NATIONAL WEATHER SERVICE
DES MOINES IA

Central Iowa The Weather Whisper

Volume 4, Issue 1 Spring 2010

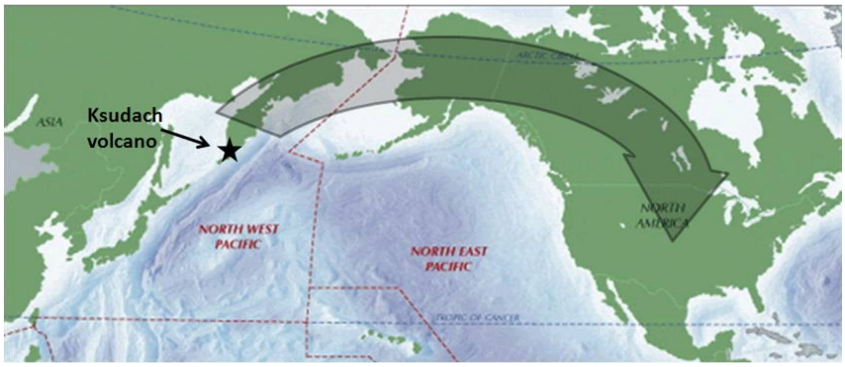
- Ksudach Eruption
- Jim Snapp Thank You

Inside this issue:

The Ksudach Eruption of 1907 and the Spring that wasn't

by Jim Lee, General Forecaster

It is a well known fact among scientists, history buffs, and weather aficionados that 1816 is often called "The Year Without a Summer" because of the abnormally cold conditions that prevailed across the northeastern United States, eastern Canada, and northern Europe throughout that year. This was caused by the very large and explosive eruption of the volcano Tambora in Indonesia in April of 1815. The enormous amount of ash ejected into the atmosphere (see Table 1) reflected incoming sunlight and significantly cooled most of the northern hemisphere. So severe were the effects that in New England snow fell in every month of 1816, and in July and August lake and river ice were observed as far south as Pennsylvania. The severely cold temperatures led to widespread crop failures and famine. Americans had not yet moved westward into the plains, so the effects of the Tambora eruption in the Midwestern states were not recorded.



What most people do not know is that nearly a century later, in the spring of 1907, this scenario repeated itself to a considerably smaller extent. March of 1907 was a quiet and unseasonably warm month across most of the United

(Continued on page 5)

Thank You Jim Snapp

by Jeff Johnson, Warning Coordination Meteorologist and Ken Podrazik, General Forecaster

Jim Snapp volunteered with the National Weather Service (NWS) since 1993 as an amateur radio operator. Before retiring earlier this year, he was the primary net controller for the amateur radio spotter network at the NWS office in Des Moines and was deeply involved with the Mid Iowa Skywarn Association (MISA). Amateur radio spotters are extremely important in the support of the NWS mission of "protection of life and property" by providing the NWS with timely and accurate spotter reports during severe weather. Jim was always readily available to help out operations at the office in Johnston, IA, during any time of the day or any day of the week. He handled thousands of reports from multiple severe weather events throughout his time here at the office in Johnston. We greatly appreciate all that he has done for us as he always helped with warning decision services. His dedication was outstanding and his services will surely be missed. From everyone at the NWS office in Des Moines...Thank you Jim for all your hard work and we will miss you dearly.

Jim Snapp (left) receiving a recognition award from Jeff Johnson (right) during Jim's going away celebration at the NWS Office on February 17, 2010.

Jim Snapp hard at work at the NWS Office

New Special Weather Statement Policy *by Ben Moyer, Senior Meteorologist*

Beginning this spring, the National Weather Service in Des Moines will have a new policy concerning short-term weather and impact information. The old Short Term Forecast product will be replaced by Special Weather Statements. Special Weather Statements will be used to convey short-term weather and impact information of importance to our customers that (1) is insufficient to justify issuance of a warning or advisory or (2) provides information in the convective pre-warning mode. For more details, please go to the following location on the Web http://www.crh.noaa.gov/images/dmx/Media Advisory 2010-02.pdf.

What does a Tornado Emergency Mean? *by Ben Moyer, Senior Meteorologist*

Beginning this spring, the National Weather Service in Des Moines will use the term "tornado emergency" in tornado warnings or severe weather statements in rare instances when **significant**, **widespread** damage with a **high likelihood of numerous fatalities** is expected to continue due to a strong and violent tornado approaching or affecting a highly vulnerable population. This term is not to be confused with the intended purpose of, and response to, the issuance of any tornado warning. The National Weather Service wants the public to take every warning seriously and to take action that saves lives when a warning is issued for their location.

The intended purpose of using the term "tornado emergency" is as follows:

- To motivate and provide a sense of urgency to persons in the path of this storm to take immediate shelter in a reinforced structure that offers *maximum* protection from destructive winds.
- To communicate to state, local, and county officials and emergency responders that they should prepare for immediate search and rescue operations.
- To communicate the need to prepare for immediate medical emergencies, evacuation measures, and emergency sheltering.

Violent EF-5 tornado approaching New Hartford, IA on 25 May 2008. Photo courtesy of Rod Donavon, Senior Meteorologist, NWS Des Moines.

Maximum Wind and Hail Tag on Severe Thunderstorm Warnings

by Jeff Johnson, Warning Coordination Meteorologist

Beginning this March, all National Weather Service Offices in the Central Region will be appending an experimental tag line to severe thunderstorm warnings and follow-up severe weather statements. The tag line is a concise code which identifies maximum hail size and wind speed expected for a given warning. Inclusion of this information at the end of these products represents an effort to respond to partner requests from the emergency management community as well as several societal impact groups.

One specific application concerns the activation of emergency alert sirens. Local area sirens are typically alarmed for tornadoes only. Decoding this tag line will facilitate the capability for local area emergency managers to activate sirens for particularly dangerous severe thunderstorm events when conditions exceed user-defined thresholds, say for winds greater than 90 mph as an example.

