

High Plains Herald

National Weather Service
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The National Weather Service provides weather forecasts and warnings for the protection of life and property and the enhancement of the national economy.

Fall 2012

Inside this Issue:

Meet a Meteorologist

By Mike Weiland

We are proud to introduce you to Gerry Claycomb a senior meteorologist here at your National Weather Service Office.

Gerry came to the NWS office in Cheyenne in February 2010 as a senior meteorologist. Prior to working in Cheyenne, Gerry worked at the NWS office in Springfield, MO and Elko, NV and has been in the NWS since March 2002.

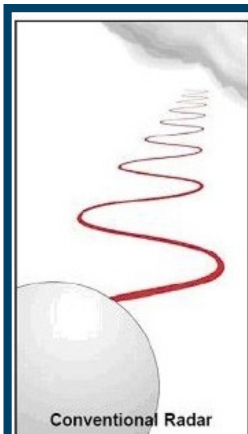
Gerry worked for the US Air Force for 21 years as a weather forecaster and was able to travel to locations such as Japan, Korea, Alaska, and Germany overseas and California and Washington State stateside. Gerry is proud of his service with the US Air Force. He provided support for weather sensitive customers who were grateful for his efforts.

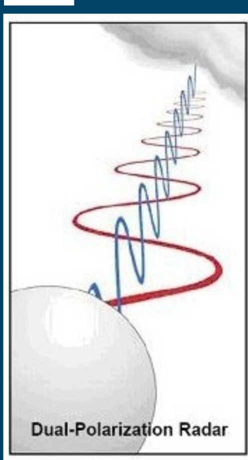
Gerry also provided weather forecasts for the first aircrews that flew inspectors into Eastern Russia for the Intermediate-Range Nuclear Forces Treaty inspections in 1987 between the United States and the USSR.

Gerry worked as a contractor at McMurdo Station, Antarctica from September 2001 until hired by the National Weather Service in 2002. He provided aviation forecast support to the NY Air National Guard who provided support missions to the South Pole Station and deploying scientists to and from various research stations around the continent.

Through Gerry's exciting career he has been married to Juanita for the past 30 years. They have a son, Gerald III who lives in St. Louis.

Gerry likes the challenge of forecasting for southeast Wyoming and the western Nebraska Panhandle. His main interests are aviation and fire weather and he is the office program leader for both of those types of forecasts.





The Cheyenne National Weather Service (NWS) Doppler Radar...KCYS...will be upgraded to use new technology known as dual polarization. Installation will begin on Monday, October 1, 2012 and take up to two weeks to complete. During this time the radar will be unavailable.

Dual polarization will result in better estimation in precipitation amount, size, and type in addition the ability to give forecasters a higher degree of confidence in distinguishing heavy rain and hail. For any questions about the installation, please contact:

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Meteorologist-in-Charge
Steven.apfel@noaa.gov
307-772-2468 ext. 642
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"Meteorologists are constantly monitoring the amount of moisture at the surface and in the upper atmosphere to make a weather forecast. "

Inside this Issue:

What are Relative Humidity and Dew Point and how do They Affect the Weather?

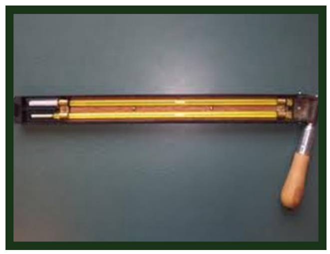
By Mike Weiland

Both Relative Humidity and Dew Point are a measure of moisture in the atmosphere. Knowing those values is very important as it is the amount of moisture that determines cloud cover, if it will rain or snow, if it will be foggy and much more. Meteorologists are constantly monitoring the amount of moisture at the surface and in the upper atmosphere to make a weather forecast.

There are various ways to determine the relative humidity and dew point. Meteorologists use satellite imagery, atmospheric soundings, (done twice a day with weather balloons and attached equipment), as well as hourly surface observations.

Water vapor is always present in the atmosphere as a gas and is usually invisible. The only way to actually "see" water vapor is when there are clouds, fog or precipitation. The more water vapor in the atmosphere, the more clouds will be present as well as a better chance of rain or snow.

