# High Plains Wind

(Weather Information News Data)

October 14, 2011
Volume 5 Issue 3

National Weather Service, 920 Armory Road, Goodland, KS 67735
http://www.weather.gov/gld/ w-gld.webmaster@noaa.gov 785-899-7119

## Inside This Issue



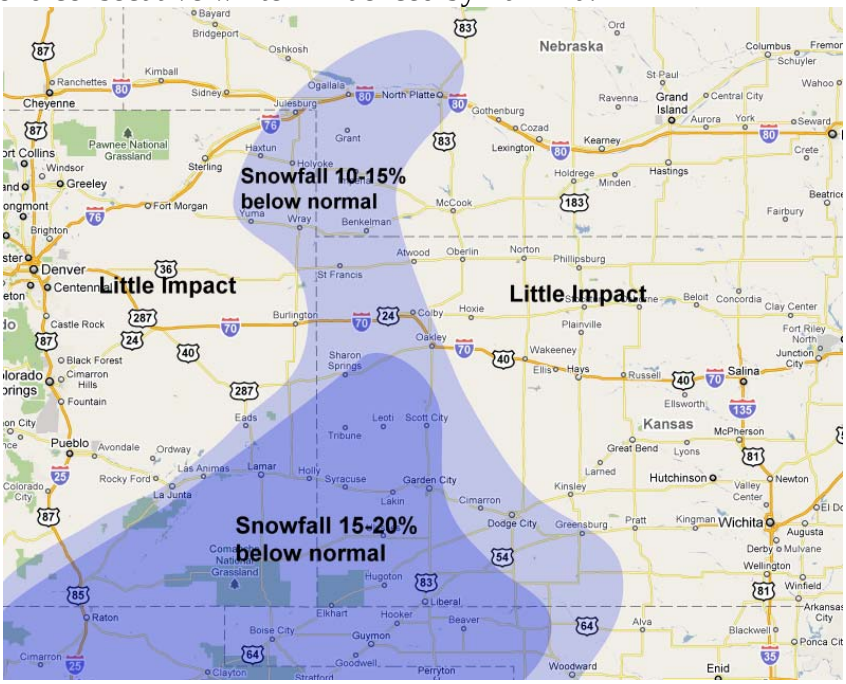
*"La Niña …is strengthening again."*

## A Message from the Meteorologist-in-Charge

*By Scott A. Mentzer*

# La Niña and the Winter Outlook

La Niña, which is characterized by unusually cold sea temperatures in the Equatorial Pacific Ocean, is strengthening again. This will be the second consecutive winter influenced by La Niña.




**Typical Snowfall Impacts during La Niña Years**

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# 2011: A Year of Tornado Records

**by Dave Floyd, WCM**

Weather history will show that 2011 will be notorious for the following:

- It was the 4th deadliest tornado year on record, and the deadliest year since modern records began in 1950. Tornadoes have claimed 546 lives in the United States so far this year. The average over the last ten years is 56 fatalities.
- The deadliest single tornado since 1950 occurred in 2011. The EF5 tornado in Joplin, Missouri on May 22nd claimed 159 lives.
- The most tornadoes of any month occurred in 2011. A whopping 747 tornadoes were recorded in April.

The tables below show how 2011 stacks up against other years.

| Year | Fatalities |
|---|---|
| 1925 | 794 |
| 1936 | 552 |
| 1917 | 551 |
| **2011** | **546** |
| 1927 | 540 |
| 1896 | 537 |
| 1908 | 477 |
| 1909 | 404 |
| 1932 | 394 |
| 1942 | 384 |

**Table 1. Deadliest tornado years in U.S. history.**

| Tornado | Fatalities | Date |
|---|---|---|
| Tri-State (Missouri/Illinios /Indiana) | 695 | March 18, 1925 |
| Natchez, Mississippi | 317 | May 6, 1840 |
| St. Louis, Missouri | 255 | May 27, 1896 |
| Tupelo, Mississippi | 216 | April 5, 1936 |
| Gainesville, Georgia | 203 | April 6, 1936 |
| Woodward, Oklahoma | 181 | April 9, 1947 |
| **Joplin, Missouri** | **159** | **May 22, 2011** |
| Amite LA, Purvis, Mississippi | 143 | April 24, 1908 |
| New Richmond, Wisconsin | 117 | June 12, 1899 |
| Flint, Michigan | 116 | June 8, 1953 |

**Table 2. Deadliest tornadoes in U.S. history.**

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# The Joplin Tornado

Given the continual declining trend in tornado fatalities over the past six decades, many have felt that the days of high loss of life as a result of tornadoes was a thing of the past. In the 1950s, the average number of tornado fatalities each year was 165. For the decade 2000 to 2009, that number had fallen to 56. Credit for this remarkable decreasing trend has been attributed to increased public awareness of weather hazards thanks to increased outreach and safety campaigns, improved communication of weather information, organized storm spotter training, and improved technology such as Doppler radar.

Why is it then, on May 22, 2011, 159 people lost their lives in Joplin, Missouri. A tornado warning was issued 17 minutes before the tornado developed, and 19 minutes before it reached the Joplin city limits? Sirens were sounded multiple times. Shouldn't 17 minutes be enough time for everyone to reach safety?

After a major weather event, the National Weather Service performs a "Service Assessment". The purpose of the assessment is to review the facts in detail to discover whether proper procedures were followed, find what worked well, what needs improvement, and define best practices for future events. In recent years there has also been an increased emphasis on learning the societal response to warning information. People are interviewed after a tornado event to discover how they learned of the tornado, how they reacted, where they sought shelter. The results of these interviews have been enlightening.