The maximum wind and hail size tag line is an experiment which will be evaluated from March 1, 2010 through October 1, 2010. During this period, we encourage comments of suggestions for improvement using the electronic survey provided at the link below. Your feedback will help us determine product usefulness, potential modifications, and permanence to our warning format. On-line customer feedback survey (http://www.weather.gov/survey/nws-survey.php?code=svr-wind-hail)

Coming Soon - Website Tutorials *by Aubry Wilkins, Meteorologist Intern*

Have you found yourself wondering what the weather was like on July 4, 2008? Or what the forecast for the Cedar River near Waterloo is? The answers to these questions can be found on the National Weather Service Des Moines' website at www.weather.gov/desmoines along with a wealth of additional information about weather, our mission, outreach activities and educational materials. We know that all this information can make the website difficult to navigate and frustrating to use. Coming soon however, we will be developing and posting short, helpful "how to" videos about the website. We will cover topics such as looking up climate data, utilizing the forecast, and much, much more. So check back frequently to see what we've added and enjoy exploring the site!

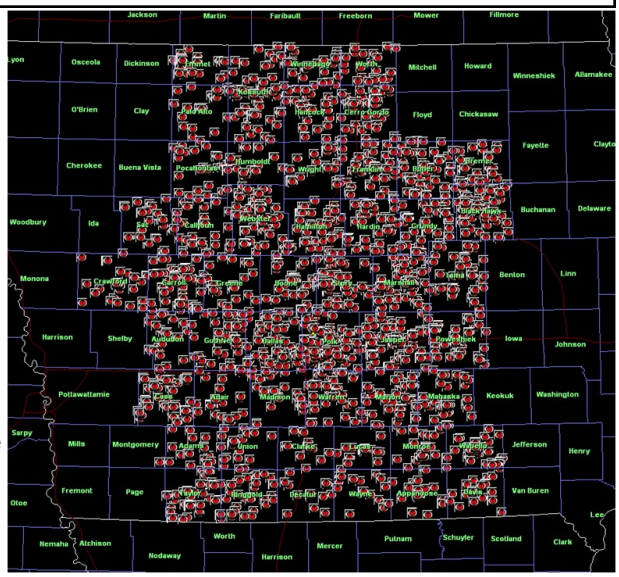
New Employee Spotlight—Jacob Beitlich, *Meteorologist Intern*

I grew up on a dairy farm just south of La Crosse, Wisconsin, along the Mississippi river. As any farmer knows, the weather has a major impact on the daily tasks, and this is what motivated me to pursue a career in meteorology. I earned a Physics/Mathematics bachelor's degree from the University of Wisconsin, La Crosse in May 2007, and earned my master's degree in Atmospheric and Oceanic Sciences from Wisconsin University this past December. I was thrilled at the opportunity to work for the National Weather Service here in Des Moines. I feel that the people, and also the ever-changing weather, make Iowa a great place to live. For example, during one of the many winter storms this year, my car got hung up on a snow drift on my way to work. Since I had just moved, I didn't own a snow shovel, but a neighbor stopped and let me borrow his so I could dig myself out. No more than fifteen minutes later, a second vehicle stopped by to assist me and helped push me out. As I was thanking them, a third pick-up truck stopped and offered to lend me a hand. This Good Samaritan attitude is why my fiancé and I are excited to start our lives together in this community. Besides weather, I enjoy playing baseball, volleyball, golfing, mowing the lawn, and grilling steaks.

Spotters Needed in Rural Areas *by Brad Small, Senior Meteorologist*

The spotter training schedule at the National Weather Service (NWS) in Des Moines kicked off February 17 and will last through the end of April. Hundreds of spotters have been trained so far but more are still needed, especially in rural areas. We currently have 2,928 spotters across our 51 county forecast area, however many of those are clustered in and around larger cities. As you can tell from Figure 1, gaps of coverage still exist in many locations.

Spotters are a critical part of the warning system with their reports often making the difference between whether a warning is issued or not. Doppler radars give us a lot of information, but not what is happening near the ground, or even the lowest several thousand feet in most instances. NWS spotters are not asked to go mobile or become storm chasers. All we ask is that you take a spotter training class, either in person or on-line. Our spotters are not chasers but rather points of contact that call the NWS with severe weather reports, or are available for inquiries from NWS staff regarding conditions in their area. All participants are volunteers and never asked to alter their plans on any given day. Being a spotter is a great way to volunteer in your community. Your report may make the difference in a severe weather situation and save lives.



Above Figure: Locations of weather spotters in central Iowa trained by staff from the National Weather Service in Des Moines.

If you would like more information on the NWS Des Moines Spotter Program such as training dates, on-line training, field guides, course notes and registration information, please visit http://weather.gov/desmoines and select the Spotter Training tab on the front page. Other information is available by contacting Warning Coordination Meteorologist Jeff Johnson (jeff.johnson@noaa.gov) or Spotter Program Leader Brad Small (bradley.small@noaa.gov), both at (515) 270-4501.

- *Fun Fact: 1,800 thunderstorms occur at any moment across the world. That adds up to 16 million storms each year worldwide!*

Seasonal Snowfall Normals (July 1- June 30)

Location	Normal	2009-2010 Season Total (thru Feb)
Des Moines	36.2"	62.3"
Mason City	39.4"	42.5"
Waterloo	34.1"	51.3"
Ottumwa	26.9"	N/A

NOAA All Hazards Weather Radio *by Rob DeRoy, Data Program Manager & NWR Program Leader*

NOAA All Hazards Weather Radio (NWR) is a primary method to automatically receive Severe Weather and other life threatening emergency messages from the National Weather Service.

Known as the "Voice of the National Weather Service," "NOAA All Hazards Weather Radio" is provided as a public service by the National Oceanic & Atmospheric Administration (NOAA), part of the Department of Commerce. NWR includes more than 900 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal.

Broadcasts are found in the public service band at these seven frequencies (MHz): 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, 162.550.

Iowa has 36 transmitters covering all 99 counties. Each transmitter provides broadcast service to several counties. Fourteen of these transmitters are located in the Des Moines National Weather Service area of responsibility. These are:

Des Moines	WXL-57	162.550 MHz
Waterloo	WXL-94	162.550 MHz
Fort Dodge	WXK-84	162.400 MHz
Marshalltown	KXI-98	162.500 MHz
Montezuma	KXI-62	162.450 MHz
Lenox	KXI-65	162.450 MHz
Rathbun Lake	WXN-91	162.425 MHz
Carroll	KZZ-51	162.425 MHz
Van Wert	KZZ-68	162.475 MHz
Iowa Falls	WNG-666	162.525 MHz
Denison	WNG-668	162.550 MHz
Ringsted	WNG688	162.475 MHz
Ottumwa	WNG-630	162.500 MHz
Forest City	KJY-63	162.500 MHz

Each Iowa county is served by one or more transmitters. To see a complete listing of which counties are served by these 36 Iowa transmitters, please see: http://www.weather.gov/nwr/CntyCov/nwrIA.htm.

