

Minnesota WeatherTalk Newsletter for Friday, January 1, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate
Subject: Minnesota WeatherTalk Newsletter for Friday, January 1, 2010

Headlines:

- Preliminary climate summary for December 2009
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 1st
- Past weather features
- Auld Lang Syne
- Outlook

Topic: Preliminary Climate Summary for December 2009

Mean December temperatures were generally 1 to 2 degrees F cooler than normal for most observers in the state. Extremes for the month ranged from 52 degrees F at Marshall on December 1st to -23 degrees F at Orr on the 12th. Minnesota reported the coldest temperature in the 48 contiguous states on five days during the month.

Nearly all observers in the state reported above normal December precipitation, mostly thanks to the winter storms and blizzards on the 8th and 9th and again on the 24th and 25th. Many communities reported three to four times normal December precipitation. Winnebago with 3.05 inches recorded the 2nd wettest December in history, while Lambertton with 3.76 inches also reported their 2nd wettest December in history. Browns Valley in Traverse County reported their wettest December in history with 1.98 inches. Snowfall amounts were well above normal as well. Many climate observers reported over 20 inches. Worthington reported a record amount of snow for December with 34.6 inches, while Fairmont and Lambertton also reported a new record monthly total with 36.3 inches.

The blizzard on December 8-9 closed highways and schools in many southeastern communities with winds gusting to 45-50 mph. Similarly the blizzard of December 24-25 closed roads in northeastern communities with winds of 50-55 mph and zero visibility.

Weekly Weather Potpourri:

For the second consecutive week significant snowfall occurred across Scotland and England. Portions of the Midlands and Wales were getting doses of snowfall on Tuesday and Wednesday of this week, following the 4 to 8 inch amounts that occurred in eastern and northern sections of England. Some airports had to close for a period of time.

Tropical Storm Laurence struck NW Australia last week and produced the wettest December in eleven years for Dawin, where as much as 16 inches of rainfall was recorded. The storm also produced wind gusts of 58 mph.

A cold snap and succession of snow storms affected travel across Northern Europe for the Christmas holiday last week. Heavy snow forced airports to close for a time in France, Germany, Belgium, and the Netherlands. Severe cold was blamed for 29 deaths in Poland as temperatures fell below 0 F there.

MPR Listener Question: What do you think was the most unusual Minnesota weather event in 2009?

Answer: Despite the March blizzards, the prolonged flood fight on the Red River, the 5th consecutive year with summer drought in the state, and the recent very snowy Christmas, my nomination is the temperature variation observed on May 19, 2009 across the state. It was probably the all-time highest range in Minnesota temperatures at any point in time. At 4:00 pm on May 19th, Grantie Falls was reporting an air temperature of 100 degrees F with strong south winds, while at the same time the coastal station at Grand Marais along Lake Superior was reporting an air temperature of 34 degrees F, with light easterly winds off the lake. This 66 degrees F temperature difference is probably a record statewide for any point in our history.

Almanac for January 1st:

The average MSP high temperature for this date is 23 degrees F (plus or minus 13 degrees standard deviation), while the average low is 7 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for January 1st:

MSP weather records for this date include: highest daily maximum temperature of 48 degrees F in 1897; lowest daily maximum temperature of -12 degrees F in 1974; lowest daily minimum temperature of -30 degrees F in 1974; highest daily minimum temperature of 42 degrees F in 1897; record precipitation of 0.47 inches in 1891 and

record snowfall of 4.4 inches in 1911. Maximum snow depth has been 20 inches in 1969.

Average dew point for January 1st is 8 degrees F, with a maximum of 36 degrees F in 1950 and a minimum of -38 degrees F in 1974.

All-time state records for January 1st:

Scanning the state climatic data base: the all-time high for this date is 56 degrees F at Luverne (Rock County) in 1998; the all-time low is -46 degrees F at St Vincent (Kittson County) in 1885. The all-time record precipitation amount for this date is 2.00 inches at Lawrence (Mille Lacs County) in 1897. The all-time record snowfall is 18.0 inches at Ada (Norman County) in 1921.

Past Weather Features:

January 1, 1885 at Saint Vincent (Kittson County) was the coldest New Years Day in Minnesota history with a morning low of -46 degrees F and a high of only -27 degrees F for a daily mean temperature of -36.5 F.

Very mild weather ushered in the New Year of 1897. Afternoon highs reached the mid 50s F in Caledonia (55 F), Winona (54 F), and Albert Lea (54 F). Amid the warm temperatures some observers reported significant rainfalls. Campbell reported 1.17 inches while New London reported an inch of rainfall.

1998 is remembered as the warmest New Years Day in modern times. Temperatures were in the 50s F under sunny skies across southern Minnesota counties and with the absence of snow cover many golf courses were open.

Words of the Week: Auld Lang Syne

The Scottish words of British poet Robert Burns are said to translate to "for times gone by" and I salute all MPR listeners and Minnesota WeatherTalk readers who have put up with me for one more year. I hope the weather has challenged you at times, as it has me. Besides providing us with something to talk about, it is one of the features of living on Earth that helps us build endurance and character, two attributes we need.

Outlook:

Generally cold and dry for New Years Day and into the weekend. Many daytime highs will only reach the single digits or teens. Some moderation in temperature by the middle of next week.

Further Information:

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For access to other information resources go to

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Minnesota WeatherTalk Newsletter for Friday, January 8, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, January 8, 2010

Headlines:

- January Cold snap brings some new records to start 2010
- More snow
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 8th
- Past weather features
- Methods used in snow forecasting
- Outlook

Topic: January cold snap brings some record lows

The first five days of January brought extremely cold temperatures to parts of Minnesota, with several nights dropping below zero degrees F. Minnesota reported the coldest temperature among the 48 contiguous states in the USA on 5 of the first 7 days this month. In some cases the arctic air mass produced record-setting low temperatures. International Falls reported record lows on both the 2nd and 3rd with morning readings of -37 degrees F. They actually had five consecutive days with lows of -30 degrees F or colder. Grand Forks, ND reported record lows on the 1st and 2nd with -33 F and -35 F, respectively. On January 2nd they got no warmer than -17 degrees F which was a record cold maximum temperature for the date. Fargo-Moorhead also reported a record low on the 2nd with -33 degrees F. Others who reported record low temperatures over the first five days of the month included:

Marshall, MN -27 F on the 2nd
Pipestone, MN -32 F on the 2nd
Worthington, MN -31 F on the 2nd
Orr, MN -40 F on the 3rd
Littlefork, MN -39 F on both the 3rd and 4th
Crookston, MN -35 on the 2nd

Park Rapids, MN -38 F on the 2nd
Browns Valley, MN -36 F on the 2nd
Wadena, MN -36 F on the 2nd
Waseca, MN -30 F on the 4th
Olivia, MN -32 F on the 2nd

Topic: Snow cover continues to increase

Following the heavy snow storms of December, the persistently cold weather spell has preserved the snow cover around the region as little melting has taken place. Most areas have 8-12 inches of snow cover, while the north shore highlands along Lake Superior have 18 to 24 inches in many places. The deeper snow cover has stabilized frost depths in the soil which range from 6 to 18 inches.

A significant snow storm over January 6-7 added to the snow depths across southern Minnesota counties, especially those in the southwest. Many observers reported from 2 to 5 inches of snowfall from this storm. For some it was record-setting. Dawson reported a record-tying 6 inches for January 6th (tied with 1967), while Worthington and Pipestone reported a new record 6 inches for January 7th. Windom reported a record-tying 8.0 inches on the 7th (tied with 1967), while Browns Valley reported a new record 7.5 inches for the 7th.

Following the snow storm, strong northwest winds brought dangerous windchills of -35 to -40 degrees to many parts of the state. Schools were closed and many roads were blocked in southwestern Minnesota counties. Fortunately this spell of severe cold is expected to be relatively short-lived, moderating by Sunday.

Weekly Weather Potpourri:

Much of the eastern half of the USA has been in the grip of arctic cold through the first week of January 2010. Snow had fallen as far south as KY and TN, with some snow showers in AL and GA as well. Many freeze warnings had been issued for the Deep South, including the citrus areas of Florida. Temperatures fell into the teens F in portions of AR and TN.

The so-called El Nino climate signature (cool and wet winter) was in evidence across the southeastern states during the month of December, 2009. Besides the cool temperatures, according to NOAA all of the following locations reported a record-setting wet month of December: Mobile, AL (15.37"), Augusta, GA (8.97"), Columbus, GA (13.62"), Savannah, GA (10.71"), Charleston, SC (10.10"), Columbia, SC (9.31"), and Wilmington, NC (8.86'). In addition Tallahassee, FL (10.92"),

Pensacola, FL (13.75"), and Macon, GA (8.98") just missed setting records for December precipitation.

Many parts of western Europe have been in the grip of a cold and snowy weather pattern this month as well. Snow and ice, along with temperatures as cold as just 2 degrees F caused school closures and travel disruptions in England, Scotland and Wales this week. In France heavy snows closed a number of roads, while Poland and Norway were coping with an arctic air mass that brought many below zero F readings, including a -42 degrees F to the Norwegian town of Roeros. The homeless and poor were getting assistance from officials there.

Heavy snow in the Beijing area of China closed roads and caused flight delays and cancellations there this week. Nearly a foot of snow fell in Seoul, South Korea on Monday of this week paralyzing the city for a time. A satellite view of the snow is available from NASA-MODIS at...

<http://earthobservatory.nasa.gov/IOTD/view.php?id=42172>

MPR Listener Question: I am heading back to the Mt Everest base camp this winter and wondered about finding a snowfall forecast for the Himalayan region. Do you have any recommendations?

Answer: Under the guidance of the World Meteorological Organization (WMO) the Beijing Climate Center in China provides climate monitoring and seasonal climate prediction for much of Asia, including Nepal. You can view some of their graphical products for this winter at

http://cmdp.ncc.cma.gov.cn/pred/en_md.php

From their monthly and seasonal outlook products it appears that a dry but cold weather pattern is expected much of this month. Good luck in your expedition.

Almanac for January 8th:

The average MSP high temperature for this date is 23 degrees F (plus or minus 13 degrees standard deviation), while the average low is 5 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for January 8th:

MSP weather records for this date include: highest daily maximum temperature of 54 degrees F in 2003; lowest daily maximum temperature of -7 degrees F in 1887; lowest

daily minimum temperature of -30 degrees F in 1875; highest daily minimum temperature of 36 degrees F in 1880; record precipitation of 0.33 inches in 1875 and record snowfall of 2.5 inches in 1909. Maximum snow depth has been 18 inches in 1969.

Average dew point for January 8th is 5 degrees F, with a maximum of 36 degrees F in 2002 and a minimum of -33 degrees F in 1977.

All-time state records for January 8th:

Scanning the state climatic data base: the all-time high for this date is 60 degrees F at Fairmont (Martin County) and Winnebago (Faribault County) in 2003; the all-time low is -48 degrees F at Moorhead (Clay County) in 1887. The all-time record precipitation amount for this date is 1.14 inches at Tamarac Refuge (Becker County) in 1989. The all-time record snowfall is 17.0 inches at Isabella (Lake County) in 1969.

Past Weather Features:

January 7-9, 1873 brought a blizzard to Minnesota. The New Ulm observer reported a "violent snow storm" with winds up to 45 mph. Temperatures fell by more than 50 degrees F and huge drifts blocked railroads for days. Between 70-90 deaths were blamed on the storm.

In January of 1875 the first 25 days of the month all brought below zero F overnight temperatures to downtown St Paul. On 11 days the temperature never climbed above 0 F.

Although the first week of January 2010 has been a cold one it does not compare to that of 1887. The Signal Corps Office in downtown St Paul reported morning lows that ranged from -10 F to -42 degrees F, and five days when the afternoon high remained below 0 degrees F. In addition 22 inches of snow accumulated during January of 1887.

The warmest January 8th in Minnesota history occurred in 2003 when over 60 Minnesota communities reported daytime highs of 50 degrees F or greater. Such warmth caused citizens of the Twin Cities to abandon the downtown skywalk system and enjoy a walk outside at lunchtime.

Words of the Week: Lemo Technique, Magic Chart, Garcia Method, and Cook Method

These are all names given to procedures used by meteorologists to forecast snow amounts. They all utilize various attributes of upper air measurements (radiosondes) and tend to work differentially depending on geography and the character of the winter storm. In the Western Great Lakes Region forecasters will often use the Garcia Method which has been in play since the mid 1990s.

Outlook:

Cold, but sunny start to the weekend with continued below normal temperatures. Warming trend with more clouds on Sunday, as some daytime temperatures reach into the 20s F. Chance of light snowfall Sunday night into early Monday. Moderation in temperature next week as the thermometer remains mostly above 0 F. There will be a greater chances for snow as we approach next weekend.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, January 15, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate
Subject: Minnesota WeatherTalk Newsletter for Friday, January 15, 2010

Headlines:

- January Thaw
- Perspectives on water offered next week
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 15th
- Past weather features
- Mandatory Levels
- Outlook

Topic: A January Thaw

After enduring a very cold start to the month, temperatures moderated this week. 41 degrees F at Waskish, 36 degrees F at Roseau, Ely, and Marshall, even 36 degrees F at International Falls which had reported -38 F last week. The warmer temperatures softened up the snow and ice, allowing citizens to scrap roofs and sidewalks clean from earlier storms. A moderating temperature pattern appears to be in store for the rest of the month according to NOAA's Climate Prediction Center. Many daytime highs should reach the 20s and 30s F, while overnight lows remain in the single digits and teens. With a temperature inversion in place this week, mild, warm air aloft is passing over the snow laden landscape in Minnesota. While the air temperatures near the ground have warmed up nicely, they are even higher aloft as the National Weather Service upper air data (radiosondes) show temperatures as high as the mid 50s F up at the 5000 foot level. You can read more about this at the NOAA-Chanhassen Forecast Office web site....

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=46523&source=0

Topic: Perspectives on Water in Our Changing World

I will be participating in a World Savvy Program held at Breck School (123 Ottawa Ave North) in Minneapolis on Wednesday, January 20, 2010 at 6:00 pm. This discussion on water's role in the Earth climate system, as well as sustainable water resource management will include Dr. Deb Swackhamer, Director of the University of Minnesota Water Resources Center, and Joan Nephew, Executive Director of the Freshwater Society. The panel will be moderated by MPR's Jeff Horwich. It is open to the public if you wish to attend.

Weekly Weather Potpourri:

The southeastern states were recovering from snow and freezing temperatures that had occurred last week and earlier this week. Key West had reached its 2nd coldest temperature of all-time with a reading of 42 degrees F on January 11th, while some panhandle communities of Florida had seen temperatures fall into the teens F. Some citrus, strawberry, and vegetable growers had protected their crops on several nights by using overhead irrigation to water them down. In west-central parts of Florida irrigation systems had run for up to 140 hours and completed depleted some shallow wells. As a consequence some areas saw the development of numerous sink holes. It will be sometime before the groundwater is replenished in those areas.

Arctic air regained its grip on parts of Alaska this week as Chandalar Lake reported -60 degrees F and Bettles reported -55 degrees F for overnight lows. The cold was expected to persist in interior Alaska. Daytime highs were only in the -30s to -40s F. Conversely, Tomtor, Siberia was experiencing a heat wave this week with temperatures in the -30s F. They usually see January temperatures of -50 to -60 degrees F.

A paper recently published in the Journal of the American Academy of Child and Adolescent Psychiatry documents that there is a substantial increase in prevalence of Serious Emotional Disturbances (SED) among residents who experienced Hurricane Katrina in 2005. The SED persisted among youth for periods of 18 to 27 months and was exhibited in depression, hyperactivity, eating disorders, inappropriate behaviors, and phobias. This study documents the need for mental health treatment resources following such disasters.

MPR Listener Question: I heard the National Weather Service Office in Chanhassen report this week that the temperature about 4000 ft over the Twin Cities was in the 50s F, but a strong inversion prevented us from seeing higher temperatures at the surface. Our high in the Twin Cities this week has been only about 30-31 degrees F. But how often do we see a temperature of 50 degrees F during January anyway?

Answer: Not very often. Going all the way back to 1871, the Twin Cities climate data show a January daytime high of 50 degrees F or greater only in the following years: 1900, 1908, 1931, 1942, 1944, 1981, and 2003. This is only 7 years out of the past 140 years, so a very low frequency of occurrence. The highest temperature ever in January in the Twin Cities was 59 degrees F on January 25, 1944.

MPR Listener Question: I have heard that Embarrass in northern St Louis County often reports the state's lowest temperature. How many state record lows have they reported?

Answer: Indeed, Embarrass has only been an official National Weather Service observation site since October of 1994 and they have already reported at least 15 new state record low temperatures including -57 degrees F on January 20, 1996. This surpasses the number of state record lows reported from International Falls, which has been reporting climate data since 1897. However, Tower also located in northern St Louis County boasts a record 47 state record low temperatures. It will take Embarrass quite a while to catch up with them.

Almanac for January 15th:

The average MSP high temperature for this date is 21 degrees F (plus or minus 14 degrees standard deviation), while the average low is 4 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for January 15th:

MSP weather records for this date include: highest daily maximum temperature of 43 degrees F in 1990; lowest daily maximum temperature of -20 degrees F in 1888; lowest daily minimum temperature of -37 degrees F in 1888; highest daily minimum temperature of 33 degrees F in 1973 and 1980; record precipitation of 0.45 inches in 1969 and record snowfall of 3.2 inches in 1953. Maximum snow depth has been 17 inches in 1970 and 1984.

Average dew point for January 15th is 4 degrees F, with a maximum of 36 degrees F in 1949 and a minimum of -39 degrees F in 1972.

All-time state records for January 15th:

Scanning the state climatic data base: the all-time high for this date is 57 degrees F at New Ulm (Brown County) in 1908 and at Winnebago (Faribault County) in 1914; the all-time low is -53 degrees F at Moose Lake (Carlton County) in 1972. The all-time record precipitation amount for this date is 2.43 inches at Little Fork (Koochiching

County) in 1950. The all-time record snowfall is 20.0 inches at Winsted (McLeod County) in 1982.

Past Weather Features:

Following the terrible Children's Blizzard of January 12, 1888, Minnesota was in the grip of arctic cold for several days. In the 10 days following the storm the US Signal Corps Office in St Paul reported overnight lows of -27 F, -43 F, -31 F, -21 F, -20 F, -20 F, -34 F, -46 F, -45 F, and -17 F. The only time the thermometer rose above zero during these 10 days was a brief spell to 4 degrees F on January 17th. Further north, Rush City reported morning lows that ranged from -44 F to -58 degrees F.

January 16, 1967 brought a blizzard and ice storm to many parts of the state. Winds gusted to 75 mph and blew snow into huge drifts, especially in northeastern counties. Several roads were closed and many motorists were stranded in the storm. It was one of the first times the state highway patrol rescued stranded motorists using snowmobiles.

Words of the Week: Mandatory Levels

Twice daily, at 12 hour intervals, the government weather services around the world probe the atmosphere with balloon launched instrumentation, called radiosondes. These airborne measurements of temperature, pressure, humidity and wind throughout the vertical profile of the atmosphere provide the input to a number of numerical forecast models. The design of the forecast models mandates numerical input from certain constant pressure levels in the atmosphere (e.g. 1000 mb, 850 mb, 700 mb, 500 mb, and others). These are called mandatory levels because they are required to make the forecast models work.

Radiosondes are generally designed to sample the atmosphere up to an elevation of approximately 19 miles, at which point the balloon may burst and the instrument package released will parachute back to the Earth's surface. The 19 mile elevation includes nearly 99 percent of the Earth's atmospheric mass. The radiosonde balloons are designed to ascend at a nearly constant rate of 300 meters/minute. Numerous precautions are taken to insure that high quality data are collected. For example if the balloon does not ascend to at least the 400 mb level (approximately 4.5 miles), then a second attempt is made with another balloon. Even if the balloon ascends properly to the maximum elevation, if it fails to transmit data for an interval of 10 minutes or longer, a second balloon is launched to try again. This reflects the importance of maintaining a consistent and comprehensive data flow to run the operational forecast models. The data from radiosondes around the United States are available over the Internet from a number of sites, including the UNISYS site...

http://weather.unisys.com/upper_air/index.html

Outlook:

Mostly sunny on Saturday with many high temperatures reaching the 30s F, perhaps even 40 F. More cloudiness on Sunday, but highs will still be in the 20s and 30s F. Continued moderation in temperature next week with a chance for snow again by late Tuesday or Wednesday.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, January 22, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate
Subject: Minnesota WeatherTalk Newsletter for Friday, January 22, 2010

Headlines:

- New Seasonal Climate Outlook
- Recent Warm Trend in January
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 22nd
- Past weather features
- "Mercury on the chute"
- Outlook

Topic: New Seasonal Climate Outlooks from NOAA-CPC

The NOAA-Climate Prediction Center released their update seasonal climate outlooks on Thursday (Jan 21) of this week. An El Nino related above normal temperature pattern is favored for Minnesota over the February through April period. Signs of this are already in play across the region during the second half of January, as temperatures have been averaging 8 to 14 degrees F above normal around the state since January 11th.

The new outlooks show equal chances for above or below normal precipitation across Minnesota during the February through April period. Heavy snows are forecasted for the Red River Valley locations in northwestern Minnesota for the last week of January, where they may get an additional 6-9 inches.

Topic: Warming Trend in January

After starting the first ten days of the month usually cold, record-setting in some cases (-40 F at Orr for example), the month of January has taken a turn at the warm side. After reporting new record lows of -37 degrees F on the 2nd and 3rd of the month, International Falls set a new daily maximum temperature record on the 15th with 39 degrees F, then a new record warm minimum temperature on the 16th with 27 degrees

F. They just missed tying a record high on the 16th with an afternoon reading of 43 degrees F. In addition, Bemidji set a new high temperature record with 42 degrees F on the 15th and Wheaton set a new record high with 45 degrees F on the 16th.

Weekly Weather Potpourri:

Environment Canada reports that Ontario recorded 29 tornadoes in 2009 tying the provincial record for most in one year (with 2006). Minnesota reported only 24 tornadoes in 2009 and that's the first time in the modern era of record keeping that Ontario, Canada has reported more tornadoes in one year than Minnesota.

Sunday through Thursday (Jan 17-21) this week brought heavy rains to parts of California. A number of climate observers reported total rainfall amounts ranging from 3 to 7 inches. Palm Springs received half of its annual rainfall amount in less than one week. The strength of this storm system was considerable as new low barometric pressure readings were established at both Fresno and Bakersfield where the barometers fell to 28.94 inches. With continued rains mudslides were anticipated in a number of the foothills communities of Southern California.

A new weather station installation at City Park Golf Course in the metro area of Denver, CO will provide the National Weather Service Office there with real-time data to help them better monitor and forecast the weather closer to the city center. Most other observers for the Weather Service are taken from airport locations or areas further from the city. This new station is a collaboration between the Denver Parks and Recreation Department and the Denver Museum of Nature and Science. This is reported in the current edition of Weatherwise magazine.

For centuries scientists recognized that most of the sun's energy was received near the equator and distributed as heat and water vapor toward the poles. This was thought to produce the differences observed in temperature conditions from place to place. Thus latitude was considered as the chief factor in temperature distribution. Perhaps the first person to geographically describe the temperature of Earth using isotherms (lines of equal value) was the German natural scientist Alexander von Humboldt (1769-1859). He published the first global map of isotherms in 1817, showing the mean annual temperature values as derived and interpolated from 58 climate stations. It was obviously a coarse map, however it did provoke among the scientific community the need to measure the climate at more locations. By 1852 a map of isotherms based on annual mean temperature was derived from 1100 climate stations. Over the last 160 years many depictions of the Earth's climate have been derived using lines of equal value for pressure, precipitation, sunshine and other climate measures. Humboldt's initial map of isotherms in 1817 is thought by many to represent the birth of cartographic representation of the Earth's climate.

MPR Listener Question: What have been the coldest estimated windchill conditions in Minnesota and when did they occur?

Answer: January 22, 1936 brought perhaps the worst windchill conditions ever recorded in Minnesota. From 3 am to 11 am that morning, windchill conditions in the Twin Cities area ranged from -70 to -75 degrees F, while rural areas of the state likely approached -80 or -85 degrees F. These conditions were brought on by a strong arctic high pressure system which swept in behind a blizzard on the 21st. Winds blew nearly constant at 25 to 30 mph for hours, as temperatures dropped through the -20s to the -30s and -40s F. In the Twin Cities area, many citizens did not even attempt to go to work. Transportation problems included frozen street car switches and rail cars that were frozen to the tracks. With wind and temperature conditions that would freeze exposed skin in less than 30 seconds, many observed that when people ventured outside that morning in the downtown areas, they ran from building to building to minimize their exposure.

Almanac for January 22nd:

The average MSP high temperature for this date is 23 degrees F (plus or minus 14 degrees standard deviation), while the average low is 5 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for January 22nd:

MSP weather records for this date include: highest daily maximum temperature of 53 degrees F in 1942; lowest daily maximum temperature of -17 degrees F in 1936; lowest daily minimum temperature of -34 degrees F in 1936; highest daily minimum temperature of 36 degrees F in 1900; record precipitation of 0.89 inches in 1982 and record snowfall of 3.2 inches in 1953. Maximum snow depth has been 17 inches in 1970 and 1984.

Average dew point for January 22nd is 5 degrees F, with a maximum of 38 degrees F in 1934 and a minimum of -38 degrees F in 1963.

All-time state records for January 22nd:

Scanning the state climatic data base: the all-time high for this date is 59 degrees F at Lynd (Lyon County) in 1900; the all-time low is -51 degrees F at Itasca State Park (Clearwater County) in 1922. The all-time record precipitation amount for this date is 2.53 inches at Austin (Mower County) in 1973. The all-time record snowfall is 22.0 inches at Lynd (Lyon County) in 1917.

Past Weather Features:

This week in 1900 brought a remarkable warm spell of weather. Many climate observers reported daytime highs in the 50s F. The Opjorden farm in Milan (Chippewa County) reported a daytime high of 61 degrees F on the 19th. But the month finished cold with a reading of -21 degrees F at the Opjorden farm on the 31st.

A heavy snow storm with high winds brought blizzard conditions to the state over January 21-22, 1917. Glencoe, Stillwater and Minneapolis reported 16 inches of new snow, while Redwood Falls and Lynd reported 22 inches. Tracy reported a storm total of 24 inches.

This week in 1936 brought one of the coldest stretches of weather in Minnesota history. Some northern locations like Baudette reported morning lows of -32 F or colder on 7 consecutive mornings. Many climate observers reported -40 degrees F or colder with terrible windchill conditions. As a result a number of Minnesota citizens died as a result of exposure.

Words of the Week: "Mercury on the chute"

This is an expression rarely used anymore, but in the first 50 years of the National Weather Service it was used to describe the onset of a cold wave, when temperatures fall rapidly and reach levels that are a threat to agriculture and commerce, and even human health. Often times when the mercury in the thermometer was dropping rapidly, meteorologists would report that the "mercury was on the chute." Residents of the Fargo-Moorhead area saw "mercury on the chute" this week when the thermometer hit 35 degrees on January 17, only to fall to just 5 degrees F on the 18th. That's relatively minor in a historical context, as daily temperatures have fallen as much as 60 to 70 degrees F in one day.

Outlook:

Mixed precipitation in store for the state this weekend and through Monday. The precipitation may make travel problematic on Saturday as a number of areas are affected by freezing rain and drizzle. Later in the weekend there will be more snow. Winds will pick up on Monday and it will be cooler. Relatively more sun next week, with generally cooler temperatures.

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Minnesota WeatherTalk Newsletter for Friday, January 29, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate
Subject: Minnesota WeatherTalk Newsletter for Friday, January 29, 2010

Headlines:

- Preliminary January Climate Summary
- Earliest climate journal
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 29th
- Past weather features
- GODAE
- Outlook

Topic: Preliminary January Climate Summary

After starting cold, moderating during the middle of the month, and finishing again on the cold side, most of the mean monthly temperatures reported by Minnesota climate observers are close to their historical averages. Extremes for the month ranged from -40 degrees F at Orr to 45 degrees F at Wheaton and Browns Valley. Minnesota climate observers reported the coldest temperature in the 48 contiguous states 8 times during the month. Temperatures as cold as the -30s F reached as far south as Pipestone, Worthington, and Waseca.

Most weather observers reported surplus precipitation during the month of January. Much of the precipitation came as a result of winter storms on the 6th and 7th, and again on the 22nd and 23rd. Following the winter storm earlier this week winds of 40 to 50 mph produced blizzard conditions in many areas, especially western counties where many roads had to be closed for a period of time. By the end of the month the water content of the snow cover in many areas was 3 to 4 inches and frost depths in the soil ranged from 12 to 24 inches.

Topic: Earliest Weather Journals

We are somewhat familiar with the pioneer weather records in Minnesota, which have been of great value to climatologists and historians who have reconstructed past events, episodes and patterns that have had significant impact on the state. Soldiers as well as pioneer settlers contributed measurements and diary observations to these early state climate records. Elsewhere some of these types of observations go even deeper into history.

Perhaps the earliest known weather journal is that of William Merle, an English clergyman who worked in Oxford and kept a daily journal of the weather there from 1337 to 1344. Prior to the use of any instruments, Merle wrote in Latin his daily observations of temperature (warm, hot, cool, cold), frosts, rain, snow, hail, thunderstorms, wind, and phenology of the landscape (flowering, leaf falls, etc). These written records were passed on to William Reed the Bishop of Chichester, who in 1386, bequeathed them to scholars of Merton College, Oxford. The original journal was a considerable stack of loose vellum sheets (probably from lambskin) and was not bound until 1634. The Merle records have been compared to those of modern times to assess seasonality and the frequency of rainfall. Merle also wrote two other documents about weather forecasting, however on this topic both Aristotle the Greek Philosopher and Virgil the Roman poet predate him by over 1000 years. Nevertheless, in scientific circles Merle's daily journal of weather observations is thought to be the earliest systematic written record.

Weekly Weather Potpourri:

For those who want to visit with our own National Weather Service Forecast Office personnel, they will be present at the Government on Display Weekend held at the Mall of America on Saturday and Sunday. You will find them in the Rotunda on the east end of the Mall. So if you have any weather questions about Minnesota it is a perfect opportunity to visit with an expert.

Minnesota is not the only place experiencing colder than normal conditions this week. Temperatures of -40 degrees F have been reported from parts of Mongolia. Combined with heavy winter storms this has been especially difficult on the livestock herds in that country. It is estimated that perhaps as many as a million head of livestock have perished due to weather. In addition parts of Turkey, Bulgaria, and Romania have been hit hard by cold and snow this week. Dozens of deaths have been reported due to exposure as temperatures have fallen into the -30s F.

Researchers are experimenting with methods to use mobile phone antennas to detect and estimate rainfall. Recently conducted in parts of western Europe, research has shown that an array of mobile phone antennas can be useful in detecting rainfall droplet size distribution and intensity of precipitation. With such data and it be

possible to better quantify the amount of precipitation and the area encompassed from a given storm system. How does the method work? The research team takes advantage of what is essentially a nuisance for mobile network operators -- the fact that raindrops interfere with microwave radio links between base stations, disrupting signal transmission. Data on the attenuation of signal strength is used to estimate the intensity of rainfall along the path between two antennas. In areas where the density of the mobile phone networks is great, the resolution of these rainfall estimates is superior to that provided by rain gauges or weather radar. This technique may be especially useful to those who need to rapidly forecast amounts of storm sewer runoff, or potential for erosive events. You can read more about this at...

<http://www.sciencedaily.com/releases/2010/01/100127111110.htm>

MPR Listener Question: What do you see for Groundhog Day next week?

Answer: The forecast models suggest a chance for snow in places on Groundhog Day (next Tue, Feb 2) with daytime temperatures in the teens and twenties F. Perhaps he won't see his shadow and winter will end early? Yea, right!

The climate statistics for cloud cover in Minnesota suggest that on Groundhog Day (Feb 2) an animal will cast a shadow 70 to 80 percent of the time (under clear to partly cloudy skies) and therefore go back into its burrow and consequently by tradition forecast six more weeks of winter weather. However, we have had some real extremes in weather on Groundhog Day.

The largest contrasts in temperature conditions on Groundhog Day occurred during the 1990s. In 1991 several communities reported daytime temperatures ranging from the upper 40s to mid 60s F and numerous records were set, including 48 F in the Twin Cities and a remarkable 66 F at Wheaton (Traverse County). Conversely in 1996 Minnesota marked one of its coldest days in history with morning lows of -50 degrees F or colder at ten different locations, and a new statewide record low of -60 degrees F at Tower, MN. Not many states can claim Groundhog Day as marking their coldest temperature in history.

In addition, the Groundhog Days of 1915 and 2004 were remarkable for snow. In 1915 an all day snow brought 15 to 20 inches across southern Minnesota, closing schools early and stranding some livestock in drifts that were over 4 feet high. In 2004, similarly a heavy snow storm dominated most of the Minnesota landscape on both the 1st and 2nd of February, bringing 7 to 12 inches of fresh snow to portions of central and southern Minnesota.

Almanac for January 29th:

The average MSP high temperature for this date is 22 degrees F (plus or minus 14 degrees standard deviation), while the average low is 4 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for January 29th:

MSP weather records for this date include: highest daily maximum temperature of 49 degrees F in 1931; lowest daily maximum temperature of -15 degrees F in 1951; lowest daily minimum temperature of -29 degrees F in 1951; highest daily minimum temperature of 34 degrees F in 1906; record precipitation of 0.52 inches in 2001 and record snowfall of 5.3 inches in 1967. Maximum snow depth has been 20 inches in 1969 and 1970.

Average dew point for January 29th is 3 degrees F, with a maximum of 36 degrees F in 1983 and a minimum of -38 degrees F in 1966.

All-time state records for January 29th:

Scanning the state climatic data base: the all-time high for this date is 60 degrees F at Canby (Yellow Medicine County) in 1931; the all-time low is -54 degrees F at Pokegama Dam (Itasca County) in 1899. The all-time record precipitation amount for this date is 1.84 inches at Windom (Cottonwood County) in 1909. The all-time record snowfall is 19.0 inches at Lutsen (Cook County) in 1996.

Past Weather Features:

This week in 1899 an arctic cold wave hit the state producing readings of -40 degrees F or colder at many northern Minnesota locations. Some observers reported six consecutive days of continuous below 0 F readings to end the month. Pokegama Dam reported a morning low of -54 degrees F, but "warmed up" to -12 degrees F by mid-afternoon!

January 29, 1977 with blowing snow, low visibility, daytime high temperatures ranging from -4 degrees F to only plus 2 degrees F, and windchill readings of -45 to -50 degrees F, the Saint Paul Winter Carnival activities were moved indoors for the first time.

A localized heavy snow storm affected areas along the north shore of Lake Superior on January 29, 1996. The storm dropped 16 inches at Wolf Ridge Environmental Learning Center near Finland, 15 inches at Grand Portage, 14 inches at Grand Marais, and 19 inches at Lutsen. Lutsen received over 46 inches of snowfall in January of 1996.

Words of the Week: GODAE

This is another scientific acronym which stands for Global Ocean Data Assimilation Experiment. Sponsored by the Office of Naval Research their web hosts a variety of near real time ocean data, including temperature, salinity, and velocity of currents. The data are used both for Naval Operations and for ocean research. You can visit their web site at...

<http://www.usgoda.org/>

Outlook:

Cool and sunny on Saturday, then increasing clouds on Sunday with a chance for snow later in the day and into Monday and Tuesday. Continued cool temperatures to mid-week, then a pronounced warming trend will be observed later in the week and towards next weekend. Perhaps the effect of El Nino finally showing up.

Further Information:

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<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

Minnesota WeatherTalk Newsletter for Friday, February 5, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, February 5, 2010

Headlines:

- February starts with snow in the south
- Recent trends in freezing rain and freezing drizzle
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 5th
- Past weather features
- Weeping wings
- Outlook

Topic: February starts with snow for some

Many southern areas of the state were hit by a storm that moved across the state over February 1st and 2nd. Snowfall amounts mostly ranged from 2 to 3 inches, though both Red Wing and Hastings reported over 4.5 inches. The new snow on top of somewhat icy sidewalks and streets produced more than a few accidents. Some northern locations were missed by the snow, but remained very much on the cold side. Embarrass reported the coldest temperature in the 48 contiguous states on February 1st with -26 degrees F, while International Falls had the coldest temperature on February 3rd with -22 degrees F.

Additional snow developed on Thursday night into Friday, delivering another 1-2 inches across much of the state, and ushering in a snowy period that is expected to last until February 10th. After that, the NOAA Climate Prediction Center models show a drier than normal pattern across Minnesota during the middle part of the month.

Topic: Recent trends in freezing rain and freezing drizzle

A recent listener question actually prompted me to do an analysis of these data. Historically, during the months of January and February the Twin Cities Metro Area

and southern Minnesota communities record freezing rain or freezing drizzle about one day every other year, or in some cases close to one day per year. However, since 1990 the frequency of occurrence for these frozen precipitation types seems to be increasing for January and February. For example, January and February of 1993, 1998, and 2006 brought 7 days with freezing rain or freezing drizzle to the Twin Cities. In 1999 there were 6 such days, while 2003 and 2005 brought 5 days with freezing rain or freezing drizzle. Further, so far in 2010, we have recorded 4 days with such weather in the Twin Cities area (including Thursday of this week). Of the past 20 years, only 1990, 2001, and 2002 brought no recorded January or February freezing rain or freezing drizzle type weather to the Twin Cities Metro Area. In fact the average frequency of such events since 2003 has been 4 days each year, or quadruple the historical frequency of occurrence.

This observation may be nothing more than random variation. On the other hand, it fits rather well with climatological evidence to suggest winters are getting warmer, dew points are getting higher, and the hydrologic result is a change in winter precipitation types. A higher frequency of freezing rain or freezing drizzle types of precipitation during Minnesota winters is not generally welcome because of the many problems it creates, most notably more traffic and pedestrian accidents.

Weekly Weather Potpourri:

In light of recent public comments about the various sources of temperature data used to assess climate change, Dr. Peter Stott from the United Kingdom Meteorological Office explains the three independent primary temperature data sets that are used to calculate year by year global temperature trends. In essence, though these data sets are independently derived from measurements, they depict very similar temperature trends for the Earth climate system. You can read more about this at...

<http://www.metoffice.com/climatechange/science/explained/explained5.html>

Tropical Cyclone Oli in the South Pacific Ocean was churning up the seas near Bora Bora and Tahiti with winds of over 150 mph on Wednesday and Thursday this week. These winds were producing wave heights of 20-25 feet. The storm was expected to travel poleward past 20 degrees south latitude and weaken substantially over the weekend.

The U.K. Met Office and the BBC report this week that Scotland has recorded its coldest December-January period since 1914 when detailed record keeping began. Scottish weather stations recorded a high frequency of overnight lows that were below 25 degrees F, and one reading was as cold as -8 degrees F. It was reported to be the coldest December-January period in Northern Ireland since 1962-1963 as well.

A strong winter storm was pounding the mid-Atlantic states on Friday (Feb 5) with a mixture of precipitation and high winds. Blizzard or near-blizzard conditions were expected to develop in parts of MD, DE, and NJ, along with the Washington, D.C. area. Snowfall forecasts ranged from 8-12 inches for Philadelphia to 16-24 inches for Washington, D.C. and parts of Virginia and Maryland.

MPR Listener Question: I know I am probably just dreaming of spring, but how many Minnesota communities have seen 70 degrees F in the month of February? Has the Twin Cities every made it?

Answer: Only three Minnesota climate stations have ever recorded 70 degrees F during the month of February. Pleasant Mound in Blue Earth County and Le Sueur reported 73 degrees F and 70 degrees F, respectively on February 26, 1896. Lake Wilson in Murray County reported 70 degrees F on February 23, 2000. That's it. The highest February temperature reported in the Twin Cities is 64 degrees F on February 26, 1896.

Almanac for February 5th:

The average MSP high temperature for this date is 23 degrees F (plus or minus 13 degrees standard deviation), while the average low is 6 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for February 5th:

MSP weather records for this date include: highest daily maximum temperature of 51 degrees F in 2005; lowest daily maximum temperature of -11 degrees F in 1895 and 1936; lowest daily minimum temperature of -27 degrees F in 1979; highest daily minimum temperature of 33 degrees F in 2005; record precipitation of 0.52 inches in 1908 and record snowfall of 7.5 inches in the same storm of 1908. Maximum snow depth has been 22 inches in 1967.

Average dew point for February 5th is 6 degrees F, with a maximum of 42 degrees F in 1946 and a minimum of -36 degrees F in 1979.

All-time state records for February 5th:

Scanning the state climatic data base: the all-time high for this date is 61 degrees F at Madison (Lac Qui Parle County) and Beardsley (Big Stone County) in 1963; the all-time low is -54 degrees F at Pokegama Dam (Itasca County) and Leech Lake Dam (Cass County) in 1895. The all-time record precipitation amount for this date is 2.35

inches at Lynd (Lyon County) in 1915. The all-time record snowfall is 24.0 inches also at Lynd (Lyon County) in 1915.

Past Weather Features:

Over February 5-7, 1857 a mid-winter warm up ushered in back to back snow storms. Ft Snelling received 11 inches of new snow on top of an already deep snow cover. Further north over a foot of snow arrived, pushing the snow depth to 3 feet or greater. An arctic air mass descended across the state following the passage of the cold front and temperatures fell to -35 degrees F at Ft Snelling and -56 degrees F near Fort Ripley.

On February 5, 1963 a welcome but short duration warm spell occurred across the state. Over 20 communities reported a daytime high of 50 degrees F or greater, many in the western portions of the state. Two days later daytime temperatures were back in the 20s F, but the warm up did melt the snow cover in many parts of the Minnesota landscape.

About 2:00 pm on the afternoon of February 4, 1984 a blizzard started in NW Minnesota and spread south through the Red River Valley and into the Minnesota River Valley. Though snowfall amounts were relatively light, the storm packed powerful winds that caused "white-out" conditions on many roads and highways. The relatively sudden onset of the storm caught many Minnesota citizens off guard. Winds of 50 mph were common and some gusts as high as 80 mph were recorded. Many motorists were stranded overnight from February 4th to the 5th. At least 16 deaths were blamed on the storm.

On Groundhog Day, (Feb 2) in 1996 Tower, MN reported the all-time state record low of -60 degrees F. Less than a week later, on February 8, 1996 they reported a high of 48 degrees F, a warm-up of 108 degrees F and their highest reading for that month.

Words of the Week: Weeping wing

These words refer to an ice protection system used on aircraft. Most typically a glycol-based chemical is released through small meshed orifices on the leading edge of the wings. The fluid flows along the airstream passing across the top and bottom of the wing and leaves a thin coat of fluid that protects against surface ice formation. This system provides both anti-icing and deicing protection for aircraft. It can also be used on windshields and propeller blades.

Outlook:

Near seasonal average temperature over the weekend with chances for snow. Snow off and on early next week, then drier and cooler by Wednesday and Thursday.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, February 12, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, February 12, 2010

Headlines:

- More February snow
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 12th
- Past weather features
- A jargon contest
- Outlook

Topic: Three-day snow storm

For many areas of Minnesota Sunday through Tuesday of this week brought a long duration snowfall. Some west-central and eastern sections of Minnesota saw 7 to 10 inches of new snow, while up to a foot of new snow was observed in western Wisconsin. It was the third snow storm of the month. Many observers now report above normal snowfall for February, which isn't even half over yet. Some of the monthly totals so far are:

11.3" at MSP Airport 12.9" at Waseca 11.9" at Morris 11.4" at Rochester
9.1" at St Cloud 9.7" at Fargo-Moorhead 8.5" at Mankato 18.7" at Chanhassen

Above normal snowfalls this month continues a February trend, as 7 of the first 10 Februarys in the new millennium have delivered above normal snowfall to many climate observers in the state.

Following the snow storm earlier in the week, Embarrass reported a low of -22 degrees on February 11th, coldest in the 48 contiguous states.

Weekly Weather Potpourri:

NOAA announced earlier this week the formation of a new Climate Services Division. The new division will bring climate research and climate services to a more local scale, working in partnership with Regional Climate Offices, as well as State Climate Offices. You can read all about the new NOAA Climate Services at their revised web site....

<http://www.climate.gov/>

The Mid-Atlantic states were hammered again by another heavy snow storm, the 2nd in less than a week. Some near-record or record setting amounts of snowfall were recorded. Here is a listing of the snow storm total for February 9-10, along with the monthly total snowfall for February (in parenthesis) for selected cities:

Baltimore, MD 19.5" (49.2") Atlantic City, NY 7.1" (28.4") Allentown, PA 17.8" (27.7") Philadelphia, PA 15.3" (44.4")
Washington, D.C. National Airport 10.8" (31.9") Washington, D.C. Dulles Airport 9.3" (45.7")

Many businesses and schools were closed down as a result of this storm.

On Friday (Feb 12) of this week many southern and southeastern states were dealing with a snow storm. Dallas-Ft Worth reported over 11 inches of new snow, while parts of Louisiana had recorded up to six inches of snow. Some observers in Mississippi had reported 3 inches of snow by Friday morning, while observers in Mobile, Monroe, and Washington Counties in Alabama reported 1 to 4 inches. Forecasters in Georgia and Florida were calling for snow during the day Friday and into the evening as well.

Heavy seasonal snowfall helped produce two avalanche disasters this week, one in the high Salang Pass of Afghanistan and the other near a ski resort in Kasmir. The avalanche in Kasmir caused at least 17 deaths, all Indian soldiers and the one in Afghanistan caused at least 169 deaths. Both events took place at high elevations ranging from 9,000 to 11,000 feet.

MPR Listener Question: Has the Twin Cities snow season every ended in February? Some of us are getting tired of snow by the end of the month.

Answer: There is no official record of the snow season ending in February for the Twin Cities. It may have happened in the very mild winter of 1877-1878 when an estimated 6 inches of snow came in February, but then only a trace was reported for the rest of the spring. Other winters that have almost seen an end of the snow season in February were 1894-1895 and 1904-1905. February of 1895 brought 3.3 inches of snowfall to the Twin Cities, and March brought only 0.4 inches of snow to St Paul and

only 0.8 inches to Minneapolis, the last of which came on March 15th. There was no more snow for the rest of that spring. Similarly in 1905, February brought 9.3 inches of snow to the Twin Cities, then March brought only 1.0 inches, the last of which fell on March 14th. There was no more snow for the rest of the spring. I don't think that these unusual historical weather patterns will play out this year.

