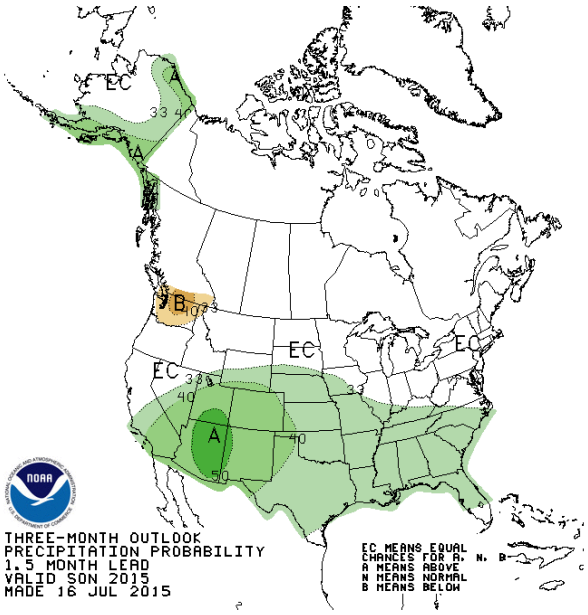
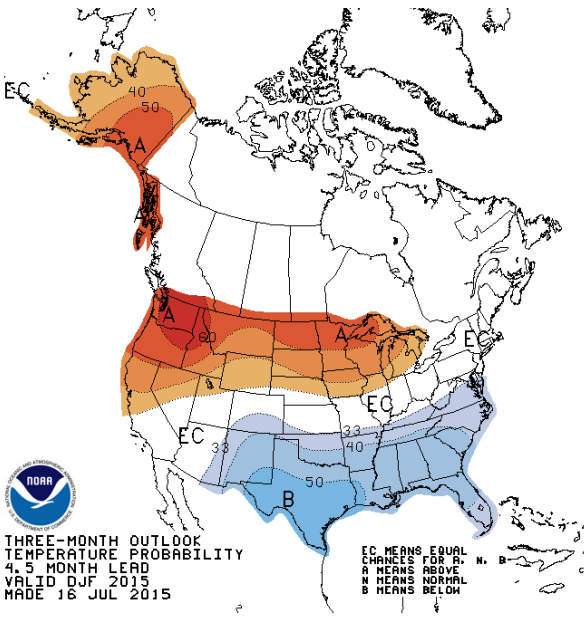
El Niño Has Arrived (cont.)

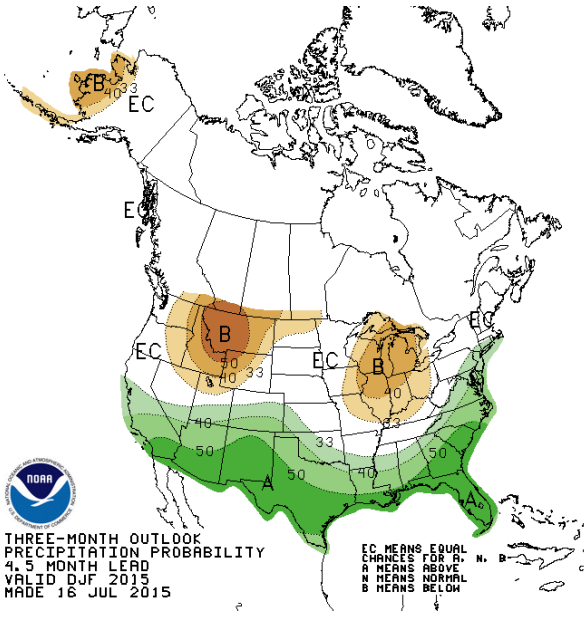




(above): Climate Prediction Center outlooks for temperature (left) and precipitation (right) for the autumn months of September, October and November. On the temperature map, areas in blue are favored to have below normal temperatures, including Illinois; warmer than normal conditions are shown in the orange and brown shades. On the precipitation map, wetter than normal conditions are shown in green, including southwestern Illinois, while drier conditions are shown in brown.

