The Southern Plains Cyclone

A weather newsletter from your Norman Forecast Office for the residents of western and central Oklahoma and western north Texas

We Make the Difference When it Matters Most!

Volume 6 | Winter 2008 | Issue 1

ICE !

Photos: Taken in Norman, OK. Provided by Alex Lamers (Left) and Kevin Scharfenberg (Right)

Historic Ice Storm

By Ty Judd, Meteorologist Intern & Patrick Burke, General Forecaster

The Southern Plains states have seen more than their fair share of ice storms over the past decade. Long bands of freezing rain some 50 to 80 miles wide stretched from Kingfisher, Oklahoma, up to Kansas City in 2000. Kansas saw another crippling storm in 2004, and southeast Oklahoma was buried in ice during the winters of 2002 and 2007. Residents of our region have become accustomed to pictures of downed trees and power lines, and landscapes encased in one to two inches of ice. It is staggering, then, to think that the storm of December 2007, outdid them all.

A devastating December storm affected a large swath of Oklahoma beginning on Sunday, the 9th, and continuing through Tuesday, the 11th. The storm left behind a trail of severe damage to trees and power lines, which, in turn, led to the worst power outage in Oklahoma history (in terms of the number of people impacted). Other ice storms have produced thicker accumulations of ice compared to the three quarters to one inch which accumulated last December, but never before had a storm zeroed in on the urban corridor from Lawton to Oklahoma City and Tulsa.

The storm began when an arctic cold front entered the northern half of Oklahoma on December 8th, and then sagged into central Texas by the morning of the 9th. With a slow moving upper level storm approaching from the west, a well recognized ice-storm producing weather pattern was in place. The National Weather Service Forecast

See **Ice Storm** on page 4

Meet Your Weatherman Steve Kruckenberg

Greetings! My name is Steve Kruckenberg and I am the Service Hydrologist at the NWS Norman forecast office. Unlike the forecast staff at our office, which includes a total of 12 forecasters, I am the only hydrologist at the Norman Forecast Office. I oversee the hydrology program, which includes 56 river forecast points within the NWS Norman area. As part of our mission to save lives and property, the NWS Norman staff issues flood and flash flood watches, outlooks, warnings and statements for rivers, creeks, streams and other flood-prone areas within our area of responsibility. I am also part of the NWS Norman web team, and have helped to create web pages like the

Enhanced Weather Page that is used by numerous emergency management officials as well as the general public.

I was born in Oklahoma, but grew up in central Kansas. I have always been interested in weather. During my grade school years my parents bought me a weather observation hobby kit for birthday which I promptly installed. I used the kit to make and record my own weather observations. My interest in tornadoes was so great that I probably checked out Snowden

See **Weatherman** on page 3

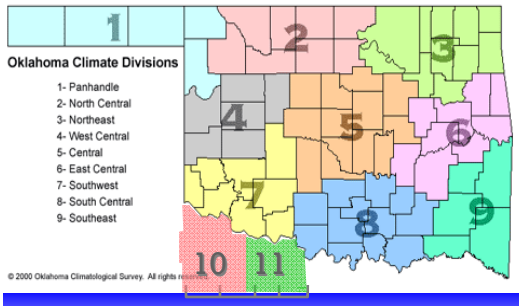
La Niña Winter

By Bruce Thoren, General Forecaster and Climate Focal Point

In addition to tackling today's weather and looking out at the next seven days, the National Weather Service also makes forecasts several months into the future. Such long range forecasts, or "climate outlooks" can greatly benefit a number of industries. Imagine private weather companies helping a farmer plan what crop to plant and when, or energy departments anticipating whether people will need to cool or heat their homes during March. Climate outlooks do not try to forecast the weather for a particular day. You wouldn't use a climate outlook to plan your outdoor wedding, but knowing whether the upcoming months will average warm and dry versus cold and wet can go a long way towards planning larger, longer lived operations.

