The Dryline

The Official Newsletter of the National Weather Service in Amarillo

Inside this issue:

Wildfires Hit the Panhandles

By Todd Beal, Forecaster

Fire burning in a field near Borger, TX

Residents of the Texas and Oklahoma Panhandles are familiar with adverse weather such as tornadoes, severe thunderstorms, and winter storms. However, another type of hazardous weather is common to the Panhandles when strong winds and dry conditions combine, producing dangerous fire weather conditions. This scenario unfolded on the afternoon and early evening of February 27, 2011 as a high wind and wildfire event occurred across the Panhandles.

A powerful storm system emerged out of the southwestern states on February 26 and approached the southern High Plains during the day on February 27. At the surface, a deepening low pressure system rapidly intensified over eastern New Mexico and southeastern Colorado. A dryline shifted eastward across the Panhandles into western Oklahoma early Sunday afternoon, replacing upper 50 to lower 60 dewpoints east of the dryline with widespread single digit dewpoints across the area. With temperatures warming into the lower and middle 70s and very dry air in place, relative humidity values between 5 and 10 percent were common during the afternoon hours.

In addition to the dry air in the atmosphere, the recent lack of meaningful precipitation has resulted in the drying out of grasses and fuels (combustible materials such as plants, shrubs, leaves, and shrubs). In fact, 1-hour fuel moisture levels and 10-hour fuel moisture levels were very low as well, around 2 and 3 percent, respectively. The remaining ingredient that would lead to a high to extreme fire danger threat is strong winds, which this storm system possessed.

By mid-day, a lee side surface low pressure system strengthened to 990 mb, which induced a tight pressure gradient across the area. Also present with this storm system were very strong winds in association with the middle and upper level jet streaks, both of which were in excess of 100 knots (115 mph). In the lowest 3 kilometers of the atmosphere, wind speeds on average were between 40 knots (46 mph) and 50 knots (58 mph). With warming temperatures and little in the way of cloud cover, these stronger winds aloft were able to "mix" down to the surface.

...Wildfire continued on page 2...

Wild Fires Strike the Panhandles (continued)

Hay bales on fire along Interstate 40

Southwest winds increased between 30 and 40 mph across much of the area with the strongest winds impacting the southern Texas Panhandle. The higher gusts that accompanied these strong winds were impressive as well with numerous gusts between 60 and 70 mph mainly across the Southwest and South Central Texas Panhandle. The highest wind gust of the day was recorded at Rick Husband International Airport in Amarillo where a 69 mph wind gust occurred at 1:38 P.M. The strong winds led to another weather hazard, blowing dust, which prompted the issuance of a blowing dust advisory for the all of the Texas Panhandle. Visibilities were reduced to less than a mile at times and made travel treacherous on main highways such Interstate 40, Interstate 27, and Highway 60.

With dry air in place, drying fuels, and very strong winds, wind-driven wildfires were a concern on this day. Shortly before 1:00 P.M., the first wildfire of the day, which occurred in Potter County, was reported to the NWS in Amarillo. This was the first of numerous wildfires on this day, with 10 wildfires burning at least 300 or more acres of land. The most damage occurred from the North Amarillo fire and the Lake Tanglewood fires where 29 and 26 homes, respectively, were destroyed. The origins of the wildfires ranged from accidental human start to arson, and downed power lines and sparks from trains and automobiles. Below is a table of the largest wildfires across the Panhandles on Sunday, February 27. Information regarding acreage burned was obtained from the Texas Forest Service.

