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 4 | Spring 2006 | Issue 2

Meet Your Weatherman Dan Herring

Hello! My name is Dan Herring and I am an electronics technician here at the National Weather Service in Norman. My primary responsibility is maintaining the Twin Lakes (Oklahoma City) radar. I also serve as the backup Automated Surface Observing System (ASOS) technician for our forecast area.

I studied fundamental electronics at Kessler Air Force Base, and have more than 30 years of hi-tech electronics experience. I have had a fascination with electronics ever since I can remember and slowly acquired an amateur radio license and a commercial Federal Communications Commission (FCC) license with an emphasis in radar.

My interest in weather began while stationed on Guam with the WC-130 typhoon chasers. It was a very challenging, exciting, and rewarding time during my military career. We traveled all over the Pacific and provided a very valuable service not only to the military but the many island nations in that area. On occasion maintenance personnel would get to ride along when the typhoon chasers would investigate a storm - I assure you the Texas Giant Rollercoaster has nothing on that! Here in Norman balloons are

See **Weatherman** on page 2

Red Rock Tornado - April 26, 1991

By Doug Speheger, General Forecaster

The mid to late 1980s were a relatively calm era in Oklahoma and north Texas tornado history, at least as far as the lack of violent tornadoes (tornadoes classified as F4 or F5 on the Fujita Scale). After April 29, 1984 when a violent tornado struck Mannford (near Lake Keystone), there were no violent tornadoes in the state for almost 7 years. This is the longest period of time that the state has gone without a violent tornado since tornado data began to be regularly compiled in 1950, and likely dating back to statehood. Within the Oklahoma and north Texas counties currently served by the NWS Norman, there were no violent tornadoes for almost 10 years after the Binger tornado of May 22, 1981 (discussed in the article below). Furthermore, no violent tornadoes had occurred within the entire state of Oklahoma since 1984. Unfortunately, those streaks ended 15 years ago on April 26, 1991.

The day started ominously as storms formed across central and western Oklahoma in the early morning hours and moved northeast. A tornado struck the town of Tonkawa in northern Oklahoma about an hour after sunrise. These early storms moved northeast into Kansas and weakened in the late morning hours, but a dry line remained across central Kansas into central Oklahoma.

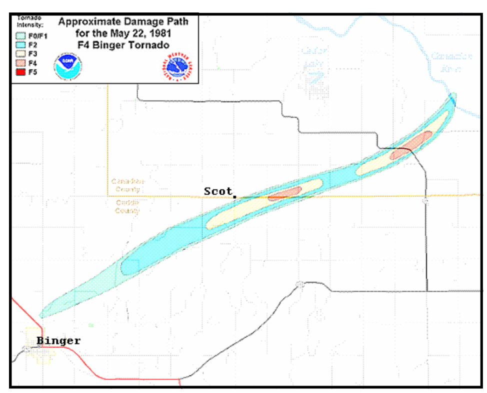
See **Red Rock** on page 4

A Look Back at the Tornado Outbreak in Oklahoma on 22 May 1981 -- The Binger Tornado

By Mike Branick, Lead Forecaster

Meteorologists and residents of western and central Oklahoma probably remember the tornado outbreak that affected parts of Oklahoma on 22 May 1981. At least 13 tornadoes were reported in west central, central and northeastern Oklahoma during the afternoon and evening -- of which eight were rated strong or violent (F2 or greater on the Fujita Scale). Fortunately, there were no deaths, and only 12 injuries were reported. For the 25 year anniversary of this event, we will revisit some of the details that made this an event to remember for many Oklahomans.

Conditions on the morning of 22 May suggested the potential for severe and possibly tornadic thunderstorms later



The path of the Binger, Oklahoma tornado of 22 May 1981. Map adapted by Steve Kruckenberg, NWS Norman from McDonald, Norville and Marshall, 1981.

