High Plains Wind

(Weather Information News Data)

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"NOAA mobilized experts from across the agency to help contain the spreading oil spill..."

A Message from the Meteorologist-in-Charge

By Scott A. Mentzer

Environmental Decision Support Activities across the Country

The National Weather Service (NWS) is part of the National Oceanic and Atmospheric Administration (NOAA). NOAA played a key role in a number of responses across the county that required decision support. In the spring and summer of 2010, NOAA provided expertise and guidance to key decision makers during the Deepwater Horizon / BP oil spill response.

NOAA mobilized experts from across the agency to help contain the spreading oil spill and protect the Gulf of Mexico's many marine mammals, sea turtles, fish, shellfish and other endangered marine life.

NOAA spill specialists advised the U.S. Coast Guard on cleanup options as well as advising all affected federal, state, and local partners on sensitive marine resources at risk in this area of the Gulf of Mexico.

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Ever Wonder?

By David Thede, Lead Forecaster and David L. Floyd, WCM

Have you ever wondered or been curious about where the weather observations you hear on NOAA All Hazards radio or various media outlets come from? We'll feature a different weather station in each newsletter.

McCook Ben Nelson Regional Airport ASOS

On December 4, 1996, the McCook Ben Nelson Regional Airport's ASOS (Automatic Surface Observing System) became the official means of collecting and reporting weather data for weather related activities, aviation and climate research. ASOS works non-stop updating observations every minute, 24 hours a day, 365 days a year. Hourly observations are sent, with special observations being transmitted when significant changes are detected. The site is located 2 miles east of McCook at an elevation of 2583 feet.

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Here is a list and description of the sensors ASOS uses:

SKY CONDITION: ASOS sky condition is determined by a laser ceilometer referred to as the Cloud Height Indicator (CHI). The CHI is used to detect the presence of clouds directly overhead up to 12,000 feet AGL (Above Ground Level).

VISIBILITY: ASOS visibility is based on light 'scattering. The visibility sensor projects a beam of light over a very short distance, and the light that is scattered is detected by a receiver. The amount of light scattered and then received by the sensor is converted into a visibility value. This sensor has a range of ¼ statute miles to 10 statute miles.

PRESENT WEATHER AND OBSTRUCTIONS TO VISION: There are two ASOS present weather sensors. The Precipitation Identifier (PI) sensor discriminates between rain (RA) and snow (SN). The Freezing Rain (FZRA) sensor detects freezing rain. ASOS evaluates multiple sensor data and infers the presence of obstructions to vision. The thunderstorm sensor detects cloud-to-ground discharges and assigns a range in miles from the ASOS.

The PI sensor has the capability to detect and report -RA, RA, +RA, -SN, SN, +SN. (The plus or minus sign corresponds to light, moderate, or heavy precipitation.) When rain and snow are mixed and the prevailing precipitation type can not be determined, ASOS will report UP (Undetermined Precipitation).

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The Freezing Rain sensor measures accumulation rates as low as 0.01 inches per hour. If freezing rain is detected and the PI sensor indicates no precipitation or rain, then freezing rain is reported. If freezing rain is detected when the PI indicates snow, then snow is reported.

Obstructions to vision are not directly measured by ASOS, but inferred from measurements of visibility, temperature, and dew point. There are only two reported by ASOS: Fog (FG) and Haze (HZ), and only when the visibility is below 7 statute miles.

TEMPERATURE AND DEW POINT: The ASOS temperature and dew-point sensors directly measure the air and dew-point temperatures. The temperature sensor has a range of -80 degrees Fahrenheit to +130 degrees Fahrenheit.

WIND: ASOS uses an Ice Free Wind (IFW) sensor (pictured above). The IFW is a combined wind speed and direction device that has no moving parts. It has an array of three equally spaced ultrasonic transducers in a horizontal plane. The sensor measures the time it takes for the sound generated by resonating alternate transducers to travel from one transducer to the other. The transit time is measured in both directions. This sensor has a range of 0 to 125 knots (0 miles per hour to 144 mph).

PRESSURE: Because pressure measurement is critical, three separate and independent pressure sensors are used at larger airports. Two pressure sensors are used at other locations. This sensor has a range of 16.9 inches of mercury to 31.5 inches of mercury.

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PRECIPITATION ACCUMULATION: ASOS uses a Heated Tipping Bucket precipitation gauge. This sensor has a range of 0 (zero) to 10.00 inches per hour.