Modern NOAA All Hazards Weather Radio receivers use "SAME" technology which allows the user to program the radio for Severe Weather Watches and Warnings for one or more counties. For information on how to program a "SAME" enabled receiver see: http://www.nws.noaa.gov/nwr/same.htm.

When a National Weather Service office broadcasts a warning, watch or non-weather emergency, it also broadcasts a digital "SAME" code that may be heard as a very brief static burst, depending on the characteristics of the receiver. This "SAME" code contains the type of message, county(s) affected, and message expiration time.

A properly programmed receiver will automatically turn on for that message, with the listener hearing the 1050 Hz warning alarm tone as an attention signal, followed by the broadcast message. This warning service is provided to users 24 hours per day, 365 days a year. Listeners will also receive specific forecasts for their area along with hourly weather conditions and much more weather related information.

A New Marshalltown NOAA Weather Radio Site on the Horizon

by David Reese, Electronics System Analyst

The Marshalltown All Hazards NOAA Weather Radio (NWR) site is planning to move to a new location by July 2010. The current NWR site tower structure located at the Alliant Energy Sutherland Power Station in Marshalltown, has been deemed unreliable due to repeated flooding. Alliant has made plans to vacate all of their own equipment from the site and tear down the tower by early summer. Alliant has offered to allow the NWS to move the current NWR transmitter and antenna to an alternate location just a few miles from the current location. The new location offers the same amenities and service as the existing site, but on higher ground, with basically no future threat of flooding. A new lease agreement with Interstate Power Company is being drafted by the NWS for the new location, and we expect to be relocating the transmitter in just a few months. NWS technicians accompanied by Alliant technicians will be performing the actual move.

***Fun Facts:** Most snowfall in a winter season (July-June) for Des Moines, Iowa. The current totals are valid thru March 20th, 2010:*

1. *72.0 INCHES IN 1911-12*
2. *70.9 INCHES IN 1885-86*
3. *69.0 INCHES IN 2009-10*
4. *64.1 INCHES IN 1961-62*
5. *62.9 INCHES IN 1981-82*

Marshalltown Transmitter in the 2008 Iowa River Flood

New Location

Ksudach Eruption of 1907 *continued from page 1*

States east of the Rockies, especially in the southeastern states. In late March, on or around the 28th, the volcano Ksudach on the Kamchatka Peninsula of eastern Russia exploded sending ash high into the atmosphere. The ash traveled with the jet stream winds across the north Pacific, over Canada and into the central and eastern United States (see Figure 1). As a result temperatures dropped sharply beginning in the first week of April and did not recover significantly for many weeks. The months of April and May were unseasonably cold east of the Rockies, with multiple snow events coming much later than usual and many tree and field crops ruined by late freezes. In Iowa, snow fell across most or all of the state on April 29th, May 3rd, and May 15th. The second of these storms produced snow over most of the Midwestern states on May 2nd-3rd including amounts of 1.2" at Des Moines, 1.7" at Kansas City, and 4.3" at North Platte. Many all-time May cold and snow records were set in 1907 and have not been broken since, including the latest date of the year on which at least an inch of snow has fallen at Des Moines (1.2" on the 3rd) and the latest date of any measurable snowfall at Des Moines (0.1" on the 15th). During the storm of the 15th an amazing 5" of snow fell at Rock Rapids in far northwestern Iowa.

The unusually cold temperatures that occurred during this event were unprecedented in many areas of the country east of the Rockies. At stations all the way from Montana and the Dakotas, through Iowa and Illinois and the Great Lakes Region, down into the southern plains of Oklahoma and Kansas, and east to Pennsylvania and Washington DC, April and May of 1907 still rank among the three coldest on record for each of those months. Fortunately the effects of the eruption and ash cloud began to moderate by June and were no longer detectable by the end of the summer, due to the relatively small magnitude of the eruption as compared to the much larger Tambora event of 1815.

Table 1

Volcano	Tambora	Ksudach	Mt. St. Helens
Year of eruption	1815	1907	1980
Explosivity Index (VEI)	7	5	5
Volume of ash ejected (km^3)	160	2.4	1.2

March is Flood Awareness Month in Iowa *by Jeff Zogg, Senior Hydrologist*

The Rebuild Iowa Office (RIO) and the National Weather Service (NWS) are working together to encourage flood awareness and safety for everyone in Iowa. This year, the NWS's National Flood Safety Awareness Week ran from March 15-19, in conjunction with Governor Culver's declaration of March as Flood Awareness Month in Iowa.

Why flood awareness? The answer is simple. Flooding is the #1 storm-related killer. It kills more people than tornadoes or lightning. Most of the fatalities occur when people drive or walk into flooded areas and then either drown or are swept away to their deaths. Flooding also takes many different forms, from river flooding to flash flooding to snow melt flooding; and occurs in any month of the year, any time of day and is a threat in almost any place.

But flooding doesn't happen very often. That's why it's important to know how to find important information, how to prepare for potential flooding, where to obtain flood insurance if it is required in your area and general safety tips to help keep you, your family and your property safe.

The NWS has many different ways to help you keep up with the latest flood warnings, watches and forecasts. One is NOAA Weather Radio which broadcasts flood watches and warnings. Information is also available on the Internet via the Advanced Hydrologic Prediction Service (AHPS), at http://www.weather.gov/ahps. AHPS also includes the latest flood warnings, watches and forecasts.

Hopefully, flooding will never affect you. But if it does, both the NWS and RIO want you to be prepared for whatever comes your way. For more information, visit the NWS flood safety awareness Web site at http://www.floodsafety.noaa.gov/. Also, visit the RIO flood awareness Web page at http://www.rio.iowa.gov/flood_awareness.html.

- ***Fun Fact: The largest hail stone to fall in the United States was 7 inches in diameter and fell in Aurora, Nebraska on June 22, 2003.***

2010 Cooperative Observer Length of Service Awards *by Brad Fillbach, Cooperative Program Manager*

Brad Mueller of Greenfield received a 5 year Certificate of Appreciation. Brad Fillbach, Hydrometeorological Technician at NWS Des Moines, presented Brad with his certificate.