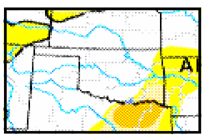
that day. South winds at the surface were bringing moist air (dewpoints in the 60s)

See **Binger** on page 3

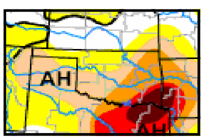
Drought Update

By Jennifer Palucki, Meteorologist Intern

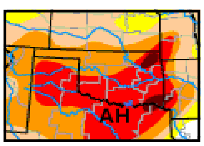
It's no secret that Oklahoma and western north Texas have been extremely dry over the last several months. But how dry have we been? In Oklahoma City, normal rainfall between September 1 and February 28 is 14.46 inches. From September 1, 2005 through the end of February 2006, Oklahoma City received just 3.69 inches of precipitation. That is only 26 percent of the normal rainfall. This was the 2nd driest six month period in Oklahoma City (September - February) since records began in 1891. Wichita Falls was also very dry, only receiving 61 percent of there normal rainfall for the period. The following figures show the progression of the drought from October through mid March.



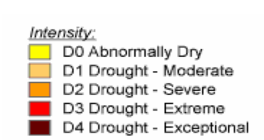
October 11, 2005



December 22, 2005



March 14, 2006



In March, a few light rains blanketed the area early in the month, but significant rainfall did not come until the weekend of March 17-20. Widespread rainfall amounts of one to three inches accumulated across most of the area with selected areas in southern and southeastern Oklahoma receiving near four inches.

Interestingly, the rainfall the weekend of March 17-20 at Oklahoma City and Wichita Falls was more rainfall than each location had received in the last five months! Over the weekend, Oklahoma

See **Drought** on page 3

Tales, Legends, and Other Sayings

By Mike Branick, Lead Forecaster

Weather-related sayings and stories have been commonplace in many cultures since the beginning of time, many of which have been passed down through the years. Are they truth, or are they myth? Can they really be used to predict the weather? This column will examine a different popular weather saying in each issue, exploring its origins and whether or not there is any real meteorological truth upon which it might be based.

If you have heard of a particular weather-related story or saying that you've always wondered about and would like us to look into it, please e-mail your questions and requests to *Jennifer.Palucki@noaa.gov*.

This Issue's Topic – "A ring around the moon (halo) means rain is coming."

A lunar halo is a relatively rare sight. It is a ring of light with the moon in the center. The angular distance from the moon to the halo is about 22 degrees. On rare occasions the halo will display faint colors, from reddish on the inside through yellow to perhaps slightly bluish on the outside. However, in most cases the colors are too faint to discern and the halo simply looks white. A similar phenomenon occasionally can be seen around the sun during the day (solar halo), but because the moon is a far weaker source of light, lunar halos are much less frequent and can be seen only at night, when the moon is full or nearly so.

Halos occur when a thin but relatively uniform layer of high altitude clouds (cirrus clouds, usually at a height of 25,000 to 40,000 feet) passes in front of the sun or moon. The cloud layer is made up of ice crystals which refract (bend) the light from the sun or moon. Although rainbow-like colors can be seen occasionally, especially in solar halos, the process is not the same as that which produces rainbows. The latter occur as a result of reflection (not refraction) of light by liquid water drops (not ice crystals).

The ability to predict weather based on the appearance of a lunar halo is shaky at best, but not without physical reason. Since the strongest winds in the atmosphere generally occur at the cirrus level, the first clouds to arrive ahead of large storm systems are high, thin cirrus clouds that are precisely the kind needed to create a halo. Hence, the appearance of a halo - especially around the moon - might imply that a storm system is approaching. Similar clouds may spread downwind ahead of thunderstorm complexes, so a halo could precede approaching thunderstorms. These predictions are more likely to work out if the high clouds thicken and lower with time. The problem is that halo-producing cirrus clouds are not associated only with rainstorms or thunderstorms, and rainstorms are not always preceded by halo-producing cirrus clouds (or at least not a visible halo - sometimes lower clouds arrive first, obscuring any halo present).

Reference: "Weather Queries" [**Weatherwise**, March/April 2001].

Weatherman: From Page 1

launched twice a day with radiosondes attached to them. On a weather aircraft, we had a similar radiosonde which was pushed out a tube in the aircraft floor, and then floated to earth on a small parachute while taking temperature and other readings.

NWS Norman leads the nation in a continuous effort to stay on the cutting edge of technology. We field new sensors and upgrade systems constantly, working closely with meteorologists and engineers in an effort for continuous improvement. Of course, we also repair unscheduled equipment outages and perform preventative maintenance to keep the systems in a high state of readiness for rapidly changing Oklahoma weather.

I'm proud to be a member of the NWS Norman team. It, too, provides a high degree of challenges and excitement which make each day rewarding.

