



Minnesota WeatherTalk Newsletter for Friday, January 6, 2012

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 6, 2012

Headlines:

- Warm and record-setting start to January
- Cold in Florida
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 6th
- Past Weather
- Outlook

Topic: Warm and record-setting start to January

After starting New Years Day cold, icy, and snowy, the first week of January has brought temperatures that range from 8 to 12 degrees F warmer than normal on average, with all-time record-setting values on the 4th and 5th. For January 4th many western and southern communities reported new record high temperatures including: 47 F at Redwood Falls; 49 F at Browns Valley; 50 F at Luverne; 51 F at Pipestone and Montevideo; 52 F at Madison, Milan, and Canby; and 54 degrees F at Marshall and Minneota (both in Lyon County). The last reading is a new all-time state record high for January 4th, breaking the old record of 50 F at Worthington in 1930.

Even more remarkable were the temperatures measured on Thursday, January 5th. It was clearly the warmest January 5th in state history as scores of observers reported new record high temperatures and the former state record high, 57 degrees F at Crookston in 1902, was shattered by a reading of 64 degrees F at Minneota (Lyon County) reached at 2:30 pm. Some of the new records included: 63 F at Marshall and Canby; 62 F at Granite Falls; 61 F at Madison and Montevideo; 59 F at Morris and Redwood Falls; 57 F at Pipestone, Wheaton, Willmar, Olivia, Tracy, and Luverne; 55 F at Fargo, Rochester, and Fergus Falls, and 54 at Moorhead and Worthington. Even as far north as St Vincent (Kittson County) and Baudette (Lake of the Woods County) hit 50 degrees F, while record highs of 48 degrees F and 46 degrees F were reported at Duluth and International Falls, respectively. The record warmth of January 5th carried over into Friday at Duluth, as at 12:01 am on January 6th they reported a new record high for the date of 45 degrees F! For some observers the temperatures were not only new records for January 5th but near all-time highs for any day in January. The state record high for January remained intact (69 degrees F occurred at Montevideo on the 24th in 1981).

Despite all of the January warmth, Embarrass, MN did report the lowest temperature in the 48 contiguous states on the January 3rd with -19 degrees F. They had warmed nearly 60 degrees F, hitting 41 F by the 5th.

Topic: Cold in Florida

In contrast to Minnesota's warm January, Florida residents were turning on their furnaces this week as some new record low temperatures were set on the mornings of January 3rd and 4th. In central and northern Florida counties some overnight lows in the upper teens to low 20s F were reported. As far south as Punta Gorda it was 29 degrees F. Temperatures are supposed to rebound into the 70s F this weekend.

Weekly Weather Potpourri:

Many parts of Manitoba, Canada reported record-setting temperature on January 5th as well. Outdoor skating was suspended in most cities, including Winnipeg, which reached a new record high of 44 degrees F.

The new year started out very wet in parts of southeastern Brazil, bringing flooding rains this week to over 60 communities. Parts of the country north of Rio de Janeiro reported over a 10 inches of rain this week. A number of deaths were reported due to flood waters as the rains continued in the higher landscape positions creating huge volumes of runoff in watersheds that flowed through towns and cities. For the second consecutive January flood waters have forced the evacuation of thousands of homes there, complicated by a dam bursting as well.

According to the NOAA-Storm Prediction Center the nation has been spared any severe weather reports Next Day » through the first 6 days of 2012. Further their models show no severe weather threats on the horizon through January 8th.

According to Munich Re, one of the world's largest reinsurance firms, 2011 was the costliest year in history in terms of weather damages. It is estimated that total insured damage and loss worldwide was near one third of a trillion dollars. Earthquakes and tsunamis accounted for over half the loss. You can read more about their findings at....

<http://www.usatoday.com/weather/index>

MPR listener question: Do you see signs of real winter coming later this month? Surely we'll see below zero degrees F and some significant snowfall, won't we?

Answer: Indeed, it is too early to dismiss winter. Weather models are suggesting a transition over January 11-13 across Minnesota, as strong winds usher in colder air and a chance for significant snowfall at mid-month, especially in northern Minnesota. I don't know how long it will last, but it will certainly feel more like winter by late next week.

Almanac for January 6th:

The average MSP high temperature for this date is 22 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 5 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for January 6th:

MSP weather records for this date include: highest daily maximum temperature of 49 degrees F in 1900; lowest daily maximum temperature of -14 degrees F in 1909; lowest daily minimum temperature of -27 degrees F in 1887 and 1912; highest daily minimum temperature of 35 degrees F in 1928; record precipitation of 0.40 inches in 1967; record snowfall is a 5.2 inches in 1932.

Average dew point for January 6th is 6 degrees F, with a maximum of 33 degrees F in 1965 and a minimum of -34 degrees F in 1942.

All-time state records for January 6th:

Scanning the state climatic data base: the all-time high for this date is 53 degrees F at Bird Island (Renville County) in 1900. The all-time record low for this date is a very cold -55 degrees F at International Falls (Koochiching County) in 1909. The all-time

record precipitation amount for this date is 3.00 inches at Fergus Falls (Otter Tail County) in 1997. State record snowfall for this date is 19.0 inches at Hinckley (Pine County) in 1997.

Past Weather Features:

This Saturday, January 7th, marks the anniversary of one of the state's most lethal blizzards. In 1873, the New Ulm observer called it the "most violent snow storm" he had ever witnessed, as within seconds visibility was reduced to less than 20 yards by snowfall and winds of 45 mph. The storm raged from the 7th to the 10th of January. Wind chill conditions, though unmeasured back then, were very dangerous, and with the absence of any visibility farmers strung ropes between home and barn so they wouldn't become lost going to tend their animals. Still, 70 people lost their lives and hundreds of livestock perished as well. This three-day blizzard was one of the longest lived of the 19th Century, leaving drifts over 10 feet high that blocked trains for days.

January 6-8, 1887 brought a cold wave to Minnesota, as many observers reported constant temperature readings below 0 F. Temperatures fell to -42 degrees F at St Vincent, -38 degrees F at Spring Valley, and -34 degrees F at Bird Island. It proved to be one of the coldest Januarys in state history..

January 5-7, 1909 brought another cold wave to the state with temperatures falling to -30 degrees or colder in over 30 Minnesota communities. And yet another cold wave dominated the first half of January in 1912 bringing many mornings with temperatures in the -30s and -40s F. On January 6th the observer at Hallock reported a daytime high of only -24 degrees F.

Conversely on January 6, 1900 a brief one day January thaw brought temperatures in the 40s F with several communities reaching into the 50s F.

Both 1994 and 1997 brought snowy starts to the month of January. In January of 1994 some observers reported snow over the first seven days, with amounts ranging from 3-10 inches on the 6th. Over January 4-6, 1997 northern observers reported 6-20 inches of snowfall and Eveleth reported a snow depth of 45 inches (where are the snowshoes?). Lutsen ended up with over 53 inches of snowfall that month.

Outlook:

Partly cloudy skies and above normal temperatures over the weekend, with little chance for precipitation. Continuing that way early next week, then a chance for snow towards the end of next week with strong winds and a significant cooling trend.

Further Information:

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

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

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Minnesota WeatherTalk Newsletter for Friday, January 13, 2012

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 13, 2012

Headlines:

- More temperature records, then snow
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 13th
- Past Weather
- WAA
- Outlook

Topic: More temperature records, then snow

January 9-10 brought even more new high temperature records to the state and the region, adding to the previous weeks record-setting values. It was far and away the warmest first 10 days of January ever measured in Minnesota history, averaging over 20 degrees F above normal statewide (27.2 F versus a normal of 7.1 F). New temperature records were established for many Minnesota communities on January 3, 4, 5, 6, 8, 9, and 10, as a total of 163 new temperature records were reported, and 18 record temperatures were tied around the state. Three all-time state high temperature daily records were set.

On January 9th 37 communities reported new record high temperatures (values in the 40s and 50s F) topped by 57 degrees F at Milan and Redwood Falls, while on January 10th, new temperature records were set for 35 communities, including 59 degrees F at Marshall, which was a new statewide record high for the date. In addition on January 10th automated stations at Morton, St Peter, Minneota, and Blue Earth reported temperatures over 60 degrees F, but those won't be entered as records because of the absence of historical context with automated measurement systems.

Following January 9-10th warmth, the other shoe dropped as temperatures fell by 30-35 degrees F on the 11th. Strong winds ushered in a cold polar air mass. Many weather stations reported wind gusts from the NW of 30 mph or more. Some stations even saw winds peak over 40 mph, including 41 mph at Starbuck and Benson, 42 mph at Sauk Centre, 43 mph at New Ulm and Olivia, 44 mph at Madison and Appleton, 45 mph at Clara City, 46 mph at St James, and 47 mph at Canby. The strong winds produced windchill values from -20 to -30 F in some western and northern counties. By Thursday (Jan 12) Bigfork, MN had seen their temperature drop to -1 degrees F, having seen a record 45 degrees F only two days before. And by Friday morning, Hallock reported -15 degrees F, much more typical of January weather.

The relatively fast moving cold front deposited measurable snowfall in places, especially southeastern and northern counties. Some of the amounts included: 3.5 inches at Hibbing; 2.0 inches at Bemidji; 2.4 inches at Orr; 2.5 inches at Toftte; 3.0 inches at Gunflint Lake; 3.4 inches at Preston; 2.5 inches at Rushford; 5.5 inches at Winona; 4.0 inches at Lanesboro and at Grand Meadow; and 7.3 inches at Caledonia. Areas of northern and western Wisconsin received even larger amounts of snowfall (13 inches at Ashland and 10 inches at Hurley, among others). More information on the weather change in January can be found at....

http://climate.umn.edu/doc/journal/winter_return_120111_12.htm

Snowfall will more commonly be in the forecast for the balance of January, as a series of weather disturbances pass. Still, many residence of the state wonder where the snow is. Duluth Airport has reported less than 13 inches of snowfall so far for the winter of 2011-2012. Their record for least snowfall in a season is 26.8 inches in 1899-1900.

Weekly Weather Potpourri:

Portions of the United Kingdom have also been reporting a mild winter so far, with many daytime temperature in the 40s and over night lows from the mid 30s to mid 40s F. Under such conditions gardeners had noticed roses and daffodils were staying in bloom and gardens were being showcased on some of the BBC broadcasts.

The NOAA Storm Prediction Center reported the first tornadoes of 2012 this week. On January 9th (Monday) two tornadoes were reported in east Texas (Meadows and Dickinson) with somewhat minimal damage, while on January 11th (Wednesday) a tornado was reported in Ellenboro, NC where it caused some damage to buildings.

The National Weather Service in Alaska has reported exceptional snowfall amounts for many climate stations there. Valdez has reported over 95 inches of snowfall so far in January, following over 150 inches in December. Areas around Anchorage are also seeing record amounts of snowfall this winter.

NCAR scientists have studied down-scaled climate model output to assess the frequency of hail storms over Colorado. If the climate models are right in their prediction of warmer temperatures in the future, the frequency of pea-sized hail storms over Colorado may be diminished according to this report. You can read more at...

<http://www.sciencedaily.com/releases/2012/01/120108143555.htm>

MPR listener question: I am missing the snow for cross country skiing, something I trained for this fall and have not had the opportunity to do. What is the snowiest 2nd half of January for the Twin Cities area.

Answer: Don't give up hope! We will definitely see more frequent chances for snowfall during the second half of January. Back in 1982, the Twin Cities recorded over 42 inches of snow during the second half of January, producing a nice 20-25 inch snow base for skiers.

Almanac for January 13th:

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

MSP Local Records for January 13th:

MSP weather records for this date include: highest daily maximum temperature of 48 degrees F in 1891, 1980, and 1987; lowest daily maximum temperature of -14 degrees F in 1916; lowest daily minimum temperature of -30 degrees F in 1916; highest daily minimum temperature of 34 degrees F in 1960; record precipitation of 0.37 inches in 1887; record snowfall is a 6.0 inches in 1967.

Average dew point for January 13th is 9 degrees F, with a maximum of 37 degrees F in 1947 and a minimum of -33 degrees F in 1982.

All-time state records for January 13th:

Scanning the state climatic data base: the all-time high for this date is 60 degrees F at Lamberton (Redwood County) in 1987. The all-time record low for this date is a very cold -50 degrees F at Bagley (Clearwater County) in 1916. The all-time record precipitation amount for this date is 1.75 inches at Owatonna (Steele County) in 1999. State record snowfall for this date is 14.0 inches at Beaver Bay (Lake County) in 1874 and at New Richland (Waseca County) in 1910.

Past Weather Features:

Powerful winds from Lake Superior combined with a strong winter storm produced 14 inches of new snowfall on January 13, 1874. This record was tied by New Richland (Waseca County) which reported 14 inches of snowfall on January 13, 1910. That 1910 winter storm also brought 12 inches of new snow to Fairmont, 11 inches at Grand Meadow, and 10 inches at Lynd.

January 12-13, 1916 brought a severe cold wave to the state. Over 40 Minnesota communities reported low temperatures of -30 degrees F or colder, while 17 communities were -40 degrees F or colder. This was one of 8 cold waves to hit the state in January 1916.

Temperatures in the 40s and 50s F prevailed during a pronounced thaw period over January 11-14, 1987. Very little snow cover was evident around the state in mid-January that year.

Word of the Week: WAA

This is actually a contraction used in National Weather Service forecast discussions to refer to "warm air advection", when air currents generally from the south, usher in warmer air across the region. A significant rise in temperature can occur, even overnight when WAA plays out over several hours. Sometimes the temperature rise can be larger than the daily change that occurs during the hours that the sun is shining.

Outlook:

Chance of snow through Saturday, with a gradual warm up in temperatures to above normal values for Sunday and Monday. Chance of snow again by last Monday and

into Tuesday, followed by sharply colder temperatures. Another chance for snow towards next weekend.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, January 20, 2012

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 20, 2012

Headlines:

- Coldest readings of the winter so far
- New Seasonal Climate Outlook
- Course on Severe Weather
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 20th
- Past Weather
- Outlook

Topic: Coldest readings of the winter so far

Some of the National Weather Service Offices issued Extreme Cold Warnings for parts of Minnesota this past Wednesday and Thursday (Jan 18-19) as a result of an arctic air mass advancing across the state and associated strong winds that produced wind chill values from -35 to -40 F. In fact overnight near Grand Marais a katabatic wind (drainage wind from higher elevation) peaked at 59 mph. These high winds made for some extreme overnight and early morning wind chill (WC) values along the north shore of Lake Superior with WC of -50 degrees F at Isabella, -51 degrees F near

Grand Portage, and -53 degrees F near Grand Marais. On Thursday morning Minnesota reported the coldest temperature in the 48 contiguous states for the 3rd time this month with a low of -26 degrees F at Hallock, Park Rapids, Fosston, Babbitt, Orr, and Crane Lake. And again on Friday morning, Cook reported -27 degrees F (same as Churchill, Manitoba along the shores of Hudson Bay!).

Snowfall was generally light associated with this arctic cold front. Nevertheless some observers reported 1 to 4 inches of new snowfall. Hibbing reported 3.9 inches. But the arctic air mass reinforced by the presence of fresh snow cover brought very cold temperatures across the entire state, the coldest of the winter. MSP International Airport fell to -1 degrees F just before midnight on January 18th tying the record date (set in 1889 and 2002) for the latest below 0 F temperature reading during any winter season back to 1871. Later that night MSP dropped all the way to -11 degrees F, the coldest reading of the winter so far in the Twin Cities. As far south as Austin and Albert Lea fell to -9 degrees F. Daytime high temperatures remained below 0 F in many locations, and only reached the single digits above 0 F in some southern Minnesota communities.

Soil temperatures plummeted by over 40 degrees where there was no snow cover, and frost depths grew deeper going down to depths of 20 to 24 inches. Fortunately Friday brought more snow to southern counties (1-3 inches) and further snow was expected over the weekend, so perhaps some insulating snow cover will be present next week across much of the Minnesota landscape.

Topic: New Seasonal Climate Outlook

The NOAA Climate Prediction Center (CPC) issued new seasonal climate outlooks this week for the balance of winter and early spring. Their models suggest a warmer than normal February for parts of Minnesota, but equal chances for above or below normal temperature values for the balance of winter and early spring. The models also suggest wetter than normal conditions across much of Minnesota during the spring (March-May).

Topic: Course on Minnesota's Severe Weather

I will be teaching another course for the College of Continuing Education this winter called: "From Hurricanes to Fresh Water Furies: Severe Storms and Their Consequences." The course is offered during only 3-Tuesday night meetings (7:00 to 9:00 pm), concluding with a tour of the National Weather Service in Chanhassen on March 6th. I will attempt to make the class informative and educational, so if you are interested please check it out at....

<http://www.cce.umn.edu/LearningLife/Upcoming-Events/index.html>

Weekly Weather Potpourri:

A strong winter storm brought rain, freezing rain, sleet, and snow to the states of Washington and Oregon this week. Snowfall amounts of 4 to 12 inches were common on Wednesday with a record 6.8 inches at the Seattle-Tacoma International Airport. Olympia reported over a foot of snow, while Mount Hood in Oregon received over 50 inches. Additional snowfalls were expected in higher elevations for Thursday as the storm moved further east over Idaho and Montana.

The NOAA National Weather Service announced recently that 2011 saw the fewest lightning deaths across the USA of any year on record. The NWS reported only 26 lightning deaths during 2011, less than half of the historical average. This may provide evidence that citizens are more aware and educated than ever before regarding lightning safety measures, a good sign. You can read more about this at...

<http://www.usatoday.com/weather/news/story/2012-01-09/lightning-deaths-storms-weather/52504754/1>

In addition NOAA announced two additional weather events in 2011 that resulted in an economic impact of \$1 billion or more. This brings the total number of billion-dollar weather and climate disasters in 2011 to 14. You can read more about this at...

http://www.noaanews.noaa.gov/stories2012/20120119_global_stats.html

Tropical Cyclones Ethel and Funso were spinning away in the Southern Indian Ocean this week. Funso was bringing heavy rainfall and high seas to Madagascar and Mozambique, while Ethel was staying generally over open water.