The problem meteorologists struggle with is that there are very few tools that can be used to make a three month forecast. The atmosphere is chaotic, meaning subtle changes can turn into big changes in a short time. Our best bet when forecasting months in advance is to examine very large scale patterns, including those in the earth's oceans. That is where La Niña comes into play. La Niña conditions occur when tropical sea-surface temperatures across the eastern and central Pacific Ocean cool to below normal values. The opposite occurs during El Nino, when the same waters warm to above normal values. Ocean or sea surface temperatures are important because they govern the exchange of heat and moisture between the water and the atmosphere.

Studies have shown that the accuracy of long range forecasts for the lower 48 states peaks in late winter, when the atmosphere is perhaps less chaotic, or at least has fewer dominant influences. The latter is particularly true when strong La Niña or El Niño conditions are present. During the second half of 2007, meteorologists correctly predicted the onset of a strong La Niña that would take place during the winter leading into 2008. So what does a strong La Niña usually mean for Oklahoma and western north Texas? Since the late 1940s, 18 La Niña episodes have been documented, and they have corresponded with a greater likelihood of above normal temperatures and below normal precipitation during the winter months (December through February). What is normal at Wichita Falls, however, is certainly not what is normal at Stillwater. Furthermore, not every La Niña is created the same; each event varies in duration and amount of ocean cooling. We studied this issue in greater detail by breaking the forecast area into smaller "climate divisions" (9 in Oklahoma and 2 in western north Texas) and comparing the effects of strong versus weak La Niñas.



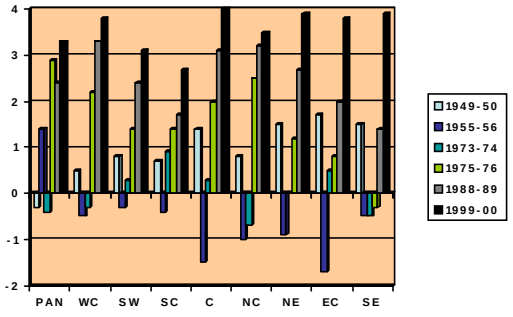
Climate Divisions in Oklahoma and western north Texas.

Analysis of the strong events (the winters of 1949-50, 1955-56, 1973-74, 1975-76, 1988-89, and 1999-00) suggests that La Niña, indeed, increases the odds of above normal temperatures and near or below normal precipitation throughout every climate division. Analysis of weak events, however, indicates that temperatures are more likely to fall *below* normal, especially across the northern climate divisions of Oklahoma. Weak events had seemingly little effect on precipitation.

Heading into the winter of 2007-2008, forecasters were confident that the season would be defined by a strong La Niña. Therefore, the previous six strong La Niña winters were further broken down by month. In December, each climate division was characterized as having near normal to above normal temperatures. Precipitation amounts were usually below normal across western climate divisions while the eastern one-third of divisions experienced either normal or below normal precipitation.

January temperatures showed the same trends as December. January precipitation, however, showed a strong signal that below normal precipitation would most likely occur across each climate division. February temperatures throughout Oklahoma were above normal to well above normal, with the exception of 1989 when well below normal temperatures were observed. February's precipitation data were mixed, with most areas receiving near or below normal precipitation. The exception was the Panhandle and northwest region of state where below normal precipitation occurred in all but one year.

So did past La Niñas provide some insight into what occurred during the winter of 2007-08? Precipitation during the month of January 2008 ranged from near normal to well below normal in all but one climate division.



Example Analysis of temperatures (December) across 9 Oklahoma climate divisions for 6 strong La Niña events. Most events produced average temperatures of 1 to 4 degrees warmer than normal.

See **La Niña** on page 6

Woodward Spotter Sees Training Come to Life

By Patrick Burke, General Forecaster

Each year meteorologists from the National Weather Service Forecast Office in Norman head out to visit with the communities we serve, offering training to our volunteer storm spotters. Sessions are typically hosted by the local emergency management team, and are heavily attended by police and fire personnel, as well as the general public. These people become our trained eyes in the field, reporting severe weather back to their community leaders and to the Norman forecast office, ensuring prompt and accurate local warnings of hail, strong winds, flooding, and tornadoes. This year, that training suddenly came to life for one Woodward woman.