In the 14 years since ASOS has been commissioned in McCook the following weather extremes have been measured:

Highest maximum temperature – 111F July 6, 2001 and July 9, 2006

Lowest minimum temperature –15F January 5, 2004

Daily record precipitation – 5.13” May 23, 2008

3 day consecutive record precipitation – 6.26” May 21-24, 2008

7 day consecutive record precipitation – 6.50” May 21-28, 2008

Highest sea level pressure – 30.98” March 11, 1998

Lowest sea level pressure – 29.07” February 25, 1998

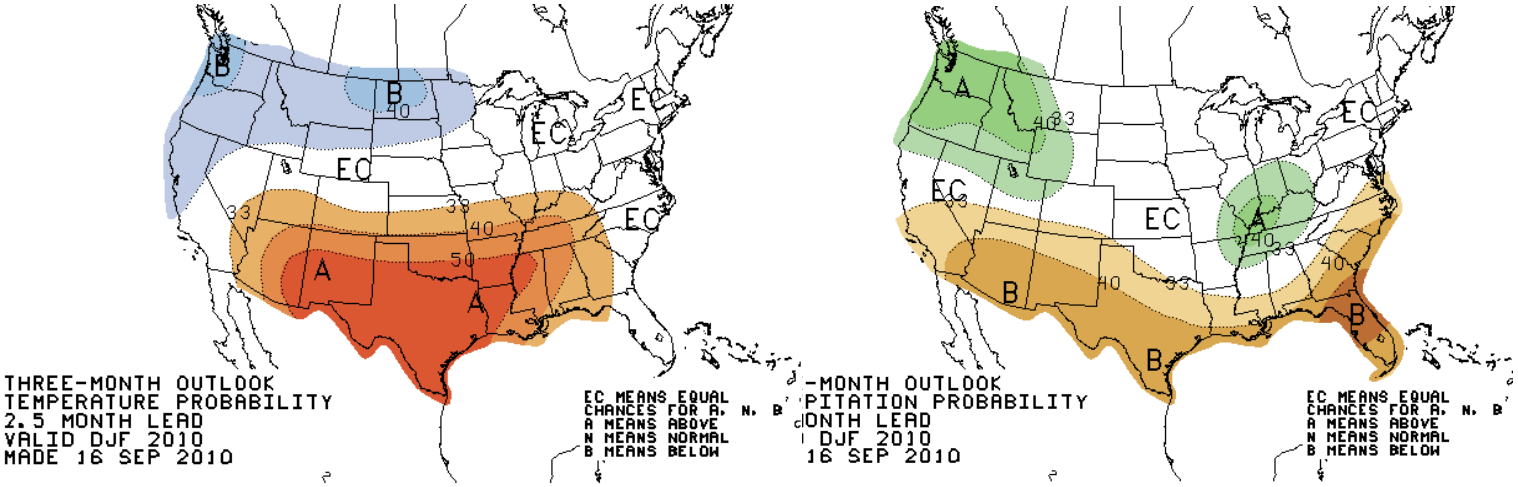
Highest peak wind gust – 77 mph July 3, 2003

Highest daily average wind speed – 33.7 mph February 9, 2002

La What?

By Dave Floyd, Warning Coordination Meteorologist

When the Climate Prediction Center (http://www.cpc.noaa.gov/) issued the 2010-2011 Winter Outlook (shown below with temperature on left, precipitation on right), it was stated the forecast was heavily influenced by developing La Niña conditions in the tropical Pacific Ocean. So what exactly is a La Niña? How can the Pacific Ocean influence weather over the Central High Plains? What does this mean for the Tri-state area?



In a nutshell, research occurring over the last 3 decades led to the discovery that variations in sea surface temperatures in the tropical Pacific Ocean can have a profound influence on the circulation of the atmosphere. Ships and data buoys routinely collect the temperature of the sea surface, as well as the temperature at various depths in the water. There is a recurring pattern of temperature swings in the ocean from colder than normal to warmer than normal that typically repeats every 3-5 years. When the sea surface temperatures are warmer than normal, it is called an El Niño or warm episode, and when water temperatures are colder than normal, the term La Niña, or cold episode is used.

The origin of these terms goes back to the initial discovery that the fishing industry (primarily anchovies) off the west coast of South America was occasionally disrupted by the presence of unusually warm water just off the coast. Since this tended to occur around Christmas, the term El Niño (The Christ Child) was coined.