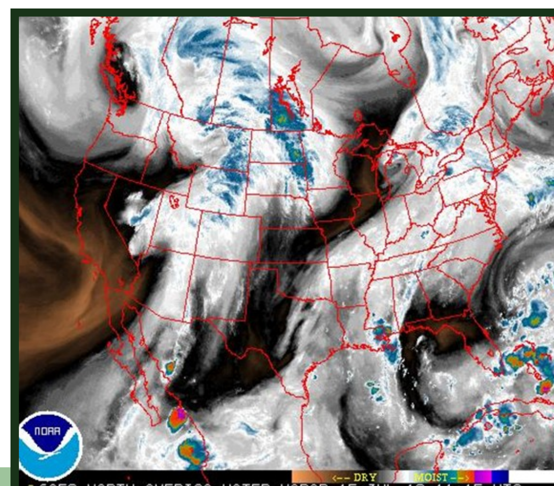
Meteorologists commonly use dew point to express the amount of moisture. The dew point is the temperature at which water vapor will condense to liquid water. The greater the amount of moisture, the higher the dew point. One nice thing about the dew point is it usually changes slowly over time. The dew point is measured by evaporating water on a thermometer and then calculating the difference between that and the actual air temperature. It is usually done by a sling psychrometer, where spinning the wetted thermometer enables evaporation which lowers the reading on that thermometer.



A Sling Psychrometer used to obtain the dew point and relative humidity.

Now, what is the difference between dew point and relative humidity? Well, relative humidity is the percentage of water vapor in the air when compared to how much the air can potentially hold. So, on a hot day, the air can hold more water vapor and the relative humidity goes down. On a cool night, the air can hold less water and the relative humidity increases. The relative humidity during the day can change dramatically (especially in the summer) and can range from 100% at late night to 10% or less in the afternoon. The lower the relative humidity, the lower the possibility of rain, snow and fog.

Water Vapor Satellite Image. The white and blue areas indicate greater amounts of water vapor.



CoCoRaHS

It is never too late to join a volunteer network of people observing and recording their daily precipitation. It is a fun and interesting way to be a be involved with the weather. If you have questions, please visit www.cocorahs.org for more information or call 307-772-2468 ext. 516.

Mountain Waves and Strong Winds

By Mike Weiland

Mountain Wave winds occur frequently to the east of the mountains from the Fall through Spring. In our area, this type of wind occurs to the east of the Snowy Range as well as the Laramie Range and extend east up to 100 miles or so.

The name Mountain Wave comes from the way the winds behave when they flow over a mountain peak. Typically, strong west winds at the mountain top level flow over the mountain and then are forced downward to the surface. That "wave" cycle is repeated in a dampened form further east. This scenario is shown in the first image. The strongest winds usually occur just to the east of the mountains where the wave (and associated winds) first nears the ground.

For places such as Cheyenne and Wheatland, these winds can reach 80 MPH and often begin in the nighttime hours. Perhaps the most dangerous aspect of these winds is for pilots. The extreme turbulence can be dangerous for aircraft.

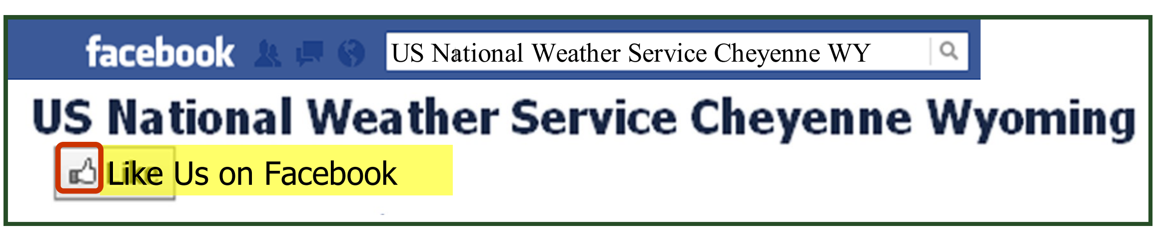
The Mountain Wave typically is associated with lenticular (or lens type looking) clouds. When that type of cloud is seen, strong winds are usually taking place at the cloud level. The lower pictures are lenticular clouds.

Mountain Wave Winds (Courtesy of COMET)

Lenticular Clouds

"For places such as Cheyenne and Wheatland, these winds can reach 80 MPH ..."

Inside this Issue:



Weather 101: The Enhanced Fujita Scale and What it Means?

