THE RISING BAROMETER

WINTER EDITION

A Big Thank You to Our Cooperative Observers

From the Staff at National Weather Service - Cheyenne

The National Weather Service (NWS) Cooperative Observer Program (COOP) is truly the Nation's weather and climate observing, network of, by, and for the people. Across the United States more than 11,000 volunteers take observations on farms, in urban and suburban areas, National Parks, seashores, and mountain tops. In southeast Wyoming and the western Nebraska panhandle our COOP program is no different. You provide observational meteorological data, in most cases daily maximum and minimum temperatures, snowfall, and 24 hour precipitation totals. These data are required to define the climate of the United States and to help measure long-term climate changes. In addition, your observations provide near real-time information to support forecast, warning, and other public service programs of the NWS.

The NWS office in Cheyenne supports 85 COOP sites in all 15 counties of our County Warning Area. The equipment at the sites used to gather these data is provided and maintained by personnel assigned to our office. When you send your observational forms to us, we quality control the forms and then send them to the National Climatic Data Center (NCDC) in Asheville, NC, where the data are digitized, checked and achieved. The NWS truly appreciates how you conscientiously contribute your time so that these observations can provide the vital information the nation needs. This data is invaluable in learning more about floods, droughts, heat and cold waves affecting us all. The data is also used in agricultural planning and assessment, engineering, environmental impact assessment, utilities planning, and litigation. Your data plays a critical role in efforts to recognize and evaluate the extent of human impacts on climate from local to global scales. Once again, thank you very much!

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A New Way of Thinking at NWS Cheyenne

By: John Griffith, Warning Coordination Meteorologist

This winter, the National Weather Service in the Cheyenne office will implement a new way of doing business. For many years, personnel at NWS Cheyenne have had different criteria for winter weather and high wind warnings and advisories based on an arbitrary threshold of 7000 feet above sea level. This winter season we will try something different.

This new thinking will have little or no affect on many portions of our County Warning Area (CWA) especially east of Interstate 25 in Wyoming or any part of the Nebraska panhandle. However, to areas

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Skywarn Recognition Day

By: Mike Weiland, Lead Forecaster

Skywarn Reconigtion Day for 2008 has been set for 2008. This year it will be held from 5 PM Friday, December 5th to 5 PM Saturday, December 6th. This year's event will be the 10th annual.

Skywarn is a national network of severe weather spotters. It is a group of volunteers, trained by the National Weather Service in identifying severe weather. Those volunteers then report severe weather to the local National Weather Service office. In this way, the spotters become an important part of the severe weather warning process. Volunteers helping out their neighbors and community by providing timely information about severe storms.

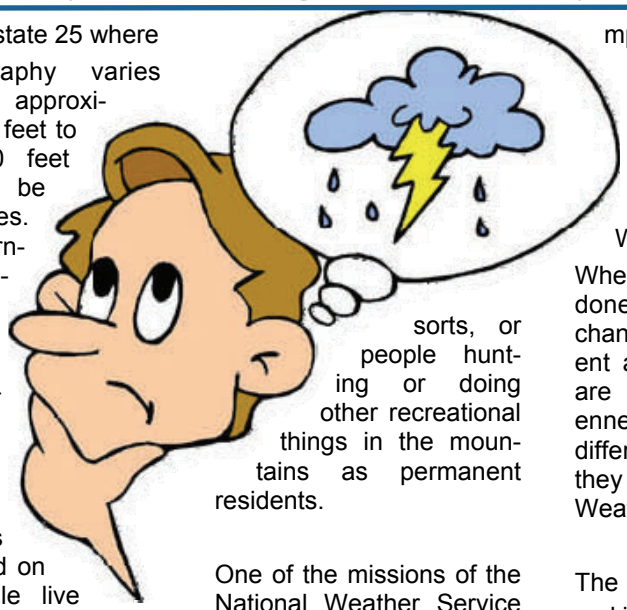
Skywarn Reconigtion Day celebrates the contributions that local amateur radio operators make to the National Weather Service's Warning process. In Cheyenne, the SHYWY amateur radio club will have equipment set up at the National Weather Service office and operators will attempt to call other weather offices during that 24 hour period. It is an honor to have them here at the office throughout the year and they are much appreciated.