Responding to warnings is not a simple act of stimulus-response, rather it is a non-linear, multi-step, complex process. Relationships between false alarms, public complacency and warning credibility are highly complex as well. The vast majority of Joplin residents did not immediately take protective action upon receiving a first indication of risk. Instead, the majority of residents waited until processing additional credible confirmation of the threat and its magnitude from a non-routine, extraordinary risk trigger before taking protective action.

What type of non-routine trigger are we talking about? Physical observation of the tornado, seeing or hearing confirmation and urgency of the threat on radio or television, and/or hearing a second non-routine siren alert are among a few. I recall the major tornado event in Oklahoma City on May 3rd, 1999 when I was living in the area. The on-air meteorologist stated: "Folks, in my 20 years as a broadcast meteorologist, I have never heard the National Weather Service use this kind of language before. This is serious stuff, you need to be underground or in a shelter to survive this tornado".

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People have differing responses to tornado warnings depending in part on their personal experience (having directly experienced a tornado earlier in their lifetime), and also on hearing the same information from multiple sources. Apparently, any confusion or contradiction between sources announcing a threat will delay public response so additional information can be gathered. Such contradiction might include, for example, a radio or TV station announcing a tornado warning but no sirens are heard or hearing of a tornado threat from a friend but the sky overhead does not look threatening. Another scenario might be hearing a warning, but in the person's experience, tornadoes typically do not occur this time of year or this time of day (personal life experience database).

The National Weather Service continues to look into ways of improving the warning process. Items being explored include examining the wording in warnings to help convey the threat, new radar scanning strategies for fast evolving threats, a non-routine warning mechanism to help provoke public response, and exploring emerging technologies for warning dissemination via mobile devices such as cell phones. You will be hearing more about this last item early next year as the new technology is rolled out.

# NWS Goodland Now on Facebook!!

Looking for another way to stay informed about the weather across the Tri-State area? If so, then be sure to check out the Facebook page for your NWS office in Goodland at the following link:

http://www.facebook.com/US.NationalWeatherService.Goodland.gov.

The use of Facebook will allow our office to reach out and be interactive on a regular basis. Best of all, this page is available for anyone to view even if you don't have a Facebook account.

# NWS Goodland Participates in the NWS National Week of Service

**by Chris Foltz, Meteorologist**

***Meteorologist Intern Chris Schaffer delivering a meal***

National Weather Service offices across the country serve the communities of our great country each day by providing critical weather, water, and climate information and forecasts. During the week of September 25 - October 1, many offices helped those they serve in a different fashion by seeking out community service projects. Your National Weather Service office in Goodland delivered Meals on Wheels to those in need in Goodland. We encourage everyone to seek out opportunities to help out your local community. The need is endless and even a few hours a month can make a HUGE difference!

**NOAA's National Weather Service taking action to build a**

***'Weather-ready'* nation**

**For more information click here:**

**http://www.noaanews.noaa.gov/stories2011/20110817_weatherready.html**

# Dual-Polarization ("Dual-Pol") Radar Coming to Goodland in November!

By Greg J. Guillot, Meteorologist Intern

Photo by Pam Murray, Meteorologist Intern

The Weather Surveillance Radar 88-D network is currently undergoing a major technological upgrade which will, for the first time, bring dual-polarization capability to National Weather Service radars around the country. This upgrade is, by far, the most significant technological advance to NWS radars since the inception of the WSR-88D radar in the late 1980's. After roughly a year of testing this new technology at five forecasting offices around the country, including the Wichita, KS office, widespread installation of "dual-pol" radar began in September. The Goodland Weather Forecast Office is scheduled to receive the upgrade to its WSR-88D radar in the beginning of December! This upgrade in radar technology will, in general, help improve identification of precipitation type (i.e., whether the radar echoes are rain, snow, or hail, etc.), precipitation accumulation, and associated weather hazards.

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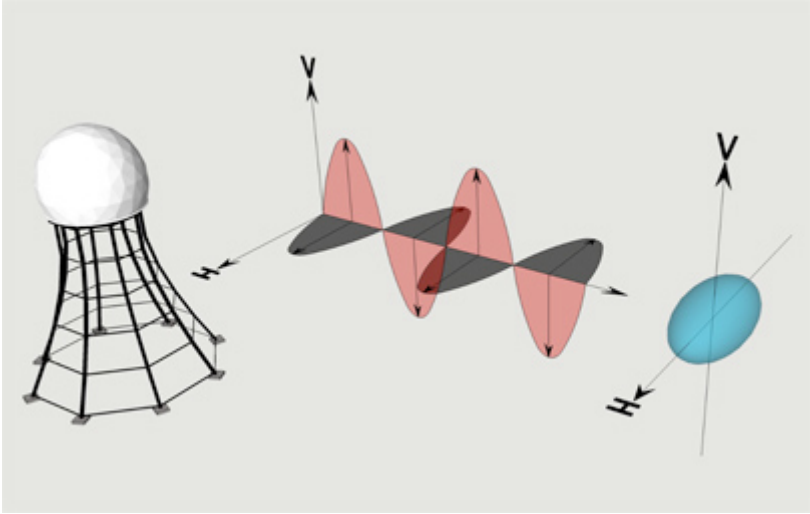
So, what exactly is “dual-pol” radar anyway? Answering that question requires a brief explanation of how our current radar ‘works’. Radars without dual-pol technology transmit horizontal radio waves in pulses, and precipitation and other objects in the atmosphere return part of that energy back to the radar. The fact that these pulses are only oriented in one plane (horizontal) means that the radar can be referred to as a ‘single’ polarization radar.



