The Rising Barometer

Winter 2006-07

Bringing you a fair look at weather in southeast Wyoming and the western Nebraska panhandle

Inside This Issue

If you have any comments or suggestions regarding this newsletter, please e-mail us at
w-cys.webmaster@noaa.gov

Hello from the Head Weather Guesser

John Eise, Meteorologist in Charge

Welcome to our Winter Newsletter. My name is John Eise (pronounced "eyes"), and I am the new Meteorologist in Charge for the National Weather Service at Cheyenne. I am happy to be here to serve each of you in Southeast Wyoming and the Nebraska Panhandle. Before arriving in Cheyenne, I worked in Milwaukee, Wisconsin as well as Amarillo, Texas, St. Louis, Missouri, and Anchorage, Alaska. Our family is happy to be out here in this beautiful country. Our job at the National Weather Service is to provide a top level of service that protects you and your family, and supports your business decisions. We have a talented staff that provides service to you, our customer, 24 hours a day, 7 days a week...even on holidays! You may always find the latest weather, water, or climate information on our website at http://weather.gov/cheyenne. If you ever have a comment on how we can improve our service, please call me at (307) 772-2468, Extension 642, or you may e-mail me at John.Eise@noaa.gov. I look forward to being of service to you.

In 2007, the National Oceanic and Atmospheric Administration, of which the National Weather Service is a part, will celebrate 200 years of service to the nation. As part of this celebration, we are looking for your weather stories and pictures to help us preserve our American Heritage. If you give us permission, we will share your story or picture on our website for others to enjoy. Just send them to John.Eise@noaa.gov or you can mail them to:

National Weather Service
1301 Airport Parkway
Cheyenne, WY 82001
Attn: Preserve America Program

From all of us here at the National Weather Service, all the best to you and yours for the holidays and in the New Year of 2007.

Winter Weatherlore & Folklore Forecasts

Folklore is different from weatherlore, but both are interesting and entertaining and have been around for thousands of years. Folklore are beliefs based on fear and superstition. Weatherlore is based on observation of the environment and the effects and changes the weather has on insects, animals, birds, and people.

- If ant hills are high in July, winter will be snowy.
- If the first week in August is unusually warm, the coming winter will be snowy and long.
- For every fog in August, there will be a snowfall in winter.
- When leaves fall early, fall and winter will be mild; when leaves fall late, winter will be severe.
- Squirrels gathering nuts in a flurry, will cause snow to gather in a hurry.
- Much rain in October, much wind in December.
- A warm October, a cold February.
- Flowers blooming in late autumn, a sure sign of a bad winter coming.
- As high as the weeds grow, so will the bank of snow.
- Thunder in the fall foretells a cold winter.

NOAA Weather Radio All Hazards: On Alert For All Emergencies

Saving lives is the focus of NOAA Weather Radio All Hazards by providing immediate broadcasts of severe weather warnings and civil emergency messages and giving those in harm's way critical lead time to respond and remain safe. Broadcasts of tornado warnings, flood warnings, AMBER Alerts, chemical spill messages, and many other notifications, in addition to routine weather observations and forecasts, make the NOAA Weather Radio an essential item for every home and business. NOAA Weather Radio All Hazards, a component of the nation's Emergency Alert System, is comprised of a nationwide network of more than 950 radio stations directly linked with 1 of the 123 local offices of NOAA's National Weather Service, which issues weather warnings and relays civil emergency messages on behalf of law enforcement agencies. The NOAA Weather Radio is provided as a public service by the National Oceanic and Atmospheric Administration, an agency of the U.S. Department of Commerce.