Winter Storm Warning:

Life threatening severe winter conditions have begun or will begin within 24 hours. ***Act Now!***

A New Way of thinking at NWS Cheyenne (cont.)

west of Interstate 25 where the topography varies greatly from approximately 5000 feet to over 12,000 feet there will be some changes. Issuing warnings and advisories for these rapidly changing elevations is challenging. Therefore, our new procedures will be based on where people live versus the actual elevation. Wherever people live we will consider the lower elevations. The higher peaks in the CWA will need to meet a higher criterion before warnings are issued. A point to make here also is that we will not consider lodges, ski resorts, or people hunting or doing other recreational things in the mountains as permanent residents.



One of the missions of the National Weather Service is "the enhancement of the national economy". With that statement in mind, we will consider the entire Interstate system west of Cheyenne as being part of our low elevation area. Our high wind warning criteria for lower elevations is sustained winds of 40 mph or gusts to 58 mph persisting for one hour or longer. This will, no doubt, lead to more high wind warnings for the mountainous areas through southeast Wyoming.

When it is all said and done, most of these changes will be transparent and most people who are served by the Cheyenne office will not see any difference in the products they see from the National Weather Service.

The bottom line is we are making these changes to hopefully serve the people of southeast Wyoming and the western Nebraska panhandle better. To quote the Director of the National Weather Service, Dr. Jack Hayes, "We Help America Make Better Decisions."

Forecaster Departs for Greener Pastures

By: Chad Hahn, Lead Forecaster

On August 14th, staff at the National Weather Service (NWS) Office in Cheyenne said "good-bye" to Forecaster Mike Sowko, who was promoted to the Hydrometeorological Prediction Center (HPC) in Washington D.C. Mike had been a Forecaster at NWS Cheyenne since October 2004. Before his service in Cheyenne, Mike was a Meteorologist Intern at the Hanford, California NWS Office and a student trainee at the Pittsburgh, Pennsylvania NWS Office.

While at the NWS in Cheyenne, Mike's primary responsibility was the fire weather program. During his time in Cheyenne, Mike was routinely dispatched to various wildfires across the country to provide on-site weather support to incident commanders. Mike was dispatched to Greensburg, Kansas to assist FEMA in clean-up operations after the large F-5 Tornado decimated the town. After his efforts in Greensburg, Mike was invited to speak at a Conference in Kansas City, attended by 38 of the Meteorologists-in-Charge across the Central U.S.

As if starting a new job in a new town wasn't enough, Mike also wed his girlfriend, Holly, in a Wisconsin Wedding in late October. We all wish Mike the best of luck in all of his future endeavors.

Mike Sowko (right) accepts an office keepsake from Meteorologist-in-Charge, John Eise (left) at his going-away party.

About 70% of injuries due to ice and snow are a result of vehicle accidents.

Do You Like to Measure Rain/Snow at Your House?

By: Mike Weiland, Lead Forecaster

If this sounds like you, then you definitely have a big interest in weather. And, there is a program that might be of interest to you and you may have already heard about it. It is called the Community Collaborative Rain and Hail Study, or CoCoRahs for short. It is now a nationwide effort to get a detailed daily network of volunteer reports. It is easy, interesting and fun. What is nice is that it helps researchers and water managers get detailed precipitation data. CoCoRahs also allows you to see your and your neighbors daily rain or snow information plotted on a map. If you do not have a rain gage, we will even provide one for you. If this program sounds like something you'd like to do, check out their webpage at cocorahs.org, or call Mike at 772-2468 extension 516.