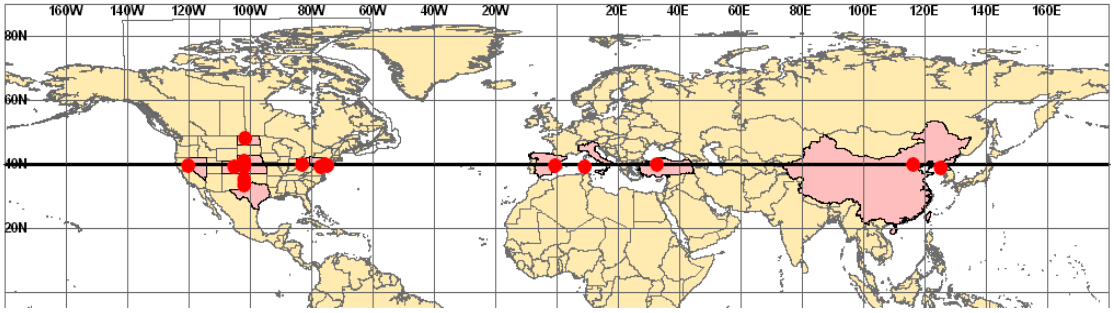

Graphic courtesy of University Corporation for Atmospheric Research
http://www2.ucar.edu/

Dual-polarization radars, on the other hand, transmit and receive pulses with both horizontal and vertical orientations. This capability gives greater information on the size and shape of droplets in the atmosphere, as well as the density of these drops. This is very important and useful to a radar operator as varying types of precipitation take on different shapes and densities.

# Ever Wonder?

*By David Thede, Lead Forecaster*

Ever wonder what the weather is like for locations around the world with a similar latitude or longitude as Goodland? I did, so I gathered the data for various cities around the world not knowing what to expect. Is it drier, wetter, warmer, cooler, or similar to that of Goodland? Will elevation differences matter? I'll look at the monthly temperatures for 11 locations with a similar latitude as Goodland and four locations with a similar longitude as Goodland (Table 1).




| Location | Latitude/Longitude | Elevation (feet) |
|---|---|---|
| Goodland, Kansas | 39.35/-101.71 | 3681 |
| Reno, Nevada | 39.53/-119.81 | 4505 |
| Baltimore MD/Washington DC | 39.18/-76.67 | 146 |
| Columbus, Ohio | 39.99/-82.89 | 815 |
| Philadelphia, Pennsylvania | 39.87/-75.24 | 36 |
| Atlantic City, New Jersey | 39.46/-74.58 | 75 |
| Castle Rock, Colorado | 39.37/-104.86 | 6224 |
| Beijing, China | 39.93/116.39 | 143 |
| Pyongyang, North Korea | 39.0/125.30 | 89 |
| Ankara, Turkey | 39.93/32.86 | 3077 |
| Valencia, Spain | 39.47/-0.37 | 49 |
| Cagliari, Italy | 39.22/9.12 | 13 |
| Amarillo, Texas | 35.22/-101.83 | 3607 |
| Lubbock, Texas | 33.58/-101.85 | 3282 |
| Minot, North Dakota | 48.23/-101.30 | 1716 |
| Ogallala, Nebraska | 41.13/-101.72 | 3222 |

**Table 1 – Locations of Compared Stations**

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For locations with a latitude similar to Goodland (Table 2), the average monthly temperature in January and February for Goodland is in the cooler half of the locations studied with Valencia, Spain the warmest followed closely by Cagliari, Italy. The coldest was Pyongyang, North Korea. By March and continuing into May Goodland's average high temperature is generally within 1 degree of the average for all sites sampled. As we get into the summer months June through August, Goodland ties with Beijing, China for 2nd warmest with an average temperature of 86.5 degrees. Reno, Nevada is the warmest at 88.0 degrees. As we transition into the latter half of fall and early winter we see that Goodland's November monthly average high temperature is the 2nd coldest at 49.6 degrees with Pyongyang, North Korea the coldest at 48.9 degrees. For December Goodland is in the bottom half of the colder sites sampled. Looking at the 12 month average high temperature shows Goodland at 63.9 degrees, slightly over a half degree cooler than the average for the 12 sites studied. Valencia, Spain was the warmest at 72.1 degrees while Pyongyang, North Korea was the coldest at 60.3 degrees.