On Thursday, Feburary 29, 2008, I had the pleasure of delivering a 2 hour presentation to an eager crowd of 121 people at the High Plains Technology Center in Woodward. Tressie Harzman was one of the people that night who, through a combination of diagrams, photographs, and video, learned how to quickly and safely spot the thunderstorm processes that typically lead to severe weather and tornado formation. Just three days later, on Sunday, March 3rd, Tressie writes,

"I was traveling back home to Woodward from Oklahoma City and was about 2 miles west of [a tornado] on highway 270 when it touched down. We had been watching the clouds and could see the wall cloud forming and then the tornado. All thanks to weather training school, I was able to recogonize it."

Using her cell phone, Tressie snapped a photograph of the tornado which touched down four miles north of Eagle City in Blaine County. The photograph clearly shows the condensation funnel and a pronounced clear slot where downdrafts around the circulation have cleared out the low level clouds. This clear slot is often observed just prior to and during a tornado. Few storm spotters get to see their training come to life in this way, especially so soon!

Fortunately, the tornado did not cause any injuries, but it is a sign that spring is arriving on the plains. If you have missed this year's spotter training, you can still stay safe and learn about severe weather on our web site, http://weather.gov/norman.

Weatherman: From page 1

Flora's book, Tornadoes of the United States, many times from the public library. It was the only book available at the time with detailed tornado data and photos.

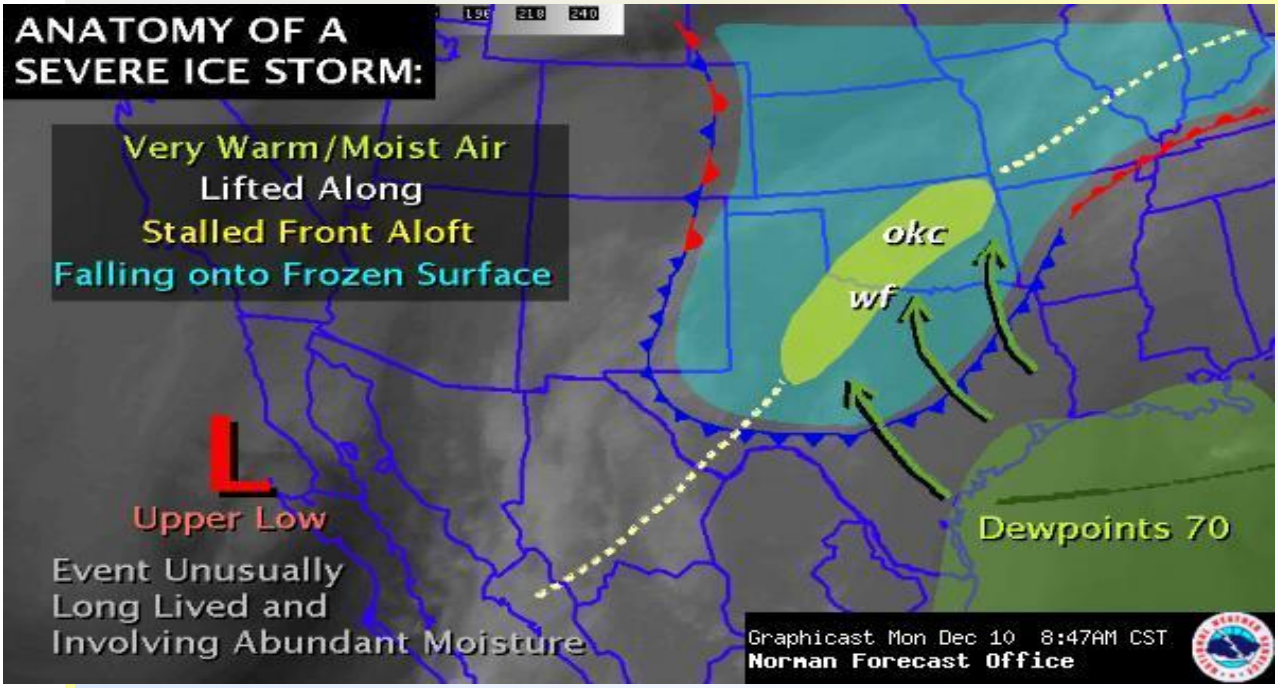
I received a Bachelors Degree in Mathematics from Bethany College, a small private college in central Kansas before moving on to the University of Oklahoma where I earned another Bachelors Degree in Meteorology. After graduating from OU, I was hired as a hydrologist intern at the Missouri Basin River Forecast Center (MBRFC) now located in Pleasant Hill, MO. After receiving training at the MBRFC, I then moved to Goodland, KS to become the Service Hydrologist at the NWS Forecast Office. During my time in Goodland I was asked to provide assistance at other NWS offices during the prolonged flooding that occurred in the north central and central U.S. during the summer of 1993. I worked at both the North Central River Forecast Center (NCRFC), now in Chanhassen, MN, and the NWS Forecast Office in Topeka, KS, during flood events in July 1993. The Great Flood of 1993 will always be a memorable event for me.