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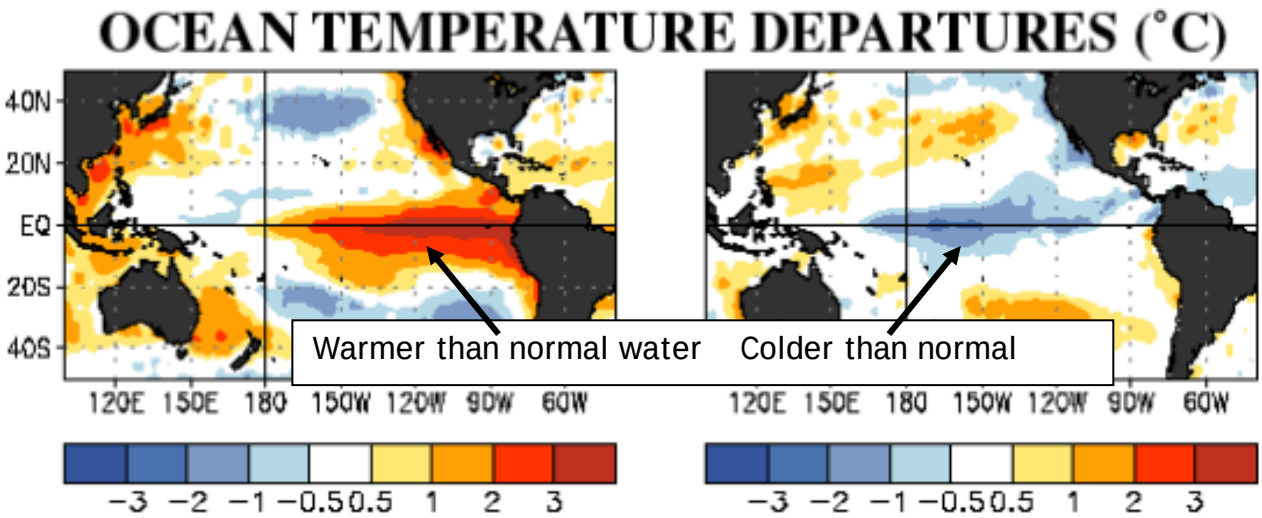
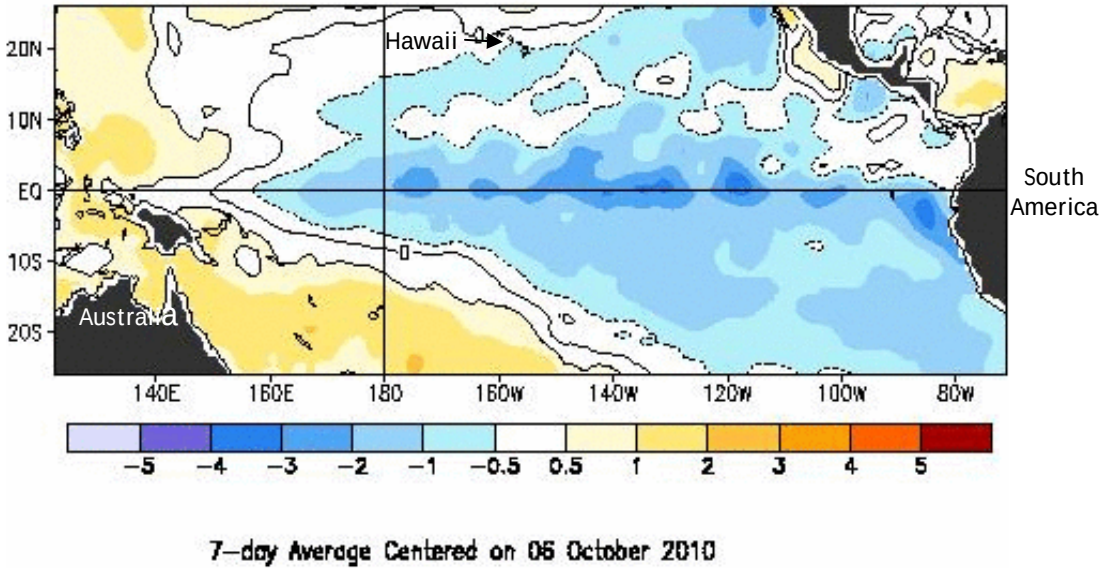
The map below gives some idea of what we are talking about. On the left are typical El Niño conditions, where the orange and red shades indicate warmer than normal sea surface temperatures. The map on the right is a typical La Niña pattern, where the blue shades indicate colder than normal sea surface temperatures.



What is the current state of ocean temperatures in the tropical Pacific Ocean? The map below shows the weekly average temperature anomaly along the equator for October 6, 2010. The various shades of blue indicate that sea surface temperatures are below normal by as much as 3-4 degrees Celsius, or 5-7 degrees Fahrenheit. If that doesn't sound like much, realize that this is occurring across thousands of miles.



Variations in sea surface temperature occurring on a scale this large will influence the location, persistence, and intensity of thunderstorms over the Pacific Ocean, which in turn has big implications not only for ocean currents, but for atmospheric wind patterns as well.