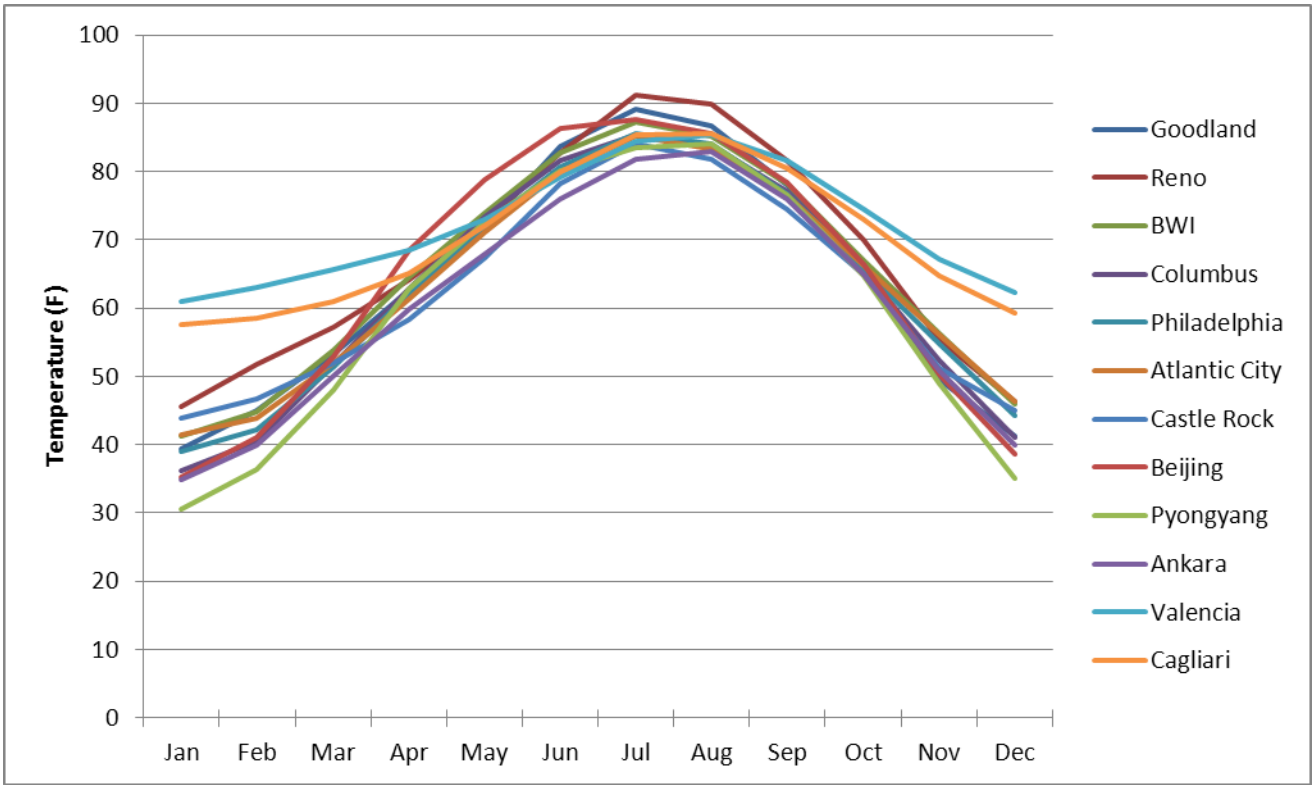


**Table 2 – Average Monthly Maximum Temperature by Latitude**

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For locations with a longitude similar to Goodland (Table 3) we start to see the influence of the equator and the North Pole, especially in January and February as Minot, North Dakota is the coldest by at least 20 degrees compared to the average of the five sites studied. Goodland is within less then a half degree of the five city average of 42 degrees. The warmest was Lubbock, Texas at 54.9 degrees. Both Lubbock and Amarillo remain quite warm compared to Goodland through the spring but by summer (June through August) the difference in temperature quickly decreases with Lubbock averaging 90.6 degrees, Amarillo 89.0 degrees and Goodland 86.5 degrees. Ogallala, Nebraska has a nearly identical 3 month average temperature (86.2 degrees) with Minot, North Dakota being the coolest at 79.1 degrees. As we move into fall and winter we see that Goodland and Ogallala are in the middle of the sample with Minot being the coldest and Lubbock being the warmest.

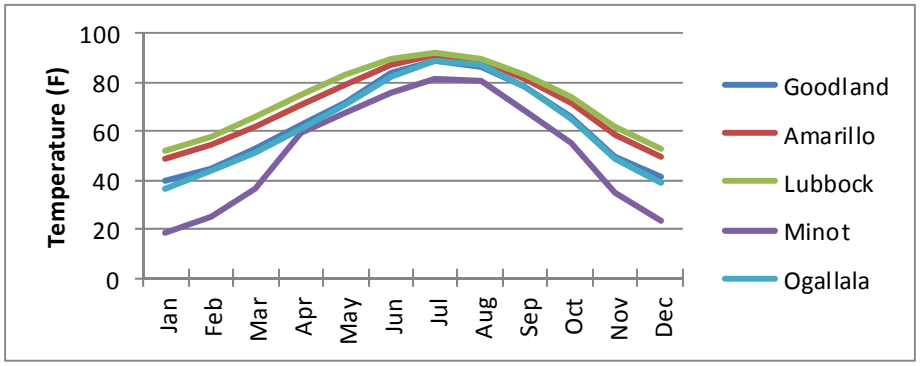


**Table 3 - Average Monthly Maximum Temperature by Longitude**

For locations with a latitude similar to Goodland (Table 4), we see that for January and February Goodland is the 2nd coldest with an average low temperature of 18.3 degrees. The coldest was Castle Rock, Colorado at 15.5 degrees. The warmest location was Valencia, Spain at 45.4 degrees. For the spring months (March-May) Goodland ranks as the 3rd coldest location with an average low temperature of 35.6 degrees. Not too far behind is Reno, Nevada at 34.2 degrees with Castle Rock, Colorado being the coldest at 31.0 degrees. The warmest location is again Valencia, Spain with an average temperature of 52.3 degrees followed by Cagliari, Italy at 49.2 degrees. As we head into summer, Goodland's June through August average low temperature is 58.7 degrees, 3.6 degrees below the average of 61.3 degrees for the 12 stations studied. Only 3 locations have a cooler average temperature than Goodland (Castle Rock, Reno and Ankara) with the warmest reading of 68.9 degrees at Beijing, China. As we head into fall and winter, Goodland remains in the top 25 percent of coldest sites while Valencia, Spain remains the warmest. It shouldn't be too much of a surprise that for the 12 month average low temperature, Goodland ranks 3rd coldest with a 37.5 degree average, ahead of Reno, Nevada (35.2 degrees) and Castle Rock, Colorado (32.3 degrees). The warmest location is Valencia, Spain at 56.1 degrees.