Diane Ward of Gilman, Iowa received her 15 year Length of Service Award. Brad Fillbach, Hydrometeorological Technician at NWS Des Moines, presented Diane with her award.

Climatological Data for November 2009 to February 2010

Location	Month	Average Temp	Departure	Highest	Lowest	Rain / Snow	Departure
Des Moines	Nov	46.9°F	+9.0°F	75°F (8th)	26°F (30th)	1.3" / T	-0.8" / -4.5"
	Dec	22.7°F	-2.2°F	62°F (1st)	-6°F (10th)	2.83" / 28.2"	+1,50" / +20.5"
	Jan	16.7°F	-3.7°F	44°F (13th)	-17°F (2nd)	1.68" / 13.3"	+0.65" / +4.5"
	Feb	20.0°F	-6.6°F	35°F (4th, 28th)	-9°F (9th)	1.08" / 19.7"	-0.11" / +11.5"
Mason City	Nov	40.6°F	+7.8°F	69°F (8th)	19°F (27th)	0.51" / T	-1.45" / -5.0"
	Dec	16.4°F	-2.6°F	50°F (1st)	-8°F (10th)	3.02" / 21.7"	+1.94" / +13.7"
	Jan	9.9°F	-4.0°F	34°F (23rd)	-23°F (2nd)	0.71" / 5.4"	-0.27" / -5.7"
	Feb	13.4°F	-7.2°F	34°F (5th)	-14°F (11th)	1.13" / 15.4"	+0.21" / +9.2"
Waterloo	Nov	42.4°F	+7.3°F	71°F (7th, 8th)	21°F (5th, 27th)	0.61" / T	-1.49" / -4.8"
	Dec	18.8°F	-2.8°F	55°F (1st)	-12°F (11th)	3.19" / 27.3"	+2.08" / +19.8"
	Jan	12.2°F	-3.9°F	37°F (23rd)	-20°F (2nd)	0.84" / 7.8"	+0.00" / -0.4"
	Feb	16.3°F	-6.3°F	35°F (5th)	-14°F (11th)	1.00" / 16.2"	-0.05" / +8.9"
Ottumwa	Nov	45.6°F	+6.2°F	74°F (8th)	24°F (27th)	2.56" / M	+0.14" / M
	Dec	23.8°F	-2.8°F	59°F (1st)	-6°F (10th)	0.85" / M	-0.47" / M
	Jan	16.5°F	-5.5°F	42°F (13th, 23rd)	-15°F (2nd)	0.92" / M	-0.08" / M
	Feb	18.8°F	-9.1°F	35°F (1st)	-9°F (9th)	M / M	M / M

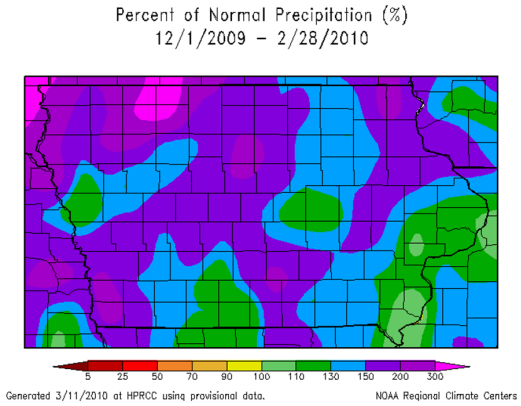
2009-2010 Winter Weather in Iowa *by Craig Cogil, Senior Meteorologist*

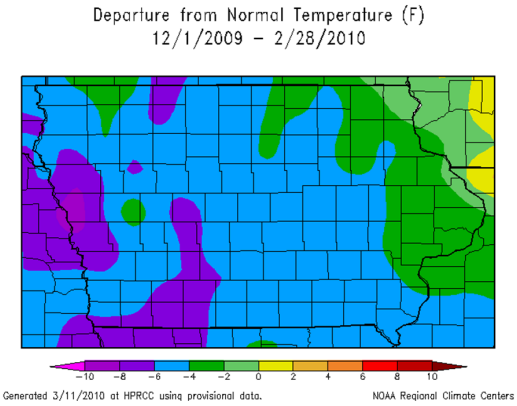
Temperatures:

Temperatures were below normal for the third winter in a row across Iowa. Much of this was due to the extensive snow cover over the state and persistent flow from Canada. The largest departures were in western Iowa where readings were about 6 to 8 degrees below normal while the northeast corner of the state saw departures of only about a degree below normal.

Precipitation:

Precipitation was widespread across the state during the winter months with the entire state seeing above normal amounts. The largest departures were in the far northwest corner of the state where precipitation was over 200% of normal with most of the state at 130% of normal or greater. The far southeast corner of the state saw precipitation near normal. Snowfall came often and in great quantities with the state as a whole seeing the most snow ever for a winter season. Snowfall was 45.1 inches averaged across the state. This is 23.3 inches greater than normal and is the new record for the three month period for snowfall on a statewide average.





Iowa Statewide Averages and Rankings for Temperature and Precipitation

Month	Temperature	Departure from Normal	Rainfall	Departure from Normal	Temperature Ranking	Precipitation Ranking
December 2009	19.8°F	-2.8°F	2.70"	+1.47"	31st Coolest	2nd Wettest
January 2010	13.7°F	-4.1°F	1.33"	+0.38"	33rd Coolest	37th Wettest
February 2010	17.5°F	-6.7°F	0.96"	-0.02"	26th Coolest	69th Driest
Winter 2009-10	17.0°F	-4.5°F	4.99"	+1.82"	19th Coolest	9th Wettest

Table above: statewide rankings for December are based upon 137 years of records, while January/February are based on the past 138 years. All values are preliminary. Winter months include December through February.