Features of the NOAA Weather Radio:

- **Tone Alarm**: Special tones precede the initial broadcast of all emergency announcements regarding immediate weather threats and civil emergency messages to gain a listener's attention. These tones will turn your Public Alert or SAME (Specific Area Message Encoding)-equipped radio on to alert you to potentially dangerous conditions in your local area. This is especially critical when severe storms or other events occur during the night when most people are sound asleep.
- **Size**: Units are small (about the size of a clock radio) and require little space on a night stand or table.
- **Battery Backup**: Ensures continued service during a loss of electricity.
- **Customization**: Models featuring SAME technology can be programmed to sound only select alerts for your area.
- **Portability**: Units can travel (vacations, relocations) and will receive the signal from the nearest transmitter.

Receivers carrying the Public Alert logo meet certain performance criteria including, SAME, alert customization, and a battery backup. Select units also allow connections for an external antenna and devices for the hearing or visually impaired, such as strobe lights, pagers, or bed shakers.

Purchasing NOAA Weather Radios:

Units that receive the NOAA Weather Radio All Hazards signal are available at many electronic retail stores, marine supply stores, mail order catalogs, and the Internet. Prices vary by model and available options, but typically range between $20 and $80.

When Should I Expect My All-Hazards Radio to Alarm?

The NWS office in Cheyenne will alarm the All-Hazards Radio when certain warnings and advisories are issued. The following is list of our products that should trigger your alarm:

Blizzard Watches and Warnings	Civil Danger Warning	Civil Emergency Message
Earthquake Warning	Evacuation Immediate	Flood Warning
Fire Warning	Hazardous Materials Warning	Heavy Snow Warning
Law Enforcement Warning	Radiological Hazard Warning	Routine Weekly Test
Shelter In-Place Warning	Severe Thunderstorm Watch	Severe Thunderstorm Warning
Tornado Watch	Tornado Warning	Winter Storm Warning

Winter Weather Safety

Winter weather is upon us, and it can be brutal in this part of the nation. Are you prepared? Being prepared is the best defense and can mean the difference between life and death. Here are a few safety tips that can help you be prepared:

Vehicle Safety: Check and winterize your vehicle before taking trips. Make sure your vehicle has adequate antifreeze. Make sure your heater and defroster work properly. Carry a winter survival kit in your vehicle (for example, cell phone, blankets, flashlight with extra batteries, snow scraper, first-aid kit, high-calorie, non-perishable foods such as protein bars, tool kit, tire chains, tow rope, compass, shovel, etc.). Always tell someone where you are going and approximately how long you will be gone, and check the weather forecast before going out.

Home Safety: Keep extra food and water on hand during the winter months in case you get snowed in. Have a back-up heat source in case of a power outage, and keep a flashlight with extra batteries on hand. Ensure your first-aid and safety supplies are well stocked. Test your smoke alarms once a month. The strain from cold temperatures and heavy labor such as shoveling, pushing a car, or walking in deep snow may cause a heart attack in older and less physically fit individuals. Avoid overexertion when shoveling snow by taking occasional breaks.

When Do We Issue Winter Warnings?

If the following conditions are forecast to occur in Southeast Wyoming or the Western Nebraska Panhandle, the National Weather Service in Cheyenne may issue one of several different winter weather products. We issue these products to provide our customers advance notice of hazardous winter weather events that may threaten life or property.

- Typically, a Winter Weather Watch or Warning is issued when the event is expected to have more than one predominant hazard. For example, if heavy snow and strong winds are forecast, then a Winter Storm Watch or Warning would be issued to include all the hazards. Winter Storm Watches are usually issued when the event is expected in the next day or two. Winter Storm Warnings are issued when hazardous winter weather is occurring, imminent, or has a high probability of occurring.

- Blizzard Warnings are issued when winds are sustained, gusts are over 35 miles per hour, and visibilities are reduced to less than one quarter mile with snow and blowing snow. Also for a Blizzard Warning, these conditions must be expected to continue for three hours or longer.

- Heavy Snow Warnings have different criteria for different locations in our area of responsibility as well as different timeframes. A Heavy Snow Warning will be issued for elevations below 7,000 feet when 6 inches of snow is expected in 12 hours or 8 inches of snow is expected in 24 hours. A Heavy Snow Warning will be issued for elevations above 7,000 feet when 8 inches of snow is expected in 12 hours or 10 inches of snow is expected in 24 hours.