Almanac for February 12th:

The average MSP high temperature for this date is 26 degrees F (plus or minus 12 degrees standard deviation), while the average low is 9 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for February 12th:

MSP weather records for this date include: highest daily maximum temperature of 59 degrees F in 1990; lowest daily maximum temperature of -5 degrees F in 1908 and 1936; lowest daily minimum temperature of -30 degrees F in 1875; highest daily minimum temperature of 34 degrees F in 1908, 1928, and 1984; record precipitation of 0.42 inches in 1984 and record snowfall of 3.2 inches in the 1940 and 1965. Maximum snow depth has been 22 inches in 1979.

Average dew point for February 12th is 11 degrees F, with a maximum of 37 degrees F in 1928 and a minimum of -28 degrees F in 1967.

All-time state records for February 12th:

Scanning the state climatic data base: the all-time high for this date is 62 degrees F at Luverne (Rock County) and New Ulm (Brown County) in 1990; the all-time low is -50 degrees F at Roseau (Roseau County) and Winton (St Louis County) in 1914. The all-time record precipitation amount for this date is 2.60 inches at Bird Island (Renville County) in 1953. The all-time record snowfall is 17.0 inches also at Fairmont (Martin County) in 1965.

Past Weather Features:

During one of the coldest Februarys in Minnesota history, February 12, 1875 never reached 0 degrees F. During a stretch of 16 consecutive nights with below 0 F temperature readings St Paul struggled to reach a high of -5 degrees F after a morning low of -14 degrees F. Further north at Fort Ripley where they were in the midst of 44 consecutive nights of below 0 F temperature readings, the afternoon high for February 12, 1875 also reached -5 degrees F after bottoming out at -42 degrees F the previous day.

Another very cold February gripped the state in 1914. The morning of February 12th brought -50 degrees F to Roseau and Winton, but temperatures were -40 degrees F or colder at eight other locations as well. Again mid-February brought a string of consecutive mornings with below 0 F readings.

A heavy snow storm across southern Minnesota and northern Iowa over February 11-12, 1965 closed highways and schools. The storm dumped 17 inches at Fairmont, 14 inches at Faribault and Winona, 13 inches at Waseca, and 9 inches at New Ulm. Council Bluffs, Iowa reported a record 19 inches of snow. Further north, Two Harbors was in the middle of a snowy February which brought 22 inches of new snow and left them with 4 feet of snow on the ground.

February 12, 1990 was sunny and warm. Three Minnesota communities reported daytime temperature of 60 degrees F or greater and dozens of others were well into the 50s F. It was a welcome relief from winter.

Words of the Week: A jargon contest

Over the years I have heard many complaints about the snow and ice that builds up in the wheel wells of cars, sometimes to the extent that it impedes the steering or causes the tires to make terrible noises. When these frozen masses dislodge they can cause hazards for other cars trying to avoid them. Some people refer to this nuisance mass of frozen water as snow boogers, car crap, or fenderburgs. I would like to ask MPR listeners and Minnesota WeatherTalk Newsletter readers to suggest a name for these troublesome icy masses. Please send me your suggestions and I will pick out some of the best ones.

Outlook:

Cooler than normal temperatures are expected to persist for sometime, perhaps for the balance of the month. There will be a chance for snow over the weekend, especially in western and southern counties. Amounts may range from 1 to 3 inches. Saturday night will bring stronger winds which will likely lead to blowing and drifting snow in many areas through Sunday. Continued cooler than normal next week, but generally a dry pattern with little additional snowfall.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, February 19, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, February 19, 2010

Headlines:

- Upholding our reputation
- Ships' weather logs valuable
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 19th
- Past weather features
- A jargon contest continues
- Outlook

Topic: Upholding our reputation for cold

Even though most climate observers in the state are reporting average February temperatures that differ little from historical normals, Minnesota has reported the coldest temperature in the 48 contiguous states 6 times this month, bottoming out with -26 degrees F at Embarrass on the 1st of the month. Among other states, Montana has reported the coldest temperature 4 times. Further north in Canada it has been quite cold. Winnipeg has ranged from 25 degrees F to -25 degrees F this month, while in arctic latitudes at Eureka (80 degrees N. latitude) they have reported temperatures of -40 degrees F or colder 6 times so far in February.

Topic: Value of Ships' Log-books to Climate Reconstructions

In recent decades climatologists have given more attention to 17th, 18th, and 19th century ship log-books to characterize climates of the past, and to analyze weather types, storm trajectories and frequencies of different weather conditions. It was common practice for ships' captains and masters to routinely log their position and weather conditions at noon each day, and sometimes several times per day associated with watch changes on deck.

The Naval Instruction Manual published by the British Admiralty in 1731 was one of the first publications to suggest standards for ship observations of the weather. These observations often included the date, time of day, the ships' position, notes on wind conditions, state of the sea, sky conditions, visibility, and precipitation. Log-books and journals from as far back as 1678 have been reviewed by climatologists to reconstruct weather patterns along major ocean routes and even to detect El Nino events in the Pacific Ocean (particularly when sea surface water temperatures were also taken). Because ships' captains as a breed had such high respect for the weather, it is not surprising that they were keen observers and recorded their observations diligently and with common notations and codes.

I suspect that even today the conversations in restaurants, bars, and pubs of the various ports around the world are laced with weather stories, observations and interpretations about what's happening in the world of weather on the seas.

Weekly Weather Potpourri:

Tropical Cyclone Gelane was churning this week in the Southern Indian Ocean northeast of La Reunion Island. It was producing sustained winds of 140 mph with gust to over 160 mph, but was expected to weaken starting on Sunday without striking La Reunion. Maximum wave heights were approaching 30 feet.

The New Orleans/Baton Rouge Office of the National Weather Service posted a 136-year climatology on their web site for the annual Mardi Gras celebration in New Orleans. You can read about it at....

<http://www.srh.noaa.gov/lix/?n=mardigras>

New Seasonal Climate Outlooks released by the NOAA Climate Prediction Center for the period of March through May indicate a trend toward above normal temperatures in NC and NE sections of Minnesota. Equal chances of warmer or cooler than normal temperature patterns are indicated for other areas of the state. In addition the CPC meteorologists indicate that there are equal chances that March, April, May will be wetter or drier than normal.

According to the NOAA-North-Central River Forecast Center revised spring flood outlooks (expected to be elevated risks this spring) will be released and discussed this Friday (Feb 19) around 11:00 am in the Twin Cities and in Fargo-Moorhead. If you want to pick up on more details for specific Minnesota watersheds you can use the NOAA-NCRFC web site at....

<http://www.crh.noaa.gov/ncrfc/?n=sproutlookoffseason>

An atmospheric scientist from University of Missouri is study the effects of climate change on the frequency and duration of blocking high pressure systems across the North American Continent. Models suggest that the frequency of blocking highs may increase in the future, and that they may be longer lasting. This could affect the persistence of storminess in some regions. You can read more about this study at...

<http://www.sciencedaily.com/releases/2010/02/100218125535.htm>

On the humorous side, an Australian weather presenter doing the breakfast forecast over television this week was attacked by a pesky pelican. He completely lost his composure. You can see it at...

<http://news.bbc.co.uk/2/hi/asia-pacific/8520027.stm>

MPR Listener Question: What is the deepest frost depth recorded in Minnesota soils during the winter?

Answer: I cannot give you a definitive answer because of the relative scarcity of data on soil frost depths. Much of the historical data in Minnesota is derived from frost tube measurements which typically record depths to 5 feet, but not beyond.

There is a report from the weather observer in Brainerd, MN during January of 1918 which gives a frost depth of 91 inches (7 ft 8 in) in a coarse sandy soil. This is the deepest I can find in the climatological records. It occurred during a winter of very little snow cover and very cold December-January temperatures (about 10 degrees below normal). There have probably been deeper frost depths that have not been measured. By the way, current frost depths around the state generally range from 10 to 36 inches.

Almanac for February 19th:

The average MSP high temperature for this date is 27 degrees F (plus or minus 12 degrees standard deviation), while the average low is 10 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for February 19th:

MSP weather records for this date include: highest daily maximum temperature of 57 degrees F in 1981; lowest daily maximum temperature of -3 degrees F in 1929; lowest daily minimum temperature of -20 degrees F in 1929 and 1941; highest daily minimum temperature of 40 degrees F in 1930; record precipitation of 0.72 inches in

1952 and record snowfall of 8.3 inches also in the 1952. Maximum snow depth has been 30 inches in 1967.

Average dew point for February 19th is 12 degrees F, with a maximum of 46 degrees F in 1930 and a minimum of -31 degrees F in 1941.

All-time state records for February 19th:

Scanning the state climatic data base: the all-time high for this date is 68 degrees F at Winona (Winona County) in 1981; the all-time low is -52 degrees F at Baudette (Lake of the Woods County) in 1966. The all-time record precipitation amount for this date is 2.50 inches at Montevideo (Chippewa County) in 1984. The all-time record snowfall is 23.0 inches also at Luverne (Rock County) in 1962.

Past Weather Features:

A strong winter storm stuck the state over February 18-20, 1952. The storm produced thunder, lightning, sleet, freezing rain and heavy snows. An ice storm shut down parts of northern Iowa, while many southern and central Minnesota locations received heavy snows including 11.6" at MSP Airport, 13.6" at downtown St Paul Airport, 15" at Tracy and Wheaton, 18.5" at Bird Island, 16.3" at Little Falls, 22" at Milan, 11.3" at Pipestone, 16.7" at Willmar, and an incredible 30" at Marshall. Public schools were closed and many communities were isolated for a number of days. This storm contributed to an enormous snow season that produced devastating floods in the Minnesota River Valley during April of 1952.

Another strong winter storm struck NW Iowa and SW Minnesota over February 17-19, 1962. This storm brought thunder, lightning, along with freezing rain and heavy snow. Some NW Iowa observers reported over 20" of snow from this storm. In SW Minnesota, the observer at Luverne reported 23", Worthington reported 21.6", Tracy reported 11", and Pipestone reported 8.2 inches. The storm added to a record-setting February total snowfall at Worthington (40"), Luverne (37.5"), and Tracy (30.5").

This week in 1981 was marked by extraordinary warmth across southern Minnesota counties. Many observers reported several days with highs in the 60s F and overnight lows in the 30s F, values that are 20 to 30 degrees F above normal. Combined with bright sunshine these temperatures thawed frozen soils and some farmers were seen plowing fields and even planting crops by the last week of the month.

Words of the Week: Continuation of the jargon contest

Last week I solicited MPR listeners for suggestions about what to call the snow and ice that builds up in the wheel wells of cars, and sometimes impedes the steering or causes the tires to make terrible noises. I will accept suggestions for one more week and then announce a winner (who will be sent a signed copy of the Minnesota Weather Almanac). So far, there have been over two dozen submissions to this contest, although some I could never say on the air! Some of the more unique terms suggested so far include:

Carsicles
Divots
Klingons
Sludge nuggets
Road cookies
Car patties
Snocks
Snow fangs
Car dung

I will publish the full list in WeatherTalk next week, and declare a winner.

Outlook:

Near seasonal temperature under partly cloudy skies over the weekend. There will be chances for light snow in southern counties lasting through Monday. Generally dry next week with a very gradual warm up.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

Minnesota WeatherTalk Newsletter for Friday, February 26, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, February 26, 2010

Headlines:

- Preliminary February Climate Summary
- CoCoRaHS Training Available
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 26th
- Past weather features
- A jargon contest summary
- Outlook

Topic: Preliminary Climate Summary for February

Average monthly temperatures were near normal in some parts of northeastern Minnesota, but elsewhere they ranged from 1 to 4 degrees F colder than normal. The extremes for the state ranged from 42 degrees F at Forest Lake on the 17th to -27 degrees F at International Falls on the 24th. Minnesota reported the coldest temperature in the 48 contiguous states at least 10 times during the month.

Observers reported a great amount of variability in precipitation for the month. Some were well above normal, while others well below normal. Three snow storms brought significant amounts to the state. Some of those receiving above normal snowfall for the month included: Twin Cities 13.9", Rochester 13.9", Waseca 15.6", Chanhassen 18.6", Glenwood 12", Fairmont 17.1", Worthington 19.5", Browns Valley 16.5", and Wheaton 14.8 inches

Topic: CoCoRaHS Training Coming Up

The Community Collaborative Rain, Hail and Snow Network (<http://www.cocorahs.org/>) Minnesota Chapter will be holding training sessions for new observers. Two sessions this week include 6:30 to 8:30 pm Friday (Feb 26) at the Wick Science Building on the St Cloud State University Campus, and 10:00 am to

noon Saturday (Feb 27) in Maplewood at the Maplewood Fire Station #2. Observer training is provided jointly by the NOAA National Weather Service and Minnesota State Climatology Office. If you are interested, want to make a reservation, or have further questions you can call 952-368-2520. You can access daily reports from the Minnesota CoCoRaHS network by going to

<http://www.cocorahs.org/ViewData/StateDailyPrecipReports.aspx?state=MN>

Weekly Weather Potpourri:

The Met Office in the United Kingdom announced this week an effort to collaborate through the World Meteorological Organization in releasing a global temperature data set to the public for ongoing analysis of trends in means and extremes. The data set will contain not just monthly values of mean temperature, but daily values, and perhaps even hourly values. You can read more about this at....<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20100224b.html>

A recent paper published in the Journal of Geophysical Research-Atmospheres by Menne, Williams and Palecki of NOAA's National Climatic Data Center refutes the claims by Davey, Pielke Sr (2005) and Watts (2009) that the U.S. Historical Climate Network upward temperature data trends are heavily biased by faulty siting of instruments. Their analysis suggests this is not the case. Further that there may be a slight cooling bias in the daytime maximum temperatures of this data series. You can read the full article at

<http://www1.ncdc.noaa.gov/pub/data/ushcn/v2/monthly/menne-et-al2010.pdf>

Or if you prefer you can read some interpretation and commentary about this paper at the following web sites...

<http://www.skepticalscience.com/On-the-reliability-of-the-US-Surface-Temperature-Record.html>

<http://scienceblips.dailyradar.com/story/on-the-reliability-of-the-u-s-surface-temperature/>

Follow up to the email piracy story related to climate change and improper behavior by some climate scientists can be found at the RealClimate web site where climate scientists articulate their views and recent studies. There you will find Dr. Ben Santer's written responses to some accusations that appeared this winter in the British newspaper The Guardian. You might find some of these letters interesting. You can read more at...

<http://www.realclimate.org/index.php/archives/2010/02/close-encounters-of-the-absurd-kind/>

Another strong, slow-moving winter storm hit the northeastern states on Thursday (Feb 25) bringing snow and high winds to many states. In NY, VT, and NJ thousands of people were without power for a time. Snowfall amounts ranged from 3 to 8 inches in those states as many schools closed early. North of Philadelphia snowfall was expected to range from 6 to 14 inches on Thursday night and many schools were expected to be closed on Friday.

The NOAA National Weather Service and North-Central River Forecast Center (NCRFC) released an updated spring flood outlook at the end of last week. Large areas of the Red River and Minnesota River are expected to be at risk of moderate to major flooding this spring. The specific outlooks for various watersheds can be found at the following web site....

http://www.crh.noaa.gov/ncrfc/content/river_fcsts.php

MPR Listener Question: How do Heating Degree Days (daily mean temp below 65 F) for this season compare to normal values? It seems that since the very mild November, temperatures have been just a little bit either side of normal.

Answer: Since November 1st (beginning of the heating season) most climate observers report below normal accumulation of Heating Degree Days (HDD). This trend is heavily weighted by the extraordinary November 2009 we had which produced only about half the normal HDD. Anyway for the period from November 1, 2009 to February 24, 2010 some major cities in Minnesota show the following Heating Degree Day accumulations:

Twin Cities	_____	HDD Total 4822	_____	Departure -309	_____	Percent
Less Than Normal						6 pct
Duluth	_____	HDD Total 5571	_____	Departure -148	_____	Percent
Less Than Normal						3 pct
Rochester	_____	HDD Total 4992	_____	Departure -288	_____	Percent
Less Than Normal						5 pct
International Falls	_____	HDD Total 5838	_____	Departure -401	_____	Percent
Less Than Normal						6 pct

Almanac for February 26th:

The average MSP high temperature for this date is 30 degrees F (plus or minus 12 degrees standard deviation), while the average low is 13 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for February 26th:

MSP weather records for this date include: highest daily maximum temperature of 64 degrees F in 1896; lowest daily maximum temperature of -2 degrees F in 1919; lowest daily minimum temperature of -21 degrees F in 1897; highest daily minimum temperature of 41 degrees F in 1998 record precipitation of 0.83 inches in 1873 and record snowfall of 8.0 inches also in the 1873. Maximum snow depth has been 26 inches in 1962 and 1967.

Average dew point for February 26th is 15 degrees F, with a maximum of 46 degrees F in 2000 and a minimum of -22 degrees F in 1950.

All-time state records for February 19th:

Scanning the state climatic data base: the all-time high for this date is 73 degrees F at Pleasant Mound (Blue Earth County) in 1896; the all-time low is -49 degrees F at Pokegama Dam (Itasca County) in 1897. The all-time record precipitation amount for this date is 2.50 inches at Wannaska (Roseau County) in 1964. The all-time record snowfall is 16.1 inches at Red Lake (Beltrami County) in 1930.

Past Weather Features:

On February 26, 1873 a heavy snow storm crossed the state dropping up to 8 inches of fresh snow in St Paul. Aided by the snow cover an arctic front that invaded the state to begin the month of March brought extreme cold. Overnight minimum temperatures on March 3rd reached -24 degrees F in St Paul and -35 degrees F at Fort Ripley, some of their coldest early March readings ever.

On this date in 1896 strong south winds ushered in very warm air across southern Minnesota. Pleasant Mound in Blue Earth County hit 73 degrees F, the highest statewide temperature reading ever for the month of February. Le Sueur too hit 70 degrees F that day. Many other locations reached the high 60s F, including New Ulm and St Peter. A cold front, with strong northwest winds brought in polar air the next day, as temperatures fell by over 40 degrees F, concluding the month with highs only reaching 30s F.

The very next year, February 25-26 Minnesota was invaded by arctic high pressure and extremely cold temperatures. Five communities reported overnight lows of -40

degrees F or colder. Statewide record lows were set at Leech Lake on the 25th with -50 degrees F and at Pokegama Dam on the 26th with -49 degrees F. The trend of unusually cold weather continued that year well into the first half of March.

A very slow moving winter storm brought heavy snow to northeastern Minnesota over February 22-26, 2001. Duluth reported 19 inches, Grand Marais had over 21 inches, Lutsen Mountain reported 29 inches, Tower had 17 inches, Two Harbors reported 19 inches, and Wolf Ridge ELC near Finland received 23 inches. Good skiing and snowmobiling conditions were enjoyed well into March that year.

Words of the Week: Wrap-Up of the Jargon Contest

For the past two weeks I have solicited MPR listeners for suggestions about what to call the snow, ice, and grit that builds up in the wheel wells and around the fenders of cars. This "stuff" sometimes impedes the steering or causes the tires to make terrible noises. I am told that many years ago Dick Chapman on WCCO radio and Dave Moore on the Bedtime Nooz spoke about this stuff as well and contrived various names for it. This time around, I received over 50 suggestions about what to call this stuff. Some were not suitable for radio, so we'll have to exclude those. Our purpose was to find a term that was a suitable description for this "stuff" and that most broadcasters could easily pronounce on the air.

This week I asked a committee of colleagues (MPR meteorologists Craig Edwards and Paul Huttner, Dan Luna of the National Weather Service, colleagues at the DNR-State Climatology Office, colleagues at the University of Minnesota St Paul Campus, and broadcasters and newsroom staff at MPR) to vote on their favorite jargon terms. After summarizing the votes, I find that there is a four-way tie for first place:

carcicles, carnacles, fenderbergs, and fender fudge all received the same number of votes. I will be contacting those who submitted these terms and make arrangements to send them a prize.

I might add that several other jargon terms received significant votes, but did not emerge as winners.

Some of these terms were: snow clods, slushcicles, hubcicles, klingons, wheelwell willies, wheelwell squealers, wheeler squealers, road cookies, car patties, autobergs, carlactites, car goobers, snunk, snurds, icecretes, cryomites, Nowegian omlettes.

Outlook:

Generally partly cloudy with a warming trend over the weekend. Some chance for snow in eastern sections. Continued warming into next week. Daytime highs should reach the 30s F in most places and the start of March will be a dry one.

Further Information:

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For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

Minnesota WeatherTalk Newsletter for Friday, March 5, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, March 5, 2010

Headlines:

- Warmth at last
- Air Pollution Alert
- Climate and Art
- Weekly Weather Potpourri
- MPR listener question
- Almanac for March 5th
- Past weather features
- Upslope Thaw
- Outlook

Topic: Warmth at last....

Finally this week many observers in Minnesota reported their first temperature readings of 40 degrees F or higher since December 1st of last year. Areas with deeper snow cover (SW, WC, and NW) remained in the 30s F. Elsewhere there were many readings in the 40s F, including 44 F at Lake Kabetogama, Virginia, and Hibbing, 43 F at Orr, Crane Lake, Brainerd, Hinckley, Aitkin, Eveleth, and Winona, 42 F at Red Wing, Pokegama Dam and the Twin Cities, and 41 degrees F at Grand Rapids, Cook, and Isle. Even Embarrass hit 42 degrees F this week after not seeing a reading that high since November 25th. The alternating freeze/thaw cycles due to daytime and nighttime temperature fluctuations were helping to gradually discharge some of the snow cover around the state. Some snow water content measurements made this week showed a reduction of a quarter to half inch from what was measured two weeks ago. This is not significant enough to reduce the flood threat on most watersheds. This threat remains especially high on the Minnesota River and Red River of the North. Persistence of the current weather pattern would be helpful if it played out for the remainder of the month, but anymore substantial precipitation will worsen the flood threat in most places. You can still follow the hydrologic outlook for many Minnesota watersheds by going to the NOAA North-Central River Forecast Office web page at...

<http://www.crh.noaa.gov/ncrfc/>

Topic: Air Pollution Alert

The same persistent high pressure system that has brought moderating temperatures to Minnesota this week has also produced enough air stagnation that small particulates are accumulating in the air in sufficient quantity to lead to a health concern. Thus, the MPCA issued a Air Pollution Health Alert this week for Thursday through Saturday (Mar 6) for the metro areas of Rochester and the Twin Cities. The Air Quality Index (AQI) is expected to exceed 90 over this period of time, so those who suffer from respiratory or cardiovascular problems are cautioned to limit exposure and take it easy. Updates on the AQI are available at the PCA web site...

<http://aqi.pca.state.mn.us/>

Topic: Climate and Art

Climate definitely had an impact on the European Impressionist painters of the late 19th century, including Monet, Pissarro, and Renoir, among others. Curator Eliza Rathbone of the Phillips Collection, an art museum in Washington, D.C. studied the historical winter weather records of France from 1864 to 1893. She found that the most severe winters occurred in 1879-80 and 1890-91. This research helped her date some heretofore undated Impressionist paintings from the period. Further, some of the features of ice and snow so vividly depicted in famous paintings clearly date from these severe winters. The artists either painted from memory or in some cases actually set up their aisles and canvas in the harsh winter environment to paint outside. In the extreme winter of 1879-1880, Monet produced 17 ice floe paintings from his observations of the Seine River in France.

Weekly Weather Potpourri:

There is a good article in the current issue of the Minnesota Conservation Volunteer Magazine (pg 8-11) about the use of renewable energy to power the University of Minnesota-Morris campus. They are using both wind generated power and power from biomass gasification. Their self-sufficiency and much reduced carbon footprint are admirable characteristics. You can read more about it

www.morris.umn.edu/greencampus

The United Kingdom's Meteorological Office announced this week that preliminary data for December through February shows their country had its coldest winter since

1978-1979. Departures in mean daily temperature averaged about 4 degrees F colder than normal throughout the period, with overnight readings as low as -8 degrees F in the Highlands of northern Scotland.

NOAA highlights the mid-Atlantic winter storms and features a good discussion about distinguishing between weather and climate on their web page this week. The frequency of magnitude of winter storms hitting the Atlantic states has little to do with climate change and a good deal to do with the Arctic Oscillation. You can read more at...

http://www.noaa.gov/features/02_monitoring/index.html

Two articles that appeared in this week's Science magazine are worth a read. The first one written by researchers from the University of Alaska documents that the East Siberian Arctic Shelf is releasing larger amounts of methane than earlier thought. Methane is a powerful greenhouse gas, so this release as the permafrost continues to thaw and develop leaks may have important implications for climate models and climate change. You can read more at...

<http://www.sciencedaily.com/releases/2010/03/100304142240.htm>

The second article of interest in Science this week is from a study conducted by Harvard researchers. They found that the global glaciation that took place on Earth 716.5 million years ago was complete and even the tropical oceans were frozen over. Either the onset or termination of this glaciation was associated with widespread and massive volcanic activity according to the geologic records. You can read more at...

<http://www.sciencedaily.com/releases/2010/03/100304142228.htm>

MPR Listener Question: In your book you mention that March shows the largest historical temperature spread of any month in Minnesota, with a high of 88 degrees F at Montevideo on March 23, 1910 and a low of -50 degrees F at Pokegama Dam on March 2, 1897. But which day in March specifically shows the highest range in temperature here in the Twin Cities?

Answer: The largest absolute spread in March temperatures for the Twin Cities is associated with the 1st (59 F high in 1990 and -32 F low in 1962) and the 26th (81 F high in 2007, -10 F low in 1996, a 91 degrees F range. In terms of daytime temperatures on the 23rd of the month the range has been 83 F in 1910 and 10 F in 1965, and 73 degrees F range. In terms of overnight temperatures the largest spread in temperature is associated with the 4th (50 F in 1894 and -22 F in 1873) and the 11th (45 F in 1977 and -27 F in 1948).

Almanac for March 5th:

The average MSP high temperature for this date is 33 degrees F (plus or minus 11 degrees standard deviation), while the average low is 16 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for March 5th:

MSP weather records for this date include: highest daily maximum temperature of 72 degrees F in 2000; lowest daily maximum temperature of 8 degrees F in 1901; lowest daily minimum temperature of -14 degrees F in 1960; highest daily minimum temperature of 46 degrees F in 1983; record precipitation of 0.70 inches in 1961; and record snowfall of 11.0 inches in the 1915. Maximum snow depth has been 26 inches in 1962.

Average dew point for March 5th is 14 degrees F, with a maximum of 49 degrees F in 1983 and a minimum of -23 degrees F in 1960.

All-time state records for March 5th:

Scanning the state climatic data base: the all-time high for this date is 79 degrees F at Milan (Chippewa County) in 2000; the all-time low is -40 degrees F at Pokegama Dam (Itasca County) in 1890 and at Warroad (Roseau County) in 1943. The all-time record precipitation amount for this date is 3.00 inches at Lower Red Lake (Beltrami County) in 1896. The all-time record snowfall is 28.5 inches at Karlstad (Kittson County) in 1966.

Past Weather Features:

March 5, 1881 brought the first temperature reading of 40 degrees F at Ft Snelling since November 10, 1880, a period of 115 days. This was the "long winter" written about by Laura Ingalls Wilder. The thaw in March of 1881 brought flooding to the Minnesota River Valley.

March 5, 1890 brought a very cold morning to most of Minnesota, with Duluth being the warm spot thanks to the moderating influence of Lake Superior. Morning lows included -40 F at Pokegama Dam, -34 F at Leech Lake, -30 F at St Vincent, -21 F at Moorhead, -20 F at Ft Snelling, but just -6 F at the Duluth Harbor. The cold weather hung on deep into the spring that year as Pokegama Dam measured a morning low of -17 degrees F on April 1st.

Over March 2-5, 1966 a slow moving but powerful blizzard gripped central and northern Minnesota counties with howling winds and heavy snowfall. Many people were stranded in their cars. The state patrol used snowmobiles for the first time as rescue vehicles, though snowplows were used as well. The storm brought up to 3 inches of ice to the Duluth area causing multiple power outages. Four people died as a result of the storm. Snowfall totals were record-setting in some areas: Fosston reported 22.5", Warroad 20", Red Lake 22", Big Falls 21", International Falls 21.3", Wadena 29", Meadowlands 22", Karlstad 28.5", and Park Rapids 32.2 inches. Drifts up to 20 feet high blocked roads for up to 4 days. The heavy snowfall helped to set up April flooding on the Red River of the North and the upper reaches of the Mississippi River.

March 5, 2000 brought the warmest temperatures ever measured in Minnesota for so early in the year. The Twin Cities reported the earliest annual measurement of 70 F or higher with an afternoon reading of 72 degrees F. Other record highs that day included 71 F at Benson, 70 F at Canby, 75 F at Madison, 79 F at Milan (a state record), 74 F at Montevideo, 70 F at Wheaton, 75 F at Chaska, 70 F at Gaylord, 71 F at Hutchinson, 71 F at Luverne, 74 F at Redwood Falls and Marshall, 72 F at Windom, 73 F at New Ulm, and 70 F at Fairmont. There was virtually no snow on the ground in these places, so the bright sunshine really warmed up the ground.

Words of the Week: Upbank or Upslope Thaw

A thaw, or marked rise in temperature at positions higher than the surrounding landscape. This happens before the thaw takes place in the lower landscape positions, such as a valley, which may take more hours to show some signs of thaw. The inversion layer often keeps temperatures in lower landscape positions below the freezing mark well into the morning hours.

A feature of the thaw period this week around Minnesota, was the more rapid loss of snow cover on south or southwestern facing slopes. As the sun's elevation angle gets higher and days grow longer, now by about 17-19 minutes each week, the sun's thawing effect is greatly magnified.

Outlook:

Cloudy over the weekend with a chance for rain or snow showers on Saturday. Some areas could see quarter to half inch amounts. Drier on Monday and somewhat warmer towards the end of next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, March 12, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, March 12, 2010

Headlines:

- Rivers responding
- North Woods Warmth
- Weekly Weather Potpourri
- MPR listener question
- Almanac for March 12th
- Past weather features
- Outlook

Topic: Rivers responding to spring snow melt runoff

Temperatures for March have been averaging warmer than normal, especially during the past week. Combined with recent higher dewpoints, fewer freeze/thaw cycles, and rainfall amounts ranging from 0.2 to 0.75 over the past few days there has been an acceleration in the snow melt process increasing the runoff flows into southern and western Minnesota watersheds. Rivers in these areas will continue to respond even more next week and in many areas reach minor to moderate flood stage. You can monitor the daily flow readings as well as the hydrologic forecasts for specific rivers at...

<http://www.crh.noaa.gov/ahps2/index.php?wfo=mpx>

National Weather Service Office in Chanhassen was already issuing flood warnings for portions of the Upper Minnesota River (near Montevideo) and for areas around the Crow River (Delano) on Thursday this week. Other overland flood warnings were put out for areas of Wilkin, Clay, and Norman Counties.

New daily rainfall records were set at Grand Forks International Airport and Fargo International Airport on March 10th this week. Grand Forks reported 0.37 inches, while Fargo reported 0.65 inches. Browns Valley, MN also reported a record amount of rainfall on March 10th with 0.36 inches.

Topic: Warmth in the north woods this week

While stubborn clouds and snow cover combined to prevent 50 degrees F readings in southern and western Minnesota this week, the wooded northern landscape warmed considerably. Below are some high temperature readings in north-central and northeastern Minnesota where the forested landscape is more capable of storing the heat from the higher sun angles this month.

Bemidji 52 F Kabetogama 52 F Crane Lake 52 F
Cotton 54 F Grand Rapids 54 F Bigfork 54 F
Virginia 55 F Hibbing 55 F Eveleth 55 F

Ely reported a statewide high of 57 degrees F. International Falls also reported 50 degrees F on March 10th, and tied or broke records for warm overnight low temperatures on the 9th, 10th, and 11th (34 F, 30 F, and 36 F, respectively). For many locations, these were the first temperature readings of 50 degrees F or higher since November 11, 2009 for some locations, marking a period of 115-118 days below the 50 F mark. Readings of 50 F or higher are more probable for many areas of the state next week.

Weekly Weather Potpourri:

Tropical cyclone Tomas formed west of Pago Pago in the South Pacific this week. It was expected to grow and intensify through the weekend producing 20 foot seas and winds of 115 mph, before weakening north of New Zealand later next week.

NASA announced the passing this week of Dr. Joanne Simpson at age 86 years. She was the first woman in the USA to earn a doctorate in meteorology and was a NASA research atmospheric scientist for many years. Her special areas of research included convective storms and tropical cyclones. She published at least 190 scientific articles throughout her career and was a Past President of the American Meteorological Society.

The BBC Weather Center in London set a Guinness World Record this week for interactive weather reporting by mapping temperature reports from 261 school children filed at 9:15 am on March 11th. Viewers were amazed at the variability in the temperature measurements all reported at the same moment in time. The BBC's Carol Kirkwood reported on the event.

In other BBC News this week the United Kingdom Meteorological Office announced it will no longer provide seasonal forecasts (typically 4 times per year). Continuing public criticism pointing out the inability of the UK Met Office to forecast extreme

seasons like this winter (cold and snowy), or the recent very wet summers motivated the office to carry out some customer research which directed them to the decision to drop the seasonal forecast product. You can find more at...

http://news.bbc.co.uk/2/hi/uk_news/8551416.stm

A winter storm paralyzed portions of Italy on Wednesday of this week. The snow storm shut down the airport at Bologna and closed many roads and schools. Up to three feet of new snow was reported in the mountains, while heavy rain caused some flooding elsewhere.

MPR Listener Question: Seems as though March has uncharacteristically brought an end to the snow season for the Twin Cities. No measurable snowfall has been recorded since the 23rd of February. When was the last time the month of March brought no measurable snowfall to the Twin Cities?

Answer: I would remind you that last March brought only 1.5 inches to the Twin Cities, then we received another 2.5 inches in April. Before that, March of 1981 brought only 0.1 inches, which is the lowest amount of snowfall ever reported in March for the Twin Cities. It is rare indeed to have less than one inch of snow in March, as it has happened only 8 times in history since 1885.

Almanac for March 12th:

The average MSP high temperature for this date is 37 degrees F (plus or minus 12 degrees standard deviation), while the average low is 22 degrees F (plus or minus 12 degrees standard deviation).

MSP Local Records for March 12th:

MSP weather records for this date include: highest daily maximum temperature of 69 degrees F in 1990; lowest daily maximum temperature of 11 degrees F in 1956; lowest daily minimum temperature of -8 degrees F in 1956; highest daily minimum temperature of 50 degrees F in 1990; record precipitation of 1.10 inches in 1899; and record snowfall of 11.0 inches in the 1915. Maximum snow depth has been 26 inches in 1962.

Average dew point for March 12th is 21 degrees F, with a maximum of 55 degrees F in 1995 and a minimum of -17 degrees F in 1984.

All-time state records for March 12th

Scanning the state climatic data base: the all-time high for this date is 70 degrees F at Beardsley (Big Stone County) in 1934; the all-time low is -34 degrees F at Ada (Norman County) in 1896. The all-time record precipitation amount for this date is 3.30 inches at Madison (Lac Qui Parle County) in 1977. The all-time record snowfall is 18.0 inches at Elgin (Wabasha County) in 1997.

Past Weather Features:

A number of historical blizzards are associated with this time period in March:

March 11 brought a blizzard to west-central Minnesota in 1897. New London, Sauk Center, and Morris received 15-16 inches of new snowfall. Travel was impossible and children were kept home from school on Thursday and Friday, giving them a 4-day weekend. There was no high school hockey tournament to attend back then.

North Shore communities recorded a blizzard on March 13-14, 1917. Many areas reported 20 or more inches of new snow and the train to Duluth was shut down for a time.

March 11-12, 1976 brought a blizzard to northern Minnesota shutting down schools and closing roads. Waskish and Big Falls reported nearly a foot of snow, while International Falls and Kettle Falls reported over 15 inches.

Outlook:

Chances of light rain on Saturday, then mostly cloudy Sunday. Moderating daytime temperatures in the 40s and 50s F. Drier on Monday and Tuesday. Somewhat warmer towards the middle of next week with a winter storm brewing for Friday and Saturday.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, March 26, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, March 26, 2010

Headlines:

- Weather for the Twins Target Field
- Flooding widespread, but diminishing
- Snowless March?
- Weekly Weather Potpourri
- MPR listener question
- Almanac for March 26th
- Past weather features
- Outlook

Topic: Weather for the Twins Target Field

For the first time since 1981, Twins home baseball games will be played outdoors this year. The new Target Field opens with a University of Minnesota Gopher's baseball game on Saturday (March 27), then the Twins play their final exhibition games against St Louis on Friday, April 2nd (5:10 pm) and Saturday (April 3rd (1:10 pm). The first regular season game against Boston is 3:00 pm on Monday, April 12th. Well, what kind of weather might be in store for both the players and fans this season at Target Field?

Climatology shows that May and June bring the highest frequency of rain, with about 12 days each month. September brings the least with an average of 9 rainy days. When the Twins do well enough to get into the post season October brings even fewer days with precipitation, averaging only 8 days. Climatology also shows that it snows two days in April, but the snow is short-lived. It snowed on six April dates in 1983, but the Twins were in the Metrodome. It snows about once per decade in May, and about once every five years in October.

Unlike Texas, Kansas City, St Louis, and Tampa, daytime and nighttime temperatures are more frequently comfortable (68-75 F) in Minnesota for baseball during the period from May through September. Daily high temperatures remain below 50 degrees F

about 10 days each April, but after that such a temperature pattern is rare for the rest of the baseball season. April and October can bring some harshly cold weather for baseball, with temperatures staying in the 20s and 30s F, especially for night games. Perhaps the Twins will market light weight but warm under garments (with logos) for fans to wear to these games.

Wind conditions at Target Field may generally favor the long ball hitter. Because of the orientation of the field a wind from the east will be blowing towards home plate. But this type of wind is rare during the baseball season. More commonly the summer winds will have a westerly component. In April and early May the prevailing wind direction of NW will favor left handed hitters who pull the ball to right field. Goodness knows the Twins lineup has plenty of them (Mauer, Morneau, Kubel, and Thome among others). In the core of the summer season the prevailing winds from the South will favor hitting the ball to left field. For post season play in October the prevailing winds will once again favor balls hit to right field. In general terms winds coming from the west will favor keeping marginally foul balls in fair territory and therefore playable, especially helpful to a good defensive team like the Twins.

Sun angles during day games may impact the right fielder and center fielder at times. As opposed to Metrodome games, these position players will need to spend plenty of time getting used to various sun angle and sky conditions in the new park. Helping to mitigate sun angle effects on outfield play, many of the Twins day games will start at 12:10 pm this year, when the sun angle is quite high, rather than low in the sky.

For this weekend, the Gopher baseball team may be hosting a game on Saturday with temperatures in the upper 40s to low 50s F and a chance for light showers. By next weekend when the Twins play the exhibition games against St Louis, it will likely be warmer, but there is a chance for a storm system on Friday and Saturday. Hopefully, by the regular season opener against Boston on April 12th the weather will be even warmer, though the first half of April is expected to be wetter than normal. During Severe Weather Awareness Week in Minnesota, April 19-23, the Twins will be hosting the Cleveland Indians for games at Target Field.

Topic: Spring snow melt flooding widespread, but diminishing

Over the past ten days the National Weather Service has issued flood warnings in at least 43 Minnesota counties. These warnings were all associated with minor, moderate, or major levels of flooding, in some cases compounded by ice jams. In some areas roads and bridges were closed and/or damaged enough to be in need of repair. Thankfully, the second half of March has brought little precipitation, with many areas reporting less than 0.2 inches since the 12th. Though widespread, the

levels of flooding were not as high as earlier predictions had estimated, and it appears that flooding levels will be relatively short-lived in many places.

Topic: Snowless March?

Not even a trace of snowfall has been recorded in the Twin Cities this month. This is also true for Rochester, St Cloud, and a number of other Minnesota communities. Even International Falls has only recorded 0.2 inches of snowfall this month. Should the final days of March remain void of snowfall in the Twin Cities area it would mark only the 3rd time historically that the Metro Area has recorded no snow for March. What were the other years when this happened? No, not 1981, when we recorded a measly 0.1 inches of March snow. Way back in time, over a century ago, both 1878 and 1860 were years that brought no March snowfall to the area. In fact farmers had crops planted by March in 1878, the one and only time this has happened.

Topic: Topic: Sundial Rhymes

Now that the sun is climbing so high in the sky and people are spending more time outside, I thought it might be a good time to reflect on the ancient practice of telling time by the sun. Sundials are perhaps one of the oldest instruments known. Many are quite ornate and used in gardens or public parks. There are several which have appropriately inscribed rhymes. Some of these include:

Serene I stand among the flowers;
And only count life's sunny hours.

When the hour is bright and clear,
You'll find the time recorded here.

Set me right and use me well;
And I the time to you will tell.

Of shade and sunshine for each hour,
See here a measure made.
Then wonder not if life consists,
Of sunshine and of shade.

Anyone know of other sayings or slogans?

Weekly Weather Potpourri:

The NOAA Storm Prediction Center reports that following a historically quiet February (just one tornado reported in the USA) March is continuing the trend with just 14 reports of tornadoes across the nation. This is not necessarily a signal for what to expect in April. In fact, based on climatology of tornadoes showing a sharp rise in frequency about this time each year, many states (including Minnesota) host severe weather awareness week during the month of April.

On Monday of this week Perth, Australia was hit by a severe storm that brought golf ball size hail, winds of 70 mph, torrential rains and flooding. Some schools and hospitals were closed due to flooding and many lost power for a time. Perth had been suffering through one of its driest summers in recent years.

Tuesday and Wednesday this week brought heavy snow and a slushy mess to Denver, CO. Over 5000 people were left stranded at the Denver International Airport on Tuesday night as snowfall ranged from 9 inches in the heart of the city to 23 inches in the suburbs. Some residents were left without power and several schools were closed.

Earlier this week a volcanic eruption in Iceland sent a plume of ash to 18,000 feet above the Atlantic Ocean. Weather services were tracking the ash to see where it would end up and how it might affect weather systems heading for Europe. As a result of the eruption airports in Iceland were closed for a time.

MPR Listener Question: In the Twin Cities, we have had 13 nights this month when the temperature stayed above the freezing mark. This of course contributed to the relatively rapid loss in snow cover. How often does March bring nights of such warmth? It seems unusual.

Answer: The frequency of warm nights above freezing is indeed unusual for this month. Unlike February, Minnesota has not reported the nation's lowest temperature even once this month. Historically March usually brings only 5 such nights. The last time we had 13 or more days when the minimum temperature remained above freezing in March was 2000 (15). In 1946 and 1973 there were 19 days in March when overnight lows remained above the freezing mark. Conversely, numerous years show no days in March when the temperature remained above freezing, most recently in March of 1984.

Almanac for March 26th:

The average MSP high temperature for this date is 43 degrees F (plus or minus 12 degrees standard deviation), while the average low is 26 degrees F (plus or minus 10 degrees standard deviation).

MSP Local Records for March 26th:

MSP weather records for this date include: highest daily maximum temperature of 81 degrees F in 2007; lowest daily maximum temperature of 12 degrees F in 1996; lowest daily minimum temperature of -10 degrees F in 1996; highest daily minimum temperature of 50 degrees F in 1945 and 2007; record precipitation of 1.02 inches in 1921; and record snowfall of 10.0 inches in 1936. Maximum snow depth has been 18 inches in 1965.

Average dew point for March 26th is 25 degrees F, with a maximum of 59 degrees F in 1991 and a minimum of -21 degrees F in 1996.

All-time state records for March 26th:

Scanning the state climatic data base: the all-time high for this date is 84 degrees F at Winnebago (Faribault County) in 1907; the all-time low is -31 degrees F at Fosston (Polk County) in 1996. The all-time record precipitation amount for this date is 2.50 inches at Beardsley (Big Stone County) in 1902 and at Whiteface Reservoir (St Louis County) in 1950. The all-time record snowfall is 13.0 inches at Redwood Falls (Redwood County) in 1936.

Past Weather Features:

Minnesota farmers were tempted to plant small grains on this date in 1907 when the temperatures soared to 35 degrees F above normal. Observers at Winnebago, Albert Lea, Faribault, Lake Crystal, New Richland, and Grand Meadow reported afternoon highs in the 80s F. Some also reported late afternoon and early evening thunderstorms that day.

An unusual late season winter storm struck the Twin Cities over March 24-27 in 1936. The first wave of the storm brought high winds and thunderstorms. The lightning and thunder set off many burglar alarms in the downtown areas. As the temperature dropped the precipitation turned into snow, dumping 15.2 inches in Minneapolis. It was a dirty snow as strong winds brought in soil particles from the west (common during the Dust Bowl Era) that mixed with the snow. This mixture of snow and soil caused severe visibility problems at times.

Words of the Week: Park Factoring

In the world of baseball many fans have come up with ways to rate whether a ball field is a "hitter's park" or a "pitcher's park." Some of the factors considered are: the amount of foul territory; color scheme of the park itself; distances to the outfield

fences and curvature of the field; type of turf and soil mixture of the infield; orientation and elevation of the bleachers; and of course many different weather elements (sky color, cloudiness, humidity, wind, temperature, sun angles) are somehow factored into whether a field makes for good offensive or defensive baseball. All of this analysis awaits to be done for the Twins Target Field during the first full year of use in Minneapolis. I am sure we'll be hearing more about this.

Outlook:

Chance of precipitation Saturday and into the early evening. Drier on Sunday. A warming trend begins Monday with temperatures reaching the upper 50s F, then 60s and 70s F during mid-week. Chance of precipitation increases towards the end of next week with stronger winds.

Further Information:

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<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

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Minnesota WeatherTalk Newsletter for Friday, April 2, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, April 2, 2010

Headlines:

- Climate Summary for March
- Record setting temps start April
- Weekly Weather Potpourri
- MPR listener question
- Almanac for April 2nd
- Past weather features
- Thirl and tirl
- Outlook

Topic: Climate Summary for March

A very warm March ended this week with a bang as Duluth reported a record-tying high of 71 degrees F on the 31st. Most observers reported mean monthly temperatures that ranged from 7 to 11 degrees F above historical normals. Minnesota reported the lowest temperature in the 48 contiguous states only once during March, highly usual. Extremes for the month ranged from 78 degrees F at Theilman (Wabasha County) on the 31st to -9 degrees F at Warroad on the 1st. One aspect that many observers commented about was the high frequency of nights that remained above freezing. Both the Twin Cities and Rochester reported 16 days when minimum temperatures never fell to the freezing level (historical average is just 5-6 days), while Fargo-Moorhead reported 13 such days (historical average there is 3-4 days). This feature of the March climate helped to greatly accelerate the snow melt process, which produced widespread flooding on Minnesota watersheds during the month. In Minnesota at least 43 counties received flood warnings from the National Weather Service during March.