(below): Outlooks for the winter months (December, January, February) for temperature (left) and precipitation (right). The northern tier of the lower 48 states are favored for above-normal temperatures, including the northern third of Illinois, with cooler than normal weather across the southern U.S. Much of the Midwest and northern Rockies is favored to be drier than normal, with wetter conditions along the southern tier of states.





Lightning Trivia: A Pop Quiz

Our last issue contained a pop quiz on severe weather such as tornadoes and hail. This issue, we'll focus on lightning. How many of these do you know?

1) Who is typically struck by lightning more in the United States, males or females?
   A) Males
   B) Females

2) True or False: Lightning victims do not carry an electrical charge, and life-saving procedures such as CPR can be started immediately.

3) Which outdoor activity featured the most lightning strike victims between 2006-2014?
   A) Golfing
   B) Fishing
   C) Yard work
   D) Camping

4) To stay safe, how long should you stay indoors following the last sound of thunder?
   A) 5 minutes
   B) 15 minutes
   C) 30 minutes
   D) It is safe to leave immediately.

5) Which month features the most lightning fatalities on average?
   A) June
   B) July
   C) August

Did You Know?

If there was a lightning strike in a crowded stadium, the hazard area would typically extend out about 50 feet, killing 1 to 2 people and injuring dozens of others. However, some injuries can occur as far as 100 feet away. This would be equivalent to the kill radius and injury radius of a hand grenade!

Photo by Shae Cohan

Answers:

1=A. Approximately 81% of lightning fatalities in the U.S. were males.

2=True.

3=B. There were 31 lighting deaths while fishing, compared to 16 for camping, 13 for yard work, and 8 for golfing.

4=C.

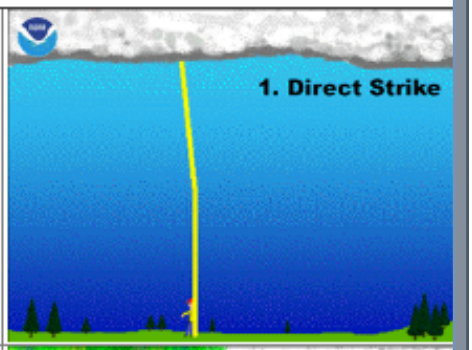
5=B.

Lightning Science: Five Ways Lightning Strikes People

It is not always possible to know exactly how a victim has been struck, but here is a list of ways that lightning strikes its victims. Any of these types of strikes can be deadly. Immediate medical attention, including calling 911, starting CPR, and using an AED, may be critically important to keep the person alive until more advanced medical care arrives.

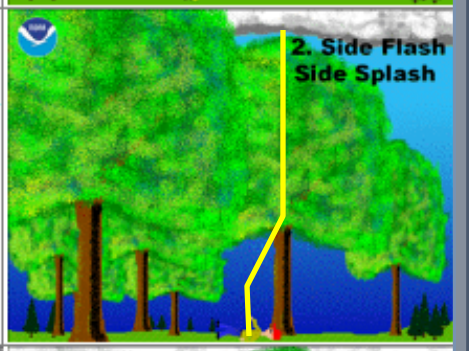
Direct Strike

A person struck directly by lightning becomes a part of the main lightning discharge channel. Most often, direct strikes occur to victims who are in open areas. Direct strikes are not as common as the other ways people are struck by lightning, but they are potentially the most deadly. In most direct strikes, a portion of the current moves along and just over the skin surface (called flashover) and a portion of the current moves through the body--usually through the cardiovascular and/or nervous systems. The heat produced when lightning moves over the skin can produce burns, but the current moving through the body is of greatest concern. While the ability to survive any lightning strike is related to immediate medical attention, the amount of current moving through the body is also a factor.