Freezing Drizzle! Are We Back in Kansas

By: Melissa Goering, Science and Operations Officer

In southeast Wyoming and the Nebraska Panhandle we are all too familiar with snow in the winter season. Thus, it's very surprising (particularly for motorists) to experience freezing precipitation (freezing drizzle, freezing rain, and ice pellets) given the rarity of the occurrences of these type of precipitation for our area. There are subtle differences in how these types of frozen precipitation occur in the atmosphere. Freezing rain typically forms as a result of ice crystals falling into a warm mid-level layer with freezing temperatures at the surface (Fig. 1). Drops in the upper level start out as ice crystals and change over to rain through the warm layer. With the freezing temperatures at the surface, the rain immediately freezes on impact at the surface. Freezing drizzle is similar to freezing rain, but typically starts out by a different process. There is drier air in the

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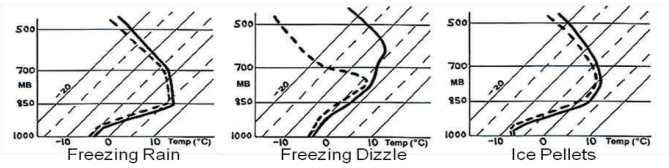


Figure 1 - Vertical temperature profiles associated with different forms of precipitation. ***Image courtesy of Continental Weather Monitoring Research Organization @ http://cwmro.com***

Former COOP Observer, John Kortes turns 100

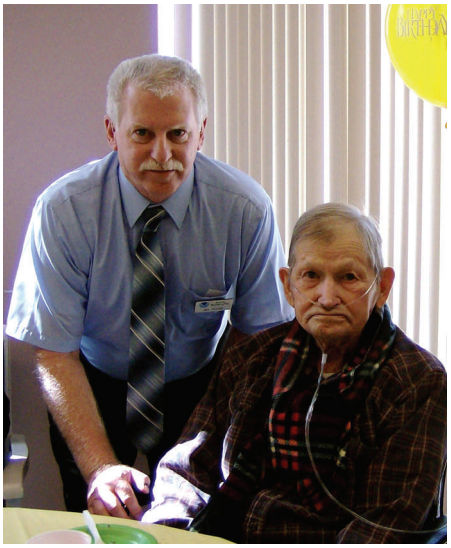
By: Jim House, Hydrometeorological Technician

About 50% of cold-related injuries happen to people over 60 years old.

In 1917, John Kortes began taking weather readings. The Bureau of Fisheries and the National Weather got the family a thermometer to use "as long as they would report daily temperatures and precipitation". He was nine at that time. In 1922, at the age of 14, John took over the responsibility for the daily readings.

In 1930, John Kortes signed on with the National Weather Service as an observer with the COOP Program. At that time there were about 300 airway stations providing weather observations. There were 210 regular weather offices with about 1000 full-time employees. The airway stations and weather offices were more concerned with aviation and warnings.

The COOP program was designed to provide observational meteorological data, usually consisting of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals, required to define the climate of the United States. It also provided observational meteorological data in near real-time to support forecast, warning and other public service programs of the National Weather Service.



Jim House (left) presented John Kortes (right) with a brief history of his work taking observations for the NWS.

Except for a few years during the construction of Seminoe Dam and WWII, John recorded daily weather observations through the summer of 2003. In the year 2000, John received the Stufft Award for his 70 years of service. At that time, he was one of only five people in the nation to have reached that level. In February of this year, 2008, the Warners of

(Continued on Page 5)

Former COOP Observer, John Kortes Turns 100 (cont.)

Gering Nebraska reached 70 years of service. Interesting that four of this awards winners are from this part of the nation, John from Leo, Wyoming, the Warners from Harrisburg and Gering Nebraska and Ruby Stufft, for whom the award is named, from Ainsworth, Nebraska.