By Debbie Winston

Introducing Weather 101:

As the office manager for the National Weather Service Office, I do not have a lot of knowledge about meteorology, but I am learning a lot by working here. I thought there might be some of you out there that would be interested in learning with me, so I am starting the Weather 101 Column. This way we can explore the weather together. The information is checked by meteorologists here in our office, so it is accurate. For this issue I have chosen the subject of the Enhanced Fujita Scale for tornadoes and what it means. If you have ideas for future subjects just send an email to cys.info @noaa.gov.

The Enhanced Fujita Scale and What it Means

The size of a tornado doesn't indicate the strength of the tornado. Small tornadoes can be very strong and large tornadoes can be quite weak. In 1971 Tetsuya Fujita from the University of Chicago and Allen Pearson, the head of the National Severe Storms Forecast Center (now known as the Storm Prediction Center), introduced the Fujita-Pearson Scale to measure the intensity of tornadoes.

The scale was created to assess the storm damage caused by tornadoes, determined when the National Weather Service (NWS) conducted a Storm survey. During the Storm survey, the NWS examined the path length and width, as well as damage to structures and vegetation.

In 2007, the enhanced Fujita Scale was introduced by the National Weather Service. It is more accurate in matching the wind speeds with the damage caused.

An EF0 tornado, also called a Gale Tornado, has estimated wind speeds of 40-72 mph. It causes light damage such as broken tree branches and missing roof tiles.

With an EF1 tornado there is moderate damage, therefore they are called Weak Tornadoes. These tornadoes remove tiles from a roof, overturn a mobile home, and they can even push cars off the road. These tornadoes have winds speeds from 73-112 mph.

EF2 or Strong Tornadoes have wind speeds of 113-135 mph. These tornadoes can snap large trees, tear the roof off of a house, over turn large semi-trucks, turn light objects into missiles possibly take out external walls.

Damage from the EF2 tornado that hit Wheatland, WY on June 7, 2012 (Credit NWS CYS)

An EF3 tornado is classified as a Severe Tornado. Their wind speeds are estimated at 136-165 mph. These storms not only take off roofs but may take out some walls, too. These tornadoes can uproot large trees, tumble large semi-trucks or train cars, lift heavy vehicles off of the ground and take out internal walls.

EF3 Tornado that hit Wichita, KS. Posted April 14, 2012. (Credit Stacey Cameron)

EF4 tornado or Devastating tornadoes will level homes, and lift cars. Here larger objects become projectiles. The wind speeds for an EF4 tornado are from 166-200 mph and debris can be carried miles.

An EF5 Tornado, which is called an Incredible tornado will have wind speeds above 200 mph. These tornadoes can lift houses off their foundations and carry them for miles, and cars can be lifted and tossed in excess of 100 meters from their original position. An EF5 tornado can peel the bark off of trees, as well as scour pavement off the ground.

Image showing damage from the EF5 tornado that hit Joplin, Mo. On May 22, 2011 (Credit NOAA)

The Fujita Scale is based on the damage from the storm, not the appearance of the funnel cloud. As previously mentioned, the NWS personnel complete a storm survey as soon as possible after the storm to determine the official rating. The goal is to determine the highest wind speed through the damage path and assign an EF scale category, using damage indicators for different structures and vegetation to determine degrees of damage.

With the introduction of the Enhanced Fujita Scale there was a need for continuity of records. To assure more consistent assessment of damage more detailed information is collected; descriptions with photos, video and aerial photos, eye witness accounts, engineering reports, the types of structures involved, effects on vegetation, ground-swirl patterns, radar tracking, and the path length and width.

"The size of a tornado doesn't indicate the strength of the tornado."

Inside this Issue:

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"During the recognition day, SKYWARN operators visit NWS offices and contact other radio operators across the world. "

SKYWARN Recognition Day

By Mike Weiland

SKYWARN Recognition Day was developed in 1999 by the National Weather Service (NWS) and the American Radio Relay League (ARRL). It celebrates the contributions that volunteer SKYWARN radio operators make to the NWS. During the recognition day, Skywarn operators visit NWS offices and contact other radio operators across the world. The Skywarn operators provide the opportunity on that day for National Weather Service staff members in Cheyenne to talk to other National Weather Service meteorologists around the country.

This year the day will be from the evening of Friday, December 7 through late afternoon on Saturday, December 8. The object of Skywarn Recognition Day is for all amateur stations to exchange information with as many other stations and NWS offices as possible on various frequencies. Usually, the information exchange is short, consisting of an amateur radio station's call sign, location and a description of the current weather.

