SCIPP
A NOAA RISA TEAM

SCIPP Winter Weather Information Document

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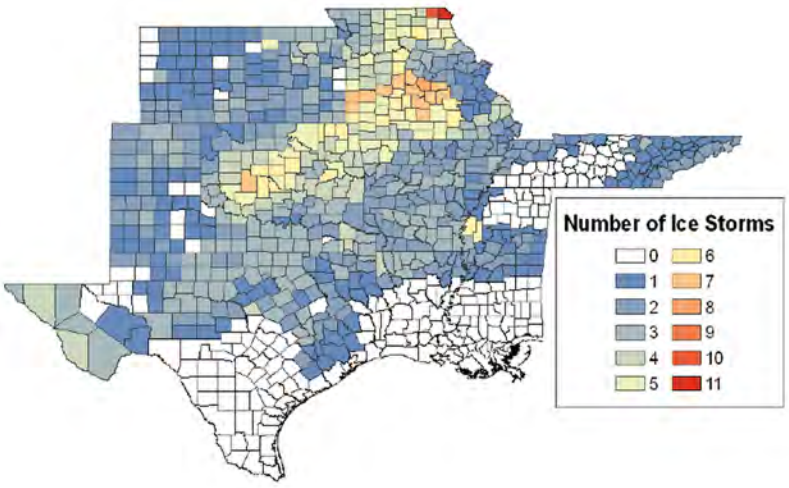
Introduction to Winter Weather

The term winter weather can bring to mind a variety of weather conditions within the SCIPP region ranging from sleet and freezing rain to heavy snow and thick coatings of ice. Extremely cold temperatures often accompany winter weather resulting in dangerous temperatures for humans and livestock in addition to damaging crops and farmlands. Unlike tornadoes and flash floods, which are more localized in nature, winter weather can affect multiple states at one time--bringing travel and communications to a halt.

Description

While many associate the southern states with drought and extreme heat, the SCIPP region also experiences crippling and severe winter weather. From ice storms that cut off power to thousands to snowstorms that bring transportation to a standstill, the SCIPP region is no exception to winter's fury. While winter officially begins in late December and ends in late March, snow and ice events can occur as early as November. Ice storms are most frequent in the months of December and January in the SCIPP region, (Kovacik et al. 2013) and freezing precipitation is the most common in central Oklahoma through southwestern Missouri and northwestern Arkansas (White et al. 2013). The number of ice storms within the SCIPP region and surrounding states from 2000-2009 can be seen in Figure 1. A maximum in ice storms is evident from central Oklahoma through southwest and central Missouri. While the SCIPP region also receives snow, some regions are more commonly affected than others. One unique aspect regarding snowstorms is that snow often falls in very concentrated bands which causes one city to receive tremendous amounts of snow while the next nearby city receives very little. For example, on December 24, 2004, the eastern coast of Texas experienced a historic snowstorm. Victoria County received slightly over a foot of snow but Gonzales County 65 miles away received none. Snowstorms within the SCIPP region can cause slick road conditions and travel delays in addition to disrupting the education system, since schools often close for snow or ice.

Figure 1: Number of Ice Storms within the SCIPP Region from 2000-2009 (Kovacik, 2013)



Forecasting Winter Weather

When forecasting winter storms, meteorologists look for several ingredients to be present. For both snowstorms and ice storms, sufficient lift, abundant moisture, and cold temperatures must be present. Lift is necessary in order for clouds and precipitation to form. For example, when warm air moves into a region and is forced to rise over cold air, clouds and precipitation often result. Topographic barriers also force air to rise. Abundant moisture is necessary so that the air can become saturated for precipitation to form. An excellent source of moisture for the SCIPP region is the Gulf of Mexico. Furthermore, the temperature profile must be cold enough to allow snow and ice to form. When determining whether precipitation will fall as sleet, snow, or freezing rain, meteorologists rely heavily on soundings, which are produced twice a day and are essentially a snapshot of what the atmosphere looks like at some point in time. When the entire sounding temperature is below freezing (Figure 2), the precipitation that falls will be snow. However, if the sounding temperature has a warm layer that is above a layer that is below freezing (Figure 3), precipitation will initially fall as rain but will be supercooled in the cold layer and freeze upon contact with the ground. In addition to soundings, meteorologists also utilize surface observations, satellite data, models, and past experience to forecast winter weather.

Figure 2: Classic Snow Profile

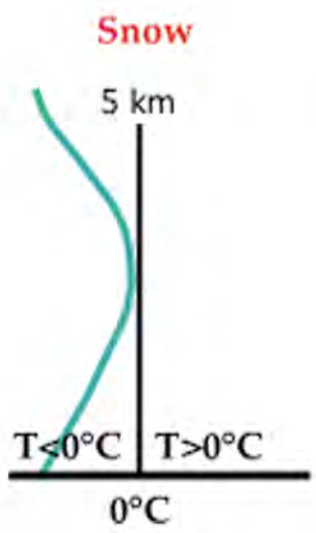


Figure 3: Classic Freezing Rain Profile

Images Courtesy of the University of Illinois
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/cld/prcp/zr/fcst/fcst.rxml

What to do during a Winter Storm

1 **Keep your NOAA Weather Radio close by and listen to your local television and radio channels.** Your NOAA Weather Radio is an excellent and official source for real-time weather information and warnings.