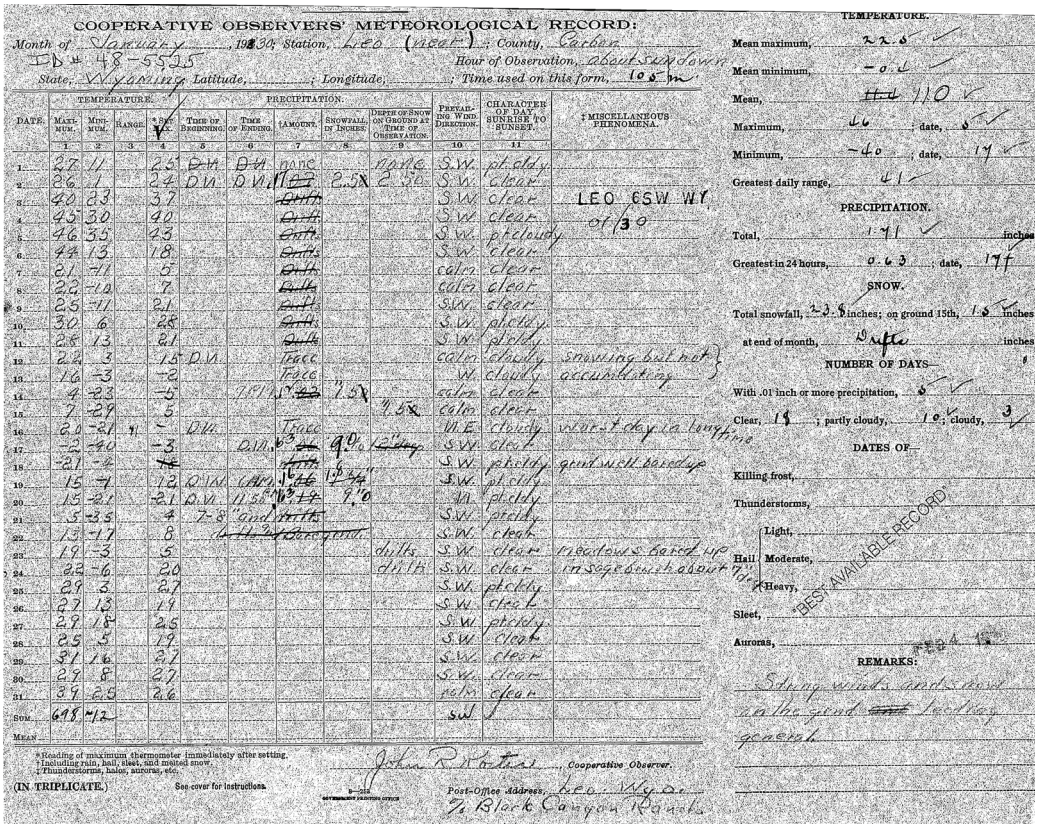
John was also part of a separate climate study involving the Honeysuckle bush. This study tracked the date of the first blooms on the bush. (Included is the original agreement, signed by John, that started the Leo 6 Sw COOP site. Also included is a copy of his first month of observations from January 1930. The pictures are of John at his desk, with the Honeysuckle bush, with his Landsburg Award in 1990 and at the ceremony at which he received the Stufft Award for his 70 years of service in 2000.)

In the late 1940s, the Army gave the Weather Bureau 25 surplus radars, launching the network of weather surveillance radars still in use today. In the 1960s, weather satellites were put up. Attempts were made at weather modification. (Even when successful, the results were often not good)

In 1970, the name of the Weather Bureau was changed to the National Weather Service and became a part of the National Oceanic and Atmospheric Administration.

Today, advances in satellites, radars, communications, automated weather observing systems and super speed computers have resulted in more timely and precise forecasts and warnings for the nation.

John Kortes served for over 73 years as a COOP observer. There aren't many with that many years of service. To borrow the words of one of today's radio personalities, John Kortes is truly "A GREAT AMERICAN"!



COOPERATIVE OBSERVERS' METEOROLOGICAL RECORD:

Month of January, 1930 Station, Leo (near); County, Carbon

ID #: 48-5525 Hour of Observation, about sundown

State, Wyoming Latitude, ; Longitude, ; Time used on this form, 105 m

DATE.	TEMPERATURE. Maximum.	Minimum.	Range.	Mean.	PRECIPITATION. Time of Beginning.	Time of Ending.	Amount.	Snowfall. in Inches.	Depth of Snow on Ground at Time of Observation.	Prevailing Wind Direction.	Character of Day. Sunrise to Sunset.	† Miscellaneous Phenomena.
	1	2	3	4	5	6	7	8	9	10	11	
1	27	11		25	D.M.	D.M.	none		none	S.W.	pt. cldy.	
2	26	1		24	D.M.	D.M.		2.5	2.50	S.W.	clear	
3	40	23		32						S.W.	clear	LEO 6SW WY
4	45	30		40						S.W.	clear	of 30
5	46	35		45						S.W.	pt. cloudy	
6	44	13		28						S.W.	clear	
7	21	-11		5						calm	clear	
8	22	-10		7						calm	clear	
9	25	-11		21						S.W.	clear	
10	30	6		28						S.W.	pt. cldy.	
11	28	13		21						S.W.	pt. cldy.	
12	22	3		15	D.M.		Trace			calm	cloudy	snowing but not
13	16	-3		-2			Trace			W	cloudy	accumulating
14	4	-23		-5				7.5	7.5	calm	clear	
15	7	-29		5						calm	clear	
16	20	-21		-1	D.M.		Trace			N.E.	cloudy	worst day in long time
17	-2	-40		-3		D.M.		9.0	12 cldy	S.W.	clear	
18	-21	-2		[illegible]						S.W.	pt. cldy	good well covered up
19	15	-7		12	D.M.	D.M.				S.W.	pt. cldy	
20	15	-21		-21	D.M.	11.50		9.0		N.	pt. cldy	
21	5	-35		4		7-8				S.W.	pt. cldy	
22	13	-17		8						S.W.	clear	
23	19	-3		5					drifts	S.W.	clear	meadows bared up
24	22	-6		20					drifts	S.W.	clear	in sagebrush country
25	29	2		27						S.W.	pt. cldy	
26	27	13		19						S.W.	clear	
27	29	18		25						S.W.	pt. cldy.	
28	25	5		19						S.W.	clear	
29	31	16		27						S.W.	clear	
30	27	8		27						S.W.	clear	
31	39	25		26						calm	clear	
Sum.	698	-12								S.W.		
Mean												

* Reading of maximum thermometer immediately after setting.
† Including rain, hail, sleet, and melted snow.
‡ Thunderstorms, halos, auroras, etc.

(IN TRIPLICATE.) See cover for instructions.

John R Kortes, Cooperative Observer.

Post-Office Address: Leo, Wyo.
7 Black Canyon Ranch

TEMPERATURE.
Mean maximum, 22.5
Mean minimum, -0.5
Mean, ~~11.4~~ 11.0
Maximum, 46 ; date, 5
Minimum, -40 ; date, 17
Greatest daily range, 41

PRECIPITATION.
Total, 1.91 inches
Greatest in 24 hours, 0.63 ; date, 17

SNOW.
Total snowfall, 23.5 inches; on ground 15th, 15 inches
at end of month, Drifts inches

NUMBER OF DAYS
With .01 inch or more precipitation, 5
Clear, 18 ; partly cloudy, 10 ; cloudy, 3