Most observers reported a drier than normal March, with a few observers in northwestern sections reporting slightly above normal amounts. Most of the precipitation occurred between the 9th and the 12th, and many observers reported no precipitation after the 12th.

The most memorable climate feature of March was the absence of snowfall. From Grand Rapids to Rochester, scores of observers reported a snowless March, the first time in history for many. In the Twin Cities it was the first snowless March since 1878. The month concluded with flood waters and lake ice cover diminishing rapidly. The drying of the landscape was sufficient to provoke a high fire danger in many counties as the DNR issued many burning restrictions. As the soils dried and warmed up many farmers were considering doing some field work. This early field-working season is analogous to that of 1981 when many small grains were planted during the month of March.

Topic: April starts with record-setting temperatures

Following the very mild March, April 1st brought some record-setting high temperatures to Minnesota. Under mostly sunny skies and moderate southerly winds, afternoon highs easily reached the 70s and 80s F. The following were new record highs for the date:

Blue Earth 85 degrees F (tied the all-time statewide record set at Winona in 1986)

Waseca 79 degrees F (tied record)

Fairmont 81 degrees F

Rochester 83 degrees F (highest reading ever for so early in the spring)

Red Wing 81 degrees F

Austin 82 degrees F

Duluth 62 degrees F

Mankato 84 degrees F

St Cloud 77 degrees F

Eau Claire 84 degrees F

La Crosse 82 degrees F

With a high of 81 degrees F on April 1st at MSP the Twin Cities just missed tying the record high of 82 degrees F set back in 1882. Nevertheless, it was arguably the warmest April 1st in history across many parts of the state.

With a cold front approaching for the weekend daytime highs are expected to cool off by 15-20 degrees F or more.

Weekly Weather Potpourri:

A study by George Mason University reveals what television meteorologists think about climate science and climate change. The study is available online at

http://wattsupwiththat.files.wordpress.com/2010/03/tv_meteorologists_survey_findings_march_2010.pdf

and even more is written about the study at the News Cut blog written by Bob Collins for MPR:

http://minnesota.publicradio.org/collections/special/columns/news_cut/

From among over 550 television meteorologists who responded to the university survey, the vast majority (85%) said they trusted the State Climatologists the most when it comes to opinions about climate change. Fully two-thirds of them speak to their audiences at various times about climate change, but less than half believe that scientists are in agreement about it. It remains a polarizing subject that is delicate for TV meteorologists to handle in the brief on air time they have.

From the American Chemical Society Meeting in San Francisco this week, scientists report a new "smart roof" coating material made from cooking oil waste that can simultaneously reduce summer air conditioning bills and wintertime heating bills. The coating is made from processing waste cooking oil into a liquid polymer that when applied to roof shingles hardens into a durable coating. The coating function varies from season to season, helping to capture and store heat in the winter, and dissipate heat in the summer. It might be available for commercial use in another three years.

Northern Ireland and Scotland were hit by a strong snow storm this week causing widespread transportation problems. Ferry services and airports were shut down for a while over March 30-31. A train between Glasgow and Inverness was stalled by a huge snow drift for a time. Many communities lost power as well. Some areas reported 8 to 12 inches of snow that was driven into drifts by winds of 60 and 70 mph.

MPR Listener Question: With all the warmth and record-setting high temperatures, what are soil temperatures doing this week?

Answer: As the landscape has dried out and warmed up this week soil temperatures at the 4-6 inch depth have increased through the 40s into the low to mid 50s F. Where mulch has been removed the rise in soil temperature is even greater. According to Bob Mugaas of the Extension Horticulture Program if the soil is no longer soft and squishy it is fine to seed for new turf now, especially with some April showers on the way. Sod applications should be possible after producers start cutting sod later this month.

Almanac for April 2nd:

The average MSP high temperature for this date is 47 degrees F (plus or minus 12 degrees standard deviation), while the average low is 30 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for April 2nd:

MSP weather records for this date include: highest daily maximum temperature of 78 degrees F in 1981; lowest daily maximum temperature of 24 degrees F in 1874; lowest daily minimum temperature of 9 degrees F in 1877; highest daily minimum temperature of 59 degrees F in 1963; record precipitation of 1.06 inches in 2006; and record snowfall of 3.4 inches in the 1920. Maximum snow depth has been 10 inches in 1975.

Average dew point for April 2nd is 28 degrees F, with a maximum of 61 degrees F in 1963 and a minimum of -8 degrees F in 1954.

All-time state records for April 2nd:

Scanning the state climatic data base: the all-time high for this date is 83 degrees F at Beardsley (Big Stone County) in 1928; the all-time low is -21 degrees F at Tower (St Louis County) in 1975. The all-time record precipitation amount for this date is 3.17 inches at Luverne (Rock County) in 1967. The all-time record snowfall is 12.0 inches at Canby (Yellow Medicine County) and Minneota (Lyon County) in 1960.

Past Weather Features:

One of the coldest starts to April in the Twin Cities occurred in 1874 when the daytime maximum temperatures remained in the 20s F over the 2nd, 3rd, and 4th of the month. The morning low on the 4th was a bone-chilling 7 degrees F.

Early April of 1960 brought heavy snow to southwestern and western Minnesota communities. Over April 1-2 wind-driven snow piled up to produce 12 inches of snow at Canby and Minneota, 10 inches at Dawson, 9.5 inches at Morris, 8 inches at Milan, and 6.5 inches at Pipestone. The snow was short-lived as temperatures climbed into the 50s F later in the week.

April 1-2, 1967 brought heavy rainfall to south-central and southwestern Minnesota. Some reports were record-setting such as 3.17 inches at Luverne, 2.80 inches at Slayton, 2.70 inches at Windom, 2.65 inches at Comfrey, 2.59 inches at Blue Earth, 2.54 inches at Fairmont, and 2.50 inches at North Mankato. In one day all of these communities received an entire April's worth of rainfall.

1975 brought the coldest April 2nd in history for many communities. Scores of observers reported morning lows that were below 0 F. Tower started the day at -21 degrees F and warmed up by 48 degrees F to 27 F by late afternoon.

On April 2, 1981 most of southern and western Minnesota was enjoying afternoon highs in the 70s F. It was 81 degrees F in Marshall, Luverne, and Redwood Falls, and 82 degrees F in New Ulm. Farmers were seen out seeding fields in one of the earliest planting seasons ever, and many golf courses were open.

Words of the Week: Thirl and tirl

Both of these words are Scottish in origin, initially meaning to whirl, rotate, or spin, such as in a dance. Among Scottish weather people these terms, thirl (pronounced thurl) and tirl (pronounced turl), refer to a fresh, strong breeze. I suppose this is based on observations of the wind causing leaves and other loose materials to spin about across the ground. As we begin April the winds have certainly picked up, ranging from 15 to 20 mph in many areas. Appropriate, since climatologically April is the windiest month of the year.

Outlook:

Widespread showers early Saturday with much cooler temperatures. Drier on Easter Sunday and Monday, but increasing chances for precipitation by Tuesday. It will remain mostly cloudy next week with daytime temperatures in the 50s and 60s F and chances for showers on many days through the end of the week when temperatures will cool down.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, April 9, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, April 9, 2010

Headlines:

- Early planting underway
- Record early ice-out dates
- Annual Larson-Allmaras Lecture next week
- Weekly Weather Potpourri
- MPR listener question
- Almanac for April 9th
- Past weather features
- Global Hawk
- Outlook

Topic: Early planting underway

Like 1981, 1994, and 1998 spring has been so accelerated this year that soil conditions are suitable for field work and farmers are getting it done in many places. There are reports of tillage and planting of small grains coming from many southern and western Minnesota counties. Soil temperatures have warmed into the 50s F and are very suitable for small grains. In addition alfalfa fields are greening up. Risk of spring frost remains too great for consideration of corn planting this early, but some farmers are likely to begin planting after April 15th.

Topic: Early ice-out on Minnesota's lakes

Over the first 9 days of the month, Minnesota weather observers have reported temperature conditions that are 9 to 13 degrees F warmer than normal, with many days of bright sunshine. Several northern lakes including Bemidji (Apr 6), Itasca (Apr 3), Leech (Apr 6), and Vermillion (Apr 6) lost their ice during the first 6 days of April, the earliest ice-out in their historical records, which range in length from 60 to 90 years. Significant ice is still present on a few far northern lakes like Rainy and Lake of the Woods. You can read more about ice-out conditions at the State Climatology web site.....

http://www.climate.umn.edu/doc/ice_out/ice_out_status_10.htm

Topic: Annual Larson-Allmaras Lecture next week

Dr. Henry Janzen, research scientist with Agriculture Canada, will give a lecture titled "Tending the Land of Our Grandchildren" next Wednesday, April 14, 2:00 pm in Rm 335 Borlaug Hall on the University of Minnesota St Paul Campus. Dr. Janzen will address climate change, biodiversity, demands for food and fuel, and waning freshwater supply as issues that affect agricultural and soil management. Anyone interested in this topic is invited to attend this public lecture. You can read more about it at...

http://www.swac.umn.edu/Larson_Allmaras_Lecture.html

Weekly Weather Potpourri:

With the formation of the new NOAA Climate Services Division more units of government may be looking into making use of climate data and models in their policy and operational decisions. University of Colorado Center for Science and Technology Policy Research has put together a Climate Services Clearinghouse web site that has links to 442 other web sites that provide data, information, and interpretation relative to climate services. You can check this out at...

<http://sciencepolicy.colorado.edu/climateservices/>

Dr. James Hansen, climatologist with NASA has been honored with the Sophie Prize, an international environment and development award named for Norwegian author Jostein Gaarder's novel Sophie's World. The prize was awarded to Dr. Hansen for his clear communication of the threat posed by climate change and his commitment to future generations. Dr. Hansen was a former guest on MPR's "Jet Streaming" podcast.

A study published in *Frontiers in Ecology and the Environment* this week shows that water temperatures have risen significantly over the decades in 20 major U.S. streams and rivers. Among these are the Hudson River and the Delaware River. This study dovetails with the work of the University of Minnesota's Heinz Stefan who showed that some Minnesota rivers and lakes are showing overall high temperatures as well. You can read more at...

<http://www.sciencedaily.com/releases/2010/04/100406101444.htm>

Heavy thunderstorms poured rain down on Rio de Janeiro earlier this week causing mudslides that destroyed homes and may have killed up to 200 people. A record 24-hour amount of rainfall, 11.3 inches was reported from Rio as the rains fell over

Monday through Wednesday this week. Continued moist winds from the south were expected to bring chances of rainfall to the end of the week, but in lighter amounts.

MPR Listener Question: I have been driving around Minnesota this week and seen a number of farmers planting crops. This is so early to see planting activity I was wondering have there been other years when farmers were planting so early in the spring?

Answer: Probably the all-time earliest planting in the state of Minnesota occurred in the Pioneer Era. In 1878, following the mildest winter of the 19th Century, farmers planted crops in February and March. Bear in mind that Minnesota was primarily an infant in agricultural development and most of the crops were small grains (wheat, oats, barley) which can tolerate cold temperatures better than corn and soybeans.

Other years in the modern era when exceptionally early planting occurred were 1981, 1994, 1998, and 2000. In most years early planting has turned out to be a benefit. However there is still a risk of late spring frost damaging crops that emerge and grow fast in early spring.

Almanac for April 9th:

The average MSP high temperature for this date is 51 degrees F (plus or minus 11 degrees standard deviation), while the average low is 32 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for April 9th:

MSP weather records for this date include: highest daily maximum temperature of 81 degrees F in 1930; lowest daily maximum temperature of 29 degrees F in 1973; lowest daily minimum temperature of 15 degrees F in 1997; highest daily minimum temperature of 54 degrees F in 1945; record precipitation of 0.75 inches in 1919; and record snowfall of 5.5 inches in the 1894. Maximum snow depth has been 4 inches in 1980.

Average dew point for April 9th is 27 degrees F, with a maximum of 58 degrees F in 1945 and a minimum of -1 degrees F in 2007.

All-time state records for April 9th:

Scanning the state climatic data base: the all-time high for this date is 91 degrees F at Redwood Falls (Redwood County) in 1977; the all-time low is -19 degrees F at Sawbill Camp (Cook County) in 1939. The all-time record precipitation amount for

this date is 3.19 inches at Breckenridge (Wilkin County) in 1878. The all-time record snowfall is 15.0 inches at Beaver (Winona County), along the Whitewater River in 1973.

Past Weather Features:

Over April 9-10, 1931 vast clouds of dust were seen across southern and western Minnesota as a severe dust storm raged. This was only the beginning of several dust storm episodes during the 1930s.

A late season snow storm stuck southeastern Minnesota over April 8-10, 1973. Many observers there reported record amounts for the month. The storm dropped 9 inches at Winona, 9.5 inches at Rochester, 12 inches at Winona, and 15 inches at Beaver. A second snow storm struck during mid-April that year, leaving Grand Meadow with a record 22 inches for the month, and Winona with a record 15.6 inches.

A sort of mini heat wave occurred over April 9-11, 1977 when temperatures soared into the mid 80s to low 90s across the state. Observers at Redwood Falls, Madison, Campbell, and Browns Valley reported highs in the 90s F and it was as warm as 89 degrees F at Crane Lake along the Canadian border. Believe it or not frost occurred less than a week later in many places.

Words of the Week: Global Hawk

This is the name for NASA's new remote-controlled airplane that can fly for up to 30 hours and at altitudes of 65,000 feet. The plane will be equipped with scientific instruments to make measurements of the chemical composition of the troposphere, as well as observe clouds and particulates. It is expected to fly 4-5 missions over the Pacific Ocean from its home at Edwards Air Force Base in California.

Outlook:

Warming trend over the weekend, with a chance for showers in the southwest by late Sunday. Showery on Monday, Tuesday, and Wednesday with continued warmer than normal temperatures. A bit cooler and drier by the end of next week.

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Minnesota WeatherTalk Newsletter for Friday, April 16, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, April 16, 2010

Headlines:

- Wettest week of the year so far...
- Highest dewpoints of the year...
- New seasonal climate outlook
- Weekly Weather Potpourri
- MPR listener question
- Almanac for April 16th
- Past weather features
- HYSPLIT AND PUFF
- Outlook

Topic: Wettest week of 2010 for some....

Showers and thunderstorms visited the state this week, primarily over April 13-14, bringing some heavier rainfall amounts to central and western sections. For many observers this was the wettest week of the year so far. The thunderstorms brought hail to parts of Martin (1.5" diameter), Blue Earth (1.75" diameter), and Renville (0.75" diameter) Counties. Some of the heavier amounts of rainfall included: a record 0.90" at St Cloud on the 13th; a record 3.00" at Willmar on the 13th; at total of 0.95" at the University of Minnesota/St Paul; a total of 0.80 inches at MSP; a total of 1.37" at Lamberton; a total of 1.00" at New London; a total of 0.93" at Fairmont; and a total of 0.90" at Pipestone and Gaylord.

Though these showers disrupted field work, most farmers were back in the fields by Thursday and Friday, as weather and soil conditions remained favorable for planting.

Topic: High dewpoints this week

With southerly winds this week, the more humid air from southern plains states made it all the way to Minnesota raising our dewpoints (DP) to the highest levels of the year so far. Many citizens remarked how it felt like a June evening on Wednesday (April

14). Indeed, dewpoints reached the high 50s to low 60s F, much more typical of late June rather than mid-April. Some reports included: 58 degrees F DP at MSP International Airport; 59 degrees F DP at Mankato and Holman Field in St Paul; 61 degrees F DP at Albert Lea and Rochester; and 63 degrees F DP at the University of Minnesota St Paul Campus Climate Observatory.

The combination of high dewpoints and an unusually high pollen count caused some respiratory problems for many citizens. Stronger winds with lower dewpoints were expected to alleviate this problem somewhat over the weekend.

Topic: New Seasonal Outlook from NOAA-CPC

The NOAA Climate Prediction Center released a new seasonal outlook this week covering the period from May through July. The outlook calls for below normal temperature conditions and above normal rainfall conditions across Minnesota and the western Great Lakes Region. Should this hold true, it would be our 3rd consecutive cooler than normal growing season in Minnesota. Thus, getting an early start on the planting season may be even more beneficial for farmers as it may offset slower than normal crop growth and development.

Weekly Weather Potpourri:

Next week is severe weather awareness week in Minnesota and Wisconsin. Homeland Security and Emergency Management Departments, along with National Weather Service Forecast Offices will be putting out educational materials about different types of weather threats and conducting tests of warning systems, including testing the sirens in various places on Thursday, April 22nd. Read more at...

<http://www.crh.noaa.gov/mpx/?n=swaw>

Parts of northern India were experiencing a dry spell and heat wave earlier this week. Temperatures soared above 110 degrees F in places. Some observers reported several consecutive days with temperatures over 100 degrees F. Doctors were attending to people suffering from the heat and dehydration.

A paper in the current issue of Weatherwise magazine by Stan Changnon examines trends in severe storms and associated economic losses across the USA. He finds that losses from hail storms have more than doubled since 1990. Even without major shifts in the frequencies of some types of storms, the economic losses continue to grow. The author attributes this to the growth of urban population centers and their vulnerability to weather extremes.

Remote controlled instrumented small planes will be used again this year in the Great Plains to study severe thunderstorms and even tornadoes. The aircraft will operate for a program called VORTEX-2 and will be deployed in TX, OK, KS, NE, SD, MO, and IA. The instrumented propeller-driver aircraft have a 10 ft wingspan and can be launched ahead of storms to measure the conditions during their formation. You can read more at...

http://www.usatoday.com/weather/research/2010-04-14-tornado-research-study_N.htm

MPR Listener Question: Earlier this month you reported there was a high or extreme fire danger in many Minnesota counties. Have the rains this week alleviated most of that?

Answer: Indeed, the rains have helped, but so has the green up of vegetation on the Minnesota landscape. There are still a number of central and northern Minnesota counties showing high or very high fire danger ratings, but many others, most notably in southern areas have been reduced to moderate or low fire danger ratings. The fire danger in some counties will be enhanced by high winds and low dewpoints this weekend as the National Weather Service issues a red flag warning for some. Read more about fire danger at the DNR web site...

http://www.dnr.state.mn.us/forestry/fire/firerating_restrictions.html

Almanac for April 16th:

The average MSP high temperature for this date is 57 degrees F (plus or minus 12 degrees standard deviation), while the average low is 37 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for April 16th:

MSP weather records for this date include: highest daily maximum temperature of 88 degrees F in 1964; lowest daily maximum temperature of 20 degrees F in 1875; lowest daily minimum temperature of 10 degrees F in 1875; highest daily minimum temperature of 65 degrees F in 1976; record precipitation of 1.04 inches in 2003; and record snowfall of 5.0 inches in the 1961. Maximum snow depth has been 7 inches in 1983.

Average dew point for April 16th is 32 degrees F, with a maximum of 63 degrees F in 2002 and a minimum of 8 degrees F in 1953.

All-time state records for April 16th:

Scanning the state climatic data base: the all-time high for this date is 93 degrees F at Fairmont (Martin County) in 2002; the all-time low is 0 degrees F at Gunflint Lake (Cook County) in 1983. The all-time record precipitation amount for this date is 3.40 inches at Pipestone (Pipestone County) in 2003. The all-time record snowfall is 13.0 inches at Itasca State Park (Clearwater County) in 1945.

Past Weather Features:

A cold week prevailed at this time in 1875. Over April 15-17, 1875 snow fell around the Twin Cities and daytime temperatures barely made the 20s and 30s F. Overnight lows ranged from just 10 to 12 degrees F over three nights. By April 18 the temperature had rebounded to 64 degrees F.

One hundred eighteen years ago this week (April 14, 1886) an F4 tornado (winds over 200 mph) traveled 25 miles across central Minnesota, killing 74 people, injuring 213, and destroying over 200 homes. Described by witnesses as alternately a massive 1/2 mile wide funnel and also as a "double spiral" the tornado swept up the water as it crossed the Mississippi River near Sauk Rapids, leaving the river bottom dry for a brief period. Sauk Rapids was completely devastated, while not far from Rice, MN eleven members of a wedding party were swept away to their death. Though more destructive tornadoes have occurred since this time in Minnesota, none have caused more deaths than this one. This storm was featured on the TPT documentary about Minnesota's Deadliest Tornadoes.

A snow storm over April 14-17, 1961 brought late season winter storm to many areas of Minnesota. The Twin Cities received over 7 inches of snowfall, but many others places had even more. Red Lake reported over 16 inches, Duluth reported over 17 inches, Grand Rapids reported 13 inches, and International Falls over 10 inches. It wasn't winter's last gasp either. Even more snow fell across the state over the last week of April.

Words of the Week: HYSPLIT AND PUFF

These are two models used to forecast ash plume trajectories and dispersion from volcanic eruptions. Both have been in use during the recent eruption of a volcano beneath a glacier in Iceland. This eruption released an ash plume that reached 55,000 feet and was headed for Western Europe across the North Atlantic. Many airlines were grounded as a result of this ash plume. You can read more at..

<http://www.metoffice.gov.uk/corporate/pressoffice/2010/volcano.html>
<http://news.bbc.co.uk/weather/hi/news>

HYSPLIT stands for Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model. It was developed for use by NOAA in the 1990s by Roland Draxler and is used to track a variety of airborne elements besides volcanic ash. PUFF is an ash dispersion model developed at the University of Alaska in the 1980s and it uses National Weather Service forecasted wind fields aloft from a grid cell data base.

Outlook:

Generally drier for the weekend, with cooler days and nights. Temperatures will be closer to seasonal averages. Overnight lows will dip into the 20s and 30s F. Generally dry next week with a chance for showers again by Wednesday and Thursday.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

Minnesota WeatherTalk Newsletter for Friday, May 7, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, May 7, 2010

Headlines:

- Mother's Day
- Dry Early Growing Seasons
- Weekly Weather Potpourri
- MPR listener question
- Almanac for May 7th
- Past weather features
- Tesselated clouds
- Outlook

Topic: Mother's Day

May 8, 1910, almost exactly 100 years ago, Governor Adolf Eberhart declared Minnesota's first Mother's Day. Looks like many places may see some frost in the morning this Sunday, but then warm up into the 50s F by afternoon for Mother's Day. No rain and plenty of sunshine too, so don't rule out taking Mom for an outing or doing something outside. HAPPY MOTHER'S DAY!

Topic: Can we break the trend of dry early growing seasons?

In the Twin Cities area the last wet growing season (May-Sep) was 2002, when over 28.5 inches of rainfall occurred. Since that time every growing season but one (2005) has brought at least three drier than normal months, especially early in the season. Six of the last seven Mays have been drier than normal, five of the last seven Junes have been drier than normal, and all seven Julys have been drier than normal. This trend has produced a good deal of stress and landscape vegetation in the Metro Area, especially trees. So far in 2010 the only near normal month in terms of precipitation has been April (2.32 inches). The rapid growth from the early growing season is already using up soil moisture reserves to a wetter than normal period is truly needed. Unfortunately most of the forecast and outlook models favor a drier than normal weather pattern across Minnesota for much of May. The U.S. Drought Monitor continues to show moderate to severe drought in NE counties. If the trend towards a dry early growing season of the past seven years continue drought areas are likely to spread around the state.

Weekly Weather Potpourri:

The NOAA Storm Prediction Center reports that after a rather quiet Jan-Mar period there were 197 tornado reports in April, including the massive mile wide tornado that killed 10 people in Mississippi on the 24th. In addition there have already been 33 tornado reports filed nationwide

over the first week of May, all of them coming on the 1st of the month when tornadoes were reported in KY, TN, AK, and MS. A tornado early Thursday morning in China killed at least 39 people, injured another 150, and left many homeless. Killer tornadoes are relatively rare in China.

NOAA scientists, mostly meteorologists and oceanographers, are assisting with tracking of the oil spill in the Gulf of Mexico. Twice daily forecasts are being provided for the coastal regions that may be subjected to pollution from the spill. You can read more about NOAA's activities there at...

<http://deepwaterhorizon.noaa.gov/>

MPR Listener Question: Forecasters are talking snow this weekend in some places. Have we ever had snow in May, following a snowless March and April?

Answer: Certainly not in the Twin Cities. I can find no years when snow occurred in May after a snowless March and April for anywhere in the state. Perhaps the closest to this situation occurred at Cloquet in 1960 when they reported only 1.3 inches of snow in March, zero in April, and then 0.8 inches in May. There have been numerous times in northern Minnesota (Grand Rapids, Roseau, International Falls) when a snowless April has been followed by snow in May.

Duluth has reported just a trace of snow in March and April this year, and it is virtually certain they will have measurable snowfall this month (May), so that will be a first for them.

International Falls reported no snow in March, April, or May of 1915, the only time that has happened there.

Pete Boulay of the Minnesota State Climatology Office has written extensively about May snowfalls in the Twin Cities. You can find this at their web site...

http://www.climate.umn.edu/doc/journal/historic_may_snowstorms.htm

Bismarck, ND reported over a half inch of snow on Friday, May 7th and several observers in northern Minnesota were reporting snowfall on Friday morning as well.

Almanac for May 7th:

The average MSP high temperature for this date is 65 degrees F (plus or minus 12 degrees standard deviation), while the average low is 45 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for May 7th:

MSP weather records for this date include: highest daily maximum temperature of 92 degrees F in 1963; lowest daily maximum temperature of 38 degrees F in 1907; lowest daily minimum temperature of 27 degrees F in 1885; highest daily minimum temperature of 68 degrees F in

1896; record precipitation of 1.31 inches in 1933; and there was a trace of snowfall on this date in 1907 and 1954.

Average dew point for May 7th is 37 degrees F, with a maximum of 70 degrees F in 1916 and a minimum of 15 degrees F in 1945.

All-time state records for May 7th:

Scanning the state climatic data base: the all-time high for this date is 95 degrees F at Maple Plain (Hennepin County) in 1934 and at Rosemount (Dakota County) in 1990. The all-time low is 13 degrees F at Hallock (Kittson County) in 1907. The all-time record precipitation amount for this date is 3.25 inches at Tyler (Lincoln County) in 1983. The all-time record snowfall is 5.0 inches at Gonvick (Clearwater County) in 1924.

Past Weather Features:

Today, May 7th marks the 170th anniversary of the one of the most lethal tornadoes in United States history. In 1840, a tornado up to 1 mile wide swept up the Mississippi River southwest of Natchez, MS, leveling the forests along both river banks. The town of Natchez was destroyed, and parts of Vidalia, Louisiana (across the river) were also damaged. The death toll was at least 317, most of which were people caught in flatboats and steamboats on the river. A piece of a steamboat window was found 30 miles away. Some speculate that there were many slaves killed in the fields, but not reported to authorities. The recent long-track tornado (149 miles) that struck Mississippi on April 24 and killed 10 people is further documented at...

<http://www.norman.noaa.gov/2010/04/some-brief-notes-on-the-24-april-2010-long-track-tornado/>

May 5-6, 1965 brought 12 tornadoes to Minnesota. Six tornadoes struck the Twin Cities area on the evening of May 6th causing considerable damage, especially to Fridley and Mounds View. Sirens were used to warn residents, but 13 people were killed. Hail stones as big as baseballs were collected by some residents.

On May 2, 1976, the Minnesota Twins game had to be cancelled as a result of a 1 inch snowfall, the latest snow-out in the team's history. It was short-lived as the weather improved steadily after that, returning to summer-like conditions.

Words of the Week: Tessellated clouds

Taken from the Latin word tessellatus, meaning to form as a mosaic from smaller squares or oblong shapes. These types of clouds are typically stratocumulus or cirro-cumulus layers which look like a patchwork in the sky, sometimes even a checkerboard. There were some present in the Twin Cities area on Tuesday of this week (May 4th) when we shot up to 79 degrees F. Sometimes these cloud forms appear as a warm front approaches.

Outlook:

After seeing temperatures climb to near 80 degrees F on Tuesday the weekend will seem more like winter with highs only in the 40s and 50s F. Patchy frost on Saturday and Sunday mornings in many places may require gardeners to protect sensitive vegetation. There will be a warming trend starting on Monday. Chances for more rainfall later on Monday and Tuesday as temperatures slowly climb back to near normal.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, May 21, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, May 21, 2010

Headlines:

- Frequency of 90 F days in May
- Hay cutting
- New Seasonal Climate Outlook
- Early Lake County History
- Weekly Weather Potpourri
- MPR listener question
- Almanac for May 21st
- Past weather features
- Tanqueray skies
- Outlook

Topic: Frequency of 90 F days in May

For the Twin Cities a 90 degrees F day in May comes along about every two or three years. Last year, 2009, May 19th produced the warmest day of the entire year with an afternoon high of 97 degrees F (100 degrees F at Milan and 101 degrees at Madison were the highest readings in the state last year, a rare occasion when May brought the warmest temperatures). May of 1934 was the hottest in Minnesota history and brought 8 days of 90 F or higher to the Twin Cities, 14 such days to Beardsley. May of 1987 and 1988 each brought 4 days of 90 F or greater temperatures to the Twin Cities. I would not be surprised to see some areas of Minnesota reach 90 degrees F late into the weekend or early next week.

Topic: Hay cutting underway this week

Despite a cooler than normal start to May and widespread frosts on the 2nd weekend of the month many alfalfa stands were nearly 30 inches tall and ready to be cut across southern and central Minnesota this week. Hay cutting was moving along nicely in many counties by Wednesday of this week (May 19). Certainly it is earlier than normal, but it looks to be a good crop and in many areas such an early cutting will allow more of the late May rainfall to replenish the root zone for a good 2nd cutting of hay later in the summer. It is good timing for hay producers as next week looks to be wetter and more problematic for doing field work.

Topic: New Seasonal Outlooks from NOAA-CPC

The NOAA Climate Prediction Center released new seasonal climate outlooks this week. For the period from June through August they call for a higher than normal chance of below normal temperatures in Minnesota, with equal chances for above or below normal rainfall. Western areas of the state are favored to see higher than normal rainfall over this period. You can view these outlooks at...

<http://www.cpc.ncep.noaa.gov/products/predictions/90day/>

Topic: Agriculture in the early history of Lake County

An early climate record from the mid 19th century Smithsonian network exists for the Beaver Bay area. Two frontier settlers named Henry Wieland and Thomas Clark II recorded daily climate observations near Beaver Bay and along the Beaver River Valley from 1858 to 1875. Their records have become part of the Minnesota Climatology Office data base. Initial attempts at developing agriculture in the Beaver Bay area are documented in some of these records. It was their hope to produce locally grown vegetable and fruit crops for the developing citizens working in the timber and mining industries. Potatoes, carrots and a variety of berries were some of the crops grown. The soils were judged to be rich in nutrients and the initial growing seasons of 1859 and 1860 were quite warm, with some temperatures reaching the 90s inland from the lakeshore. Over the years however the soils proved to be too heavy and wet, promoting root and fungal diseases. The early warm growing seasons proved to be an aberration, and the climate demonstrated a preference for being cool with frequent frosts that resulted in very short growing seasons, some less than 80 days long.

In the 140 years since Wieland and Clark settled there, Lake County has seen little if any benefit from local agriculture, but the local economy has survived from the three Ts: timber, taconite, and tourism. In fact Split Rock Lighthouse remains the most visited of historic sites in the state and is hosting its Centennial Celebration this year.

Weekly Weather Potpourri:

A study published this week in Nature highlights how much heat energy has been stored in the oceans since 1993. Scientists from NOAA, NASA, the Hadley Centre, University of Hamburg, and the Meteorological Institute in Japan collaborated on the study which shows a significant ocean warming that is signaling a climate imbalance as the planet warms. You can read more about this work at...

<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20100520.html>

On the 100th Anniversary of Glacier National Park the NASA Earth Observatory web site is showcasing a depiction of the amount of shrinkage in the Grinnell Glacier that has occurred since 1950. Many of the glaciers in the park have totally melted and remaining ones continue to melt at a rapid rate. You can view the story and the image at...

<http://earthobservatory.nasa.gov/IOTD/view.php?id=43942>

The National Research Council of the National Academy of Science earlier this month released a report on "America's Climate Choices." This report is offered in three segments: Evidence for Climate Change; Mitigation of Climate Change; and Adapting to Climate Change. Several very reputable scientists have contributed to this report and it is worth reading at...

<http://americasclimatechoices.org/>

Two tropical cyclones were bringing significant amounts of rainfall to portions of the Indian Ocean Basin. Cyclone 2A was off the coast of Somalia, with winds over 70 mph creating wave heights of 18 feet. It was expected to bring significant rainfall to the NE coast of Somalia and in the Karkaar Mountains of the Horn of Africa. Cyclone Laila in the Bay of Bengal was bringing high seas, heavy rains and strong winds (80 mph) along the east coast of India this week. The storm caused the shut down of several oil drilling operations along the coast. Winds were expected to drop off below 50 mph by the weekend, but persistent heavy rains along the coast were expected to continue as the storm moved NE towards Bangladesh.

Former Weather Anchor at WCCO-TV and KARE-11 TV in the Twin Cities, Paul Douglas has launched a new television weather service to compete with the cable Weather Channel. The new service called "Weather Cast" is put together in the studios of Weather Nation in Excelsior, MN. It is available on the Dish Network as of Friday (May 21st). Paul Huttner, MPR meteorologist, writes about it in his Updraft blog.

<http://minnesota.publicradio.org/collections/special/columns/updraft/>

MPR Listener Question: Wednesday was a magnificent day of sunshine. All day long not a cloud in the sky here in Woodbury. Did we set any kind of record for sunshine or solar radiation on May 19th.

Answer: Unfortunately the National Weather Service no longer keeps records of minutes of sunshine, or percent possible sunshine. Dave Ruschy of the Department of Soil, Water, and Climate reports that total solar radiation from the St Paul Climate Observatory on Wednesday (May 19) was near 716 calories per square centimeter. This represents 99 percent of the maximum value ever measured on that date. So it is safe to assume that the clear skies produced a near record day of sunshine. Actually the record daily values of solar radiation for Minnesota are often days when there is a little cloud cover that reflects and enhances the amount of light coming from the sky (called diffuse radiation) in addition to the direct solar radiation.

Almanac for May 21st:

The average MSP high temperature for this date is 71 degrees F (plus or minus 10 degrees standard deviation), while the average low is 50 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for May 21st:

MSP weather records for this date include: highest daily maximum temperature of 92 degrees F in 1964; lowest daily maximum temperature of 46 degrees F in 1915; lowest daily minimum temperature of 33 degrees F in 1997; highest daily minimum temperature of 71 degrees F in 1921; record precipitation of 3.16 inches in 1906. There was a trace of snow on this date in 1931 and 1963.

Average dew point for May 21st is 47 degrees F, with a maximum of 69 degrees F in 1927 and a minimum of 17 degrees F in 1924.

All-time state records for May 21st:

Scanning the state climatic data base: the all-time high for this date is 100 degrees F at Thief River Falls (Pennington County) in 1964; the all-time low is 18 degrees F at Brimson (St Louis County) in 2002. The all-time record precipitation amount for this date is 5.75 inches at Montgomery (Le Sueur County) in 1960. The all-time record snowfall is 2.5 inches at Pigeon River (Cook County) in 1926.

Past Weather Features:

May of 1829 was a warm and dry one with the first multiple days of 90 degrees F or higher during the month of May at Ft Snelling. At least six days reached temperatures that high, including 92 F on May 20th. It rained only four days and drought had settled in by the end of the month.

May of 1924 was long remembered by a generation of Minnesotans as a cold and snowy one. On the 21st the second of two measurable May snowfalls occurred across northern Minnesota. The observer at Angus measured 2.2 inches, while Argyle received 2 inches and Bemidji had an inch. Cold air that accompanied the snow brought the thermometer down to just 19 degrees F at Baudette.

May 16-22, 1960 was one of the wettest weeks in history for south-central Minnesota communities. Heavy thunderstorms brought rain on five consecutive days for some, and amounts over the 20th and 21st were enough to produce flash flooding, especially along the Blue Earth, Zumbro, and Minnesota River watersheds. Some reports included 10 inches at New Prague, 9.14 inches at Jordan, 8.10 inches at Montgomery, 6.22 inches at St Louis Park, and 5.66 inches in Bloomington. Many basements were flooded, and several roads were washed out

Words of the Week: Tanqueray skies

Not commonly used in America, this term has been used by the BBC meteorologists in England to describe those rare spring and summer days when the sky is perfectly clear, as clear as the London dry gin they drink. Such was case on Wednesday of this week (May 19) across most of Minnesota under bright, sunny skies when sun screen was definitely needed by those who were outdoors.

Outlook:

Warm and humid, with an increasing chance of showers and thunderstorms from west to east later in the weekend. Some may be heavy. Temperatures will range from the 70s F in the north to near 90 F in south-central and southeastern areas of the state. Continued warm into next week with chances for showers. A bit cooler by mid week, but it certainly looks like the rest of the month will be warmer and wetter than the first half.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, May 28, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, May 28, 2010

Headlines:

- May Heat Sets Some Records
- Heavy Dose of Rainfall for Some
- Perhaps our warmest spring ever
- Weekly Weather Potpourri
- MPR listener question
- Almanac for May 28th
- Past weather features
- Stagnation Area
- Outlook

Topic: Extra dose of heat in May

Sunday through Tuesday of this week brought unusually high temperatures and high dewpoints to Minnesota. These conditions were ushered in on high winds from the south. Several communities reported wind gusts from 35 to 55 mph. Many records were set for high daytime temperatures, warm overnight low temperatures and high dewpoints. Monday, May 24th brought the highest daytime readings as many observers reported temperatures in the 90s F. Record setting readings included:

97 F at Cambridge, St James, and Red Wing; 95 F at MSP, Waseca, and Mankato; 94 F at St Cloud; 93 F at Eau Claire, WI; and 93 F at Willmar and Owatonna. It was also a record-setting 86 degrees F at Duluth on Tuesday (May 25th).

Dewpoints ranged from the mid 60s F to the very sticky mid 70s F earlier in the week as well. The high dewpoints kept overnight minimum temperatures quite high. Some of the record setting overnight minimum values Monday and Tuesday included 71 F at St Cloud, 70 F at Rochester, 72 F in the Twin Cities, and 74 F at La Crosse, WI. As a result of the high dewpoints and temperatures reaching the 90s F the National Weather Service had to issue a heat advisory for the Twin Cities Metro Area, as Heat Index values approached 100 degrees F.

Thankfully by Wednesday, the heat and high dewpoints had abated, though it was expected to return on Saturday over Memorial Weekend.

Topic: Thunderstorms and heavy rain for some

The high dewpoints provided fuel for thunderstorms over the period from Sunday through Wednesday this week. Sunday night Duluth Airport recorded 3.93 inches of thunderstorm rain, not only breaking the daily record, but shattering the record for most rainfall ever on a single day in May. International Falls reported a record amount of 0.97 inches on Monday. Other northern Minnesota locations reporting significant rainfall included: Crookston 2.82", Red Lake Falls 2.91", Baudette 3.13", Thief River Falls 2.40", Warroad 2.00", Argyle 1.55", and Grand Forks 1.40 inches.

High winds and hail accompanied some of the thunderstorms up north, with hail stones up to 1.75 inches in diameter reported. Some flooding occurred as well along rivers that feed into the Red River of the North.

Topic: Perhaps a record warm spring in Minnesota

Pete Boulay of the Minnesota State Climatology Office estimates that if the forecast through the Memorial Weekend holds a new record for the warmest spring may be set in Minnesota. Remember that temperatures averaged 8 degrees F warmer than normal across the state in March, and then over 7 degrees F warmer than normal in April. Although the first two weeks of May brought cooler than normal conditions to the state, the temperatures for the second half of the month have more than made up for this, averaging from 6 to 9 degrees F warmer than normal at most locations. With a warmer than normal Memorial Weekend, this will be the third consecutive month that averages warmer than normal, following a colder than normal February. Further, the temperature departure for the three months of March, April, and May may be so high that it will beat the record warmest spring (Mar, Apr, May) of 1977.

Weekly Weather Potpourri:

The May/June 2010 issue of Weatherwise magazine has an interesting interview with Russell Brice, owner of Himalayan Experience, a firm that takes hikers up Mt Everest and other peaks. He takes about the weather on Everest and the use of forecast products from Meteotest, a weather information service out of Bern, Switzerland. He says the best weather conditions for climbing Everest are temperatures in the teens F and winds less than 7 mph. But this hardly ever happens according to Brice.

The interior of India has been experiencing a pre-monsoon heat wave this week, with temperatures soaring well above 100 degrees F. Jalgoan reported 120 degrees F, Delhi 113 degrees F, Haryana 118 degrees F, and Amritsar in Punjab was 116 degrees F. The weather pattern indicates that the start to the monsoon season (normally around June 1st) may be later than usual, as sunny skies with continued hot temperatures were expected throughout the coming weekend and into early next week. Persistence of the heat wave worries officials about water supply needs, as well as heat related illness and death.

It appears as though a tropical cyclone may form in the Eastern Pacific off the coast of El Salvador and Honduras this weekend. The National Hurricane Center is tracking a low pressure

center that seems to be strengthening. As such portions of Central America may be in store for some severe weather and heavy rain late into the weekend or early next week. For the 2010 Easter Pacific Hurricane Season the first tropical storm name would be Agatha should this low pressure system reach this status over the weekend.

MPR Listener Question: What happens if a hurricane goes into the oil slick covered water in the Gulf of Mexico? Would it rain oil onto the land where the hurricane makes landfall? If accompanied by lightning, could the hurricane rain burning oil?

Answer: NOAA Administrator Dr. Jane Lubchenko just held a press conference on Thursday this week (May 27) about the coming North Atlantic Hurricane Season. It is expected to be an active season with up to 23 named tropical storms, 8 to 14 hurricanes and from 3 to 7 major ones (category 3 or higher). The oil in the Gulf might be swept ashore in hurricane storm surge, but would not be distributed in the rainfall pattern as oil will not evaporate. In fact oil over the surface of the ocean would tend to inhibit evaporation of water somewhat. I don't think there are going to be any anticipated effects on hurricanes themselves, but such storms may redistribute the oil pollution or sweep it further inland. I don't believe that lightning would ignite the oil as it is too well mixed with the water and is unrefined or in crude form. You can read more at information relevant to these questions at...

<http://www.cnn.com/2010/US/05/27/hurricane.season.worries/index.html?iref=allsearch>
http://www.usatoday.com/weather/storms/hurricanes/2010-05-26-hurricane-season-prediction_N.htm
<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20100525.html>

Almanac for May 28th:

The average MSP high temperature for this date is 73 degrees F (plus or minus 10 degrees standard deviation), while the average low is 53 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for May 28th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1934; lowest daily maximum temperature of 46 degrees F in 1947; lowest daily minimum temperature of 36 degrees F in 1889 and 1965; highest daily minimum temperature of 75 degrees F in 2006; record precipitation of 2.08 inches in 1899. There was a trace of snow on this date in 1965.

Average dew point for May 28th is 50 degrees F, with a maximum of 70 degrees F in 1941 and a minimum of 22 degrees F in 1947.

All-time state records for May 28th:

Scanning the state climatic data base: the all-time high for this date is 106 degrees F at Beardsley (Big Stone County) in 1934; the all-time low is 17 degrees F at Pokegama Dam (Itasca County)

in 1889. The all-time record precipitation amount for this date is 6.15 inches at Wabasha in 1970. The all-time record snowfall is 2.0 inches at Kelliher (Beltrami County) in 1970.

Past Weather Features:

On May 27, 1931 about 4:20 pm an F-3 tornado (winds 158-206 mph) crossing Clay and Norman Counties in northwestern Minnesota struck the Empire Builder passenger train near Sabin. The tornado lifted five coach cars off the tracks and deposited them 80 feet away. One person was killed and 57 were injured. Several farms near Moorhead were also destroyed by this tornado which was on the ground for 40 miles.

May 27-28, 1965 brought a rare late spring snow storm to many parts of Minnesota. Though the Twin Cities just reported a trace of snow, Cook received 1.7 inches, while Cass Lake and Caribou reported an inch. Both International Falls and Duluth reported 0.8 inches, with slippery streets and sidewalks. A trace of snow was recorded as far south as Worthington.

The evening of May 27 and early morning of May 28, 1970 brought heavy thunderstorms and flash flooding to Goodhue and Wabasha Counties in southeastern Minnesota. Rainfall ranged from 4 to 6 inches across the area, and most of this fell in just a few hours. The Zumbro and Cannon Rivers flooded, washing out bridges and roads. Several cars were swept away and three people drowned. One farmer lost 175 head of cattle in the flood waters.

Words of the Week: Stagnation area

In air pollution meteorology this refers to a region of the lower atmosphere (planetary boundary layer) near the surface where the following conditions persist for at least 4 days: wind speeds less than 17 mph (poor ventilation), no frontal passages (change in air mass), and no precipitation (washout). Under these conditions, fossil fuel emissions, particulates and other aerosols can build up in the atmosphere reducing the air quality.

Outlook:

Warm on Saturday, cooler on Sunday and Monday with a chance for widely scattered showers and thunderstorms. A generally cooler and drier weather pattern is seen for next week, with a chance for showers again by Thursday.

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Minnesota WeatherTalk Newsletter for Friday, June 4, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 4, 2010

Headlines:

- Warm spring behind us
- Mixed start to June
- Weekly Weather Potpourri
- MPR listener question
- Almanac for June 4th
- Past weather features
- Stacking
- Outlook

Topic: 2010 was one of the warmest meteorological springs in Minnesota history

From preliminary climate data for March through May of 2010, this was a remarkably warm spring season in Minnesota. For residents of Duluth it was the warmest spring in history averaging 45.6 degrees F, surpassing the record warmth of 1977. For International Falls (44.4 F), Rochester (50.2 F), and the Twin Cities (52.4 F) it was the 2nd warmest spring in history, marginally behind 1977. Considering the statewide climate summary for spring it was the 2nd warmest as well, trailing only 1987, with the average three month temperature departures ranging from 5 to 7 degrees warmer than normal.