Featured this week on the NOAA web site are some interesting ocean facts, some often overlooked. If you want to read about them further you can go to:

http://oceanservice.noaa.gov/podcast/supp_jan12.html

Research published in the current edition of the journal Nature documents changing climate patterns in the southern and eastern Amazon Basin as a result of land disturbance (notably deforestation and fire). This work documents some changes in the hydrological cycle and drought frequency. You can read more at

<http://www.sciencedaily.com/releases/2012/01/120118173701.htm>

MPR listener question: I heard that the below zero degrees F reading in the Twin Cities on Wednesday this week (Jan 18) tied the historical record for the latest such reading during a winter season, set in 1889 and 2002. I am curious to know what was the weather pattern like for the rest of the winter snow season during those earlier years, and if they are similar might that be the case this year?

Answer: Unfortunately, there is little similarity between the winters of 1888-1889 and 2001-2002. In 1889 there was a very cold February, followed by a cold March and April, with abundant snowfall towards the end of winter. In 2002, a moderately cold February, was followed by a warm March and April, with only 8 inches of snowfall after January 31st. As for the rest of this winter, please see the discussion above on the new seasonal climate outlook.

Almanac for January 20th:

The average MSP high temperature for this date is 23 degrees F (plus or minus 15 degrees F standard deviation), while the average low is 6 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for January 20th:

MSP weather records for this date include: highest daily maximum temperature of 52 degrees F in 1908; lowest daily maximum temperature of -17 degrees F in 1888; lowest daily minimum temperature of -32 degrees F in 1888; highest daily minimum temperature of 35 degrees F in 1921; record precipitation of 0.80 inches in 1982; record snowfall is a 17.1 inches in 1982.

Average dew point for January 20th is 4 degrees F, with a maximum of 36 degrees F in 1909 and a minimum of -38 degrees F in 1985.

All-time state records for January 20th:

Scanning the state climatic data base: the all-time high for this date is 61 degrees F at Madison (Lac Qui Parle County) and Montevideo (Chippewa County) in 1944. The all-time record low for this date is a very cold -57 degrees F at Tower and Embarrass (St Louis County) in 1996. The all-time record precipitation amount for this date is 1.76 inches at Preston (Fillmore County) in 1988. State record snowfall for this date is 17.1 inches at MSP International Airport in 1982.

Past Weather Features:

An arctic air mass brought a severe cold wave to the state in mid-January of 1888. On January 20th downtown St Paul reported a morning low of -41 degrees F (-46 F at Fort Snelling) and an afternoon high of only -20 degrees F. In the far north at St Vincent, MN they were in the midst of a long cold wave which kept the temperature at 0 degrees F or below for 288 consecutive hours. On the 20th the morning low was -45 degrees F with an afternoon high of -22 degrees F.

Conversely a warm, sunny day greeted Minnesota citizens on January 20, 1944. Over two dozen Minnesota cities reached temperatures of 50 degrees F or higher, topped by 61 degrees F at Montevideo.

January 20, 1982 started one of the snowiest 4-day January periods in Minnesota history. Over that period of time Duluth received 24.2 inches, Cambridge reported 18 inches, Rosemount reported 24 inches, and the Twin Cities reported an incredible 37.4 inches.

In the famous drought year of 1988, January 20th brought one of the heaviest precipitation events of the year to some southern Minnesota communities. Windom, Worthington, and Mankato reported over 1.20 inches. Theilman reported 1.69 inches, while Preston reported 1.76 inches, mostly falling as snow, but these amounts were the second largest daily precipitation amounts for the entire year of 1988 at those locations.

Following a fresh snowfall, severe cold prevailed across the state on January 20, 1996. At least 35 communities reported morning lows of -40 degrees F or colder, while in the north 7 climate stations reported lows of -50 degrees F or colder.

Outlook:

Increasing cloudiness over the weekend with chances for occasional snow and moderating temperatures. Daytime temperatures will climb into the 20s and 30s. Drier by Tuesday with temperatures near normal, then warming again towards the end of next week.

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Minnesota WeatherTalk Newsletter for Friday, January 27, 2012

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 27, 2012

Headlines:

- Preliminary climate summary for January 2012
- Minneapolis Climate Action Planning
- Weekly Weather Potpourri
- MPR listener question
- Almanac for January 27th
- Past Weather
- Outlook

Topic: Preliminary climate summary for January 2012

A very warm January prevailed across Minnesota. Many observers report mean monthly temperatures that are 7 to 9 degrees F warmer than average. Both Fargo-Moorhead and International Falls report their 5th warmest January in history, while on a statewide basis January 2012 appears to rank as the 7th warmest historically. Three new state record high temperatures were set for the month (on the 4th, 54 F at Marshall; on the 5th, 63 F at Marshall and Canby; and on the 10th, 59 F at Marshall). MSP International Airport reported only three mornings with below zero F temperatures, well below the average of eleven. The monthly temperature extremes

were 63 degrees F at Marshall and Canby on the 5th, and -30 degrees F at Brimson (St Louis County) on the 20th. January was the 4th consecutive month with significantly above normal temperatures across the state, making the October (2011) through January (2012) period one of the warmest in state history. One final note on temperature: despite the dominance of warm temperatures, Minnesota reported the coldest temperature in the 48 contiguous states on four dates during the month.

It was also generally a drier than normal month, though some observers reported significant snowfall, and the largest monthly total for the winter so far. Some of those with significant January snowfall included: 14.9 inches at Orr; 14.1 inches at Kabetogama; 12.7 inches at Lanesboro; 11.4 inches at Grand Meadow; and 10.3 inches at Gunflint Lake. The last weekend of the month may bring additional snows to these areas as well.

Over January 9-10 strong winds were reported around the state with the advance of an arctic high pressure system. Many reported wind gusts from 40 to 50 mph.

Soil frost depths increased during January, starting out at just a few inches below the soil surface and dropping to as deep as 20 to 30 inches in places where there is little snow cover.

Topic: Minneapolis Climate Action Planning

On February 1, at 5:30 pm the City of Minneapolis is hosting a meeting to discuss climate change and human health impacts at the Minneapolis Central Library. This is part of the process for the city to develop a detailed climate action plan as it considers its future. The meeting is open to the public, and if you wish to attend you can find out more at...

<http://www.minneapolismn.gov/sustainability/climate/index.htm>

I will be a speaker at this meeting, along with Kristin Raab from the Minnesota Department of Health.

Weekly Weather Potpourri:

This weekend, over January 28-29, the Mall of America is hosting "Government on Display." Your National Weather Service and North-Central River Forecast Center staff will be present with interactive displays of some of the data and tools they use to make forecasts. If you are in the vicinity, please drop by and visit as they will be in the Rotunda area.

After three consecutive years of serious spring snow melt flooding along the Red River in northwestern Minnesota, it was a relief to hear from the National Weather Service this week that there is little or not threat of major spring snow melt flooding along the basin this year. Precipitation patterns for the past six months have shown large deficits in most areas along the Red River Basin and this dryness is expected to persist. Very little snow cover has been realized so far this winter along the Red River and its tributaries as well. There is still a 30-50 percent chance of minor flooding along some points depending on the amount of late winter and early spring precipitation.

The NOAA Storm Prediction Center reported that January 22nd was the busiest severe weather day of the new year. There were 37 reports of tornadoes (significant ones in Alabama), 32 reports of large hail, and 128 reports of strong winds, mostly across the southeastern states.

Two tropical cyclones were churning in the southern hemisphere this week. Off the northwest coast of Australia Cyclone Iggy was increasing in strength with wind gusts over 80 mph and sea waves of 23 feet (as of Jan 27). It was expected to reach peak strength by the 31st of January, bringing heavy rains to northwestern Australia. Between Mozambique and Madagascar Cyclone Funso was bringing seas heights of 30 feet with wind gusts up to 150 mph. It was expected to dissipate by the 30th of January.

MPR listener question: What are your thoughts on the new Plant Hardiness Zones released earlier this week by the USDA and showing that a wider array of plants may now be adapted to the Twin Cities area (zone 4b) and southern Minnesota counties (zone 5a)?

Answer: I am not an expert in plants, but from a climate perspective there has been a change in Minnesota's temperature patterns, especially in winter. In many locations the average winter minimum temperatures are higher now than they once were. The downtown areas have not seen -25 degrees F since February of 1996, while Rosemount reported temperatures that cold in 2009, and Chaska reported such temperatures in 2011. Zone 4b designates an area suitable for plants that can withstand winter temperatures down to -25 degrees F, while zone 5a designates an area for plant materials that can tolerate down to -20 degrees F. Because of micro-climate effects (slopes, soils, lakes, and urban heat islands) it is difficult to generalize about plant hardiness zones. In the Twin Cities Metro Area, we see that winter minimum temperatures colder than -25 degrees F occur with widespread variation. Some areas record such temperatures every 4-5 years while others may go 7-10 years.

Almanac for January 27th:

The average MSP high temperature for this date is 20 degrees F (plus or minus 14 degrees F standard deviation), while the average low is 2 degrees F (plus or minus 15 degrees standard deviation).

MSP Local Records for January 27th:

MSP weather records for this date include: highest daily maximum temperature of 47 degrees F in 1934; lowest daily maximum temperature of -10 degrees F in 1917; lowest daily minimum temperature of -23 degrees F in 1950; highest daily minimum temperature of 34 degrees F in 1944; record precipitation of 0.42 inches in 1916; record snowfall is a 3.8 inches in 1916.

Average dew point for January 27th is 1 degree F, with a maximum of 35 degrees F in 1944 and a minimum of -32 degrees F in 1966.

All-time state records for January 27th:

Scanning the state climatic data base: the all-time high for this date is 61 degrees F at Winnebago (Faribault County), Worthington (Nobles County), and Lakefield (Jackson County) in 2002. The all-time record low for this date is a very cold -54 degrees F at Pokegama Dam (Itasca County) in 1904. The all-time record precipitation amount for this date is 1.80 inches at Harmony (Fillmore County) in 1944. State record snowfall for this date is 18.0 inches at Hokah (Houston County) in 1996.

Past Weather Features:

Following a fresh snowfall on January 25 and 26 in 1915, Wednesday the 27th brought record cold temperatures to many areas. At least seven communities saw the alcohol thermometer drop to -40 degrees F or colder. The daytime high only reached -19 degrees F at Bagley and Fosston.

A soaking rainfall was welcome across southwestern Minnesota over January 27-28, 1944. It broke a 75-80 day drought when very little precipitation had occurred. Amounts of 1.00 to 1.55 inches were recorded along a stretch from Tracy to Canby.

January 25-27, 1996 brought heavy snow to southern Minnesota communities, during what was already a very snowy winter. Many observers reported at least a new foot of snow, while Preston, Winona, and La Crescent reported over 17 inches.

January 27, 2002 brought a sunny and warm day to southern Minnesota communities. Over two dozen weather observers reported daytime highs of 50 degrees F or higher,

and a number of places reached 60 degrees F. There was little snow left on the ground after such a warm up.

Outlook:

Chance of light snow with cooler temperatures over the weekend. Precipitation may be mixed in places with freezing drizzle possible in the northeast. Then, a warming trend begins on Monday and runs through next week as temperatures will average well above normal. Another chance for snow by Wednesday.

Further Information:

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

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

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Minnesota WeatherTalk Newsletter for Friday, February 3, 2012

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 3, 2012

Headlines:

- February starts warm and foggy
- High dewpoints too
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 3rd
- Past Weather
- Outlook

Topic: February starts warm and foggy

Following the trend of previous months, February started very warm this week with temperatures ranging from 15 to 25 degrees F warmer than average. Some observers in western Minnesota reported new record highs for February 1st including: 50 F at Morris; 51 F at Benson; 52 F at Ortonville and St James; 55 F at Marshall; and 56 F at Minneota. On February 2nd afternoon temperatures again reached the 40s and 50s F in some places, as Rochester reported a new record high of 48 degrees F. It was the warmest first two days of February since 1931.

In addition, along river valleys and in eastern and northern sections of the state fog was dense and very persistent the first three days of the month. Almost continuous fog was reported from some southern counties, along with some freezing fog. In the north, fog, overcast, and occasional snow flurries prevailed over the first three days of the month.

Topic: High Dewpoints Too

With the warm temperatures, melting snow, and fog prevailing this week near record to record-setting dewpoint values were seen at a number of locations. Dewpoints ranged from 35-40 degrees F during the day, more typical of April and May. The condensation produced by high dewpoints made many surfaces wet and slippery, which combined with the fog contributed to hundreds of traffic accidents around the state.

Weekly Weather Potpourri:

The NOAA-National Weather Service in Alaska reports one of the coldest Januarys in history there. Nome and Bettles, Alaska reported their coldest mean January temperature in history, while Fairbanks was 5th coldest. During the month some observers reported temperatures in the -60s to -70s F. Noatak, Alaska was still reporting -60 degrees F on February 2nd. You can read more at

<https://nwschat.weather.gov/p.php?pid=201202012052-PAFG-NOAK49-PNSAFG>

Heavy snows with blizzard conditions were reported from parts of Colorado this week. The National Weather Service reported snowfall rates as much as 2 inches per hour. Portions of Interstates 70 and 25 were closed to traffic for a time, and a weather observer west of Denver (near Pinecliff) reported 18 inches of new snow by Friday morning.

Heavy rains continue to fall over southern Madagascar which has seen little relief in two weeks. Following heavy rain from Cyclone Funso last week, tropical thunderstorms have continued much of this week. The rains washed out river banks, flooding hundreds of homes and displacing over 1000 people. More on Cyclone Funso can be found at...

http://www.nasa.gov/mission_pages/hurricanes/archives/2012/h2012_Funso.html

Last week NASA renamed one of its polar orbiting satellites in honor of the late Professor Verner E. Suomi of the University of Wisconsin. Born in Eveleth, MN in 1915, Dr. Suomi is called the "father of satellite meteorology" having developed many

of the instruments and tools used today during his tenure on the faculty of the Space Science and Engineering Center at UW-Madison, especially in the 1960s and 1970s.

MPR listener question: Which Minnesota locations got the most snow in January, and where has the most seasonal snowfall occurred in the state so far?

Answer: Northern observers have reported the most snow. In January, Orr and Kabetogama reported over 16 inches, while Isabella in the highlands of the Lake Superior north shore reported 17 inches. For the entire snow season so far Isabella has reported 42 inches, Kabetogama nearly 38 inches, and Gunflint Lake and International Falls just over 32 inches.

Almanac for February 3rd:

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

MSP Local Records for February 3rd:

MSP weather records for this date include: highest daily maximum temperature of 51 degrees F in 1934; lowest daily maximum temperature of -13 degrees F in 1989; lowest daily minimum temperature of -27 degrees F in 1886; highest daily minimum temperature of 35 degrees F in 1991; record precipitation of 0.42 inches in 1943; record snowfall is a 3.4 inches in 1936 and 1976.

Average dew point for February 3rd is 3 degree F, with a maximum of 32 degrees F in 1924 and a minimum of -37 degrees F in 1923.

All-time state records for February 3rd:

Scanning the state climatic data base: the all-time high for this date is 65 degrees F at Browns Valley (Traverse County) in 1991. The all-time record low for this date is a very cold -52 degrees F at Itasca State Park (Clearwater County) in 1996 and at Warroad (Roseau County) in 1936. The all-time record precipitation amount for this date is 1.50 inches at Red Lake in 2000. State record snowfall for this date is 12.0 inches at Caledonia, Harmony, La Crescent, and Zumbro Falls in 1983.

Past Weather Features:

During the first few days of February 1886 many observers reported morning lows of -30 degrees F or colder. Duluth reported a very snowy February, as half of the days in the month brought snowfall totally over 20 inches.

February of 1934 was one of the warmest and driest in state history. Many observers reported daytime highs in the 40s on the 3rd, and some reported temperatures in the 40s and 50s F for the remainder of the month. Places like Milan, Alexandria, Waseca, Morris, Winnebago, and Tracy saw their driest February of all time with just a trace of precipitation for the month.

On February 3, 1936 the state was in the grip of an extended arctic cold wave. Many communities reported low temperatures of -40 degrees F or colder. At Roseau the morning low was -48 degrees F and the afternoon high only made it to -8 degrees F. The Roseau observer did not report a temperature above zero F until February 8th.

Early February of 1983 brought significant snowfall to many southern and central communities. Over February 2-3 observers reported 6 to 12 inches of snowfall, which caused school delays and closed some roads. Caledonia ended up getting over 23 inches of snowfall that month.

1991 brought one of the warmest Februaries in state history. Over the first ten days, temperatures averaged 20-30 degrees above average at many Minnesota locations. Many days brought 40s, 50s, and even 60 degrees F.

On February 3, 1996 Tower, MN saw the thermometer rise 41 degrees F, from a low of -60 degrees F to a high of -19 degrees F. By February 8th the daytime high was 48 degrees F, a rise of 108 degrees.

Outlook:

Weekend will start out cloudy and mild, but progressively get sunnier. Temperatures will remain mild, with a good deal of sun on Sunday. Cooler by Tuesday next week with temperatures falling back closer to normal. Chance of snow towards the end of next week, but generally dry across the state until then.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, February 10, 2012

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 10, 2012

Headlines:

- Cold revisits Minnesota
- Planting in February?
- Weekly Weather Potpourri
- MPR listener question
- Almanac for February 10th
- Past Weather
- Outlook

Topic: Cold revisits Minnesota

After starting February exceptionally warm last week, temperatures plummeted this week to more typical wintertime values. On Tuesday, February 7th Ash Lake in northern St Louis County reported the coldest temperature in the 48 contiguous states with -20 degrees F. Then on Wednesday, February 8th, Embarrass reported -17 degrees F, and after a brief respite from the cold on Thursday, Friday morning, February 10th Flag Island reported the coldest temperature among the 48 contiguous states with a reading of -17 degrees F. On February 7th over 20 Minnesota weather observers reported below 0 F readings, while on February 8th, the number of

observers reporting below 0 F readings was over 30. Then, on Friday, February 10th over 50 Minnesota communities reported below 0 F readings, as far south as Windom (Cottonwood County) which reached -2 degrees F. An Extreme Cold Warning was in effect for northwestern counties on Friday, where windchill values were as cold as -40 degrees F. Another round of below 0 F readings are expected for Saturday morning, before a warming trend starts on Sunday.