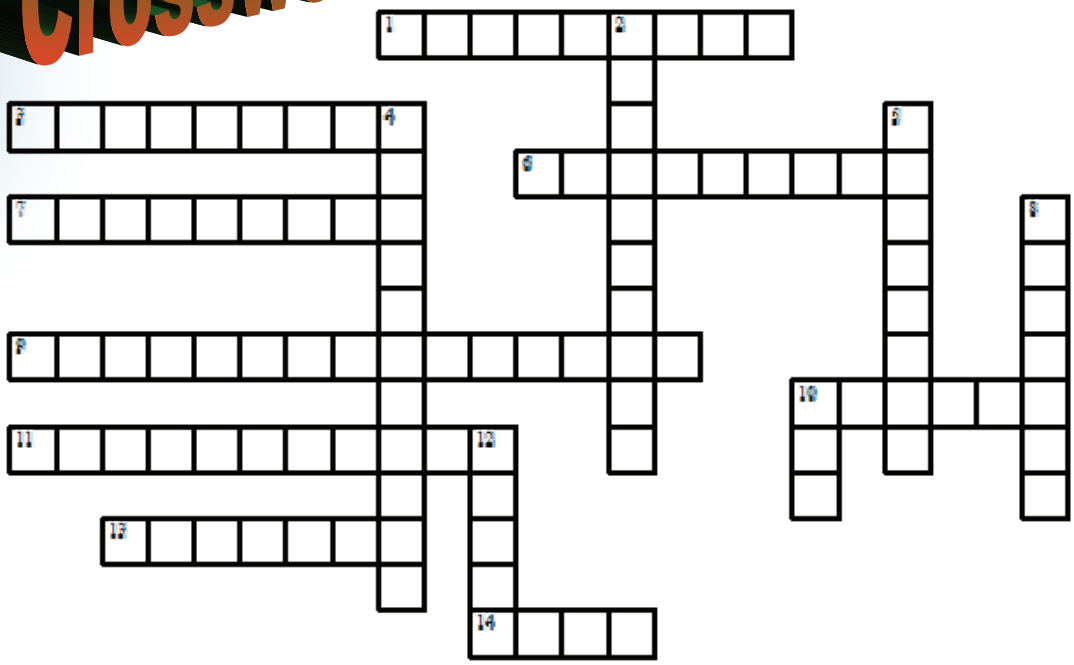
DATES OF
Killing frost,
Thunderstorms,
Hail: Light, ; Moderate, ; Heavy,
Sleet,
Auroras,

REMARKS:
Strong winds and snow make good ~~[illegible]~~ feeding grounds

BEST AVAILABLE RECORD

Actual form that Mr. Kortes completed when he began taking weather observations back in January of 1930.

Winter Crossword



ACROSS

1 A zone separating two air masses, of which the cooler, denser mass is advancing and replacing the warmer.
3 Relatively strong winds concentrated in a narrow stream in the atmosphere, normally referring to horizontal, high-altitude winds.
6 An instrument for measuring the quantity of rain that has fallen.
7 A transition zone between a mass of warm air and the colder air it is replacing.
9 A front between warm and cold air masses that is moving very slowly or not at all.
10 Is a periodic cooling of surface ocean waters in the eastern tropical Pacific along with a shift in convection in the western Pacific further west than the climatological average.
11 Air that flows toward higher terrain, and hence is forced to rise.
13 Issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurring. A warning is used for conditions posing a threat to life or property.
14 In meteorology, a region of high pressure; also known as anticyclone.

DOWN

2 An instrument that is carried aloft by a balloon to send back information on atmospheric temperature, pressure and humidity by means of a small, expendable radio transmitter.
4 The science dealing with the atmosphere and its phenomena.
5 A measure of atmospheric moisture. It is the temperature to which air must be cooled in order to reach saturation (assuming air pressure and moisture content are constant).
8 A nationwide network of volunteer weather spotters who report to and are trained by the National Weather Service.
10 An area of a relative pressure minimum that has converging winds and rotates in the same direction as the earth.
12 Used when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and or timing is still uncertain. It is intended to provide enough lead time so that those who need to set their plans in motion can do

Answers on Page 8

Why Talk About Winter Weather?

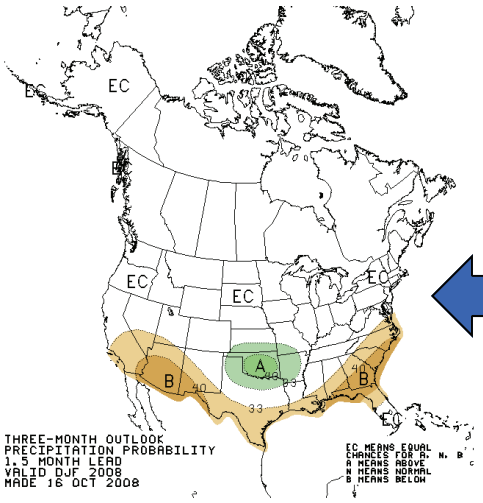
By: John Griffith, Warning Coordination Meteorologist

Winter storms may not be as dramatic as the tornadoes and flash floods of the summer months but they can be just as deadly. Each year, dozens of Americans die due to exposure to cold. Add to that number, vehicle accidents and fatalities, fires due to dangerous use of heaters and other winter weather fatalities and you have a significant threat.