- Wind Chill Warnings are issued when the wind chill is expected to below minus 30 degrees Fahrenheit with wind speeds of 10 miles per hour or greater.

- A Freeze Warning will be issued for the first occurrence of the season when the temperature falls below 32 degrees Fahrenheit.

My First Wyoming Blizzard

Jim Hatten

I remember experiencing my first real Wyoming blizzard just four months after I began working at the National Weather Service in Cheyenne. It was just before Thanksgiving of that year on Thursday, November 22, 1979. Light snow began to fall Monday night, and there were three inches of snow on the ground early Tuesday morning when I arrived to work the day shift. Things were only getting started. Forecasters in our office were well aware that weather conditions needed for a snowstorm on the high plains were going to come together later Tuesday and last through Wednesday. Unfortunately, this was the worse time for holiday travelers. Deep upslope moisture was already in place, and a strong low pressure area was going to lift out of the Southwestern United States, eventually moving across Colorado. Light snow continued to fall during the daylight hours on Tuesday, and there was a good 6 to 8 inches of snow on the ground by sunset when I was supposed to go home after my day shift. However, with heavier snow and strong winds expected, it was decided that I should stay in case others couldn't make it into work. Indeed, heavy snow and strong north to northeast winds of 25 to 40 mph began in earnest Tuesday evening, with a full-fledged, raging blizzard and zero visibility by midnight. Over a foot of additional snow fell during the night, with a 24-inch snow depth reported early Wednesday morning. It was a very difficult snow depth to measure, however, due to the large amount of blowing and drifting that was occurring. Blizzard conditions persisted during Wednesday, even though the intensity of the snow decreased some in the afternoon. The snow finally tapered off Wednesday night and ended early Thanksgiving morning. The final numbers at the airport were 25.6 inches of snow with over 2 inches of water equivalent. After the first of our coworkers arrived to relieve us (one walked in using snowshoes) and our parking lot had been plowed, I was allowed to go home late Thanksgiving morning. I had been at the office for 49 consecutive hours. Several others had worked the same length of time, and one or two had even been at the office longer than I. We had enough food on hand and took turns grabbing brief naps while keeping forecasts and weather statements current. As I drove home that morning, the four-lane road I took had not yet been plowed. It only had one usable lane, and even that one zigzagged around abandoned vehicles. Some of the snowdrifts were 8 to 10 feet high. I wondered what kind of place this was that could have a blizzard like this just a few months after a tornado. I sure didn't anticipate it driving home that morning, but now I've been here over 25 years.

Office Tours

Connie Hopkins

Have you ever wondered how a meteorologist predicts the weather or how a Doppler radar works? If so, you might like an educational tour of the National Weather Service Office in Cheyenne, Wyoming. The National Weather Service is located at 1301 Airport Parkway and offers tours of its facility to the public. Tours are generally held on weekdays, but we can accommodate groups during evening or weekend hours. Tour group size is generally limited to a maximum of 20 persons due to space limitations at the forecast office. We encourage additional tour chaperones to accompany younger groups of children. The typical office tour generally lasts from 45-60 minutes and involves an informative session on who we are and what we do, followed by a walking tour through the building to see our weather forecasters at work collecting data and using the latest technology to predict the weather. If you would like to schedule a tour of our facility, contact our Administrative Support Assistant, Connie Hopkins, at (307) 772-2468, Ext 221 or by e-mail at Connie.Hopkins@noaa.gov.