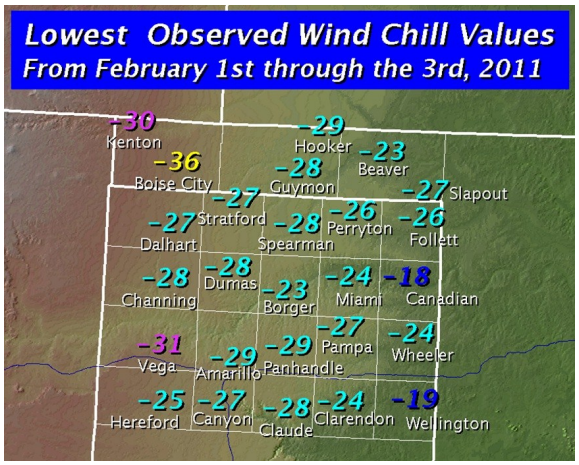
The highest wind gust on February 27 was 69 mph measured at the Rick Husband International Airport.

Fire	Location	Acreage
Homefeld Wildfire	10 ESE Glen Rio	400
So Close Wildfire	6 SSW Borger	21,500
Willow Creek South Complex	4 N Amarillo	24,310
Bunker Hill Road Complex	12 WSW Ware	1000
Arnot Fire	5 W Canyon	419
Locust Grove Wildfire	13 WNW Glazier	19,200
County Rd 18 Wildfire	4 ENE Wheeler	2,500
Tanglewood Complex	1 NNW Lake Tanglewood	1,659
Thompson Wildfire	3 N Four Way	400
Hedley FM 203 & CR 28 Wildfire	3 ENE Hedley	550

February Arctic Outbreak

By Justyn Jackson, Forecaster

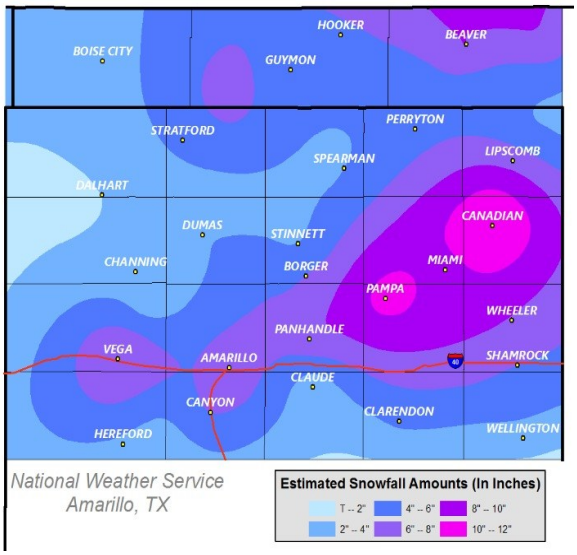
Despite most of the winter being fairly mild, the frigid temperatures during late January and early February will likely be remembered for a long time. The lowest temperature recorded during that time period at Amarillo was -6° F on the mornings of February 9 and 10. Borger's lowest temperature was -2° F on the mornings of February 2 and 10, Dalhart's lowest temperature was -13° F on the morning of February 3, and Guymon's lowest temperature was -6° F on the morning of February 3. What also made the arctic outbreak so brutal was that temperatures remained below freezing for a prolonged period of time. Amarillo remained below freezing for approximately 112 hours between Monday, January 31 and Friday, February 4. The average temperature during that period was only 11.6° F, one of the coldest periods ever observed at Amarillo. In addition to the cold temperatures, strong northerly winds produced bitterly cold wind chill values. In fact, on the morning of February 1, the Boise City, Oklahoma Mesonet site recorded a wind chill of -36° F, the second lowest chill ever recorded by an Oklahoma Mesonet site.



Lowest observed wind chill values February 1-3

Days Below Freezing	Dates	Average Temperature (° F)
12	Dec 1978-Jan 1979	20.1
10	Feb 1895	15.5
9	Dec 1982	26.4
8	Dec 1983	9.5
5	***Jan 31-Feb 4, 2011***	***11.6***

Shortly after the brutally cold weather ended, a powerful upper-level storm system produced a winter storm across the Texas and Oklahoma Panhandles on February 8 and 9. A heavy band of snow formed late on the evening of February 8 across the western Texas Panhandle and slowly moved eastward overnight. In addition to the heavy snow associated with the band, northerly winds were also quite strong. In fact, brief blizzard conditions in Amarillo were observed within the snow band that resulted in near whiteout conditions at times. The heaviest snowfall accumulations were generally along the Highway 60 corridor from Amarillo to Canadian. Amarillo received 6.5 inches, Canadian received 12.0 inches, and Pampa received 10.5 inches. Beaver County in the Oklahoma Panhandle also experienced some higher snowfall amounts, including 8.0 inches at Beaver and Gate.