Here at the National Weather Service in Cheyenne, there are a dedicated group of amateur radio operators who spend considerable time training and working in the office when hazardous weather is occurring or is expected. The operators are part of the SHYWY Amateur Radio Club in Cheyenne and use a base amateur radio station located in the office at the National Weather Service in Cheyenne.

Although many contacts are in Laramie County, the operators can reach many parts of southeast Wyoming and the western Nebraska panhandle with their radios. The additional reports from the amateur radio operators have been very valuable here at the NWS in Cheyenne as well as around the nation. Their hard work and dedication provide important information that enables more timely warnings to the citizens of our area! For more information on the SHYWY amateur radio club contact cnuttb_@bresnan.net.

The wireless industry, The FCC, and FEMA will roll-out the WEA's (Wireless Emergency Alerts) system nationwide this year. The service started in June and is free. You do not have to sign up. You can verify through your cell carrier if they are participating.

Tornado warnings, flash flood warnings and several other high-end warnings will go direct to wireless users in an affected county automatically if their device is compatible.

http://www.noaa.gov/features/03_protecting/wireless_emergency_alerts.html

Meteorological Satellites: An Introduction

By Mike Jamski

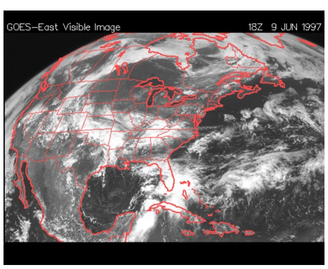
The world's first meteorological satellite was launched from Cape Canaveral on April 1, 1960. Named TIROS for Television Infrared Observation Satellite, it demonstrated the advantage of mapping the earth's cloud cover from satellite altitudes. TIROS was a polar orbiting satellite (POES). POES continued to be used today and offer the advantage of daily global coverage, by making polar orbits at an altitude of 540 miles 14 times daily. Since the number of orbits per day is not an integer, the orbital tracks do not repeat on a daily basis. Currently in orbit we have morning and afternoon satellites, which provide global coverage four times daily.

TIROS 6

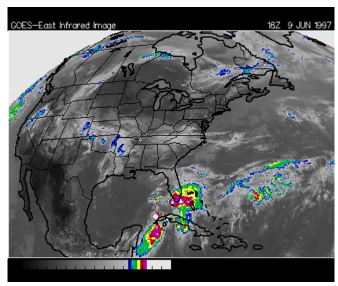
The geostationary satellites were placed in orbit beginning in 1966. Unlike POES satellite, geostationary satellites orbit at an altitude of 22,236 miles at the equator. At this distance the satellite completes one rotation with the earth in 24 hours. The net result is the satellite appears stationary, relative to the earth. This allows them to hover continuously over one position on the surface to get continuous pictures of the earth from this vantage point. Geostationary Operational Environmental Satellites (GOES) satellites are the mainstay of weather forecasting for the National Weather Service. Satellite images you see on TV weathercasts are from GOES satellites. The United States operates two meteorological satellites in geostationary orbit, one over the equator at 75° West with a view of the East Coast and the other over the equator at 135° West for the West Coast view.

GOES 8

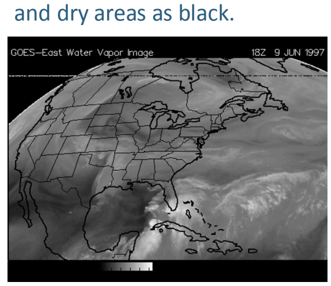
Visible imagery (below) is just like the name suggests; an image of the earth in visible light. The satellite detects sunlight reflected from objects within the viewfinder. Thick clouds appear brighter and lower altitude clouds darker in visible photos.



The obvious problem with visible imagery is that it is only available during the day. To combat this problem, the infrared (IR) sensor was devised. It senses radiant (heat) energy given off by the clouds. Warmer (lower in the atmosphere) clouds give off more energy than cold (higher) clouds. IR imagery (below) measures the heat and produces several images based upon different wavelengths in the IR range of the electromagnetic spectrum. Often these images are color enhanced to help better distinguish the taller, colder clouds from shallow clouds.



Water vapor imagery (below) is unique in that it can detect water vapor (water in a gas state) in addition to clouds. However, due to absorption of energy by the atmosphere this view only senses the top third of the troposphere. While the low level moisture is hidden from the satellite sensor, the upper level moist and dry areas are plainly observable. Moist areas show up as white and dry areas as black.



"...drought conditions have returned to parts of the area for the first time since early March of 2011..."