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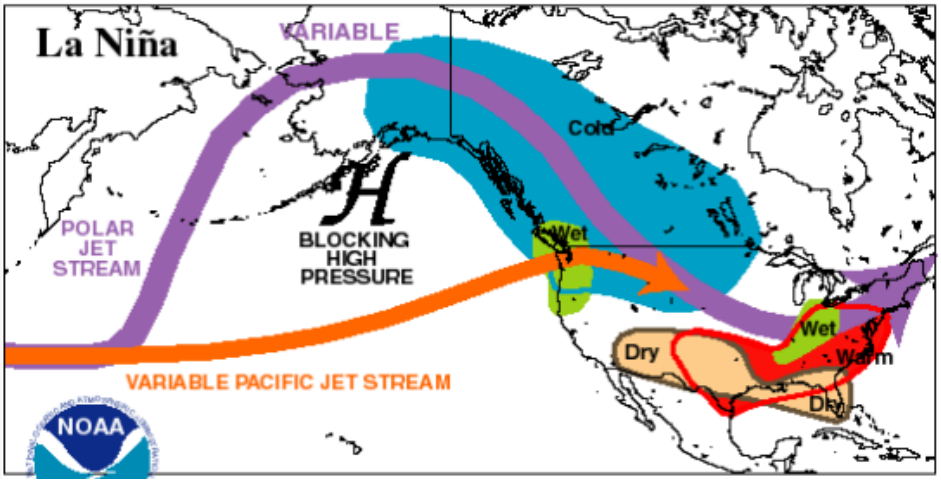
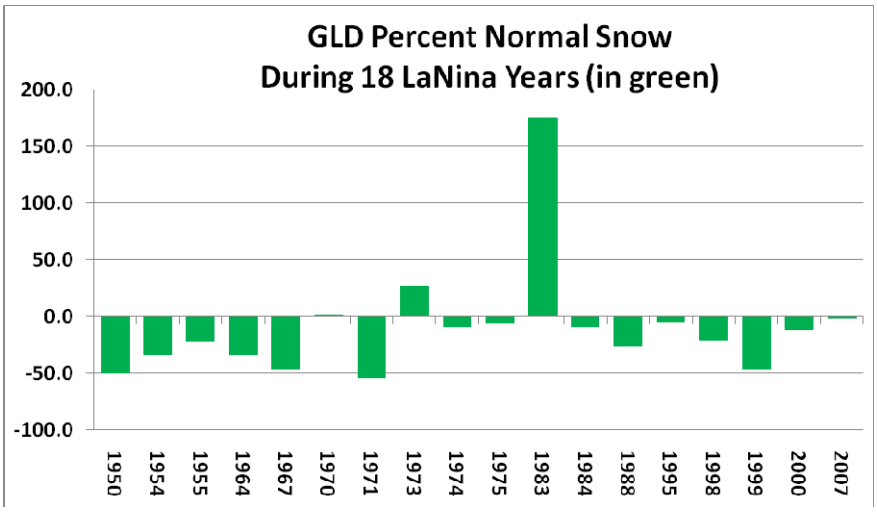
In a typical La Niña pattern, the downstream effects on North America during the winter months can be summarized by the graphic below. The Pacific Northwest is often colder and wetter than normal, the southern United States is often drier and warmer than normal, and the Ohio and Tennessee Valley area is typically wetter than normal.



Since northwest Kansas, southwest Nebraska, and eastern Colorado are in the middle of these anomalies, I decided to look a bit closer to see what we might expect in terms of snowfall this winter. Given this is a La Niña year; I looked at all the previous La Niña years and compared that with snowfall in Goodland (GLD). The graph below shows the results. It appears that in most La Niña years, the result is below normal snowfall in Goodland, since most of the green bars (percent of normal snowfall) appear below the zero line. I'm not sure what happened in 1983!



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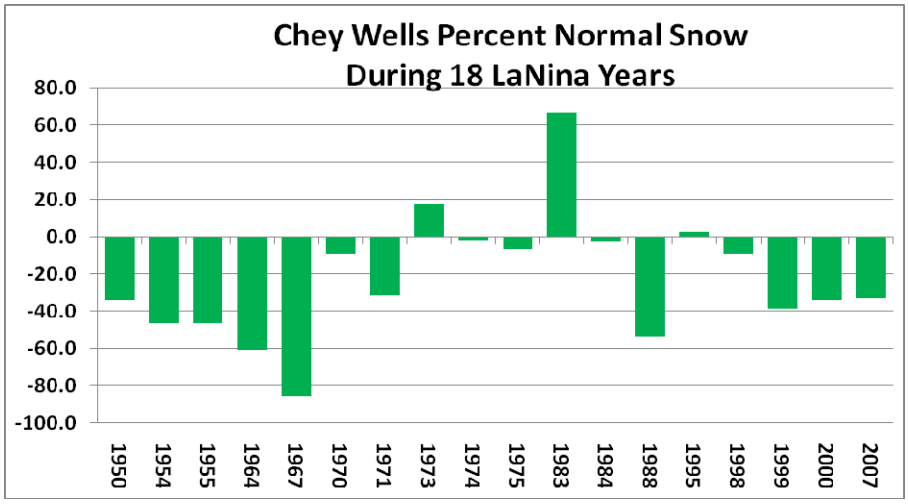
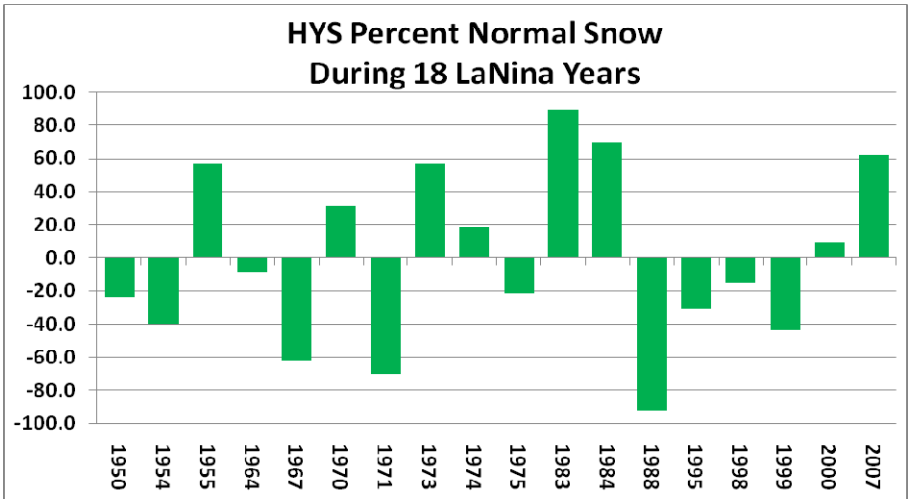
To determine whether or not this is true for other locations, I looked at Cheyenne Wells, Colorado. Once again, a pattern of below normal snowfall is seen in La Niña years since just about all the green bars are below the zero line.