Estimated snowfall accumulations February 8-9

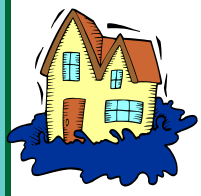
Severe Weather Safety

By Christine Krause, Forecaster

Spring is a season characterized by warmer temperatures. In turn, people get rejuvenated and ready for all the delights that warm weather affords us, especially after a long and cold winter. Springtime is also earmarked by wild swings in weather from warm and windy days, to cool evenings, to several rounds of thunderstorms. Thunderstorms are part of life in the Texas and Oklahoma Panhandles. In Amarillo, 87% of the annual rainfall is received from March through October, and almost all of this can be attributed to thunderstorms. Without this beneficial rain, the Panhandles would be a virtual desert. However, when thunderstorms do occur there are many hazards that can damage property or threaten lives. It is important that everyone be aware of these hazards and know how to protect themselves and their property.

Lightning is a part of EVERY thunderstorm and often strikes without warning. Lightning kills dozens of people and injures hundreds more each year in the United States. Most deaths occur when people are caught outside with no shelter. It is important to remember that lightning can strike several miles away from the thunderstorm, so the best place to be is indoors. If you hear thunder, you are close enough to be struck by lightning and should seek shelter immediately!

Flooding causes more than 100 deaths each year in the United States and can occur almost anywhere. Most flood related deaths occur in automobiles. Even if you don't live near a river or stream, you can still be affected by flood waters. Flash flooding is an increased concern in the Texas and Oklahoma Panhandles during the summer months when thunderstorms produce very heavy rainfall in a short amount of time. Drainage systems may not be able to handle all the water at once and roads and underpasses can quickly flood. If you run across water covering the road, you should turn around and find an alternate route. It only takes a foot or two of water to cause your vehicle to stall or float.



Severe thunderstorms can produce large hail and damaging straight line winds. A severe thunderstorm is defined as having hail one inch in diameter (the size of a quarter) or larger. (The straight line wind criterion of 58 mph or higher also defines a severe thunderstorm.) When severe thunderstorms approach, seek shelter in a sturdy building to avoid injury. Large hail can damage property and can cause injury to those caught outside. Strong straight line winds can occasionally exceed 100 mph and cause widespread damage equivalent to that of a tornado. These winds can destroy mobile homes and damage sturdy buildings.

Tornadoes are a very rare natural phenomenon associated with thunderstorms but occur in the Great Plains region of the United States more than anywhere else in the world. In the Texas and Oklahoma Panhandles, tornadoes are most common in late spring and early summer. The strongest tornadoes can produce some of the strongest winds ever recorded at the Earth's surface and completely destroy well-built structures. The best place to be during a tornado is in a basement or inside a small room inside a sturdy building and away from outside walls and windows. If caught outside with no shelter available, lie face down in a ditch or other low spot and cover your head.

...Severe Weather Safety continued on Page 5...

Severe Weather Safety continued…

The first step in protecting yourself and your property is to know when a severe thunderstorm or tornado is approaching. Understand the statements and warnings issued by the National Weather Service and have a reliable means of being alerted when these statements are issued. One of the best ways to make sure you know when a warning is issued is to have a NOAA All Hazards Weather Radio. These devices are inexpensive, are available at local electronic stores, and can be specially programmed to alert you when threatening weather is approaching.