After a couple years in Goodland, I then became a Hydrometeorological Analysis and Support (HAS) Forecaster at the NCRFC. One of the most memorable events during my time there was the extensive spring snowmelt flooding along the Red River of the North that flooded many cities and towns, and devastated the cities of Grand Forks, ND and East Grand Forks, MN during April 1997.

After four years as a HAS Forecaster, I returned to Norman where I now work as the Service Hydrologist at the Norman Forecast Office. Some of the more memorable flood events include the "Halloween" flood of October 31-November 3, 1998 when the record crest stage was set at the Blackwell, OK river gage site, and the early March 2004 flash flood that plagued the city of Kingfisher, OK, and derailed a freight train. The widespread and prolonged flooding that occurred from late March through mid August 2007 will also be forever burned into my memory. All-time record crests occurred at many river forecast points during those months, and during some periods, multiple cities were nearly simultaneously flooded including Blackwell, Chickasha, El Reno, Guthrie, Kingfisher, Lindsay, Waurika, and Yukon in Oklahoma, and Wichita Falls in western north Texas. During 2007, some rivers and creeks experienced flooding for the first time since the early 1990s.

I am fortunate to be part of the NWS Norman staff, and we will continue working with emergency managers, numerous state and federal agencies, and the public to improve and expand hydrologic services.

Ice Storm: From Page 1



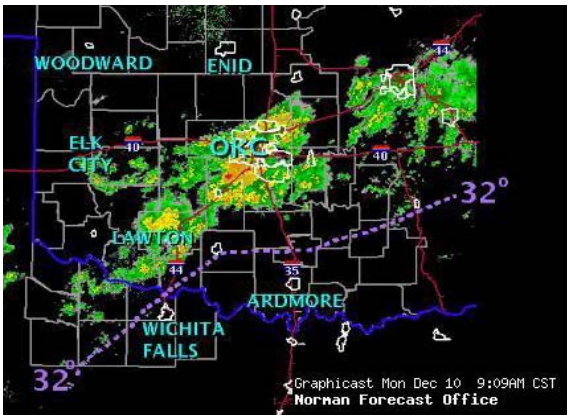
Graphicasts Describing the weather features which produced the ice storm (Left) and showing heavy rain falling north of the freezing line (Bottom).

Office in Norman issued winter storm watches nearly 60 hours in advance of the storm's onset.

While the large scale pattern was comparable to previous big storms, several factors conspired to enhance the intensity and impact of the December 2007, storm. The cold air arrived sooner and was slightly colder than initially expected. This would allow ice to form more rapidly and with less runoff, especially on exposed and elevated surfaces such as trees. Meanwhile, unusually warm and moist air, with dewpoints in the 70s Fahrenheit, streamed up and over the front, arriving in Oklahoma at a few thousand feet above the ground. During the height of the event, the cold front in Texas literally separated fresh arctic air from fresh tropical air originating deep in the Gulf of Mexico and the northern Caribbean Sea. The contrast across the front, of cold and dry versus warm and moist, was at the upper end of what can occur anywhere on earth.

The tropical moisture contributed to greater instability and more intense rain producing thunderstorms which formed near a stalled mid level front in Oklahoma. The zone of thunderstorm formation was nearly stationary from Lawton to Oklahoma City to Tulsa for over 30 hours, meaning the same areas received countless thunderstorms dumping heavy freezing rain. Had temperatures not risen a few degrees on the 11th, the story would have been even worse, as another inch of cold rain fell across the state.