Inside this Issue:

"...some of the Weather Folklore Stories are based on scientific facts."

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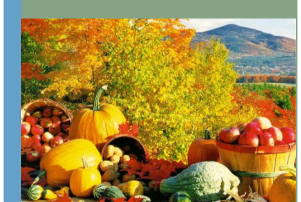


Weather Folklore and the Science Behind It

By Debbie Winston

For a long time people's livelihoods depended on the weather and after years of observations they developed weather folklore. Many of the weather folklore stories that you hear are simply not true. Surprisingly, many of these beliefs have been passed from generation to generation and were based on observations and evidence: what we now call science. So some of the Weather Folklore Stories are based on scientific facts.

When windows won't open, and the salt clogs the shaker, the weather will favor the umbrella maker.
Windows with wood frames tend to stick when the air is full of moisture. Also, salt absorbs moisture, so it clumps together rather than pouring out of the shaker. As moisture collects in the air, there is a greater likelihood of precipitation.

A Ring Around the Moon, Rain or Snow is Coming Soon.
A halo appears around the moon or the sun when ice crystals at high altitudes refract light. That indicates that moisture is descending to lower altitudes, where it is likely to take the form of rain. A halo is a more reliable indicator of storms in warmer months than during winter months. The brighter the circle, the greater the probability.

When the dew is on the grass, rain will never come to pass. When grass is dry at morning light, look for rain before the night.
Dew is more likely to form on nights that are clear and calm nights. These conditions are usually associated with fair weather or high pressure systems. Cloudy, windy weather that keeps dew from forming often signifies the approach of a rain-producing system.

Cold is the night . . . when the stars shine bright.
This applies more during the winter months. The more clouds that are in the sky, the less stars you see. A very clear sky permits more starlight to shine through so the stars appear brighter. Clouds hold in daytime heat like a blanket. With fewer clouds at night, the temperature will fall and allow the air to cool.

Red sky at night, sailor's delight; red sky in the morning, sailor take warning.
Deep red sunsets are often associated with dry, settled weather and high pressure. But the key sign is in the red sky around the sun, not the clouds. So a deep red sunset may indicate fair weather.
Red sky in the morning is completely different. As the sun rises in the east, it may light up the clouds associated with a weather front coming in from the west, which might indicate that rain is on its way.

If the moon's face is red, of water she speaks.
This saying of the Zuni Indians is very accurate. The red color is a result of dust being stirred up by a weather front. These fronts bring moisture to the area.

When smoke descends, good weather ends.
The changes in atmospheric pressure before a storm along with the humidity, prevent chimney or bonfire smoke from rising.

Leaves change shape in cold weather.
You might notice that a normal tree you passed yesterday now has all of its leaves curled into cigar shapes. It's probably a temperature-sensitive rhododendron. In dropping temperatures the leaves droop and then roll up. The shape change helps the plant cope with weight of heavy snow or ice. There is less surface to cover, so there's not as much of a chance branches will break.

If crows fly low, winds going to blow.
When the barometric pressure drops, flying at heights becomes difficult for birds. The pressure drop is also believed to hurt birds' ears, prompting them to fly lower at a lower altitude.

Trout jump high when a rain is nigh.
When air pressure drops, it could cause trapped gases on the bottom of a body of water to be released.
This release causes microscopic organisms to disperse into water, which prompts small fish to start feeding. The small fish attract larger fish that prey on them. Eventually, all this feeding can cause such a stir that the fish start jumping.

Inside this Issue:

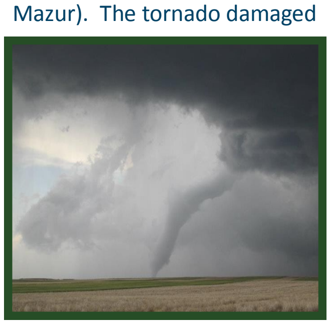
2012 Convective Season Events Summary

By Mike Jamski

A cold front spawned severe thunderstorms over the northern NE Panhandle on April 6. Downburst winds estimated at 75 mph damaged homes, uprooted trees and knocked over coal cars at a rail yard in Alliance. Thunderstorm winds to 60 mph were reported at Torrington and Bordeaux WY on April 26. Thunderstorms that same day produced heavy rain and flash flooding in Box Butte and Scotts Bluff counties in the central NE Panhandle.