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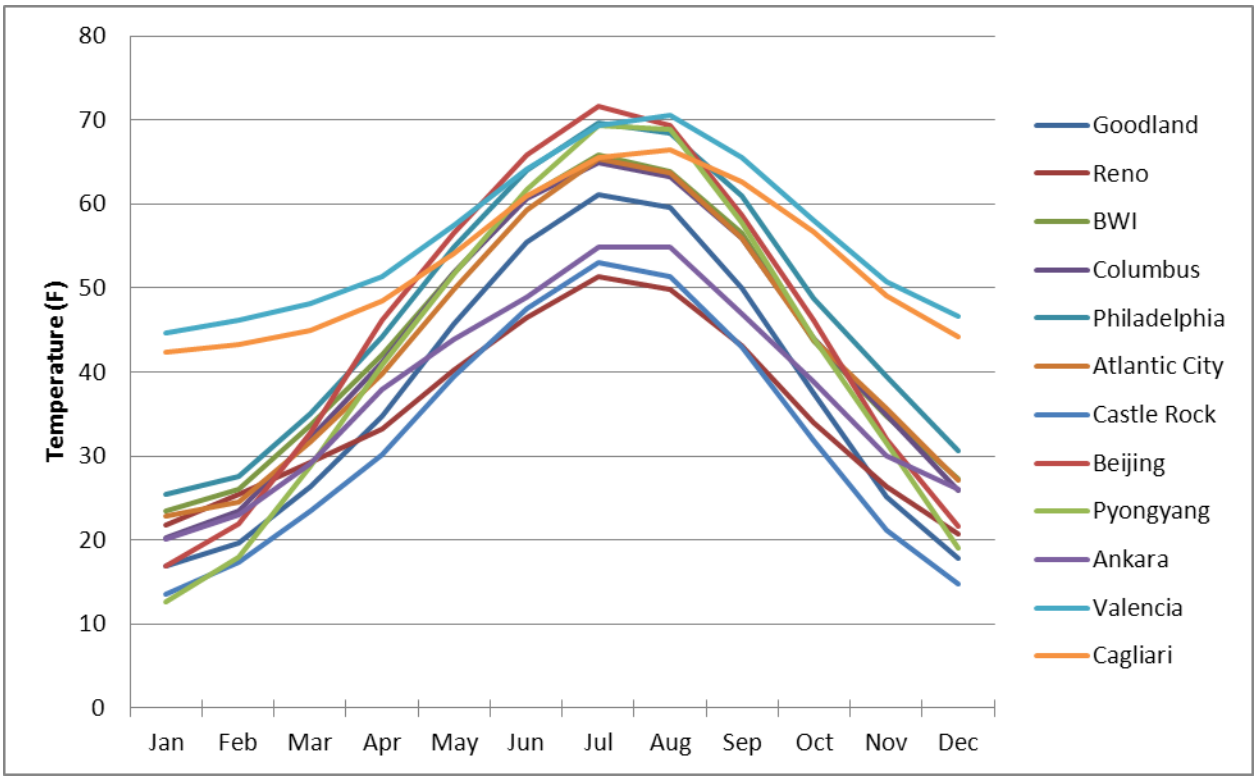



**Table 4 - Average Monthly Minimum Temperature by Latitude**

Table 5 shows locations with a longitude similar to Goodland, and a similar scenario to the monthly and 12 month average low temperature was observed. Minot, North Dakota was the coldest (31.5 degrees) while Lubbock, Texas was the warmest at 46.2 degrees. Goodland averaged 37.5 degrees.

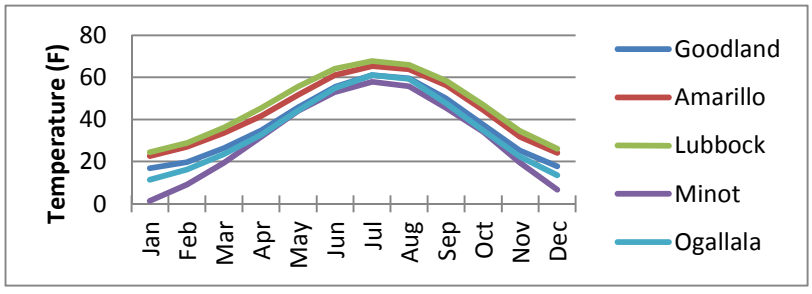
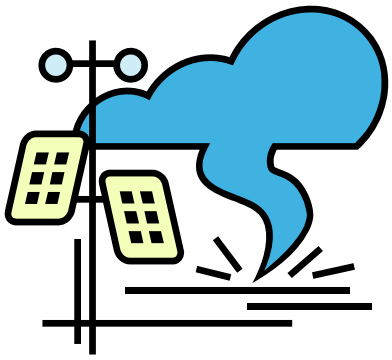



**Table 5 - Average Monthly Minimum Temperature by Longitude**

(In the next newsletter, Dave will examine precipitation amounts using the same methodology.)