Topic: Planting in February?

Historical records show that February of 1878 was so mild that many Minnesota farmers were in their fields planting small grains (wheat, barely, oats). Soils had thawed and were not too wet to till. Many observers reported temperatures in the 40s and 50s F for half the days of the month. It is the only time in Minnesota history, that much of the state was planted in the month of February.

Weekly Weather Potpourri:

Tropical Cyclone Jasmine was churning in the South Pacific Ocean well east of Australia. It was an intense system with winds over 130 mph, generating sea wave heights over 30 ft. It is expected to dissipate out to sea southwest of Tonga over the weekend. Another Tropical Cyclone, Giovanna, was approaching Madagascar in the Southern Indian Ocean with wind speeds over 100 mph and sea waves over 15 feet. It was expected to bring heavy rains and strong winds to Madagascar over the weekend.

NOAA reported this week that January 2012 was the 4th warmest on record for the 48 contiguous states. It was also exceptional for the lack of snow cover across the USA, especially when compared to last year. You can read more at..

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

A big winter freeze continues to plague most of Europe as some eastern countries have seen temperatures plummet to -40 degrees F this week. News services report over 200 deaths due to exposure during this siege of arctic air. Many rivers and canals froze, including the Danube River, disrupting shipping traffic there. Freezing rain was making driving treacherous in parts of the United Kingdom as well. You can read more at....

<http://www.bbc.co.uk/weather/features/16948525>

<http://www.metoffice.gov.uk/news/releases/archive/2012/snow-follows-ice>

It was on February 9, 1870 that the U.S. National Weather Service was established. At first it was called the Weather Bureau and it was part of the War Department because,

it was said, "military discipline would probably secure the greatest promptness, regularity, and accuracy in the required observations." It became a civilian agency 20 years later, under the Department of Agriculture, and then was switched to the Commerce Department in 1940. These days, the National Weather Service is based out of Silver Spring, Maryland. It plays a very big role in making sure that American air travel is safe, providing up-to-minute weather updates to air traffic controller centers across the nation.

MPR listener question: I have heard that some areas of the state are experiencing the lowest seasonal snowfall totals in many years. Will any records be set for lack of snow?

Answer: Indeed, many are reporting very low snowfall totals this winter. Some of these locations include:

MSP 14.9 inches (2nd lowest total behind 1930-1931 when 14.2 inches fell)
Austin 13.2 inches (lowest since winter of 1976-1977)
Zumbrota 12.8 inches (lowest since winter of 1962-1963)
St Cloud 16.2 inches (lowest since 1967-1968)

Those who might set new records for lowest ever snowfall seasons include:

Warroad, currently only 8.6 inches
Leech Lake, currently only 11.2 inches
Floodwood, currently only 11.4 inches
Moorhead, currently only 11.8 inches
Duluth Airport, currently only 17.4 inches

Almanac for February 10th:

The average MSP high temperature for this date is 24 degrees F (plus or minus 12 degrees F standard deviation), while the average low is 6 degrees F (plus or minus 13 degrees standard deviation).

MSP Local Records for February 10th:

MSP weather records for this date include: highest daily maximum temperature of 49 degrees F in 1877; lowest daily maximum temperature of -16 degrees F in 1899; lowest daily minimum temperature of -24 degrees F in 1885; highest daily minimum temperature of 33 degrees F in 1999; record precipitation of 0.60 inches in 1898; record snowfall is a 4.3 inches in 1953.

Average dew point for February 10th is 9 degree F, with a maximum of 37 degrees F in 1996 and a minimum of -25 degrees F in 1982.

All-time state records for February 10th:

Scanning the state climatic data base: the all-time high for this date is 57 degrees F at Luverne (Rock County) in 1977. The all-time record low for this date is a very cold -49 degrees F at Tower (St Louis County) in 1899. The all-time record precipitation amount for this date is 1.69 inches at Montevideo (Chippewa County) in 1965. State record snowfall for this date is 20.0 inches at Pigeon River (Cook County) in 1939.

Past Weather Features:

February of 1877 brought one of the warmest ever stretches of winter weather to Minnesota. Ten of the first eleven days of the month brought daytime highs in the 40s F in St Paul, peaking with 49 degrees F on the 10th.

February 10, 1885 brought an arctic air mass to Minnesota with lows of -24 degrees F in St Paul, -27 degrees F in Moorhead, and -32 degrees F at Duluth. Temperatures remained below the freezing mark until the 25th.

Perhaps the coldest ever February 10th occurred in 1899 when many communities reported record-setting lows, including -49 F at Tower, -45 F at Pokegama Dam, -44 F at Leech Lake and Detroit Lakes, -42 F at Roseau and Willow River, -40 degrees F at Milaca, -39 F at Lake City, and -35 F at Caledonia. Temperatures turned around and reached the 40s F by the 15th of the month.

In the decidedly wet February of 1953 a winter storm deposited ice, glaze, and 6-8 inches of new snowfall across central Minnesota over the 9th and 10th. Beardsley reported 15 inches of snowfall. The ice and glaze caused numerous traffic accidents and delays, while also leading to some fallen power lines in western counties.

Another big snow storm occurred over February 9-10, 1965. Many central and northern Minnesota locations reported from 9 to 15 inches of new snow.

February 10-12 brought record warmth to many areas of Minnesota. Daytime temperatures reached the 40s and 50s F under bright, sunny skies.

Outlook:

Cold to start the weekend with many single digit and below 0 F readings Saturday morning. Then a warming trend starts again on Sunday, with a chance for snow on Monday and Tuesday. Generally mild temperatures prevail again next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, February 17, 2012

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 17, 2012

Headlines:

- Snow this week
- Cold up north
- Last call for severe weather class
- Weekly Weather Potpourri
- Two MPR listener question
- Almanac for February 17th
- Past Weather
- Outlook

Topic: Snow this week

Monday, February 13th brought snow to southern Minnesota counties, as well as a few communities in the north. Across the south 1-4 inches of snowfall blanketed what had been a snow-free landscape. Grand Meadow reported 3 inches, while Caledonia in Houston County reported 4 inches, their heaviest snowfall of the 2011-2012 season. Brainerd and Moorhead reported over 3 inches, while Hibbing reported 5 inches. More snow came on Wednesday to some southern counties as Sherburn, Wells, Fairmont, and Grand Meadow all reported 3 more inches.

Topic: Cold up north

From Friday, February 10th through Monday, February 13th northern Minnesota reported the coldest temperatures in the 48 contiguous states, the first time this winter such a streak of cold weather has dominated the northern Minnesota landscape. On February 10th it was -18 degrees F at Flag Island, on February 11th it was -20 degrees F at Fosston, on February 12th it was -14 degrees F at Embarrass, and on February 13th it was -16 degrees F at Embarrass. The cold spell came to an end by Valentine's Day as daytime temperatures soared into the 30s and 40s F again, well above normal for this time of year. In fact Marshall (Lyon County) reached 48 degrees F at 3:00 pm on Valentine's Day.

Topic: Last Call for Course on Minnesota's Severe Storms

My College of Continuing Education Class on Minnesota's severe weather history will begin on February 21st at 7:00 pm on the St Paul Campus. Only three sessions long (classes on February 28, and March 6 as well), I will dissect some of the state's most famous storms and discuss their consequences. We will also have a tour of the National Weather Service in Chanhassen during the last course meeting. If you are interested, please go to....

<http://www.cce.umn.edu/courses/CS-0593.html>

Weekly Weather Potpourri:

Madagascar was hit by Cyclone Giovanni this week. The storm brought wind gust of 140 mph, heavy rains and strong coastal storm surge. It was expected to rejuvenate over the Mozambique Channel and perhaps bring heavy rain again to southern parts of Madagascar before dissipating.

Winter's grip has eased up in Europe this week. Last week's extreme cold was evident in single digit lows reported from the United Kingdom, and minimum temperatures as cold as -40 degrees F from eastern European countries. Cold and ice even caused parts of the Rome Colosseum to fall off, disrupting the tourism there. This week temperatures have climbed into the teens and twenties, even 40s and 50s F in parts of Germany and France, with less snow and more glimpses of the sun.

A recent paper in the Proceedings of the National Academy of Sciences suggests that ecosystem response to heat waves and droughts is highly variable depending on the month and season in which they occur, and that this is an important feature of climate change that needs more study. For example prairie grasses respond far differently to drought in June than they do in September. You can read more about this study at....

<http://www.sciencedaily.com/releases/2012/02/120215155300.htm>

MPR listener question: I recently realized that there has been literally no static electricity this winter, at least for me. Did something in me change, or is it a result of this warm winter?

Answer: You are right about the warmth. Since November 1, 2011, 77 percent of all days have brought above normal temperatures to the Twin Cities. But in addition dewpoints (atmospheric water vapor) has been very high this winter. The presence of more moisture in the atmosphere makes it more conductive preventing the build-up of charged particles. In the indoor environment humidifiers help keep static electricity potential down, but Mother Nature does it best if the atmosphere outside is moist to begin with. During this winter we have had many dewpoints in the 20s and 30s F, about 25-30 degrees F higher than normal. These have produced days with relative humidity of 65-80 percent, conditions that are not conducive to the formation of static electricity.

MPR listener question: Is the snow drought this winter strictly a lack of storms, or is it weak storm systems that deposit little snow?

Answer: To a degree it is both. For the Twin Cities (15.3 inches of snow to date) and Duluth (17.9 inches of snow to date), snow storms have been generally light in quantity, but also less frequent than in normal winters. In the Twin Cities the average number of daily snowfalls for the November through February period is 29, and only 20 days have delivered a measurable snowfall this winter. Up at Duluth, the average number of daily snowfalls for November through February is 45 and only 26 days have delivered a measurable snowfall this winter. In contrast, International Falls averages 44 days with measurable snowfall between November and February, and they have reported 46 days with measurable snowfall so far this winter, but all the storms have brought light amounts. The heaviest daily snowfall at International Falls has been only 4.5 inches back on November 26, 2011.

Almanac for February 17th:

The average MSP high temperature for this date is 28 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 10 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for February 17th:

MSP weather records for this date include: highest daily maximum temperature of 55 degrees F in 1981; lowest daily maximum temperature of -12 degrees F in 1936;

lowest daily minimum temperature of -20 degrees F in 1903 and 1936; highest daily minimum temperature of 36 degrees F in 1998; record precipitation of 0.29 inches in 1972; record snowfall is a 3.8 inches in 1972.

Average dew point for February 17th is 14 degree F, with a maximum of 44 degrees F in 1981 and a minimum of -26 degrees F in 1942.

All-time state records for February 17th:

Scanning the state climatic data base: the all-time high for this date is 66 degrees F at Luverne (Rock County) and at Pipestone (Pipestone County) in 1981. The all-time record low for this date is a very cold -52 degrees F at Pokegama Dam (Itasca County) in 1903. The all-time record precipitation amount for this date is 1.85 inches at Hokah (Houston County) in 1984. State record snowfall for this date is 13.0 inches at Beaver Bay (Lake County) in 1870.

Past Weather Features:

February 17, 1875 was the last of 16 consecutive days in the Twin Cities with below 0 F morning temperatures. Twenty-three days brought below 0 F temperature readings that month, the coldest February in Twin Cities history. A similar pattern prevailed at Duluth. At Fort Ripley they reported 44 consecutive days with below 0 F readings in the morning hours.

February 17, 1903 brought one of the coldest days in the history of Detroit Lakes, MN. After a morning low of -47 degrees F, the afternoon high only climbed to -26 degrees F.

February of 1936 was the coldest in state history. No wonder that many observers reported record low temperatures on the morning of February 17th. Over 20 communities were -30 degrees F or colder. Many observers reported 350 consecutive hours or more of below 0 F readings that month.

February 16-18, 1967 brought 6 to 14 inches of snowfall across southern and central Minnesota counties. Roads were closed in some places and schools were let out early for the weekend. It was one of the snowiest weeks of the winter in 1966-1967.

On February 17, 1981 spring was in the air. As far north as Detroit Lakes it was 57 degrees F, with many other western and southern Minnesota communities reporting afternoon temperatures in the 60s F under bright, sunny skies. From the 17th to the 21st of the month temperatures averaged 25-30 degrees F warmer than normal, thawing agricultural soils and promoting an early planting season.

Outlook:

Mostly sunny to start the weekend, with above normal temperatures. Warmer yet on Sunday, but with increasing cloudiness later in the day. A chance for snow and rain, or mixed precipitation on Monday and continuing into Tuesday. Continued above normal temperatures with a chance for rain or snow showers on Wednesday and Thursday as well.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, February 24, 2012

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 24, 2012

Headlines:

- Increase in seasonal snowfall totals
- Watch for any new Leap Day precipitation records
- Weekly Weather Potpourri
- Two MPR listener question
- Almanac for February 24th
- Past Weather
- Outlook

Topic: Increase in seasonal snowfall totals

Monday through Wednesday this week brought several inches of new snow to areas of the state. In fact, it was the snowiest 3-day period of the winter for some observers. In the north International Falls reported 8 inches; Crookston, Orr, Hibbing, Cook, and Two Harbors reported 6 inches; Isabella reported 6.2 inches; and Kabetogama reported 7.4 inches. In central Minnesota Mora reported 5.2 inches and Plymouth 5.0 inches, while MSP reported 2.7 inches. In the south Theilman, and Cannon Falls reported over 2 inches.

The new seasonal snowfall totals for some observers: Gunflint Lake 36.6 inches; Isabella 49.4 inches; Kabetogama 48.3 inches; Orr 40 inches, and International Falls 41.2 inches. Despite the recent snowfall, many locations are still significant seasonal deficiencies: at Duluth the season has delivered just 22.9 inches (normal through the end of February is 65.6 inches); at MSP the seasonal snowfall total is 18 inches (normal through the end of February is 39.7 inches); and at Rochester the seasonal snowfall total is just 20.1 inches (normal through the end of February is 39.9 inches).

Southern counties in the state were getting more appreciable snowfall on Thursday (Luverne reported over 4 inches), and there is another chance for snow (and mixed precipitation) expected on Sunday, and again next Tuesday and Wednesday to close out the month of February. If all of this snow and rain materializes February may end up to be the first wetter than normal month statewide since last July. Yes, we have recorded six consecutive drier than normal months in Minnesota, and it is about time to bring that to a halt.

Topic: Watch for any new Leap Day precipitation records

Since Leap Day (Feb 29) only comes around every 4 years, the record amounts for precipitation that day at many Minnesota locations are rather modest (0.7 inches of snowfall in the Twin Cities for example). With a major winter storm in the forecast for next Tuesday and Wednesday it is possible that many new precipitation records will be set around the state on Wednesday. We'll see.

Weekly Weather Potpourri:

Wednesday and Thursday brought a strong winter storm to Colorado and Wyoming this week. Heavy snow was driven by extreme wind, 70-90 mph in places. This resulted in power outages for some, broken trees, and closure of Interstate 70 and Interstate 25 for periods of time. It snowed up to 3 feet in Wyoming's Teton Mountains.

Long-lived Cyclone Giovanna brought heavy rainfall to Madagascar last week and early this week. NASA's TRMM satellite measurement systems estimated rainfall amounts of over 10 inches across Madagascar, causing serious flooding. News services reported at least 23 deaths due to the storm, and up to 190,000 people were displaced from their homes. Fortunately no threat of tropical storm development was seen in the Western Pacific or Indian Oceans this week.

According to recent research from the University of North Carolina at least 18 different bird species in the eastern USA are migrating north to their breeding grounds earlier in the year, most probably due to climate change. Researchers at UNC are

using data collected through the eBird citizen observing program that has been operating the past decade. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/02/120223142642.htm>

MPR listener question: I go into the bathroom of my house on a windy day and the toilet water is moving around in the bowl. What causes this to happen?

Answer: The simple answer is pressure. House plumbing is vented to the outside through a vent stack (usually in the roof). On very windy days, the rapidly moving air across the top of the vent stack creates a suction, causing a fluctuating lowering of pressure in the vent stack. This in turn causes the water to move about in the waste water plumbing of the house. You can read more about this at...

<http://www.mentalfloss.com/blogs/archives/83541>

MPR listener question: With the relatively new NOAA Threaded Extremes in the Twin Cities climate record, what is the all-time high temperature and low temperature officially? How does this compare to say Rochester to the south and International Falls to the north?

For the Twin Cities (1871-2012), the highest temperature recorded is 108 F on July 14, 1936, the lowest ever is -41 F on January 21, 1888.

For Rochester (1886-2012), the highest temperature recorded is 108 F on July 14, 1936, the lowest ever is -42 F on January 7, 1887.

For International Falls (1897-2012), the highest temperature recorded is 103 F on July 22, 1923, the lowest ever is -55 F on January 6, 1909.

(Note: temperature records were not kept for International Falls in the 1930s).

Almanac for February 24th:

The average MSP high temperature for this date is 30 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 12 degrees F (plus or minus 14 degrees standard deviation).

MSP Local Records for February 24th:

MSP weather records for this date include: highest daily maximum temperature of 59 degrees F in 1880; lowest daily maximum temperature of -2 degrees F in 1967; lowest daily minimum temperature of -20 degrees F in 1967; highest daily minimum temperature of 42 degrees F in 2000; record precipitation of 1.90 inches in 1930; record snowfall is a 4.8 inches in 2007.

Average dew point for February 24th is 16 degree F, with a maximum of 44 degrees F in 1930 and a minimum of -34 degrees F in 1950 .

All-time state records for February 17th:

Scanning the state climatic data base: the all-time high for this date is 67 degrees F at Pipestone (Pipestone County) in 1958. The all-time record low for this date is a very cold -46 degrees F at Red Lake Falls (Red Lake County) in 1955. The all-time record precipitation amount for this date is 2.10 inches at Beaver Bay (Lake County) in 1868 and at Tower (St Louis County) in 1964. State record snowfall for this date is 19.0 inches at Beaver Bay (Lake County) in 1868.

Past Weather Features:

February 21-24, 1868 brought a significant winter storm to Minnesota. Rain and snow mixed fell across the state. Fort Ripley received over a foot of snow, while Beaver Bay reported 19 inches. In the Twin Cities nearly 10 inches of snowfall was reported.