Binger Tornado: From Page 1

northward through Texas into western Oklahoma, and a dry line was poised across the Texas Panhandle. However, early morning data showed a strong cap (layer of warm air aloft) over central Oklahoma, and the return flow of moist air led to widespread low clouds across much of the state. There were uncertainties as to whether the low clouds would break to allow enough heating to destabilize the surface air and allow surface-based thunderstorms to form.

The low clouds eventually broke as the dry line moved east into western Oklahoma, but clearing was confined to a relatively narrow zone just ahead of the dry line. That was enough, though, and by

Cordell, Oklahoma tornado of 22 May 1981; otherwise known as the "Wizard of Oz" tornado. Photo courtesy of NSSL.

mid afternoon thunderstorms developed near the dry line in southwestern Oklahoma. The first tornado formed just northwest of Cordell at 4:17 pm, damaging a mobile home and several barns as it moved northeast over a six-mile path. This tornado was filmed and photographed by a tornado intercept team during a project bring conducted jointly by the National Severe Storms Laboratory (NSSL) and Mississippi State University. It is still referred to by some people as the "Wizard of Oz" tornado, because of its similarity in appearance to the tornado in the classic 1939 movie.

Another thunderstorm developed to the south of the Cordell storm and tracked northeast, causing some anxious moments as it headed directly toward Oklahoma City. This storm produced at least six tornadoes (one storm chase summary indicates at least 12) from west of Fort Cobb Reservoir northeastward to between El Reno and Union City. The largest and most violent tornado touched down just north of Binger at 6:45 pm and traveled northeast for 16 miles, ending near the South Canadian River southwest of El Reno. This massive tornado was up to a mile wide, and produced damage that was rated high-end F4 on the Fujita Scale. Fortunately, the tornado passed mostly across rural areas, and all families that were in its path had underground shelters. The tornado was visible from large distances, giving people in its path ample warning of the approaching storm. Doppler radar data, obtained from the NSSL research radar in Norman, clearly showed a classic "hook" echo and a strong rotation signature associated with the tornado. All of these factors led to plenty of advanced warning, and as a result there were no deaths or injuries. At least seven homes were destroyed or severely damaged, along with several barns. Automobiles and heavy farm equipment were rolled and tumbled over distances of up to 500 feet. Several large oil storage tanks were blown away, one of which was found 1500 feet from its original location.

The Binger, Oklahoma F4 tornado of 22 May 1981. Photo courtesy of NSSL.

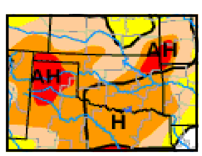
The massive tornado was headed straight for Oklahoma City, but both the tornado and the thunderstorm that spawned it weakened before reaching the city. Low clouds, which had cleared earlier in the day over western Oklahoma, did not break in central Oklahoma until mid to late afternoon. As a result, the storm moved into cooler and less-unstable conditions, and was unable to maintain its intensity.

The Binger tornado, by virtue of its extraordinary size and strength, received most of the attention on this day. But farther west, a complex of severe thunderstorms continued to regenerate over west central Oklahoma in the area of Foss Reservoir. These storms produced at least five tornadoes between Foss Reservoir and the Clinton-Arapaho area. One of these tore through the south and east sides of Clinton, causing F3 damage and injuring 12 people.

Drought: From page 2

City received 2.18 inches of rain, and from November 1 through March 16, the city had received only 0.99 inches of rain! Similarly in Wichita Falls, the weekend dropped 2.35 inches of rain, while over the last five months, only 1.22 inches of precipitation had fallen.

So, did this break the drought? No. While the rainfall eased fire weather concerns temporarily, the drought is far from being over. The following figure shows that after the much needed rainfall, Oklahoma and western north Texas remains in the moderate to severe drought category.