# Do you have a Home Weather Station?



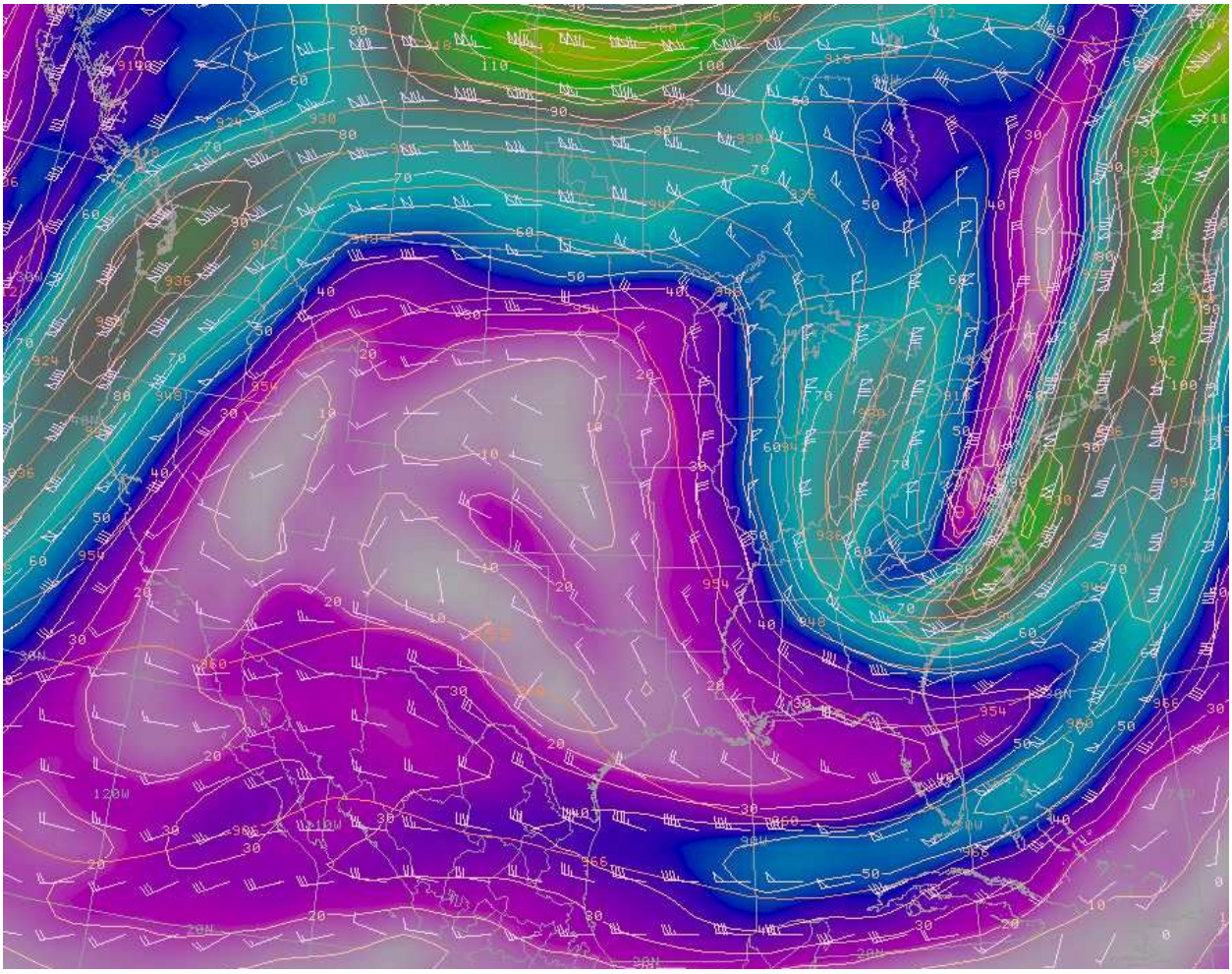
More and more people are purchasing home weather stations. Many have the capability of transmitting the data they receive from their home computer to other locations. The National Weather Service is interested in receiving the data from your home weather station to expand our network of weather information in Colorado, Kansas and Nebraska. For more information please contact Dave Thede at 800-272-7811.

Are you ready for winter? A winter safety kit is an important addition to your vehicle. A battery operated weather radio is also important. To prepare for winter storms click here for more tips:

http://www.nws.noaa.gov/om/winter/resources/Winter_Storms2008.pdf

# What is a Jet Streak?

By Chris Schaffer, Meteorologist Intern



Meteorologists commonly refer to the position of the jet stream, a region of fast-moving air in the upper atmosphere. Within the jet stream, there are localized areas where the wind speeds are particularly fast called jet streaks. The jet stream (in blue, in the image above) and the embedded jet streaks (in green) are present at different heights within the atmosphere at different times of the year. While they always remain in the upper atmosphere and well above the surface, they are observed at higher altitudes during the summer and lower altitudes in the winter.

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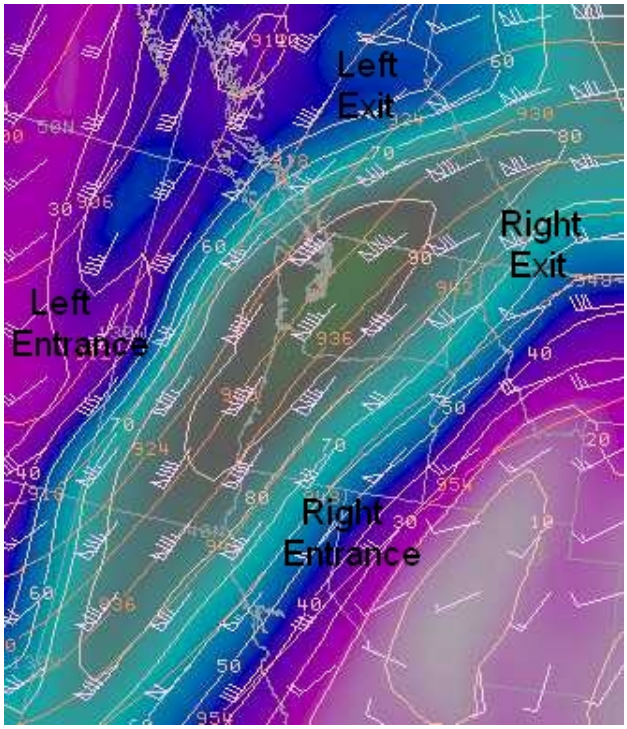
Recognizing and correctly forecasting the position of jet streaks is important when anticipating areas that may receive showers and thunderstorms. A jet streak can be divided into four quadrants, considering where the air enters and exits the jet. Due to the way air speeds up and slows down as it enters and exits a jet streak, air is generally expected to rise in the right entrance and left exit regions, and expected to descend in the left entrance and right exit regions. Rising air is an important ingredient in forming thunderstorms, severe and non-severe.