Why the Wind Blows

Mike Weiland

As you are well aware, it is often windy over Southeast Wyoming and Western Nebraska in the fall through spring. Chicago may be called the windy city, but most places in this part of the country are windier. In fact, Cheyenne stands in fourth place among larger cities for the highest average annual wind speed. Not included in that report were even windier places, like Rawlins, Hanna, and Medicine Bow. Places in the Nebraska Panhandle are a bit less windy than across the border in Wyoming. But why does the wind blow so frequently and strongly in our area? For most places, the stronger and more consistent winds occur from the Fall through the Spring. In Cheyenne, our highest wind gust has been 86 mph which occurred on a January day.

There are several reasons for those strong winds, but first let's look at why there is wind in the first place. The atmosphere constantly tries to be in balance. It doesn't like too cold or too hot conditions. The atmosphere tries to warm the cold places and cool the hot places. The variations in temperature cause low and high pressure at the surface (and in the upper atmosphere). Wind typically blows from cold (high pressure) to warm (low pressure). Really, the wind is a result of pressure differences which are caused by differences in temperature. When those differences in pressure are large, the winds tend to be faster, due to the larger change in pressure over a small area.

In our area the differences in pressure in the cooler months can be large and can also change quickly. In addition, the jet stream in the winter is often over Wyoming and Nebraska. Those stronger winds in the atmosphere can translate toward the ground. Because our part of the country is fairly high in elevation, those stronger winds translate to the ground more easily. Storms often bring a cycle in the winds. Ahead of a storm, there will be increasing South or West winds, which shift to the Northwest or North after the passage of a storm. Then the cycle repeats itself as another storm approaches.

Just for your information, there are several kinds of strong winds that can affect Southeast Wyoming and the Western Nebraska Panhandle. These are Chinook, Gap, and Bora. Chinook winds are warming west winds to the east of many mountain ranges. Bora winds are much shorter in duration and are caused by the passage of a cold front. Finally, Gap winds are winds funneled through gaps in mountains, such as in Northern Carbon County and to the south of Wheatland.

More information on winds, such as normals and records can be found on the Cheyenne National Weather Service website. You may also give us a call to find out additional information.

Snow Measurement Quiz

Buzz Hutcheon

The following quiz was administered at the National Weather Service Snow Sensor Study Meeting held on August 15, 2006, in Salt Lake City, Utah. Take this quiz and see how you fare. Answers are shown on page 7.

1) In 1910, how many observers reported 10:1 snowfall to water content rations in their daily precipitation reports compared to those reporting today?

   a) more weather observers reported
   b) less weather observers reported
   c) about the same number reported

2) If during the same day it snowed 1.2", totally melted, and then snowed another 1.2", and then again totally melted so that no snow remained at the time of observation, then what should be reported as the snowfall for that day?

   a) 0.0
   b) T (trace)
   c) 1.2"
   d) 2.4"
   e) 3.6"
   f) none of these choices

3) If the observer or automated system reported a period of time when snow was visible in the air but no new snow accumulation was observed on the ground or snow board, how much snow should you report for this period?

   a) 0.0
   b) T (trace)
   c) neither of these choices

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4) Assume that your station is required to report hourly SNOINCR remarks when heavy accumulations of 1 inch or more per hour are occurring. If your station has reported SNOINCR 1 for 6 consecutive hours, but the maximum accumulation of new snow during this 6-hour period was 4.0", would your correct 6-hour snowfall total be:

a) 0.0
b) 2.0"
c) 4.0"
d) 5.0"
e) 6.0"
f) none of these

5) If precipitation falls as freezing rain and at the end of the day, the depth of clear ice on your snow board or other measurement surface has reached 1.0", what should you report as your daily snowfall?

a) 0.0
b) T
c) 1.0"
d) 10.0"
e) none of these choices

6) For the same situation above, what would you report for your depth on ground at the time of observation?

a) 0.0
b) T (trace)
c) 1.0"
d) 10.0"
e) none of these choices

7) If the snow fell uniformly (i.e., little or no drifting) for 24 hours and your snowfall measurements at each 6-hourly observation were 2.2, 3.7, 3.3 and 1.6", respectively, BUT your station also operated a 24-hour snow board which you check every 6 hours but only clear once daily, and it's greatest depth during the day was 6.8", and the depth at the end of the day had decreased to 6.0", then what would you report as your official daily snowfall?