March 23, 2006

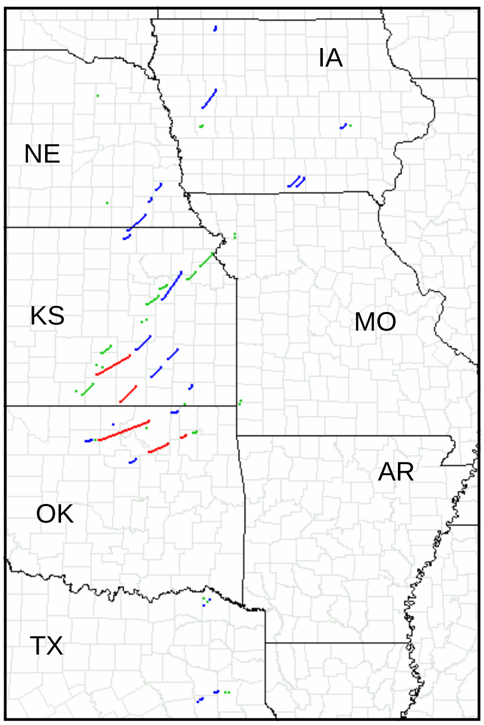
When this figure is compared to the third figure on page 2, it should be noted that the drought intensity in northwest Oklahoma remained the same. This is because many areas only saw an inch of precipitation or less during the weekend of March 17-20.

A round of severe weather on April 1 brought more much needed rain across the state. Rainfall amounts of up to one to two inches were recorded, with some locales in southwest Oklahoma receiving over two inches.

All figures adapted from the Drought Monitor website at *http://www.drought.unl.edu/dm/index.html*

Red Rock Tornado: From Page 1

Storms redeveloped in the afternoon along the dry line and an outbreak of tornadoes across much of the central and southern plains ensued. Before the event was over, 55 tornadoes had touched down in Oklahoma, Texas, Kansas, Missouri, Nebraska and Iowa, including five violent tornadoes that occurred in southern Kansas and Oklahoma. The deadliest tornado occurred in the Wichita, Kansas area when an F5 tornado moved through the southern and eastern portions of the Wichita metropolitan area, including McConnell Air Force Base and the town of Andover. Four other tornadoes received F4 ratings in this outbreak, three of these in Oklahoma. One of these overturned several cars on the Cimarron Turnpike before the striking the towns of



Tornadoes across the southern and central plains on April 26 and early morning of April 27, 1991. Green paths indicate weak tornadoes (F0 or F1 on Fujita Scale), blue paths are strong tornadoes (F2 or F3), and red paths show violent tornadoes (F4 or F5).

Westport and Skiatook. This tornado killed one person and injured another 24. A second F4 tornado injured 22 when it struck Oologah, Oklahoma to the northeast of Tulsa.

The other violent tornado was the only one to strike within the NWS Norman area of responsibility, initially touching down east of Enid, about 2.5 miles east of Garber, and it is this tornado that became known as the “Red Rock”

Facing north along U.S. 77 in Noble County Oklahoma at 7:45 pm CDT, April 26, 1991. The Red Rock tornado is just ¾ of a mile north of the research team and is moving from left to right. Tornado © 1991 Doug Speheger.

tornado. It touched down at 6:30 pm, and moved northeast about 66 miles over the next hour and a half, making this one of the longest tornado paths documented in Oklahoma. At times, the tornado was about 3/4 of a mile wide. Fortunately, despite the long path of this large tornado, there were no fatalities and only six injuries, none of which were serious. This tornado crossed Interstate 35, but did not directly strike any towns. It got its name as it passed between the communities of Marland and Red Rock.

This tornado was also noteworthy because it was well documented by severe storm researchers. A research team from the University of Oklahoma (including myself) was able to record wind information from the tornado using a portable Doppler Radar. We set up this radar on U.S. Highway 77 just a mile or two north of State Highway 15 in Noble County. The photo shows the tornado crossing U.S. 77 north of the research crew. As the tornado passed the highway, peak wind speeds over 270 mph were recorded with the Red Rock tornado, which was the highest known measured wind speed of a tornado until May 3, 1999 tornado near Bridge Creek, Oklahoma. It should be noted however that very few tornadoes have actually had wind speeds measured at close range by Doppler Radar. The Red Rock tornado was likely only the 10th tornado to ever have had radar-based wind speed measurement taken. In the vast majority of tornadoes, the intensity is estimated based upon the damage that is caused, so it is difficult to compare the intensity of the Red Rock tornado to other historic tornadoes. The wind speeds measured were technically within the wind speed range given by Fujita as F5 (winds above 260 mph), but the wind speeds were measured at a height closer to the top of the visible tornado, rather than to the part of the tornado near the ground. Therefore, it is unclear how strong the winds may have been closer to the ground. An F4 rating was assigned based on the destruction of a few houses in Noble County observed during the post-storm damage survey.

Below is a list of all the violent tornadoes in Oklahoma and Texas since 1990.