- *Fun Fact: The energy from one lightning flash could light a 100-watt light bulb for more than 3 months.*

Normal High/Low Temperatures

Location	Mar 1	Apr 1	May 1	Jun 1
Des Moines	41 / 23	55 / 35	67 / 46	78 / 57
Mason City	34 / 18	50 / 30	65 / 42	76 / 53
Waterloo	38 / 19	53 / 31	66 / 42	78 / 54
Ottumwa	42 / 25	56 / 36	67 / 48	78 / 59

Outlook for Spring through Summer of 2010 *by Miles Schumacher, Senior Meteorologist*

The winter of 2009-10 turned out to be colder than expected due to a combination of several factors. The El Niño developed about as expected; however the warm water pattern in the Pacific was shifted west of normal. Another factor was the state of the Atlantic Oscillation. The Atlantic Oscillation is a climatic pattern across the Atlantic Ocean which in the negative state, as was the case this past winter, results in colder weather for much of the central and eastern U.S. Although the past winter was not extremely cold, these two factors combined to produce persistent cold air over Iowa, which also resulted in significant snowfall.

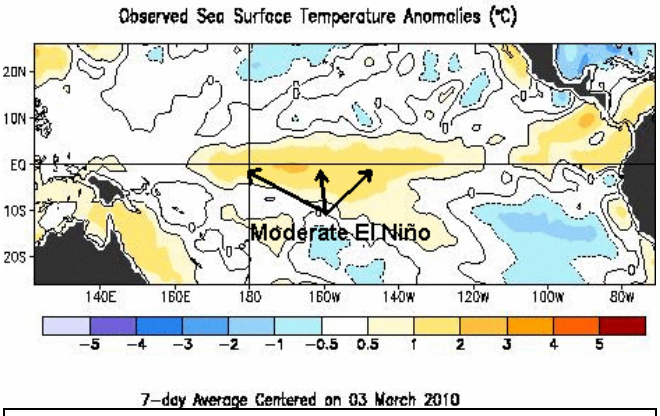


Figure 1: Sea surface temperature departure from normal in the equatorial Pacific.

As we head into the spring season, many have wondered if the cold will continue or if the cold winter means the summer will be warmer than normal. There is not a strong correlation between winter temperatures and the subsequent summer. The more significant factor will be the state of El Niño this summer. Currently the El Niño remains at moderate strength as depicted by warm water departures in the equatorial Pacific are shown in Figure 1. It appears it will remain a factor through the spring and will weaken gradually during the summer.

The atmospheric response to El Niño is not very strong during the spring and summer months, though there is some influence. During the spring season there is a tendency for drier than normal conditions for Iowa. As we move into the summer, the odds tip slightly toward cooler than normal weather and slightly drier than normal conditions. There are questions as to what the state of El Niño will be this summer. Various models are used as a guide and the overall consensus is that there will be at least a weak signal into the boreal summer. That would suggest there will be an influence on the weather in Iowa this summer, albeit a weak one. Figure 2 shows the central Pacific sea surface temperature departure (black line) and a series of forecasts (red and blue lines) through the time period centered on October 2010.

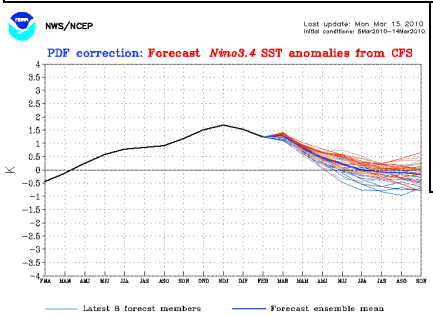


Figure 2. Sea surface temperature departure for the past year and projection into the fall of 2010. Departure in Kelvin is shown on the ordinate with time on the abscissa.

Although no two years are the same, one can look at weather patterns of the recent past to give some indications of near term weather trends in the future. This forecast is based on the best fit from several of the years that were similar to the late winter and spring so far. Considerations were also made for El Niño and other factors that control our weather. The effects of El Niño are likely to diminish with time as the current event has peaked and will decay slowly. As stated above, the effects during the spring are weak for temperature and tend toward drier weather overall. Looking at years similar to the recent past suggest temperatures are not likely to be much above or below normal for the months of April and May (Figure 3). There is a tendency for cooler than normal conditions to settle into areas north of Iowa, with some of the cooler air spilling into the state periodically. For that reason, we look for a slight negative departure over the northeast. Warming this spring is expected to be fairly rapid to the south of Iowa and some periods of above normal temperatures are expected to move into Iowa as we move through the spring, enough so that temperatures are expected to be slightly above normal on average over the southwest.

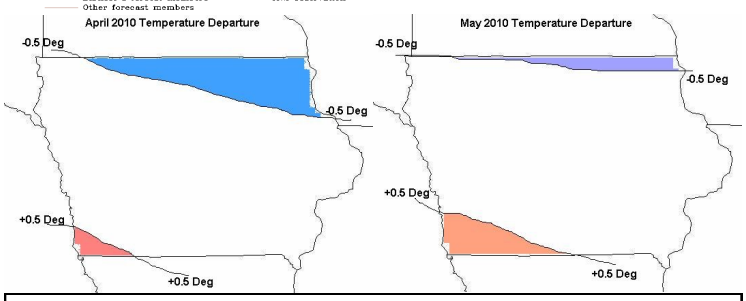


Figure 3: Mean temperature departure forecast for April (left) and May (right).

There is a somewhat stronger signal with spring precipitation. Though it does not look like the spring will be dry, the odds tip slightly toward the drier than normal side as the spring progresses. May is the most likely month to have sub-normal rainfall as the seasonal upper level high pressure begins to develop over the southern U.S. and steers storm systems to the north of Iowa (Figure 4).

As we move into the summer, again the influence of El Niño is expected to be minor both because there is not a great deal of influence by El Niño in the summer months, and also because it is expected to weaken considerably by this summer. Both the influence from El Niño and the analog years of recent past weather suggest the summer will be fairly close to normal, in stark

(Continued on page 9)

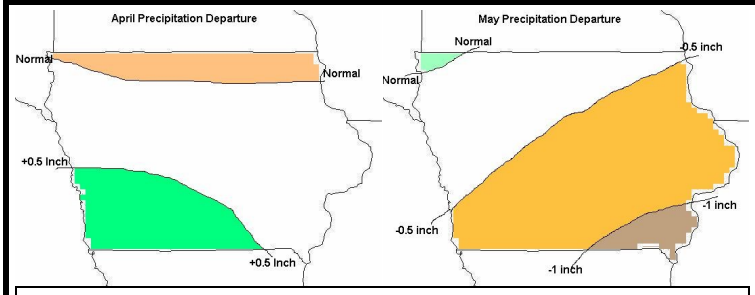


Figure 4: Mean precipitation departure forecast for April (left) and May (right).