Next, I looked further east to Hays, Kansas (HYS). In this case there does not appear to be much of a relationship between cold Pacific Ocean sea surface temperatures and snowfall. During the previous 18 La Niña years shown below, snowfall was sometimes above normal, and sometimes below normal in Hays.



What does this tell me? If I were playing the odds and just looking at the graphs above, I would place my bet on less than normal snowfall in western Kansas and eastern Colorado this winter. If I were living in Hays, Kansas, I would have a much harder time deciding which way to go based on the graph above. I'll let you know next May how it all turns out! We'll see if the La Niña pattern this year works as it has in the past!

What is Fire Weather?

By Mickey McGuire, Lead Forecaster

Weather is a critical ingredient in the development and behavior of wildfires. High winds, high temperatures, low humidities, and dry lightning are the critical weather variables that affect the potential for fire ignition and fire behavior. A detailed knowledge of the fire weather forecast is useful for operational decision-making, and can be vital to land management personnel if critical conditions are forecasted. The National Weather Service works around the clock to ensure the most accurate forecasts, warnings, and data are readily deployed to fire management personnel. The Weather Service hosts a fire weather program that produces timely and informative products geared specifically to the fire community.

Fire Weather Planning Forecasts

Participating National Weather Service offices issue standardized products known as Fire Weather Planning Forecasts. The product begins with a short text discussion of the ongoing weather pattern followed by a tabular 1 to 3 day forecast of cloud cover, precipitation, temperatures, relative humidity, winds, and other fire weather indices. Finally, the product includes a concise text format weather outlook for the next four to seven days. Fire management and dispatch teams across the nation rely heavily on the Fire Weather Planning Forecast as a daily guide and planning tool for crucial fire weather operations.

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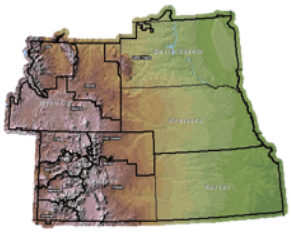
Did you know…

An average of 106,400 wildfires develop across the United States each year.

As a result, 4,083,000 acres are consumed with 9 out of 10 fires ignited by humans. Year to date, the Rocky Mountain Area has had 2,155 wildfires burning 101,755 acres. The Rocky Mountain area covers the area outlined below. *(Jan 1, 2010-Oct 4, 2010)*



Spot Forecasts

Prescribed or planned burning is done frequently across federal and state lands to clear away brush, debris, and other potentially hazardous fire fuels. Spot Forecasts are "point specific" forecasts created to inform land agencies and associated burn officials of forecasted weather conditions during these expected burn times. These products are created on request by meteorologists at the National Weather Service. Spot forecasts may also be requested for ongoing wildfires at specific locations. Spot forecasts for prescribed burns and wildfire control can both be requested online from the National Weather Service web page or via phone from your local Weather Service office.

The Red Flag Program

The Red Flag Program was developed to warn fire fighters and other related fire management officials of the potential for large fire growth and other hazardous burning conditions. When dry fuels or cured vegetation exists with critical fire weather, the Red Flag program will alert users of life threatening fire conditions by the issuance of a Fire Weather Watch or a Red Flag Warning. This program is driven primarily by high winds combined with low humidities, two critical elements leading to a dangerous fire environment. Other factors may also warrant the issuance of a Fire Weather Watch or Warning such as dry lightning, strong wind shifts, or generally hot and dry conditions. The Red Flag program can aide in fire safety, preparation, and control methods. If a Red Flag warning is issued for your area, listen to your local NOAA Weather Radio broadcast for further information.