Except for far northwestern counties, May was the 3rd consecutive warmer and drier than normal month this year. Though precipitation so far this year has been lacking in many areas, it is especially deficit in northeastern counties (Lake and Cook) which are designated to be in severe to extreme drought. You can see more detail in the seasonal distribution of precipitation by going to.....

http://www.climate.umn.edu/doc/journal/drought_2010.htm

Topic: Mixed start to June

Initial weather reports for June are mixed, with a cool, wet start for some northern communities (International Falls) and a warm, dry start for others (Browns Valley and Ortonville). Embarrass, MN reported the nation's low only once in May, on the 9th with 17 degrees F, but they reported the nation's low on June 3rd this week with 33 degrees F. Widespread rains occurred overnight on June 3-4 bring quarter inch to three quarter inch amounts to much of central and southern Minnesota. Brainerd reported nearly an inch, while Lanesbora received 0.84 inches, and Austin 0.75 inches.

Crop conditions around Minnesota are good to excellent in most areas, with crop growth progressing ahead of normal. Additional rainfall would be welcome by most farmers, except for those in the far northwestern counties which have been very wet. Temperatures appear to be trending close to normal in June, but are expected to warm significantly above normal by mid-month.

Topic:

Weekly Weather Potpourri:

Last weekend the first Tropical Storm of the Eastern Pacific Hurricane Season, Agatha brought strong winds and heavy rains to portions of Guatemala, Honduras and El Salvador. Flooding damage was substantial and over 155 people lost their lives. The Eastern Pacific and North Atlantic are relatively quiet this week with no tropical storms, but on Thursday (June 3) Tropical Cyclone Phet was churning off the coast of Oman in the Northern Indian Ocean with wind speeds over 115 mph and wave heights over 30 feet. It weakened over northeastern Oman on Friday, and emerged over the Arabian Sea. But it was still packing winds over 80 mph and was expected to migrate towards Pakistan over the weekend and early next week.

Many wildfires in Canada, especially those north of Montreal, were sending plumes of smoke across eastern provinces and northeastern states this week. A haze detectable in satellite imagery settled over portions of NH and MA this week. Over 480 square miles of Quebec forests have been consumed in these fires so far.

The U.S. Government has launched a new web portal, [HD.gov](http://www.hd.gov), which provides decision makers and planners with access to data and case studies that explore the human dimensions of natural resource management. Some of the areas include adaptation to climate change and cost/benefit analysis methods for managing coral reefs and fisheries. You can find this information at....

<http://www.hd.gov/HDdotGov/>

Speaking of fisheries, the Star Tribune had an article this week about changes in habitat for ciscoes, a cold-water fish that inhabits many northern Minnesota lakes. Their habitat has been declining in some areas as a result of warming lake waters. Fish die-offs due to warm waters have been noted in some areas. You can read more about this at...

<http://www.startribune.com/sports/outdoors/95285009.html?elr=KArksUUUoDEy3LGDiO7aiU>

A recent study in the Journal of Environmental Psychology finds that people who spend 20 or more minutes each day in the natural environment (outdoors) experience greater energy, vitality, and sense of well-being than those who don't. Being in nature is a boost to the human psyche. You can read more about this study at...

<http://www.sciencedaily.com/releases/2010/06/100603172219.htm>

MPR Listener Question: I noticed that portions of the north shore landscape of Minnesota are in severe to extreme drought as we enter the month of June. How often does this area of the state experience severe drought? It seems to me that it is less than southern Minnesota.

Answer: Northeastern Minnesota has been persistently dry since last year, especially Lake and Cook Counties. Severe to extreme drought appears in this area of the state about once every 14-15 years. You are correct in that the southern portions of the state see severe to extreme drought appear about once every 9 to 10 years. Over the past five years some area of the state has experienced severe to extreme summer drought each year.

Almanac for June 4th:

The average MSP high temperature for this date is 76 degrees F (plus or minus 8 degrees standard deviation), while the average low is 56 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for June 4th:

MSP weather records for this date include: highest daily maximum temperature of 96 degrees F in 1968; lowest daily maximum temperature of 56 degrees F in 1935 and 2002; lowest daily minimum temperature of 38 degrees F in 1998; highest daily minimum temperature of 70 degrees F in 1934; record precipitation of 1.92 inches in 1880.

Average dew point for June 4th is 51 degrees F, with a maximum of 76 degrees F in 1925 and a minimum of 29 degrees F in 1921.

All-time state records for June 4th:

Scanning the state climatic data base: the all-time high for this date is 100 degrees F at Lamberton (Redwood County) in 1968; the all-time low is 21 degrees F at Bigfork (Itasca County) in 1964. The all-time record precipitation amount for this date is 5.30 inches at Zumbrota (Goodhue County) in 1958. The all-time record snowfall is 1.5 inches at Mizpah (Koochiching County) in 1935.

Past Weather Features:

June 4, 1935 was an unusual day in northern Minnesota. Temperature were in the 30s and low 40s F with low overcast and rain showers. Mizpah in Koochiching County reported nearly a half inch of rain which included 1.5 inches of snowfall, a record that still stands for so late in the spring.

A complex of severe thunderstorms visited the state on June 4, 1958. Heavy rainfall and hail occurred across southern Minnesota. Zumbrota reported 5.30 inches of rainfall with flash flooding on the Zumbro River. Rochester reported 4.02 inches, Red Wing 3.57 inches, Grand Meadow 3.95 inches, Jordan 3.26 inches, and Young America reported 3.70 inches. In Stearns County an F-2 tornado (winds 113-157 mph) was on the ground for 18 miles between 4:00 pm

and 5:00 pm that afternoon. It inflicted damage to 30 farms, mostly west of Sauk Rapids.

Words of the Week: Stacking

This does not refer to the CDs in the MPR music library! In meteorology this term refers to a condition of continuity in the vertical of a low pressure or high pressure system. That is, the geographic center of low pressure at the surface, tends to be the same for low pressure aloft as well. So there is little tilt or horizontal distortion in the pressure field. This may happen with large scale, slow moving low pressure systems and show up in satellite water vapor imagery as a large rotating white blob of clouds.

Outlook:

Cloudy throughout the weekend with near seasonal temperatures. Chances for scattered showers and thunderstorms, especially in northern sections. Drier by next Wednesday with warmer temperatures towards the end of the week.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

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Minnesota WeatherTalk Newsletter for Friday, June 11, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 11, 2010

Headlines:

- Biggest rains of the year so far.....
- Hail Climatology
- Solstice River on June 20
- Commentary on science
- Weekly Weather Potpourri
- MPR listener question
- Almanac for June 11th
- Past weather features
- Renegade showers
- Outlook

Topic: Biggest rains of the year so far....

A stalled frontal system across southern Minnesota brought heavy rains and thunderstorms to many central and southern counties overnight on June 10-11. Frequent lightning strikes and strong winds (over 40 mph) accompanied these storms as well. Some observers reported rainfall amounts from 1 to 3 inches, and a few reported new record-setting amounts for June 11th. Some record reports included:

3.23 inches at Redwood Falls; 3.12 inches at Willmar; 2.85 inches at Delano; 2.67 inches at Tracy; and 1.83 inches at Olivia

Storms were expected to bring more rains early in the weekend and again the middle of next week.

Topic: Hail Climatology in Minnesota

Widespread hail has not been reported in Minnesota since May 24th, but this weekend will bring conditions that may produce some. Most crops in the state are now susceptible to hail damage, but many are covered by crop insurance, and understandably so.

Hail is common in many midwestern states. In Minnesota the hail season runs primarily from March through November, peaking in June and July in terms of the frequency of events. A typical year produces 11 to 13 days with hail across the state. The areas of the state with the

highest average annual frequency are counties in west-central, southwestern and parts of southeastern Minnesota, which record from 2 to 4 days with hail, primarily during the growing season. Hail losses filed with insurance companies typically exceed 100 claims per year.

The most common time of occurrence for hailstorms is between 3 pm and 8 pm, in correspondence with the peak times of day for thunderstorms and tornadoes. Hailstorms are often associated with stationary fronts over northern Iowa or southern Minnesota.

A hail pad is sometimes used to measure the distribution of sizes and shapes regarding hailstones. This is composed of a piece of foam board, covered with a secured sheet of aluminum foil and placed in an exposed area when thunderstorms are predicted. The falling hailstones leave a measurable impression in the foil so that size and shape can be determined after the storm without having to go out and collect the stones.

The Skywarn spotter training program of the National Weather Service uses food, sports, and money analogies to define the size of hailstones. Spotters may report actual measured diameters of hailstones or make estimates using the analogies in the table below....

Hail Diameter Size Description

- 1/4 in. Pea size
- 1/2 in. Marble size
- 3/4 in. Dime size
- 7/8 in. Nickel size
- 1 in. Quarter size
- 1 1/4 in. Half Dollar size
- 1 1/2 in. Walnut or Ping Pong Ball size
- 1 3/4 in. Golf Ball size
- 2 in. Hen egg size
- 2 1/2 in. Tennis ball size
- 2 3/4 in. Baseball size
- 3 in. Teacup size
- 4 in. Grapefruit size
- 4 1/2 in. Softball size

Topic: 14th Annual Solstice River Performance, June 20th

The 14th Annual Solstice River dance performance will take place on and around the Stone Arch Bridge in Minneapolis at 8:30 pm on June 20th (the solstice this year is 6:28 am June 21st, too early in the morning for a public event). This year the theme is built around "water rites" and "water rights." To read more about this celebration of the Mississippi River on the longest day of the year, you can go to...

http://www.hamline.edu/education/environmental/cgee/solstice_river.html

Topic: Comments on the philosophy of science

Dr. David Miller a philosopher at the University of Warwick, U.K. wrote an article for the "science compass" column in Science magazine over a decade ago and highlighted some perspectives on science that are well worth reviewing, especially in regards to evaluating the use of science to guide public policy:

-observation, precision measurements, experimentation, logic and hypothesis testing with statistics lead scientists to conclusions that are probable, but not certain. In nearly all scientific questions a realm of uncertainty still exists.

-we, as scientists are often too harsh and critical of colleagues who make interesting but false conjectures. The need to be right, or alternatively, the paralyzing fear of being wrong can distort judgement and stifle creative thinking. Even the best make mistakes.

-scientists need to show more readiness to admit ignorance when confronted with questions and issues yet to be settled or tested. Ignorance is no more shameful than poverty or disease. Saying, "I don't know" is the simple answer, while saying why you don't know is more challenging and complex.

-hand in glove with the admission of ignorance is a tempering of unrealistic public expectation that scientists have all the answers. We don't. This is well recognized in the field of atmospheric science and the public has a history of being forgiving and understanding on this point. It is perhaps not the case in many other fields of science, especially medicine.

Dr. Miller points out that science above all is a method of critical thinking which attempts to prove hypotheses, often by assigning a probability of their likelihood. Whether or not this approach to understanding the world reveals truth, it is a healthy and correct posture to be skeptical rather than to blindly accept scientific conclusions. Sometimes scientific study and conclusions are found to be flawed years after first being reported.

Weekly Weather Potpourri:

Thunderstorms with heavy rains caused flash flooding over June 10-11 in parts of southwest Arkansas. Areas in Pike and Montgomery Counties reported rainfall totals of 5 to 6.5 inches. In the Albert Pike Recreation Area up to 12 people were reported killed in the flash flooding. More rainfall was expected later in the day on Friday.

The heat wave that plagued parts of Pakistan in late May is continuing in June. Temperatures from 122 to 129 degrees F have been reported in parts of that country so far this month, with power outages and many people suffering from the heat. Despite some recent cooling, temperatures for the weekend are expected to range from 110 to 120 degrees F, with Heat Index values over 130 degrees F.

Satellite views of the oil spill in the Gulf of Mexico continue to be available at NASA's Earth Observatory web site.

<http://earthobservatory.nasa.gov/NaturalHazards/>

You can view the size and trajectory of the oil clearly in the imagery from June 7th. NOAA continues to make daily forecasts for the Gulf area to assist responders who are trying to contain and clean up the oil.

Strong winds and large waves caused a ferry to capsize in Bangladesh this week. Of the 35 passengers on board, twelve were drowned. In recent years a number of ferry accidents have occurred during the monsoon season in that country.

MPR Listener Question: As the summer solstice, longest day of the year, approaches I was wondering what the true difference in day length is across Minnesota, since our state is over 400 miles in distance from south to north. Is there much difference in day length on the summer solstice whether I'm fishing Lake Okabena in Nobles County or Lake of the Woods on the Canadian border?

Answer: Actually there is a measurable difference in day length between the lakes you mentioned. For the summer solstice, June 21st this year, the length of day on Lake Okabena would be approximately 15 hours and 26 minutes. If you are fishing on Lake of the Woods it would be 16 hours and 12 minutes, a difference of 38 minutes more daylight.

Almanac for June 11th:

The average MSP high temperature for this date is 76 degrees F (plus or minus 9 degrees standard deviation), while the average low is 57 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for June 11th:

MSP weather records for this date include: highest daily maximum temperature of 96 degrees F in 1956; lowest daily maximum temperature of 55 degrees F in 1877; lowest daily minimum temperature of 40 degrees F in 1903; highest daily minimum temperature of 74 degrees F in 1956; record precipitation of 2.58 inches in 1975.

Average dew point for June 11th is 54 degrees F, with a maximum of 71 degrees F in 1918 and a minimum of 31 degrees F in 1962.

All-time state records for June 11th:

Scanning the state climatic data base: the all-time high for this date is 102 degrees F at Fairmont (Martin County) in 1933; the all-time low is 24 degrees F at Fort Ripley (Crow Wing County) in 1877. The all-time record precipitation amount for this date is 5.31 inches at the DNR's Camp Norris (Lake of the Woods County) in 2002.

Past Weather Features:

This week in 1877 brought one of the coldest spells of June weather ever recorded at Fort Ripley in central Minnesota. Over the five days from June 8 to June 12 the overnight lows were 18 F, 23 F, 30 F, 24 F, and 27 degrees F. The last frost of the month occurred on June 18, 1877.

The warmest June in history was 1933. Over June 10-11 nine Minnesota communities reported temperatures of 100 degrees F or greater. On June 10th, while Fairmont was baking in 106 degrees F, residents at the harbor in Grand Marais were enjoying 55 degrees F. New Ulm reported 9 days of 100 F temperatures in June of 1933.

June 8-11, 2002 brought unprecedented flash flooding to many areas of northwestern and north-central Minnesota. Rainfall totals exceeded 6 inches in many places, including 7.21" at Red Lake Falls, 6.80" at Roseau, 9.26" at Warroad, 9.65" at Baudette, and 11.95" at Camp Norris. Many rivers flooded, and most properties in the city of Roseau were flood damaged.

Words of the Week: Renegade showers

This is how meteorologists often refer to isolated thunderstorms and showers that have broken away from a major complex of thunderstorms or a large frontal system. Often times these clouds escape from the main air flow aloft and may linger over areas of the landscape already saturated by the earlier passage of strong thunderstorms. They typically only effect small areas ranging up to less than 100 square miles. The use of the Spanish term renegade implies a hostile deserter from the main band of active weather. Such was the case over the north shore area of Lake Superior this week on Wednesday (June 9) as some renegade showers brought sprinkles to Eveleth, Silver Bay, and Grand Marais.

Outlook:

Early part of the weekend looks stormy with plenty of rain across central and southern sections of the state. Drier by Sunday with somewhat cooler temperatures, then relatively quiet weather for Monday and Tuesday. Another chance for showers and thunderstorms by Wednesday and Thursday next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, June 25, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 25, 2010

Headlines:

- June Tornadoes
- NOAA Climate Services
- Weekly Weather Potpourri
- MPR listener question
- Almanac for June 25th
- Past weather features
- Heliotropic plants
- Outlook

Topic: Tornadoes in June

The National Weather Service has updated their assessment of the tornado outbreak from last Thursday, June 17th. They confirm 20 tornadoes across the state affecting portions of at least 10 Minnesota counties. The outbreak occurred from roughly 3:30 to 9:00 pm. If not changes are made in this assessment the tornado outbreak of June 17th will rank 2nd to that of June 16, 1992 when 22 tornadoes were confirmed in Minnesota, including the F-5 monster that destroyed Chandler (Murray County). The partial and incomplete listing below shows some of the major Minnesota tornado outbreaks of 6 or more since 1881.

Date Number of Time Rating Location

Tornadoes

7/15/1881 6 2-6 pm F2-F4 SW-SC
6/27/1894 12 5-9 pm F2-F3 SW-SC
04/30/1967 13 6-8 pm F1-F4 SC-SE
08/6/1969 8 3-6 pm F2-F3 NE
06/28/1979 15 3-9 pm F0-F3 W-E
06/16/1992 22 4-11 pm F1-F5 SW-SC
07/21/1995 14 5-8 pm F0-F2 W-E
10/26/1996 14 3-7 pm F0-F2 W-E
07/01/1997 18 3-9 pm F0-F3 W-E
03/29/1998 14 3-7 pm F0-F4 SC
08/09/1999 10 6-8 pm F0-F1 EC
07/25/2000 14 3-9 pm F0-F4 C-EC
05/01/2001 7 5-8 pm F0-F2 SE

05/09/2001 9 6-9 pm F0-F2 C-EC
05/15/2001 7 4-6 pm F0 N
06/11/2001 17 2-6 pm F0-F2 WC-C
06/13/2001 16 5-9 pm F0-F3 W
06/24/2003 15 5-9 pm F0 C
07/9/2003 7 3-6 pm F0 WC-S
07/14/2003 12 3-9 pm F0 SC
05/11/2004 7 6-9 pm F0 W
06/11/2004 8 3-8 pm F0 S
08/08/2004 8 4-7 pm F0 NW
06/23/2005 10 4-8 pm F0 NW
06/29/2005 8 5-9 pm F0 W-SC
07/11/2005 8 7-10 pm F0 NW
06/11/2008 7 6-8 pm F0 SW
07/11/2008 9 3-7 pm F0-F3 WC
06/17/2009 6 4-9 pm F0 WC-SC
08/19/2009 7 2-7 pm F0 EC-S

Four more tornadoes were reported on June 21st (Monday) across Marshall and Beltrami Counties this week, and on Thursday funnel clouds were sighted in Itasca and St Louis Counties, but no tornadoes were reported. June has obviously been a busy month for severe weather, as NOAA's Storm Prediction Center documents 312 reports of tornadoes across the nation so far this month.

Topic: NOAA Climate Services Division Useful in Design, Planning and Risk Applications

The recent establishment of the NOAA Climate Services Division in part is motivated by the growing utilization of climate data in various economic sectors. Those working in agriculture, water management, and energy related commercial enterprises account for a significant percentage of NOAA climate data users.

Traditional uses include the examination of weather risk associated with the design and planning of various construction projects, and increasingly, an assessment of the uncertainty in cash flow and earnings from operations that are vulnerable to weather events and episodes. Climate data services provide managers with a means to assess the probability of extreme events, climate trends, changes in seasonal climate variability patterns, current monitoring networks and examination of proposed regulatory guidelines related to the environment. It is expected that there will continue to be increased utilization of climate data services as many companies expand into marketing products more globally as well.

Weekly Weather Potpourri:

Many Minnesota weather observers have reported rainfall on at least half the days this month of June, and a few have seen rain on 18 days. Normal frequency of rainy days in June is 11 to 13 days. With more rain to come this weekend, some communities may see a near record number of days with rain this month.

The National Hurricane Center reports this week that it is watching an organized convective system off the coast of Honduras. This system will be over a favorable ocean environment this weekend and may strengthen into tropical storm status. As such it could bring heavy rainfall to Yucatan and later migrate over the Gulf of Mexico. Meanwhile hurricanes Darby and Celia were spinning away in open water off the west coast of Mexico and Baja California, but were not immediate threats to coastal communities.

Heavy rains brought floods to NE Brazil this week displacing over 150,000 people from their homes. You can read more about this at...

http://news.bbc.co.uk/2/hi/world/latin_america/10399569.stm

Bridgeport, Connecticut was hit by a rare tornado on Thursday of this week, knocking out power, leveling trees, and damaging some buildings. You can read more at...

http://www.usatoday.com/weather/storms/tornadoes/2010-06-24-connecticut-tornado_N.htm

MPR Listener Question: What percentage of Minnesota's tornadoes occur in the month of June?

Answer: Historically speaking June is the month of peak frequency for tornadoes in Minnesota, with 25 to 30 percent occurring in that month. July is 2nd in frequency, and May is third. Tornadoes have occurred in all months in Minnesota except for December, January, and February.

Almanac for June 25th:

The average MSP high temperature for this date is 81 degrees F (plus or minus 8 degrees standard deviation), while the average low is 61 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for June 25th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1934; lowest daily maximum temperature of 63 degrees F in 1942 and 1968; lowest daily minimum temperature of 46 degrees F in 1957; highest daily minimum temperature of 75 degrees F in 1901; record precipitation of 2.88 inches in 1978.

Average dew point for June 25th is 57 degrees F, with a maximum of 76 degrees F in 1943 and a minimum of 38 degrees F in 1926.

All-time state records for June 25th:

Scanning the state climatic data base: the all-time high for this date is 109 degrees F at Beardsley (Big Stone County) in 1933; the all-time low is 25 degrees F at Kelliher (Beltrami County) in 2001. The all-time record precipitation amount for this date is 6.60 inches at the Elk River (Sherburne County) in 2003.

Past Weather Features:

June 19-25, 1988 was one of the hottest weeks of the summer during the drought year of 1988. Over 50 Minnesota observers reported temperatures of 100 degrees F or greater during that week, topped by 107 degrees F at Canby and Browns Valley. Thankfully the air was exceptionally dry so that it cooled off at night. At Canby the temperature soared to 107 degrees F on the 25th, but then fell by 41 degrees to just 66 degrees F overnight.

Over June 24-25, 2003 thunderstorms brought extremely heavy rains to east central Minnesota counties. Many of these rains were accompanied by hail and high winds, and produced localized flash flooding. The two day rainfall totals included: 8.19" at Elk River; 7.50" at Monticello; 6.68" at Plymouth; 6.50" at Brooklyn Park; 6.25" at Buffalo; 6.00" at North Branch and Brooklyn Center; 5.90" in downtown Minneapolis; and 5.75" at Robbinsdale. You can read more about these historic storms at...

http://www.climate.umn.edu/doc/journal/flash_floods/ff030622-25.htm

Words of the Week: Heliotropic plants

Some plants exhibit a character known as heliotropism, taken from the Latin root words helio for sun and tropos meaning to turn. The daily orientation of these plants actually changes with the position of the sun in the sky. For this reason these plants are called "sun trackers." Agronomic crops like sunflowers and some species of cotton are heliotropic, facing east to greet the sun in the morning, and facing west to say goodbye to the setting sun in the evening. It has been estimated that sunflowers receives up to 40 percent more sunlight on their leaves than they would from fixed orientation all day. Some desert plants exhibit heliotropic behavior but only during the winter months when the day length is shorter and the sun's elevation angle is lower.

Outlook:

Warmer temperatures on Saturday with a chance for showers and thunderstorms. Cooler and drier by Sunday and Monday. Continuing dry through the end of June next week with near seasonal temperatures.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, July 2, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 2, 2010

Headlines:

- June Climate Summary
- Wet/Warm Start to July up North
- Weekly Weather Potpourri
- MPR listener question
- Almanac for July 2nd
- Past weather features
- SMOS
- Outlook

Topic: June 2010 Climate Summary

June mean temperatures were near normal to slightly warmer than normal in southern and western sections of Minnesota. Some northern communities reported temperatures that were 1 to 3 degrees cooler than normal. For example International Falls reported a mean monthly temperature that was nearly 3 degrees F cooler than normal, and for only the 4th time in history (joining 1947, 1982 and 1985) a June with no temperatures of 80 degrees F or higher. Extremes for the month ranged from 31 degrees F at Embarrass on June 29th to 97 degrees F at Winona on the 26th.

June rainfall was well above normal for many southern Minnesota communities as well as some located near Lake of the Woods in northern Minnesota. The statewide average rainfall for June was nearly 5.70 inches ranking among the 20 wettest in history and the wettest since 2002 (6.23"). Many observers reported measurable rainfall on 19 or 20 days during the month. Rochester reported their 7th wettest June with 7.79 inches, and a record number of days, 20, with measurable rainfall. Waseca reported a record June rainfall with 9.64 inches, as did Lanesboro with 11.63 inches. In addition several observers reported some record-setting daily rainfall amounts during the month, topped by 3.93 inches at Waseca on the 18th.

Despite the very wet month, a dry Canadian air mass descended over the state on June 29th and brought a record-tying low dewpoint to the Twin Cities with a reading of only 38 degrees F. That low dewpoint produced a relative humidity reading of just 29 percent on Tuesday afternoon.

You can read more detail about the wet June at the Minnesota State Climatology Office web site:

http://www.climate.umn.edu/doc/journal/wet_june_2010.htm

June also brought tornadoes, hail, and high winds. At least 31 tornadoes were reported across the state during June with the largest numbers on the 17th (20) and on the 25th (7). There were also scores of hail reports, including some that damaged crops in southern and western Minnesota.

Despite the severe weather episodes and persistent wet conditions in many places June ended with most of Minnesota's major crops doing very well. Minnesota Agricultural Statistics Service reported that 90 percent of the corn was in good to excellent condition, 85 percent of the spring wheat was in similar condition, along with 83 percent of the soybean crop.

Topic: Wet and warm start to July up north

Early on July 1st an isolated but intense thunderstorm brought heavy rain across portions of Koochiching and St Louis Counties. New record daily rainfall amounts were set at International Falls (3.04"), Kabetogama (3.44"), and Crane Lake (1.88"). For a time high water closed some county roads, and affected traffic on Highways 53 and 11 in northern Minnesota. In addition Grand Forks, ND started out the month of July with a record-setting high of 94 degrees F, while Moorhead and Crookston reported 93 degrees F, and Baudette, Warroad, and Roseau each had 90 degrees F.

Weekly Weather Potpourri:

Earlier this week it was announced that the sister cities of Duluth, MN and Thunder Bay, Ontario are competing to see who is greener. The competition will be based on estimating the emission of greenhouse gases and will kick off this fall. I am sure we'll be hearing more about it.

Hurricane Alex, the first of the Atlantic Hurricane Season, came ashore in northern Mexico this week with winds near 100 mph. It brought excessive rain, high winds, hail, and large waves. Even areas some distance from landfall, like Brownsville and southern Texas reported rainfall amounts of 5-6 inches and wind gusts from 48 to 66 mph. Fortunately the subtropical Atlantic Ocean and Gulf of Mexico were expected to see quiet weather over the next week.

The United Kingdom Met Office announced this week that nationwide the first 6 months of 2010 have been the 2nd driest in 100 years, and driest since 1929. Many areas have reported 14 inches or less so far in 2010, about 50 to 60 percent of normal. As a result water storage reservoirs are running about 60 to 65 percent of capacity, when they usually run about 80 percent at the end of June.

Flooding in northeast Romania this week killed 20 people and displaced thousands from their homes earlier this week. Many areas reported flooded roads and property damage from heavy rains brought by severe thunderstorms. Both Romania and Bulgaria have been hit by heavy rain storms and floods repeatedly this month.

A report for the National Science Foundation on "Arctic System Modeling" was released earlier this week. It represents 3 years of effort from a range of arctic scientists and addresses many aspects of climate change in the polar latitudes. A .pdf version of the report can be found at...

<http://www.iarc.uaf.edu/publications/reports/IARCTP10-0001.pdf>

MPR Listener Question: In your WeatherTalk newsletter of last week you listed a number of historical tornado outbreaks, most of which have occurred over the past two decades. Is this evidence that tornadoes are occurring with greater frequency and abundance in Minnesota?

Answer: My answer is no, but we really cannot fairly compare the older severe weather reports and statistics with those of the modern era. Since the deployment of Doppler radar in the 1990s, as well as the use of various storm spotter networks we have become better at detecting and documenting tornadoes across our state. As such, we don't miss any. In the old days this was not the case. For example on September 11, 1868 across sparsely populated southern Minnesota damaging tornadoes were reported in Sibley, Nicollet and Wabasha Counties, but undoubtedly there were more that were either not spotted or not reported. Similarly on June 27, 1894 at least 12 damaging tornadoes were reported from Pipestone to Kandiyohi to Hennepin Counties, but there is little question that many were missed.

Almanac for July 2nd:

The average MSP high temperature for this date is 81 degrees F (plus or minus 7 degrees standard deviation), while the average low is 62 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for July 2nd:

MSP weather records for this date include: highest daily maximum temperature of 96 degrees F in 1911; lowest daily maximum temperature of 60 degrees F in 1892; lowest daily minimum temperature of 49 degrees F in 1924; highest daily minimum temperature of 77 degrees F in 2002; record precipitation of 3.12 inches in 1944.

Average dew point for July 2nd is 59 degrees F, with a maximum of 75 degrees F in 1949 and a minimum of 38 degrees F in 1917.

All-time state records for July 2nd:

Scanning the state climatic data base: the all-time high for this date is 105 degrees F at Winona in 1911 and at Canby (Yellow Medicine County) in 1925; the all-time low is 28 degrees F at Tower (St Louis County) in 1980. The all-time record precipitation amount for this date is 6.44 inches at the New Folden (Marshall County) in 1901.

Past Weather Features:

July 1-2, 1975 brought a flash flood to many northwestern Minnesota counties. Rainfall amounts ranged from 3 to 8 inches across portions of Marshall, Kittson, Pennington, Clearwater, Beltrami, Hubbard, and Cass Counties. Roads were flooded in Bemidji as well as portions of Hwy 71 near the Red Lakes. For many observers 80 to 90 percent of the July rainfall that year came from this single storm.

On July 4, 1995 a strong thunderstorm produced some flash flooding in western Minnesota counties. Benson reported a record 4.52 inches, and New London a record 4.40 inches. Milan in Chippewa County reported a new state record for July 4th of 9.78 inches of rainfall.

Word of the Week: SMOS

This is an acronym from the European Space Agency. It is a name given to their satellite that was deployed last fall to monitor soil moisture and ocean salinity (SMOS) on a global scale. These measurements will be useful to scientists studying the water cycle and to meteorologists who need to update soil moisture status in countries that do not have extensive ground monitoring stations. You can read more about the potential uses of this satellite at...

<http://www.sciencedaily.com/releases/2010/06/100630115016.htm>

Outlook:

Warm on Saturday and Sunday with a chance for showers and thunderstorms. Some could be severe and bring heavy rains. Somewhat cooler on Monday and Tuesday with a chance for scattered showers and thunderstorms. Drier on Wednesday and Thursday.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

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Minnesota WeatherTalk Newsletter for Friday, July 9, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 9, 2010

Headlines:

- July rainfall plentiful in places
- Weekly Weather Potpourri
- MPR listener question
- Almanac for July 9th
- Past weather features
- EMMA
- Outlook

Topic: Plentiful July rainfall for some

Barely a week into the month and several Minnesota weather observers are already reporting above normal monthly values. Normal monthly amounts range from 3.5 to 4.5 inches around the state. Leading the pack is Kabetogama, on the doorstep of Voyageurs National Park. The observer there received record setting rains on the 1st with 2.73 inches and on the 4th with 3.05 inches. The monthly total is already 7.03 inches at Kabetogama. Similarly, International Falls had a record amount of 3.04 inches and now stands at 6.18 inches for the month. Others already reporting rainfall totals that equal or exceed normal monthly values are Cook with 3.49 inches, Park Rapids with 4.99 inches, Walker with 4.25 inches, and Forest Lake with 4.49 inches. In their monthly outlook released on June 30th, the NOAA Climate Prediction Center had indicated rainfall would be above normal in July, but only for southern Minnesota counties. Most places are glad to see the moisture, though the mosquito populations have been greatly enhanced by it.

After starting the month with the statewide low temperature, just 35 degrees F on the 1st, Embarrass has seen overnight lows in the 50s and 60s F so far this month with many daytime readings in the 80s F. So far this month most observers are reported mean temperature values that range from 3 to 6 degrees F warmer than normal.

Weekly Weather Potpourri:

On Wednesday of this week (July 7) a British Independent Review Committee chaired by Sir Muir Russell released its findings on the Climategate email investigation. This was instigated last fall by a theft of scientific emails from the University of East Anglia Climate Research Unit. The tone and content of these emails had called into question the integrity of some scientists who worked on the IPCC Climate Change reports. The Review Committee exonerated the scientists involved, writing "their rigor and honesty as scientists are not in doubt"....and concluding that they "did not find any evidence of behavior that might undermine the conclusions of the IPCC

(Intergovernmental Panel on Climate Change) assessments." This is the third independent review of Climategate and each has cleared the scientists involved of any malfeasance. The scientists who endured these investigations are continuing to decipher the complex climate processes of Earth and will hopefully contribute new knowledge and understanding in the next IPCC report.

After four consecutive days with heat advisories some mid-Atlantic and northeastern states were seeing some drop in daytime temperatures by Friday this week with readings in the low 90s F. Many communities in NY, NJ, DE, CT, PA, MD, VA, and District of Columbia were reporting daytime highs from the upper 90s to 105 degrees F earlier. Over July 5-8 Washington D.C. reported daytime highs of 99 F, 102 F, 102 F, and 95 F, with two nightly low temperature readings of 80 degrees F, awfully stressful for residents without air conditioning. Several cities opened community cooling centers and kept longer hours at community pools so people could cool off.

Some parts of southern most Texas were expected to get 6 to 8 inches of rainfall Thursday and Friday as a result of thunderstorms associated with Tropical Depression 2 in the Gulf of Mexico. Places like Alice, TX have already received over 7 inches of rainfall this month and flooding was expected along the Rio Grande River. Substantial rainfall was also evident in northeastern portions of Mexico.

A new University of Georgia study release this month reveals more about the dangers of leaving children and pets inside vehicles during the hot summer months. This research may help frame better guidelines and safety rules for parents and owners of pets. Some of the research shows that temperatures inside a closed automobile in full sunlight can rise by as much as 29 degrees F in a half hour. You can read more about this study at...

http://www.uga.edu/news/artman/publish/100629heat_table.shtml

Also earlier this month NOAA scientists revealed that they have used models to assess the coastal threat of oil spills in the Gulf of Mexico. They used historical wind patterns and ocean currents to examine the trajectories of oil spills. The threats to coastline areas from Texas to Florida are understandably variable, with the primary threatened area running from eastern Louisiana to the panhandle of Florida. You can find more information at the NOAA web site.

http://www.noaanews.noaa.gov/stories2010/20100702_longterm.html

MPR Listener Question: I moved to the Twin Cities from St Louis, MO just two years ago. Always love the weather chats on Friday. In St Louis, July was always hot and humid, every single July record high temperature was 100 degrees F or greater (ranging from 100 F on July 8, 2001 to 117 F on July 14, 1954). Does the Twin Cities climate history show the same thing in terms of 100 degrees F in July? Seems like strongly urbanized areas (St Louis, Philadelphia, New York, etc) get to 100 F fairly often.

Answer: The Twin Cities climate records show that there have been five dates in July (2nd, 9th, 17th, 25th, and 29th) when the daily high has never reached 100 degrees F. The highest reading ever on July 2nd is 96 degrees F in 1911. The climatology of 100 F readings in the Twin Cities

shows that the earliest was 106 F on May 31, 1934, and the latest 104 F on September 10, 1931. The frequency of 100 degrees F in the Twin Cities is once in about every 5-6 years, while the frequency at St Louis, MO is about once every 3 years. The last Twin Cities occurrence was 101 degrees F on July 31, 2006, while the last occurrence in St Louis was 103 F on August 16, 2007.

Almanac for July 9th:

The average MSP high temperature for this date is 83 degrees F (plus or minus 7 degrees standard deviation), while the average low is 63 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for July 9th:

MSP weather records for this date include: highest daily maximum temperature of 99 degrees F in 1976; lowest daily maximum temperature of 67 degrees F in 1873; lowest daily minimum temperature of 48 degrees F in 1895; highest daily minimum temperature of 82 degrees F in 1936; record precipitation of 2.55 inches in 2000.

Average dew point for July 9th is 60 degrees F, with a maximum of 75 degrees F in 1946 and a minimum of 36 degrees F in 2001.

All-time state records for July 9th:

Scanning the state climatic data base: the all-time high for this date is 110 degrees F at Beardsley (Big Stone County) in 1936; the all-time low is 30 degrees F at Tower (St Louis County) in 1900. The all-time record precipitation amount for this date is 6.00 inches at the Forest City (Meeker County) in 1858.

Past Weather Features:

The Smithsonian weather observer at Forest City, MN (Meeker County) reported a 6 inch rain on July 9, 1858, the third time he reported a 2 inch rain or greater during that month. He reported 13 days with rainfall in July of 1858 totaling 16.91 inches a record monthly value for the county, and one of the wettest months in Minnesota history. He also noted crop damage due to hail and heavy rain across Meeker County.

From 6:00 to 7:00 pm on July 9, 1932 several tornadoes touched down across portions of Rock, Nobles, Brown, Cottonwood, and Watonwan Counties in Minnesota. A number of injuries were reported, as at least 23 farms were destroyed or damaged. A dozen people were injured in the pool hall at Ellsworth, MN (Nobles County). One of the tornadoes was estimated to be F-4 (winds of 207-260 mph).

At least 16 Minnesota communities reported afternoon highs of 100 degrees F or greater on July 9, 1936. In addition the overnight lows remained in the 70s and 80s F most places making for an uncomfortable night's sleep. However, the observer at Grand Marais, MN reported an evening temperature of 53 degrees F, good sleeping weather there.

Word of the Week: EMMA

I must admit I have a soft spot for this name (my daughter's), but in this meteorological context it is an obvious acronym for European Multi-Service Meteorological Awareness system. It is a joint effort of the Meteorological Services of the United Kingdom, France, Germany, and the Netherlands, among others. EMMA is an Internet based communications system patterned somewhat after our own National Weather Service Storm Prediction Center risk and warning products. It is designed to provide the European community with up to date information and forecasts concerning the risks of severe weather events and episodes in common graphical format over the Internet. From this project the METEOALARM system was launched in 2007 and now serves 21 European countries with weather warning information. This information is available over the Internet using a web browser, or from kiosk terminals in many European airports. You can look at METEOALARM graphics and products at....

<http://www.meteoalarm.eu/>

Outlook:

Warmer and more humid on Saturday with a chance for showers and thunderstorms later in the day. Cooler Sunday and Monday with a chance for showers and thunderstorms. Generally dry Tuesday and Wednesday, with another round of showers and thunderstorms late Wednesday and into Thursday. Warmer and wetter trend in the weather as we move towards mid-July.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

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Minnesota WeatherTalk Newsletter for Friday, July 16, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 16, 2010

Headlines:

- Sticky/Stormy Wednesday
- Climatology of Thunderstorms
- Voyageurs National Park
- Weekly Weather Potpourri
- MPR listener question
- Almanac for July 16th
- Past weather features
- Plowtery
- Outlook

Topic: Sticky/Stormy Wednesday, July 14th

With dewpoints as high as 84 degrees F and Heat Index Values as high as 118 degrees F, Wednesday definitely felt and acted like the sultry subtropics. Many places reported severe thunderstorm winds, hail, and even tornadoes. A tornado was reported north of Northfield (Rice County) and another east of Hinckley. There were reports of hail from Todd, Douglas, Scott, Crow Wing, and Stearns Counties, some up to 1.75 inches in diameter. Winds over 60 mph were reported from Wadena and Winona Counties. Most of the heaviest rains were reported in northern and eastern sections of the state. Some of these amounts included 2.15" at Kellogg (Hwy 61 south of Wabasha), 1.90" at Tower, 1.88" at Grand Marais, 1.83" at Brainerd, 1.63" at Embarrass, and 1.05 inches at Kabetogama. Kabetogama has now reported 8.36 inches for the month of July, with 3 record-setting daily rainfalls.

The real story on Wednesday (July 14) was the widespread high Heat Index Values, driven by the unusual dewpoints, for some the highest reported in five years. Some of these values included:

Twin Cities, dewpoint 79 F, Heat Index 106 F
Rochester, dewpoint 80 F, Heat Index 106 F
Mankato, dewpoint 81 F, Heat Index 108 F
Fairmont, dewpoint 81, Heat Index 110 F
Albert Lea, dewpoint 79 F, Heat Index 107 F
Austin, dewpoint 81 F, Heat Index 110 F
Owatonna, dewpoint 81 F, Heat Index 108 F

Dodge Center, dewpoint 82 F, Heat Index 114 F
Preston, dewpoint 82 F, Heat Index 114 F
St James, dewpoint 84 F, Heat Index 118 F

Certainly the heat advisory issued by the National Weather Service was well warranted for Wednesday. Thankfully it was also relatively short-lived.

Topic: Thunderstorm climatology

The average number of days with thunderstorms each year varies across Minnesota, from about 30 days in northern counties to over 40 days for those counties along the Iowa border. This is considerably more than west coast states and the northeastern states, but less than most southern states. The state with the largest number of annual thunderstorm days is Florida, where some central counties record 100 days with thunderstorms each year. This feature of Florida's weather is the result of convergence of the sea breezes coming off both the east and west coasts, which induces lift in the warm, humid air and development of thunder clouds. Another area of relatively high frequency in thunderstorms is found in the Rocky Mountain Front Range through portions of Wyoming, Colorado, and New Mexico. In this region, topography plays an important role and helps produce 60-70 days with thunderstorms each year.

Incidentally, so far in 2010, we have recorded 18 days with thunderstorms in the Twin Cities, the most coming in June with six. Duluth has reported 11 days with thunder so far this year, International Falls has reported just 12 days with thunder (5 so far in July), and Rochester has reported 21 days with thunder.

Topic: Visit to Voyageurs National Park

If you are in the vicinity of Voyageurs National Park next weekend, please come to the Kabetogama Visitors Center on Friday night, July 23rd for a program about the new book *Voyageur Skies: Weather and the Wilderness of Minnesota's National Park*. Photographer Don Breneman and I will be talking about our new book which chronicles the history, the ecosystems and the weather of our state's National Park. You'll hear stories about weather extremes and see beautiful photos of the park in all seasons of the year.

Weekly Weather Potpourri:

A most destructive hail storm struck portions of North Dakota on Wednesday, July 14th. Many buildings and motor vehicles were damaged by the high winds and large hail, especially in Sioux County. Hail stones from golf ball size to tennis ball size were common, and one observer found 5 inch diameter hail stones, which tied the state size record from a storm back in August of 1969. You can read more about this storm and the associated damage at the NOAA/National Weather Service Bismarck Office web site...

<http://www.crh.noaa.gov/bis/>

Robert Henson, author of the Rough Guide to Climate Change, is out with a new book titled *Weather on the Air: A History of Broadcast Meteorology*. He traces the use of art and graphics in television meteorology among other points, and how the weather segments have become the most watched evening news broadcast in some markets. There is an article about his new book in the current edition of *Weatherwise* magazine.

Typhoon Conson was churning away in the South China Sea this week off the coast of Hainan, the 2nd largest island of China. It was expected to pass over the island on Friday and move near Hanoi on the weekend. Conson was packing winds of 90 mph with heavy rain bands and sea waves of 19 feet.

A heat wave visited many parts of Russia this week, bringing temperatures well into the 90s F and dewpoints in the upper 60s F to lower 70s F. Heat stress has become more common and many seek relief by going swimming or boating. Moscow was expected to see daytime temperatures stay in the 90s F through the weekend.

MPR Listener Question: Some of us are concerned about the effects of high dewpoints and high humidity on our indoor environments, especially condensation on windows, floors, railings, and other things. Wednesday's heat and humidity was especially problematic. Any chance that the high dew points above 70 F that we experienced on Wednesday will return later this month?

Answer: Indeed, it appears more heat and humidity are headed our way from July 21 to July 30. Historically this is the time of year we can get dewpoints in the 70 to 80 degrees F range. Under these conditions we certainly tend to have higher Heat Index Values (sometimes above 100 degrees F), and more condensation on surfaces that are kept much cooler than the outside air temperature (foggy windows, drippy stairways and hand railings). Of course air conditioning helps take the moisture out of the air in many buildings, and indoor fans keep the air mixed. But when the dewpoints get above 70 F even the best designed buildings may have trouble keeping the indoor humidity down.

Almanac for July 16th:

The average MSP high temperature for this date is 84 degrees F (plus or minus 7 degrees standard deviation), while the average low is 64 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for July 16th:

MSP weather records for this date include: highest daily maximum temperature of 102 degrees F in 1926; lowest daily maximum temperature of 66 degrees F in 1900; lowest daily minimum temperature of 51 degrees F in 1911 and 1958; highest daily minimum temperature of 80 degrees F in 1931; record precipitation of 1.28 inches in 1908.

Average dew point for July 16th is 61 degrees F, with a maximum of 76 degrees F in 1986 and a minimum of 42 degrees F in 1976.

All-time state records for July 16th:

Scanning the state climatic data base: the all-time high for this date is 113 degrees F at Wheaton (Traverse County) in 1936; the all-time low is 32 degrees F at Sawbill Camp (Cook County) in 1940. The all-time record precipitation amount for this date is 6.38 inches at Moorhead (Clay County) in 1993.

Past Weather Features:

The evening of July 16, 1963, between 6:00 and 11:00 pm a severe thunderstorm over Winona, Wabasha, and Olmsted Counties in southeastern Minnesota delivered up to six inches of rainfall, causing flash flooding in many areas. As many as 250 campers were evacuated from Whitewater State Park as the river flooding the campgrounds and highways. Elsewhere that evening hail up to 3 inches in diameter was reported, and there was a tornado reported in Watonwan County.

July 15-16, 1993 brought severe thunderstorms and flash flooding to portions of Clay, Becker, and Mahnomen Counties in northwestern Minnesota. Rainfall totals included 6.67" at Moorhead, 5.97" at Tamarac Wildlife Refuge, 3.90" at Georgetown, 7 inches near Hawley, and 7.50 inches at Callaway. Many basements were flooded and several roads were washed out or closed for a time. The Wild Rice and Buffalo Rivers went out of their banks and flooded nearby agricultural lands.

Word of the Week: Plowtery

A Scottish word used to describe a drizzly or showery day, often accompanied by low overcast with few sunny breaks. This type of weather would probably be welcome in Minnesota following our spell of heat and humidity this week.