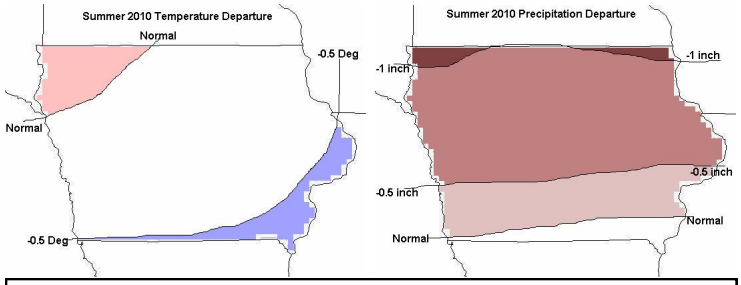


Figure 5: Mean temperature departure from normal forecast for the summer (left) and mean rainfall departure for the summer (right).

contrast to last summer. The temperature departure is not expected to be very large, on the order of a half degree. Precipitation for the summer is likely to lean toward the drier side. Although drier than normal conditions are expected for the summer, the departure is not likely to be all that significant. With mean rainfall expected to be normal to about 10% below normal, it is very unlikely that drought conditions will become established as antecedent soil conditions will be very moist and should carry through the summer given the mild temperatures expected (Figure 5).

These outlooks are based more heavily on statistics than many of the methods used by the Climate Prediction Center (http://www.cpc.ncep.noaa.gov/). The complete set of official forecasts from the Climate Prediction Center can be found on our website (http://www.weather.gov/climate/climate_prediction.php?wfo=dmx).

- ***Fun Fact: The channel of air through which lightning passes can be heated to 50,000 °F. This is hotter than the surface of the Sun.***

Spring Flood Outlooks: How Do We Make Them? *by Jeff Zogg, Senior Hydrologist*

By the time you receive this newsletter, this year's snow melt flood event will be winding down. You likely heard about our spring flood outlooks starting in late winter. For this spring they mentioned a "high risk of significant flooding" beginning with our first outlook in late January. We highlighted them on our Web site and many of our media partners referenced them as well. This article will explain how we make our spring flood outlooks. As an example, below is how we made our March 5, 2010 spring flood outlook. Since we issued three spring flood outlooks this season, we followed a similar process for each outlook and for each of our river forecast points.

We first note the current hydrologic conditions as of March 2, 2010. By current hydrologic conditions we mean factors such as river levels, soil moisture, frost depth and snow pack. We typically choose a date that is a few days before the outlook's issuance date because it takes time to run our river models, analyze their output and prepare the outlook.

We then run our river forecast model in two different modes. The first mode is the conditional simulation (CS). In CS mode, we ultimately run our model 60 times for each river forecast point, with one run for each of the 60 years before the current year. For each run, we initially set up our model with the current hydrologic conditions as of March 2, 2010. This is called initializing the model to the current hydrologic conditions. Then, for each of the 60 model runs, we run our model using observed temperature and precipitation for a past year, and for roughly the three month period following March 2. In the case of our March 5, 2010 outlook, we first initialize our model to the current hydrologic conditions as of March 2, 2010. Then, we run our model using observed temperature and precipitation from March 2, 1949 through May 7, 1949. Once our model finishes, we again initialize it to the current hydrologic conditions as of March 2, 2010. Then we run our model again, using observed temperature and precipitation from March 2, 1950 through May 7, 1950. We repeat this process for each year through 2008.

The second mode in which we run our river forecast model is the historical simulation (HS). HS mode is quite different from CS mode. For starters, in HS mode we initialize our model to the current hydrologic conditions as of March 2, 2010 only once. Then, we run our model continuously for a 60-year period, using observed temperature and precipitation data for each day in that 60-year period. In other words, we start our model on March 2, 1949 and run it non-stop through May 7, 2008, using observed temperature and precipitation.

After we run our model in CS and HS mode, we perform a separate analysis on each mode's results. For both CS and HS modes, our analyses reveal the single highest river level, or crest, observed in each of the March 2 through May 7 time periods, and for each of the 60 years from 1949 through 2008. In other words, our analyses of the CS and HS modes yield 60 crests for each mode. Then, for each mode, we rank the 60 crests from greatest to least and assign a corresponding probability of exceedance. In the case of the top crest, its rank is #1 and its probability of exceedance is the statistical formula 1/(60+1) = 1.6%. In the case of the bottom crest, its rank is #60 and its probability of exceedance is the formula 60/(60+1) = 98.4%. Again, we use separate lists for CS and HS.

(Continued on page 11)

Overview of the December 8-9, 2009 Blizzard *by Ken Podrazik, General Forecaster*

Drifts at the NWS Office in Johnston, IA. Aubry Wilkins present. Photo taken by Jim W. Lee.

The very active winter weather season began in early December when a major blizzard blasted across the state dropping anywhere from 8 to 16 inches of snow throughout much of Iowa (Figure 1). The storm began early Tuesday morning on December 8th, 2009 when light to moderate snowfall extended across central to southern Iowa. The snow slowly spread over the rest of the state and intensified throughout the afternoon and into the evening hours, significantly affecting the Des Moines Metro area rush hour Tuesday night (Figure 2). Northwest winds increased to 25 to 35 mph with gusts over 50 mph at times late Tuesday night into early Wednesday morning. There were even a couple of reports of wind gusts to 60 mph overnight Tuesday into Wednesday. These strong winds and heavy snow produced large drifts throughout the state, with several over 6 feet! Visibility became reduced significantly across much of Iowa late Tuesday night into Wednesday. Widespread whiteout conditions were observed from early Wednesday morning through the early afternoon over the central to north-central portions of the state (Figure 3). The heavy snow, large drifts, and reduced visibility caused several closures of roads and difficult travel (Figure 4). The very strong storm affected a great portion of the central United States. In fact, blizzard warnings were in effect from Tuesday night through Wednesday over eastern Nebraska, southern Minnesota, northern Missouri, the southern half of Wisconsin, far northeast Kansas, and the entire state of Iowa (Colored Orange in Figure 5). A temperature gradient across Iowa late Tuesday night was about 25 degrees from southeast to northwest Iowa. By Wednesday afternoon, temperatures throughout the state plummeted into the single digits to around 10 above, leading to wind chill values well below zero. The snow finally tapered off by Wednesday afternoon and high pressure began to build into the region Wednesday night. By Thursday, clear skies allowed the large swath of snow throughout much of the region to be seen (Figure 6).