There are many factors that lead to upward or downward motion of air, however. While a jet streak may be encouraging upward or downward motion, something at a lower level may be forcing air in the opposite direction. A jet streak would try to move air downward in the left entrance region, but a cold front within that same region may be leading to strong upward motion at the lower levels. A meteorologist would need to take this, and any other factors, into consideration when making a precipitation forecast. If the cold front was under the right entrance region instead, the upward motion from both the jet streak and the front would be working together to allow for even stronger upward motion, which may make a forecaster more confident about the chance for precipitation to occur.

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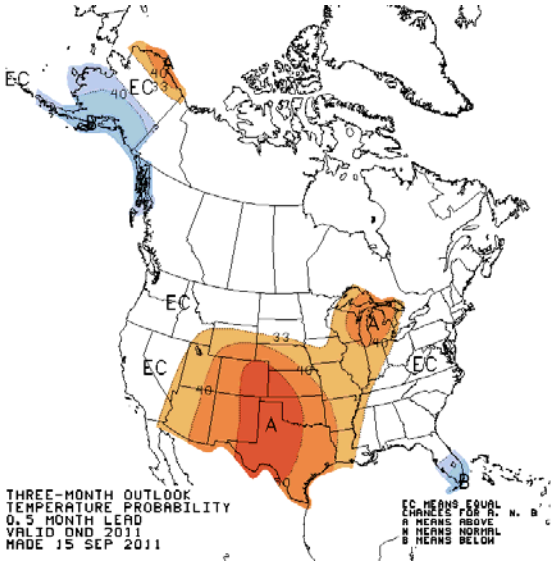
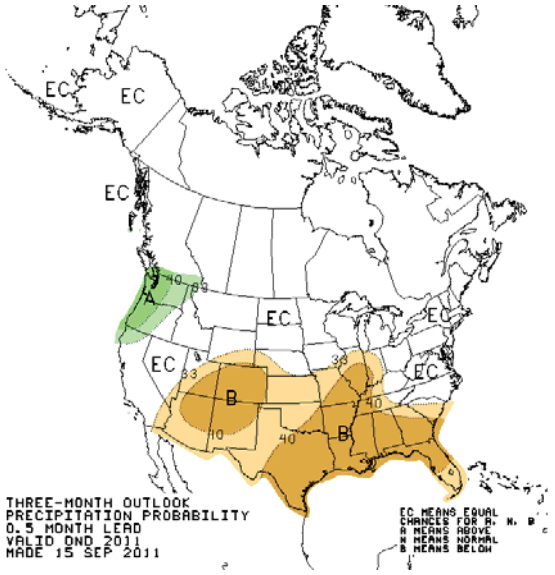
La Niña has an impact on winter weather across the Tri-State area, so meteorologists are monitoring the situation closely. Dave Floyd, a meteorologist at the Goodland National Weather Service office, discovered that snowfall during a La Niña year is approximately 10-20% less than snowfall that occurs during a normal year across much of the Tri-State area.

The Climate Prediction Center issued the winter outlook which takes into account the impacts of La Niña. The outlook calls for a good chance of below normal precipitation and a better chance for above normal temperatures across much of the High Plains.

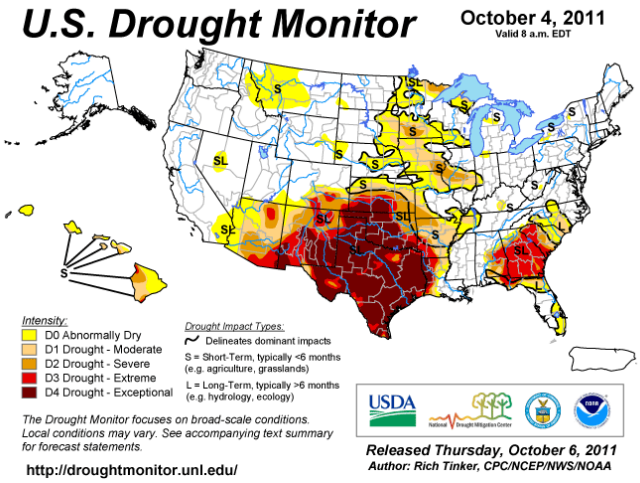



**Temperature Outlook (Oct – Dec)**




**Precipitation Outlook (Oct – Dec)**

This is not good news, especially for areas in southwest Kansas that are experiencing exceptional drought conditions. The current Drought Monitor shows exceptional drought across most of the southern Plains, including the southern third of Kansas.




**Current Drought Monitor**

# Cooperative Observer News

*by Mike Lammers, OPL*

## Helpful Tips for Good Observers - Reminders

- WxCoder III (applies only to observers who enter their data directly into the computer)
    - If you have missing data from being out of town or some other reason, remember to note the reason in the remarks section. Keep in mind that many years from now someone may need this data. Seeing a blank space with no reason will leave the user of the data thinking, "Did the observer forget to take the observation that day? Was the observer out of town? Why is this missing?"
    - Especially important is the END OF THE MONTH CLOSE OUT. Please do this diligently each month. It is very important. As the observer, please check your data and then do your close out prior to the TENTH of each month. It is best to do this right after the first of the month. Once this is done, we will check your data here at the NWS Goodland office. Then we do our close out by the TWENTIETH of the month. Once we do our close out, your report will go electronically to NCDC and to the world.
    - If you have any questions about END OF THE MONTH CLOSE OUT AND HOW TO DO IT, email michael.lammers@noaa.gov or give the office a call at 1-800-272-7811.

- For everyone, never leave a data space blank. If it is missed, please put an M for missing there. For precipitation including snowfall, if none occurs on a given day be sure to put zeroes in those spaces.

- Also for our observers with the Standard Rain Gauge, as we approach winter and freezes, don't forget to remove the funnel and inner tube. For this region, around the first of November is a good time to do this.