Outlook:

Warm into the weekend with a chance for showers and thunderstorms later on Saturday and early Sunday. Some thunderstorms may be severe. A bit cooler on Sunday and Monday, then a chance for showers Tuesday through Thursday with a warming trend. Heat Index Values may approach 100 degrees F in some places towards the end of next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, July 23, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 23, 2010

Headlines:

- Severe Weather Frequency Above Normal
- Heavy rain and storms on July 22nd
- Visit to Voyageurs National Park
- Weekly Weather Potpourri
- MPR listener question
- Almanac for July 23rd
- Past weather features
- "Salad Days"
- Outlook

Topic: Severe Weather Frequencies Above Normal This Year

So far in 2010 the National Weather Service has reported nearly 400 cases of severe weather (flash floods, large hail, tornadoes, and damaging winds). This frequency of severe weather reports is clearly above normal. Eight more tornado reports were filed along with 40 damaging wind reports on Saturday, July 17th. According to Todd Krause, Warning Coordination Meteorologist for the National Weather Service Minnesota has seen at least 40 tornadoes so far this year. There were only 24 tornadoes reported in Minnesota last year, and 43 were reported in 2008. Todd is still documenting the damages from the storms last Saturday (July 17th) as well.

Most of the severe weather occurred over ten dates: May 23, May 24, June 17, June 21, June 25, June 26, July 10, July 13, July 14, and July 17. According to NOAA's Storm Prediction Center Minnesota recorded over 145 large hail reports and 120 damaging wind reports on these ten dates alone. No wonder the sound of chain saws cutting up broken trees has been so common around the state. In addition there have been numerous reports of flash flooding across parts of the state. You can read more at...

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=54261&source=0

Despite all the severe weather, Minnesota crops appear to be in good shape this year, with high yields expected. As of July 19th, according to Minnesota's Agricultural Statistics Office 88 percent of the spring wheat crop in good to excellent condition, 84 percent of the soybeans are in good to excellent condition, and 90 percent of the corn crop is in good to excellent condition.

Topic: Heavy Rainfall on July 22

Some areas of southern Minnesota reported heavy rainfall on Thursday, July 22nd, especially across portions of Rock, Nobles, Jackson, Martin, and Faribault Counties. Luverne set a new record with 2.08 inches, as did Fairmont with 3.18 inches. Others with significant amounts included Jackson (1.29"), Austin (1.42"), Dodge Center (1.45"), and Rochester (1.28"). A tornadoes were reported later in the day in Beltramia and Douglas Counties, the latter causing damage to a farm. The wet pattern for July is expected to continue as well.

Topic: Visit to Voyageurs National Park

If you are in the vicinity of Voyageurs National Park Friday, July 23rd, please come to the Kabetogama Visitors Center that evening (7:00 pm) for a program about the new book *Voyageur Skies: Weather and the Wilderness of Minnesota's National Park*. Photographer Don Breneman and I will be talking about our new book which chronicles the history, the ecosystems and the weather of our state's National Park. You'll hear stories about weather extremes and see beautiful photos of the park in all seasons of the year. I hope you can join us there.

Weekly Weather Potpourri:

Some areas of northeast Kentucky received 5-6 inch rains on July 21st (Wed) and many roads were flooded. Rivers and streams also went out of their banks. More rain was expected later this week in the same area.

Dryness that carried over from 2009 into 2010 has put four counties in Hawaii in extreme to exceptional drought conditions. The USDA this week designated these areas as agricultural disasters making them eligible for low interest loans through the Farm Service Agency. This is a somewhat rare conditions for Hawaii, but many important crops, and even cattle production have been severely affected by the drought.

Russia's Hydrometeorological and Environmental Monitoring Service reported this week that surveys of Arctic Sea Ice show a rapid loss so far this summer that may rival what happened in 2007, a record-setting year for loss of sea ice. Should the melting continue for the balance of summer at its present pace, arctic sea ice may shrink below the record low value of 1.6 million square miles that was reported in September of 2007.

In Tropical Weather reports this week, nothing is expected to form in the Eastern Pacific Ocean, while the National Hurricane Center is tracking Tropical Storm Bonnie as it heads for the Florida Keys. It is expected to remain a Tropical Storm and not a hurricane, but nevertheless will bring disturbed weather to the oil spill area in the Gulf. Elsewhere Tropical Storm Chanthu was churning away in the Western Pacific Ocean northwest of Zhanjian, China on Thursday this week with winds of 75 mph and sea waves of 12 feet. It was expected to dissipate over the sea just northwest of Vietnam by the weekend.

Former chief meteorologist for the National Weather Service, Craig Edwards is highlighted as one of the unique features of Target Field in this week's news reporting by WCCO television. He

serves the Twins as game-day meteorologist, forecasting just prior and during the home games there. This is thought to be a completely unique position within Major League Baseball, and further Craig does a good job at it....you can read more at...

<http://wcco.com/10best/target.field.unique.2.1800223.html>

Earlier this week, NOAA-NCDC reported global and USA climate anomalies for June. Globally for the land surface stations it was the warmest June in history, and the 4th consecutive record-setting warm month. For the oceans it was the 4th warmest June on record. Other highlights and features of the recent climate can be found in this report at...

<http://www.sciencedaily.com/releases/2010/07/100718233311.htm>

MPR Listener Question: With so much severe weather reported in Minnesota so far this summer do you see this trend continuing for the rest of the season?

Answer: Yes, I do. The NOAA CPC favors a continued trend towards warmer and wetter conditions for the balance of this month and into early August. We will see dewpoints likely reach the 70s F again and that represents a great deal of latent energy that can fuel convection. In addition, with the La Nina episode developing in the equatorial Pacific Ocean the historical correlation favors a continued northerly displacement of the jet stream across the U.S. such that many weather disturbances will be directed across our state. Under this scenario we should have a higher probability of more thunderstorms during the balance of summer.

Almanac for July 23rd:

The average MSP high temperature for this date is 84 degrees F (plus or minus 7 degrees standard deviation), while the average low is 64 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for July 23rd:

MSP weather records for this date include: highest daily maximum temperature of 105 degrees F in 1934; lowest daily maximum temperature of 67 degrees F in 1962; lowest daily minimum temperature of 47 degrees F in 1876; highest daily minimum temperature of 80 degrees F in 1934; record precipitation of 9.15 inches in 1987.

Average dew point for July 23 is 60 degrees F, with a maximum of 81 degrees F in 2005 and a minimum of 40 degrees F in 1998.

All-time state records for July 23rd:

Scanning the state climatic data base: the all-time high for this date is 108 degrees F at Maple Plain, Milan, and Mora in 1934; the all-time low is 28 degrees F at Kelliher (Beltrami County) in 2002. The all-time record precipitation amount for this date is 9.15 inches at MSP International Airport in 1987.

Past Weather Features:

On this date in 1934 many parts of the state were still in the grip of a 7 day heat wave when average daily high temperatures ranged from 95 to 113 degrees F. With an overnight low of 80 degrees F, many Twin Cities residents slept on porches or outside on the lawn to avoid dehydration overnight. Thunderstorms on July 25th brought some much needed rain to parched crops in western Minnesota.

This week in 1962 was a cold one bringing overnight lows in the 40s and lows 50s F and daytime highs in the 60s and 70s F. Crops were running behind normal in development. Over 25,000 fans watched the Minnesota Twins beat the Detroit Tigers 8-1, but it was a cold night at the old Met Stadium with temperatures falling from the low 60s into the upper 50s F. Sweaters and windbreakers were needed as fans watched Bob Allison and Rich Rollins home runs carry the Twins to victory.

The evening of July 23, 1987 brought devastating flash floods to the Twin Cities Metro area. Dewpoints reached the low to mid 70s F indicating a huge amount of water vapor in the air. Over a period of six hours (7:00 pm to 1:00 am) 10 inches of rain fell at MSP airport. Mound reported over 8 inches, St Paul and Hastings reported nearly 5.50 inches, and Rosemount nearly 6 inches. Flooding was widespread, with parts of I494 and I94 closed for a period of time.

July 23, 2005 brought record-setting high dewpoints and Heat Index Values to parts of Minnesota. A new state record high dewpoint was set that afternoon at Pipestone and St James with a reading of 86 degrees F (a Persian Gulf type number). Heat Index Values ranged from 110 to 120 degrees F across southern Minnesota locations, and Pipestone tied the state record high Heat Index with 125 degrees F during the afternoon. Many citizens avoided the stress by simply staying indoors where they had some air conditioning.

Word of the Week:

Salad Days of Summer

Shakespeare used the term "salad days" to describe a time of youthful inexperience. However in more modern times, this term is used to describe the time of summer when sunny days and warm nights chase away our hunger for hot foods and we turn to cool drinks, ice cream and salads. Of course it also happens to be the time of year when fresh ingredients for salads are in great abundance. Witness the success of the many Farmer's Market in major urban areas around the state. Marketing research has indeed shown that our diets and drinking habits are related closely to weather conditions and many food retailers stock up on appropriate foods for the peak of "salad days" in the good old summertime.

In fact marketing research also shows that the public get their daily dose of weather information more from radio and less from television during the summertime since many more activities keep people away from their television sets.

Outlook:

Partly cloudy over the weekend with a chance for showers and thunderstorms on Saturday. Drier on Sunday and Monday with warmer temperatures and higher dewpoints into next week. Chance of showers and thunderstorms again by Tuesday and Wednesday.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

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Minnesota WeatherTalk Newsletter for Friday, July 30, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 30, 2010

Headlines:

- Dewpoint Driven Discomfort
- Wet up North
- Dr. Stephen Schneider
- Weekly Weather Potpourri
- MPR listener question
- Almanac for July 30th
- Past weather features
- Sukhovei
- Outlook

Topic: Dewpoint Driven Discomfort

On Tuesday, July 27 this week very high dewpoints, ranging from the lows 70s F to low 80s F, combined with warmer than normal temperatures to push the Heat Index to 100 degrees F or higher in many areas of the state. Some communities that reported Heat Index Values of 100 F or higher on Tuesday afternoon included: Red Wing, Dodge Center, Preston, Mankato, New Ulm, Fairmont, Marshall, Redwood Falls, Montevideo, Appleton, Benson, Madison, Morris, St Cloud, Princeton, Cambridge, Willmar, Glencoe, Twin Cities, Sauk Center, Litchfield, Buffalo, Granite Falls, Canby, Pipestone, Worthington, Rochester, and Austin. The highest Heat Index reported was 114 degrees F at St James. Many areas, especially across central Minnesota counties, reported large hail and strong winds, ranging from 50 to 70 mph. Record rainfall amounts were reported on Tuesday for Fargo, ND with 1.82 inches, Hawley with 1.73 inches, and Bruno with 2.60 inches. Fortunately a drier air mass moved in by Wednesday, dropping dewpoints by 15 to 20 degrees F into the more comfortable 50s and 60s F.

Topic: Wet July Up North

Rainfall in July has been abundant in far northern Minnesota. Kabetogama along the Canadian border reports 9.98 inches so far, while International Falls reports 8.59 inches. Across the border in Kenora, Ontario they report 8.62 inches this month as well. For some it is the wettest July since 1966.

Topic: On the passing of Dr. Stephen Schneider

One of the most well known and published climate scientists, Dr. Stephen Schneider of Stanford University passed away from a heart attack on July 19th. Many colleagues have contributed obituaries and remembrances. Some can be found at...

<http://www.economist.com/node/16690669>

<http://www.realclimate.org/>

<http://www.nytimes.com/2010/07/20/science/earth/20schneider.html?scp=2&sq=Stephen%20Schneider&st=cse>

Dr. Schneider was founder and editor of the journal *Climate Change*. He was also a prolific writer, a mentor to many young scientists, and an advocate for doing something about climate change. He was widely admired and respected. I only spoke to him a few times throughout his career, but he was always helpful and encouraging when it came to public engagement about climate science. He clearly challenged scientists to think about the concepts of duty and freedom when it came to discussion and pragmatic application of new scientific knowledge. His position, mostly by his own example, was that duty calls us to engage the public about the implications of new scientific knowledge, and that the uncertainty dimension of that knowledge should not hold us back from expressing our own views as citizens. In order to do that we need to express our values and views relative to society and the freedoms afforded us by the government. In so doing we risk negative public reaction, but that alone should not prevent us from exercising our duty as citizens to bring new knowledge to the table in dealing with major societal problems and issues. In regards to adaptation or mitigation strategies and measures to deal with climate change, Dr. Schneider recognized that there will always be tension provoked by the actions taken when they are founded on uncertain or probabilistic deployment of new knowledge. But to do nothing is a mistake, especially for future generations.

Weekly Weather Potpourri:

Members of the NOAA National Climate Extremes Committee are considering a new record hail stone size resulting from thunderstorms and hail over Vivian, SD earlier this month on July 23rd. A hail stone that was 8 inches in diameter and a circumference of 18.5 inches was collected. The current record-holder is a hail stone from Aurora, NE on June 22, 2003 which was 7 inches in diameter with a circumference of 18.75 inches.

NOAA also reported this week that according to scientists from 48 countries this past decade was the warmest on record globally based on many different measurements of the atmosphere and oceans. In conjunction three climate indicators are declining: Arctic sea ice, glaciers, and the extent of spring snow cover in the Northern Hemisphere. You can read more about this report at...

http://www.noaanews.noaa.gov/stories2010/20100728_stateoftheclimate.html

Portions of Russia continue to suffer from heat waves, drought, and wildfires. The Russian small grain crop is likely to suffer from reduced yields this year as rainfall has been grossly inadequate

in many areas. In some areas Russian officials say it is the worst drought in 130 years. You can read more at...

<http://www1.voanews.com/english/news/europe/Russias-Heat-Wave-Wilts-Crops-Nation-99125084.html>

A paper published in the current edition of the International Journal of Climatology documents the trend in hot days and heat waves across China over the last several decades (1961-2007). There is a clear trend towards a higher frequency of hot days (95 F or greater) since the 1990s in most areas. Trends in heat waves (3-5 days duration) were variable, but of higher frequency along the southeast coast and the north. You can read more at..

<http://www3.interscience.wiley.com/journal/122539200/abstract>

MPR Listener Question: What with all this talk about dewpoints and discomfort this month, I was wondering about the other end of the spectrum, dry air in July. What is the lowest dewpoint measured in July? Is it even lower in August?

Answer: We do not have dewpoint histories from all locations in Minnesota, but I can use the Twin Cities records. The lowest dewpoint in July for the Twin Cities was 33 degrees F on July 27, 1934 (Dust Bowl Era). This was associated with a relative humidity of only 25 percent. The Twin Cities dewpoint in August was 26 degrees F on August 25, 1934. This was associated with an afternoon relative humidity of only 20 percent and a high fire danger.

Almanac for July 30th:

The average MSP high temperature for this date is 82 degrees F (plus or minus 7 degrees standard deviation), while the average low is 63 degrees F (plus or minus 6 degrees standard deviation).

MSP Local Records for July 30th:

MSP weather records for this date include: highest daily maximum temperature of 100 degrees F in 1933; lowest daily maximum temperature of 63 degrees F in 1956; lowest daily minimum temperature of 50 degrees F in 1889 and 1971; highest daily minimum temperature of 79 degrees F in 2006; record precipitation of 1.65 inches in 1872.

Average dew point for July 30 is 60 degrees F, with a maximum of 81 degrees F in 1999 and a minimum of 35 degrees F in 1936.

All-time state records for July 30th:

Scanning the state climatic data base: the all-time high for this date is 107 degrees F at Milan (Chippewa County) in 1933; the all-time low is 27 degrees F at Two Harbors (Lake County) in 1964. The all-time record precipitation amount for this date is 4.84 inches at Dodge Center (Dodge County) in 1950.

Past Weather Features:

On July 30, 1872 strong thunderstorms passed across Minnesota, bringing record setting rains to many counties. At St Paul 1.65 inches was reported, while Duluth reported 1.72 inches, Fort Ripley 1.29 inches, New Ulm 1.10 inches and Hutchinson 4.00 inches. It was just one of many thunderstorms during the month of July, 1982. Hutchinson ended up reporting a record wet month with 12.35 inches of rainfall.

On July 30, 1933 twelve Minnesota communities reported a high temperature of 100 degrees F or higher. At Beardsley it marked the 6th consecutive day with temperatures of 100 degrees F or greater. Fortunately strong thunderstorms and a cold front brought cooler temperatures on the 31st, as the mercury dropped to just 49 degrees F at Beardsley.

July 29-30, 1999 are remembered as two of the most uncomfortable days in Minnesota history. Dew point temperatures in the mid to upper 70's were prevalent across the state, with many locations in southern Minnesota reaching values exceeding 80 degrees. At 1100 AM on July 30 the dew point temperature at the Twin Cities International Airport reached 81 degrees. Combined with temperatures in the 90s F the dewpoints helped elevate heat index values to at least 110 degrees in many southern Minnesota communities. The Twin Cities heat index reached 115 degrees F during the afternoon, second highest to the value of 119 degrees F, that occurred on July 11, 1966.

Word of the Week: Sukhovei

This is a Russian word (soo-co-vay) which refers to a dry, hot wind that sweeps across the steppes of Central Asia periodically. It can be very destructive in magnifying drought and increasing wildfire danger. In the prairies where wheat is grown this wind can deprive farmers of good yields, or even blow down crops making them difficult to harvest. Such has been the case in some areas of Russia this month where the sukhovei has blown with some frequency during a prolonged hot, dry spell.

Outlook:

Near seasonal average temperatures into the weekend. Chance of showers and thunderstorms later on Sunday, then Monday and early Tuesday. Drier by Wednesday with temperatures a few degrees cooler.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, August 13, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 13, 2010

Headlines:

- Sultry August
- Record rainfalls on the 10th
- Comparing Sultry Climates
- Special Notice-Event next month
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for August 13th
- Past weather features
- Sultry
- Outlook

Topic: Sultry August Sets Some Records

MSP Airport reports the following climate records this month so far:
High of 96 degrees F on August 8th ties record maximum from 1914
High of 95 degrees F on August 9th ties record maximum from 1947
Low of 76 degrees F on August 9th breaks record of warmest low (75 F in 1936)
Dewpoint of 76 degrees F on August 8th breaks record for highest dewpoint (75 F in 1995)
Dewpoint of 75 degrees F on August 10th tied the record for highest dewpoint (in 1938)

In addition 10 days so far this month have brought dewpoints of at least 70 F to the Twin Cities, and for the summer roughly 200 hours of 70 F or greater dewpoints have been reported, the greatest amount since the summer of 2004. More on the high dewpoints and moisture can be found at the National Weather Service web site....

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=56299&source=0

Topic: Record Rainfalls on August 10th and 13th

Many observers reported record-setting rainfall amounts on August 10th (Tuesday). West-central Wisconsin communities reported 3 to 6 inches of rainfall with widespread flash flooding and wet basements, especially in St Croix and Pierce Counties. But many Minnesota communities reported high winds and record-setting rainfall as well, including: MSP Airport 2.47 inches, Hastings 3.31 inches, Fosston 2.12 inches, Flying Cloud Airport 3.42 inches, Jordan 2.23 inches,

University of Minnesota St Paul 4.23 inches, and Lower St Anthony Falls 4.85 inches. Other amounts included 4.72 inches in Lauderdale, 2.70 inches in Woodbury, and 3.64 inches at Target Field.

Yet more heavy rains occurred during the evening of August 12th and early morning of August 13th. Many locations, including Paynesville, Hutchinson, Burnsville, Willmar, Glenwood, and Zumbrota reported over 2 inches of rainfall. At Zumbrota a record 4.05 inches was reported. Several observers reported strong winds associated with these storms as well, and one tornado was reported in Lac Qui Parle County.

Topic: Comparing Sultry Climates (Southern MN and the Florida Keys)

August dewpoints at many locations have been near record-setting, with a number of places reported values of 80 degrees F or higher. For residents of St James, MN (Watonwan County) the month has not been unlike living in Key West, FL. In fact comparing some of the dewpoint readings, along with the Heat Index Values (calculated from air temperature and dewpoint) suggests that residents of St James have had to cope with more tropical-like weather than residents of Key West. The list below shows a day by day comparison of afternoon dewpoints and Heat Index Values for selected dates in August, 2010 at the two locations:

August 2: Key West dewpoint 77 F, Heat Index 103 F; St James dewpoint 81 F, Heat Index 95 F

August 3: Key West dewpoint 79 F, Heat Index 105 F; St James dewpoint 82 F, Heat Index 109 F

August 7: Key West dewpoint 79 F, Heat Index 108 F; St James dewpoint 81 F, Heat Index 106 F

August 8: Key West dewpoint 79 F, Heat Index 108 F; St James dewpoint 86 F, Heat Index 122 F

August 9: Key West dewpoint 77 F, Heat Index 90 F; St James dewpoint 82 F, Heat Index 111 F

August 10: Key West dewpoint 77 F, Heat Index 90 F; St James dewpoint 81 F, Heat Index 106 F

Special Notice: Event Next Month

Earlier this month, United Kingdom Environmental Secretary Caroline Spelman spoke about the need to prepare for climate change across all sectors of government and within the business community. "We know that some level of [climate] change is now unavoidable and it is the responsibility of us all to think about what a changing climate will mean for our health, our businesses and our way of life. By planning for the adaptation we need now we can ensure that the UK is best placed to meet the challenges of climate change head-on. A warmer climate will bring both opportunities and challenges for businesses of all sizes. I want to ensure that UK businesses are well placed to take advantage of the new opportunities that arise as well as ensuring they are ready for the difficulties that higher temperatures and more adverse weather could mean for their staff and working practices."

In the United States according to the Pew Center for Global Climate Change 38 states have already documented comprehensive climate action plans, and at least 21 states have Climate

Adaptation Plans to adjust to changes anticipated or already occurring in their respective climate patterns. Minnesota is working in this direction as well. The University of Minnesota Landscape Arboretum in Chaska is hosting a two-day event next month (Sept 16-17) called Clean Water and Climate Adaptation Summit 2010. Anyone can register for this program and to learn more about it you can go to the web site...

<http://www.arboretum.umn.edu/cleanwaterclimatechangeadaptationsummit.aspx>

The 18th Annual Kuehnast Lecture Program will be part of this event on the evening of September 16, starting at 7:00 pm. Speakers this year are Dr. Ben Santer from Lawrence/Livermore National Laboratory in California, and Dr. Eileen Shea from NOAA Climate Services. They will present modeling and data tools for assessing climate adaptation strategies.

Weekly Weather Potpourri:

Over August 7-9 (Sunday-Tuesday) this week Ames, IA received close to 9 inches of rainfall, causing widespread flooding there. Squaw Creek and South Skunk River burst their banks and flooded much of the southern part of the city, as well as the Iowa State University campus. Reports from the National Weather Service Office in Des Moines can be seen at...

http://www.crh.noaa.gov/news/display_cmsnews.php?wfo=dmx

Tropical Storm Dianmu moved across the Sea of Japan with winds of 50-60 mph this week, creating sea waves of 15 feet, and heavy rainfall. It was delivered heavy rain to portions of northern Japan.

Very heavy monsoon rains have plagued parts of Pakistan, killing more than 1600 hundred people and displacing millions more. Authorities estimate that 2.6 million acres of cropland has been inundated. Many relief efforts are being organized there. More information and images can be found at...

<http://www.bbc.co.uk/news/world-south-asia-10904903>

<http://earthobservatory.nasa.gov/IOTD/view.php?id=44991>

AccuWeather released its own winter outlook for the United States earlier this week. It is primarily based on the historical climate correlations that result from the continued presence of a La Nina episode in the equatorial Pacific Ocean. As such, for much of Minnesota the AccuWeather outlooks sees a cold and snowy winter. Good news for those who like winter time recreation opportunities in our state.

NOAA officially reopened 5,000 square miles of previously closed Gulf fishing waters this week. This region lies 115 miles northeast of the Deepwater/BP wellhead that was formerly leaking. Resumption of fishing activity was still problematic this week as disturbed weather

associated with tropical depression number 5 was threatening the area. This system was expected to develop into a tropical storm.

You can read more at...

http://www.noaanews.noaa.gov/stories2010/20100810_fishreopening.html

MPR Listener Question: Can you tell me if on the average there are more days with 70 degree dew points or 90 degree temperatures? I am not a fan of sweating so I like the 90 degrees F temperatures a lot better than these 70 degrees F dew points.

Answer: Using the Twin Cities climate records since 1980 the average number of days each year with dewpoints of 70 F or higher is 23, while the average number of days with 90 F air temperatures is 12. So the high dewpoint days that make you so uncomfortable are about twice the frequency. The all-time record year for dewpoints of 70 F or higher is 2002 with 48 days, while the all-time record for days when the maximum air temperature was 90 degrees F or higher is 1988 with 44 days.

MPR Listener Question: I was in Ottertail County last Saturday evening (Aug 7) during severe weather which included a tornado earning. Once the worst of the weather passed, I went outside and heard constant thunder that never broke or varied in sound and lasted well over an hour. New to me... what was it?

Answer: Continuous rolling thunder is most often the result of cloud to cloud lightning strikes, which out-number cloud to ground lightning strikes. Without examining the radar animation for the evening of August 7th it is difficult to determine the extent of the thunderstorm complex that was migrating across Ottertail County. But reports from observers suggest it passed over you between 7:00 pm and 8:30 pm. The large complex of thunderstorm cells also passed across Wadena County to the east and Douglas County to the south, where it was still raining and producing thunder as late as 9:30 pm. Since you can still hear thunder from distances of 10-12 miles I suspect you were hearing the frequent cloud to cloud, and cloud to ground strikes from some distance away as a continuous rumble.

MPR Listener Question: I very much enjoy going up to northeastern Minnesota, but there's no denying the mosquitoes, gnats, and biting flies are a significant deterrent to spending time in the woods. When does the Arrowhead region typically get its first frost hard enough to put a significant dent in the mosquito population each fall?

Answer: Northeastern Minnesota weather observers reported average first fall frost between September 15 and September 22. However, it has been my experience that mosquito populations are set back by overnight temperatures in the 30s F, and that can happen as early as the first ten days of September in that section of the state.

MPR Listener Question: How does Minnesota rate against other states for of extreme perceived weather as measured by a heat-index-to-wind-chill-index spread?

Answer: There is no definitive answer available, because of lack of data from many other states. In Minnesota our highest Heat Index Value has been 125 degrees F which occurred in July of 1999 and 2005. On January 10, 1982 observers in the Red River Valley of Minnesota reported windchill readings of -71 degrees F. These extreme values of Heat Index and Windchill are probably matched in states like MT, WY, ND, but that is just a guess.

Almanac for August 13th:

The average MSP high temperature for this date is 81 degrees F (plus or minus 7 degrees standard deviation), while the average low is 61 degrees F (plus or minus 5 degrees standard deviation).

MSP Local Records for August 13th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1880; lowest daily maximum temperature of 63 degrees F in 1951; lowest daily minimum temperature of 48 degrees F in 1924 and 1997; highest daily minimum temperature of 71 degrees F in 1944; record precipitation of 2.05 inches in 2007.

Average dew point for August 13th is 60 degrees F, with a maximum of 78 degrees F in 1995 and a minimum of 37 degrees F in 1933.

All-time state records for August 13th:

Scanning the state climatic data base: the all-time high for this date is 108 degrees F at Beardsley (Big Stone County) in 1965; the all-time low is 25 degrees F at Kelliher (Beltrami County) in 2002. The all-time record precipitation amount for this date is 6.41 inches at the Grand Meadow (Mower County) in 1911.

Past Weather Features:

About 7:30 pm on the evening of August 14, 1978 a tornado raced across portions of the Boundary Waters Canoe Area in northern St Louis County. Many docks, boats, and resort buildings were damaged along Burntside Lake and Jackfish Bay. Significant tree damage occurred around Virginia and Ely. The tornado was on the ground for 15 miles.

On August 13, 1988, in the middle of a terrible drought both Cotton and Hibbing reported historic August rainfall amounts. Heavy thunderstorms lasting most of the afternoon and early evening delivered 5.75 inches at Hibbing and 5.84 inches at Cotton. These are the largest single day rainfall amounts ever reported from those two Minnesota communities.

August 13, 2001 brought a morning low temperature of 27 degrees F to Kelliher (Beltrami County), just one of 20 summer frosts that occurred there that summer. One year later, August 13, 2002 brought a morning low of 25 degrees F to Kelliher, one of 9 summer frosts that occurred that year.

Word of the Week: Sultry

This term has various connotations, but in meteorology it is commonly used in many states (along with the term swelter) to refer to hot and humid conditions, where the air feels "close" or even "oppressive." Forecasters may use the term when they expect high dew points, or combinations of high temperature and high humidity. It is used frequently in the tropical latitudes, but certainly was appropriate for Minnesota this week with record high dewpoints and Heat Index values over 100 degrees F. Under such conditions thermo-regulation (stability of body temperature) for humans and animals becomes a challenge.

Outlook:

Cooler with lower dewpoints over the weekend. Lingering chance of showers especially in the north on Saturday. Generally cooler and drier Sunday into Monday. Chance of showers again by Tuesday and Wednesday next week, as temperatures remain near normal.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, August 20, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 20, 2010

Headlines:

- Comparing 1993 and 2010 Summer Rainfall
- June 17 Tornado Summary Available
- State Fair Weather Quiz on August 26th
- Climate Adaptation and Clean Water Summit
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for August 20th
- Past weather features
- Mushroom weather
- Outlook

Topic: Comparing 1993 and 2010 Summer Rainfall

Recent media coverage on the flooding in Iowa has highlighted some similarities between the summers of 1993 and 2010 in terms of heavy rainfall. You can find more at...

http://www.weather.com/blog/weather/8_22649.html (the Weather Channel)

http://www.climate.umn.edu/doc/journal/wet_summer_2010.htm (the Minnesota State Climatology Office)

I thought it might be useful to do a similar comparison for Minnesota since most of our weather observers have seen above normal rainfall this summer as well. Normal total rainfall for June through August ranges from 10 inches in the far northwest to nearly 14 inches in southeastern Minnesota. So rainfall totals of 18 inches or greater over the three months represents 150 percent or normal or greater in terms of departures.

Back in 1993 much of central and southern Minnesota reported 150 percent of normal or greater for the summer months (June-August), with many areas reporting well over 20 inches. The average summer rainfall that year across southwestern Minnesota was over 22 inches, while the averages across south-central and southeastern counties were 23 and 21 inches respectively. Wettest ever summers were recorded at Lake Wilson with 26.90 inches, Albert Lea with 27.01 inches, Fairmont with 28.63 inches, and Bricelyn with 30.31 inches. Region-wide there were many reports of flooding on watersheds of all sizes.

In 2010 some Minnesota observers have already reported summer rainfall totals that exceed 18 inches, and there are still 11 days to go in August. But the huge surplus of rainfall is not as widespread across the state as it was in 1993. In fact areas of greatest surplus on rainfall this summer are widely dispersed. For example both Hinckley and Winona have seen rainfall totals of nearly 20 inches this summer, while Hampton (Dakota County), Farmington (Dakota County), Blue Earth (Faribault County), Lanesboro (Fillmore County), and Kingsley Corner (Olmsted County) have already reported over 20 inches. Waseca, Winnebago, and Rosemount are not far behind having already reported over 18 inches of summer rainfall. Great as these numbers are they are no where near the record quantities of rainfall reported from Des Moines (27.89 inches), Ames (26.89 inches), or Ottumwa (27.89 inches) in Iowa. Yet, there are still 11 days to go in August and the outlook calls for above normal rainfall during this period. So we may see some records approached in Minnesota as well.

Topic: June 17, 2010 Tornadoes Summarized

Todd Krause, Warning Coordination Meteorologist with the National Weather Service in Chanhassen, MN has posted a summary of the tornado events of June 17th. He reports that 24 of the 25 tornadoes reported within the Chanhassen forecast jurisdiction were videotaped. In total it appears that there were about 40 tornadoes statewide that day. There have been many more since and Krause thinks the record annual number of Minnesota tornadoes, 74 in 2001, will likely be exceeded. Read more at...

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=56725&source=0

Topic: 14th Annual Minnesota Weather Quiz on MPR's Midday, August 26th

Minnesota Public Radio's Midday program will be the first MPR broadcast from the State Fair again this year on Thursday, August 26, from 11:00 am to 1:00 pm. During the first hour we will host the 14th Annual Minnesota Midday State Fair Weather Quiz. If you are curious about weather events and headlines from the past year and want to learn something, please tune in to MPR that day.

Topic: Clean Water and Climate Adaptation Summit, September 16-17, 2010

Earlier this month, United Kingdom Environmental Secretary Caroline Spelman spoke about the need to prepare for climate change across all sectors of government and within the business community. "We know that some level of [climate] change is now unavoidable and it is the responsibility of us all to think about what a changing climate will mean for our health, our businesses and our way of life. By planning for the adaptation we need now we can ensure that the UK is best placed to meet the challenges of climate change head-on. A warmer climate will bring both opportunities and challenges for businesses of all sizes. I want to ensure that UK businesses are well placed to take advantage of the new opportunities that arise as well as ensuring they are ready for the difficulties that higher temperatures and more adverse weather could mean for their staff and working practices." In the United States according to the Pew Center for Global Climate Change at least 38 states have already documented comprehensive climate action plans, and at least 21 states have Climate Adaptation Plans to adjust to changes

anticipated or already occurring in their respective climate patterns. Minnesota is working in this direction as well. The University of Minnesota Landscape Arboretum in Chaska is hosting a two-day event next month (Sept 16-17) called Clean Water and Climate Adaptation Summit 2010. Anyone can register for this program and to learn more about it you can go to the web site...

<http://www.arboretum.umn.edu/cleanwaterclimatechangeadaptationsummit.aspx>

The 18th Annual Kuehnast Lecture Program will be part of this event on the evening of September 16, starting at 7:00 pm. Speakers this year are Dr. Ben Santer from Lawrence/Livermore National Laboratory in California, and Dr. Eileen Shea from NOAA Climate Services. They will present modeling and data tools for assessing climate adaptation strategies. More about the Kuehnast Program at...

http://climate.umn.edu/doc/journal/kuehnast_lecture/

Weekly Weather Potpourri:

Recent reports from NASA scientists reveal the extent of declining Mangrove Forest ecosystems in the tropics and subtropics. The rate of loss in these ecosystems is higher than expected and likely related to changing climatic patterns. You can read more at...

<http://www.sciencedaily.com/releases/2010/08/100818085932.htm>

With a few months to go in the tropical storm and hurricane season for the North Atlantic Basin, the National Weather Service in Miami, FL has published a nice summary of August storm climatology. It makes for some interesting reading. You can find it at..

http://www.srh.noaa.gov/images/mfl/news/August_SoFLTC.pdf

After months of oppressive heat, drought, and wildfires, Russia was receiving some relief this week associated with a large-scale mid-latitude cyclone moving across the country. A wide cloud shield with significant rainfall was bringing much needed moisture to many areas, and behind the front was much cooler and drier air which was expected to bring widespread relief, especially to citizens without the benefit of air conditioning. Temperatures there over the weekend were mostly expected to be in the 50s and 60s F.

MPR Listener Question: Can you tell me how many Twins games have been postponed due to weather during the first season at Target Field?

Answer: I checked with friend Craig Edwards who is the game-day meteorologist for the Twins. So far only two games have been postponed due to weather. The game against Baltimore on May 7th was called off even before it began due to rain. It was played the next day as part of a double-header. The game against the Yankees on May 25th was postponed in the middle innings and resumed the next day as part of a day-night double-header. That's pretty good luck with the weather so far this year.

Almanac for August 20th:

The average MSP high temperature for this date is 80 degrees F (plus or minus 7 degrees standard deviation), while the average low is 60 degrees F (plus or minus 5 degrees standard deviation).

MSP Local Records for August 20th:

MSP weather records for this date include: highest daily maximum temperature of 97 degrees F in 1976; lowest daily maximum temperature of 62 degrees F in 1966; lowest daily minimum temperature of 40 degrees F in 1950; highest daily minimum temperature of 74 degrees F in 1906, 1955, and 1959; record precipitation of 2.23 inches in 1891.

Average dew point for August 20th is 58 degrees F, with a maximum of 78 degrees F in 1959 and a minimum of 28 degrees F in 2004.

All-time state records for August 20th:

Scanning the state climatic data base: the all-time high for this date is 105 degrees F at Campbell (Wilkin County) in 1976; the all-time low is 25 degrees F at Alborn (St Louis County) in 1934. The all-time record precipitation amount for this date is 8.00 inches at Worthington (Nobles County) in 1913.

Past Weather Features:

On August 21, 1883 an F-5 tornado (winds greater than 260 mph) passed through Rochester, MN damaging or destroying more than 300 homes. It was on the ground for 25 miles and derailed a train causing many injuries and killing a crew member. Over the period from 3:30 pm to 7:30 pm other tornadoes were observed elsewhere in SE Minnesota that day. In total 40 lives were lost.

On the evening of August 20, 1904 strong winds and tornadoes struck in parts of Carver, McLeod, Hennepin, Ramsey, and Washington Counties. Waconia was hit by an F-4 tornado (winds 207-260 mph). A section of the high bridge over the Mississippi River near St Paul was blown down, and the Tivoli Concert Hall in downtown St Paul was heavily damaged. In total the storms killed 15 people.

Overnight on August 19-20, 1913 heavy thunderstorms with frequent lightning strikes caused considerable damage near Worthington, MN. Rainfall totaled 8 inches, the greatest single day amount for that location. Many fields were flooded.

By August 20, 1959 a heat wave had its grip on Minnesota. Many observes reported temperatures in the 90s F with oppressive dewpoints in the 70s F. For residents of Tracy, MN it was the 13th day in August with a temperature of 90 degrees F or greater. Heat Index values ranged from 100 degrees F to 108 degrees F.

Word of the Week: Mushroom weather

A term used sometimes in Europe to describe warm and damp conditions that favor the emergence and development of mushrooms, especially the edible kinds that are hunted. Certainly our weather in Minnesota this month fits this criteria, but I don't get many reports of mushrooms.

Outlook:

Warming trend into the weekend with highs reaching the mid 80s to low 90s F by Sunday. Chance of scattered showers and thunderstorms by Monday, then better chances on Tuesday. Cooler temperatures by mid-week and drier too.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

<http://www.climate.umn.edu/Seeley/>

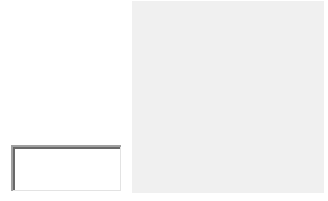
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Minnesota WeatherTalk Newsletter for Friday, August 27, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 27, 2010

Headlines:

- Coolest Air of the Month
- Wet August for Many
- MPR "Midday" State Fair Weather Quiz
- Climate Adaptation and Clean Water Summit
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for August 27th
- Past weather features
- Climatotherapy
- Outlook

Topic: Coolest Air of the Month

Just in time to start the State Fair run, a cool, dry Canadian air mass descended on the state this week. Overnight lows dropped into the 40s and 50s F and most people had a chance to "air out" their homes and apartments. Up north observers reported some overnight lows in the 30s F for Thursday morning, August 26th. Some of the lowest readings included: 36 F at Embarrass and Grand Marais Airport, 37 F at Silver Bay,

38 F at Tower, and 39 degrees F at International Falls, Cook, Ely, Orr, and Hibbing. This spell of cool weather is expected to be short-lived however.

Topic: Wet Month of August for Many

Over half of the Minnesota weather observers have reported above normal rainfall during the month of August. Many have reported over 5 inches. Some of the wetter spots include Collegeville with 7 inches, Hinckley with 7.50 inches, and Melrose with over 8 inches. Chances are the last few days of the month will bring additional rainfall as well, along with higher humidity and warmer temperatures.

Topic: Take the State Fair Weather Quiz

On MPR's Midday program we broadcast the annual State Fair Weather Quiz on Thursday this week (August 26th). There was a good crowd and we gave away the 2011 Minnesota WeatherGuide Calendar as a prize for those participating in the quiz. In fact, if you want to buy the new Minnesota WeatherGuide Environment Calendars from the Freshwater Society you can go to the KARE-11 booth at the State Fair or order them online from the Freshwater Society at....

<http://www.freshwater.org/index.php/calendars>

You can also take the State Fair Weather Quiz yourself by going to...

<http://minnesota.publicradio.org/features/2010/08/26-weather-quiz/index.shtml>

Or if you wish you can read about State Fair weather history all the way back to 1885 by going to the Minnesota State Climatology Office web site at....

http://www.climate.umn.edu/doc/journal/state_fair_weather_10.htm

Topic: Clean Water and Climate Adaptation Summit, September 16-17, 2010

Earlier this month, United Kingdom Environmental Secretary Caroline Spelman spoke about the need to prepare for climate change across all sectors of government and within the business community. "We know that some level of [climate] change is now unavoidable and it is the responsibility of us all to think about what a changing climate will mean for our health, our businesses and our way of life. By planning for the adaptation we need now we can ensure that the UK is best placed to meet the challenges of climate change head-on. A warmer climate will bring both opportunities and challenges for businesses of all sizes. I want to ensure that UK businesses are well placed to take advantage of the new opportunities that arise as well as ensuring they

are ready for the difficulties that higher temperatures and more adverse weather could mean for their staff and working practices.” In the United States according to the Pew Center for Global Climate Change at least 38 states have already documented comprehensive climate action plans, and at least 21 states have Climate Adaptation Plans to adjust to changes anticipated or already occurring in their respective climate patterns. Minnesota is working in this direction as well. The University of Minnesota Landscape Arboretum in Chaska is hosting a two-day event next month (Sept 16-17) called Clean Water and Climate Adaptation Summit 2010. Anyone can register for this program and to learn more about it you can go to the web site...

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http://climate.umn.edu/doc/journal/kuehnast_lecture/

Weekly Weather Potpourri:

New research from the University of Edinburgh provides some tools to assess the effects of climate change on the deterioration of historic buildings and monuments. Researchers hope that this work can be used by preservationists to help maintain historical sites as the climate changes during the next 50-100 years. You can read more about this at...

<http://www.sciencedaily.com/releases/2010/08/100823113422.htm>

This week, the NOAA National Hurricane Center was issuing advisories on Hurricane Frank in the Eastern Pacific Ocean (south of Baja California), Hurricane Danielle in the North Atlantic (SE of Bermuda), and Tropical Storm Earl in the central North Atlantic. Hurricane Frank may bring some rain to the southern tip of Baja California early next week. Earl was expected to intensify and become a hurricane by Sunday, while Danielle, currently a class 4 hurricane (winds of 135 mph) is expected to move north and east of Bermuda and slowly weaken early next week. Yet another tropical wave was forming east of Earl in the North Atlantic as well. The Hurricane Center expects a busy month of September.

The latest seasonal outlook for drought issued by NOAA earlier in August shows that there are prospects for improvement in the drought areas of Cook and Lake Counties

in Minnesota. The NOAA Drought Outlook favors continuous improvement in moisture conditions across those north shore counties from September through November. Good news for recharging lakes and streams in northeast Minnesota.

MPR Listener Question: Do the daily temperature extremes in Minnesota range over 100 degrees F in certain months?

Answer: Yes, for October, November, December, January, February, March, and April there are numerous dates when the statewide temperature extremes range over 100 degrees. This range in daily temperature can be found most frequently in the month of March. For March 18th the statewide maximum temperature reading has been as high as 84 degrees F (Canby in 1921) while the statewide low for that date has been -48 degrees F (at Sawbill Camp in 1939). Thus the historical range in temperature on March 18th in the state of Minnesota is 132 degrees F.

Almanac for August 27th:

The average MSP high temperature for this date is 79 degrees F (plus or minus 9 degrees standard deviation), while the average low is 60 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for August 27th:

MSP weather records for this date include: highest daily maximum temperature of 99 degrees F in 1926; lowest daily maximum temperature of 60 degrees F in 1914; lowest daily minimum temperature of 42 degrees F in 1887; highest daily minimum temperature of 76 degrees F in 1973; record precipitation of 2.80 inches in 1978.

Average dew point for August 27th is 60 degrees F, with a maximum of 77 degrees F in 1990 and a minimum of 33 degrees F in 1935.

All-time state records for August 27th:

Scanning the state climatic data base: the all-time high for this date is 103 degrees F at Tracy (Lyon County) in 1973; the all-time low is 22 degrees F at Tower (St Louis County) in 1986. The all-time record precipitation amount for this date is 5.63 inches at Winsted (McLeod County) in 1978.

Past Weather Features:

Over August 22-27 of 1887 a cool, dry air mass occupied much of Minnesota. In the Twin Cities temperatures averaged 15-20 degrees cooler than normal, with overnight lows ranging from 37 to 43 degrees F.

Between 5:00 and 7:00 pm on August 26, 1977 tornadoes passed over portions of Ottertail, Wadena, Cass, and Crow Wing Counties in Minnesota. Over 20 people were injured, but there were not fatalities. One tornado, an F-2 (winds 113-157 mph) was on the ground for 26 miles and destroyed many cabins in the Long Lake area.

Word of the Week: Climatotherapy

This term refers to a temporary or permanent relocation of a patient to alleviate symptoms of disease or injury by finding a more favorable climate. Sometimes respiratory, arthritis, or skin diseases are treated in this way where patients are sent to drier, wetter, or sunnier climates.

Outlook:

Warming trend with higher humidity for the weekend. Breezy on Saturday and Sunday, with a chance for showers and thunderstorms by Sunday afternoon and evening. Continued chance for showers and thunderstorms Monday and Tuesday. Drier and cooler by next Thursday.

Further Information:

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<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

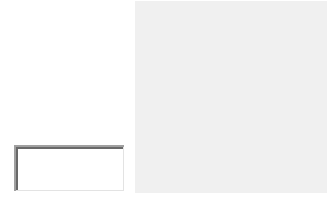
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Minnesota WeatherTalk Newsletter Items for Friday, September 3, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter Items for Friday, September 3, 2010

Headlines:

- August Weather Wrap-Up
- September starts wet in SW MN
- Come Meet "Morning Edition" at the State Fair
- Climate Adaptation and Clean Water Summit
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for September 3rd
- Past weather features
- Exclamation cloud
- Outlook

Topic: August Weather Wrap-Up

The last few days of August brought more heat, humidity and heavy rains to some areas of the state. Over the 29th to the 31st a number of southern Minnesota observers reported afternoon high temperatures in the 90s F with dewpoints in the 70s F. International Falls tied a record high temperature with 88 degrees F on the 30th, while

on the same date Duluth (73 F), MSP (77 F), and St Cloud (70 F) set records for warm overnight lows.