On February 24, 1880 a mild, spring-like day greeted Minnesota citizens. Residents of St Paul enjoyed 59 degrees F under sunny skies, while up north in Duluth the afternoon temperature reached a balmy 52 degrees F. Temperatures cooled down to single digits and below zero F readings by the end of the month that Leap Year of 1880.

A winter storm over February 22-25, 1964 brought heavy snowfall to northern Minnesota. Waskish received 7 inches, Leech Lake 8 inches, and Big Falls reported 8.5 inches from the storm. For some Minnesota weather observers this was the only significant snow storm of the month.

Both February 24, 1955 and 1967 saw extreme cold visit the state. Many observers reported overnight lows of -30 degrees F or colder, and even -40 F and colder in northern counties. Daytime highs could not rise above 0 F. Many observers reported daytime highs between -5 and -8 degrees F.

The last exceptionally snowy February 24 was in 2001, when many observers reported from 4 to 12 inches of new snowfall. Minneota, Cloquet, Two Harbors, Duluth, Moose Lake, and Hinckley all reported 10-12 inches of new snow

Outlook:

Mostly sunny and mild on Saturday. Increasing cloudiness on Sunday, with a chance for rain or snow. Snow will be heavier in the north. Continued chance for precipitation

through Monday. Then another chance for rain/snow late Tuesday and into Wednesday next week, with more significant amounts in southern Minnesota. Temperatures will fall back closer to seasonal normals to conclude the month of February.

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/>

NOTE: News releases were current as of the date of issue. If you have a question on older releases, use the news release search (upper left-hand column of the [News main page](#)) or the main Extension search (upper right of this page) to locate more recent information.

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Minnesota WeatherTalk Newsletter for Friday, March 2, 2012

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 2, 2012

Headlines:

- A wet week
- February climate summary
- Weekly Weather Potpourri
- Three MPR listener questions
- Almanac for March 2nd
- Past Weather
- Outlook

Topic: A wet week

The last week of February brought plenty of precipitation to the state. Many observers reported six consecutive days with precipitation, along with some record-setting amounts on the 28th and 29th. A blizzard was declared for some west-central counties, along with the north shore area of Lake Superior. The blizzard left many Duluth residents paralyzed and unable to move about on Wednesday and Thursday.

Some records set on February 28th included:

0.83 inches of precipitation at Rochester

0.89 inches of precipitation at Eau Claire, WI

1.11 inches of precipitation at Canby
1.20 inches of precipitation at Milan
1.78 inches of precipitation at Red Wing
0.97 inches of precipitation at Chanhassen
1.48 inches of precipitation at Elgin

Some records set on February 29th (Leap Day) included:

0.78 inches of precipitation and 9.7 inches of snowfall at Duluth
0.51 inches of precipitation and 4.7 inches of snowfall at St Cloud
0.51 inches of precipitation at Rochester
1.63 inches of precipitation at Austin (record for any day in February)
1.52 inches of precipitation at Dodge Center
1.35 inches of precipitation at La Crescent
1.37 inches of precipitation at Albert Lea
0.65 inches of precipitation at MSP
0.68 inches of precipitation at Eau Claire, WI
0.90 inches of precipitation at Amboy
1.05 inches of precipitation at Two Harbors
1.73 inches of precipitation at Gaylord
1.72 inches of precipitation at Winnebago
1.56 inches of precipitation at Hutchinson
1.46 inches of precipitation at Marshall
1.52 inches of precipitation at Windom
1.96 inches of precipitation at Waseca
2.01 inches of precipitation at St Peter
2.23 inches of precipitation at Faribault (a new statewide record for Feb 29th)

In addition many observers across central and northeastern Minnesota reported new record snowfall amounts for February 29th. Some reported over 10 inches, including Mora with 11.1 inches, Ortonville and Lake Carlos with 12 inches, Two Harbors with 10.2 inches, and Hinckley with 12.3 inches (a new statewide record for Feb 29th). Even greater amounts of snowfall occurred in northwestern Wisconsin.

The moisture was generally very welcome (the wettest week in the state since August 2011), but ice, sleet, and snow made for hundreds of traffic accidents over the 28th-29th.

You can read more at...

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=79829&source=2
http://www.climate.umn.edu/doc/journal/leap_day_blizzard120228_29.htm

Topic: Climate Summary for February

February's climate kept up the trend of the past six months delivering above normal temperatures to the state. Most observers reported average monthly temperatures that were 4 to 9 degrees F above normal, with the highest departures in the north (International Falls was 9.2 degrees F above normal). February 2012 ranks 10th warmest statewide historically. Extremes for the month ranged from 55 degrees F at Milan, Montevideo, Marshall, and Lambert on February 2nd to -20 degrees F at Fosston on February 11th. Despite the warmer than normal month, Minnesota reported the coldest temperature in the 48 contiguous states 7 times during the month.

Thanks to an extremely wet last week of the month, with record-setting amounts of precipitation on the 28th and 29th, February broke the string of six consecutive drier than normal months, as many observers finished with 200 percent of normal. In fact February 2012 ranks as the 10th wettest historically based on statewide average. A number of communities reported over 2 inches of precipitation for the month (statewide normal for February is only 0.67 inches), and Worthington reported a new monthly record of 2.23 inches, as did Faribault with 2.55 inches. Monthly snowfall for February ranged from 1 inch at La Crescent to over 30 inches along the north shore of Lake Superior. Both International Falls (17.7 inches) and Duluth (19.7 inches) reported their snowiest month of the 2011-2012 season. Two Harbors just missed tying their monthly record snowfall for February (30.3 inches in 2001) with a total of 30.2 inches, while Brimson in St Louis County set a new monthly snowfall record for February with 25.2 inches. Duluth reported at least a trace of snowfall the last ten days of the month (including a record 9.7 inches on Leap Day), while International Falls reported snowfall on 9 of the last 10 days of the month.

Weekly Weather Potpourri:

The same winter storm system which brought rain, freezing rain, sleet, and snow to Minnesota over Feb 28-29 produced severe weather in other Midwestern states. The NOAA Storm Prediction Center received 43 reports of tornadoes over those two days, with reports from NE, KS, MO, and IL on the 28th, and reports from IN, TN and KY and 29th. Twelve storm-related deaths and scores of injuries were reported from these tornadoes.

The Joint Typhoon Warning Center was tracking and reporting on two tropical cyclones in the Indian Ocean this week. Tropical Cyclone Irina was spinning over the

west coast of Madagascar and is expected to track across the Mozambique Channel striking that country over the weekend with wind gust of 95 mph and sea waves of 16-20 feet. Further east another, weaker tropical cyclone was playing out NE of La Reunion and Port Louis, but no threat to any land.

Parts of Victoria, New South Wales, and the Australian Capital Territory were seeing flooding rains this week. Many areas reported over an inch of rain on March 1st, and storms were expected to bring another 1-3 inches of rainfall through the weekend, causing flooding on many watersheds.

A recent study of the Arctic by NASA scientists shows that the extent of perennial arctic sea ice is declining at a rate of about 13.5 percent per decade. The thicker ice of the Arctic is declining at a faster rate than the year to year seasonal ice cover. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/02/120229190000.htm>

Thanks to Jan Null who pointed out a recent New York Times article about Texas State Climatologist Dr. John Nielsen-Gammon of Texas A&M University. He walks a fine line when it comes to climate change in a conservative state, but he is highly respected for the work he does. You can read more about him at

http://www.nytimes.com/2012/03/02/us/state-climatologist-can-explain-why-texans-wont-need-umbrellas.html?_r=2&ref=science

The Iditarod sled dog race begins this Saturday, March 3rd from Anchorage, Alaska, and will conclude 975 miles later at Nome. There is abundant snow across much of the route this year as some parts of Alaska have seen record-setting snowfalls this winter. Mushers hope for ideal conditions during the race, with plenty of snow pack, and temperatures ranging from plus 10 F to -20 F along the way.

MPR listener question: The storm of February 28-29 was quite significant for snowfall in then north. Both International Falls (17.7 inches) and Duluth (19.7 inches) reported their snowiest month of the season in February. The snowy end to February makes me wonder how often is February the snowiest month of the winter?

Answer: This varies depending on where you are in the state. For the Twin Cities, February is the snowiest month about 14 percent of the time historically (back to 1884); for Duluth, February is the snowiest month about 15 percent of the time (back to 1871); and for International Falls February is the snowiest month about 18 percent of the time (back to 1895).

MPR listener question: The snow storm in northern Minnesota on February 26th brought brown and yellow snow. Was this soil picked up by the wind in the western prairie?

Answer: Indeed, I suspect it was. The day before (Feb 25th) low level winds, strong at times, were blowing from the west and I suspect picked up some soil particles. Many parts of the western Dakotas and Nebraska have seen relatively little snow cover this winter.

MPR listener question: How much of the recent precipitation do you think will infiltrate into our dry soils? It is much needed.

Answer: Historically winter precipitation does not abundantly find its way into soils, mostly because the soil is frozen and/or relatively wet going into the winter season with little room to absorb more moisture. On average about 15-25 percent of the wintertime precipitation finds its way into the soil. However this winter, the soils are so dry, especially near the surface which has been going through some freeze/thaw cycles because of so many warmer than normal days, I think a greater percentage of the precipitation will find its way into the dry soil pore spaces. This will be helped by crop residues and tillage roughness that has left small pockets of micro-relief in agricultural fields. This will hold the moisture better until it has time to infiltrate the soil.

Perhaps as much as 50 percent or more of the recent precipitation will pass into the soil and help with recharge. That is not to say drought alleviation has occurred. The soil moisture deficits are too extreme for that. But it is a start, and with a wetter than normal month of March projected by the NOAA CPC, this is perhaps the start of a significant late winter and early spring recharge cycle with respect to soil moisture. We can only hope it is.

Almanac for March 2nd:

The average MSP high temperature for this date is 32 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 16 degrees F (plus or minus 12 degrees standard deviation).

MSP Local Records for March 2nd:

MSP weather records for this date include: highest daily maximum temperature of 54 degrees F in 1923; lowest daily maximum temperature of 5 degrees F in 1989; lowest daily minimum temperature of -17 degrees F in 1913; highest daily minimum

temperature of 37 degrees F in 1882; record precipitation of 0.58 inches in 1951; record snowfall is a 7.1 inches in 1951.

Average dew point for March 2nd is 14 degree F, with a maximum of 41 degrees F in 1983 and a minimum of -26 degrees F in 1950 .

All-time state records for March 2nd:

Scanning the state climatic data base: the all-time high for this date is 71 degrees F at Luverne (Rock County) in 1974 and at Browns Valley (Traverse County) in 1992. The all-time record low for this date is a very cold -50 degrees F at Pokegama Dam (Itasca County) in 1897. The all-time record precipitation amount for this date is 2.45 inches at Young America (Carver County) in 1965. State record snowfall for this date is 15.0 inches at Mountain Iron (St Louis County) in 1904 and at Santiago (Sherburne County) in 1965.

Past Weather Features:

The first four days of March 1951 brought heavy snows to Minnesota. Communities up north reported 10 to 15 inches of new snow, while some in central and southern Minnesota recorded 15 to 20 inches. Cokato reported 21 inches, while Winthrop had 22 inches. For many communities March of 1951 proved to be the snowiest in history. Communities reporting 40 or more inches of snowfall for the month included, MSP, Stillwater, Morris, Campbell, Farmington, Grand Meadow, Harmony, Wheaton, and Waseca.

1965 again brought a snowy March. Over the 1st and 2nd a strong winter storm produced record-setting snowfall amounts for many locations, including 14 inches at Grand Rapids, 17 inches at Little Falls, 18 inches at Bird Island and Springfield, 20.5 inches at St Cloud, and 23.3 inches at Collegeville. The month produced an all-time record of 66.4 inches of snow at Collegeville, and helped to produce spring flooding on the Upper Mississippi River.

March 2, 1974 brought an early taste of spring with many observers reporting temperatures in the 50s F. It was 50 degrees F as far north as Moose Lake, and many western Minnesota communities reached 60 degrees F or higher, topped by 71 degrees F at Luverne. In fact the whole first week of March that year brought temperatures that were 15 to 25 degrees F warmer than normal.

March 2, 1989 was one of the coldest in history, as at least 17 Minnesota communities reported a morning temperature of -30 degrees F or colder. The daytime high at Fosston only reached -7 degrees F, while Rosemount was a warm spot in the state

with a reading of 5 degrees F. Tower which was -42 degrees F saw a 50 F temperature rise to plus 8 F by the next day.

March 1-2, 1992 brought another early taste of spring to western and southern Minnesota as temperature soared into the 50s and 60s F. Canby and Milan hit 70 degrees F, while Browns Valley reached 71 degrees F, setting records. Temperatures tailed off into the 30s and 40s F by the third of the month.

Outlook:

Mostly cloudy with near normal temperatures over the weekend, and a slight chance for snow in places around state. Warm up starts on Monday, as daytime temperatures rise into the 40s and 50s F by the middle of the week. Chance for rain and/or snow later in the week.

Further Information:

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

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

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Minnesota WeatherTalk for Friday, March 9, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, March 9, 2012

HEADLINES

- Warm March 6th
- Windy March 8th
- Weekly Weather potpourri
- MPR listener question
- Almanac for March 9th
- Historic weather
- Outlook

Topic: Warm March 6th

March 6th was the warmest statewide in 12 years. Many observers reported daytime temperatures 20 to 30 degrees above normal. Several locations reached the 50s and 60s F. Among the warmest spots in the state were: 68 F at Minneota; 67 F at Preston; 66 F at Winona; 65 F at Albert Lea; 64 F at Auston, Caledonia, and La Crescent; 63 F at Rochester, Amboy, Winnebago, and Fairmont; 62 F at Pipestone; and 60 F at MSP.

Kabetogama set a new record high with 51 degrees F, while La Crescent also set a record high with 64 degrees F. It was probably the 2nd warmest March 6th in history behind 2000 when a number of observers report 70 degrees F and higher.

In addition the warm, moist southerly winds brought near record setting dewpoint for the Twin Cities. The dewpoint reached 42 degrees F on March 6th and reached 45 degrees F on March 7th. For some southern Minnesota counties dewpoints reached the low 50s F before cooler and drier air settled in. The warm air mass brought plenty of fog to places as well.

Topic: Windy March 8th

The windiest day of the month so far occurred on Thursday the 8th, as a strong high pressure cell moved down from Canada with an associated cold front. The temperature at International Falls plummeted from 28 degrees F to -14 degrees F. From 5:00 pm in the late afternoon through 9:00 pm in the evening, many observations of 40 mph plus winds were reported around the state. All of these communities saw winds of 40 mph or higher for brief periods of time: MSP, Duluth, Hibbing, St Cloud, Park Rapids, Warroad, Winona, Cloquet, Rush City, Canby, Clearwater, Hutchinson, and downtown St Paul. Highest wind speeds reported were 47 mph. You can find a summary at.....

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=80409&source=0

Topic: Weekly Weather Potpourri

The Joint Typhoon Warning Center was issuing advisories this week for two southern hemisphere storms: long-lived cyclone Irina between Madagascar and Mozambique (expected to weaken), and another tropical cyclone Koji way off the west coast of Australia (expected to strengthen) but no threat to land.

New South Wales in Australia continued to have flooding rains this week, after some areas received nearly 5 inches last week. Many daily and weekly rainfall records were set. It was said to be the wettest week since 1974. Evacuation orders were given for some cities, as roads and bridges were damaged by rushing waters. The economic cost of the flooding is estimated to exceed \$530 million.

Researchers from McGill and Concordia University report that the outdoor hockey season in Canada is shrinking significantly. Ice conditions suitable for skating have suffered as winter season temperatures have warmed since the 1950s. The largest decreases in the skating season length were observed in the Prairies and Southwest regions of Canada. You can read more at....

<http://www.sciencedaily.com/releases/2012/03/120305081425.htm>

In other Canadian climate news, the Ontario Ministry of Natural Resources-Climate Change Program has released "A Practitioner's Guide to Climate Change Adaptation in Ontario's Ecosystem." It is a pragmatic look at what measures can be taken to adapt to climate change and build resilience. You can learn more on the web at....

<http://www.climateontario.ca/>

MPR listener question: March was expected to see above normal precipitation. Last weekend brought heavy snow in the northeast. Which observers have already seen a wetter than normal start to March?

Answer: Some northeastern places have certainly seen above normal snowfall amounts so far this month: Two Harbors reports 13 inches; Duluth reports 11.8 inches; Tofte and Hibbing report 12 inches; Isabella reports 16.5 inches; and Hermantown reports 19 inches. Only Beaver Bay has reported over an inch of precipitation (liquid) with 1.21 inches in their gage so far this month.

Twin Cities Almanac for March 9th:

The average MSP high temperature for this date is 35 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 18 degrees F (plus or minus 11 degrees F standard deviation).

MSP Local Records for March 9th:

MSP weather records for this date include: highest daily maximum temperature of 61 degrees F in 1878 and 1879; lowest daily maximum temperature of 6 degrees F in 1933; lowest daily minimum temperature of -10 F in 1951 and 2003 (Pioneer Era -16 F in 1856); highest daily minimum temperature of 50 F 37 F in 1878; record precipitation of 0.84 inches in 1918 (Pioneer Era 0.92 inches in 1871); and record snowfall of 10.9 inches also in 1918. Snow depth was 22 inches on this date in 1979.

Average dew point for March 9th is 16 degrees F, with a maximum of 44 degrees F in 1911 and a minimum of -17 degrees F in 2003.

All-time state records for March 9th:

The state record high temperature for this date is 77 degrees F at Caledonia (Houston County) in 2000; the state record low temperature for this date is -33 degrees F at Tower (St Louis County) in 1984. State record precipitation for this date is 1.96

inches at St James (Watonwan County) in 1992; and state record snowfall for this date is 16.0 inches at Red Wing (Goodhue County) in 1999.

Past Weather Features:

March of 1878 was the 2nd warmest in Twin Cities history. Back to back afternoon temperatures of 61 degrees F occurred on the 8th and 9th. The temperature topped 60 degrees F eight times that month. By March 11, 1878 all the ice was out on Lake Minnetonka, the earliest date for such an occurrence. On March 9, 1878 the minimum temperature never fell below 50 degrees F in the Twin Cities, 15 degrees warmer than the average daily high!