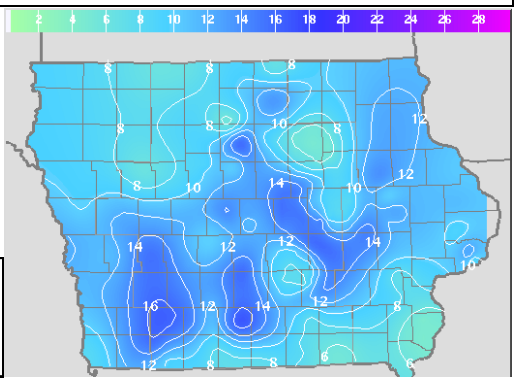


Figure 1: Snowfall totals by early Wednesday Dec 9th, 2009.

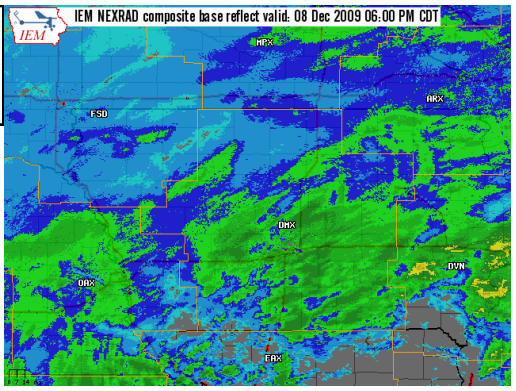


Figure 2: Radar Image 6pm Tuesday Dec 8th, 2009. Courtesy IEM.

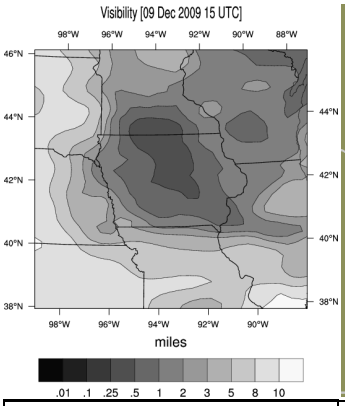


Figure 3: Observed Visibility Wednesday morning. Courtesy IEM.

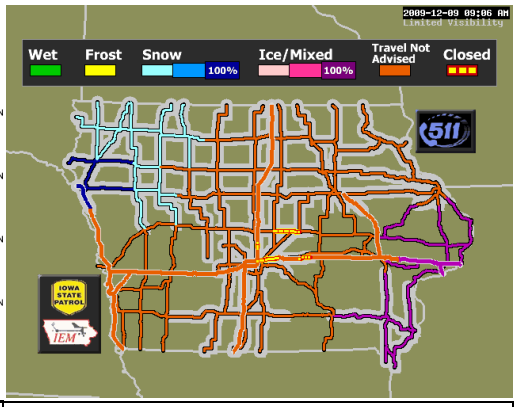


Figure 4: Road conditions Wednesday morning. Courtesy Iowa State Patrol and IEM.

Drifts in Grimes, IA. Photo taken by Ken Podrazik

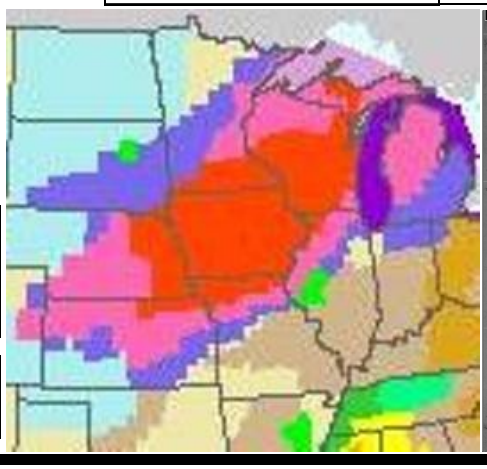


Figure 5 (left): Map of NWS homepage listed a wide area of blizzard warnings, winter storm warnings, winter weather advisories, and wind chill warnings across the majority of the central United States.

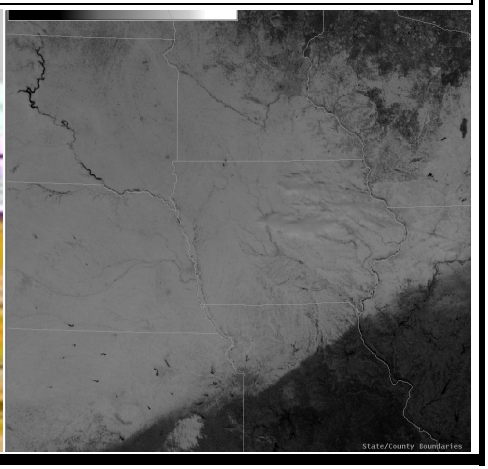


Figure 6 (right): Visible satellite image Friday December 10, 2009.

Spring Flood Outlooks *continued from page 9*

CS is termed as such because its results are weighted heavily toward this year's current hydrologic conditions. Thus, you can consider the CS probabilities as the actual risk for the coming three months of this year. HS is termed as such because its results are weighted much less by this year's current hydrologic conditions, and instead are weighted heavily by 60 years' worth of observed temperature and precipitation data. Since several decades' worth of observed temperature and precipitation data is, by definition, climatology, you can interpret the HS probabilities as the "normal" or "climatological" risk.

We then plot the data for both CS and HS on an exceedance probability graph. The x-axis contains the exceedance probabilities and the y-axis contains the crest values. See Figure 1 for the exceedance probability graph for the Cedar River at Waterloo. The CS data is plotted on a black line with filled-in triangles. The HS data is plotted on a blue line with filled in circles. The valid time period of this graph is from March 5, 2010 through May 7, 2010. One can use the graph to determine the probability of exceeding a given crest value. Or, one can determine a crest value corresponding to a given exceedance probability. For example, to determine the probability of exceeding 15 feet, read across from the value of 15 feet on the y-axis. Find where it intersects the CS and HS plots, then drop down to the x-axis to determine the corresponding probabilities. In this example, the CS probability is 73% and the HS exceedance probability is 18%.