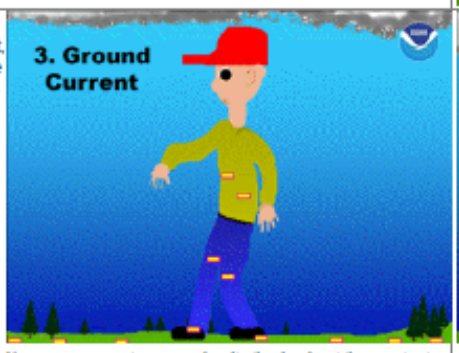
Side Flash

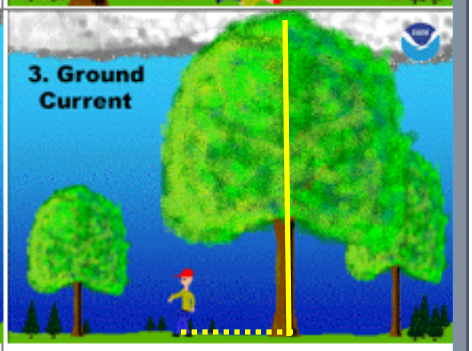
A side flash (also called a side splash) occurs when lightning strikes a taller object near the victim and a portion of the current jumps from taller object to the victim. In essence, the person acts as a "short circuit" for some of energy in the lightning discharge. Side flashes generally occur when the victim is within a foot or two of the object that is struck. Most often, side flash victims have taken shelter under a tree to avoid rain or hail.



Ground Current

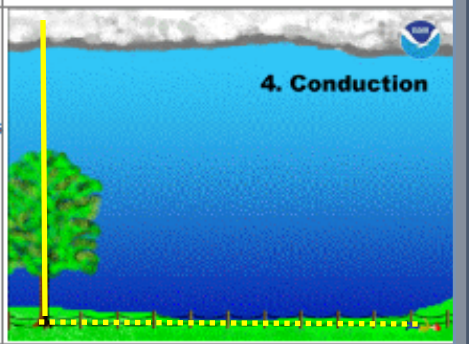
When lightning strikes a tree or other object, much of the energy travels outward from the strike in and along the ground surface. This is known as the ground current. Anyone outside near a lightning strike is potentially a victim of ground current. In addition, ground current can travels in garage floors with conductive materials. Because the ground current affects a much larger area than the other causes of lightning casualties, the ground current causes the most lightning deaths and injuries.Ground current also kills many farm animals. Typically, the lightning enters the body at the contact point closest to the lightning strike, travels through the cardiovascular and/or nervous systems, and exits the body at the contact point farthest from the lightning. The greater the distance between contact points, the greater the potential for death or serious injury. Because large farm animals have a relatively large body-span, ground current from a nearby lightning strike is often fatal to livestock.





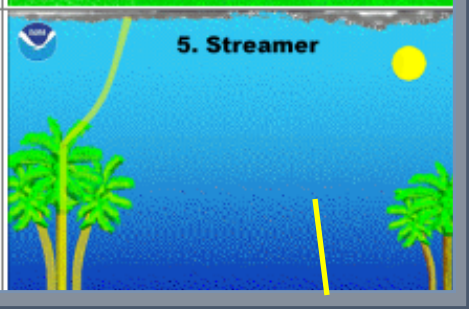
Conduction

Lightning can travel long distances in wires or other metal surfaces. Metal does not attract lightning, but it provides a path for the lightning to follow. Most indoor lightning casualties and some outdoor casualties are due to conduction. Whether inside or outside, anyone in contact with anything connected to metal wires, plumbing, or metal surfaces that extend outside is at risk. This includes anything that plugs into an electrical outlet, water faucets and showers, corded phones, and windows and doors.