March 9, 1883 brought light snow to the Twin Cities, with 0.01 inches of precipitation recorded. That turned out to be a rare event, as that March brought only 0.06 inches, the driest March in Twin Cities history.

In March, 1951, 12 of the first 14 days of the month brought at least a trace of snowfall to the Twin Cities. This snowiest March in history brought 40 inches, and produced an average snow depth by mid-month of 27 inches. Later in the month a large spring snow melt flood began on the Mississippi River.

March 8-9, 1999 brought a very heavy snowfall to eastern sections of the state, closing roads and schools in many areas. The Twin Cities airport reported a new record snowfall of 12.5 inches on the 8th and a storm total of 16 inches. Stillwater reported 11 inches, Chanhassen 13 inches, Red Wing 15 inches, and Hastings 12 inches. Further north Two Harbors reported over 15 inches, and Duluth over 9 inches. It was the heaviest snowfall for the month of March that year.

An arctic cold outbreak held its grip on the state on March 9, 2003. Red Lake reported -27 degrees F, while Warroad recorded -21 degrees F. As far south as Marshall (Lyon County) it was the coldest March 9th in history, with a high of only 9 degrees F and a low of -12 degrees F.

Blizzard Coyote (named by the Grand Forks Herald newspaper) struck the Red River Valley on March 11, 2009. It was a precursor to spring snow melt flooding of long duration along the Red River.

Outlook:

Sunny and mild on Saturday, with some afternoon highs in the 50s and 60s F. Increasing clouds on Sunday, with a chance for light rain. Continued chance for rain

on Monday, then dry and mild Tuesday through Thursday next week, with much above normal temperatures.

Further Information:

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Minnesota WeatherTalk for Friday, March 16, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, March 16, 2012

HEADLINES

- Record string of March warmth
- New Seasonal Climate Outlook
- An Invitation
- Weekly Weather potpourri
- Two MPR listener questions
- Almanac for March 16th
- Historic weather
- Outlook

Topic: Record warmth continues

Many observers have reported new daytime high temperature records as well as warm overnight low temperature records over the last week. Up north at International Falls, they reported new daytime highs on March 10 (59 F), March 11 (61 F), March 13 (55 F), March 14 (57 F), and March 15 (57 F tied record). Other northern Minnesota locations reported some remarkably high temperatures for so early in the year, including records of 65 F at Grand Rapids and 62 F at Hibbing on the 10th, and 66 F at Cass Lake, with 55 F at Embarrass on the 11th and 64 F on the 15th (incredibly high for a location that is usually the state's cold spot). Duluth Airport reported new record highs on the 11th (57 F) and the 14th (68 F).

Further south more records were set, with Moose Lake reporting a record high of 67 F and Hinckley a record 72 F on the 14th. In fact, many observers reported afternoon readings in the 70s F on the 14th. A record of 71 degrees F was reported at St Cloud, 73 F was reported at MSP, Madison, and Grand Meadow, 74 F at Austin and Rochester, and 75 degrees F at Winona Dam. The last reading established a new statewide temperature record for March 14th, breaking the old record of 73 F at Pipestone on March 14, 1935. Eau Claire, WI broke their record for March 14th by 10 degrees F, hitting 76 F at 4:00 pm in the afternoon. Thursday, the 15th brought even more 70 F plus readings, but fell short of the statewide record of 80 F set at Waseca in 1927. Rochester reported a record 74 degrees F, while Luverne, Albert Lea, and Preston hit a record 73 degrees F. Forest Lake and Red Wing Dam reported record highs of 75 degrees F, while Windom and Worthington also reported record highs with 72 degrees F.

The overnight air remained warm too at many locations, as Rochester reported their warmest low ever for March 14th with 49 degrees F and MSP reported a record 48 degrees F. Temperatures around the region were expected to hit record-setting territory again Friday through Monday as daytime highs are expected in the 70s F and perhaps even some 80s F, while overnight lows may remain in the 50s F.

With the persistent warmth lake ice-out dates may be 2-3 weeks earlier than normal this year. Certainly lake ice in southern Minnesota counties has been disappearing rapidly this week. You can follow the progress of lake ice-out reports at the DNR-State Climatology Office web site:

http://climate.umn.edu/lake_ice/

One further note, thunderstorm season may come early as well, especially if dewpoints reach into the 50s and 60s F this weekend and next week. The highest March dewpoint in the Twin Cities climate record is 60 degrees F on March 24, 1945. But this value may be surpassed next week as strong warm, moist air from the south is expected across the state, with increasing chances for thunderstorms.

Topic: New Monthly and Seasonal Climate Outlook

The NOAA Climate Prediction Center released new outlooks this week. For April the continued trend of significantly above normal temperatures (now six months long in the state) is expected to prevail in Minnesota. There is no indication whether precipitation will be above or below normal. Similarly the outlook for April, May, and June shows no tendency for either above or below normal values of mean temperature and total precipitation.

<http://www.cpc.ncep.noaa.gov/>

Topic: An Invitation

For those interested in learning and wanting to visit the University of Minnesota, there is a golden opportunity this month. The College of Agricultural, Food, and Natural Resource Sciences is hosting the annual event "Classes Without Quizzes" on Saturday, March 31st from 8:00 am to 1:00 pm on the St Paul Campus. I will be speaking about evidence for climate change and its consequences in Minnesota, but there will be many other fine speakers and interesting topics presented as well, including a talk on grapes and the wine industry, the new plant hardiness zones, invasive species, and other great topics. For more information and a chance to register please check out the web site.....

<http://www.cfans.umn.edu/AlumniFriends/Events/CWQ/index.htm>

Weekly Weather Potpourri:

Tropical Cyclone Lua was being monitored as it strengthened off the NW Australian coast. This relatively large system was producing wind gusts over 100 mph and sea waves over 30 feet as it approached the Australian coast line near Port Hedland. It was expected to bring heavy rain to the area over the weekend.

A recent study from the University of Connecticut and published in Global Environmental Change suggests a link between the great economic recession and increased skepticism in climate change. When job security and economic health are at risk, many people don't want to contend with the problems presented by climate change. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/03/120313122456.htm>

NOAA announced last week results from a study of trends in Great Lakes winter ice cover. Generally over the past 40 years the trend is downward in the areal coverage of ice on the Great Lakes. In addition there is less variability from year to year. You can read more from the NOAA release at....

<http://researchmatters.noaa.gov/news/Pages/GLice.aspx>

MPR listener question: This has been such a mild winter for the Twin Cities. Have we had any week-long spells of weather when the temperature never rose above 32 F? I can't recall.

Answer: Yes, despite the persistent warmth this winter we have had two such spells in the Twin Cities. December 4-10 saw no temperature above 32 F, and also January 17-24. But those are the only two. Remarkably, 76 percent of all days since November 1, 2011 have seen above normal temperatures in the Twin Cities.

MPR listener question: If Friday, March 16 brings record high temperatures (as forecasted), the Twin Cities will report 5 new record highs in the last 7 days, a remarkable string of warmth. Does the Twin Cities climate record show any other weekly periods when 5 or more record high temperature values were set? It seems highly unusual.

Answer: Indeed, there have only been 5 other similar periods of persistent record-setting warmth in the Twin Cities climate records. Going back to 1871, maximum daytime temperature records were set over the following 5-day periods:

June 26-June 30, 1931

June 16-June 20, 1933

July 10-July 14, 1936

February 16-February 20, 1981

March 4-March 8, 2000

I might also add that the Twin Cities report three new record warm lows this week as well, and there may be more in store for the weekend.

Twin Cities Almanac for March 16th:

The average MSP high temperature for this date is 37 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 19 degrees F (plus or minus 11 degrees F standard deviation).

MSP Local Records for March 16th:

MSP weather records for this date include: highest daily maximum temperature of 71 degrees F in 1930; lowest daily maximum temperature of 8 degrees F in 1900; lowest daily minimum temperature of -10 F in 1900; highest daily minimum temperature of 43 F in 2003; record precipitation of 0.80 inches in 1917; and record snowfall of 9.0 inches also in 1917. Snow depth was 23 inches on this date in 1962.

Average dew point for March 16th is 19 degrees F, with a maximum of 52 degrees F in 2003 and a minimum of -10 degrees F in 1941.

All-time state records for March 16th:

The state record high temperature for this date is 75 degrees F at Fairmont (Martin County), New Ulm (Brown County), and St Peter (Nicollet County) in 1930, and again at Luverne (Rock County) in 1966; the state record low temperature for this date is -34 degrees F at Pokegama Dam (Itasca County) in 1899. State record precipitation for this date is 2.44 inches at Lynd (Lyon County) in 1917; and state record snowfall for this date is 24.0 inches also at Lynd (Lyon County) in 1917.

Past Weather Features:

A period of bitter cold ended on March 16, 1897 as temperatures went from below 0 F readings in the morning to afternoon highs in the 30s and 40s F. For pioneer settlers in Campbell (Wilkin County) it was the last below 0 F reading of a long, bitter winter. Further north at Detroit Lakes, after bottoming out at -43 degrees F on March 15th temperatures rise to 56 degrees F by the 18th. For the rest of March temperatures moderated from the 30s F to 50s F, prompting rapid snow melt and spring flooding.

A winter storm brought heavy snowfall to Minnesota over March 16-17, 1917. Railroad traffic was blocked for a period of time as huge drifts covered the tracks. Some of the snowfalls from this storm included: 12 inches at Milaca, New London, and Bird Island; 13 inches at Collegeville and Redwood Falls; 14 inches at St Cloud and Glencoe; 15 inches at Duluth; 17 inches at Hutchinson; 18 inches at Willmar and Tyler; 20 inches at Canby; and 24 inches at Lynd. That month, Duluth reported 48.2 inches of snowfall, with a maximum snow depth of 40 inches.

A brief, but record-setting warm spell visited the state over March 15-16, 1930. Many climate observers saw temperatures climb into the 70s F, setting record highs. Among these locations: Chaska, Hutchinson, Faribault, Fairmont, Waseca, Pipestone, New Ulm, St Peter, and the Twin Cities. It was 68 degrees F as far north as Floodwood. Following the early spring warm up, temperatures plummeted to single digit lows on the 21st of March.

The St Patrick's Day Blizzard struck Minnesota on March 17, 1965. Some incredible snowfall amounts were reported, as roads schools were closed. Some of the reported snowfalls included; 12 inches at Springfield, Cloquet, Gaylord, and New London; 13 inches at St Cloud and Santiago; 14 inches at Hutchinson, Two Harbors and Buffalo; 17 inches at Duluth; 18 inches at Mora; and 23.6 inches at Collegeville.

Outlook:

A record-setting weekend coming up with exceptionally warm days and warm nights. Some new state record high temperature values may be set. Increasing cloudiness on Monday with a chance for showers and thunderstorms later in the day and breezy

conditions. Continued chance for thunderstorms on Tuesday and Wednesday with somewhat cooler temperatures. Still, overall above normal temperatures will continue for the balance of next 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/>

NOTE: News releases were current as of the date of issue. If you have a question on older releases, use the news release search (upper left-hand column of the [News main page](#)) or the main Extension search (upper right of this page) to locate more recent information.

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Minnesota WeatherTalk for Friday, March 23, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, March 23, 2012

HEADLINES

- Records, Records, Records
- Early phenology and early tornado
- Did you know?
- An Invitation
- Weekly Weather potpourri
- MPR listener question
- Almanac for March 23rd
- Past weather
- Outlook

Topic: Records were made to be broken, but this is ridiculous!

March of 2012 is delivering once in a lifetime temperature records. It has surpassed June of 1933, July of 1936, and February of 1981 in the total number of warmest maximum and minimum daily temperature records set. At last count (as of March 23), the Twin Cities have seen 17 new daily record temperature values (both max and min) so far this month. Rochester and International Falls have seen 16 new record temperatures so far this month, while St Cloud reports 14 new temperature records. Even Duluth, which has a climate that is highly regulated by Lake Superior, has reported 10 new temperature records so far this month. You can keep up to date with these records at...

http://www.climate.umn.edu/doc/journal/mild_march_2012.htm

Imbedded in these record-setting reports are even more profound significant features: earliest ever 80 degrees F at MSP (80 F) and Rochester (81 F) on March 17th; highest March temperature ever reported from International Falls (79 F on March 18th) and Kabetogama (77 F on March 20); highest minimum temperatures ever reported in March from nearly all climate stations in the state (with overnight lows in the 50s and 60s F); and highest dewpoints ever measured in March (many in the 60s F).

Concerning the high dewpoints for March, the National Weather Service also reported a record-setting value of precipitable water measured by the Chanhassen radiosonde on Monday evening this week with a value of 1.27 inches in the column of atmosphere. This was just ahead of the significant rainfall event that night. More information can be found at.....

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=80782&source=0

In addition at least 8 statewide high temperature records for March have been tied or broken this month. These include:

66 F at Amboy, MSP, and Milan on the 10th

68 F at Marshall on the 11th

74 F at Rochester on the 14th

82 F at Redwood Falls on the 16th

82 F at Madison on the 17th

84 F at Canby on the 18th (tied state record)

84 F at Madison on the 19th

80 F at Redwood Falls on the 20th

Many locations, including the Twin Cities are on a pace to set a new record for the warmest month of March in history, surpassing the record warm March of 1910.

International Falls which had never seen 70 degrees F in March before has reported 5 days with 70 F or higher this month. La Crosse, WI has reported 9 consecutive days with high temperatures of 70 degrees F or greater, a new record for March.

Topic: Early phenology and early tornado

Many of our weather observers have remarked about unusual spring phenology observations: insects (mosquitos, Asian beetles); butterflies; bud swelling, flowering, and leaf out; crops breaking dormancy (alfalfa fields); early spring wheat planting; and of course early ice-out dates on lakes. Green Lake in Kandiyohi County saw its earliest loss of ice on March 20, while White Bear Lake saw its earliest on March 19.

Out west, Lake Minnewaska in Pope County saw its earliest ice-out date on March 21st.

The NOAA National Weather Service reported that an EF-0 (winds 65-85 mph) touched down in northern Waseca County on Monday evening, March 19th. It was on the ground for about 7 miles between 6:25 and 6:35 pm and damaged some buildings. This was the 2nd earliest tornado reported in Minnesota history, just a day later than the one that struck north of Fairmont (near Truman) on March 18, 1968. You can read more at

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=80895&source=0

BTW Severe Weather Awareness Week in Minnesota does not occur until the 3rd week of April this year.

Topic: Did you know?

Greg Spoden of the DNR-State Climatology Office shared the following bit of climate history. For the Twin Cities climate record (1871-present) the year with the fewest number of rainy days (days with measurable precipitation of 0.01 inches or greater) was 1910 with only 74 rainy days (roughly 20 percent of all days). That year the total precipitation was just 11.54 inches and 1910 also brought the warmest ever March to the Twin Cities.

Conversely, in 1977 and 1991 there were 145 rainy days in the Twin Cities (nearly 40 percent of all days). Total annual precipitation in 1991 was 36.69 inches, while it was 34.88 inches in 1877, both considerably above the modern normal of 30.61 inches. Interestingly enough, during the wettest year in Twin Cities history, 1911 with 40.15 inches, there were 127 rainy days reported.

Topic: An Invitation

For those interested in learning and wanting to visit the University of Minnesota, there is a golden opportunity this month. The College of Agricultural, Food, and Natural Resource Sciences is hosting the annual event "Classes Without Quizzes" on Saturday, March 31st from 8:00 am to 1:00 pm on the St Paul Campus. I will be speaking about evidence for climate change and its consequences in Minnesota, but there will be many other fine speakers and interesting topics presented as well, including a talk on grapes and the wine industry, the new plant hardiness zones, invasive species, and other great topics. For more information and a chance to register please check out the web site.....

<http://www.cfans.umn.edu/AlumniFriends/Events/CWQ/index.htm>

Weekly Weather Potpourri:

March 21-22 brought a heavy spring snow storm to parts of Oregon. Eugene reported a record 7.5 inches of snow, with a record cold high temperature of 36 degrees F on the 21st. At higher elevations in the Cascades observers reported over 30 inches of snow. Mt Hood Meadow reported 33 inches. Some power outages resulted from the heavy snow. March temperatures have been averaging colder than normal for much of the Pacific northwest.

Earlier this week the United Kingdom Meteorological Office announced a new updated global temperature dataset (HadCRUT4) that is more comprehensive than those previously used. It includes some surface observations from polar regions and from some oceans. This will be used to further study global patterns and change in temperature. You can read more about it at....

<http://www.metoffice.gov.uk/news/releases/archive/2012/hadcrut-updates>

March 23 is World Meteorological Day in recognition of the formation of the World Meteorological Organization under the United Nations on March 23, 1950. The WMO has 189 member nations and helps coordinate the worldwide data gathering and distribution, as well as setting standards for observational and measurement practices. You can read more at...

<http://www.wmo.int/worldmetday/>

MPR listener question: With the March 19th tornado report from Waseca County being the 2nd earliest in history, were environmental conditions similar on March 18, 1968 when a tornado struck near Truman in northern Martin County near the border with Watonwan County.

Answer: Somewhat similar conditions prevailed for both. Conditions Monday evening, March 19th in Waseca were near summer-like with a temperature in the low 70s F and dewpoints over 60 degrees F (plenty of low level moisture). Winds were blowing from the SE in the 20 to 30 mph range. On March 18, 1968 temperatures were in the mid 60s F, with dewpoints in the 50s F and strong winds of 30-40 mph. The tornado struck near Truman close to 5:30 pm, but was only on the ground for 4 miles. It damaged some farm buildings (winds were estimated at 113-157 mph, about F-2 scale). Fortunately both were short-lived tornadoes.

MPR listener question: Do southerly winds bring warm weather, or does warm weather bring southerly winds?

Answer: For the most part at our latitude and position on the North American Continent, southerly winds bring warm weather. Meteorologists call this warm air advection. Winds blowing from the south usually bring warmer air to our latitudes. These winds may be generated by the approach of a low pressure system to our southwest, or by the retreat of a high pressure system to our east. Often times southerly winds also bring higher dewpoints (humidity) as moisture released from the Gulf of Mexico can migrate north over the southern and central plains states all the way to Minnesota if the winds are persistent and strong enough.