Watches: The National Weather Service issues a watch when conditions are favorable for a hazardous weather event to develop within the watch area. Some watches include Severe Thunderstorm, Tornado, and Flash Flood Watches. When a watch is issued, you should be alert for changing weather conditions, make initial preparations for the potential for hazardous weather, and listen for possible warnings.

Warnings: When the National Weather Service in Amarillo issues a warning for your area, it is intended to alert you that hazardous weather is occurring now or is imminent. Some warnings include Severe Thunderstorm Warnings, Tornado Warnings, and Flash Flood Warnings. When a warning is issued, you should take immediate action to protect life and property from the impending hazardous weather event.

The Five Year Anniversary of the March 12, 2006 Wildfire Outbreak

By Ken Schneider, Senior Forecaster

Severe drought conditions, which started in September 2005, led to a prolonged fire season which continued well into March 2006. Above normal temperatures for the winter and early spring season contributed to relative humidities remaining below normal. On March 12, a surface low pressure system over the central Plains states deepened in response to a jet streak approaching from the southern Rockies. The surface pressure gradient tightened across the southern High Plains resulting in strong west to southwest downsloping winds of 25 to 35 mph with gusts up to 50 mph or higher. To exacerbate the wind situation, a cold front moved through the southern High Plains late on March 12 into early March 13. This caused a wind shift to the north and northwest with continued strong winds.

The first wildfire occurred before the March 12 event in the Texas Panhandle in extreme northeast Oldham County on Friday March 10. The wildfire broke out around 2:20 P.M. CST about four miles north of Boys Ranch along U.S. Highway 385 when a car caught fire. Southwesterly winds of around 25 mph spread the wildfire across Moore and Hartley Counties with the wildfire edging within seven miles of Dumas and burned 13,000 acres. Flame lengths were reported to be 11 feet. Residents southwest of Dumas were under a voluntary evacuation. However, the largest outbreak of wildfires occurred on March 12.

Fire burns through a fence near Borger, TX

...Anniversary Outbreak continued on Page 6...

Anniversary Outbreak continued…

On March 12, more than a dozen large wildfires burned over one million acres across the southern High Plains that lasted for nearly a week with the largest fires. The wildfires accounted for eleven civilian deaths in the Texas Panhandle and at least nine injuries to firefighters and one civilian injury. One of those injured firefighters later died. The wildfires burned over 1,700 square miles and eight towns were evacuated. Over 40 structures were destroyed including 32 homes. Cattle ranchers lost approximately four to six thousand head of cattle. The smoke from the Groom wildfire and blowing dust caused havoc along Interstate 40 between Groom and McLean. A nine-car accident near Groom resulted in four deaths and six injuries. The Interstate was shut down for several hours causing major traffic delays and detours. More than 1,040 electrical poles were destroyed leaving at least 80 homes without power.

The largest wildfire in the Texas Panhandle started between 11:00 A.M. and 12:00 P.M. and began as two separate fires four miles southeast of Borger and nine miles south of Borger on the Burnett (6666) Ranch. High winds downed power lines which sparked the wildfires. These two fires merged into the large wildfire known as the Borger fire. This fire burned into southeast Hutchinson County, northwest Gray County, through central Roberts County and finally into western Hemphill County. The Borger fire consumed roughly 479,549 acres.

Multiple small fires combined to create the other large wildfire, known as the I-40 wildfire, which began around 11:00 A.M. CST in Gray County. The I-40 wildfire was also caused by downed power lines due the high winds. The origins of the small fires were just east of Groom, near Jericho, and just west of Lefors. The I-40 wildfire burned approximately 427,696 acres. Together, the Borger and I-40 wildfires were named the East Amarillo Complex and consumed 907,245 acres. The wildfires also destroyed about 700 miles of fencing which may cost as much as $5,000. The Texas Forest Service said that the wildfires moved 45 miles in just 9 hours with a spread rate of 5 miles per hour and flame lengths of 11 feet. Other large wildfires occurred in the Texas Panhandle on March 12. These include:

Plane drops fire retardant over a burning field

- A 2,000 acre fire 14 miles south-southwest of Canyon at 8:20 A.M. CST – 2 outbuildings lost.
- An 1,800 acre fire 4 miles southeast of Lelia Lake at 3:00 P.M. CST – 8 outbuildings destroyed.
- A 1,600 acre fire 6 miles southeast of Canyon at 8:30 A.M. CST.
- A 1,000 acre fire 7 miles southwest of Canyon at 11:55 A.M. CST.
- An 800 acre fire 9 miles west-northwest of Channing at 12:00 P.M. CST.
- A 500 acre fire 6 miles west-southwest of Cactus at 11:45 A.M. CST.
- And a 450 acre fire 7 miles southeast of Amarillo at 12:40 P.M. CST.

Science Corner

What are Supercells?

By Justyn Jackson, Forecaster

Have you ever looked at the sky on a May or June day and seen a very tall storm cloud that has an anvil that stretches as far east as you can see? If so, chances are you have probably seen a supercell thunderstorm (Figure 1). On the thunderstorm spectrum, supercells are the least common type of thunderstorm, but they have a high propensity to produce severe weather, including damaging winds, very large hail, and sometimes weak to violent tornadoes. What makes a supercell unique from all other thunderstorm types is that it contains a deep and persistent rotating updraft called a mesocyclone. If the environment is favorable, supercell thunderstorms can last for several hours.

Figure 1. Supercell near Groom, TX on June 18, 2010 viewed from the NWS Amarillo office. Image courtesy of Chris Nuttall.

What ingredients are needed for the development of supercells? Although supercells require some degree of buoyancy, moderate to strong speed and directional wind shear between the surface and about 20,000 feet is the most critical factor. Wind shear not only creates the mesocyclone, but it also allows the storm to be tilted, which is important for maintaining a separate updraft and downdraft region. A separate updraft and downdraft allows the supercell to be long-lived because it reduces the likelihood that too much rain-cooled, stable air from the downdraft region will be ingested into the updraft, causing the storm to weaken.

Supercells are most common in the central part of the United States, but they can occur in other regions of the country and other parts of the world. There are also a variety of supercell types, including classic, high precipitation, low precipitation, and even miniature. Classic supercells (Figure 2) are tough to precisely define. Nonetheless, these supercells typically exhibit a textbook appearance on radar and in the field for spotters. Radar features may include the presence of a hook echo, a weak echo region (WER), a bounded weak echo region (BWER), and a V-notch. Low-level storm features are visually identified by a well-defined wall cloud, a rain free base, a rear flank downdraft, and distinctly separate updraft and downdraft regions. Classic supercells are most commonly found in the Great Plains of the United States and can be relatively isolated. High precipitation (HP) supercells (Figure 3) are less isolated than their classic counterparts and often form in environments with a high degree of atmospheric moisture and weak mid-level storm-relative winds. As a result, the updraft tends to become rain-wrapped, which makes it difficult to identify low-level storm features, including wall clouds and tornadoes. Low precipitation (LP) supercells (Figure 4) form in environments with low atmospheric moisture content and strong mid-level storm-relative winds. LP supercells usually don't produce much precipitation, but what precipitation they do produce is usually in the form of very large hail. Since these supercells form in an environment with

Figure 2. Top view and radar depiction of a classic supercell.

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Supercells continued…

low atmospheric moisture, they are not uncommon in the Texas and Oklahoma Panhandles. Miniature supercells are smaller versions of classic supercells, they typically form in the cool season, and they are characterized by weak to moderate buoyancy that is confined to a relatively small vertical depth below 20,000 feet above ground level.