2 **Stay inside your home and do not travel.** 70% of winter weather related deaths are due to vehicle accidents and 25% are due to being caught out in the storm (NOAA). If you do choose to travel, be sure someone knows where you are going and travel along main roads where emergency vehicles can find your car if it becomes stuck.

3 **Don't overwork yourself when shoveling snow.** Make sure to take frequent breaks and stay hydrated when shoveling snow. Exhaustion and heart attacks due to overexertion are two common causes of death in winter weather.

4 **If you choose to go outside, bundle up and dress in multiple layers to keep warm.** Make sure to also cover up exposed and vulnerable areas of your body, especially your head as 40% of your body heat can be lost through your head (NOAA).

5 **If you decide to travel, be sure to have an emergency kit of food, water, and medical supplies in your car.**

6 **If your car becomes stranded in snow and ice, take proactive measures to ensure your safety.** If there is a building within short walking distance, seek shelter there. However, if there are no buildings within a short distance, run your car in 15 minute increments or slightly crack the window to avoid carbon monoxide poisoning. Attach some sort of visible marker to your car so that emergency vehicles can easily spot you. Make sure your tail pipe is clear of snow as blockage to the tail pipe can lead to carbon monoxide poisoning. Move your hands and legs often to keep blood circulating throughout your body and huddle together with other passengers to

Notable Winter Storms within the SCIPP Region

Oklahoma Ice Storm:
January 28-30, 2002

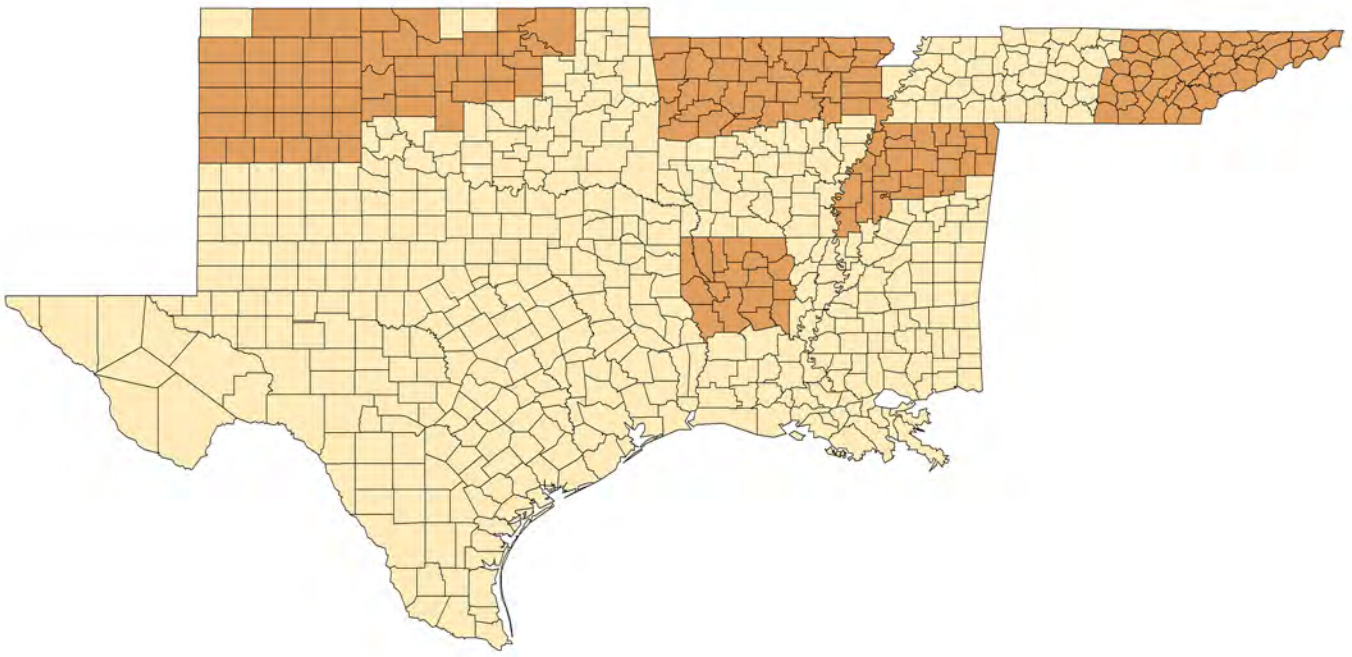
Freezing rain began to fall between the 29th and 30th, leaving north and west-central OK with average ice accumulations between 1-2 in. thick with some areas receiving up to 4-6 in. Although the ice storm lasted just over 24 hrs., over half of the counties within OK were declared as federal disaster areas. The ice storm caused $100 million in damages, 7 fatalities, and a quarter million people to not have power. Even three weeks after the storm, 2,320 people still did not have power (OCS).