Date	Rating	Location
04/25/90	F4	Parker County, TX
06/01/90	F4	Pecos County, TX
04/26/91	**F4**	**Noble County, OK**
04/26/91	F4	Westport and Skiatook, OK
04/26/91	F4	Oologah, OK
05/11/92	F4	Pittsburg County, OK
06/27/92	F4	Fritch, TX
11/21/92	F4	Harris and Liberty Counties, TX
04/24/93	F4	NE Tulsa and Catoosa, OK
04/25/94	F4	Lancaster, TX
06/08/95	F4	Pampa, TX
06/08/95	F4	Near McClean and Kellerville, TX
06/08/95	F4	Near Allison, TX
05/27/97	F5	Jarrell, TX
05/27/97	F4	Pedernales Valley (near Lake Travis), TX
05/03/99	**F5**	**Bridge Creek - S. Oklahoma City - Moore, OK**
05/03/99	**F4**	**Dover, OK**
05/03/99	**F4**	**Mulhall, OK**
05/11/99	F4	Mason County, TX
05/08/03	**F4**	**SE Oklahoma City, OK**

Bold entries are tornadoes affecting the Oklahoma and north Texas counties served by the NWS Norman office.

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

By Rick Smith, Warning Coordination Meteorologist

Enhanced Fujita Scale. You may have seen news reports that the scale we use to rate tornado intensity is changing. Meteorologists and engineers have been using the Fujita Scale of tornado intensity since the early 1970's to rate tornadoes according to the damage they leave behind. Over the past few years, a team of experts developed a modified damage scale, called the Enhanced Fujita Scale. The new scale still relates estimates of wind speed to tornado damage, but it has been revised to make the wind estimates more accurate.

The National Weather Service will begin using the Enhanced Fujita Scale for rating tornado damage in February of 2007, after people who perform damage surveys receive training on the new system. To everyone else, the changes should be hard to notice.

If you'd like much more detailed information on the new tornado damage rating scale, visit *www.spc.noaa.gov/efscale/*.

Spotter Training Wrap-Up. NWS Norman has wrapped up the storm spotter training season for 2006. We conducted our last training session in Perry, Oklahoma on March 30. Meteorologists from the NWS Norman Forecast Office conducted about 45 training sessions across Oklahoma and Texas this season. More than 2400 people attended the sessions, with about a quarter of those attending a class for the very first time. Several locations saw over 100 people in attendance, including Stillwater, Altus, Woodward and Norman.

We rely very heavily on storm spotters to report local weather conditions to us. But even if you are not a spotter, you can help us by sending in your report of significant weather. To send us your report, go to *weather.gov/norman/stormreport*.

We're moving! WFO Norman, along with many other weather-related organizations in Norman are gearing up for our big move to the National Weather Center. By the end of summer, most meteorological organizations in Norman, including the Storm Prediction Center, National Severe Storms Laboratory, Warning Decision Training Branch, the Oklahoma Climatological Survey and the University of Oklahoma School of Meteorology will all be working together in a brand new building on the south campus of OU. The current schedule calls for organizations to begin moving in May. The WFO in Norman is scheduled to move the first week in August.

To see the latest pictures of the building, go to *nwc.ou.edu*.

New Weather Radio Transmitters on the Way! In a continuing effort to expand the national network of NOAA Weather Radio stations, the National Weather Service recently announced several new transmitters coming soon to the area. While we do not have an exact timetable for when you might actually hear these stations on the air, it is hoped they will be on the air by the end of this year. Stay tuned for further updates.

Here are the new stations, and their approximate coverage areas:

- Wewoka, Oklahoma - This new station will fill a fairly large gap in the network, and will provide weather information to Seminole, Pottawatomie, Pontotoc, Hughes and adjacent counties.
- Chickasha, Oklahoma - Located just east of Chickasha, this new transmitter will help give more consistent coverage to Grady County and sections of adjacent counties.
- Childress, Texas - Filling another significant gap in the weather radio network, the new Childress NWR transmitter will provide coverage to southeastern sections of the Texas panhandle, as well as parts of western north Texas (including Hardeman and Foard counties) and far southwest Oklahoma (including Harmon, Jackson, and parts of Greer counties).
- Guymon, Oklahoma - The first weather radio station in the Oklahoma panhandle will also cover adjacent parts of surrounding states.
- Antlers, Oklahoma - This new transmitter in far southeast Oklahoma will provide coverage to parts of Pushmataha, and Choctaw counties, as well as adjacent parts of Atoka and Bryan counties.