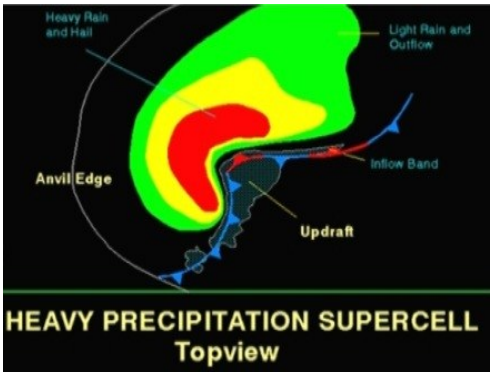


Figure 3. Top view and radar depiction of a high precipitation supercell.

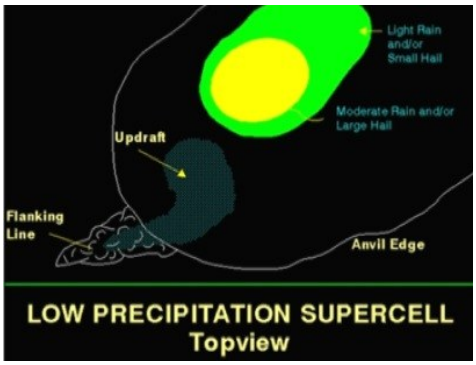


Figure 4. Top view and radar depiction of a low precipitation supercell.

It can be difficult to characterize the type of a supercell because it will likely evolve from one type to another during its life cycle. For example, a supercell may initially form as a LP supercell on the Caprock, but by the time it moves off the Caprock, it may transition to a classic supercell. Regardless of the supercell types, the processes responsible for supercell formation are the same for every location.

Staff Changes at NWS Amarillo

The talent and experience in our office is recognized across the National Weather Service. Therefore, once again, we have had to say goodbye to a couple of excellent individuals in our office. First, we wish the very best for JJ. Brost. JJ was promoted to the Science and Operations Officer at the National Weather Service Office in Tucson, Arizona. JJ had served as a Journeyman Forecaster in our office. He was strongly involved in our Decision Support program and was responsible for the development of our Decision Support Workshops for the past two years. We will miss JJ's outgoing personality and humor.

We also bid goodbye to Chris Nuttall. Chris had served as a Meteorologist Intern in our office. He has been promoted to a Journeyman Forecaster position in Shreveport, Louisiana. Chris did a lot of work maintaining our storm spotter lists and was instrumental in cataloguing these lists into Google Earth files for quick access.

We have actually lost a third staff member to promotion. However, we're very pleased to announce that Justyn Jackson, our other Meteorologist Intern, has been promoted to fill the vacant Journeyman Forecaster position in our office. Justyn has been an outstanding Intern and has been very proactive in his training and in support of our operations. Justyn has already taken on the responsibility of serving as our office Webmaster. Justyn holds Bachelor's and Master's Degrees in Geosciences with an emphasis on Broadcast and Operational Meteorology. We look forward to working with Justyn in his new position!

Weather Review and Outlook

By Rich Wynne, Science & Operations Officer

The La Niña pattern, which began in early Fall 2010, reached its peak moderate to strong intensity in January 2011 but has now started to weaken. Drier than normal conditions over the Texas and Oklahoma Panhandles continued and were reflected in below average precipitation totals. In general, warmer and drier conditions occurred for the beginning of 2011.

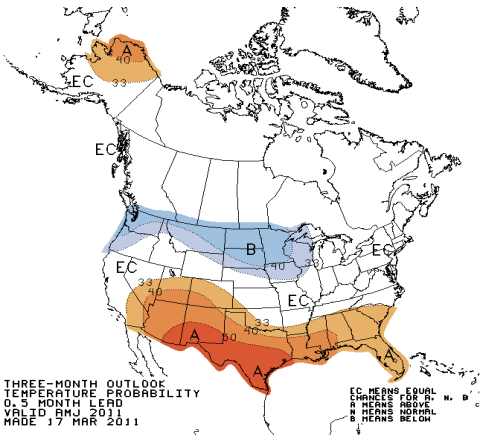
	AVG HIGH	AVG LOW	AVG TEMP	PRECIP
JAN	51.0 (+2.1)	20.2 (-6.8)	35.6 (-0.2)	0.06 (-0.57)
FEB	52.2 (-1.9)	20.2 (-2.4)	36.2 (-4.4)	0.43 (-0.12)
MAR	66.8 (+4.6)	35.2 (+1.6)	51.0 (+3.1)	0.06 (-0.50)