Fire Prevention Tips

- *Avoid driving or parking vehicles in grassy areas where tall, dry grass comes into contact with hot engine components.*
- *Attend outdoor fires until they are completely safe and extinguished.*
- *Most wildfires are caused by careless people. Properly dispose of cigarettes and other smoking materials.*

Cooperative Observer News

by Mike Lammers, OPL, and Christina Henderson, HMT

On the left, Delbert Rose, observer at 22 miles south of Oakley KS, accepts a 45 Year Length of Service Award presented by Scott Mentzer, Meteorologist-In-Charge of NWS Goodland. Delbert received the Hagemeyer Award for his accomplishment. Also attending from the NWS Goodland,KS office were Mike Lammers, and Joy Hayden. *Photo by Joy Hayden on 26 August 2010.*

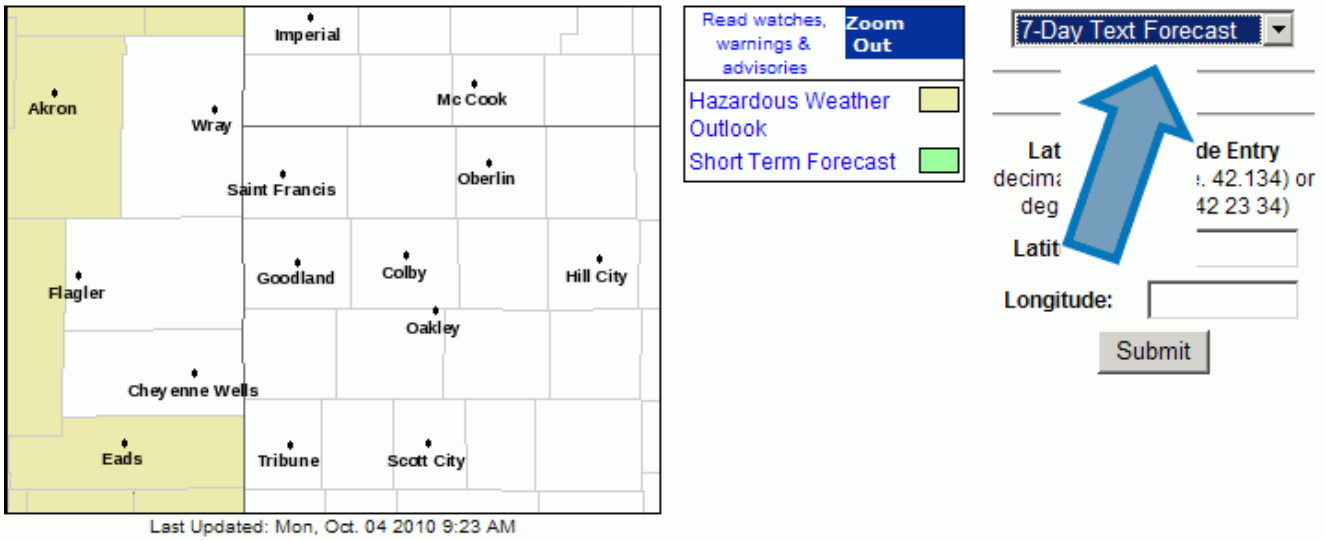
Betty Treu, observer at 9 NNW of Studley, KS. accepts a 35 Year Length of Service award on behalf of her late husband ,Willard and herself. Making the presentation was Scott Mentzer, Meteorologist-in-Charge of the NWS Goodland office. Pictured on the left are Christina Henderson, Betty Treu, recipient of the award, and Michael Lammers. *Photo by Joy Hayden on 10 September 2010.*

As we prepare for the winter months, don't forget to remove the funnel from your rain gauge to prevent damage from freezing rain and snow. If you have any questions about winterizing your equipment, please be sure to give us a call!

New Probabilistic Forecast Products

By Albert Pietrycha, Science Operations Officer

Several new experimental probabilistic products are now available on the National Weather Service (NWS) interactive forecast information web page. These products include a probability of exceedance for wind speed and wind gust plus a probabilistic quantitative precipitation forecast (PQPF). These products are intended to convey forecast uncertainty. For example, if a wind speed is forecasted to be 20 mph, what is the likelihood of it reaching 25 mph? Or, if the rain forecast calls for a tenth of an inch, what is the likelihood that a quarter of an inch may occur?



The wind products were developed by the Wichita, Kansas, National Weather Service Forecast Office, and the PQPFs method was developed at the Tulsa, Oklahoma, office. These methods were tested using forecasts from those offices for a couple years before implementing experimentally as a part of the interactive forecast information display on the NWS web page.

The probabilistic wind data are provided hourly extending 60 hours in time. The PQPFs are forecasted hourly out to seven days with exceedance values available for 3, 6, 12 or 24 hour periods. You can view the data in a graphical or tabular output. To view the data visit the following address:

http://forecast.weather.gov/gridpoint.php?site=gld

After the page loads, in the drop down box select either Hourly Weather Graph or Digital/Tabular (drop down menu denoted by the blue arrow above). Then, select the location you want on the map.