a) 3.7"
b) 6.0"
c) 6.8"
d) 7.0"
e) 10.8"
f) none of these choices

8) Your station is experiencing blizzard conditions. After 12 hours of snow, blowing snow, and visibilities of 1/4 mile or less, you notice your snow board is completely clear, although at one time you saw 1" on the board before the strong winds blew it clear. Despite the poor visibilities, after 12 hours of snow the depth out in the fields around your station is only 2" except for a few large 3-foot drifts. Your friend calls you from the south end of town where there is much less wind and drifting. He reports 8" in his relatively calm back yard. Your Standard Rain Gauge does not have a protective wind shield, and at the end of the 12 hours of blizzard conditions, the water content in the gauge is only 0.15". What would you report for your 12-hour total snowfall for your station?

a) T (trace)
b) 0"
c) 1.5""
d) 2.0"
e) 8.0"
f) 36.0"
g) none of these choices

9) If it has been snowing steadily for 6 hours and your 6-hour precipitation measurement is 0.35", but no snow has accumulated on streets, sidewalks, or your snowboard. However, 1.0" of snow has accumulated on the roof of your car and most grassy areas around your station. What should you report as your 6-hour snowfall?

a) 0.0
b) T (trace)
c) 1.0
d) 2.0
e) 3.5
f) none of these choices

Answers to Snow Quiz on Pages 5-6:

1) a 6) c
2) d 7) e
3) b 8) d
4) c 9) c
5) a

NWS Tests Snow Measuring Equipment

Buzz Hutcheon

If you have been lucky enough to drive by the weather service office in the past few months, you may have noticed the new equipment on the southwest side of our building. We are 1 of 20 or so locations in the United States taking part in a joint research project with Canada to try to find an automated system for taking snowfall and snow depth measurements. Now, those of you taking snowfall and snow depth measurements, don't go packing up your equipment anytime soon! We are still going to need you and anyone else who may be interested for many years to come.

The United States test sites are scattered across Alaska, Arizona, Colorado, Indiana, Maine, Michigan, South Dakota, and Cheyenne, Wyoming. The sensors use ultrasonic sound to measure the distance between the base of the sensor and the snow board below. In addition, a temperature sensor is used to determine the temperature of the air at roughly the mid-point of the air column that the ultrasonic beam is passing through. This is our second go-around with this type of equipment and so far, the results have been favorable. Of course, our results haven't been quite as good as others, but we are unique in that we can provide a proving ground for how the setup works in windy conditions!

If this system does continue to prove itself, sensors could eventually be added to the Automated Surface Observing Systems installed at many of the Airports across the country.

Winter Outlook & El Nino

Rich Emanuel & John Eise

As seen in the image below, sea surface temperatures over the central and eastern tropical Pacific Ocean are averaging about 1 to 1 1/2 degrees above normal, signifying El Nino conditions. Most forecasts indicate that the current El Niño conditions will peak during the Northern Hemisphere winter (December 2006-February 2007), then weaken in the springtime (March-May 2007).