On the 31st thunderstorms brought 1.72" to Zumbro Falls, 1.79" to Winona Dam, 1.67" to Marshall, 2.20" to Montevideo, 1.60" to Morris, 1.71" to Spring Valley, 2.10" at Theilman, 2.08" at Houston, 4.20" to Spring Grove, and 4.53" to Caledonia. These amounts were new daily records at Spring Grove and Caledonia, where flash flood warnings were issued. Several other observers across southern Minnesota received over 1 inch of rainfall during the afternoon and evening of the 31st.

August brought plenty of warmth as most observers reported mean monthly temperatures that were 2 to 7 degrees F warmer than normal. Extremes ranged from 96 degrees F at MSP airport on August 8th to 36 degrees F at Embarrass on August 26th and 27th. Oddly, Minnesota did not report the nations lowest temperature on a single date during August. Observers in Minnesota did report some unusually high dewpoints, many of 70 degrees F or higher. MSP reported 15 days during the month when the dewpoint reached a tropical-like 70 degrees F, including 7 consecutive days from the 7th to the 13th.

August rainfall was above normal for most Minnesota observers, except for a few in southern counties. For some it was among the wettest in history, including 9.86" at Collegetown, 8.79" at New London, 8.24" at Hinckley, 7.93" at Morris, 7.70" at Ortonville, 7.60" at Mora, 7.51" at Bemidji, 7.30" at Wadena, 7.10" at Cloquet, 7.00" at Montevideo, 6.92" at Babbitt, and 6.63" at Wabasha.

August 7, 12, and 13 brought some tornadoes to Minnesota. The total number is still be determined, but western and southeastern counties filed reported sightings on those dates. It has certainly been a record-setting year for numbers of tornadoes in the state.

In a wider context some summer climate attributes that were notable (much provided by the NWS Office in La Crosse, WI):

La Crosse, WI reported 20.93 inches of rainfall during the June-August period, a new record amount surpassing 20.32 inches in 2007.

Wabasha, MN reported 24.21 inches of rainfall during the June-August period, a new record amount surpassing 22.21 inches in 1993.

Winona Dam reported 20.21 inches of rainfall during the June-August period, a new record amount surpassing 20.19 inches in 1998.

MSP Airport reported 26 days with dewpoints of 70 degrees F or higher.

Rochester reported an average summer (June-August) dewpoint of 63.1 degrees F breaking the record from 1995 (62.8 F).

Topic: September starts wet in southwestern Minnesota

Heavy thunderstorms early on September 2nd brought record-setting rainfall to some parts of southwestern Minnesota. The following were record setting amounts for the 2nd: 3.77 inches at Marshall, 3.02 inches at Tracy, 1.67 inches at Springfield, and 1.51 inches at Slayton. Elsewhere many areas received over an inch of rainfall (1.84" at Morgan and 1.21" at Redwood Falls). National Weather Service issued flash flood warnings for Lyon and Lincoln Counties in Minnesota as Highway 59 had to be closed for a time. Later in the day winds of 40 to 50 mph hit the Duluth area

Topic: MPR's "Morning Edition" at the State Fair

The "Morning Edition" crew will be at the Minnesota State Fair from noon to 2:00 pm on Friday, September 3rd. We will be located at Carousel Park, just south of the Grandstand. Please drop by to listen to Midday. Cathy Wurzer, Paul Huttner, and I will be present and happy to talk with you about the weather and other important matters.

Topic: Clean Water and Climate Adaptation Summit, September 16-17, 2010

Earlier this month, United Kingdom Environmental Secretary Caroline Spelman spoke about the need to prepare for climate change across all sectors of government and within the business community. "We know that some level of [climate] change is now unavoidable and it is the responsibility of us all to think about what a changing climate will mean for our health, our businesses and our way of life. By planning for the adaptation we need now we can ensure that the UK is best placed to meet the challenges of climate change head-on. A warmer climate will bring both opportunities and challenges for businesses of all sizes. I want to ensure that UK businesses are well placed to take advantage of the new opportunities that arise as well as ensuring they are ready for the difficulties that higher temperatures and more adverse weather could mean for their staff and working practices." In the United States according to the Pew Center for Global Climate Change at least 38 states have already documented comprehensive climate action plans, and at least 21 states have Climate Adaptation Plans to adjust to changes anticipated or already occurring in their respective climate patterns. Minnesota is working in this direction as well. The University of Minnesota Landscape Arboretum in Chaska is hosting a two-day event next month (Sept 16-17) called Clean Water and Climate Adaptation Summit 2010. Anyone can register for this program and to learn more about it you can go to the web site...

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http://climate.umn.edu/doc/journal/kuehnast_lecture/

Weekly Weather Potpourri:

There is an interesting article in the New Scientist by Chris Mooney this week about the continued decline in Arctic Sea Ice. Since 1979 the volumetric loss in sea ice is quite substantial. The trend is expected to continue. You can read more at...

<http://www.newscientist.com/article/mg20727751.300-arctic-ice-less-than-meets-the-eye.html>

A wet August was noted this week by Environment Canada for Churchill, Manitoba. Along the southwestern shores of Hudson Bay in Churchill, Manitoba it was a cool, wet month of August. In fact they reported nearly three times the normal amount of August rainfall with 7.14 inches, and on August 24th set an all-time daily rainfall record for August with a measurement of 4.12 inches. That is a heavy duty thunderstorm for nearly 59 degrees north latitude.

Both the NOAA National Hurricane Center (NHC in Miami, FL) and the Naval Joint Typhoon Warning Center (JTWC in Hawaii) were having busy weeks tracking storms and issuing advisories and warnings. NHC was busy with storms named Danielle (dissipated earlier this week), category 4 Hurricane Earl off the east coast, Tropical Storm Fiona which remained at sea but may threaten Bermuda over the weekend, and Tropical Storm Gaston which is expected to become a hurricane over the weekend but is still far out to sea. In addition NHC was expecting the development of a new tropical storm off the west coast of Mexico in the eastern Pacific Ocean. Earl was the major concern as it was threatening to do damage along the Carolina and Virginia coasts, producing wave heights of 10 to 30 feet according to offshore buoys, with winds well over 100 mph. More on these storms can be found at...

www.nhc.noaa.gov

The JTWC was busy with Tropical Storm Kompas in the Sea of Japan heading for South Korea with 70 mph winds and 15 foot seas, and there was another storm forming (expected to develop into a typhoon) in the South China Sea headed towards South Korea. Kompas was said to be the strongest storm to hit Seoul, South Korea in

15 years. JTWC was also issuing advisories on Tropical Storm Lionrock, northeast of Hong Kong where it was producing 70 mph winds and 20 foot seas and threatening damage to the Chinese Province of Fujian. More can be found at...

<http://www.usno.navy.mil/JTWC>

MPR Listener Question: Last week at the State Fair during the MPR Midday "Weather Quiz" broadcast a member of the audience stumped me with a question about which year was the foggiest in Twin Cities history. I had never thought about that question and did not know the answer. With the help of Greg Spoden from the Minnesota State Climatology Office I think I have an answer.

Answer: Since 1945 the National Weather Service has kept track of fog in the Twin Cities (MSP airport) on an hourly basis. For most years this was a manual observation where fog was noted when visibility of certain visual targets was impeded. Starting in the mid 1990s the Automated Service Observing System (ASOS) took over this observation and there were initially some problems in determining fog, from smoke, haze, or other atmospheric features. As a consequence I have discounted some of the data from the mid 1990s. Nevertheless I feel confident in saying the 1983 was the foggiest year in the Twin Cities since 1945. During that year fog was noted on 143 days, nearly 39 percent of the time. I might add it was also a very wet year with over 39 inches of precipitation in the Twin Cities. Conversely, the year with the least number of foggy days was 1976, with only 48, and of course that was a drought year with only 16.50 inches of precipitation in the Twin Cities. The average number of foggy days in the Twin Cities each year is 91.

Almanac for September 3rd:

The average MSP high temperature for this date is 77 degrees F (plus or minus 9 degrees standard deviation), while the average low is 57 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for September 3rd:

MSP weather records for this date include: highest daily maximum temperature of 97 degrees F in 1925; lowest daily maximum temperature of 58 degrees F in 1934; lowest daily minimum temperature of 32 degrees F in 1974; highest daily minimum temperature of 73 degrees F in 1960; record precipitation of 1.08 inches in 1887.

Average dew point for September 3rd is 55 degrees F, with a maximum of 74 degrees F in 1960 and a minimum of 31 degrees F in 1930.

All-time state records for September 3rd:

Scanning the state climatic data base: the all-time high for this date is 103 degrees F at New Ulm (Brown County) in 1925; the all-time low is 20 degrees F at Tower (St Louis County) in 1997. The all-time record precipitation amount for this date is 5.44 inches at Mankato (Blue Earth County) in 1996.

Past Weather Features:

A heat wave persisted across southern Minnesota over September 2-4, 1925. Many communities reported consecutive days with afternoon temperatures hitting 100 degrees F or more, the hottest ever start to September.

Heavy thunderstorms caused some flooding across central Minnesota on September 3, 1926. Both Little Falls and Milaca reported over 4 inches of rainfall, while Mora had 2.10 inches and Taylors Falls 2.34 inches. As far south as Winnebago received 3 inches from these thunderstorms.

Early frost on September 3, 1974 damaged many crops across southern and central Minnesota counties. Overnight low temperatures ranged from the upper 20s to low 30s F even across southern counties and crops were not yet mature. For many communities this was the earliest fall frost of all time.

Between 5:00 and 7:00 pm on September 3, 1980 tornadoes sped across Stearns County inflicting damage on Melrose and the Waite Park neighborhood of St Cloud. One person was killed and 15 people were injured. In all the tornadoes caused over \$11 million in damages.

Word of the Week: Exclamation Cloud

This is self explanatory once you see it. I have never seen a cloud of this form over Minnesota, but I don't deny that it exists. The image is from the Cloud Appreciation Society. Perhaps such a cloud form is used to punctuate what is otherwise a perfectly fine fair weather day! See for yourself at...

<http://www.cloudappreciationsociety.org/gallery/index.php?showimage=6634>

Outlook:

Mostly dry, but continued cooler temperatures over the weekend. Warmer on Labor Day with a chance for showers and thunderstorms., some of which may be heavy.

Continued chance of showers on Tuesday, then drier for Wednesday with near seasonal temperatures.

Further Information:

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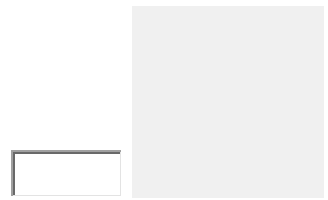
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Minnesota WeatherTalk Newsletter Items for Friday, September 10, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter Items for Friday, September 10, 2010

Headlines:

- Cool, windy, wet start to September
- Last call for Climate Adaptation Summit and Kuehnast Lecture
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for September 10th
- Past weather features
- Cloudhoppers
- Outlook

Topic: Cool, windy, wet start to September

After a warm and humid summer, September has started off relatively cool. Most observers are reporting temperatures from 3 to 6 degrees below normal for the first 10 days of the month. Many northern locations have seen overnight lows drop into the 30s F, and some have already had frost. International Falls, Hibbing, Orr, Waskish, Ely, Eveleth, Cook, and Silver Bay have already seen below freezing temperatures this month. In fact 28 degrees F at Embarrass on the morning of September 9th was the coldest in the nation. Embarrass also reported just 27 degrees F on the 5th and 6th.

In addition winds have been stronger than usual this month. Winds have gusted over 30 mph on several days, and even topped 40 mph at MSP, Rochester, St Cloud, Duluth, and Fargo-Moorhead. A strong west to northwesterly jetstream has been positioned over the state several days this month.

Thunderstorms on September 7th brought near-record or record amounts of rainfall to much of North Dakota and many communities in Minnesota as well. Some of these reports included: 2.70 inches at Starbuck, 2.24 inches at Moorhead, 1.86 inches at Hawley, 1.68 inches at Morris, 1.55 inches at Itasca State Park, 1.50 inches at Crookston, and 1.42 inches at Wheaton.

Topic: Clean Water and Climate Adaptation Summit, September 16-17, 2010

Earlier this month, United Kingdom Environmental Secretary Caroline Spelman spoke about the need to prepare for climate change across all sectors of government and within the business community. "We know that some level of [climate] change is now unavoidable and it is the responsibility of us all to think about what a changing climate will mean for our health, our businesses and our way of life. By planning for the adaptation we need now we can ensure that the UK is best placed to meet the challenges of climate change head-on. A warmer climate will bring both opportunities and challenges for businesses of all sizes. I want to ensure that UK businesses are well placed to take advantage of the new opportunities that arise as well as ensuring they are ready for the difficulties that higher temperatures and more adverse weather could mean for their staff and working practices." In the United States according to the Pew Center for Global Climate Change at least 38 states have already documented comprehensive climate action plans, and at least 21 states have Climate Adaptation Plans to adjust to changes anticipated or already occurring in their respective climate patterns. Minnesota is working in this direction as well. The University of Minnesota Landscape Arboretum in Chaska is hosting a two-day event next month (Sept 16-17) called Clean Water and Climate Adaptation Summit 2010. Anyone can register for this program and to learn more about it you can go to the web site...

<http://www.arboretum.umn.edu/cleanwaterclimatechangeadaptationsummit.aspx>

The 18th Annual Kuehnast Lecture Program will be part of this event on the evening of September 16, starting at 7:00 pm. Speakers this year are Dr. Ben Santer from Lawrence/Livermore National Laboratory in California, and Dr. Eileen Shea from NOAA Climate Services. They will present modeling and data tools for assessing climate adaptation strategies. More about the Kuehnast Program at...

http://climate.umn.edu/doc/journal/kuehnast_lecture/

All are welcome to attend. The Kuehnast Lecture is free.

Weekly Weather Potpourri:

The NOAA National Climate Data Center announced this week that summer of 2010 (June-August) was the 4th warmest nationwide since 1895. Several major cities, including New York and Philadelphia, broke summer temperature records. Wisconsin reported its wettest summer in history. You can read more at...

http://www.noaanews.noaa.gov/stories2010/20100908_augtemps.html

The Minnesota DNR released its periodic update of hydrologic conditions in the state showing huge disparities in moisture conditions from drought in the NE counties to large surplus in SW Minnesota and the southern portion of the Red River Valley. You can read more about moisture conditions in Minnesota at...

http://www.dnr.state.mn.us/current_conditions/hydro_conditions.html

Typhoon Meranti was in the Straits of Taiwan between that island nation and eastern China during the week. It packed winds of 80-90 mph with sea waves of 10-15 feet. It was expected to bring heavy rains and strong winds to the east coast of China on Friday and Saturday.

MPR Listener Question: Having already seen frost in far northern counties several MPR listeners are wondering when the first frost may occur in other parts of the state?

Answer: Cool temperatures are in store for the middle of next week, so around September 15th might bring the threat of frost to some areas. Beyond that date is a warm up period which may last until the 25th. You can find more information on average frost dates for just about anywhere in the state by going to....

<http://www.climate.umn.edu/text/historical/frost.txt>

Almanac for September 10th:

The average MSP high temperature for this date is 74 degrees F (plus or minus 10 degrees standard deviation), while the average low is 54 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for September 10th:

MSP weather records for this date include: highest daily maximum temperature of 104 degrees F in 1931; lowest daily maximum temperature of 49 degrees F in 1918;

lowest daily minimum temperature of 37 degrees F in 1917; highest daily minimum temperature of 75 degrees F in 1931; record precipitation of 2.08 inches in 1913.

Average dew point for September 10th is 53 degrees F, with a maximum of 73 degrees F in 1961 and a minimum of 25 degrees F in 1955.

All-time state records for September 10th:

Scanning the state climatic data base: the all-time high for this date is 108 degrees F at Wheaton (Traverse County) and at Milan (Chippewa County) in 1931; the all-time low is 17 degrees F at Roseau in 1917. The all-time record precipitation amount for this date is 6.75 inches at Ely (St Louis County) in 1947.

Past Weather Features:

On September 10, 1875 the Steamers Equinox and Mendota were lost in a terrible storm on Lake Michigan. Over 35 crew members were lost. This strong early September storm brought the temperature in the Twin Cities from 89 degrees F to 41 degrees F. For the Chicago area and many coastal communities of Lake Michigan 1875 was the coldest year on record.

Very early in the morning of September 10, 1929 the steamer Andaste sunk in a gale off Grand Haven, MI. This too was a strong early fall season storm. It brought a great deal of rain and high winds to the Great Lakes Region with many northwesterly gusts over 40 mph.

September 10, 1931 was one of the hottest September days in Minnesota history. At least 15 Minnesota communities reported a high temperature of 103 degrees F or greater that day. Beardsley in western Minnesota rose to 111 degrees F the next day, an all-time state record high for the month of September.

Over September 9-10, 1947 the Iron Range communities recorded on of the heaviest rainfalls in history. Over 3.50 inches of rain fell at Grand Rapids, while Virginia and Mahoning Mine reported over 5.50 inches. Ely received nearly 7 inches of rainfall and Hibbing received over 8.50 inches. Needless to say many roads were closed due to flooding.

On September 10, 2002 Albertville, MN was struck by a tornado just after midnight. It damaged some homes and garages. Tornadoes in September are somewhat unusual, but those that strike at midnight are indeed very rare throughout history.

Word of the Week: Cloudhoppers

This term is used by balloonists who make a habit of solo ballooning. They ride in hot air balloons strapped into a harness, or in chairs, single or dual baskets, bicycles, or other saddles. It makes for great "ground watching" and is done most commonly in fair weather. There are a number of web sites where you can read more about it...

<http://www.cloudhoppers.org/>

<http://www.cloudhopper.org/>

Outlook:

Some showers around early in the weekend, mostly pleasant on Sunday. Cooler Tuesday and Wednesday next week, then warmer by Thursday with a chance for showers and thunderstorms.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

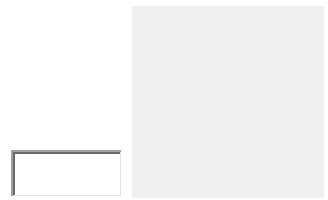
<http://www.climate.umn.edu/Seeley/>

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Minnesota WeatherTalk Newsletter Items for Friday, September 17, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter Items for Friday, September 17, 2010

Headlines:

- Stormy in the south, cool up north
- Some simple forecast rules of thumb
- Kuehnast Lecture
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for September 17th
- Past weather features
- MEOW
- Outlook

Topic: Thunder and rain in the south, cold up north

Wednesday, September 15th brought thunderstorms to portions of the state and delivered at least quarter to half inch amounts to many areas. Some observers reported very large amounts indeed, some record-setting and others very near records, including Fairmont with 0.90 inches, Canby with 1.66 inches, Redwood Falls with 1.60 inches, Rochester 1.94 inches, Bird Island 2.74 inches, Owatonna 2.48 inches, St Cloud with 1.58 inches, and Montevideo with 2.71 inches, . Some hail and high winds

were also reported with these thunderstorms, along with many sleep disruptive lightning strikes.

Up north cooler than normal September temperatures continued to prevail. Ely, Orr, and Embarrass reported more overnight lows in the 20s F this week. Embarrass has now reported six mornings in the 20s F so far this month. Most observers still report dominantly cooler than normal temperatures so far this month, and that trend is expected to continue.

Topic: Some simple forecasting "rules of thumb"

I often get asked about simple forecasting rules that might be used to anticipate weather conditions when radio and television information sources are not available. Each forecaster probably has his or her own rules of thumb, but some of the more common ones are....

Clear skies, low humidity and nearly calm winds an hour or two after sunset produce very low overnight minimum temperatures and by late September or early October often lead to frosts.

Towering cumulus clouds by mid morning can be an indicator of a stormy afternoon.

The dissipation of an overnight fog by mid morning usually ushers in a fair weather afternoon.

The dewpoint shortly after sunset is an indicator of the potential overnight minimum temperature.

When outdoors in Minnesota, stand with your back to the wind. Low pressure will be on your right and high pressure on your left. Remember that pressure systems (lows and highs) often migrate from west to east in Minnesota.

Topic: Climate Adaptation Summit and Kuehnast Lecture

The "Clean Water and Climate Adaptation Summit" and 18th Annual Kuehnast Lecture events were highly successful this week. Participants were able to learn much about what climate models can tell us, as well as what they cannot do. In addition we learned a great deal about NOAA Climate Services, and now have opportunities to partner with them in assessing climate adaptation strategies for the state of Minnesota. Much work in this area will occupy our future and I will write more about this later.

Weekly Weather Potpourri:

NOAA's National Hurricane Center was busy this week tracking Tropical Storm Karl (expected to become a hurricane before striking the east coast of Mexico this weekend, Hurricane Igor expected to pass over Bermuda early next week, and Hurricane Julia which is expected to remain far out to sea and migrate to cooler waters in the North Atlantic. All forecast advisories can be found at...

<http://www.nhc.noaa.gov/>

A University of Missouri research team reported this week that the volume of vacation visitors who come to the central and southern USA for tornado chasing is increasing. Many even come from abroad to have this "once in a lifetime" vacation chasing and photographing tornadoes. You can read more about this at...

<http://www.sciencedaily.com/releases/2010/09/100916170921.htm>

MPR Listener Question: My favorite time of year in Minnesota is during the snow season. As far as I am concerned in cannot start soon enough. What is the largest snowfall ever measured during the month of September?

Answer: The largest single day snow storm in September was 7.5 inches at Long Prairie (Todd County) on September 26, 1942. Several other communities reported 5-6 inches as well. The Twin Cities received 1.7 inches that day.

Almanac for September 17th:

The average MSP high temperature for this date is 72 degrees F (plus or minus 10 degrees standard deviation), while the average low is 52 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for September 17th:

MSP weather records for this date include: highest daily maximum temperature of 96 degrees F in 1895; lowest daily maximum temperature of 47 degrees F in 1918; lowest daily minimum temperature of 34 degrees F in 1875; highest daily minimum temperature of 75 degrees F in 1948; record precipitation of 1.25 inches in 1926.

Average dew point for September 17th is 51 degrees F, with a maximum of 71 degrees F in 1963 and a minimum of 26 degrees F in 1929.

All-time state records for September 17th:

Scanning the state climatic data base: the all-time high for this date is 105 degrees F at Milan (Chippewa County) and Granite Falls (Yellow Medicine County) in 1895; the all-time low is 14 degrees F at Mahnomen in 1929. The all-time record precipitation amount for this date is 4.02 inches at Two Harbors (Lake County) in 1955.

Past Weather Features:

One of the warmest stretches of September weather in state history occurred over the 16th to the 20th in 1895. Many locations including Bird Island, Milan, New London, Beardsley, Montevideo, and Glencoe soared well above the 100 degrees F mark. At Milan the average daytime high temperature over the 5 days was 96 degrees F. Thankfully by September 22, 1895 the Heat Wave came to an end as the daytime highs only reached the upper 40s F.

On September 17, 1955 severe weather struck northern Minnesota counties. A tornado was reported near International Falls between 7:30 and 8:00 pm and caused damage to some homes, but there were no deaths or injuries. Heavy thunderstorms produced some flash floods and power outages in northeastern counties. Cloquet, Duluth, Meadowlands, and Two Harbors reported 3-4 inches of rainfall.

On September 18, 1991 Duluth Airport reported 2.4 inches of snowfall. This is the heaviest early September snowfall in the history of that city and was a precursor to a snowy winter for 1991-1992.

Word of the Week: MEOW

With all of the tropical storm and hurricane activity this week it seems appropriate to mention this acronym. Probably your cat's greeting when you come home from work, but in the meteorological community, especially hurricane forecasting this acronym has two meanings: (1) maximum envelope of water, or;(2) maximum envelope of wind. The forecasting models used to predict landfall hurricanes will provide the meteorologist with a geographic envelope depicting the area where storm surge inundation is expected to occur across the coastal landscape. This is defined as the maximum envelope of water. Similarly, the models will also provide a depiction of the geographic area that is expected to experience tropical storm force winds (39-74 mph) or hurricane winds (greater than 74 mph). This is called the maximum envelope of wind. MEOW was a term frequently used this week in anticipating the landfall of Tropical Storm Karl on the east coast of Mexico and as Hurricane Igor aims for Bermuda.

Outlook:

Mostly sunny weekend with temperatures cooler than normal. Increasing clouds later on Sunday with a chance for showers. Off and on showery periods Monday through Wednesday next week with cooler than normal temperatures.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

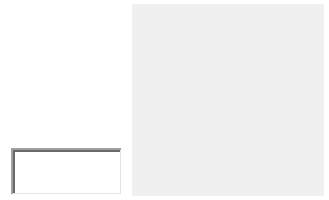
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Minnesota WeatherTalk Newsletter Items for Friday, October 1, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter Items for Friday, October 1, 2010

Headlines:

- September Climate Summary
- Year to date precipitation
- Weekly Weather Potpourri
- MPR listener questions
- Almanac for October 1st
- Past weather features
- Schneeflocke
- Outlook

Topic: September Climate Summary

Thanks to both persistence and intensity of rainfall, this month will go down in Minnesota history as the wettest September, surpassing those of 1900, 1965, 1986, and 2004. Average rainfall across the state was 6.46 inches, but many places exceeded 10 inches and reported their wettest September. Rainfall occurred on nearly half of the days in September according to many climate observers. Heavy storms on the 2nd, and over the 22nd to the 23rd caused some local flooding and damages to many places. A sampling of new monthly record rainfall totals are listed below:

Canby 9.89 inches Marshall 13.05 inches Redwood Falls 8.52 inches
Worthington 10.80 inches Faribault 11.57 inches Waseca 12.66 inches
Winnebago 11.27 inches Dodge Center 12.93 inches Theilman 13.63 inches
Zumbrota 12.67 inches Owatonna 12.54 inches Windom 14.14 inches

You can read more about this wet September at the Minnesota State Climatology Office web site:

http://climate.umn.edu/doc/journal/wet_september_2010.htm

Large as these September rainfall totals are, they are still far from the state record for September which is 18.51 inches at White Earth Reservation (Becker County) in 1869.

The heavy rains caused many watersheds to flood, some exceeding all previous measured flood crests (most notably at Henderson on the Minnesota River). The Mississippi River at St Paul reached its all-time high autumn flow rate at 77,400 cfs on September 30, 2010. Crop harvesting was limited in many areas because of flooding and ponded fields or wet soils.

Temperatures for September were from 2 to 4 degrees F cooler than normal. Extremes ranged from 22 degrees F at Embarrass on September 26th to 90 degrees F at St James on September 20th. Despite generally cooler than normal temperatures, Minnesota reported the nation's lowest temperature only one day during the month, 28 degrees F at Embarrass on the 9th.

Several observers reported multiple days with wind gust over 40 mph. Wind speeds over 50 mph were reported at St Cloud and Duluth among others.

Topic: Year to date precipitation is near-record setting for some

With the wettest September in state history behind us, I thought I would look at year to date precipitation totals. Indeed, some observers are reporting January to September precipitation totals that run 9 to 14 inches above normal. In fact on a statewide basis the average precipitation across the state through September of 2010 is 28.70 inches, the 2nd highest in history for this 9-month period (1986 was 29.03 inches for the first 9 months of the year). Some remarkable year to date totals include:

Marshall 35.96 inches Montevideo 31.12 inches Pipestone 36.25 inches
Windom 35.15 inches Hutchinson 33.82 inches Fairmont 38.67 inches
Blue Earth 40.07 inches Mankato 35.62 inches Mora 34.54 inches

Waseca 39.62 inches Winnebago 38.68 inches Theilman 40.48 inches
Caledonia 41.77 inches La Crescent 40.54 inches Wabasha 42.52 inches

Weekly Weather Potpourri:

The big weather news in California this week came from Los Angeles where an all-time record-setting high temperature of 113 degrees F was reported on September 27th (Monday). Temperature records there go all the way back to 1877 and the previous all-time record high for Los Angeles was 112 degrees F on June 26, 1990. Long Beach also tied their all-time high temperature record with a reading of 111 degrees F. It didn't cool off much at night either as overnight lows in some inland valley landscapes did not fall below 80 F.

For keeping up with fall colors the USDA Forest Service hosts a web site where you can find the latest updates on fall colors across the country, including links to tour information, places to stay, a photo gallery, a hotline, tips for tree identification, and a variety of other information. Their web site can be found at.....

<http://www.fs.fed.us/news/fallcolors/>

Tropical Storm Nicole brought heavy rains to portions of Jamaica, Cuba, and the Florida Keys on Wednesday this week. Some observers in the Florida Keys reported rainfall amounts exceeding 10 inches. Nicole weakened and became an extra-tropical storm as it tracked north over the mid-Atlantic states bringing heavy rains later in the week. Portions of the Carolinas received over 15 inches, while VA, PA, NY, MD, and other states reported 6 to 8 inch amounts, with widespread flooding in many areas.

A UCAR news release last week illustrated how strong winds affect water, and further how modeled winds may have affected the parting of the Red Sea in Moses time. The authors present a scenario which mimics the parting of the Red Sea. It is rather interesting reading and can be found at...

<http://www2.ucar.edu/news/parting-waters-computer-modeling-applies-physics-red-sea-escape-route>

Last week NOAA released a report on global land and sea temperatures for the first 8 months of 2010. The temperature values for the first 8 months of the year are tied with those of 1998 for warmest ever. Further, the June through August period was the 2nd warmest on record, trailing only 1998. You can read more about this at...

<http://www.sciencedaily.com/releases/2010/09/100919104002.htm>

Mike McClellan with Mobile Weather, Inc of Washington, IL is the lead forecaster this week for Golf's Ryder Cup matches in Wales. Looks like he will have his hands full in forecasting the weather for the weekend matches as each day will bring weather disturbances across the area, some late Saturday and some later on Sunday. Rain and wind will definitely affect the matches on most days.

MPR Listener Question: We in the Northland have been struck by the absence of warm days in September. At International Falls we have recorded only one day with a temperature of 70 degrees F or higher.

Answer: Indeed, September of 2010 is the only year I can find in the International Falls climate record when only one 70 degrees F day occurred. Previously in both 1954 and 1986 September had delivered only 2 days with 70 F or higher. However with temperatures expected to be above normal for the first half of October I would not be surprised to see 70 degrees F visit the Northland again during this month.

Almanac for October 1st:

The average MSP high temperature for this date is 67 degrees F (plus or minus 10 degrees standard deviation), while the average low is 46 degrees F (plus or minus 7 degrees standard deviation).

MSP Local Records for October 1st:

MSP weather records for this date include: highest daily maximum temperature of 87 degrees F in 1897; lowest daily maximum temperature of 45 degrees F in 1974 and 1999; lowest daily minimum temperature of 24 degrees F in 1974; highest daily minimum temperature of 61 degrees F in 1971; record precipitation of 0.75 inches in 1878.

Average dew point for October 1st is 43 degrees F, with a maximum of 66 degrees F in 1951 and a minimum of 18 degrees F in 2003.

All-time state records for October 1st:

Scanning the state climatic data base: the all-time high for this date is 93 degrees F at Madison (Lac Qui Parle County) in 1963 and at Browns Valley (Traverse County) in 1976; the all-time low is 10 degrees F at Moorhead (Clay County) in 1886. The all-time record precipitation amount for this date is 4.25 inches at White Earth Indian Reservation (Becker County) in 1869. The state record daily snowfall for this date is 8.5 inches at Isabella (Lake County) in 1985.

Past Weather Features:

October 1, 1922 was the onset of a 5-day fall heat wave across west-central Minnesota counties where many observers reported multiple days in the 90s F. The heat wave finally broke on the 6th of October as cooler Canadian air brought the temperatures down by 30-40 degrees F.

An early winter storm brought 4 to 8 inches of snowfall to many parts of north-central and northeastern Minnesota on October 1, 1985. Many of the snows were record-setting for the date, but snow cover was short-lived as temperatures warmed up into the upper 50s and low 60s F by the 3rd.

Word of the Week: Schneeflocke

This German word for snowflake will begin to appear later this fall in the German meteorological service forecasts and information statements. Last October in Minnesota brought many snowfall amounts ranging from 2 to 9 inches. So if this October is anything like last year German-speaking Minnesotans may be using this word soon.

Outlook:

Cooler this weekend with widespread frost in some areas and daytime high in the 50s F and 60s F. Generally dry, with good football and marathon weather Saturday and Sunday. A warming trend will start on Monday with a return of near seasonal temperatures, then above normal temperatures on several days next week. Chances for any precipitation will be small.

Further Information:

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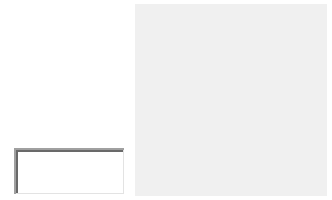
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Minnesota WeatherTalk Newsletter for Friday, October 15, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 15, 2010

Headlines:

- October Warmth in Context
- Water Resources Conference
- Weekly Weather Potpourri
- MPR listener question
- Almanac for October 15th
- Past weather features
- Forecasting Perspectives
- Outlook

Topic: October Warmth in Context

Many MPR listeners have asked me about the unusual warm weather this month. Indeed for the Twin Cities and most of the other communities in Minnesota the first two weeks of October is the warmest since 1963. In the Twin Cities the mean daily temperature during the first 14 days was over 60 degrees F. Only 1920, 1947, and 1963 were slightly warmer.

In addition, several Minnesota weather observers have reported temperatures this month of 90 degrees F or higher including those at Redwood Falls, Madison, Montevideo, Rochester, Amboy, Winnebago, Windom, Mankato, Waseca, and St James. With these high temperatures came some very low relative humidity readings as well, as over the 8th and 9th mid-afternoon readings in western Minnesota were just 20 to 25 percent. At Rochester the 90 degrees F reading on October 9th was the latest such reading for the fall season in their climate history. Warmer than normal temperatures are expected to continue for the next 10 days.

Despite this dominant pattern of warmth, Embarrass, MN reported the lowest temperature in the 48 contiguous states on Friday morning, October 15th with a reading of just 18 degrees F.

Topic: Minnesota Water Resources Conference

The Annual Minnesota Water Resources Conference will take place next week, October 19-20 at the downtown St Paul RiverCentre. There are multiple sessions to choose from visiting the topics of Wastewater, Aquatic Nutrient Management, Sediment, BMPs, Drainage and Hydrology, Climate, Agriculture, Groundwater, Sustainability and several other themes. There will also be presentations to all attendees by Congressman Collin Peterson and Professor Steve Polasky. To view the agenda and register for the event go to...

www.wrc.umn.edu/waterconf

Weekly Weather Potpourri:

The Obama Administration Council on Environmental Quality released a report from the Interagency Task Force on Climate Adaptation this week. It provides a list of recommended actions for various units of government. To read more you can go to

<http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation>

Earlier this week Yale University released the summary from a survey about Americans knowledge of climate change. The study shows that 63 percent of the citizens sampled believe that "global warming" is happening. Other details from this study may be found at..

<http://environment.yale.edu/climate/news/>

Tropical Storm Paula, the 16th named storm of the North Atlantic Hurricane Season, diminished in strength as it approached Cuba this week and was expected to be a

remnant low pressure system as it passed over the island nation this weekend. In the Western Pacific Ocean, Typhoon Megi was expected to intensify with winds over 170 mph and sea waves of 25 feet as it approached the Philippines from the east later in the weekend. It certainly has the potential to bring damaging winds, storm surge, and extremely heavy rainfall to Luzon. Megi is expected to re-emerge in the South China Sea next week and still be a strong storm.

A study published this week by NASA scientists from Goddard Institute for Space Studies reveals that carbon dioxide and other non-condensing greenhouse gases account for about 25 percent of the Earth's greenhouse gas effect while water vapor and clouds account for the other 75 percent. However the role of carbon dioxide and other non-condensing greenhouse gases is highlighted for a very significant fraction of the radiative forcing in the Earth's atmosphere, up to 80 percent. Thus its role is significant in the measure pace of change in global temperature. You can read more about this study at...

<http://www.sciencedaily.com/releases/2010/10/101014171146.htm>

Bruce Babcock, Iowa State University economist says that his studies show a northward and westward expansion of corn and soybean acreage in the USA as a result of changing climate, mostly longer growing seasons, warmer temperatures, and more precipitation. You can read his remarks at...

http://www.usatoday.com/weather/climate/2010-10-08-climate-farmers_N.htm

MPR Listener Question: Based on the forecast it looks like the Twin Cities will not see any rainfall before next week. This has been a remarkable run of dry weather (no rainfall) dating back to September 25th (0.02 inches). What is the longest run without measurable precipitation in the Twin Cities?

Answer: Your right, a period of 3 week or longer without any precipitation is unusual. It happens about once every 3-4 years. The longest I can find in the Twin Cities climate records is from November 15, 1943 to January 4, 1944, a period of 51 days. Elsewhere around the state such dry streaks have been even longer. At Milan in Chippewa County there was no measurable precipitation from November 26, 1930 to February 6, 1931, a period of 71 days. I believe the state record for such an interval is 79 days.

Almanac for October 15th:

The average MSP high temperature for this date is 62 degrees F (plus or minus 11 degrees standard deviation), while the average low is 42 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for October 15th:

MSP weather records for this date include: highest daily maximum temperature of 85 degrees F in 1947 and 1968; lowest daily maximum temperature of 39 degrees F in 1943; lowest daily minimum temperature of 21 degrees F in 1876; highest daily minimum temperature of 66 degrees F in 1968; record precipitation of 1.24 inches in 1966; record snowfall of 0.3 inches in 1992

Average dew point for October 15th is 41 degrees F, with a maximum of 69 degrees F in 1962 and a minimum of 13 degrees F in 1952.

All-time state records for October 15th:

Scanning the state climatic data base: the all-time high for this date is 93 degrees F at Madison (Lac Qui Parle County) in 1958; the all-time low is 8 degrees F at Alborn (St Louis County) in 1937. The all-time record precipitation amount for this date is 5.46 inches at Theilman (Wabasha County) in 1966. The state record daily snowfall for this date is 10.0 inches at the Isabella (Lake County) in 1937.

Past Weather Features:

On October 15, 1880 the skies was cloudy bringing rain showers to many parts of southern Minnesota with temperatures in the 50s F. But later in the day and overnight into October 16th a blizzard raged across the eastern Dakotas and western Minnesota. Blinding snow and high winds brought the railroads to a standstill. Snow drifts as high as 20 feet were reported in Canby, MN. This was the onset of "The Long Winter" that Laura Ingalls Wilder would write about as an adult. This blizzard will be featured in the Twin Cities Public Television documentary "Minnesota's Deadliest Blizzards" to be aired on Veterans Day (November 11th).

October 15, 1958 brought a last gasp of summer to portions of western and southern Minnesota as at least half a dozen communities saw afternoon temperatures soar into the 90s F. Three days later there was widespread frost with temperatures in the 20s and 30s F.

The 14th and 15th of October in 1966 brought a full-scale winter storm to Minnesota, with all forms of precipitation. There was widespread hail damage in Freeborn, Steele, Dodge, Pipestone, Brown, and Ramsey Counties. Winds howled as high as 80 mph

flattened some unharvested corn fields. Thunderstorms brought heavy rains to southern Minnesota communities where reports of 3 to 5 inches were common. one of the heaviest autumn rainfalls for many southern Minnesota communities.

Word of the Week: Forecasting

Forecasting is fundamentally about predicting the future, whether a minute ahead or a year ahead. Some great thinkers have shared their thoughts on forecasting.....

Nils Bohr (Nobel Physicist)... "Prediction is very difficult, especially if it's about the future."

William Shakespeare.... "If you can look into the seeds of time, and say which grain will grow and which will not, speak then unto me."

Edgar R. Fiedler (author) ... "He who lives by the crystal ball soon learns to eat ground glass."

Winston Churchill.... "I always avoid forecasting beforehand because it is much better to forecast after the event has already taken place."

Anonymous.... "Forecasting is the art of saying what will happen, and then explaining why it didn't."

Outlook: With the jet stream out of the north it will be cooler than of late, but mostly sunny, seasonable, and suitable for outdoor activities over the weekend. Increasing cloudiness by Sunday night with a chance for showers in southern counties, lingering over into Monday. Significantly cooler by Tuesday and Wednesday, then warming up again toward the end of next week.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

<http://www.climate.umn.edu/weathertalk/>

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<http://www.climate.umn.edu/Seeley/>

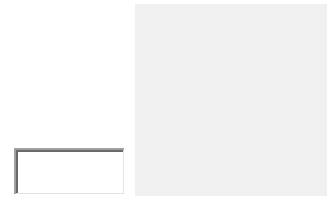
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Minnesota WeatherTalk Newsletter for Friday, October 29, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 29, 2010

Headlines:

- Massive October Storm
- The first analyzed surface weather map of the USA
- Weekly Weather Potpourri
- MPR listener question
- Almanac for October 29th
- Past weather features
- Outlook

Topic: Massive October Storm

Monday through Wednesday of this week brought about a huge transition in weather across Minnesota. After approximately a month of mostly sunny skies, comfortable temperatures and no rain, a mammoth storm crossed the state bringing a mixture of precipitation, high winds, and a new record low barometer reading for the state. The storm was massive in scale, approximately 1200 miles across west to east and produced a frontal boundary of precipitation that extended from the Great Lakes state down through Alabama.

The barometer reading of 28.21 inches (955.2 mb) at Big Fork, MN at 5:13 pm October 26th was a new state record low, and likely represents the lowest pressure reading ever measured across the upper Midwest. There is a good discussion about this topic at the National Weather Service Duluth Office web site....

http://www.crh.noaa.gov/dlh/?n=101026_pressurerecords

Both Duluth (28.37 inches) and International Falls (28.23 inches) reported their lowest barometer readings ever, and Wisconsin reported its lowest barometer reading in history when Superior reported 28.38 inches.

Such a low pressure system produced very strong winds that caused a wide swath of damage across the area. Most locations reported wind gusts of 50 mph or stronger over October 26-27, and several reported winds over 60 mph. Some of the wind gusts reported included: Redwood Falls 63 mph, Willmar 61 mph, Spring Valley 64 mph, Sauk Centre 63 mph, Alexandria 62 mph, Morris 62 mph, near Duluth 65 mph, Appleton 63 mph, and MSP International Airport 62 mph. A large number of communities temporarily suffer power outages, and a vast number of trees were either damaged or toppled. Ships on the Great Lakes were cautioned to remain in port or seek shelter from the winds.

The storm system brought a variety of precipitation. In the early stages of the storm onset, October 25th MSP reported a record 0.67 inches of rain, while St Cloud recorded a record 0.61 inches. Over October 26th record precipitation amounts occurred at Fargo (1.21"), Moorhead (1.77"), Grand Forks UND (1.85"), Hibbing (2.46"), Chisholm (2.10"), Knife River (2.24"), Aitkin (2.60"), Carlton (1.75"), Bigfork (1.47"), and Moose Lake (2.79"). At Duluth Airport an incredible 2.94 inches of precipitation was recorded on October 26th, the greatest single day amount in history for the month of October.

The later stages of this storm system (late on the 26th and into the 27th) brought measurable snowfall to many locations as well. Ft Ripley reported 3 inches of snow, Fergus Falls 3.5 inches, Brainerd 3.8 inches, Rothsay and Pelican Rapids 4.0 inches, Cloquet and Two Harbors 5.0 inches, and Hermantown west of Duluth 6.0 inches. Duluth Airport reported a total of 7.7 inches, the 4th largest snowfall total ever from a storm in October. Some observers reported seeing people out on skis.

For our area this storm was compared to the Armistice Day Blizzard (Nov 11, 1940) which had a central pressure of 28.55 inches, and the Edmund Fitzgerald Storm (Nov 10, 1975) which had a central pressure of 28.95 inches. These and other great November storms will be discussed at my presentation next Friday, November 5th at Split Rock Lighthouse in helping them celebrate their Centennial.

Topic: Preliminary Climate Summary for October

Despite the fact that October is closing out with some below normal temperature readings, the month as a whole will show an above average temperature pattern. Most observers are reporting mean monthly temperatures that range from 3 to 5 degrees F above historical averages for October. Extremes for the month were 90 degrees F at Redwood Falls and several other locations on the 8th to just 16 degrees F at Embarrass on the 29th. Embarrass reported the lowest temperature in the 48 contiguous states on October 2nd (25 F) and October 3rd (20 F).

Despite the prolonged streak of dry and sunny days that dominated the first 3.5 weeks of the month, the abundant precipitation of this week has brought the monthly totals far closer to historical normals. In the northwest, Halstad, Warroad, Thief River Falls, Red Lake Falls and Moorhead are all now reporting above normal precipitation for the month. Across the north and further east Floodwood, Two Harbors, and Wolf Ridge (near Finland) are reporting over 4 inches of precipitation for the month, a wet October. In east-central Minnesota Bruno and Cloquet are reporting over 5 inches of precipitation for the month, well over twice normal. Generally southern and western sections of Minnesota are reporting below normal precipitation for October, with the majority of it coming in the past week.

Strong winds of 50 to 60 mph and greater were reported on October 20, 26, and 27.

Weekly Weather Potpourri:

Since weather maps showing barometric pressure were all over the news this week as a result of the powerful storm that crossed the USA, it is interesting to note that approximately 140 years ago (November 1, 1870) the Army Signal Corps produced the first national weather map showing pressure across the country. This was the first full year of coordinated national weather observers by that organization. That first map, national in scope was produced from only 25 observation points. Thanks to Dr. Ed Hopkins of the Wisconsin State Climatology Office we know which USA locations provided the data for that weather map to be created. They were: Washington (DC), New York City, Boston, Chicago, St. Louis, Cincinnati, New Orleans, Nashville, Mobile, Montgomery, Augusta (GA), Buffalo, Rochester (NY), Oswego, Cleveland, Toledo, Detroit, Milwaukee, St. Paul, Duluth, MN), Omaha, Cheyenne, Pittsburgh, Key West and Lake City. Today, hundreds of locations are used by the National Weather Service to produce such weather maps.

Typhoon Chaba was generating wind gusts up to 110 mph this week with sea waves of 20-30 feet. It is expected to lose strength as it passes southeast off the coast of Kyoto, Japan this weekend. More updates can be found at...