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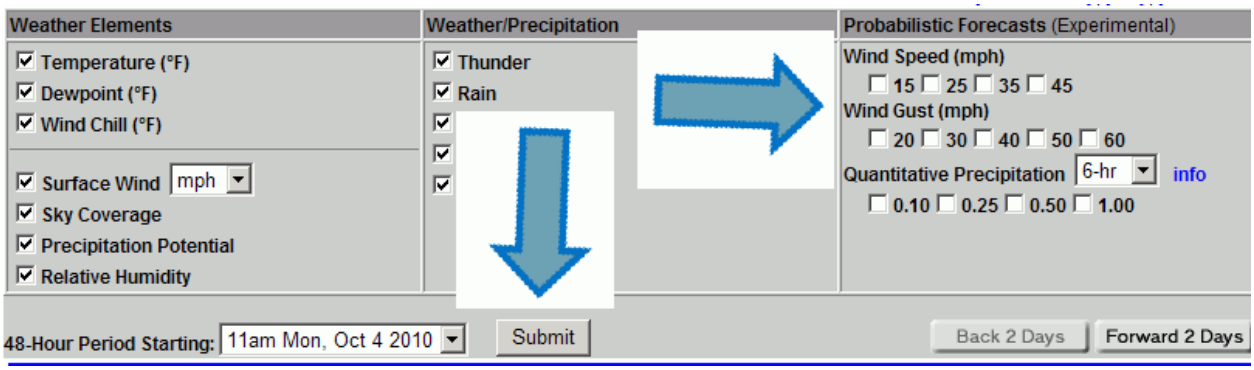
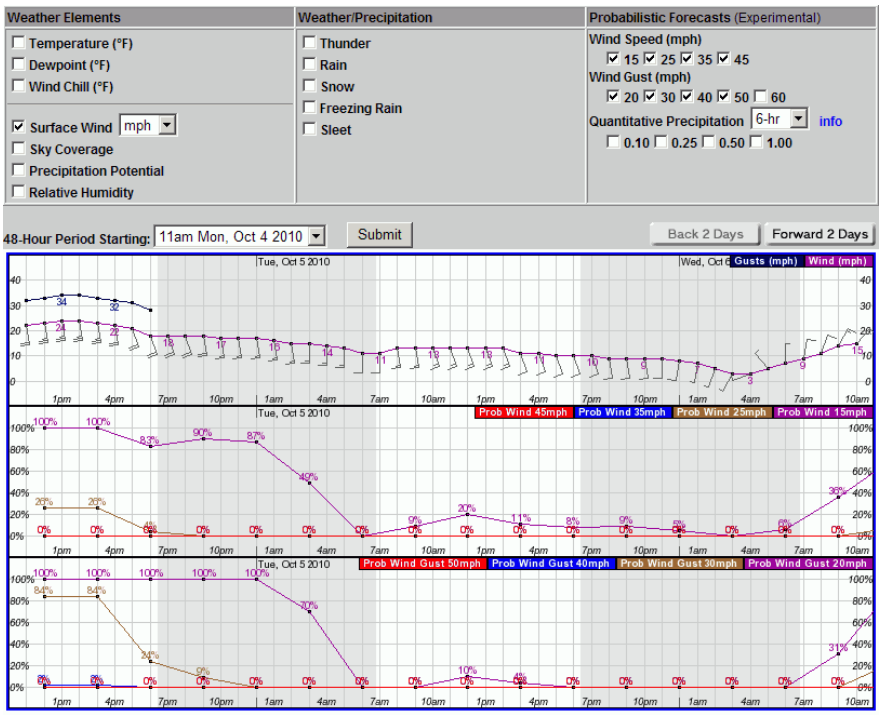
A new page will load. In the upper right hand corner choose the probabilistic forecast products you want, then select the submit button.



Below is an example the hourly weather graphic of the forecasted wind speeds and gusts, and the probabilistic wind speeds and gusts.



Tuesday, October 5 at 5pm

We would very much like to hear your feedback on these new experimental products. Comments can be sent to our office by emailing w-gld.webmaster@noaa.gov.

It's Official: Wichita Hailstone Certified State Record for Diameter Measured 7.75 inches in Diameter

The State Climate Extremes Committee have declared a hailstone recovered in west Wichita after a storm Sept. 15, 2010, to be the state of Kansas' largest diameter stone.

Photo courtesy of Melissa McCarter

The hailstone fell near Pawnee and 119th Street after a severe thunderstorm dropped giant hail in a wide swath from Goddard to Udall. Up to softball-sized hail caused significant damage to roofs, vehicles and lawns, according to Mary Knapp, state climatologist and director of the Weather Data Library at Kansas State University.

The hailstone measured 7.75 inches in diameter shortly after the stone fell in west Wichita. However, the official weight and circumference were not able to be obtained until 15 hours after the stone had fallen. At that time, the stone weighed 1.1 pounds and had a circumference of 15.5 inches. That information was submitted to the state climate extremes committee, which was able to meet Thursday afternoon.

"This has been quite a summer for large hail," said Jim Keeney, weather program manager at National Weather Service Central Region Headquarters in Kansas City. "We had a national-record stone recovered in South Dakota earlier and another is being examined as a possible state record in Oklahoma. These hailstones are significant recoveries, but they are records we wish we didn't see."

Why does it take so long to verify the measurements? The reality is that it takes some time to document all of the data, and record the procedures. "Questions arose around a National Climatic Data Center STORM DATA report from September 1970 of 7-8-inch hail," said Knapp. "It was determined that those values hadn't been documented, so the current stone claims the record. Careful documentation will minimize questions that might arise the next time a large stone is recovered." Final verification of the hailstone's record status came from NOAA's National Climatic Data Center through the State Climate Extremes Committee.