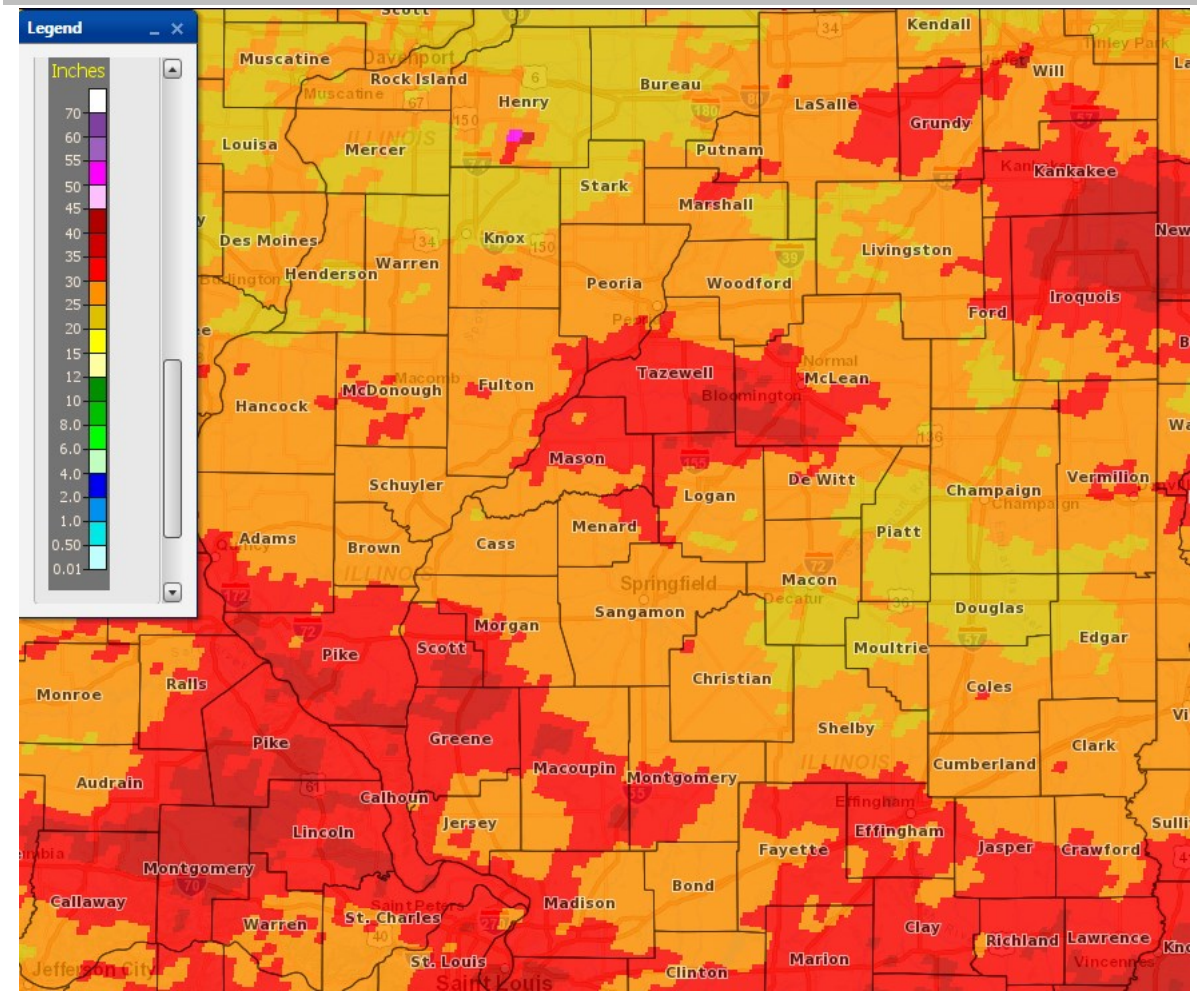


Streamers

While not as common as the other types of lightning injuries, people caught in "streamers" are at risk of being killed or injured by lightning. Streamers develop as the downward-moving leader approaches the ground. Typically, only one of the streamers makes contact with the leader as it approaches the ground and provides the path for the bright return stroke; however, when the main channel discharges, so do all the other streamers in the area. If a person is part of one of these streamers, they could be killed or injured during the streamer discharge even though the lightning channel was not completed between the cloud and the upward streamer. See Robert's story as an example of a streamer injury.



Precipitation Running Well Above Normal



Much of central and southeast Illinois has seen 25 to 35 inches of rain so far this year. This is largely thanks to unusually wet conditions during from May through July. Some locations have seen as much as 25" during this 3-month period!