Hurricane Names Retired

By Jennifer Palucki, Meteorologist Intern

After a devastating and record breaking hurricane season in 2005, the international hurricane committee of the World Meteorological Organization has decided to retire five hurricane names from last season. Hurricanes Dennis, Katrina, Rita, Stan and Wilma have been retired due to the loss of life and the incredible amount of damage they caused. Since hurricane names are recycled every six years, new names were chosen to replace them. Hurricanes Dennis, Katrina, Rita, Stan and Wilma will be replaced by Don, Katia, Rina, Sean and Whitney, respectively. Five storm names is the most to have ever been retired in a single season. The previous record was four in 1955, 1995, and 2004. Since tropical cyclones were first named in 1953, a total of 67 names have been retired. For more on this story, visit *www.noaa.gov*.

Do you know...

...the difference between a **watch** and a **warning**?

A **watch** means atmospheric conditions are favorable for severe weather to occur. Remain alert for approaching storms.

A **warning** means that severe weather has been sighted or is indicated by weather radar. In this case, you should move to your pre-designated place of safety.

Cooperative Observer Notes

Wichita Mountain Wildlife Refuge Receives 100 Year Institution Award

By Ty Judd, Meteorologist Intern

The Wichita Mountain Wildlife Refuge was recognized February 16 by the National Weather Service for 100 years of service as the official Cooperative Weather Institution. The award was the first 100-year Institution award given in the history of the Norman/Oklahoma City National Weather Service Forecast Office.

Rick Smith, Warning Coordination Meteorologist for NWS Norman (right), presents a 100 year Institutional Award to the staff of the Wichita Mountain Wildlife Refuge. Photo taken by Ty Judd, NWS Norman.

The Institution Award, marking 100 years of continuous service, was presented by Rick Smith, Warning Coordination Meteorologist, and Ty Judd, a Meteorologist interning at the forecast office. R. J. Lyons, Coretta Albright, and other staff members of the Wichita Mountain Wildlife Refuge were on hand to accept the award.

The Wichita Mountain Wildlife Refuge began as the official cooperative observing station on January 1, 1906. The station name at that time was Cache. In 1916, the name was changed to Wichita National Forest. Finally in 1937, the name was changed to the Wichita Mountain Wildlife Refuge. There have been several individuals that have been the primary observer throughout the years. The first observer was O. A. Morrissey, although he only took observations for a little over a year and a half. Besides the fact that they have been observing continuously for over 100 years, the equipment location has only moved a little more than 1000 feet, which is a remarkable feat.

The Wichita Mountain Wildlife Refuge station is a part of a national network of nearly 11,000 cooperative weather observers. The network provides information such as daily air and soil temperature data, hourly and daily precipitation amounts, evaporation data, and river stage readings.

The hourly precipitation and temperature data provided daily by the Wichita Mountain Wildlife Refuge station 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. The data from the Cooperative Program is the official source for climatological normals nationwide. The weather data supports a variety of users, such as public utilities, agribusiness, insurance companies, the construction industry, and the legal profession.

We thank Wichita Mountain Wildlife Refuge and all of our cooperative observers for there continuous hard work and dedication to the Cooperative Program.

Award Recipients

The following observers have recently received a Length of Service award:

Wichita Mountain Wildlife Refuge - 100 years
Cecil Labude - 55 years
Emory Davidson - 45 years
Imogene Bacon - 35 years
George Armor - 35 years
Merle Schwartz - 20 years

Thank you for the hard work and valuable meteorological data you have collected. We look forward to working with you for many more years.

New Observer

The NWS Staff would like to welcome Janet Henderson to the NWS Norman cooperative observer program. We look forward to working with this new observer for many years to come.

Vinson Observer Retires

The NWS Staff would like to thank Emory Davidson of Vinson for his dedicated work. Mr. Davidson took precipitation measurements for NWS Norman for 45 years and was just presented with a 45 year length of service award. Thanks and best wishes in the years to come!

Remember to mail the previous month's cooperative observer forms and recording rain gage tapes by the 5th of the month!

The Norman NWS Cooperative Observer Program Team:

Daryl Williams Forrest Mitchell Jennifer Palucki Ty Judd John Pike

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