<http://www.usno.navy.mil/JTWC/>

The NOAA Storm Prediction Center noted over 70 tornado reports filed as a result to the massive mid-latitude storm system that crossed the country this week over October 25-27. On October 26th there were 52 reports of tornadoes, and over 300 reports of strong or damaging winds. You can read more at...

http://www.spc.noaa.gov/climo/reports/101026_rpts.html

Recent research from Michigan State University documents that only about 63 percent of USA citizens understand that a tornado warning is one of the most urgent National Weather Service statements. Further, people with no personal experience of exposure to severe weather are more likely not to respond to warnings. More information can be found at...

<http://www.sciencedaily.com/releases/2010/10/101026141505.htm>

MPR Listener Question: I have over 1000 young hazelnut plants that need to be transplanted yet this fall. Can you tell me when you expect the soil to freeze?

Answer: Soil temperatures were running rather high earlier this month, but this week they have taken a drop. Shallow soil temperatures (2-4 inches depth) are now ranging from the low 40s to upper 40s F. Temperatures to start November are expected to average a few degrees warmer than normal, so I don't see soils freezing up very soon. I would expect the soil will still be workable out to the 3rd or even 4th week of this month. They generally begin to freeze up in the top 1-2 inches when overnight minimum air temperatures start dropping into the single digits and teens F.

Almanac for October 29th:

The average MSP high temperature for this date is 53 degrees F (plus or minus 11 degrees standard deviation), while the average low is 35 degrees F (plus or minus 9 degrees standard deviation).

MSP Local Records for October 29th:

MSP weather records for this date include: highest daily maximum temperature of 78 degrees F in 1922; lowest daily maximum temperature of 25 degrees F in 1925; lowest daily minimum temperature of 15 degrees F in 1925; highest daily minimum temperature of 56 degrees F in 1974 and 2004; record precipitation of 1.01 inches in 1896; record snowfall of 5.5 inches in 1905.

Average dew point for October 29th is 35 degrees F, with a maximum of 66 degrees F in 2004 and a minimum of 6 degrees F in 1988.

All-time state records for October 29th:

Scanning the state climatic data base: the all-time high for this date is 85 degrees F at Marshall (Lyon County) and Windom (Cottonwood County) in 1937; the all-time low is -3 degrees F at Campbell (Wilkin County) in 1919 and at Pipestone in 1925. The all-time record precipitation amount for this date is 2.88 inches at Montevideo (Chippewa County) in 2004. The state record daily snowfall for this date is 8.5 inches at Orr (St Louis County) in 1932.

Past Weather Features:

Arguably the coldest October 29th in Minnesota history occurred in 1925. Strong winds from 40-50 mph the day before had ushered in a cold, polar air mass. Morning lows of zero degrees F or colder were reported from several locations around the state, and from as far south as Grand Meadow and Waseca. Nearly all observers reported afternoon high temperatures in the 20s F, more like a typical January day. At Fosston in Polk County the daytime high only reached 19 degrees F. Indeed this wasn't just a single day aberration in temperature as October of 1925 proved to be the coldest in state history.

Heavy snow fell across northern Minnesota over October 28-29, 1932. Many locations including Orr, Virginia, Pine River Dam, Mizpah, Wadena, and Thief River Falls reported 5 to 8 inches of snowfall. The observer at Mizpah in Koochiching County reported four consecutive days with snowfall (October 25-28) totally a whopping 19.4 inches, the most ever for October.

Outlook:

Generally dry this weekend with daytime temperatures in the 40s to low 50s F. Should be OK for Halloween on Sunday night, but warm costumes will be more comfortable to wear. Looks mostly dry next week with a warming trend by mid-week as temperatures climb a few degrees F above normal. No major weather problems to deal with on Election Day (Nov 2nd).

Further Information:

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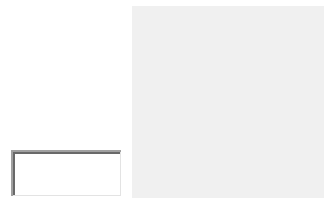
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Minnesota WeatherTalk Newsletter for Friday, October 8, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 8, 2010

Headlines:

- Near perfect run of weather
- Historical fire anniversaries this week
- Weekly Weather Potpourri
- MPR listener question
- Almanac for October 8th
- Past weather features
- Wind profilers
- Outlook

Topic: Near perfect run of weather

Since the devastating storms of September 22-23, Minnesota has been blessed with a run of good weather. How good? Remarkable, and obviously the best weather of the year so far. In terms of solar radiation, above normal sunshine under mostly clear skies, low humidity, light winds, and generally comfortable autumn temperatures have been the dominant attributes of the past two weeks. October so far has been dry with slightly above normal temperatures. As a result excellent progress was being made in the soybean and corn harvest this fall. Yields were up, and moisture content was

down, so little artificial drying was needed. The weather has been ideal for other activities as well, including football, baseball, and marathons. Of further note is consensus among forecast models that these dominant fair-weather attributes over Minnesota may continue through the third week of the month.

Topic: Anniversary of the Great Fires of 1871

The Great Lakes States suffered perhaps their worst ever fire season in the fall of 1871. The summer had been a very dry one, although this does not show up in the long-term Twin Cities climate record. The U.S. Army Signal Corps had only initiated a network of precipitation observations across the region beginning in 1870 and reports were very sparse. The Pioneer Press reported on the very low stage of the Mississippi River, the St Croix River, and the Red River of the North. The Mississippi River running through the Twin Cities was reportedly at its lowest stage in seven years. This suggests that the surrounding landscape was indeed very dry. Farm reports spoke of parched fields and large cracks in the soil.

Fires began in western Minnesota, from Breckenridge south to the Iowa border during the month of September. By October, the Pioneer Press was reporting smoky air, clouds of dust, fires lighting up the western horizon, obscured sunlight, and cinders in the air. The prairie fires peaked on October 8th in a very destructive manner. Fires destroyed farm fields, buildings and homes in the New Ulm area. Elsewhere at the same time, even greater destruction occurred: a fire broke out near Peshtigo, WI destroying the town in less than one hour and claiming 1200 lives in Door and Kewaunee Counties while scorching 1.2 million acres; the Great Chicago Fire began on the evening of the 8th of October in a stable behind the O'Leary home and was not completely extinguished until October 10th by which time it had destroyed over 17,000 buildings and killed over 200 people*; and numerous fires also broke out in Michigan, burning over 2 million acres, mostly forested lands, and killing 200 people. Snow and rain during the second half of October helped to bring an end to this terrible fall fire season.

The current edition of Weatherwise magazine has a very good article about the causes of the Great Chicago Fire. Other interesting narratives about these fires can be found on the at...

<http://www.crh.noaa.gov/grb/peshtigofire.php>

<http://www.chicagohs.org/history/fire.html>

*Footnote: the Chicago weather office of the Army Signal Corps was destroyed in this fire, along with all the early climatological

data records. They had reportedly only recorded 1 inch of rainfall from July to October.

Weekly Weather Potpourri:

Energy Secretary Steven Chu announced this week that solar panels will be installed at the White House for the purpose of providing hot water to residents. The President hopes to demonstrate wider use of renewable energy in other aspects of government as well. Back in the late 1970s President Carter had solar panels installed on the White House roof, but they were removed during the Reagan Administration. According to CNN, George W. Bush used solar energy to power a maintenance building and provide heat for the White House swimming pool.

A new study by University of Illinois researchers reveals that the deployment of wind turbines in large numbers has an effect on local temperature patterns, sometimes enhancing the length of the frost-free season. The effects are differential depending on the attributes of the local climate (continental versus coastal for example). You can read more about this at...

<http://www.sciencedaily.com/releases/2010/10/101005121726.htm>

Scientists from Environment Canada and elsewhere have participated in producing a series of informative videos called Greenspeak. These can be used in the classroom or with various stakeholder groups to talk about agriculture, natural resources, fisheries, or public health in the context of climate change and conservation. They provide a useful overview on these topics for the Western Great Lakes area. To view them you can go to...

http://www.science.gc.ca/Videos/Greenspeak-WS2ACD866E-1_En.htm

MPR Listener Question: Years ago as a teenager I heard you talk about the symmetry of the Minnesota spring and fall seasons in terms of climate characteristics and you explained why the extremes of temperature are so different when comparing March and October. My daughter (who loves science class) asked me about this the other day. Since we listen to you and Cathy on Friday mornings, I thought I might ask you to explain it to her, as you did to me many years ago. Can you please do this one more time?

Answer: The rate at which the overhead sun retreats into the southern latitudes during October is very close to the rate at which it advances into the northern latitudes during the month of March. This helps explain why the daily mean temperature increases 15 degrees in March and decreases 15 degrees in October. The overall heat gain in terms

of daily mean temperature during March is in correspondence with the overall heat loss during October. We also see a gain of a little more than 90 minutes in daylength during March and a loss of more than 90 minutes in October.

But there is a disparity in the extremes of temperature observed for these months. The extremes for October are a high of 98 degrees F at Beardsley (Big Stone County) in 1963 and a low of -19 degrees F at Roseau in 1936, for a monthly temperature spread of 117 degrees F. On the other hand the extremes for March are a high of 88 degrees at Montevideo (Chippewa County) in 1910 and a low of -50 degrees at Pokegama Dam (Itasca County) in 1897, for a temperature spread of 138 degrees F. What's the explanation? The answer is probably snow cover, a greater modifier of March climate in Minnesota as it often exists as a remnant of winter. Conversely, the establishment of any extensive snow cover over the state in October is indeed a very rare event.

Almanac for October 8th:

The average MSP high temperature for this date is 61 degrees F (plus or minus 10 degrees standard deviation), while the average low is 42 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for October 8th:

MSP weather records for this date include: highest daily maximum temperature of 84 degrees F in 1966; lowest daily maximum temperature of 42 degrees F in 1925 and 1977; lowest daily minimum temperature of 23 degrees F in 1876; highest daily minimum temperature of 69 degrees F in 1997; record precipitation of 1.43 inches in 1970; record snowfall of 0.3 inches in 1959.

Average dew point for October 8th is 41 degrees F, with a maximum of 68 degrees F in 1949 and a minimum of 17 degrees F in 1932.

All-time state records for October 8th:

Scanning the state climatic data base: the all-time high for this date is 90 degrees F at Long Prairie (Todd County) in 1905, at Montevideo (Chippewa County) in 1980, and at White Rock Dam (Traverse County) in 2003; the all-time low is 11 degrees F at Angus (Polk County), Argyle (Marshall County), Hallock (Kittson County), and Roseau (Roseau County) in 1917. The all-time record precipitation amount for this date is 4.50 inches at Burlington (Lake County) in 1860. The state record daily snowfall for this date is 6.5 inches at the Duluth Yacht Club in 1925.

Past Weather Features:

Snow and cold made for a miserable week at Fort Ripley (Morrison County) this week in 1876. Over October 5-11 several inches of snow followed by record-setting cold temperatures is documented in Fort records. Overnight lows that week ranged from 11 to 17 degrees F.

Residents of St Paul saw several frosty mornings that week as well with many low temperatures in the 20s F.

About 4:00 pm on October 6, 1900 a rare F-3 tornado (winds 158-206 mph) passed across St Louis County near Biwabik. It was on the ground for only 4 miles but it struck a mining camp, destroying several buildings and killing 10 people. This is a very rare occurrence historically in northeastern Minnesota.

October 7-10, 1949 was one of the stormiest ever fall periods for portions of northern Minnesota. Two Harbors, Pigeon River, and Meadowlands reported 3.50 inches of rain, while Gunflint Lake reported over 4 inches. Duluth and Babbitt each reported about 5 inches of rainfall during this period. In addition a terrible wind storm on October 10th caused widespread damage over many areas of the state with downed trees and power lines, along with scores of farm buildings. Wind gusts reached 76 mph at Duluth, 89 mph in the Twin Cities, and 100 mph at Rochester.

October 7-8, 1985 brought 2-7 inches of snowfall to northwestern and north-central Minnesota communities. Temperatures remained cold enough for the snow cover to remain on the ground over several days.

Word of the Week: Wind profiler

This is a three beam Doppler Radar system aimed vertically to measure atmospheric winds at different altitudes over a station. The National Weather Service WSR-88D radar has this capability, and its vertical wind profile is called a VAD Wind Profile (or VWP). VAD stands for Velocity Azimuth Display. The data are frequently referred and provide forecasters with an atmospheric profile of wind so they can detect where wind shear (sharp changes in direction or speed) is occurring and the altitude of maximum wind speeds. This information is of significant use in forecasting for aviation. There is a wind profiler system located at Wood Lake (Yellow Medicine County), MN

Outlook:

Warm on Saturday, perhaps near record-setting high temperatures following a warm Friday, then somewhat cooler on Sunday with a slight chance for showers late. Temperatures will cool but remain generally warmer than normal into next week.

Chance for widely scattered showers again on Tuesday, but generally dry for much of the upcoming week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, November 12, 2010

To: MPR Morning Edition

From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 12, 2010

Headlines:

- Run of warm days
- Winter Hazard Awareness Week
- 2010 Tornado Season Discussion, November 12th
- Weekly Weather Potpourri
- MPR listener question
- Almanac for November 12th
- Past weather features
- wind turbine jargon
- Outlook

Topic: Run of warm days, November 7-10

Over the period from November 7 to 10 this week temperatures were remarkably warm, averaging 15-20 degrees above normal in most places. On the 7th the afternoon high reached 65 degrees F at Amboy, on the 8th the high reached 69 degrees F also at Amboy, then on the 9th the high reached 74 degrees F at Sherburn, and on the 10th the afternoon high reached 76 degrees F at Blue Earth. A number of golf courses were

open for business on all four days. Some observers around the region reported new record high temperatures for these dates.

A Couple of Record high temperatures for November 8th included:

Tower 61 F Amboy 69 F

Record high temperatures for November 9th included:

Grand Forks, ND 61 F Fargo, ND 66 F Crookston 66 F
Moorhead 65 F Fairmont 70 F (tied 1999) Amboy 70 F
Blue Earth 72 F Sherburn 74 F Hallock 63 F (tied 1937)

Record high temperatures for November 10th included:

MSP 68 F La Crosse, WI 67 F (tied 1949) Kabetogama 65 F
Blue Earth 76 F Forest Lake 71 F International Falls 64 F
Hibbing 62 F Grand Rapids 63 F Cook 62 F

Topic: Winter Hazard Awareness Week, November 8-12

The National Weather Service Forecast Office in Chanhassen participated in the Winter Hazard Awareness Week activities this week, providing resources and public service announcements related to preparing ourselves for the winter season in Minnesota. With the forecast for snow this weekend, their timing is very good. A wealth of information and resources can be found at their web site...

<http://www.crh.noaa.gov/mpx/>

Topic: Local AMS meeting on the 2010 tornado season

The Twin Cities Chapter of the American Meteorological Society will host a meeting at 6:30 pm on Friday night (Nov 12) at the University of St Thomas 3M Auditorium (Owen Science Hall) in St Paul to discuss lessons learned from the 2010 tornado season in Minnesota. Special attention will be given to the tornado outbreak of June 17th. All who are interested are invited to attend.

Weekly Weather Potpourri:

A recent article published in Nature Geoscience documents that as the oceans have warmed the temperature threshold required to induce significant tropical convection has risen as well. This suggests that one of the thresholds for tropical storm development to occur is changing and may have implications for the frequency of

tropical storm development in the future. Scientists at the International Pacific Research Center and University of Hawaii are responsible for the study which you can read about at...

<http://www.sciencedaily.com/releases/2010/11/101108102612.htm>

High winds and rain have caused damage and disruption in northwest England, Wales, and Ireland this week. Wind gusts up to 70 mph were reported, downing power lines, damaging trees and shutting down ferry service. You can read more at...

<http://news.bbc.co.uk/weather/hi/news>

Freezing rain and snow were causing dangerous conditions in northern Manitoba on Thursday (Nov 11) this week. Areas were expected to see 4-8 inches of new snow with temperatures staying in the teens and twenties F through the weekend. Further north at Rankin Inlet on Hudson Bay they have already seen six days with snowfall so far this month with temperatures as cold as 4 degrees F.

This week the Inforum of the Fargo-Moorhead area featured an interesting article about farmer Norbert Schulz of Jamestown who predicts winter weather conditions based on the height and width of pig spleens. Mr. Schulz says the evidence this year suggests a winter that will be as cold and snowy as last. You can read more at...

http://www.inforum.com/event/article/id/297652/publisher_ID/1/

MPR Listener Question: We moved to the Twin Cities from California two years ago, so we are still adjusting to the climate here. How often does it snow over the Thanksgiving 4-day weekend?

Answer: Climate statistics show that it snows on Thanksgiving about once every 5 years, but for the 4-day weekend as a whole it snows closer to 50 percent of the time in the Twin Cities. About one out of every three Thanksgivings has snow cover. In addition it can be very cold. Thanksgiving of 1985 (Nov 28th) brought a morning low of -8 degrees F and an afternoon high of just 11 degrees F. In such weather Twin Cities residents tend to hunker down with hot, hearty meals anyway. You can read more about historical Thanksgiving weather from Pete Boulay at the Minnesota State Climatology Office web site...

<http://www.climate.umn.edu/doc/journal/thanks0911.htm>

Almanac for November 12th:

The average MSP high temperature for this date is 41 degrees F (plus or minus 11 degrees standard deviation), while the average low is 27 degrees F (plus or minus 10 degrees standard deviation).

MSP Local Records for November 12th:

MSP weather records for this date include: highest daily maximum temperature of 65 degrees F in 2001; lowest daily maximum temperature of 11 degrees F in 1911 and 1940; lowest daily minimum temperature of -4 degrees F in 1966; highest daily minimum temperature of 44 degrees F in 1964 and again in 2005; record precipitation of 0.90 inches in 1965; record snowfall of 8.5 inches in 1940.

Average dew point for November 12th is 26 degrees F, with a maximum of 53 degrees F in 2005 and a minimum of -9 degrees F in 1986.

All-time state records for November 12th:

Scanning the state climatic data base: the all-time high for this date is 74 degrees F at Faribault (Rice County) in 1923; the all-time low is -26 degrees F at Tower (St Louis County) in 1995. The all-time record precipitation amount for this date is 2.63 inches at Schroeder (Cook County) in 1940. The state record daily snowfall for this date is 16.0 inches at Farmington (Dakota County) and at Tower (St Louis County) in 1940 (Armistice Day Blizzard).

Past Weather Features:

November 11-12, 1911 brought an ice storm and cold wave to Minnesota. Temperatures dropped by over 30 degrees F as ice accumulated buildings and walkways. The ice was so treacherous that many pedestrians and horses were injured due to slips and falls.

A severe dust storm struck southwestern and south-central counties in Minnesota on November 12, 1933. Winds peaked from 40 to 60 mph that day picking up the soil from freshly plowed fields and blackening the skies. The dust and wind created a good deal of damage as many windows were broken and chimneys toppled. In central and northern parts of the state, rain, sleet, and snow fell. Wadena reported 6 inches of snowfall.

November 11-12 brought the Armistice Day Blizzard to Minnesota delivering 16.8 inches of snow to the Twin Cities, 26.6 inches to Collegeville, 22 inches to Orr, 24 inches to Meadowlands, 16.7 inches to Bird Island, 15 inches to St Peter, and 19.3 inches to Milaca. Following the storm, temperatures plummeted over 40 degrees F.

By the 13th and 14th many observers reported low temperatures well below 0 degrees F and daytime highs only in the teens. The temperature at Tracy (Lyon County) never rose above 8 degrees F for three days.

Words of the Week: "start up wind speed" "cut in wind speed", and "furling wind speed"

These terms are used in the design and deployment of wind turbines for power generation. The start up wind speed is the speed required for the turbine to begin to turn and is often above 5 mph. The cut in speed is the wind speed required for it to start producing power, often in the 5-10 mph range. The furling wind speed is the maximum wind speed that the turbine can withstand before damage begins to occur, this is most often between 45 and 60 mph. At the high wind speeds a braking system usually activates and shuts down the turbine.

Outlook:

Mostly cloudy skies with a chance of rain or snow Saturday, especially in eastern sections. Chance of snow may linger into Sunday for the northeast. Generally cooler temperatures and drier on Monday. Another chance for rain or snow on Tuesday, followed by even cooler temperatures for the balance of next week. Time to get your winter wardrobe out.

Further Information:

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<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

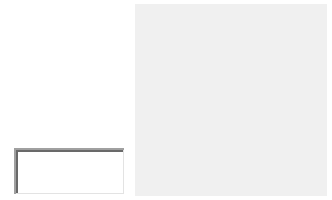
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Minnesota WeatherTalk Newsletter for Friday, November 19, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 19, 2010

Headlines:

- Winter storm of November 12-14 delivered significant moisture
- Weekly Weather Potpourri
- MPR listener question
- Almanac for November 19th
- Past weather features
- Skim ice
- Outlook

Topic: Winter Storm of November 12-14

A strong winter storm brought rain and snow, even thunder and lightning to the state over November 12-14. Many areas reported near 7 inches or greater, including: Cloquet 8", Chisholm 7", Bruno 10.9", MSP 8", Chanhassen 10.4", Duluth 10.9", Grand Marais 7", Winnebago 11", Forest Lake 10", Mankato 10", Hutchinson 9.6", Henderson 8.4", and 7.5" at the University of Minnesota-St Paul. The water content of the snow was especially high in some cases, giving snow to water ratios of 6:1 to 7:1. Elgin in Olmsted County reported 2.62 inches of precipitation and Theilman reported 2.61 inches, essentially equivalent to an entire month of November average.

precipitation. Others receiving significant amounts of precipitation included: Rochester 2.21", Grand Meadow 2.44", Spring Valley 2.40", Dodge Center 2.33", Minnesota City 2.43", Austin 2.52", Zumbrota 2.21", Wabasha 2.19", Albert Lea 1.81", Jordan 1.77", and Lake City 2.40". Rochester reported a new daily record precipitation of 1.21 inches on the 12th, while on the 13th numerous stations reported new daily record levels of precipitation, including: Theilman with 2.23 inches, Spring Valley with 2.00 inches, Dodge Center with 2.03 inches, and Austin with 2.37 inches.

Since soils were not yet frozen, much of this moisture went into storage and will be locked up in frozen soil until next spring. Though soils are not yet frozen shallow soil temperatures have declined since last weekend's snowfall so that they are in the 30s F and will likely start freezing by the end of the month with a very cold Thanksgiving week ahead. Warroad even reported a low of just 9 degrees F this week.

Topic: Three 2011 Calendars You Might Like

As the holiday shopping season is about to get underway those who love the weather, along with the Minnesota outdoors might be interested in buying calendars that feature information and images on these favorite topics. Since it is the 70th Anniversary of the Minnesota Conservation Volunteer magazine they are offering a special 2011 calendar titled "Wild Minnesota" which is full of stunning photos by many award-winning photographers. You can read more about this calendar in the current issue of the Minnesota Conservation Volunteer magazine or you can go online to read about it and order it at...

<http://www.comm.media.state.mn.us/bookstore/mnbookstore.asp?page=viewbook&BookID=81487&stocknum=13925>

Another outstanding calendar is the 2011 Freshwater Society's Minnesota Weatherguide Environment Calendar available in many bookstores and online at the Freshwater Society. This features a wealth of climate, phenology, and nature observations, along with beautiful photos. You can order online at...

<http://www.freshwater.org/index.php/publications/69>

Yet, one more 2011 calendar worth owning is the 2011 Minnesota Gardening Calendar from the University of Minnesota Extension. This calendar contains many gardening tips, along with great photos of gardening settings and plants. You can order this one online through Extension at...

<http://www.extension.umn.edu/distribution/horticulture/DG8633.html>

Weekly Weather Potpourri:

Record breaking warm November weather has been evident in parts of Russia. On Monday, November 15 Moscow reported a record high of 54 degrees F. Many areas have seen November temperatures average 15-20 degrees F warmer than normal. Animals like hedgehogs and badgers have had difficulty going into hibernation. You can read more at...

http://news.bbc.co.uk/weather/hi/news/newsid_9194000/9194905.stm

EPA announced federal guidelines for reducing greenhouse gas emissions from industrial sources. The EPA's guidance is meant to help states understand how to implement new greenhouse gas reduction requirements which go into effect January 2, 2011. You can read more at...

http://www.usatoday.com/weather/climate/globalwarming/2010-11-11-epa-emissions-guidelines_N.htm

Parts of Alberta, Canada were seeing 4 to 8 more inches of snow this week, keeping snow plows busy across that province. In British Columbia at Whistler Mountain skiers are enjoying some early season runs (6 days earlier than normal) as they report over 50 inches of snowfall already. You can find more about Canada weather at...

http://www.theweathernetwork.com/news/storm_watch_stories3&stormfile=bc_ski_resorts_open_for_busi_181110

A recent study suggests more tundra fires may be in store for polar regions as a result of warmer temperatures and drier soils. You can read more about this at...

<http://www.sciencedaily.com/releases/2010/11/101117141516.htm>

MPR listener question: How common is thunder snow like we had last Saturday and do you need to have instability for it to develop?

Answer: Yes indeed there needs to be ample moisture aloft and some instability in most cases to get thunder snow. More often than not when thunder snow occurs there is a significant fall of snow (several inches) as well. As to the frequency of occurrence in the Twin Cities, we don't have precise historical statistics, except in the most recent decades. For November, thunder occurs about every two to three years, but thunder-snow about every 10-12 years. In December thunder-snow shows a frequency of every 14-16 years, and by January it occurs less than one year in twenty. February is

back to about once every 10-12 years. So indeed it is a rare event, but experienced by most citizens at least a few times in their lifetime.

Almanac for November 19th:

The average MSP high temperature for this date is 40 degrees F (plus or minus 11 degrees standard deviation), while the average low is 25 degrees F (plus or minus 11 degrees standard deviation).

MSP Local Records for November 19th:

MSP weather records for this date include: highest daily maximum temperature of 65 degrees F in 1930; lowest daily maximum temperature of 13 degrees F in 1894; lowest daily minimum temperature of -5 degrees F in 1932; highest daily minimum temperature of 48 degrees F in 1930; record precipitation of 1.00 inches in 1983; record snowfall of 6.20 inches in 1981.

Average dew point for November 19th is 25 degrees F, with a maximum of 55 degrees F in 1930 and a minimum of -4 degrees F in 1921.

All-time state records for November 19th:

Scanning the state climatic data base: the all-time high for this date is 74 degrees F at Montevideo (Chippewa County) in 1897 and at Winona in 1953; the all-time low is -29 degrees F at Roseau in 1896. The all-time record precipitation amount for this date is 2.85 inches at Grand Portage (Cook County) in 1998. The state record daily snowfall for this date is 19.0 inches at Dawson (Lac Qui Parle County) in 1948.

Past Weather Features:

A cold wave gripped the state on November 19, 1932. Somewhat seasonal daytime temperatures in the 30s F gave way to rapidly falling temperatures throughout the day which ended up well below 0 degrees F by night. The temperature dropped 50 degrees F at Ada (32 F to -18 F) and at Campbell (37 F to -13 F). Many locations reported lows between -10 and -20 degrees F with fresh snow cover.

Over November 18-20, 1948 much of Minnesota was in the grip of a very strong winter storm. Glaze, sleet, and heavy snow were accompanied by high winds, knocking out power in many areas. Ships on Lake Superior remained in port and many schools were closed over this period. In southwestern Minnesota blizzard conditions prevailed as Dawson reported a snowfall of 19 inches on the 19th of November, a statewide record for the date. Total snowfall from this storm was near

record amounts for three communities: Canby with 18.2 inches; Dawson with 21.0 inches, and Marshall with 24.0 inches.

Words of the Week: Skim ice

This is the initial thin layer of ice formed from a pattern of ice crystals on the surface of a lake, but not yet forming a homogenous sheet. This shows up during the very beginning of lake ice formation in the late fall season, especially on shallow, still waters in bays or near shore. I saw some of this on a trip up to northeastern Minnesota this week. So some lakes are not too many days away from freezing up.

Outlook:

Chance of some mixed precipitation this weekend, especially Saturday night and Sunday. Precipitation will generally be light but some freezing rain may make travel difficult. Some snow may hang around into Monday. Near normal temperatures over the weekend will give way to much cooler weather next week as overnight lows drop into the single digits, even below zero F up north by Thanksgiving Day. Chances for snow again in southern counties by Wednesday.

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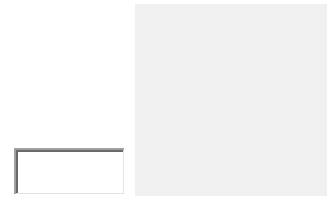
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Minnesota WeatherTalk Newsletter for Friday, November 26, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 26, 2010

Headlines:

- Consequences of freezing rain for November 20-21
- Big snows up north this week
- First sub-zero temperature reading this fall
- Weekly Weather Potpourri
- MPR listener question
- Almanac for November 26th
- Past weather features
- A Gaelic proverb
- Outlook

Topic: Consequences of freezing rain overnight from November 20-21

Light freezing rain overnight from Saturday, November 20th to early Sunday, November 21st brought dangerous driving conditions to many parts of Minnesota. A light coating of ice on streets and sidewalks produced very slippery conditions. Some observers noted ice thickness up to a tenth of an inch. Over 370 Twin Cities Metro Area traffic accidents were reported and over 450 on a statewide basis. There were two deaths attributed to the weather, as well as scores of injuries as hospital

emergency rooms were busy. It was arguably the most consequential freezing rain in the Twin Cities area since November 23, 1981 according to Pete Boulay of the Minnesota State Climatology Office.

Topic: Big snows up north

The same complex weather pattern that produced freezing rain in southern Minnesota also brought heavy snowfall to many northern areas of the state. Many observers there reported snowfall amounts of 4 to 12 inches for Monday, November 22nd. Some record reported snowfalls for that date include: 12.6 inches at Fargo, ND and Moorhead, MN; 12.5 inches at Waubun (Mahnommen County); 6.6 inches at International Falls; 9.0 inches at Blackduck; and 8.0 inches at Orr.

Still more snow fell on Tuesday, November 23, setting a few more records. Some of these included: 8.7 inches at Kabetogama; 9.0 inches at Twin Valley (Norman County), and 7.0 inches at Bigfork. On Wednesday, November 24th International Falls reported a record 6.5 inches of new snow. Their monthly total is now over 23 inches for November. Others receiving significant snowfall up north over November 25-26 included Kabetogama (11.30"), Littlefork (7.7"), Orr (7.0"), Silver Bay (6.2"), Babbitt (6.0"), and Wolf Ridge (6.0")

Topic: First below zero F reading of the fall season

Following the fresh snowfalls up north this week overnight temperatures dipped to the single digits above zero in many areas. At Embarrass, MN where there was 7 inches of new snow the thermometer dipped to -3 degrees F on Wednesday morning, November 23rd for the first reading below zero F anywhere in the state so far this autumn. Then, by Friday morning with fresh snow cover in the Red River Valley Hallock, MN dipped to -9 degrees F, while Grand Forks, ND went down to -12 degrees F.

Weekly Weather Potpourri:

USGS and NASA have collaborated to produce a project called "Earth as Art" that presents a number of vivid Earth images with artistic merit. Several images are worth viewing. You can read more and see some images at...

<http://www.usgs.gov/newsroom/article.asp?ID=2636>

or

http://eros.usgs.gov/imagegallery/collection.php?type=earth_as_art_3

A report by UCLA biologists this week suggests that climate change will continue to dwindle the suitable habitat for polar bears, and that their population will continue to decline pushing the species into competition with the grizzly bear for survival in the less-icy arctic regime. You can read more about this at....

<http://www.sciencedaily.com/releases/2010/11/101124085607.htm>

A recent study in the health care industry found that climate variables have very distinct effects on patient loads in hospitals and care facilities. In a study involving just under 60,000 patients published in the Emergency Medicine Journal a rise of 5 degrees C in maximum daily air temperature was associated with a increase in children's admissions, while a loss of 5 degrees C in minimum daily temperature was associated with an increase in adult admissions. You can read more from this study at...

<http://www.sciencedaily.com/releases/2010/11/101124214724.htm>

MPR Listener Question: For the Twin Cities area what has been the greatest depth of snow recorded at the end of November? Do you think this snow cover will last until the end of the month?

Answer: In the modern record the greatest depth of snow at the end of November was 16 inches in 1991 (46.9 inches of snow fell that month). In the Pioneer Era there may have been more snow on the ground on November 30th in 1857 or 1868 but measurements are lacking to confirm that. As to the rest of this current month, we may melt some snow this weekend, then get some more on Monday and Tuesday, next week. Thus, I think we will still have snow cover for the most part as we end the month of November.

Almanac for November 26th:

The average MSP high temperature for this date is 34 degrees F (plus or minus 10 degrees standard deviation), while the average low is 20 degrees F (plus or minus 10 degrees standard deviation).

MSP Local Records for November 26th:

MSP weather records for this date include: highest daily maximum temperature of 62 degrees F in 1914; lowest daily maximum temperature of 10 degrees F in 1898; lowest daily minimum temperature of -16 degrees F in 1977; highest daily minimum temperature of 39 degrees F in 1909; record precipitation of 1.76 inches in 1896; record snowfall of 5.9 inches in 2001.

Average dew point for November 26th is 20 degrees F, with a maximum of 52 degrees F in 1909 and a minimum of -22 degrees F in 1977.

All-time state records for November 26th:

Scanning the state climatic data base: the all-time high for this date is 68 degrees F at Fairmont (Martin County) and Tracy (Lyon County) in 1914; the all-time low is -37 degrees F at Pokegama Dam (Itasca County) in 1903. The all-time record precipitation amount for this date is 4.80 inches at Worthington (Nobles County) in 1896. The state record daily snowfall for this date is 19.5 inches at Granite Falls (Chippewa and Yellow Medicine Counties) in 2001.

Past Weather Features:

November 26, 1872 was the start of a 4-day cold snap in Minnesota, bringing many low temperatures that were well below zero F. In the Twin Cities area morning lows from the 26th to the 29th of November ranged from -6 degrees F to -21 degrees F with daytime highs only in the single digits. At Fort Ripley overnight lows ranged from -12 to -30 degrees F and the daytime high did not rise above 0 degrees F for three days.

November 26, 1896 brought the wettest Thanksgiving in Minnesota history. Sleet, freezing rain, and snow visited most areas of Minnesota. Many observers reported over an inch of precipitation, while New Ulm reported 3.20 inches. Worthington reported a total of 4.80 inches, mostly rain. But this rainfall quantity is the highest daily amount for a November date in state history.

November 26, 1965 brought heavy snows to north-central and northeastern Minnesota communities, where 9 to 16 inches of snowfall occurred. Duluth and Tower reported 6 consecutive days with snow from the 24th to the 29th and by the end of the month Tower reported a snow depth of over 30 inches.

Words of the Week: Wisdom from a Gaelic proverb

In Summer time be cheerful, chaste,
and early out of bed;
In Winter be well-capped, well-shod,
and well on porridge fed.

Outlook:

Generally more sun and warmer over the weekend. Temperatures will be closer to normal with some melting of snow on Saturday and Sunday. Increasing clouds on

Monday with a chance for mixed precipitation spreading from west to east. Drier and colder again by Wednesday of next week.

Further Information:

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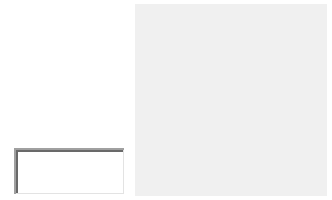
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Minnesota WeatherTalk Newsletter for Friday, November 5, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 5, 2010

Headlines:

- Split Rock Lighthouse Centennial
- "Minnesota's Deadliest Blizzards" to air
- AMS Forum on 2010 Minnesota tornadoes
- Weekly Weather Potpourri
- MPR listener question
- Almanac for November 5th
- Past weather features
- Gnomonists
- Outlook

Topic: Split Rock Lighthouse Centennial

Friday night, November 5th marks the final event to celebrate the Centennial of Split Rock Lighthouse, the most visited among Minnesota Historical Society sites. Located along the scenic north shore of Lake Superior, off Highway 61 since 1910 this historic site has endured some of nature's most challenging weather events. I will be talking about 14 of the worst November storms (1872-2010) to ever strike Lake Superior. My goal is to illustrate and describe their character and consequence. Presentations will be

given at 6:30 pm and 7:45 pm in the Split Rock Auditorium. The Minnesota Historical Society will charge a \$10 admission fee. You can find out more at

<http://events.mnhs.org/calendar/Index.cfm?VenueID=8&bhcp=1>

or by calling 218-226-6372 or email: splitrock@mnhs.org

Topic: "Minnesota's Deadliest Blizzards" to Air on November 11th

Next Thursday, November 11th at 7:00 pm Twin Cities Public Television will air the new documentary about Minnesota blizzards. Hosted by Mary Lahammer, this 30-minute documentary will cover the great blizzards of October 16, 1880 (documented in Laura Ingalls Wilder's "Long Winter" Story), January 12, 1888 (documented in David Laskin's book "The Children's Blizzard"), and November 11, 1940 (documented in William H. Hull's book "All Hell Broke Loose"). The program will describe the character and consequence of these historical storms through stories, pictures, and narrative, some provided by Paul Douglas, Hy Berman, and myself. I hope you will find it interesting.

Topic: Record-setting tornado season of 2010

The American Meteorological Society is sponsoring a forum this month: "The Largest Tornado Outbreak in Minnesota Recorded History." It will be held on Friday, November 12th at 6:30 pm at the 3M Auditorium on the University of St Thomas Campus. The meeting is open to the public. Speakers will include staff from the National Weather Service, Emergency Management Community, and some storm chasers.

Of course 2010 was a record year in Minnesota for tornadoes with 104 documented touch downs. The National Weather Service Office in Chanhassen has provided details on these storms at...

<http://www.crh.noaa.gov/images/mpx/2010torlist.pdf>

In addition, Paul Huttner, MPR chief meteorologist has written about this in his Updraft blog at...

<http://minnesota.publicradio.org/collections/special/columns/updraft/>

These tornadoes brought 3 deaths and 46 injuries. Three of them were EF-4 intensity (166-200 mph wind gusts) and 48 occurred on one date, June 17th, a record single day frequency.

Topic: Monthly frequencies for the occurrence of thunder diminished

Though thunder can occur in any month around Minnesota, we know that its frequency greatly diminishes as the fall season wears on and clouds become more stratoform (layered) in nature rather than vertical (cumuloform). From the Twin Cities climate statistics here are the average frequencies for thunder by month during the season of long nights and short days:

- 1.9 percent of all days in November
- 0.7 percent of all days in December
- 0.1 percent of all days in January
- 0.6 percent of all days in February
- 3.4 percent of all days in March

Weekly Weather Potpourri:

Embarrass, MN started out November with a reading of 15 degrees F on the 1st, coldest in the contiguous 48 states, and on Friday, November 5th Embarrass reported a low of just 1 degrees F, also coldest in the nation. In addition, though November is typically the cloudiest month of the year, the first 4 days have started remarkable sunny with near record levels of solar radiation in many places.

The NOAA National Hurricane Center was tracking Hurricane Tomas which was bringing heavy rain to Haiti. It is the 19th named storm of the North Atlantic Hurricane Season and is expected to head northeast passing east of the Bahamas this weekend then weakening and heading for Bermuda early next week. Another Tropical Cyclone was expected to impact southern portions of India this weekend with heavy rains and strong winds.

MIT researchers studying the effects of climate change on mid-latitude storm formations in the Southern and Northern Hemispheres find some differences in dynamics. Their analysis indicates that climate change may affect changes in mid-latitude storminess year round in the Southern Hemisphere, but predominately in the winter season in the mid latitudes of the northern hemisphere. You can read more at...

<http://web.mit.edu/press/2010/weaker-summer.html>

Columbia University researchers have shown that volcanic eruptions can cause lingering shifts in precipitation patterns, especially those of the Asian Monsoon Season. This research may provide government weather services with better ability to forecast the impacts of volcanic eruptions on rainfall patterns. You can read more at...

<http://www.sciencedaily.com/releases/2010/11/101103135251.htm>

NOAA announced earlier this week an upgrade to its Educational Resources web site. Additional lesson plans and resources on oceans, climate, atmosphere, marine life, and freshwater are available, including science education webinars. You can learn more at...

<http://www.education.noaa.gov/>

MPR Listener Question: I will miss your presentation on the Great November Storms at Split Rock Lighthouse and Silver Bay this weekend. Can you share with us what you think are the top November storms of all time in Minnesota?

Answer: This is tough to do. Certainly the storm last week on October 26, 2010 could also categorically fit with some of the all-time worst November storms in Minnesota history. If I judge these historical storms based on their meteorological character alone and not their consequences I would suggest the following list chronologically:

Nov 28-29, 1905 (Maatafa Storm)

Nov 10-11, 1913 ("white hurricane")

Nov 11, 1940 (Armistice Day Blizzard)

Nov 29, 1960 (Grand Marais flood)

Nov 10, 1975 (Edmund Fitzgerald Storm)

Nov 10, 1998 (previous state record low barometer)

All of these storms saw pressure falls of at least 20 mb (0.60 inches) in 24 hours, winds of 65 mph or greater, and a storm diameter of 1200 miles.

Almanac for November 5th:

The average MSP high temperature for this date is 47 degrees F (plus or minus 10 degrees standard deviation), while the average low is 30 degrees F (plus or minus 8 degrees standard deviation).

MSP Local Records for November 5th:

MSP weather records for this date include: highest daily maximum temperature of 71 degrees F in 2001; lowest daily maximum temperature of 26 degrees F in 1935; lowest daily minimum temperature of 3 degrees F in 1951; highest daily minimum temperature of 48 degrees F in 1918; record precipitation of 0.93 inches in 1948; record snowfall of 4.2 inches in 1959.

Average dew point for November 5th is 29 degrees F, with a maximum of 55 degrees F in 1956 and a minimum of 0 degrees F in 1951.

All-time state records for November 5th:

Scanning the state climatic data base: the all-time high for this date is 78 degrees F at Madison (Lac Qui Parle County) in 1975 and at Wheaton (Traverse County) in 2001; the all-time low is -16 degrees F at Detroit Lakes (Becker County) in 1951. The all-time record precipitation amount for this date is 2.02 inches at Rushford (Fillmore County) in 1948. The state record daily snowfall for this date is 11.0 inches at Floodwood (St Louis County) in 1993.

Past Weather Features:

October of 1873 concluded with 13 inches of snow in downtown St Paul. November ushered in some cold polar air and it was the coldest start to the month in the 19th Century. During the first five days of November overnight lows ranged from just 11 to 16 degrees while daytime highs struggled to get above the freezing mark. November of 1873 was the 6th coldest in Twin Cities history, with some overnight lows below 0 degrees F.

On November 7, 1885 a strong and violent gale blew the steamer Algoma into the rocks off Greenstone Point on the NE end of Isle Royale in Lake Superior. The ship was badly damaged and began to sink. Fifteen crew and passengers made it to safety on Isle Royale but 37 perished in the wreck.

On November 5, 1975 Minnesota was in the middle of a 7-day heat wave with daytime highs in the 60s and 70s F. Over 100 Minnesota communities reported afternoon highs in the 70s F. The other shoe dropped on the 10th with the famous Edmund Fitzgerald Storm and for the balance of the month cold and snow dominated the Minnesota landscape. By the end of the month Duluth and Canby had over 2 feet of snow.

Word of the Week: Gnomonists

Originally the Greek word gnomon meant an interpreter, judge or knowledgeable person. The center post of a sundial is called a gnomon, because it casts a shadow to show what time it is. Thus gnomonists are people in the know who tell time and direction by reading the size and shapes of shadows. The shadow is not always cast upon a sundial. Historically other objects that cast shadows, such as rock formations (Stonehenge), buildings or monuments have been used as well.

Outlook:

Fairly sunny weekend with mild temperatures around Minnesota. This pattern should linger into Monday with temperatures well above normal. Chance of showers by Tuesday and Wednesday with cooler temperatures toward the end of next week and some storminess heading into next weekend.

Further Information:

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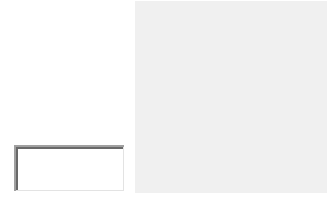
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Minnesota WeatherTalk Newsletter for Friday, December 3rd, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 3rd, 2010

Headlines:

- November climate summary
- Update on soil freezing
- Weekly Weather Potpourri
- MPR listener question
- Almanac for December 3rd
- Past weather features
- "fractional attributable risk"
- Outlook

Topic: November Climate Summary

The first twelve days of November brought warm temperatures to the state and were generally dry with very little precipitation. During the second half of the month colder temperatures prevailed and there was more frequent precipitation. Most observers reported a mean monthly temperature value from 1 to 4 degrees F warmer than normal. Extremes ranged from 74 degrees F at Sherburn (Martin County) on the 9th to an overnight low of -9 degrees F at Hallock (Kittson County) on the 26th. By the end of the month many northern Minnesota observers had reported at least one overnight

minimum temperature that was below zero F. Minnesota reported the nation's lowest temperature only once during the month, 9 degrees F at Embarrass on the 5th. Soils were freezing up for the winter, and lake ice was quickly forming and covering many smaller lakes.

Precipitation for November was near normal for many observers. Some of the places reporting well above normal values included Grand Portage with 3.12 inches, Elgin with 3.18 inches, and Wolf Ridge with 2.85 inches. A good deal of the precipitation came in the form of snowfall, and for many it was above the historical average for November. In fact on November 30th both Long Prairie (7.3") and Cook (7.5") reported record-setting snowfall amounts. Some of the greatest monthly snowfall amounts were: 32.2 inches at Kabetogama, 29 inches at International Falls, 27.9 inches at Duluth, 29.3 inches at Orr, 25.6 inches at Babbitt, 22.9 inches at Cloquet, and 21.5 inches at Isabella. The amount of snowfall in November at Kabetogama was a record, while those amounts at International Falls and Babbitt ranked 2nd highest ever for the month.

Wind gusts over 40 mph were reported by several observers on the 3rd, 19th, 24th, and 25th. A freezing rain caused hundreds of motor vehicle accidents and several injuries on November 20-21, especially in the Twin Cities Metro Area.