As it was, though, the ice that did fall resulted in one of the most costly storms in Oklahoma history. By the time the storm had ended, 2 to 4 inches of liquid had fallen from the skies, with around 1 inch of ice accumulation. The governor declared a State of Emergency for all 77 Oklahoma counties. At least 27 deaths were reported statewide, mainly due to hundreds of automobile accidents. Other deaths were attributed to prolonged cold air exposure or carbon monoxide poisoning. Most of the December 12th morning flights in and out of Will Rogers World Airport in Oklahoma City were canceled because of icy runways. Tree and power line damage occurred statewide, leaving more than 641,000 electric customers without power (the actual number of people was likely much larger). Due to the magnitude of the outage, electrical crews from dozens of states worked 12-hour shifts daily to restore power. Even with this huge relief effort, more than 150,000 residents were still without power one week after the storm.

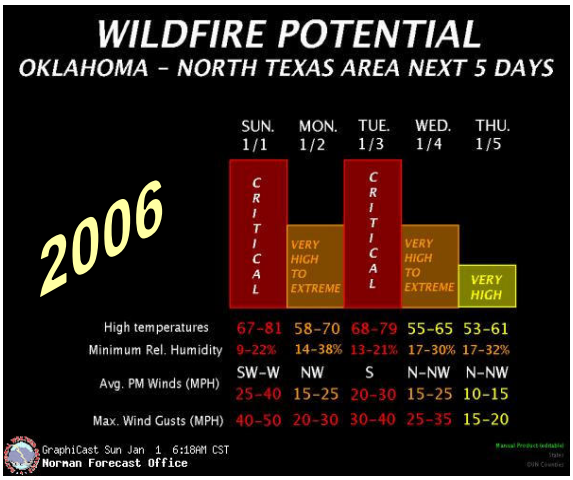


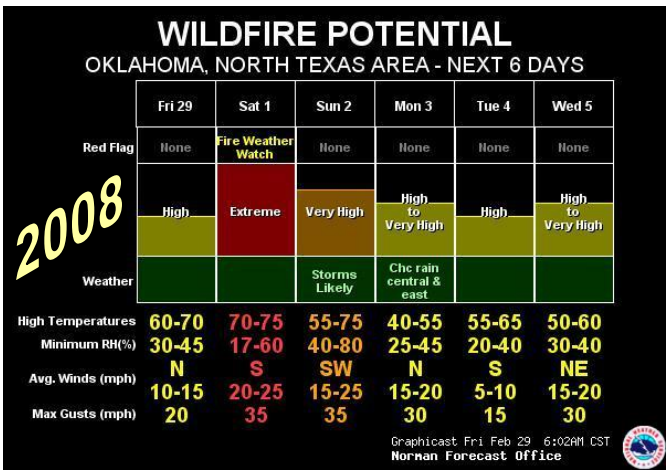
Fallen power lines created another hazard as the broken lines sparked structure fires. Fire departments responded to over 100 structure fires in all. Other fires were caused by portable heating sources inside the home. Schools, churches, and local businesses had to close, some for several days. Christmas parades and area sporting events had to be rescheduled or canceled all together. Final exams at area colleges were also postponed. The local economy took a huge hit as the ice storm occurred during the holiday season. The pecan crop loss alone was estimated at $25 million statewide. The storm cleanup was estimated to cost at least $200 million statewide. Cities were expected to remove over 750,000 cubic yards of debris. Sadly, some of the trees that had to be cut back or cut down altogether were over 100 years old.

Western North Texas was, for the most part, spared the icy weather. Sub-freezing air dipped into the region during the morning hours of the 9th, and rain created slick spots on bridges and other elevated surfaces. Some tree limbs were felled by the weight of the ice, the event did not last long, as the freezing line retreated back into southern Oklahoma and the heavier rainfall remained north of the Red River.

History of the Fire Danger Bar Graph

By Scott Curl, General Forecaster and Fire Weather Focal Point





In the winter of 2005-2006, we began an intense fire weather season that saw a record number of wildfires and acres burned across Oklahoma. Numerous fires also occurred in western north Texas. Although the National Weather Service had many ways of relaying information about fire weather and wildfire potential to our federal, state, and local partners, a rash of severe wildfires late in 2005, brought much greater interest from news media and the public.