Spring Climate Statistics

(March 1 through May 31)

Peoria:

- Average temperature: 54.4°F (2.6°F above normal)
- Total precipitation: 9.05" (1.71" below normal)
- Total snowfall: 2.7" (0.6" below normal)

Lincoln:

- Average temperature: 52.3°F (0.1°F above normal)
- Total precipitation: 11.63" (1.26" above normal)
- Total snowfall: 3.7" (1.7" above normal)

Springfield:

- Average temperature: 54.7°F (1.6°F above normal)
- Total precipitation: 9.63" (0.75" below normal)
- Total snowfall: 3.7" (0.9" above normal)

Central Illinois Lincoln Logs

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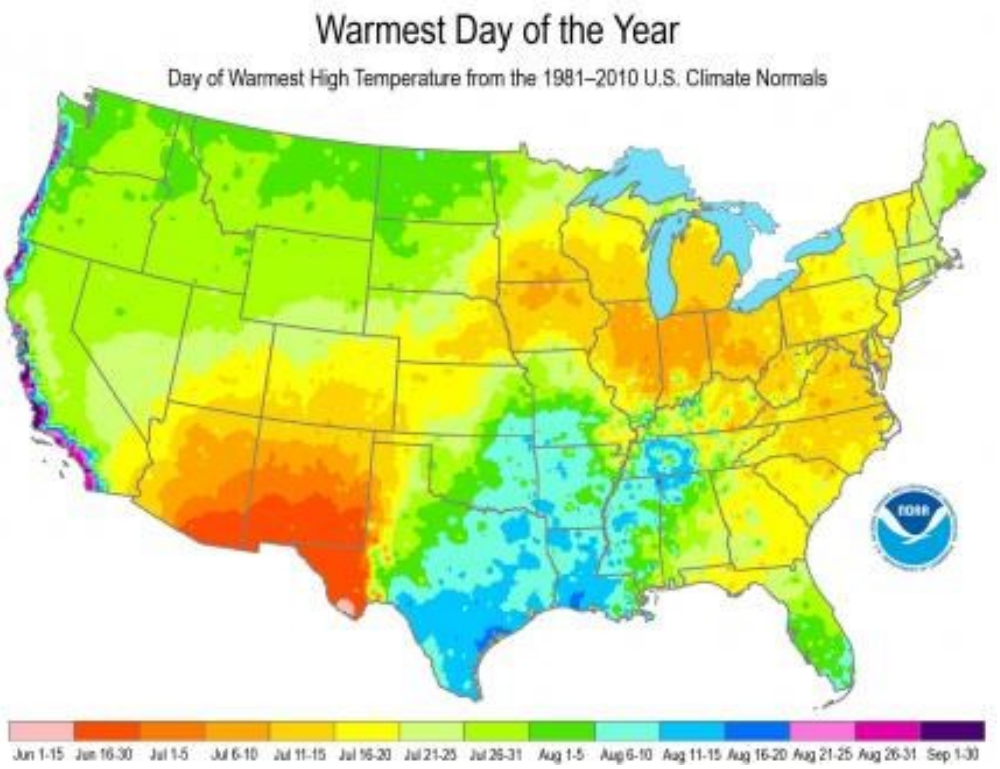
When is the Warmest Day of the Year?



The National Centers for Environmental Information derived maps of the "warmest day of the year", using 30-year climate normal. While the amount of solar radiation reaching Earth peaks around June 21 with the summer solstice, the rate of heat input from the Sun continues into the first part of July.

However, the actual period considered "warmest" varies across the nation. For example, Arizona and New Mexico peak during June, before the start of monsoon season which brings increased clouds and rainy periods. Areas along the immediate Pacific coast tend to see their warmest weather late in the season, due to the marine layer holding down temperatures in early summer.

In much of Illinois, the peak period for warmest average high temperatures is in the first half of July. However, locations close to the Ohio River will see a peak in early August.