Twin Cities Almanac for March 23rd:

The average MSP high temperature for this date is 44 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 26 degrees F (plus or minus 10 degrees F standard deviation).

MSP Local Records for March 23rd:

MSP weather records for this date include: highest daily maximum temperature of 83 degrees F in 1910; lowest daily maximum temperature of 10 degrees F in 1965; lowest daily minimum temperature of -4 F in 1965; highest daily minimum temperature of 48 F in 1910 and 1920; record precipitation of 1.18 inches in 1966; and record snowfall of 11.6 inches also in 1966. Snow depth was 22 inches on this date in 1951.

Average dew point for March 23rd is 24 degrees F, with a maximum of 54 degrees F in 1945 and a minimum of -21 degrees F in 1974.

All-time state records for March 23rd:

The state record high temperature for this date is 88 degrees F at Montevideo (Chippewa County) in 1910; the state record low temperature for this date is -37 degrees F at Baudette (Lake of the Woods County) in 1965. State record precipitation for this date is 3.87 inches at Isabella (Lake County) in 1979; and state record snowfall for this date is 18.0 inches at Montgomery (Le Sueur County) in 1966.

Past Weather Features:

March 23, 1843 at Old Ft Snelling began with a morning reading of -15 degrees F on the Fort thermometer. That especially cold month brought 22 days with below 0 F

temperature readings, and a monthly high temperature of only 27 degrees F. The monthly mean temperature was 3.9 degrees F, about 42 degrees F colder than the present month of March!

March 23, 1910 was the warmest March day in history. Over 40 communities saw afternoon temperatures climb into the 80s F, topped by 88 degrees F at Montevideo. As far north as Roseau and Warroad it was in the low 80s F, their warmest ever March temperatures. That year, the early spring warmth was a precursor to an intense summer drought.

March 23, 1965 brought record cold temperatures, following a fresh deposit of snow. Ten northern Minnesota communities reported temperatures of -30 degrees F or colder. Hallock in the Red River Valley only warmed up to a high of 3 degrees F that day.

March 22-23, 1966 saw a major winter storm deposit heavy snowfall across the southern and central Minnesota landscape. Bricelyn and Grand Meadow reported a foot of snow, while Mankato reported 13 inches, and Farmington measured 15 inches. Hastings reported 14 inches, Rosemount 14 inches, and the Twin Cities 13.6 inches. Many schools were closed and there were several travel delays.

Outlook:

Warm Saturday under cloudy skies, with a slight chances for showers in the north. Cooler on Sunday, but still warmer than normal. Continued cloudiness early next week and a chance for showers and thunderstorms late Monday through Wednesday. Breezy as well. Then cooler for Thursday and Friday

Further Information:

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Minnesota WeatherTalk for Friday, March 30, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, March 30, 2012

HEADLINES

- Preliminary Climate Summary for March (Whew!)
- Record Warmth in Canada Too!
- A Final Invitation
- Weekly Weather potpourri
- MPR listener question
- Almanac for March 30th
- Past weather
- Outlook

Topic: Preliminary climate summary for March 2012

What a month! More temperature records were broken this month than any month since the Dust Bowl Era of the 1930s. Within the USA it is estimated that 6,500 to 7,000 daily high temperature records were set or tied during the month of March. This compares to only 300-400 new low temperature records during the month, mostly in western states. Across Minnesota climate stations 424 new daily high temperature records were set and 327 new daily warm low temperature records were set in March, including 8 new statewide daily high temperature records,, and for many observers (MSP included) the earliest date for an 80 degrees F reading (March 17). In addition many observers reported the highest dewpoints ever measured in the month of March,

some even in the 60s F. You can see more record setting temperatures at two web sites.....

http://www.climate.umn.edu/doc/journal/mild_march_2012.htm

or

<http://www.ncdc.noaa.gov/extremes/records/>

Mean temperatures for the month ranged from 12 to 18 degrees F warmer than normal. State extremes were 84 degrees F at Madison (Lac Qui Parle County) on March 19th and -18 degrees F at Babbitt and Embarrass on the 6th. Despite a record-setting warm month, Minnesota reported the coldest temperature in the 48 contiguous states on the 4th (-13 F at Bemidji), the 6th (-18 F at Babbitt and Embarrass), and on the 9th (-14 F at International Falls).

Precipitation for the month was mixed with observers reporting above and below normal amounts for March. For those reporting above normal amounts much of this was due to thunderstorm rainfalls. Among those reporting a surplus of precipitation were: 3.33 inchs at Kabetogama; 3.20 inches at Northome; 2.77 inches at International Falls; 2.87 inches at Kimball; 2.62 inches at Park Rapids; 2.87 inches at Hastings; 2.56 inches at Delano; 2.49 inches at Kabetogama; 2.46 inches at Vadnais Lake; 2.58 inches at Redwood Falls; 2.20 inches at Wright; 2.15 inches at New Ulm; 2.11 inches at Beaver Bay and Orr; 2.18 inches at Lanesboro; 2.14 inches in downtown St Paul; 2.12 inches at Lester Prairie; 2.08 inches at Isabella and La Crescent; 2.04 inches at Wolf Ridge; and 2.01 inches at Forest Lake.

Though March snowfall was minimal or totally absent in many parts of southern Minnesota, snowfall on Thursday night into Friday morning (Mar 29-30) up north added to already significant amounts for some northern communities. Isabella reported a March total of 21.5 inches, Wolf Ridge 19.9 inches, Two Harbors 14 inches, Duluth Airport 11.9 inches, and 8.4 inches at International Falls.

March was a windy month as well, with wind speeds over 30 mph on several days. Some observers reported 40 plus mph winds on the 8th, 19th, 26th, and 27th. Rochester reported winds up to 58 mph on the 19th, while Fargo-Moorhead reported winds up to 55 mph on the 27th.

In the end, March was so extraordinarily warm that it advanced phenology by 3 to 4 weeks, bringing some earliest ever ice-out dates to many Minnesota Lakes, including Gull Lake (Mar 26), Crane Lake (Mar 27), Minnewaska (Mar 21), and Mille Lacs (Mar 26). Other signs included early loss of soil frost, some planting of small grains in

the Red River Valley, early leaving out of lilacs and other vegetation, early opening of golf courses, and an early navigation season on the Upper Mississippi River.

Topic: Record Warmth in Canada Too

While much attention has been focused on unusual March weather in the USA, many parts of Canada have recorded their warmest month of March as well. Across the eastern half of Canada scores of communities reported all-time highest maximum temperatures and all-time warmest minimum temperatures. North of the Minnesota border in Manitoba, Winnipeg reported an all-time March temperature maximum of 75 degrees F on the 19th, along with an all-time March dewpoint measurement of 63 degrees F. Brandon, Manitoba reported 8 new daily record high temperatures during March, including 73 degrees F on the 19th. In Ontario, just east of Lake of the Woods, Kenora reported 9 new daily high temperature records, including a reading of 75 degrees F on the 19th, with a record high dewpoint of 60 degrees F on the 18th.

Topic: An Invitation

For those interested in learning and wanting to visit the University of Minnesota, there is a golden opportunity this Saturday (Mar 31). The College of Agricultural, Food, and Natural Resource Sciences is hosting the annual event "Classes Without Quizzes" from 8:00 am to 1:00 pm on the St Paul Campus. I will be speaking about evidence for climate change and its consequences in Minnesota, but there will be many other fine speakers and interesting topics presented as well, including a talk on grapes and the wine industry, the new plant hardiness zones, invasive species, and other great topics. For more information and a chance to register please check out the web site.....

<http://www.cfans.umn.edu/AlumniFriends/Events/CWQ/index.htm>

or call 612-624-0822. Walk-up registrations are welcome too, but you should try to get there between 8:00 and 8:30 am.

Weekly Weather Potpourri:

Following the worst drought in history, many areas of Texas are seeing a very wet start to 2012, almost drought-busting in quantity of rainfall. College Station, TX reports a new monthly record rainfall for March with 8.56 inches, and a year-to-date total of 20.64 inches. The total for the first three months of 2012, exceeds the entire year's worth of precipitation at College Station in 2011 (only 19.04 inches).

Tropical Storm Pakhar was drifting 240 miles off the east coast of Vietnam and expected to strengthen before coming ashore on Saturday. It is expected to pack winds

up to 90 mph with sea waves between 20-25 feet, as it bring heavy rainfall over the weekend.

The International Permafrost Association met in Germany last month to discuss the rapid loss of permafrost in the northern hemisphere revealed in detailed satellite measurements in recent years. As the permafrost disappears the interaction of the land surface with the atmosphere will change significantly in the future releasing more greenhouse gases. It is important to understand how the loss of permafrost will impact the pace of climate change in the polar latitudes. For more on this topic you can read....

<http://www.sciencedaily.com/releases/2012/03/120327093121.htm>

A recent paper from the John Innes Centre on the Norwich Research Park has described the manner in which a plant gene (PIF4) at higher temperatures in the spring binds a molecule (Florigen) to trigger early flowering in many plants. When the temperature is unusually warm this can trigger flowering behavior that is weeks earlier than normal. Much like what we have been observing in Minnesota this month. You can read more about this study at....

<http://www.sciencedaily.com/releases/2012/03/120321143021.htm>

Dr. Jianguo Zhang of the University of North Dakota will receive the prestigious NOAA David S. Johnson Award on Friday, March 30th at the Goddard Memorial Dinner in Washington, D.C. This award recognizes young scientists who develop new techniques and products associated with satellite measurement systems. Dr. Zhang developed a new method to forecast aerosol particles in the atmosphere and a system to assess aerosol assimilation. Congratulations to Dr. Zhang. You can read more at....

http://www.noaanews.noaa.gov/stories2012/032712_davidjohnsonaward.html

MPR listener question: Everyone in my garden club is wondering if a warm March means the last spring frost will come early and we'll have a long growing season in the Twin Cities. What does our climate history show?

Answer: With thanks to Greg Spoden of the MN State Climatology Office I can say emphatically there is no historical correlation between a warm March and final spring frost dates. Here chronologically are the 10 warmest months of March and the associated last spring frost date for the Twin Cities. Bear in mind average final frost date for the Twin Cities in the spring is about April 29th.

1878 final frost April 6
1910 final frost April 25
1918 final frost April 30
1945 final frost May 10
1946 final frost May 13 (with 3" of May snowfall)
1968 final frost May 5
1973 final frost May 17
1987 final frost April 23
2000 final frost April 21
2010 final frost May 9

Despite this lack of correlation, I am sure some gardeners will plant things that are frost sensitive and just cover them if there is a threat of frost in late April or early May.

Twin Cities Almanac for March 30th:

The average MSP high temperature for this date is 47 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 29 degrees F (plus or minus 10 degrees F standard deviation).

MSP Local Records for March 30th:

MSP weather records for this date include: highest daily maximum temperature of 83 degrees F in 1968; lowest daily maximum temperature of 15 degrees F in 1969; lowest daily minimum temperature of -3 F in 1923; highest daily minimum temperature of 54 F in 1967; record precipitation of 1.51 inches in 1933; and record snowfall of 2.4 inches in 1934. Snow depth was 18 inches on this date in 1965.

Average dew point for March 30th is 27 degrees F, with a maximum of 57 degrees F in 1943 and a minimum of -11 degrees F in 1969.

All-time state records for March 30th:

The state record high temperature for this date is 87 degrees F at New Ulm (Brown County) in 1968; the state record low temperature for this date is -28 degrees F at Thorhult (Beltrami County) in 1975. State record precipitation for this date is 3.39 inches at Park Rapids (Hubbard County) in 1933; and state record snowfall for this date is 16.0 inches at Winona (Winona County) in 1934.

Past Weather Features:

March 30-31, 1923 brought a Cold Wave to Minnesota with over 40 communities reporting below zero F readings. Many set record low temperatures on those mornings in the minus teens and minus twenties.

A strong spring storm brought heavy rainfall to parts of Minnesota over March 29-30, 1933. This was one of the heaviest rain storms of the Dust Bowl Era for some observers. Cass Lake reported over a month's worth of rain with 2.00 inches, Fergus Falls reported 2.36 inches, Itasca State Park received 2.65 inches, and Park Rapids had a record 3.39 inches.

The next year, a late winter storm brought heavy snow over March 29-31, 1934. It was the biggest snowfall of the season for some with 10 inches at Fairmont, 12 inches at Albert Lea, 14 inches at Grand Meadow, 16 inches at Rochester, 17.5 inches at Zumbrota, and 19.8 inches at Winona. Schools and roads were closed in some communities.

Summer-like temperatures prevailed on March 30, 1943. Many southern Minnesota observers reported daytime temperatures in the 80s F, topped by 85 degrees F at Bird Island and Pipestone. Another early dose of summer weather came on March 30, 1968 when 30 communities saw the mercury soar to 80 F or higher, topped by 87 degrees F at New Ulm.

With abundant snow on the ground March closed with bitter cold over the 30th and 31st in 1975. Temperatures were well below zero with dangerous windchill conditions in some places. The Twin Cities did not see a 50 F temperature that spring until April 13th.

Outlook:

A warm weekend, with temperatures well above normal. Chance for showers Saturday and Sunday in the north, then a chance for showers and thunderstorms statewide by Monday. Cooler next week, but temperatures will generally remain warmer than normal. Chance for showers and snow northeastern sections on Tuesday, then drier for the rest of the week.

Further Information:

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Minnesota WeatherTalk for Friday, April 13, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, April 13, 2012

HEADLINES

- Hard freeze this week
- Soils still dry
- Weekly Weather potpourri
- MPR listener question
- Almanac for April 13th
- Word of the Week
- Past weather
- Outlook

Topic: Hard freeze this week

Several areas of the state reported morning lows in the teens and twenties F this week, the coldest temperatures since March 9th for many communities. The early spring advancement in vegetative growth had many concerned for plant damage, notably to flowers, trees, and shrubs which had already budded out or bloomed. It remains to be seen how many of the state's apple orchards were adversely affected by the freezing temperatures. Growers are cautiously optimistic that damage to orchards won't be extreme. Some of the minimum temperature observations included: 16 degrees F at Wadena, Windom, and Itasca State Park; 15 degrees F at Babbitt; 14 degrees F at Bemidji, Hallock, and Embarrass; and 13 degrees F at Park Rapids, lowest in the 48

contiguous states on April 11th. You can read more about the low temperatures on our web site at:

http://www.climate.umn.edu/doc/journal/hard_freeze_120410.htm

Topic: Mid-April and still soils are very dry

With field working season underway, and some of the state's 2012 crops already in the ground many Minnesota farmers are waiting for rain to replenish the dry soils that were a carryover from last year. The precipitation deficiency reported by some climate observers is very significant. There are many areas of the state that have reported precipitation totals since last August (a period of 8.5 months) that are more than 7 inches behind normal values for the period. Some of these locations are in the list below, showing how the deficiency for this 8.5 month period ranks historically.

Location; Precipitation Total; Departure from Normal; Historical Rank
(8/1/2011-4/11/2012); (8/1/2011-4/11/2012);

Lamberton; 5.35 inches; -7.51 inches; Driest of record
Winnebago; 8.03 inches; -7.17 inches; Driest of record
Marshall; 4.66 inches; -8.69 inches; 2nd Driest
Granite Falls; 4.89 inches; -7.82 inches; 3rd Driest
St James; 6.35 inches; -7.72 inches; 4th Driest
Canby; 3.97 inches; -8.70 inches; 5th Driest
Zumbrota; 8.96 inches; -7.54 inches; 7th Driest

So far in April, rainfall has been lacking or totally absent in many areas of the state. Rainfall normals for April range typically from 1.50 to 3.00 inches. MSP International Airport in the Twin Cities is one of the few places in the southern half of the state that has received over 0.50 inches so far this month (0.63 inches). In the north some areas have received more, for example 0.75 inches at Orr and 0.70 inches at Cook. Some significant showers are expected this weekend. In fact, on Friday morning some areas of southern Minnesota had already received a half to one inch of rainfall. But the outlook for the remainder of April does not favor abundant rainfall in the state with the possible exception of southeastern counties. So by the end of April we may see these precipitation deficits increase even more.

Weekly Weather Potpourri:

The 10th Annual Larson/Allmaras Emerging Issues in Soil and Water Lecture will take place on the University of Minnesota St Paul Campus next week, April 19th. The lecture program runs from 2:00 to 4:30 pm in Rm 335 Borlaug Hall. Our keynote

speaker is Dr. Ken Cassman from University of Nebraska who will speak about "How to guide agriculture towards sustainable food security." We will also hear remarks from Minnesota Department of Agriculture Commissioner Dave Frederickson. All are welcome to attend.

NOAA announced this week that Coors Field in Denver, CO has become the 4th Major League Baseball Park to be declared a StormReady facility. The other ball parks are Target Field (Twins), Great American Ballpark (Cincinnati Reds), and Busch Stadium (St Louis Cardinals). To be declared and certified as a StormReady facility there must be:

- a 24-hr warning point and emergency operations center
- more than one way to receive severe weather forecasts and warning updates
- a local system that monitors weather conditions continuously
- promotion efforts toward public readiness through community seminars
- a formal hazardous weather plan, utilizing weather spotters and training exercises

I think Target Field was the first MLB ball park to be certified in this program thanks to the Twins meteorologist Craig Edwards.

The National Weather Service announced this week that Anchorage, Alaska has set a new seasonal snowfall record with a total of 134.5 inches, surpassing the season of 1954-1955 (132.6 inches). City snow removal crews worked overtime filling the metro disposal sites to capacity. Many other, smaller communities in Alaska also reported their snowiest season ever.

NOAA-National Weather Service in Chanhassen, MN will promote Severe Weather Awareness Week next week (April 16-20) with daily information about severe weather threats, communication procedures for watches and warnings, recommendations to protect yourself, and a siren drill. It is a good time to check your NOAA Weather Radio and make sure it has fresh batteries.

For those visiting the Washington D.C. area close to Earth Day, NASA scientists will be in place at their tent on the National Mall over April 20-22 to share their Earth Science technologies and explorations. This is a great opportunity to learn more about satellite monitoring, climate modeling, and sample some "hands-on activities." You can learn more at...