Pete Boulay of the Minnesota State Climatology Office has posted a very comprehensive recap of November weather for Minnesota at...

http://www.climate.umn.edu/doc/journal/nov_2010_recap.htm

Topic: Update on soil temperatures

Soils are now frozen to variable depths depending on snow cover. Frozen soil depth appears to vary from 2 inches to as much as 8 inches. Soil freezing will continue to deepen with colder temperatures expected over the weekend. Only areas that receive significant snowfall from the winter storm over Friday and Saturday may see soil freezing stabilize as a result of the insulating effect of the added snow cover. Elsewhere if snow cover is thin, soil freezing depth will continue to plummet with very cold temperatures over the weekend and into next week.

Weekly Weather Potpourri:

Scotland and parts of northeast England reported a cold and snowy week that impeded both road and rail traffic. Temperatures in parts of Scotland fell to below zero F values, while snows accumulated to a depth of 8 to 20 inches in some highland areas. You can read more at...

<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20101202.html>

Elsewhere across northern Europe residents were feeling the effects of cold and snow as well. In Poland temperatures fell as cold as -15 degrees F and a number of homeless people died, while in Germany snowfalls of 10 to 12 inches prompted school and business closures. Moscow reported its coldest December 1st (-10 degrees F) since 1931, and Berlin reported the coldest start to December ever.

Further east in Russian Siberia strong arctic high pressure was bringing some awful cold temperatures for so early in December. On Thursday, December 3rd the following highs and lows were reported for these Siberian communities (all located at roughly 62 degrees north latitude):

Tomtor high -44 F low -58 F

Jakutsk high -50 F low -54 F

Mirny high -36 F low -43 F

Lake-effect snows hit upstate New York communities this week, paralyzing traffic flow and stranding many travelers as drifts up to 6 feet high blocked some roads. Many weather observers there reported storm total amounts ranging from 20 to 32.5 inches. You can read more at the NWS-Buffalo Office web site...

<http://www.erh.noaa.gov/buf/>

An article published recently in the International Journal of Climatology reports on research related to temperature trends over the past 160 years in Finland. Analysis shows a positive temperature trend for the past 100, 50, and 30 year periods. In the most recent 50 year period the warming trend in annual temperatures is heavily weighted to the winter season there, an attribute that is similar to the temperature trend seasonality in Minnesota. You can find the article at...

<http://onlinelibrary.wiley.com/doi/10.1002/joc.2046/abstract>

Dr. Frank Marks, director of hurricane research at NOAA's Atlantic Oceanographic and Meteorological Laboratory in Miami, will receive the prestigious Verner E. Suomi Award by the American Meteorological Society at the AMS 91st Annual Meeting in Seattle on Jan. 26, 2011. He is being honored for his work in utilizing airborne Doppler radar and other technologies to study the dynamics of tropical storm systems.

MPR Listener Question: Remembering how snowy last December was, I am hoping for more of the same this year because it is so great for cross-country skiing. What's

the record for snowfall during the month of December? Have any northern Minnesota areas seen as much as 50 inches?

Answer: Indeed last December was a good one for snow lovers as many observers reported 20 to 30 inches for the month. The record in the Twin Cities is 33.2 inches in 1969. On a statewide basis I can find no record of 50 inches of snowfall in the month of December. Two Harbors came close to this back in 1996 when they reported 48.9 inches and it was great skiing along the north shore of Lake Superior. December of 1996 brought 18 days with measurable snowfall at Two Harbors and 18.4 inches fell on New Years Eve.

Almanac for December 3rd:

The average MSP high temperature for this date is 32 degrees F (plus or minus 11 degrees standard deviation), while the average low is 18 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for December 3rd:

MSP weather records for this date include: highest daily maximum temperature of 62 degrees F in 1962; lowest daily maximum temperature of -1 degrees F in 1886; lowest daily minimum temperature of -19 degrees F in 1940; highest daily minimum temperature of 43 degrees F in 1962; record precipitation of 1.05 inches in 1953; record snowfall of 5.9 inches in 1934.

Average dew point for December 3rd is 18 degrees F, with a maximum of 52 degrees F in 1951 and a minimum of -22 degrees F in 1940.

All-time state records for December 3rd:

Scanning the state climatic data base: the all-time high for this date is 72 degrees F at Canby (Yellow Medicine County) in 1941; the all-time low is -38 degrees F at Itasca State Park in 1927. The all-time record precipitation amount for this date is 2.34 inches at Leonard (Clearwater County) in 1951. The state record daily snowfall for this date is 16.8 inches at Duluth Harbor (St Louis County) in 1934.

Past Weather Features:

December of 1886 started out extremely cold with almost continuous below zero F readings all around the state. December 3, 1886 was arguably the coldest ever in the Twin Cities with a morning low of -17 degrees F and an afternoon high that only reached -1 degrees F. Up in the Red River Valley at St Vincent the morning low was -

31 degrees F and the afternoon high only made it to -14 degrees F. Fortunately temperatures climbed above 0 F on December 4th and by the 9th reached 40 degrees F in St Paul. However very cold weather returned making December of 1886 one of the coldest in state history.

Record cold gripped the state on December 3, 1927 with many northern Minnesota communities reporting lows of -30 degrees F or colder. The first four days of December were extremely cold with many daytime highs only reaching single digits. Temperatures finally rose above the freezing mark (32 F) by December 5th.

The first four days of December in 1998 were the warmest ever, as many daytime highs reached the upper 60s F. Many golf courses were open for play and in the downtown areas of the Twin Cities people took their lunch outside to enjoy the weather.

Word of the Week: "fractional attributable risk"

This is a new term used in climate fingerprinting research. On the topic of weather and climate extremes researchers study both frequency and amplitude of events. As global climates continue to change, there is a wish to quantify how the risk of such events as heat waves, droughts and flash floods may change. Researchers use models to quantify the fractional change in risk (probability of occurrence) that is associated with different levels of climate change. A range of future climate scenarios predicted by climate models will produce changes in the probabilities associated with specific environmental conditions or thresholds, such as the occurrence of a 105 degrees F Heat Index Value in Minnesota for example. The shift in the future probabilities for these environmental conditions is termed a "fractional attributable risk" and we will probably be hearing more use of such terminology as further research is done.

Outlook:

Snow tapering off on Saturday, with much colder temperatures settling in for Sunday and Monday. Generally a dry pattern, with more sunshine, but sustained cold temperatures next week. Many areas will see below 0 F nighttime readings and daily highs just in the teens. A chance for snow again late next week.

Further Information:

For older versions of the "Minnesota WeatherTalk" newsletter go to

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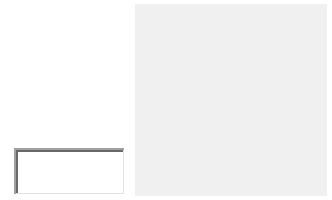
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Minnesota WeatherTalk Newsletter for Friday, December 10th, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 10th, 2010

Headlines:

- Correction to last week's listener question
- Cold start to December
- Weekly Weather Potpourri
- MPR listener question
- Almanac for December 10th
- Past weather features
- Nephometrology
- Outlook

Topic: Correction to last week's listener question and answer

You may recall last week an MPR listener asked if any observation of 50 or more inches of snowfall had occurred in Minnesota during the month of December. My reply was NO based on the fact that the largest December snowfall I could find was 48.9 inches at Two Harbors (water treatment plant) in 1996. Well, National Weather Service Cooperative observer Gordon Hommes corrected me. He makes observations at a site 7 miles northwest of Two Harbors and about 750 feet elevation above Lake Superior. In December of 2008 Gordon recorded 51.4 inches of snowfall, as 17 days

brought measurable amounts. I stand corrected. This means that in the Minnesota climate record for the five months of November through March, 50 inches or more of snow has occurred at least once in every month except February.

Topic: Cold start to the month of December

Through the first 9 days of the month most observers are reporting temperature values that range from 8 to 10 degrees F colder than normal. Many have reported several mornings below 0 degrees F, and Minnesota has reported the coldest temperature in the 48 contiguous states 3 times already: -17 degrees F at Baudette and Waskish on the 3rd; -19 degrees F at International Falls on the 7th; and -10 degrees F at Embarrass on the 9th. This is the coldest start to December since 2007. It appears that even colder weather is on the way this weekend and into next week.

Thursday, December 9th brought the month's first significant snowfall to many Minnesota communities. Grand Rapids reported 4 inches, Lusten and Hoyt Lakes reported 3.5 inches, Two Harbors reported 3 inches, Kabetogama reported 5 inches, and International Falls 2.5 inches. It appears that much more snow is on the way for December 10-11, perhaps even record-setting amounts for eastern Minnesota locations.

Weekly Weather Potpourri:

The current November/December issue of Weatherwise magazine has a terrific interview with Gavin Pretor-Pinney the Englishman and Founder of the Cloud Appreciation Society. He is also the founder of Idler magazine and has published a number of books, including The Cloudspotter's Guide and Cloud Collector's Handbook. You can visit his web site at...

www.cloudappreciationsociety.org

Weatherwise also contains interesting articles about how health care professionals use weather forecasts to prepare for increased patient loads in their facilities, and a special article about the value of the citizen weather observer.

If holiday shopping for the weather enthusiast you may want to check out some web sites that offer an array of gadgetry. One site is www.weathersense.com

You can find reference to a number of manufacturers and services that specialize in all things weather. Certainly a gift that is always appreciated is a NOAA Weather Radio, available at many electronics stores.

The UCAR-COMET program has recently issued a new online educational module about tsunamis. It includes animation, historical events, and modern detection technology. To give it a try please go to...

<http://www.meted.ucar.edu/>

A Texas A&M University researcher has published an analysis of cloud feedbacks related to climate change and he concludes that the net result will be enhanced warming. This conclusion is more definitive than earlier research that showed combinations of both positive and negative cloud feedbacks in the climate system. You can read more at...

<http://www.sciencedaily.com/releases/2010/12/101209141231.htm>

MPR Listener Question: At Maple Plain I have not had a single temperature reading of 32 degrees F or higher this month. What is the record longevity for below freezing temperatures during the month of December?

Answer: The record year for staying below the 32 degrees F mark in December was 1983. All 31 days were below 32 degrees F. Further, from December 19, 1977 to February 22, 1978 the temperature remained below the freezing mark, a period of 66 consecutive days, a record longevity in the Twin Cities area.

Almanac for December 10th:

The average MSP high temperature for this date is 27 degrees F (plus or minus 12 degrees standard deviation), while the average low is 12 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for December 10th:

MSP weather records for this date include: highest daily maximum temperature of 54 degrees F in 1979; lowest daily maximum temperature of -3 degrees F in 1977; lowest daily minimum temperature of -18 degrees F in 1977; highest daily minimum temperature of 34 degrees F in 1896, 1921, and 1930; record precipitation of 0.61 inches in 1911; record snowfall of 1.40 inches in 1970.

Average dew point for December 10th is 10 degrees F, with a maximum of 37 degrees F in 1918 and a minimum of -27 degrees F in 1977.

All-time state records for December 10th:

Scanning the state climatic data base: the all-time high for this date is 60 degrees F at Grand Meadow (Mower County) in 1939; the all-time low is -41 degrees F at Thorhult (Beltrami County) in 1977. The all-time record precipitation amount for this date is 2.42 inches at New Richland (Waseca County) in 1911. The state record daily snowfall for this date is 10.0 inches at Lake Wilson (Murray County) in 2003.

Past Weather Features:

December 10, 1939 was the last day of prolonged mild spell of weather. Over 20 Minnesota communities had reported daytime temperatures in the 50s and 60s F that week, topping out with 74 degrees F at Wheaton on the 9th.

December 10, 1977 was probably the coldest in Minnesota history. Over 30 communities reported a morning temperature of -30 degrees F or colder. With over a foot of snow cover Argyle in the Red River Valley only "warmed" to a daytime high of -18 degrees F that day.

Heavy snowfall visited many Minnesota communities over December 9-10, 2003. Snowplows were busy in such places as Chanhassen (10.5"), Stillwater (6.5"), Lambertson (8.5"), Tracy (7.0"), Owatonna (7.5"), St James (10.8"), Springfield (10.0"), Red Wing (8.5"), and Rochester (6.5"). St James ended up with over 20 inches of snow that month.

Word of the Week: Niphometrology

Adopted as official jargon by participants at the Western Snow Conference in 1942, this term was used to refer to the science of snow measurement. It is a composite formed from the Greek root words nipho meaning snow and metron meaning to measure. This term never really caught on in the scientific community, perhaps because it sounded a bit too academic for a process as simple as sticking a yardstick in the snow to measure depth.

Outlook:

Snowy and windy on Saturday, with heaviest snows in eastern sections of the state. Much colder on Saturday night with lows well below 0 degrees F and dangerous windchill conditions, continuing into Sunday and Monday. Very cold temperatures will give way to some moderation by Wednesday of next week. It will be generally a dry week.

Further Information:

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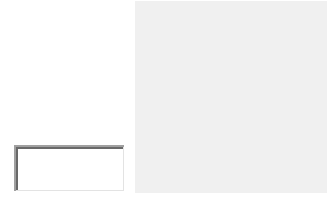
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Minnesota WeatherTalk Newsletter for Friday, December 17th, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 17th, 2010

Headlines:

- Cold December well underway
- New Seasonal Climate Outlook
- Santa Forecast on Midday
- Weekly Weather Potpourri
- MPR listener question
- Almanac for December 17th
- Past weather features
- Snow Dragon
- Outlook

Topic: Cold December well underway

Nearly everyday this month has brought colder than normal temperatures to the state. Most observers report that the average December temperature so far is from 8 to 12 degrees F colder than normal. Following last weekend's snow storm, observers reported their coldest temperatures since last February. Some of the coldest readings included: -29 degrees F at Little Fork, Kabetogama, Crane Lake, and Warroad; -31 degrees F at Cook; -33 degrees F at International Falls and Embarrass; and -34

degrees F at Babbitt. Babbitt reported three consecutive mornings this week with -30 degrees F or colder.

Through the first half of December, Minnesota has reported the coldest temperature in the 48 contiguous states six times already. This is at least partially the result of both arctic high pressure following last weekend's snow storm, and abundant snow cover in most places. The 18 inch snow depth reported at MSP International Airport earlier this week (Dec 12) was the most since the winter of 1996-1997.

More snow fell across portions of central and southern Minnesota over December 15-16 this week with the passage of an Alberta Clipper. Areas near Willmar reported over 10 inches, while Litchfield reported 9.5 inches and Hutchinson reported 8 inches. Waseca reported another 8 inches of snowfall, pushing their December total over 27 inches, nearly equal to what they got in December last year.

Topic: New NOAA-CPC Seasonal Outlooks

The NOAA Climate Prediction Center released new seasonal climate outlooks this week. For the period from January through March the Great Lakes Region, including much of Minnesota is expected to see colder than normal temperatures will generally above normal precipitation. Certainly this portends a climatic pattern that has been in evidence this month (Dec). Much of the outlook is based on historical La Nina correlations and models.

Topic: The Santa Forecast program on Midday, December 24th

Next Friday (Christmas Eve) Gary Eichten and I will be trying to make sense of the Santa Forecast this year from 11:00 am to noon on Minnesota Public Radio's Midday program. Could it be another snowy one like last year was? We'll see.....

Weekly Weather Potpourri:

A high resolution image of the snow cover across the Great Lakes Region is depicted in a satellite image at the NASA Earth Observatory web site. The extent of last weekend's snow storm, along with bands of ongoing lake effect snowfalls can be seen in the image at...

<http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=47642>

A series of heavy rains inundated parts of Columbia this month causing widespread flooding that affected two million people. More showers and thunderstorms are

expected there over the weekend bringing little relief from the flooding. You can read more at...

<http://www.bbc.co.uk/news/world-latin-america-12006568>

An ancient mummified forest found in the polar region of Ellesmere Island in Canada is providing clues about forest response to historical climate change. Species uncovered in this find include spruce and birch, but these species show signs of stress growing in the climate of 2 to 8 million years ago. You can read more about this study at...

<http://www.sciencedaily.com/releases/2010/12/101215113243.htm>

NOAA Storm Prediction Center in Oklahoma reports only 2 tornadoes nationwide so far in December, 2010, the fewest for the month since 2003. Winter weather had dominated most of the USA landscape this month and may keep the tornado numbers low. Still during 2010 it is likely total number of tornado reports will be over 1100.

MPR Listener Question: I saw that last weekend's storm produced both a snowfall and precipitation record for December 11th at MSP International Airport with 16.3 inches of snow and 1.16 inches of precipitation. In fact the December 10-11 total precipitation was 1.21 inches, a remarkably large number for the month of December. I know that other locations got more snow than MSP, but did some others also get more precipitation? Any records set?

Answer: Yes, indeed. All of the following observers reported more precipitation from last weekend's storm: Winona 1.28 inches, Faribault 1.30 inches, Red Wing 1.58 inches, Rochester 1.71 inches, and Preston 1.81 inches. In addition many reported new record precipitation amounts for December 11th including 1.00 inches at Faribault and Preston, 1.36 inches at Rochester, and 0.92 inches at Winona. On December 10th Red Wing saw a record 1.00 inches of precipitation as well. All of these amounts are exceptionally large for December storms which usually just deliver a few tenths of an inch in terms of their liquid precipitation.

Almanac for December 17th:

The average MSP high temperature for this date is 24 degrees F (plus or minus 14 degrees standard deviation), while the average low is 10 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for December 17th:

MSP weather records for this date include: highest daily maximum temperature of 53 degrees F in 1939; lowest daily maximum temperature of -5 degrees F in 1945; lowest daily minimum temperature of -17 degrees F in 1875, 1983, and 1985; highest daily minimum temperature of 35 degrees F in 1977; record precipitation of 0.81 inches in 1908; record snowfall of 10.8 inches in 1908.

Average dew point for December 17th is 7 degrees F, with a maximum of 40 degrees F in 1977 and a minimum of -22 degrees F in 1945.

All-time state records for December 17th:

Scanning the state climatic data base: the all-time high for this date is 63 degrees F at Farmington (Dakota County) and Rochester (Olmsted County) in 1939; the all-time low is -44 degrees F at Winton (St Louis County) in 1919 and at Mora (Kanabec County) in 1983. The all-time record precipitation amount for this date is 1.80 inches at Hinckley (Pine County) in 1984. The state record daily snowfall for this date is 15.0 inches at Beaver Bay (Lake County) in 1863 and at Lynd (Lyon County) in 1908.

Past Weather Features:

On December 17, 1863 at Beaver Bay an all-day storm brought 15 inches of snow to that north shore community. The temperature hovered between 10 and 12 degrees F all day.

Over December 16-17, 1908 a winter storm delivered 8 to 16 inches of snow across portions of western Minnesota. In the Twin Cities area a total snowfall of 13 inches was recorded with winds gusting to near 30 mph. Visibility was difficult and some businesses closed for the day.

On December 17, 1939 southern Minnesota was in the midst of a 4-day December heat wave. Many observers reported daytime highs in the 50s and 60s F under abundant sunshine. Some overnight lows did not drop below 40 degrees F, remarkable for the month of December.

On December 17, 1983 an arctic cold wave settled over the state keeping temperatures below 0 degrees F over 4 consecutive days. Overnight lows at Tower ranged from -29 to -52 degrees F. Even in the urban heat island of the Twin Cities the temperature remained below 0 degrees F (ranging from -17 F to -29 F) and finally rose to a high of 1 degree F on December 20th. Record-setting wind chill values were measured around the state ranging from -45 to -65 degrees F.

Words of the Week: Snow Dragon

More commercial snow removal companies, as well as public works departments are turning to the use of large-scale snow melters to get rid of large quantities of snow from parking lots, streets, and stadiums. These snow melters use heating units up to 120 degrees F and filters that sort out unwanted debris from the meltwater, before it is discharged into the storm sewer system. In many situations the use of such equipment is more economic than hauling the tons of snow off site. Some of these units used in Canada can melt as much as 130 tons per hour. One such unit being utilized by a number of western states is called the "Snow Dragon." A Snow Dragon was used to help clear TCF Bank Stadium (home of the Gopher football team) of snow this week so the Minnesota Vikings could play football there next Monday night. The Snow Dragon used at the University of Minnesota could melt up to 30 tons of snow per hour.

Outlook:

Continued cold over the weekend with a chance for snow flurries on Saturday. Better chance for snow later on Monday and Tuesday next week with a continuation of colder than normal temperatures. Temperatures for Monday night's Vikings-Bears game are likely to be in the teens F with the possibility of some snow. Additionally snow looks like a possibility for Christmas Eve next week.

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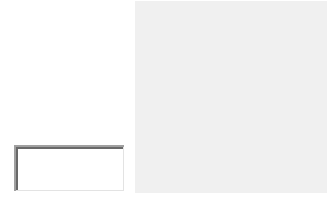
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Minnesota WeatherTalk Newsletter for Friday, December 24th, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 24th, 2010

MERRY CHRISTMAS TO ALL MINNESOTA WEATHERTALK READERS!

Headlines:

- Christmas Weather in Minnesota
- More snow on December 20-21
- Santa Forecast on Midday
- Weekly Weather Potpourri
- MPR listener question
- Almanac for December 24th
- Past weather features
- The Big Kahuna
- Outlook

Topic: Christmas weather in Minnesota

The DNR-State Climatology Office has posted a review of Christmas past weather, along with probabilities for a white Christmas. Incidentally Twin Cities residents enjoy a 72 percent chance of a white Christmas, while residents of northeastern

Minnesota have nearly a 100 percent chance of a white Christmas. You can review all of this holiday climatology at the web site....

http://www.climate.umn.edu/doc/journal/white_christmas.htm

Topic: More snow on December 20-21

A persistent snow storm brought some significant amounts to many Minnesota communities over Monday and Tuesday (Dec 20-21) this week. Areas along the north shore (near Lake Superior) from Duluth to Finland reported snowfall totals from 9 to 13 inches. Across portions of southern Minnesota some observers reported record-setting or record-tying amounts, including 7.5 inches at North Mankato, 7.4 inches at Hutchinson, and 7.0 inches at Waseca and Owatonna.

More snow fell overnight on December 23rd and on Christmas Eve, with some areas of southwestern, central and southeastern Minnesota reporting another 2 to 7 inches of snowfall. In addition more snow is possible before the end of the month next Friday (Dec 31), as another major storm system takes aim for Minnesota next Thursday and Friday.

Topic: Start of a long snow season

The fall season which ended on Monday this week (Dec 20) certainly brought plenty of snowfall to many parts of Minnesota. Early snow season accumulations were remarkable for many communities even before the official start of astronomical winter (Dec 21st). Some of the largest seasonal snowfall totals include:

MSP 38.6 inches Rochester 39 inches Chanhassen 46.8 inches
Chaska 49.1 inches Waseca 39 inches Zumbrota 40.5 inches
Grand Meadow 37.7 inches Kabetogama 46.5 inches Two Harbors 45.3 inches
Hutchinson 52.3 inches Duluth 51.5 inches Jordan 50.6 inches
Redwood Falls 35.2 inches Moorhead 34.4 inches International Falls 38.9 inches

December has brought record-setting snowfall amounts to some areas. With over a week to go in December the following observers already report record-setting or near record amounts of monthly snowfall:

Rochester 37.9 inches Caledonia 32.8 inches Lanesboro 31.0 inches (3rd highest)
Winona Dam 38 inches Preston 34.0 inches Zumbrota 36.5 inches
Grand Meadow 36.6 inches La Crescent 33.8 inches (2nd highest) MSP 31.1 inches
(2nd highest)

Rochester also reported 3.42 inches of precipitation so far this month, which is their wettest December in history, and Hutchinson has reported 41 inches of snowfall so far in December, their snowiest ever. Waseca with 34.3 inches of December snowfall and 3.29 inches of December precipitation is within striking distance of setting new records in both categories as well.

Snow depth is another memorable feature of December's weather so far. Both Rochester (29 inches) and Hutchinson (31 inches) have equaled all-time record snow depths. In addition Grand Meadow (31 inches), La Crescent (28 inches), and Winona (30 inches) have set new record snow depth marks for the month of December. Certainly plowed snow is an obstruction to visibility at many traffic intersections.

Topic: The Santa Forecast program on Midday, December 24th

Later on Friday (Christmas Eve) Gary Eichten and I will be on MPR's Midday (11 am) trying to make sense of the Santa Forecast. Looks like snow for most households in Minnesota, but not as much as last Christmas Eve. Later in the holiday period between Christmas and New Years looks to be even snowier.

Weekly Weather Potpourri:

The web site ClimateSignals has a summary of global high temperature records set during the calendar year of 2010. There was widespread distribution among many countries varying in latitude from Finland to Bolivia. You can read the summary at...

<http://climatesignals.org/2010/11/2010-records-most-national-extreme-heat-records-ever/>

Following all of the recent snow icy road conditions remain a travel threat to many European residents. Following the Christmas weekend, weather conditions are expected to warm and improve. You can read more at the U.K. Met Office web site....

<http://www.metoffice.gov.uk/news/releases/archive/2010/freezing-conditions-continue>

Wednesday, December 22 brought a relatively warmer and moist air mass to Minnesota, allowing both Rochester and the Twin Cities to briefly warm up to the freezing mark (32 F) for only the second time this month. Neither International Falls or Duluth has seen the temperature reach 32 degrees F so far this month. If you want to keep track of daily temperatures around the state you can visit our web site at...

http://www.climate.umn.edu/doc/prelim_lcd.htm

MPR Listener Question: With nearly 40 inches of snow already reported in the Twin Cities, my question is have there been other years when this much snow occurred prior to the winter solstice (Dec 21)?

Answer: Yes, indeed. In the modern eras of weather record-keeping there are at least 5 other years that produced 30 or more inches of snow in the Twin Cities before the present: 1940 (33.7"); 1978 (30.7"); 1983 (47.2"); 1985 (34.9"); and 1991 (61.7"). In 1991 Two Harbors reported 62.5 inches of snowfall before the winter solstice, while Duluth reported 63 inches. Incidentally, all of those turned out to be very long and snowy winters.

Almanac for December 24th:

The average MSP high temperature for this date is 25 degrees F (plus or minus 11 degrees standard deviation), while the average low is 9 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for December 24th:

MSP weather records for this date include: highest daily maximum temperature of 47 degrees F in 1909; lowest daily maximum temperature of -10 degrees F in 1983; lowest daily minimum temperature of -31 degrees F in 1872; highest daily minimum temperature of 35 degrees F in 1877 and 1982; record precipitation of 1.26 inches in 1982; record snowfall of 5.2 inches in 2009.

Average dew point for December 24th is 10 degrees F, with a maximum of 38 degrees F in 1936 and a minimum of -38 degrees F in 1983.

All-time state records for December 24th:

Scanning the state climatic data base: the all-time high for this date is 57 degrees F at Northfield (Rice County) in 1888; the all-time low is -43 degrees F at St Vincent (Kittson County) in 1884. The all-time record precipitation amount for this date is 2.15 inches at Medford (Steele County) in 1893. The state record daily snowfall for this date is 15.5 inches at Isabella (Lake County) in 1959.

Past Weather Features:

The 1870s brought several weather extremes on Christmas Eve. In 1871, December 23-24 brought 13 inches of snow to Whitewater in Winona County, a record amount.

In 1872 Christmas Eve started out at -34 degrees F in the Twin Cities area and warmed all the way up to -4 degrees F. The next day brought 5 inches of new snow. In 1877 Christmas week was downright balmy with daytime temperature readings in the 40s and 50s F in the Twin Cities area. Even overnight low temperatures did not fall below 34 degrees F. Then in 1879 the bottom dropped out of the thermometer as Christmas Eve brought -19 degrees F and Christmas Day started out at -39 degrees F in the Twin Cities area, the coldest Christmas ever.

Over December 22-24, 1959 a three day snow storm brought 32 inches to Isabella in Lake County, one of their biggest snow storms in history. Snow depth on Christmas that year was over 3 feet, as snow shoes were needed to get around.

December 24, 1983 brought dangerous wind chill conditions to most of the state as values ranged between -50 and -60 degrees F. The last episode of dangerous wind chill conditions on Christmas Eve was in 2000 when values ranged from -40 to -50 F for a time.

Words of the Week: The Big Kahuna

Meteorologists have used this term for years to describe enormous mid-latitude cyclones that strike the California coast during the winter season bringing abundant and mixed precipitation (rain near the coast and snow in the mountains). Often tropical in origin over the central Pacific Ocean these storms are large in scale and can occur in sequence as they have this week across California. These storms brought over two feet of snow to the mountains of California, as well as 7 to 13 inches of rainfall to coasts and valleys. Seven straight days of rain produced 8.20 inches in downtown Los Angeles, 8.57 inches at Long Beach, and over 12 inches at Temecula,

Outlook:

Slight chance of snow in the southeast on Saturday morning (Christmas Day), dry and cooler than normal most of the weekend and early next week. Warming temperatures by Tuesday and Wednesday. Another chance for measurable snow by Thursday and Friday.

Further Information:

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<http://www.climate.umn.edu/weathertalk/>

For access to other information resources go to

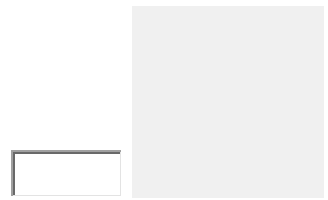
<http://www.climate.umn.edu/Seeley/>

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Minnesota WeatherTalk Newsletter for Friday, December 31st, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 31st, 2010

HAPPY NEW YEAR TO ALL MINNESOTA WEATHERTALK READERS!

Headlines:

- Record precipitation on December 30th
- 2010 Minnesota Weather Headlines and Stories
- Other 2010 Significant Weather Events
- MPR listener question
- Almanac for December 31st
- Past weather features
- Outlook

Topic: Record precipitation and snow on December 30th

Some areas of Minnesota reported record amounts of precipitation from the slow moving storm system on Thursday (Dec 30). Duluth reported a new record amount of precipitation for the date with 0.83 inches, while St Cloud also reported a record 0.82 inches. In many northwestern and northern Minnesota communities significant snowfall was measured on Thursday, ranging from 4 to 8 inches. At Fergus Falls and Grand Rapids new daily record snowfall amounts of 11 inches were reported for

December 30th. Six foot drifts of snow in the Fergus Falls were causing travel difficulties and many areas of northwestern Minnesota were seeing blizzard conditions that were expected to prevail through early New Years Day.

Topic: 2010 Minnesota Weather and Climate Significant Events

-92 consecutive days of snow cover last winter which provided ample recreation opportunities, ended abruptly on March 11, 2010

-Followed by dramatic spring warm up, with the earliest ever ice-out dates on several Minnesota lakes including Itasca, Leech, Vermillion, Rainy, and Bemidji (all in early April)

-First time ever that Duluth and other northern communities recorded no measurable snows in March and April, followed by several inches in May (4.5" over May 7-8)

-Second consecutive year of spring snow melt flooding in the Red River Valley, but not as bad as in 2009.

-Minnesota reported two tornadoes on May 24th, and then 71 in the month of June, 14 more in July, and 17 more in August for a new record total of 104, tops among states in the USA. There were 3 tornado deaths and 46 injuries. 48 tornadoes occurred on June 17th, a new record daily total for the state.

-Drought conditions which had plagued portions of the state for the previous 5 summers, all but dissipated in 2010, leaving only portions of Lake and Cook counties in the northeast with lingering drought.

-New record low pressure occurred across the state on October 26, 2010 when the barometer at Big Fork fell to just 28.21 inches during the storm. Winds of 50 to 60 mph were reported from dozens of communities across the state, along with daily record amounts of precipitation, including 2.94 inches at Duluth.

-Very heavy early snowfall for the winter of 2010-2011 has caused hundreds of car accidents and travel delays. Many observers reported over 20 inches of snowfall in November 32 inches at Kabetogama, while even more have reported over 3 feet of snowfall in December (over 46 inches at Hutchinson). Some have seen well over 50 inches of snowfall this season as the year ends (57.6 inches at Hutchinson).

-On a more positive note, 2010 brought one of the best agricultural growing seasons in state history to Minnesota farmers, as many crop yields were outstanding, even record-setting in some places, and corn planting was the earliest ever assisted by one of the warmest springs in history.

-And outdoor baseball returned to Minnesota as the Twins played at Target Field in Minneapolis and reported only two weather-related postponements for the entire season.

Topic: Other 2010 Significant Weather and Climate Events

Active North Atlantic Hurricane Season with 19 named storms, 12 reaching hurricane status. But fortunately relatively little damage to the USA. In contrast the Eastern Pacific Ocean basin saw little tropical storm activity with only 7 named storms, three of which became hurricanes. There is a NOAA web link to the entire tropical storm season satellite animation at...

<http://www.nnvl.noaa.gov/MediaDetail.php?MediaID=595&MediaTypeID=2>

Vancouver, Canada hosted the Winter Olympics during 2010 in some of the warmest February weather ever seen there. It was also very rainy and foggy, forcing them to make much of their snow. More about Canada's 2010 weather can be found at...

<http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=53E29740-1>

"Snowmadgeddon" occurred along the mid-Atlantic states over February 4-6, 2010, paralyzing many areas and shutting down government services for a period of time. Well over two feet of snowfall was reported from many areas, including over 32 inches at Washington-Dulles Airport.

For December 2009 through February 2010 the United Kingdom reported its coldest winter in over 40 years, with exceptionally cold temperatures and frequent snows in the highlands of Scotland.

Also from the United Kingdom came the news that their Meteorological Office will no longer produce seasonal climate outlooks, as verification studies proved they were too often inaccurate.

NOAA created a new Climate Services Division focused on providing local units of government with better climate data and outlooks that would be helpful in planning to adapt to changing climate conditions.

NOAA weather forecasters won widespread praise for their assistance in helping to contain and clean up the BP oil spill in the Gulf of Mexico during the spring and summer months. Their daily forecasts helped greatly in the efficiency of clean up operations.

Many communities along the east coast of the USA set energy usage records during early July as a heat wave prevailed from New York to Virginia spiking the demand for air conditioning. In addition July and August brought rare heat waves to portions of Russia where many were said to have drowned trying to cool off in lakes and streams.

Churchill, Manitoba Canada reported a record wet August with 7.14 inches of rainfall. On August 24 a new daily record of 4.12 inches of rain was reported there.

September brought a heat wave to southern California, pushing daytime highs well over 100 degrees F. Los Angeles set an all-time record high on the 27th with 113 degrees F, while Long Beach hit 111 degrees F. Fortunately it was a short-lived spell.

The Philippines were hit by a number of typhoons during 2010, some bringing record-setting rainfall amounts, strong winds and coastal erosion, finally abating in the late autumn.

December brought huge rains to California (producing floods and mudslides) and holiday travel delays and heavy snows to many in the northeast states, while drought intensified in parts of Hawaii, Texas, Louisiana and Florida.

MPR Listener Question: With the blizzard going on in western Minnesota on Thursday this week (Dec 30th) I wondered if you can tell me the record number of blizzards in Minnesota for any single winter season?

Answer: That is difficult to answer since blizzard criteria (heavy snow, winds of 35 mph, and less than quarter of a mile visibility) were not used throughout the early history of the weather service. In the modern era perhaps the winter of 1996-1997 holds the record with 14 declared blizzards in Minnesota. There may have been other winters that approached this frequency such as 1880-1881, or 1916-1917, but the data are not good enough to do a fair comparison.

Almanac for December 31st:

The average MSP high temperature for this date is 24 degrees F (plus or minus 13 degrees standard deviation), while the average low is 8 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for December 31st:

MSP weather records for this date include: highest daily maximum temperature of 50 degrees F in 1904; lowest daily maximum temperature of -12 degrees F in 1968; lowest daily minimum temperature of -24 degrees F in 1973; highest daily minimum temperature of 34 degrees F in 1890 and 1904; record precipitation of 0.98 inches in 2006; record snowfall of 7.2 inches in 1977.

Average dew point for December 31st is 9 degrees F, with a maximum of 43 degrees F in 1965 and a minimum of -34 degrees F in 1967.

All-time state records for December 31st:

Scanning the state climatic data base: the all-time high for this date is 58 degrees F at St Peter (Nicollet County) in 1921 and at Winona in 1965; the all-time low is -57 degrees F at Pokegama Dam (Itasca County) in 1898. The all-time record precipitation amount for this date is 1.50 inches at Grand Meadow (Mower County) in 1887 and at Maple Plain (Wright County) in 1889. The state record daily snowfall for this date is 18.4 inches at Two Harbors (Lake County) in 1996.

Past Weather Features:

In 1898 arctic cold had settled over Minnesota for New Years Eve. Over 15 communities reported temperatures of -30 degrees F or colder, 9 communities were -40 degrees F or colder, and Leech Lake and Pokegama reported lows of -51 degrees F and -57 degrees F, respectively. It was arguably the coldest New Years Eve in history.

Conversely in 1904 a southerly wind ushered in mild air for the end of December. New Years Eve was in the middle of a 3-day mild spell as 16 Minnesota communities reported afternoon temperatures of 50 degrees F or greater.

A strong winter storm prevailed across northeastern Minnesota on New Years Eve of 1937. Strong easterly winds created huge waves on Lake Superior and the storm clouds brought sleet, freezing rain and snow. Many boats and fishing houses were damaged by the wind and waves at Grand Marais. The observer at Grand Marais reported 15 inches of snowfall while Pigeon River in Cook County reported 18 inches that day.

December ended with a flurry of white in 1996. Many observers in the north reported 4-5 consecutive days with snowfall, piling up huge drifts on the ground. Two Harbors reported 27.6 inches of snowfall over the last five days of the month.

Outlook:

Lingering snow in the east and north early on New Years Day, then quite cold for the remainder of the weekend and beginning of next week. Slight chance for snow on Monday, but mostly dry next week. Gradual moderation in temperatures by Thursday.

Further Information:

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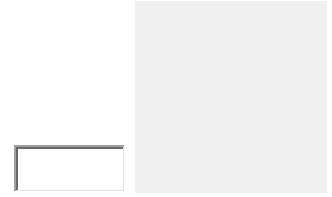
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Minnesota WeatherTalk Newsletter for Friday, October 22, 2010

To: MPR Morning Edition Crew
From: Mark Seeley, University of Minnesota Extension
Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 22, 2010

Headlines:

- Windy Wednesday
- Record solar radiation
- Absence of frost in the Metro Area
- NOAA-CPC climate outlooks
- Weekly Weather Potpourri
- MPR listener question
- Almanac for October 22nd
- Past weather features
- Skirl
- Outlook

Topic: Windy Wednesday

Though dry, mild, and sunny conditions have kept golf courses around the state open for business this month it would have been difficult to hit the ball straight on Wednesday as winds gusted to greater than 40 mph. It was by far the windiest day of the month. The Twin Cities, along with Olivia, Litchfield, Benson, St Cloud, Rochester, and Detroit Lakes saw afternoon winds gusts range from 41 to 43 mph.

Fergus Falls reported wind gusts up to 45 mph. This was a signal of change in the weather pattern, bringing in colder temperatures with increasing chances for precipitation for later in the weekend and early next week.

Topic: Record solar radiation for October so far.....

An update from Dave Ruschy who looks after the data from the University of Minnesota Climate Observatory shows that the average daily solar radiation for the first three weeks of October has set a record, averaging 36 percent above normal. No wonder that it has given that 14 days have been sunny, and 5 have been partly cloudy. So sky conditions have been great for plenty of sunshine to reach the ground.

Topic: Absence of Frost in Metro Area

Though most of the state has experienced a frost this month (Embarrass has recorded 17 days with frost), many areas of the Twin Cities Metro Area have not. The relative distribution and strength of the urban heat island might be inferred from examining the lowest temperature readings so far recorded among Twin Cities communities, suburbs, and surrounding areas. Here is a list of the lowest temperature readings through October 21st.....

MSP Airport 37 F, Bloomington 33 F, Prior Lake 37 F, Savage 38 F, St Louis Park 38 F, Plymouth 36 F, Minnetonka 36 F,
Belle Plaine 32 F, Maple Grove 34 F, Buffalo 34 F, Clearwater 35 F, Glencoe 32 F, Eagan 36 F, Lakeville 28 F,
Eagan 36 F, Farmington 30 F, Rosemount 30 F, Inver Grove Heights 29 F, South St Paul 34 F, St Paul Holman Field 37 F,
Northfield 34 F, Cottage Grove 28 F, St Paul U of M 34 F, Roseville 36 F, North St Paul 37 F, Forest Lake 35 F,
Woodbury 36 F, Landfall 38 F, Brooklyn Park 34 F, Coon Rapids 30 F, Ramsey 32 F, Blaine 32 F, Crystal Airport 30 F,
Chisago City 38 F, North Branch 34 F, Fridley 34 F, Chaska 30 F, Hastings 35 F, Jordan 32 F, Becker 35 F

In the official Twin Cities climate record first frost has come as late as November 7th (1900), and most recently as late as October 28th (2007). You can read more about the Twin Cities October climate from the State Climatology Office at....

http://climate.umn.edu/doc/journal/warm_oct2010.htm

We may see another threat of frost by next Wednesday (Oct 27) or Thursday (October 28), but if we get beyond those days we may not see a frost until the first week of November.

Topic: New NOAA-CPC Climate Outlooks

The NOAA-Climate Prediction Center released a new set of seasonal outlooks on Thursday (Oct 21st) this week. The outlook for November favors a continuation of above normal temperatures across the central portion of the country, including Minnesota. The precipitation outlook suggests equal chances for above or below normal values during November. Longer term for the winter months of December through February the CPC uses La Nina composites (historical correlations) to show a higher probability for below normal temperatures across the state, and above normal snowfall in the northern sections of Minnesota. Perhaps this is good news for those planning winter recreation activities.

Weekly Weather Potpourri:

NOAA release an Arctic Report Card this week assessing the conditions observed during 2010 in historical context. They highlighted the fact that warming continues to occur there at an alarming pace. You can read more at...

<http://www.arctic.noaa.gov/reportcard/>

After passing over the Philippines and losing strength, Typhoon Megi intensified over the South China Sea this week producing winds of 110 to 140 mph and sea waves up to 38 feet in height. Megi is expected to strike the coast of China by Friday and Saturday. In addition Tropical Cyclone Giri is off the coast of Bangladesh with winds up to 150 mph and wave heights of 18 feet. Giri is expected to bring heavy rain and damaging winds to southern Bangladesh and Myanmar on Friday and Saturday. Meanwhile, Tropical Storm Richard (the 17th named storm of the Atlantic Hurricane Season) was spinning in the western Caribbean Sea and is expected to bring heavy rains and wind to portions of Honduras, Guatemala, Belize, and the Yucatan over the weekend and into next week. It may form into a class I hurricane in the Gulf of Mexico after that.

The British Met Office is collaborating to document the weather for early 20th Century ships logs. This will help fill in the climate time series over some of the world's oceans. They are accepting the help of citizen volunteers in reading and interpreting these old ships logs. You can read more about it at...

<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20101012.html>

<http://www.oldweather.org/>

<http://icoads.noaa.gov/>

On Monday and Tuesday of this week flash floods hit the Greek Islands of Ikaria and Chios causing a good deal of property damage along with two deaths. Fortunately the forecast favors a dry period with sunny skies and temperatures in the 50s and 60s F for the coming week.

NOAA Storm Prediction Center reports only 15 tornadoes nationwide so far in October, the fewest number in years and well below the monthly average for October of 33. The most recent report was a single tornado in Cedar Hills, AZ on October 18th.

MPR Listener Question: Can you comment on your early in the year assessment that Target Field might be a hitters park if the prevailing NW winds came into play?

Answer: Indeed, during the preseason I thought that Target Field might produce a good deal of home runs to right field. But it appears I was wrong. Of all major league baseball teams the Twins had the 3rd fewest home runs on their home turf. Further more Target Field yielded the 4th fewest home runs among all major league ball parks in 2010. The only Twins player who hit more home runs at Target Field than in other major league parks was Jim Thome, who could probably hit a home run out of the Grand Canyon anyway. The steep vertical dimension of Target Field may have something to do with this. You can read more at Paul Huttner's Updraft blog...

http://minnesota.publicradio.org/collections/special/columns/updraft/archive/2010/10/october_baseball_twins_weather.shtml

Almanac for October 22nd:

The average MSP high temperature for this date is 56 degrees F (plus or minus 12 degrees standard deviation), while the average low is 39 degrees F (plus or minus 9 degrees standard deviation).

MSP Local Records for October 22nd:

MSP weather records for this date include: highest daily maximum temperature of 81 degrees F in 1992; lowest daily maximum temperature of 31 degrees F in 1936; lowest daily minimum temperature of 20 degrees F in 1936; highest daily minimum temperature of 60 degrees F in 1914; record precipitation of 0.69 inches in 1957; record snowfall of 1.6 inches in 1925.

Average dew point for October 22nd is 38 degrees F, with a maximum of 61 degrees F in 2004 and a minimum of 12 degrees F in 1936.

All-time state records for October 22nd:

Scanning the state climatic data base: the all-time high for this date is 87 degrees F at Taylors Falls (Chisago County) in 1947; the all-time low is 0 degrees F at Meadowlands (St Louis County) in 1937 and at Thorhult (Beltrami County) in 1956. The all-time record precipitation amount for this date is 2.52 inches at Preston (Fillmore County) in 1979. The state record daily snowfall for this date is 8.1 inches at Virginia (St Louis County) in 1951.

Past Weather Features:

October 22, 1947 brought summer-like heat to many Minnesota communities. New Ulm, Austin, Pipestone, Grand Meadow, Winona, Faribault, St Peter, Windom, and Winnebago all saw afternoon temperatures climb into the mid 80s F. For New Ulm it was the 6th October day that had brought 80 degrees F or higher.

October 22, 1951 brought snowfall to many parts of Minnesota. Milan reported 4 inches, while Morris reported 4.5 inches. International Falls reported 2.2 inches, their 4th day with snowfall in October, while Virginia reported a state record 8.1 inches on their way to a monthly total of 18.9 inches, an October snowfall record for them as well.

An early winter storm over October 21-23, 1979 brought a mixture of rain, sleet, and snow to southeastern Minnesota communities. Many observers there reported over 3 inches of precipitation. Rochester reported 3 inches of precipitation and 5 inches of snow which made for sloppy driving conditions.

Word of the Week: skirl

This is the Scottish word for the high pitched sound which a strong wind can make. There was a good deal of skirl on Wednesday of this week as many observations sites in Minnesota reported gusts over 40 mph, the stronger winds of the month so far.

Outlook:

Good chance of showers for southern and central Minnesota on Saturday. Chance of showers spreads north on Sunday and into early Monday. Temperatures will be cooler than of late with a chance for showers and even snow by Tuesday and Wednesday.

Even cooler temperatures toward the end of next week with many high temperatures only in the 40s F.

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