Threats, such as hypothermia and frostbite, can lead to loss of fingers and toes or cause permanent kidney, pancreas and liver injury and even death. You must prepare properly to avoid these extreme dangers. You also need to know what to do if you see symptoms of these threats.

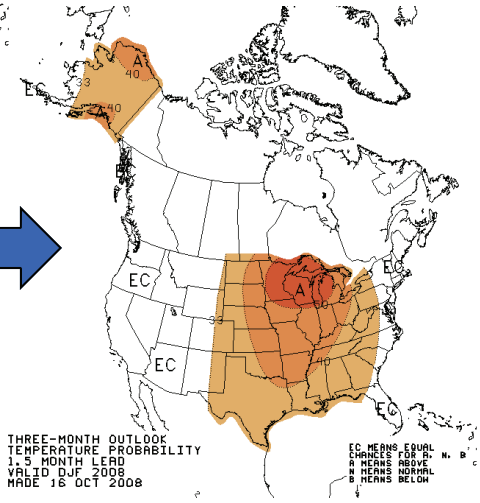
A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall and cold temperatures. People can be trapped at home or in a car, without utilities or other assistance. Attempting to walk for help in a winter storm can be a deadly decision. The aftermath of a winter storm can have an impact on a community or region for days, weeks or even months. The cost of snow removal, repairing damages and the loss of business can have severe economic impacts on cities and towns.

Winter Outlook



The precipitation outlook for Winter 2008 calls for equal chances of above , below, or near normal precipitation exist for the Northern Rockies.

The temperature outlook for Winter 2008 indicates better chances for warmer than normal temperatures across the plains states (including extreme eastern Wyoming and the western Nebraska Panhandle) as well as the Mississippi and Ohio River Valleys.



Freezing Drizzle! Are We Back in Kansas (cont.)

upper levels of the atmosphere, and instead of starting out as ice crystals they start out as super-cooled cloud droplets (Fig. 1). These super-cooled drops (very small compared to rain drops) continue to fall through the low moist layer just above the surface. However, the surfaced temperatures are below freezing and freeze on impact with the surface (similar to freezing rain). Ice pellets form very similar to freezing rain but the main difference is that the mid-level warm layer is shallow, thus the ice crystals do not completely melt. The ice crystals and mixed super-cooled drops collide just above the surface and form ice pellets as it falls to the surface (Fig. 1).

To understand the rarity of these frozen precipitation types, we look at a study done by Bernstein (2000) that examined the types of frozen precipitation across the United States. He found that the distribution of the average annual hours of frozen precipitation across southeast Wyoming and the Nebraska Panhandle was roughly 10 or less (Fig. 2). In comparing the three types of frozen precipitation, Bernstein et al (2004) found that the most common type for our area was freezing drizzle (Fig. 2). There was a local study done at the Cheyenne Weather Forecast Office (WFO) by Menzter and Hatten (1990) that examined the occurrence of freezing

(Continued on Page 9)

Average Annual Snowfall:

Centennial: 114.1"

Shirley Basin: 61.9"

Saratoga: 51.6"

Cheyenne: 55.5"

Laramie: 48.6"

Rawlins: 48.6"

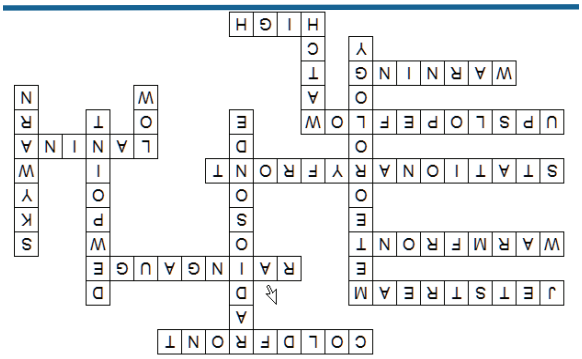
Chadron: 44.0"

Sidney: 40.9"

Scottsbluff: 39.0"

Crews wash the Doppler radar in Cheyenne in early October. ***(Photo Courtesy of Larry Brinlee, Wyoming Tribune Eagle)***

Answers: Winter Crossword



Freezing Drizzle! Are We Back in Kansas (cont.)

drizzle at the Cheyenne Airport (KCYS) between 1970 and 1989. They found that the months that tended to experience freezing drizzle at KCYS was in November and March. They also found that the typical wind direction for freezing drizzle events occurred when we had upslope flow from the south to southeast directions (not shown).