There were numerous reports of large hail and funnel clouds across the southern NE Panhandle and eastern Laramie County WY on May 5. On May 18, a small EF0 tornado touched down west of Guernsey WY, and large hail was observed north of Crawford NE.

Thunderstorms caused flash flooding in parts of Scotts Bluff County NE, as well as large hail and flash flooding in parts of Laramie County WY. Afternoon and evening thunderstorms on June 7 produced numerous reports of large hail in southeast WY and the southern NE Panhandle. Flash flooding was reported north of Cheyenne to south of Torrington along US Highway 85. EF0 tornadoes were reported in open country two miles north and eight miles east of Whitaker WY. An EF2 tornado touched down west of Wheatland WY and was on the ground for almost 21 miles before dissipating six miles northeast of Chugwater (see photo below. Credit: Rebecca Mazur). The tornado damaged or destroyed several homes and uprooted or snapped numerous large trees. One person suffered minor injury from flying debris. Afternoon thunderstorms on June 15 produced strong winds near Douglas WY and a funnel cloud a mile east of the Grayrocks Reservoir. On June 19, late evening thunderstorms generated strong winds, large hail and heavy rain in and around Torrington WY, with additional reports of large hail and strong winds near Gering, Scottsbluff and Bridgeport NE. A land spout EF0 tornado which formed along the outflow boundary of a thunderstorm touched down in open country southwest of Sidney NE on June 22. The same thunderstorm dropped large hail west of Sidney. Also, tennis ball sized hail damaged vehicles and broke windows at Mule Creek Junction WY. Large hail was reported at Lusk on June 24. On June 25, afternoon thunderstorms produced large hail and wind gusts to 82 mph in Converse County WY, downburst winds up to 72 mph from a collapsing thunderstorm north of Cheyenne downed trees and damaged a home, and thunderstorm winds of 60 mph were observed east and southeast of Chadron NE.



On July 2, three inches of rain in two hours led to flash flooding west of Potter NE. A thunderstorm wind gust of 60 mph was reported west of Sidney NE on July 3. Thunderstorms on July 5 produced large hail and damaging winds across Albany, Platte and Goshen counties in southeast WY. Heavy rain from a stationary thunderstorm caused flash flooding in downtown Laramie WY on July 7. Flash flooding was also reported about 10 miles north of Bushnell NE. Thunderstorm wind gusts to 65 mph were observed east of Dad WY on July 11. Wind gusts to near 60 mph were recorded at the Converse County WY airport on July 20 and at the Scottsbluff NE airport on July 27. On July 29, damaging straight-line winds occurred southeast of Bridgeport NE.

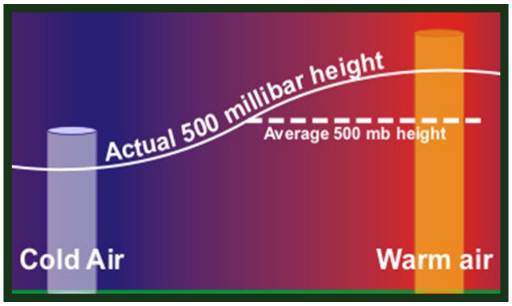
The only event for August was a thunderstorm wind gust of 62 mph at the Scottsbluff NE airport on the 6th.

There were 103 severe weather events reported this spring and summer: 66 large hail; 21 thunderstorm wind; 11 flash flood; and 5 tornado. This was the lowest number since 2008 when 118 events were reported. This year and 2008 were influenced by La Nina when the jet stream was along the Canadian border. The upside to this year's drought has been the record low number of tornadoes from April through July. The latest Climate Prediction Center outlook calls for the return of El Nino this fall and winter, which should bring an increase in precipitation and cooler temperatures. Spring and summer 2013 may be more active severe weather-wise, like 2010 when there were nearly 400 events reported. Time will tell…

North of Cheyenne Wyoming off of I-25 June 10, 2012.
Credit: Photos by Donatellia Austin