Fueled by long term drought, unusually warm weather, and dormant vegetation, fires become a near daily concern heading into January of 2006. The situation called for us to develop a simple method for conveying fire weather information to a variety of users. Senior forecaster Mike Branick is credited with hatching the idea for the first Fire Weather Bar Graph, pictured above. This graphic provided many of the elements vital in fire weather forecasting, and was presented right on the front page of our web site.

The bar graph places all the pertinent information in one location and in a format that makes it easy for fire officials to make critical decisions. The fire danger categories, such as Very High and Extreme, are determined by a formula using the state of the vegetation, temperature, relative humidity, and wind speed. Specific forecast values for these parameters are provided on the bar graph, allowing fire fighters to anticipate the range of possible fire behavior on any given day. They may use such information to plan prescribed burns and anticipate the type of response needed for wildfires. General users, meanwhile, can glance at the color coded, height coded, and labeled bars to get a quick idea of which days are most likely to support the development of wildfires. In this respect, the bar graph is intended to raise public awareness so that Oklahomans and Texans will know when to avoid risky activity such as burning trash or welding outdoors.

The Fire Weather Bar Graph was very well received by the emergency management and fire fighting communities, as well as the local media, who created similar graphics for their own newscasts.

Nearly every day for the winter of 2005-2006, forecasters at the NWS in Norman updated the Fire Weather Bar Graph. The graphical software at the time, however, was not well suited to handling significant changes to the graph from one day to the next. The actual editing process was meticulous and time consuming, as all the work was performed by hand.

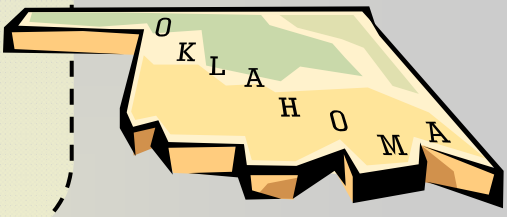
Since 2006, the graph has undergone many changes, the most significant of which is the use of locally written software designed specifically for editing the bar graph. The program was created by General Forecaster, Cheryl Sharpe. The current version of the software, which is in use for the 2008 season, pulls the National Weather Service forecast from a local database and creates the bar graph, sometimes requiring no hand edits at all. The content of the graph has also evolved, with the addition of other fields such as precipitation chances and Fire Weather Watch and Red Flag Warning information.

While the severe fire season of 2005-2006, will hopefully not be repeated anytime soon, Oklahoma and north Texas will almost certainly see bouts of wildfire activity each year. The Fire Weather Bar Graph is a great tool to quickly relay the thoughts of the forecast office as they relate to fire weather. Emergency managers, as well as other state and federal agencies, such as Oklahoma Forestry, U.S. Forestry, Bureau of Indian Affairs, and others in Oklahoma and north Texas have used this graphic to plan the allocation of assets for prescribed fires and to fight wildfires. The graphic acts as a kind of heads up for others, such as local media and the general public, who may then act carefully and remain vigilant in preventing wildfires. With innovations like the Fire Weather Bar Graph, the Norman Forecast Office continues to lead the way in providing critical decision-making information in new and creative ways.

By the Numbers

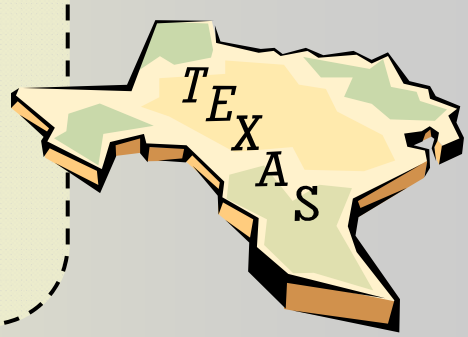
Winter 2007-2008 at Oklahoma City

	December	January	February	Combined
Average Temperature (°F)				
This year	39.0	40.1	42.0	40.4
Normal	39.5	36.7	41.7	39.3
Departure	-0.5	+3.4	-0.3	+1.1
Precipitation (Inches)				
This year	3.43	0.65	2.88	6.96
Normal	1.89	1.28	1.56	4.73
Departure	+1.54	-0.63	+1.32	+2.23