- Fischer Porter Rain Gauges (only applies to observers with this equipment)

    - Be sure to put red lines at the start and end of each tape before mailing.
    - Always check your Fischer Porter unit at least once a week to be sure it is functioning properly. If there is a problem, contact us and let us know about it.
    - When applying your on/off label to the tape, be sure to place the label at least several inches from the end of the tape. Never tape both ends together as this makes it hard for the reader to open up the tape to check it.
    - Please be timely in mailing your tapes to the NWS Goodland office. We check these tapes here at the office and then mail them to a contractor who uses a machine to take photos of each day on the tape before being sent to NCDC (National Climatic Data Center). A good habit would be to send these in to us no later than the tenth of the month if you can.

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## Why your observations are important…

Our COOP observations provide good, useful data for many people. Have you ever thought about who some of these users are?

According to the NCDC (National Climatic Data Center):

- Health and human services COOP applications include carrying on research regarding correlations between climates and diseases/physical disorders.
- The housing industry and real estate companies use COOP products in applications such as performing assessments of construction deadline penalties due to weather, planning for site selection for resort and retirement developments.
- The energy industry uses climate normal from COOP data to perform assessments in planning for the levels of power usage, compute rate adjustments, and research alternate energy sources.
- For flood control design and planning, the U.S. Army Corp of Engineers has used the 100-year return period of short duration precipitation COOP products.
- Agribusiness uses COOP data to study the effects of climate variations on crop yields, determine optimal geographic locations for crop types, and plan for application of herbicides and pesticides based upon certain weather patterns.
- COOP data is also used to plan for droughts, excessive rainfall, and late spring frosts that have obvious effects on crops.
- Transportation climate assessment products are used in planning for the best land routes for transporting commodities based upon historical weather patterns derived from COOP data. Trucking companies also use climate averages to plan for the optimal route in the transport of perishable goods.
- The National Association of Home Builders (NAHB) used COOP data to design building standards for frost protected shallow foundations. Shallower foundations have been documented to save homeowners $330 million annually in construction costs and in energy savings due to using additional foundation insulation.

The next time you record an observation remember how many people are relying on you.

Thank you!

# Recent Awards

Pictured at left are Mike Lammers, OPL, Shirley and Clement Mitchell and Scott Mentzer, MIC. Mitchell received a 40 year length of service award.

Pictured at right are Gary and Carol Andrews. Carol reports from Bonny Dam in Colorado. They were recently presented with a 15 year length of service award.

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Pictured at left is Guy Gaskell. He received an award for reporting from Winona, Kansas for 20 years.

Edna Lovell recently accepted the coveted Edward H. Stoll Award for her late husband Carl who reported from Cheyenne Wells, Colorado for almost **50** years.

# *CoCoRaHS Corner*

***By David Thede, Lead Forecaster***


The CoCoRaHS (Community Collaborative Rain, Hail & Snow Network) program has been in Kansas since 2004 and in Colorado since 1998. It's a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). I would like to thank everyone who has participated in the program and would like to recognize those who over the past 7 years (September 1, 2004 to September 1, 2011) have reported on a routine basis, including days when no precipitation fell. If one were to report every single day during the 7 year period there would be a total of 2557 days. Station ID is followed by the number of reports received over the past 7 years.

***2500-2557 reports***

CO-KC-50 (2553) CO-YU-24 (2533)

***2000-2499 reports***

CO-KC-84 (2462) KS-DC-1 (2376) KS-DC-2 (2372) CO-KC-80 (2298) KS-NT-3 (2277)

KS-SH-16 (2267) CO-YU-52 (2239) KS-SH-4 (2228) KS-SH-14 (2173) KS-CN-1 (2001)

***1500-1999 reports***

KS-DC-3 (1971) CO-KC-27 (1969) CO-YU-59 (1930) CO-YU-62 (1869) KS-RA-1 (1674)

KS-TH-18 (1668) CO-YU-48 (1647) KS-SH-21 (1642) KS-CH-28 (1609) KS-GO-7 (1578)

KS-CH-27 (1526) KS-TH-17 (1518)

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***1000-1499 reports***

KS-LG-10 (1498) KS-LG-2 (1457) CO-YU-68 (1380) KS-SH-2 (1378) KS-CH-19 (1320)

KS-GO-2 (1260) CO-KC-85 (1260) CO-KC-48 (1234) KS-NT-1 (1160) KS-GO-9 (1157)

RED_020 (1152) CO-YU-58 (1069) KS-CH-31 (1058)

If you have an interest in weather and an interest in reporting rain, hail, snow, or any combination of the three, the National Weather Service in Goodland is promoting and establishing a supplemental rain, hail, and snowfall network in northwest Kansas, east central Colorado and southwest Nebraska. This opportunity is open to all interested volunteers that have an enthusiasm for watching and reporting weather conditions every day. This exciting opportunity is known as the Northwest Kansas CoCoRaHS Expansion and can be found on the internet at:

http://www.cocorahs.org/

Interested volunteers should contact the Northwest Kansas/East Central Colorado and Southwest Nebraska CoCoRaHS Coordinator, David Thede of the National Weather Service in Goodland. He can be reached at (785) 899-7119 or at david.thede@noaa.gov.

**National Weather Service**
920 Armory Road
Goodland, KS 67735

**Phone:**
785-899-7119

**Fax:**
785-899-3501

**E-mail:**
w-gld.webmaster@noaa.gov

*Please don't forget, if you have pictures or video to share of any severe weather events that take place this year, please contact* ***david.l.floyd@noaa.gov***

*With your permission, your pictures and video will provide information and training materials for future storm spotters and meteorologists!*

The National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community. It is accomplished by providing warnings and forecasts of hazardous weather, including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. The NWS is the sole United States OFFICIAL voice for issuing warnings during life-threatening weather situations.