Air Pressure: How it's measured and its influence on local weather

By Mike Jamski



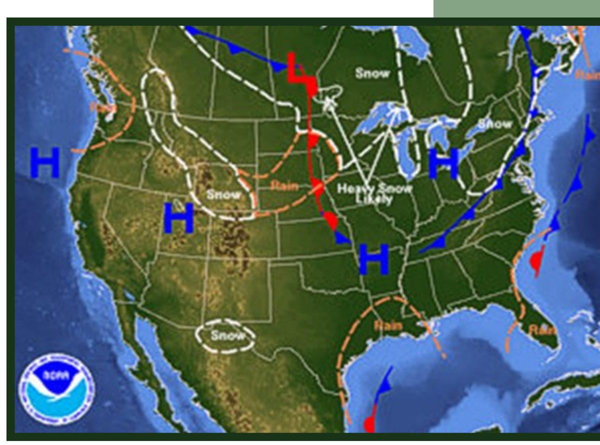
The two most common units in the United States to measure the pressure are inches of mercury and millibars. Inches of mercury refers to the height of a column of mercury measured in hundredths of inches. This is what you will usually hear from the NOAA Weather Radio or from your favorite weather or news media source. At sea level, standard air pressure in inches of mercury is 29.92. A millibar comes from the original term for pressure (bar). Bar is from the Greek "báros" meaning weight. A millibar is 1/1000th of a bar and is approximately equal to 1000 dynes (one dyne is the amount of force it takes to accelerate an object weighing one gram, one centimeter, in one second). Millibar values used in meteorology range from about 100 to 1050. At sea level, standard air pressure is 1013.2 millibars. Weather maps showing the pressure at the surface are drawn using isobars or lines of equal pressure.

Although the changes are usually too slow to observe directly, air pressure is almost always changing. This change in pressure is caused by changes in air density, and air density is related to temperature. Warm air is less dense than cooler air because the gas molecules in warm air have a greater velocity and are farther apart than in cooler air. So, while the average altitude of the 500 millibar level is around 18,000 feet, the actual elevation will be higher in warm air than in cold air.

The most basic change in pressure is the twice daily rise and fall in due to the heating from the sun. Each day, around 4 am/pm, the pressure is at its lowest and near its peak around 10 am/pm. The magnitude of the daily cycle is greatest near the equator decreasing toward the poles. On top of the daily fluctuations are the larger pressure changes as a result of the migrating weather systems. These weather systems are identified by the blue H's and red L's as seen on the weather map (below). The H's represent the location of the area of highest pressure. The L's represent the position of the lowest pressure.

Changes in atmospheric pressure are one of the most commonly used ways to forecast changes in the weather because weather patterns are carried around in regions of high and low pressure. A slowly rising atmospheric pressure, over a week or two, typically indicates settled weather that will last for a prolonged period. A sudden drop in atmospheric pressure over a few hours often indicates an approaching storm, which will not last long, with gusty winds and sometimes precipitation. By carefully watching the pressure on a barometer, you can forecast local weather using these simple guidelines:

- Decreasing barometric pressure indicates storms, rain and windy weather.
- Rising barometric pressure indicates fair, dry, and colder weather.
- Slow, regular and moderate falls in pressure suggest a low pressure area is passing some distance away. Marked changes in the weather are unlikely.
- Small rapid decreases in pressure indicate a nearby change in weather. They are usually followed by brief gusty winds and sometimes precipitation.
- A quick drop in pressure over a short time indicates a storm is likely in less than 12 hours.
- Large, slow and sustained decreasing pressure forecasts a long period of inclement weather. The weather will be more pronounced if the pressure started rising before it began to drop.
- A rapid rise in pressure, during fair weather and average, or above average pressure, indicates a low pressure cell is approaching. The pressure will soon decrease forecasting poorer weather.
- Quickly rising pressure, when the pressure is low, indicates a short period of fair weather is likely.
- A large, slow and sustained rise in pressure forecasts a long period of good weather is on its way.



"Although the changes are usually too slow to observe directly, air pressure is almost always changing."

Inside this Issue:

Summary of the 2012 Summer

By Rich Emanuel

The summer of 2012 (which climatologically is the period June through August) for this region turned out to be much warmer and drier than average, with most areas recording their hottest summer on record! A persistent area of high pressure in the upper atmosphere over the region was the main factor contributing to the hot and dry conditions, keeping most storm systems and associated precipitation and cooler air away from the area.

The summer started off very hot with June average temperatures well above normal. July was also quite warm while August was a little warmer than normal over most areas.