<http://www.nasa.gov/topics/earth/features/ed-2012-dc.html>

MPR listener question: With all of the dry, cold air this week around the state, have we set any low dewpoint or humidity records?

Answer: Though the air has been consistently dry we have not seen dewpoints fall below 0 F this week, which would have been record-setting values. The lowest readings in the Twin Cities were 13-14 degrees F, while dewpoints fell as low as 10 degrees F at Marshall. Some afternoon relative humidity readings have ranged from 16 to 19 percent, very desert-like.

Twin Cities Almanac for April 13th:

The average MSP high temperature for this date is 55 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 35 degrees F (plus or minus 9 degrees F standard deviation).

MSP Local Records for April 13th:

MSP weather records for this date include: highest daily maximum temperature of 84 degrees F in 2006; lowest daily maximum temperature of 33 degrees F in 1893 and 1928; lowest daily minimum temperature of 2 F in 1962; highest daily minimum temperature of 61 F in 1941; record precipitation of 0.94 inches in 1991; and record snowfall of 8.5 inches in 1928. Snow depth was 5 inches on this date in 1962.

Average dew point for April 13th is 31 degrees F, with a maximum of 64 degrees F in 1941 and a minimum of -2 degrees F in 1950.

All-time state records for April 13th:

The state record high temperature for this date is 90 degrees F at Wheaton (Traverse County) in 2003; the state record low temperature for this date is -11 degrees F at Roseau (Roseau County) in 1950. State record precipitation for this date is 3.25 inches at St Cloud (Stearns County) in 1862; and state record snowfall for this date is 13.0 inches at Kinbrae (Nobles County) in 1892.

Word of the Week: VisualEyes

This is the name given to the new forecasting service provided by the United Kingdom Meteorological Office and intended to provide accurate, site-specific forecasts for those who manage wind turbines. This system provides map based visualizations of weather attributes on an hour by hour basis out to five days. Temperature, visibility, wind, and precipitation types are some of the forecasted elements needed by wind turbine managers to maximize the efficiency of these systems and to guard them against weather-inflicted damage from extremes. You can read more about it at...

<http://www.metoffice.gov.uk/news/releases/archive/2011/enhancements-to-visualeyes>

Past Weather Features:

April 13, 1862 brought a large spring storm to St Cloud where it rained 3.25 inches. It continued to rain off and on for three more days producing a total of 4.22 inches and accelerating snow melt from the landscape raising the flow on the Mississippi River considerably above flood stage.

April 13-14, 1928 brought a strong spring snow storm to southern Minnesota. Downtown St Paul reported 12.8 inches, Farmington and Maple Plain received 12 inches, while Zumbrota, Faribault, New Ulm, and St Peter reported 10 inches. Following the snowfall overnight temperatures fell into the single digits.

After a snowy first two weeks of the month, April 13th brought record-setting low temperatures to the state in 1950. Many northern communities reported overnight lows ranging from -1 degrees F to -11 degrees F. Duluth reported a 29 inch snow depth on the 13th, while Grand Marais reported 23 inches of snow on the ground during one of Minnesota's coldest and snowiest Apriils.

April 12-13, 1962 saw another large spring snow storm move across the state depositing 6 inches at MSP and New Ulm, over 7 inches at Rochester, Fairmont, and Redwood Falls, and 8.5 inches at Tracy. Pipestone reported 11 inches of snow, a record that still stands.

A strong spring storm brought winds of 60-80 mph with rain, ice, and snow over April 13, 1964. Snow amounts from 6 to 10 inches were reported in NW Minnesota where roads were closed for a time. Ice build up brought down some power lines, and tipped many trees in central counties. A mixture of rain, sleet, and snow brought daily precipitation records to many locations including 2.59 inches at Bemidji, 2.55 inches at Bird Island, 2.40 inches at Itasca State Park, and 2.05 inches at Fergus Falls. In southern Minnesota near Rochester a tornado touched down at 3:00 pm and traveled three miles toward the downtown business district. It unroofed some buildings and broke out many windows. Fortunately there were no injuries or deaths reported.

April 13-14, 2003 brought a mini-heat wave to Minnesota. Strong south winds brought in an warm air mass on the 13th as temperatures soared from morning lows in the 30s and 40s F to afternoon highs in the 70s and 80s F. Wheaton was at the top of the heap with 90 degrees F. Temperatures continued warm into the 14th as over a dozen communities saw the thermometer climb into the 90s F, topped by 94 degrees F at Benson and Milan.

Outlook:

Warmer over the weekend, with a chance for showers and thunderstorms each day. Cooling down on Monday with a chance for rain and/or snow showers. Generally cooler on Tuesday and Wednesday, then a warming trend towards the end of next week. Chances for showers again mid-week as well.

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 for Friday, April 27, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, April 27, 2012

HEADLINES

- Last snow? Maybe not
- Preliminary climate summary for April
- Weekly Weather potpourri
- MPR listener question
- Almanac for April 27th
- Past weather
- Outlook

Topic: Perhaps the season's last snowfall

Earlier the week over April 21-22 a storm system crossed the state bringing snow to many northern Minnesota communities. Some received record-setting values of snowfall, including International Falls which reported 2.4 inches on the 22nd. Others reporting record amounts of snowfall for April 22nd included: Orr with 5.8 inches; Hibbing with 3.5 inches; Kabetogama with 3.0 inches; Northome with 2.7 inches; and Cook with 2.0 inches. The snowfalls at Orr and Kabetogama pushed their seasonal snowfall totals to 71.1 inches and 78.3 inches, respectively. There is a chance of snow overnight Friday and into Saturday morning to start this weekend, but after that the climate outlook favors above normal temperatures through early May, and it is likely this is the last measurable snowfall threat for our region.

Topic: Preliminary climate summary for April

Average temperatures for April have been about 2 to 4 degrees F warmer than normal for the most part. Every month since last October has been several degrees F warmer than normal. Temperature extremes for April ranged from 88 degrees F at Pipestone on the 2nd and 25th to just 3 degrees F at Grand Marais on April 17th. Minnesota reported the coldest temperature reading in the 48 contiguous states on five dates during the month. At International Falls the mean temperature value for April was barely above the mean temperature for March, the first time this has ever happened.

Many observers reported precipitation that was generally above normal. In some areas it was well above normal, with many reports of over 3 inches and some reports of over 4 inches. Both Wadena and Pipestone reported 4.13 inches as of April 26th. The monthly total rainfalls may be added to over the weekend with chances for showers each day. The most snowfall for the month was reported from Orr with 17.5 inches and Kabetogama with 13.7 inches. April was only the second month of the last July (a period of 9 months) to bring above normal precipitation amounts to the state, the other being February.

April also lived up to its reputation as the windiest month of the year, with many days bringing wind gusts of 30 mph or greater. Both Moorhead and Rochester saw 15 days with wind gusts of 30 mph or greater. The Twin Cities had two days when winds peaked over 40 mph, while Rochester had seven such days, including 51 mph on the 15th. In addition to the wind, April brought some thunderstorms, hail, and even tornado reports. Tornadoes were reported in McLeod and Lyon Counties on April 15th, and then on April 21st, between 5:30 pm and 9:40 pm tornadoes were reported from Clay, Wilkin, Otter Tail, Chippewa, Redwood, Douglas, and Swift Counties. Some agricultural structures were damaged by these tornadoes, but overall they were short-lived and did not inflict widespread damage.

Weekly Weather Potpourri:

The NOAA-National Weather Service is seeking comments on its newly designed web site. The public comment period runs until May 18th. If you wish to provide comments to the National Weather Service on the new design and its contents, please go to the "preview" web site:

<http://preview.weather.gov/>

Earlier this week for Earth Day, students helped NOAA launch new ocean drifters, which are 44 pound buoys instrumented to transmit pressure, temperature, and other measurements via satellite as they drift with ocean currents. These measurements help

NOAA scientists gather data from the oceans and better understand the interactions between the oceans and the atmosphere. You can read more at...

http://www.noaanews.noaa.gov/stories2012/20120423_drifter_mauui.html

Earlier this month a team of scientists from the Mayo Clinic established a laboratory at the base of Mt Everest to study the effects of high altitude on human physiology. The team will monitor nine climbers who are attempting to scale Mt Everest. Scientists say that the stress of high altitude exertion puts climbers under the same conditions experienced by patients suffering from heart disease. The Mayo scientists brought 1500 pounds of medical equipment and set up base camp at an elevation of 17380 ft. Weather conditions in May are usually the most suitable for climbing the mountain.

A study published recently in Tree Physiology documents that certain tree species appear to grow better in urban heat islands produced by cities. Tree physiologist Kevin Griffin of Columbia University found that species like red oak grow much better in New York's Central Park than they do in cooler settings along the Hudson Valley. Generally the higher temperatures of the city appear to stimulate more robust growth in some tree species. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/04/120424154341.htm>

MPR listener question: Are the clouds in winter different from the clouds in summer? They seem to me to be different but I am suspicious that my attitude is clouding (pun intended) my vision. In summer clouds appear to me to be beautiful but in winter they appear to be threatening.

Answer: The mixing depth of the atmosphere changes with the seasons and affects cloud formation significantly. During the winter, long nights/short days, we tend to see more layered cloud forms (stratiform), with low ceilings, and little light penetration. During spring, summer, and fall the mixing depth is greater and we see more vertical cloud forms, with a much wider array of shapes and cloud elevations. The sun angle is higher, days are longer and we get many different perspectives on the illumination of the cloud forms, making for magnificent viewing of the sky. Almost any kind of cloud form is possible to see in Minnesota during these seasons.

Clouds can be equally threatening in all seasons of the year. Certainly during the current season when we see wall clouds, squall lines, or massive cumulonimbus clouds we should feel threatened by severe weather. If you want to gain a broader perspective on all cloud forms, I would encourage you to visit the Cloud Appreciation Society web page:

www.cloudappreciationsociety.org

Twin Cities Almanac for April 27th:

The average MSP high temperature for this date is 62 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 41 degrees F (plus or minus 9 degrees F standard deviation).

MSP Local Records for April 27th:

MSP weather records for this date include: highest daily maximum temperature of 85 degrees F in 1977; lowest daily maximum temperature of 34 degrees F in 1950; lowest daily minimum temperature of 21 F in 1909; highest daily minimum temperature of 60 F in 1938 and 1974; record precipitation of 2.22 inches in 1975; and record snowfall of 8.5 inches in 1907. Snow depth was 8 inches on this date in 1907.

Average dew point for April 27th is 36 degrees F, with a maximum of 65 degrees F in 1986 and a minimum of 8 degrees F in 1934.

All-time state records for April 27th:

The state record high temperature for this date is 96 degrees F at Hallock (Kittson County) in 1952; the state record low temperature for this date is 7 degrees F at Halstad (Norman County) in 1909 and at Brimson (St Louis County) in 1996. State record precipitation for this date is 3.76 inches at Cambridge (Isanti County) in 1975; and state record snowfall for this date is 13.0 inches at Lynd (Lyon County) in 1907.

Past Weather Features:

This week in 1826 a massive snow melt flood on the Mississippi River swept away Chief Little Crow's Sioux settlement along the river where South St Paul is now located.

A late spring snow storm brought significant snowfall to many areas of the state over April 27-28, 1907. The Twin Cities received 13 inches; Stillwater reported 11 inches; Farmington received 10 inches; New Ulm reported 8 inches, and Milaca and Park Rapids reported 6 inches of new snow.

April 27, 1909 brought very cold temperatures to the state with over 17 communities reporting overnight lows in the single digits F. It was as cold as 17 degrees F as far south as Pipestone as well. It remained cold and unsuitable for farm field work until a warm up occurred on May 3rd.

The very next year, 1910 brought a Heat Wave over April 27-28 as 80 F temperatures reached nearly all communities across the state. Records were set at Lynd and Winnebago (95 F); Albert Lea, Redwood Falls, and Windom (94 F); Moorhead and St Peter (92 F); Winona (91 F) and Montevideo (90 F).

Just after 3:00 pm on April 27, 1942 an F-3 tornado (winds 158-206 mph) touched down in western Minnesota and traveled 40 miles across Lac Quie Parle, Big Stone, and Traverse Counties. A school near Ortonville was completely destroyed, with only the steps remaining. Two students were killed. There were also reports of widespread farm damage along the path of the storm and seven other people were injured.

April 26 to May 4th of 1952 brought an extended spring Heat Wave to the state. At least 18 communities reached temperatures in the 90s F, with strong southerly winds. Most major rivers were in flood stage during this time, having seen rapid loss of abundant snow cover from the winter.

Rainfall nearly everyday brought a halt to field work around the state the last week of April 1975. From the 26th to the 30th it rained everyday bringing more than 3 inches to Stillwater, Faribault, and Elk River, and over 4 inches to Red Wing, Winona, Rosemount, Hastings, St Paul, and La Crescent.

Outlook:

Cooler than normal temperatures over the weekend with chances for showers and even a little snow early Saturday. More sun on Sunday. Warming trend starts on Monday, with increasing chances for showers and thunderstorms next Tuesday and Wednesday.

Further Information:

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Minnesota WeatherTalk for Friday, May 4, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, May 4, 2012

HEADLINES

- Wet Start to May
- Minnehaha Creek Watershed District Forum
- Brief wrap-up on April precipitation
- New "Puddles" web page
- Weekly Weather potpourri
- MPR listener question
- Almanac for May 4th
- Past weather
- Outlook

Topic: Wet Start to May for Some

Strong thunderstorms crossed the state overnight from May 1st to 2nd producing numerous reports of heavy rainfall, hail, strong winds, and even tornadoes. NOAA Storm Prediction Center received reports of brief tornado touchdowns in Pope and Stearns Counties between 9:00 and 10:00 pm Tuesday night. No serious damage reports from tornadoes were evident. There were numerous reports of strong winds and large hail (1-2 inches in diameter) from many western and southern counties. Sauk Rapids reported wind gusts to 64 mph while Wabasha reported winds up to 74 mph. Many observers reported rainfall from 0.75 inches to 1.50 inches, and some reported new record rainfall amounts for May 2nd. Among the new record amounts

were 2.20 inches at St Francis; 2.10 inches at Elk River; 2.05 inches at Rush City, Slayton, and Windom; and 1.63 inches at Rice. The campus of St Cloud State University reported a rainfall of 3.11 inches,

May 3rd brought more heavy thunderstorms, strong winds and hail to southern Minnesota counties, especially the southeast. Winds up to 70 mph were reported near Harmony. Lake City reported a record rainfall for May 3rd with 1.68 inches, while Zumbrota received a record 2.21 inches and Wabasha received 2.21 inches as well (not a record there). An observer near Zumbrota reported nearly 4 inches of rainfall with a record dewpoint of 67 degrees F. The Cannon River and north branch of the Zumbro River rose dramatically flash flooding in some places. Many observers are well on their way to reporting above normal rainfall for the month of May. Over the first three days of the month Rice reports 3.30 inches, Zumbrota 2.89 inches, Wabasha 3.15 inches, Milaca 2.48 inches, and Elk River with 2.47 inches.

Topic: Announcement of the Minnehaha Creek Watershed Stormwater Adaptation Study Forum, May 15th

Speaking of heavy rainfalls, the Minnehaha Creek Watershed District in the Twin Cities Metro Area is hosting a Forum on Tuesday, May 15th from 6:30 pm to 8:45 pm at the St Louis Park Recreation Center. They will be presenting and discussing objectives associated with their stormwater adaptation study. This is in response to changing precipitation patterns across the area which have not only brought greater annual precipitation, but more frequent episodes of intense, thunderstorm produced extreme rainfall events which pose a serious flash flood threat. I will be presenting a climate perspective and many others will offer perspectives on vulnerability of infrastructure, risk management and community response, including options for storm water management and associated costs. Those interested in attending this meeting can contact Leslie Yetka with the Minnehaha Watershed District (email: lyetka@minnehahacreek.org) or phone 952-641-4524. If you want to learn more, go to.....

<http://www.minnehahacreek.org/projects/studies/weather-extreme-trends>

Topic: Wrap-up on April Precipitation

According to DNR-State Climatologist Greg Spoden in his HydroClim Newsletter, "April 2012 precipitation totals were above normal in portions of west central, north central, and northeast Minnesota. Elsewhere, monthly precipitation totals were near the historical average. It was only the second month since July 2011 where monthly precipitation totals were near to above average." Some of the larger precipitation totals for April included: 4.91 inches at Pipestone (7th wettest April in history); 4.67

inches at Sherburn; 4.66 inches at Caledonia; 4.22 inches at Grand Rapids; 4.13 inches at Spring Grove and Wadena; 4.11 inches at Browns Valley; 4.10 inches at Albert Lea and Wheaton; and 4.09 inches at Grand Meadow. These amounts and others helped bring some relief from prolonged dryness dating back to last summer. Graphics and maps related to April's climate signature can be found at....

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=82555&source=0

Topic: New web resource for recent precipitation reports

Greg Spoden from the State Climatology Office has designed a new web page for viewing maps, graphics and text associated with recent rainfall events in Minnesota. He calls it the "Puddle Page." You can also find access there to stream flow levels on Minnesota watersheds (provided by USGS). To view the page go to.....

<http://climate.umn.edu/doc/journal/puddles.htm>

Weekly Weather Potpourri:

Stan Changnon of the University of Illinois and Illinois Water Survey passed away this week. He was one of the most respected and prolific atmospheric and climate scientists of his generation. He was perhaps the first to study urban climates (St Louis and Chicago) in detail, and to work with the insurance industry in assessing weather and climate risks. Stan was our first Kuehnast Endowment presenter at the University of Minnesota giving a lecture titled "Is Climate Still Important" back in 1993. His son David is a professor of climatology at Northern Illinois University. Stan will be greatly missed by all in the atmospheric and climate science community.

The United Kingdom Meteorological Office reported this week that April was the wettest ever across that country dating back to 1910. Many observers reported over double the normal rainfall for the month, with several reports of 5 inches or more. Liscombe in Somerset reported over 10.5 inches for April. You can read more at...