Winter 2010-11 statistics for Amarillo, TX

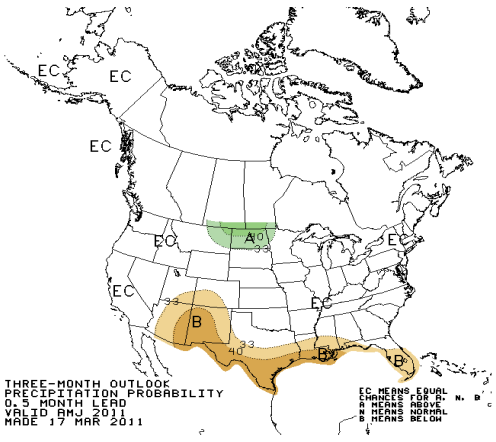
OUTLOOK FOR SPRING 2011

Indicators at the Climate Prediction Center (CPC) show that the La Niña episode should continue to weaken during the spring season. The duration of La Niña events can vary which causes trends to be uncertain. A majority of the CPC computer models show La Niña weakening in the coming months. Due to the computer models and observed trends, confidence is rising at the CPC that the pattern may shift to neutral conditions by June. Even though La Niña may be weakening, its impacts will still be felt through the spring months and early summer period.

The three-month outlook for April-May-Jun (AMJ) generally reflects a La Niña pattern through much of the period. The outlook shows slightly higher chances for near or above normal temperatures, especially for the southern Texas Panhandle. The precipitation outlook slightly favors the below normal category for the extreme western Oklahoma and Texas Panhandles. Overall, the outlook slightly favors a warm and dry period.



APR-MAY-JUN 2011 Temperature Outlook



APR-MAY-JUN 2011 Precipitation Outlook

NWS Amarillo Hosts 2011 Severe Weather Workshop

The 2011 Severe Weather Workshop held on March 19, 2011 was well attended and a great success. There was over a 100 people that attended the biennial event at the Amarillo Civic Center. Local meteorologists from the National Weather Service and major TV stations in Amarillo set up booths and interacted with the public in the morning. During the afternoon, attendees were treated to presentations by local TV and National Weather Service meteorologists, Dr. Maribel Martinez from the Amarillo Office of Emergency Management, Dr. Kevin Kloesel of the University of Oklahoma, and Bruce Jones from Midland Radio. Topics ranged from a climatology of severe weather across the Texas and Oklahoma Panhandles, to videos of tornadoes, and NOAA Weather Radio. In addition to the presentations, there was a recognition for Walt Kelly, recently retired Amarillo Emergency manager while Tababtha Tripp, Observational Program Leader, presented length of service awards to three cooperative observers. A Skywarn spotter class closed the conference. Also on this day while the conference was kicking in gear, two NWS forecasters aided local TV personalities and Bruce Jones at United Market Street to program NOAA Weather Radios for the public.

Forecaster Todd Beal (far right) programs NOAA weather radios at United Market Street.

Cooperative observer Jeanne Thompson (center) receives a length of service award for 20years from Jose Garcia, MIC WFO Amarillo (right). Tabatha Tripp looks on.

Cooperative observer Tommie Saye (center) receives a Benjamin Franklin length of service award for 55 years from Jose Garcia, MIC WFO Amarillo.

Cooperative observer Darrell Sehorn (left) receives a length of service award for 40 years from Jose Garcia, MIC WFO Amarillo.

NATIONAL WEATHER SERVICE AMARILLO

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