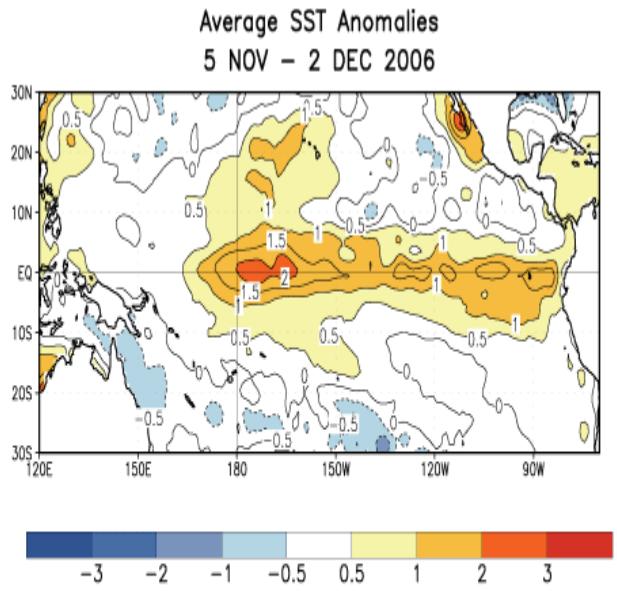

Figure 1. Average SST anomalies (°C) for the four-week period 5 November-2 December 2006. The SST anomalies are computed with respect to the 1971-2000 base period means. (Xue et al. 2003, J. Climate, 16, 1601-1612).

The expected effects from this over eastern Wyoming and the Nebraska Panhandle is for our winter season to have enhanced chances for warmer than average temperatures, especially over the Nebraska Panhandle (See Figure 2 on Page 8). No clear signal is seen for precipitation effects, with equal chances expected for below normal, normal, and above normal amounts on a regional scale (See Figure 3 on Page 8)

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The Rising Barometer is a semi-annual production of the National Weather Service office in Cheyenne.

Thanks for reading!

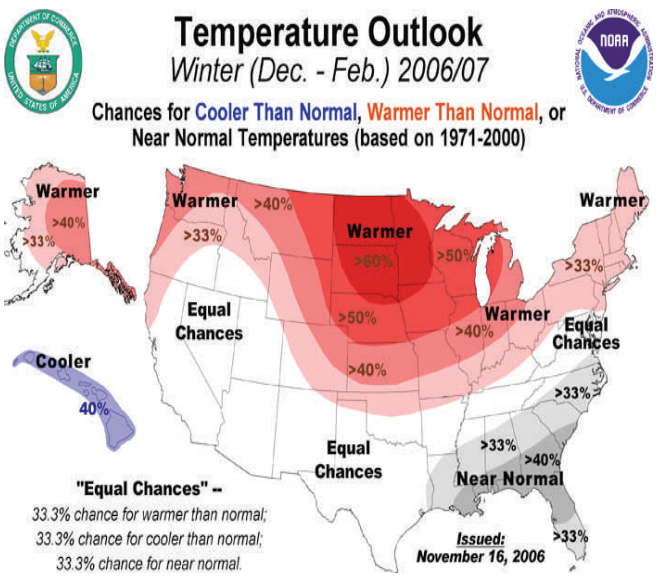

Figure 2 Winter Temperature Outlook

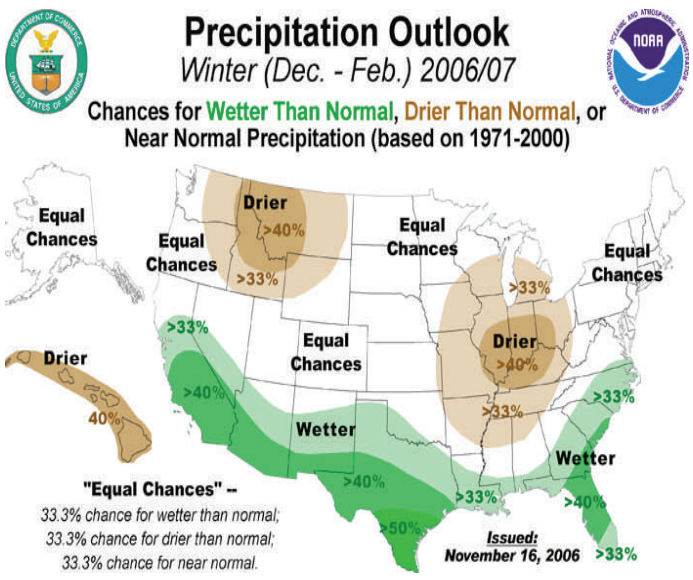

Figure 3 Winter Precipitation Outlook