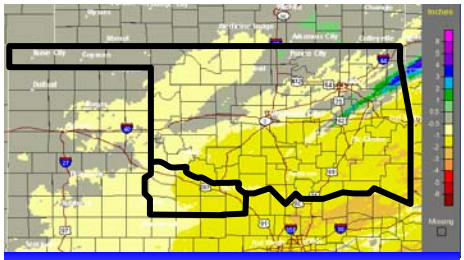


Winter 2007-2008 at Wichita Falls

	December	January	February	Combined
Average Temperature (°F)				
This year	43.7	44.3	49.0	45.7
Normal	42.9	40.5	45.7	43.0
Departure	+0.8	+3.8	+3.3	+2.7
Precipitation (Inches)				
This year	0.76	0.01	0.99	1.76
Normal	1.68	1.12	1.58	4.38
Departure	-0.92	-1.11	-0.59	-2.62



La Niña: From page 2



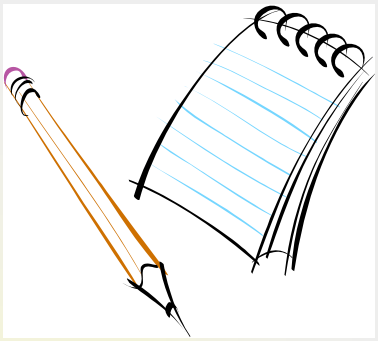
January departure from normal precipitation, indicating the vast majority of the region saw 0.5 to 2 inches less water than normal.

This result is consistent with a strong La Niña, and appears to be the best proven influence of La Nina on our region. Northeast Oklahoma was the lone exception.

On the other hand, during December 2007, only southeast Oklahoma saw the expected above normal temperatures. The other climate divisions ranged from near normal to below normal. February temperatures better fit the expectations, coming in above normal in a majority of climate divisions. The Oklahoma panhandle, northeast and parts of the east central Oklahoma saw below normal temperatures. December precipitation varied across all divisions, but the Oklahoma panhandle and north central Oklahoma came in opposite the expectations, receiving well above normal amounts. During February 2008, above-normal precipitation fell again across a majority of climate divisions.

Clearly, there may be some utility in using La Niña as a long range forecast tool. Strong La Niñas correspond very well to a dry January in Oklahoma and western north Texas. It is clear, though, that we have a long way to go toward understanding monthly and yearly climate. There have only been 18 La Niñas, and only 6 of them strong, since the phenomenon was recognized. Although we can use this data to look at trends and create probabilities, we do not have enough events to create meaningful statistics that would better determine if a link exists between La Niña and our local climate. Further complicating matters, weather is a vast system, and countless other oceanic and atmospheric patterns are taking place at the same time as La Niña. Determining how each factor interacts with the others, and narrowing in on their relative importance may be the key to improving long term forecasts of temperature and precipitation.

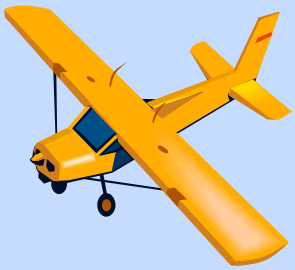
Norman Office Forecast Notebook - A Complete Look at Events and Happenings



Did You Know?

The Norman Office forecasts for seven airport terminals in Oklahoma and western north Texas. They are:

Oklahoma City (Will Rogers)
Wichita Falls (Sheppard Air Force Base)
Ponca City
Woodward
Gage
Lawton
Hobart



Later in 2008, the National Weather Service will also begin issuing terminal forecasts for airports in **Clinton** and **Norman**, Oklahoma. These are 24 hour forecasts of elements critical to aircraft operation, such as cloud heights, winds, visibility, and precipitation.

NWS Norman Hosts Student Volunteers

The Forecast Office began working more closely with the University of Oklahoma this winter. The new National Weather Center is home to both the Forecast Office and the University's Department of Meteorology. Several students have taken advantage of opportunities to work a part time schedule on a volunteer basis. The students assist meteorologists at our public service desk, answering phones, monitoring daily climate data, assisting in balloon launches, and coordinating with storm spotters during severe weather. The number of volunteer positions is limited, and preference is given to college Seniors who will benefit immediately from the experience when applying for jobs in meteorology.