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Does this make you wonder where the largest hailstones in this area fell? Dave Floyd did some research and discovered some interesting information. There were two events with hailstones with diameters of five or more inches. The first was in Greeley County, Kansas, seven miles south of Tribune on June 6, 1994. The hailstorm occurred at 6:45 CST, and caused over $500,000 in damages. Hail of 2.75 inches was also reported with the same storm. The other report came from Gove County, Kansas, in June of 1967, but no details of damage were reported with the storm.
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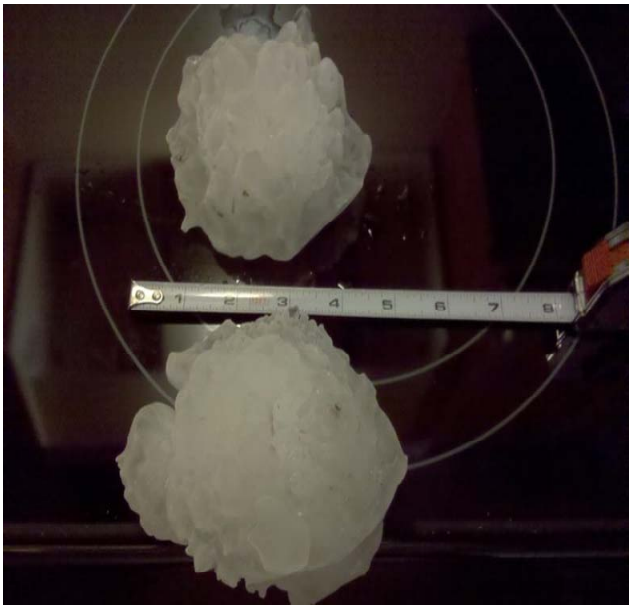

Photos courtesy of Melissa Carter and the National Weather Service in Wichita, Kansas

An in-depth report on the storm with photos and graphics is available on the Wichita office web page at http://www.crh.noaa.gov/ict/scripts/viewstory.php?STORY_NUMBER=2010091902.

And for those who have collected a record-size hailstone, some guidelines for documenting the event can be found at http://www.ncdc.noaa.gov/extremes/scec/reports/SCEC-Hail-Guide.pdf

If you would like more information about this article please contact the following:

State Climatologist, Mary Knapp (785) 532-7019
NWS Goodland Warning Coordination Meteorologist, Dave Floyd, (785) 899-6412
NWS Central Regional Headquarters Public Affairs Specialist Patrick Slattery (816) 268-3135

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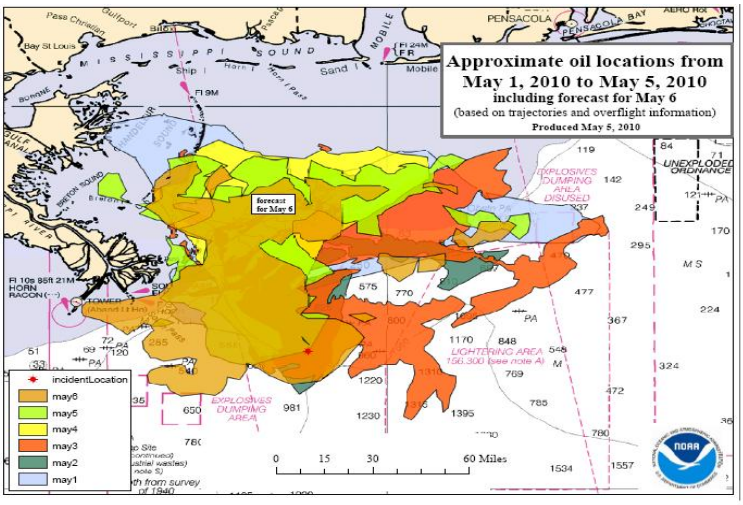
The agency predicted the oil spill's trajectory and the path of the layers of oil floating on the surface. It conducted aerial surveys to update trajectory maps and visually track the movement of the spill. It also used experimental satellite data to survey the extent of spill-related marine pollution.



Map of Oil Spill Developed by NOAA

The NWS offices in Slidell, Louisiana, and Mobile, Alabama, provided weather forecasts to a joint federal command center in Louisiana to facilitate operations planning and response efforts. The Slidell office developed a special web page to assist decision makers – http://www.srh.noaa.gov/lix/?n=embriefing.
Several NWS meteorologists across the country were deployed to the Gulf region to assist with weather support. To see more detailed information about NOAA's response, visit: http://response.restoration.noaa.gov/dwh.php?entry_id=809

Another oil spill occurred in Michigan's Kalamazoo River this summer. NWS meteorologists again provided enhanced services to help crews mitigate the issues. In fact, a meteorologist from the NWS office in Goodland will travel to Michigan in late October to provide his expertise to the Environmental Protection Agency.

One of the primary missions of the NWS is to protect lives and property. Decision support efforts, whether it be in the Gulf of Mexico, on a river in Michigan, or on the High Plains of the Tri-State area, help the agency attain that mission.

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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.