If the CS probabilities are greater than the HS probabilities, then our river forecast model is telling us that the actual risk of flooding this year is greater than normal. In the above example, this year's risk of flooding is 73%, compared to the normal risk of 18%. In other words, this year's risk of flooding is 55% greater than normal.

Although these outlooks are most popular from late winter into the spring snow melt season, we do update them year-round and around the first of each month. Just like our spring flood outlook, each updated monthly outlook covers the coming three months. You can use these outlooks to determine the risk of flooding at your river forecast points of interest. You can find the probability of exceedance information on our Web site (www.weather.gov/desmoines). In the left hand menu, use the Rivers & Lakes link to call up information for your desired river forecast point. Click on the tab named "Chance of Exceeding Levels During Entire Period."

For more information, or if you have questions, feel free to contact me at jeff.zogg@noaa.gov.

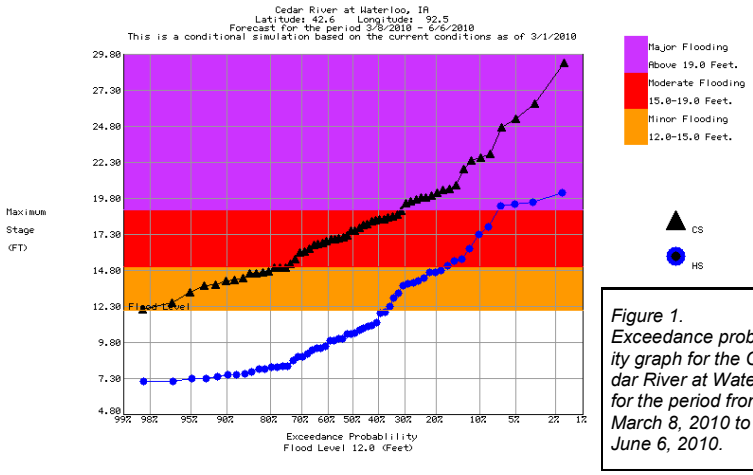


Figure 1. Exceedance probability graph for the Cedar River at Waterloo for the period from March 8, 2010 to June 6, 2010.

Severe Weather Awareness Week: April 5-9 *by Aubry Wilkins, Meteorologist Intern*

As winter finally draws to a close, it can only mean one thing: spring is right around the corner. And with spring comes severe weather. To help prepare Iowans for the upcoming severe weather season, Iowa Homeland Security and Emergency Management and the National Weather Service have declared the week of April 5-9, 2010 as Severe Weather Awareness Week. Severe Weather Awareness Week is an annual event which reminds Iowans that severe weather is a part of living in Iowa, and that understanding the risks and how to respond to them saves lives.

Topics covered this year during Severe Weather Awareness Week include: flash flooding, receiving warnings, tornadoes, severe thunderstorms and family preparedness. The National Weather Service will issue informative public information statements each day about the daily topic. This year, Severe Weather Awareness Week is getting a fresh look, with additional information posted on our website at: www.weather.gov/desmoines.

The highlight of the week will be the statewide tornado drill on Wednesday April 7, 2010. The drill will begin around 10:00 a.m. and conclude by 11:00 a.m. for all 99 counties in Iowa. All five National Weather Service offices which serve Iowa will participate in the drill.

Additional information about Severe Weather Awareness Week and links to preparedness material and educational material regarding severe weather can be found at: www.weather.gov/desmoines. Another excellent source of information can be found at the BeReadyIowa.org website: www.BeReadyIowa.org.

Media coverage is vital to the success of Severe Weather Awareness Week and will be greatly appreciated. Please contact Jeff Johnson at the National Weather Service by telephone at (515) 270-4501 or by e-mail at jeff.johnson@noaa.gov to schedule a flood safety and/or severe weather preparedness interview, or to partner in preparedness activities or productions.

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Central Iowa
The Weather Whisper

Editors:
Ben Moyer
Ken Podrazik

NWS Continues Call for Flood Impact Photos *by Brad Small, Senior Meteorologist, and Ken Podrazik, General Forecaster*

In the fall of 2009, the National Weather Service (NWS) in Des Moines began a very ambitious project hoping to document impacts from flooding that have affected our 47 river forecast points as well as other larger streams in central Iowa. The goal of the project is to gather detailed flooding effects from as many locations as possible and correlate those impacts with archived river stages. This information will then be included in our Flood Warnings and Flood Statements giving our users guidelines regarding what infrastructure will be affected when water levels reach certain heights. Impacts include water threatening or inundating roads, farmland, buildings, or bridges.

We have received several great photos already with this project, but we are still missing many impacts along forecast points within central Iowa. If you have any photos taken during recent flood events (such as 2008 and this year's flood from snowmelt), the NWS would greatly appreciate receiving a copy of those to augment our project. The photos should detail specific impacts such as when flooding covers a bridge or road, or is affecting buildings or a significant amount of farmland. In addition, please provide the name of the river or creek, the date and approximate time the photo was taken. Other information such as building or street names is greatly appreciated. Any pictures within the past five years from other flooding events would be extremely helpful. An example is provided below. A map of these locations can be found by visiting our Advanced Hydrologic Prediction Service.

Please submit pictures via e-mail to dmx.spotter@noaa.gov with the subject titled 'Impact Flooding Pictures' or via hard copy to our office at:

National Weather Service
Impact Statement Project
9607 NW Beaver Dr.
Johnston, IA 50131

Des Moines River and tributaries (specifically outside Polk County)	**Cedar River and tributaries**
Raccoon River	Winnebago River
North Raccoon River	Shell Rock River
Middle Raccoon River	Beaver Creek
South Raccoon River	Blackhawk Creek
East Fork Des Moines River	West Fork Cedar River
Boone River	**Iowa River and tributaries**
Beaver Creek	South Fork Iowa River
Walnut Creek	**South Skunk River and tributaries**
Fourmile Creek	Squaw Creek
North River	Indian Creek
South River	**Chariton River and tributaries**
Cedar Creek	South Fork Chariton River
White Breast Creek	**Thompson River**
English Creek	**East Fork 102 River**

Body of Water: Iowa River
Location: Rowan Gage site on 200th Street in Rowan, IA
Date: March 16, 2010
Time: Approximately 900am CDT