New Spotter Web Page

There is a myriad of weather information available from the National Weather Service, and just as many ways that such information can be presented. A new portion of the Norman Office's web site is custom tailored for trained storm spotters. The page provides links to training materials that will help spotters brush up on key concepts. A weather briefing link takes spotters to the current Hazardous Weather Outlook and a map of current warnings. The page refreshes automatically to keep information flowing during rapidly evolving severe weather, and spotters can even submit a storm report online with a few clicks of the mouse. Check it out at: **http://weather.gov/norman/spotter**

Editor's Note

Thanks for your patience in awaiting the Winter 2008 Newsletter. It has been a busy year already, with some form of ice, fire, or severe weather seemingly always in the forecast. It is my hope to produce the Spring 2008 Newsletter by the end of May, getting us back on track for mid-season releases. So check back soon. Spring is not far away!

You'll want to watch our enhanced web page for another exciting new feature. We have begun producing Multimedia Weather Briefings. Initially, these presentations will be published to the web in anticipation of an upcoming storm system. Eventually, they may become a routine product you might see every day. When you see the icon above, click on it, and you will see graphical forecasts and get to listen to National Weather Service Meteorologists describe how the storm is taking shape, whom it will impact, when, and how!

Cooperative Observer Notes

Length of Service Awards:

Our Observations Program Leader, Forrest Mitchell (pictured left in images 2-4), along with other members of staff, including Meteorologist-in-Charge, Mike Foster (pictured left in image 1) have been busy handing out awards to our dedicated Cooperative Observers.

Leading the way is Pat Hancock who has served a remarkable 45 years at the Sedan, OK, station, in sight of the Wichita Mountains north of Lawton.

The cooperative weather station at Billings was established in January of 1914. Initially, only precipitation was measured and reported at the Billings station. Temperature equipment was added in December of 1957. Seven observers have served over the 94 year history of the station; George Oller has served for the past 35 years.

The cooperative weather station at Cushing was established in September of 1937. Since November of 1940, the equipment has been located at on the grounds of City Hall. Until 1983, individuals with the Cushing Police Department were documented as the official weather observers. The police department, as an institution, has been documented as the observer since 1983, twenty-five years ago. Molly Greg accepted the award on behalf of the Cushing Police Department.

The cooperative weather station at Perkins was established on April 15, 1927. Previous observers include J E Bartholomew, Mrs. Francis F Gray, A Leon Reynolds, and George T Bickell. Mr. Lott started taking weather observations on September 1, 1988, and is only the fifth to serve as the official Cooperative weather Observer in the 81 year history of the Perkins station.

Mitchell says all of these observers have Mitchell said, “provided a tremendous public service to the citizens and state of Oklahoma, and to the Nation, by providing accurate and timely weather data. The information is vital towards fulfilling the mission of the National Weather Service. They are to be commended for their dedication.”

The precipitation and temperature data provided daily by the Cooperative Observing Network is used extensively by the National Weather Service and other agencies in weather forecasting, river flow analysis, storm water management, and long term climate studies.

Temperature and precipitation data from the Cooperative Program is the official source for climatological averages nationwide. The weather data supports a variety of users, such as public utilities, agribusiness, insurance companies, the construction industry, and the legal profession.

Pat Hancock - 45 years
Sedan, OK

1

George Oller - 35 years
Billings, OK

2

Cushing PD - 25 years

3

Bill Lott - 20 years
Perkins, OK

4

The Norman NWS Cooperative Observer Program Team:

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Check out our text-based and graphical forecasts for your county at *weather.gov/norman*.

If you'd like to visit our office and learn more about what goes on at the National Weather Center, go to http://nwc.ou.edu/visitor_center.php for more details on scheduling your visit. We'd love to see you!

Please share this with friends, relatives, and colleagues. Comments and suggestions are always appreciated, by phone at 405-325-3816 or by e-mail at Patrick.Burke@noaa.gov.