Temperatures:

The following table summarizes the monthly and overall summer average temperatures and the departures from normal for select sites over the area. The ranking with respect to the warmest average temperature for summer is also depicted:

City	June Avg	Depart From Normal	July Avg	Depart From Normal	Aug Avg	Depart From Normal	Jun-Aug Average	Depart From Normal	Rank
Cheyenne	67.9	+5.8	72.3	+2.9	69.3	+1.7	69.9	+3.4	1st
Laramie	64.0	+6.8	67.8	+3.8	64.7	+2.4	65.5	+4.3	1st
Rawlins	65.7	+6.4	71.3	+4.3	68.0	+2.8	68.4	+4.5	1st
Chadron	74.2	+8.3	80.0	+6.4	73.9	+1.7	76.1	+5.4	1st
Alliance	73.2	+8.4	77.4	+5.2	71.6	+1.2	74.1	+5.0	4th
Scottsbluff	75.3	+8.1	79.7	+5.6	74.1	+2.2	76.4	+5.3	1st
Sidney	75.7	=8.1	78.6	+3.4	73.1	-0.2	75.8	+3.8	1st

The warmest temperatures of the summer and the number of days with highs 90 or higher and 100 or higher are depicted for select cities in the following table:

City	Highest Temperature	Date (S)	Days Above 90	Avg days Above 90	Days at 100 or Above	Avg days at or Above 100
Cheyenne	96	June 23	26	12	0	0
Laramie	93	June 25	10	2	0	0
Rawlins	97	June 25	26	11	0	0
Chadron	109	June 26 & July 20	66	42	31	6
Alliance	108	June 26	63	43	23	5
Scottsbluff	106	June 25 & June 26	67	45	28	5
Sidney	111 **	June 26	67	33	28	3

** New all-time record for any day in Sidney

Summary of the 2012 Summer Continued on page 11

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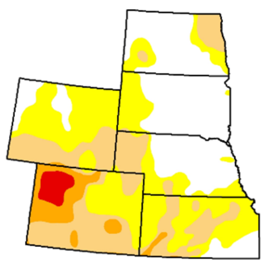
Summary of the 2012 Summer Continued

By Rich Emanuel

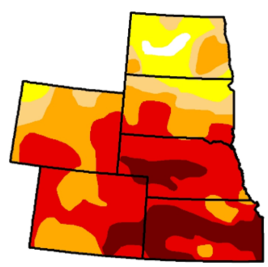
Precipitation:
The following table tabulates the June through August precipitation amounts and departures from average:

City	June rainfall and departure	July rainfall and departure	Aug rainfall and departure	Total rainfall and departure	Rank (Driest)
Cheyenne	2.69 (+0.35)	2.58 (+0.39)	0.14(-1.81)	5.41 (-1.07)	75th
Laramie	0.24 (-1.30)	1.48 (+0.05)	0.34 (-0.89)	2.06 (-2.14)	T—3rd
Rawlins	TR (-1.03)	0.98 (+0.14)	0.17 (-0.59)	1.15 (-1.48)	8th
Chadron	1.27 (-1.97)	0.23 (-1.88)	0.19 (-1.39)	1.69 (-5.24)	2nd
Alliance	1.74 (-1.11)	0.93 (-0.90)	TR (-1.30)	2.67 (-3.31)	10th
Scottsbluff	1.56 (-1.32)	1.16 (-1.16)	0.08 (-1.62)	2.80 (-4.10)	5th
Sidney	1.42 (-1.76)	1.61 (-1.35)	0.18 (-2.08)	3.21 (-5.19)	2nd

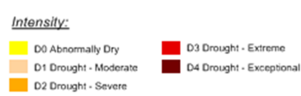
Drought Status:
The hot and dry summer obviously exacerbated drought conditions across the region, with all areas seeing a worsening of drought intensity, particularly over eastern Wyoming and the Nebraska panhandle where extreme to exceptional drought now exists. The following two maps depict the change in drought intensity from the beginning to the end of the summer:



June 1, 2012 Drought Status



August 31, 2012 Drought Status



It's not all bad news this summer. One benefit of the very dry conditions has been a significant suppression of severe thunderstorms this spring and summer. There have been only a few days with significant severe storm activity, mostly on June 5th—7th. Overall there was about one third the usual number of severe weather days across the area this season, with many of those days seeing just one event of severe weather, mostly strong wind gusts.

The wireless industry, The FCC, and FEMA will roll-out the WEA's (Wireless Emergency Alerts) system nationwide this year. The service started in June and is free. You do not have to sign up. You can verify through your cell carrier if they are participating.

Tornado warnings, flash flood warnings and several other high-end warnings will go direct to wireless users in an affected county automatically if their device is compatible.

http://www.noaa.gov/features/03_protecting/wireless_emergency_alerts.html