Arkansas Ice Storm:
January 26-28, 2009

Freezing rain began in northern and central AR during the evening hours on the 26th and lasted through the 27th. While above freezing temperatures in southern AR resulted in rain, 1-2 in. of freezing rain occurred in northern AR. Damage from the icing in northern AR was substantial with one observer describing the sound from trees continuously breaking due to the weight of ice "like a war zone" (NOAA). 18 fatalities were linked to the ice storm, 350,000 people lost power, and at least 30,000 utility poles were damaged.

Tennessee Winter Storm:
March 12-14, 1993

While the "Storm of the Century" affected the entire eastern portion of the country stretching from Florida all the way up through Maine, Tennessee was also affected by this historic storm. Snow began to fall in central and eastern Tennessee on the 12th and continued through the 14th with central and eastern TN receiving between 10-20 in. of snow. Mount LeConte in eastern TN received a record 60 in. of snow. The "Storm of the Century" resulted in 14 fatalities in just TN alone.



Texas Blizzard: February 25, 2013

Blizzard-like conditions began the morning of the 25th and continued throughout the day. Both the TX and OK panhandles were affected. Blizzard conditions were observed as snow fell at 2-3 in. per hr. and strong winds resulted in blowing snow and reduced visibility. All roads within the TX and OK panhandles were closed. Amarillo received 19 in. of snow in just 24 hrs. and wind gusts up to 75 mph were recorded.

Louisiana Winter Storm:
February 11-12, 2010

Cold air and moisture that was locked in place caused light snow to fall in parts of central and northern LA beginning the morning of the 11th. As the storm system progressed and strengthened, snow fell at 1-2 in. per hr. from later during the evening on the 11th through early morning on the 12th. The National Weather Service office in Shreveport received 5.4 in. of snow. Numerous schools were closed and many people were without power.

Mississippi Ice Storm:
February 9-11, 1994

Although the 1994 ice storm also affected parts of AR, TN, AL, LA, and TX, northern MS was the most severely affected. Freezing rain occured from the 9th through 11th and resulted in ice accumulations of 3-6 in. in northern MS. The ice storm severely damaged agriculture and croplands in northern MS. Twenty-six counties were federally declared as disaster areas. Nearly half a million people were without power and total damages from the storm was close to $2 billion.

What You can do to Prepare

1 Have the necessary supplies ready if the power goes out. Be sure to have extra flashlights, batteries, and your cell phone charged in addition to canned foods or any food that does not require cooking or refrigeration.

2 Make sure outdoor animals are taken care of. While it is important that animals are kept warm, most animal deaths in winter storms are due to dehydration (NOAA). Ensure that outdoor animals have an abundant and continuous supply of drinking water.

3 Be sure to winterize your car before winter weather hits. Check your car's antifreeze levels in addition to ensuring the heater and defroster are functioning properly. Fill up your car's gas tank before winter weather arrives as frigid temperatures could possibly freeze gasoline in a near empty gas tank.

4 Keep a supply of blankets and backup heaters available. While space heaters, kerosene heaters, and electrical generators can each supply much needed heat if the power goes out, special care should be taken when using these. Always use caution when lighting and allow some ventilation to prevent harmful fumes, such as carbon monoxide, from remaining in the house. Do not use an electrical generator indoors as carbon monoxide levels can rise unnoticed to a deadly level.

5 Take preventative measures to keep pipes from freezing. Wrap exposed pipes in insulation and let bathroom and kitchen sink faucets drip to provide pressure relief within the pipes.

For More Information

1) NOAA Winter Storms Brochure: A general overview on the causes and impacts of winter weather in addition to addressing specific ways in which to prepare for winter storms.
http://www.nws.noaa.gov/om/winter/resources/Winter_Storms2008.pdf

2) National Weather Service: The organization that issues winter weather warnings and weather forecasts for the entire country. Over 100 forecast offices cover small geographic areas.
http://www.weather.gov/

3) Weather Prediction Center Winter Weather Forecasts: From Sept. 15th through May 15th, the WPC produces winter weather maps twice a day indicating the probability for snow and freezing rain anywhere in the United States.
http://www.wpc.ncep.noaa.gov/wwd/winter_wx.shtml

4) Centers for Disease Control and Prevention Extreme Cold Guide: Provides an excellent overview on how to prepare your home and car for extreme cold in addition to discussing ways to prevent and treat frostbite and hypothermia.
http://www.bt.cdc.gov/disasters/winter/pdf/extreme-cold-guide.pdf

Contact Us

Please contact either one of our two program managers for more information about SCIPP or to get involved:

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References

Kovacik, C.E., 2013: A Preliminary Climatology of U.S. Ice Storm Frequency and a Comparison between Northeast U.S. Ice Storm Frequency and Teleconnections. M.S. thesis, University of Oklahoma, 131 pp.

White, E. D., L.M. Leslie, P.J. Lamb, 2013: A Synoptic Climatology of Southern Plains Winter Storms. Proc. 5th Conference on Climate Variability and Change, Austin, TX, Amer. Meteor. Soc.

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