We experienced two freezing drizzle events across portions of southeast Wyoming and the Nebraska Panhandle during the 2007-2008 winter season. Although freezing drizzle events are unusual in itself, both of these events exhibited rare circumstances. On the morning of December 11, 2008, freezing rain was reported across eastern portions of Wyoming and the Nebraska Panhandle. This event was very unique because the temperature profile was similar to a freezing rain temperature profile (Fig. 1) with a mid-level warm layer. This is unusual because the Bernstein (2000) found that the freezing rain occurred less than 20% of the time (Fig. 2). The freezing rain caused Interstate 80 and 25 to close across Wyoming and the Nebraska Panhandle. There were significant reports of accidents due to the freezing rain that occurred in the morning. Unfortunately there was one report of a fatality in Cheyenne due to weather related car accident. The other frozen precipitation event occurred on the evening of December 7, 2008. This event was extremely unusually not because it exhibited some characteristics of a freezing drizzle temperature profile (which is more common for Southeast Wyoming), but because it's extremely rare to start out with snow on the morning of December 7th and then switch over to freezing drizzle in the afternoon for almost 4 hours. The freezing drizzle was mainly confined to the Laramie County in Wyoming and closed Interstate 25 due to the weather. There were several reports of cars sliding of streets and highways in the Laramie County area. Heavy snow also fell over portions of southeast Wyoming with nearly 10-17 inches of snow on the Sierra Madre and Snowy Range, 5-6 inches across Cheyenne, and 3-5 inches across the Nebraska Panhandle by the afternoon of December 8, 2008. Figure 3 show pictures of the freezing drizzle and snow covered trees from December 8th and December 9th respectively.

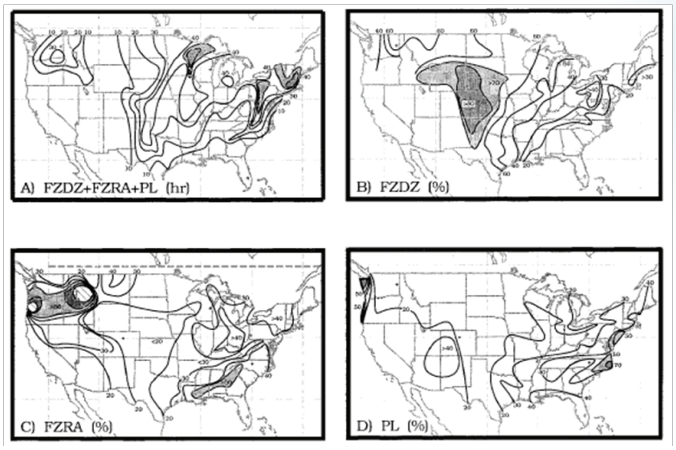


Figure 2 - Geographic distributions of (a) average annual hours of freezing precipitation and the percentage of freezing precipitation that fell as (b) freezing drizzle (FZDZ), © freezing rain (FZRA), (d) ice pellets (PL). ***Image courtesy of Bernstein (2000)***

Figure 3 - A picture of a tree on the east side of Cheyenne, WY on December 9, 2007. The snow that fell overnight on December 7th and 8th stuck to the freezing drizzle that occurred on the evening of December 7th. ***(Image courtesy of Melissa Goering)***

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http://weather.gov/cheyenne

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

Thanks From All of us at National Weather Service - Cheyenne!!!

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Information Technology Officer: Ray Gomez
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Hydrometeorological Technicians: Brian Chapman, Dan Deal, and Jim House