<http://www.metoffice.gov.uk/news/releases/archive/2011/wettest-april-on-record>

A recent study in the journal Nature Climate Change suggests that large wind turbines in west Texas used for power generation are causing a night-time warming of temperatures. Scientists from SUNY who published the study suggest that turbulence in the wake of the large turbine blades pulls down warmer air aloft towards the surface, disrupting development of an overnight inversion and keeping warm air near

the surface of the ground. This is one of the first studies to document microclimatic effects of wind turbines in the natural environment. You can read more about it at...

<http://www.sciencedaily.com/releases/2012/04/120430152045.htm>

For horse racing fans a climatology of the Kentucky Derby (all 137 years) has been made available by the National Weather Service Forecast Office in Louisville, KY. The 138th running of this race is scheduled for this Saturday (May 5th), and the forecast calls for temperatures in the mid 80s F with a chance for thunderstorms. The coldest temperature was 47 degrees F in 1957, and the warmest 94 degrees F in 1959. You can read more at...

http://www.crh.noaa.gov/lmk/?n=historical_kentucky_derby_weather

MPR listener question: Any correlation between the full moon and overnight frost in Minnesota?

Answer: We have had this question before, but the answer is the same. There are no studies that document a significant correlation of the full moon dates with spring and fall frost dates in Minnesota. It does occasionally happen, but certainly with no consistency. This correlation has been examined by many from several geographic regions of the world and I honestly don't know if it is significant anywhere on Earth

Twin Cities Almanac for May 4th:

The average MSP high temperature for this date is 66 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 44 degrees F (plus or minus 9 degrees F standard deviation).

MSP Local Records for May 4th:

MSP weather records for this date include: highest daily maximum temperature of 91 degrees F in 1952; lowest daily maximum temperature of 40 degrees F in 1890; lowest daily minimum temperature of 22 F in 1967; highest daily minimum temperature of 65 F in 1934; record precipitation of 1.74 inches in 1944; 2.0 inches of snowfall in St Paul in 1890 and there was a trace of snow in 1907 and 1944.

Average dew point for May 4th is 40 degrees F, with a maximum of 73 degrees F in 1912 and a minimum of 13 degrees F in 1957.

All-time state records for May 4th:

The state record high temperature for this date is 96 degrees F at Wheaton (Traverse County) and Montevideo (Chippewa County in 1949 and at Springfield (Brown County) in 1952; the state record low temperature for this date is 8 degrees F at Cloquet (Carlton County) in 1911. State record precipitation for this date is 4.00 inches at Blanchard Power Station (Morrison County) in 1949; and state record snowfall for this date is 5.0 inches at Mankato (Blue Earth County) in 1890.

Past Weather Features:

May 4-5, 1890 brought a rare late spring snowfall. Mankato reported 5 inches, Le Sueur 4 inches, Duluth 2.5 inches, and downtown St Paul 2.0 inches.

A hard freeze prevailed on May 4, 1907. Mora and Long Prairie reported morning lows of just 15 degrees F, while Hinckley had just 16 degrees F and New London 17 degrees F. As far south as Zumbrota was as cold as 19 degrees F.

Another hard freeze occurred in many places on May 4, 1911. Clouquet reported a low of 8 degrees F, while Littlefork measured 16 degrees F and Warroad 17 degrees F. It was as cold as 27 degrees F at St Peter.

May 4, 1926, a typical Minnesota spring day. The temperature rose from 32 degrees F in the morning to an afternoon high of 89 degrees F at Morris.

May 4-6, 1949 was a hot, sultry spell over central Minnesota bringing 90 degrees F to many cities. It also brought daily thunderstorms which deposited a month's worth of rain in many places, including 4.77 inches at Brainerd, 4.39 inches at Blanchard Power Station (Morrison County), 4.33 inches at Onamia, 4.29 inches at Aitkin, and 3.94 inches at Gull Lake.

The first five days of May in 1952 brought a Heat Wave with many temperatures in the 90s F. Finally on the 6th temperatures dropped back into the 60s F bringing some relief to farmers who were busy with corn planting that week.

May 1-7, 1954 was the snowiest week of May in Minnesota history. Temperatures hovered in the 20s and 30s F up north with daily snow showers and snow flurries. Snowfall totals for the week ranged from 4 inches at Crookston to 17.8 inches at Virginia, where the snow depth was 14 inches on May 4th! Snow was measured (1 inch) as far south as Austin.

Outlook:

Warm to start the weekend as many places should reach the 70s F. Chance for showers and thunderstorms later in the day on Saturday, then more showers and thunderstorms for Sunday with cooler temperatures. Better chance for showers in southern counties. Continued chance for showers Monday and again by Wednesday with near normal to below normal temperatures.

Further Information:

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Minnesota WeatherTalk for Friday, May 11, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk for Friday, May 11, 2012

HEADLINES

- Record setting rainfall the first week of May
- Minnehaha Creek Watershed District Forum, May 15th
- Brief tornado near Kiester
- Weekly Weather potpourri
- MPR listener question
- Almanac for May 11th
- Term of the Week
- Past weather
- Outlook

Topic: Record rainfalls for some to start early May

According to the NOAA National Climatic Data Center over the first 7 days of May, Minnesota weather observers reported 62 new daily rainfall records, an exceptionally large quantity of records for such a short period of time. Some examples of the record amounts of rainfall include:

May 1st: 1.73 inches at St Cloud Airport

May 2nd: 2.05 inches at Windom and 2.10 inches at Elk River

May 3rd: 2.21 inches at Zumbrota and Wabasha

May 4th: 1.70 inches at Amboy

May 5th: 2.41 inches at Winnebago and 2.33 inches at Sherburn

May 6th: 2.78 inches at Marshall, 2.86 inches at Hawley, 3.06 inches at Redwood Falls, 3.50 inches at Hastings, and 3.62 inches at Pipestone

The 3.62 inches of rainfall reported at Pipestone on May 6th was a new state record for the date, beating the 3.48 inches that fell at Minneota on May 6, 1983.

Many observers now report over 4 inches of rainfall for the month, and some have already totaled over 5 inches. Those over 5 inches include Springfield (5.34"), Hastings (5.18"), and Pipestone (5.90").

The abundant rainfall has alleviated drought across southern and western Minnesota. Earlier this spring up to 33 Minnesota counties were designated to be in severe drought by the U.S. Drought Monitor. In Thursday's release (May 10) of a new drought update, only a small portion of Cook County is left in severe drought. For the most part soils have been recharged with near normal moisture levels, and Minnesota's streams and rivers have risen with the recent abundant rainfall. According to the USGS flows on many southern Minnesota watersheds have risen above the 75th percentile mark.

Topic: Still Room at the Minnehaha Creek Watershed Stormwater Adaptation Study Forum, May 15th

Speaking of heavy rainfalls, the Minnehaha Creek Watershed District in the Twin Cities Metro Area is hosting a Forum on Tuesday, May 15th from 6:30 pm to 8:45 pm at the St Louis Park Recreation Center. They will be presenting and discussing objectives associated with their stormwater adaptation study. This is in response to changing precipitation patterns across the area which have not only brought greater annual precipitation, but more frequent episodes of intense, thunderstorm produced extreme rainfall events which pose a serious flash flood threat. I will be presenting a climate perspective and many others will offer perspectives on vulnerability of infrastructure, risk management and community response, including options for storm water management and associated costs. Those interested in attending this meeting can contact Leslie Yetka with the Minnehaha Watershed District (email: lyetka@minnehahacreek.org) or phone 952-641-4524. If you want to learn more, go to.....

<http://www.minnehahacreek.org/projects/studies/weather-extreme-trends>

Topic: A brief tornado near Kiester, MN

Reports showed that an EF-0 tornado (winds 65-85 mph) touched down on the evening of May 4th (Sunday) near Kiester, MN (Faribault County). It traveled for about four miles, damaging some trees, barns, and farm outbuildings. This was the 4th date so far this year that tornadoes have been reported in Minnesota.

Weekly Weather Potpourri:

Mount Washington Observatory in New Hampshire (elevation 6280 ft) is one of the world's unique climates, noted for extremes of temperature and wind. Their recent monthly climate report for April shows that they recorded ten days during the month with wind speeds of 80 mph or greater, topped by 96 mph on the 23rd. On April 28th they reported a morning low of 4 degrees F with an afternoon high of 14 degrees F and wind speeds that averaged over 60 mph. Don't even ask what the windchill index was!

The National Weather Service in Phoenix, AZ reported a combination of dust storm and thunderstorm on Wednesday afternoon (May 9) this week. Between 4:00 pm and 6:00 pm winds gusted between 40 and 60 mph stirring up clouds of dust, which was later washed out of the air by thunderstorms rainfall though it only amounted to 0.03 inches.

With the exceptional early ice-out dates this year, the Minnesota DNR was received numerous questions about the effects on the fishing season, including the Fishing Opener (May 12). You can read their press release with remarks from fisheries biologists Mike Duval and Tom Jones at.....

<http://news.dnr.state.mn.us/2012/05/03/early-ice-out-what-does-it-mean-for-the-walleye-opener/#more-8676>

NASA scientists using a new fire forecast model developed from the MODIS satellite data base have predicted a mild fire season for the Amazon Forest encompassed by parts of Brazil, Bolivia, and Peru. This is the first use of the new fire forecast model which will be further evaluated this year. You can read more about this at....

<http://www.sciencedaily.com/releases/2012/05/120510225006.htm>

MPR listener question: On average in Minnesota which month brings the highest frequency of hail?

Answer: For most of Minnesota the peak hail season is centered on June 1st, so May and June are the months mostly likely to bring hail for most of the state. Historically

there have been reports of hail in all 12 months of the year, though they are very rare from November through February.

Twin Cities Almanac for May 11th:

The average MSP high temperature for this date is 66 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 46 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for May 11th:

MSP weather records for this date include: highest daily maximum temperature of 88 degrees F in 1900; lowest daily maximum temperature of 40 degrees F in 1914 and 1966; lowest daily minimum temperature of 27 F in 1946; highest daily minimum temperature of 64 F in 1881, 1915, and 1922; record precipitation of 1.55 inches in 1935; record 2.8 inches of snowfall in 1946.

Average dew point for May 11th is 40 degrees F, with a maximum of 66 degrees F in 1922 and a minimum of 14 degrees F in 1946.

All-time state records for May 11th:

The state record high temperature for this date is 98 degrees F at Lambertton (Redwood County) in 1987; the state record low temperature for this date is 11 degrees F at Fosston (Polk County) in 1946. State record precipitation for this date is 4.60 inches at Crookston (Polk County) in 1922; and state record snowfall for this date is 3.0 inches at Isle (Mille Lacs County) in 1966.

Term of the Week: UTCI

The current issue of the International Journal of Biometeorology is devoted to the Universal Thermal Comfort Index (UTCI), an international effort by scientists to derive a comfort index related to human physiology and apparel that takes into account temperature, humidity, wind, and radiation factors that combine to effect our thermoregulation. Perhaps with time government weather services around the world will adopt this UTCI and use it in public forecast products. You can read more about it at...

<http://www.springerlink.com/content/0020-7128/56/3>

Past Weather Features:

Around 8:30 pm on May 11, 1896 an F-2 tornado (winds 113-157 mph) touched down near Worthington, MN. It cut a short half mile long path through town and damaged at least 11 homes, but there were no fatalities and just one injured person was reported.

May 11-13, 1900 brought above normal temperatures to the state of Minnesota with at least 15 communities reporting daytime highs of 90s degrees F or greater.

Strong thunderstorms brought heavy rains to northwestern Minnesota on May 11, 1922. Crookston reported over 4.5 inches of rain, Ada received 2.90 inches, Roseau 1.99 inches, and Hallock 1.75 inches. Some crop fields had to be replanted.

A little past 6:00 pm on May 11, 1937 an F-2 tornado (winds 113-157 mph) traveled 20 miles in the rural landscape between North Mankato and St Peter. It damaged some barns and other farm buildings, but no fatalities or serious injuries were reported from the storm.

May 11, 1946 brought a hard freeze to many parts of Minnesota damaging some agricultural crops, orchards, and gardens. Low temperatures ranged from 16 to 25 degrees F. The cold weather also brought some rare May snowfall over May 11-12. The Twin Cities reported 3 inches, while Bird Island, Elk River, and Moorhead also reported measurable snowfalls.

May 11, 1966 brought measurable snowfall to many central Minnesota communities, including Isle, Moose Lake, and Aitkin. It was very short-lived as temperatures climbed into the 50s F the next day.

Severe weather visited Minnesota on May 11, 1985. Hail and strong winds were reported in western counties, and a brief tornado touchdown near Osakis in Douglas County. Some northern observers reported record-setting rainfalls with 3.95 inches at Georgetown, 2.50 inches at Red Lake, 2.48 inches at Waskish, and 2.22 inches at Big Falls. In some areas roads were washed out by the heavy rain.

Outlook:

Nice spring weekend coming up with near normal temperatures and mostly sunny skies. It should be fine for both the Fishing Opener (Sat) and Mother's Day (Sun). Warming trend begins on Sunday and carries into next week, with mostly above normal temperatures and dry conditions until a chance for rainfall emerges on 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, May 18, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, May 18, 2012

HEADLINES

- Very dry air this week
- A cold morning on May 16th
- NOAA CPC climate outlook
- Weekly Weather potpourri
- MPR listener question
- Almanac for May 18th
- Past weather
- Outlook

Topic: Very dry air this week

Following a wet first ten days of the month, May turned quite dry this week, with low dewpoints and high evaporation rates (0.25 to 0.35 inches on May 14). Montevideo (Chippewa County) reported some record-setting low daily humidity readings over May 12-16. Afternoon air temperature and relative humidity are noted for each day:

May 12 70 degrees F with RH of 7%
May 13 75 degrees F with RH of 11%
May 14 88 degrees F with RH of 4%

May 15 72 degrees F with RH of 12%

May 16 73 degrees F with RH of 14%

These humidity readings at Montevideo were the equivalent of those at Tucson, Arizona this week. Many Minnesota citizens were using moisturizing creams and chapstick.

Topic: Cold morning on May 16th

After a very warm Monday this week (afternoon temperatures ranged from 86 F to 90 F in western Minnesota), Minnesota reported the coldest temperature in the 48 contiguous states on Wednesday morning (May 16) with a reading of 24 degrees F at Embarrass, the first time this month that the state has reported the coldest reading. Many observers reported overnight lows in the 20s F on May 16th including 28 degrees F at Warroad, Cook, Hibbing, Bigfork, Ely, Grand Marais, and Kabetogama, 27 degrees F at Orr, Silver Bay, and Crane Lake, and 26 degrees F at International Falls. These overnight readings represent new record lows for May 16th at Kabetogama and Orr, and ties the record low for Crane Lake.

Topic: NOAA CPC Climate Outlook

On Thursday, May 17, NOAA-Climate Prediction Center release a new climate outlook for June through August. The outlook suggests equal chances for warmer or colder than normal temperature conditions over the summer in Minnesota. It also suggests equal chances for a wetter or drier than normal summer.

Weekly Weather Potpourri:

The May 16th report from the Amundsen-Scott Weather Station at the South Pole (Antarctica) was -77 degrees F with an east wind of 10-15 mph and a windchill of -114 degrees F.

The NOAA National Hurricane Center in Miami, FL was issuing advisories this week on the first Tropical Storm of the 2012 season in the Eastern Pacific. Tropical Storm Aletta was generating winds of 40 mph and sea waves of 12 feet as it moved westward well off the coast of Mexico. It is expected to dissipate over the next several days.

Scientists from the University of Utah and Harvard University have developed a new way to estimate carbon dioxide emissions based on measured pattern detection in the atmosphere. This technique may be further refined to be used as a compliance validation measurement system should an international treaty ever be invoked that

forces reduction in carbon dioxide emissions over specified periods of time. You can read more about their work at....

<http://www.sciencedaily.com/releases/2012/05/120514152950.htm>

MPR listener question: How much does a large thunderstorm cloud weigh? It must contain a lot of water.

Answer: Thomas Schlatter, a NOAA scientist and contributor to Weatherwise magazine addressed this question in a past issue. Of course the answer is highly dependent on cloud volume. But consider a cumulus cloud with a volume of one cubic mile (1 mile wide, 1 mile long, and 1 mile deep) and a water content of 1 gram/cubic meter. This would calculate to a weight of about 9 million pounds (nearly 1.1 million gallons). That's quite a load to remain suspended in the atmosphere, but of course it does, primarily because of the droplet size and the updraft winds that hold these water droplets aloft until they reach a critical mass.

Twin Cities Almanac for May 18th:

The average MSP high temperature for this date is 69 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 49 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for May 18th:

MSP weather records for this date include: highest daily maximum temperature of 91 degrees F in 1911; lowest daily maximum temperature of 45 degrees F in 1890; lowest daily minimum temperature of 27 F in 1915; highest daily minimum temperature of 68 F in 1911; record precipitation of 1.57 inches in 1892; record 3.0 inches of snowfall in 1915.

Average dew point for May 18th is 46 degrees F, with a maximum of 72 degrees F in 1998 and a minimum of 19 degrees F in 2002.

All-time state records for May 18th:

The state record high temperature for this date is 101 degrees F at Fairmont (Martin County) and Pipestone (Pipestone County) in 1934; the state record low temperature for this date is 16 degrees F at the Duluth Experimental Farm (St Louis County) in 1924. State record precipitation for this date is 5.01 inches at Lanesboro (Fillmore County) in 2000; and state record snowfall for this date is 3.0 inches at Minneapolis (Hennepin County) in 1915.

Past Weather Features:

May of 1892 was one of the wettest in Twin Cities history. It rained everyday from 13th to the 21st (totaling nearly 4 inches). Farmers were late in planting crops that year because it rained on 18 days during the month. Many observers reported 6-8 inches of rainfall for the month, and Northfield reported nearly 10 inches.

May 18, 1915 brought cold and snow to many places in the state. Park Rapids and Caledonia observers reported 1 inch of snowfall, while Taylors Falls reported 1.5 inches. In Minneapolis an observer recorded 3 inches of snowfall, still a record for the date.

About 8:30 pm on May 18, 1918 an F-2 tornado (winds 113-157 mph) moved 8 miles across the rural landscape of Big Stone County in western Minnesota. It damaged buildings on 30 farms, but caused no injuries.

May 17-18, 1968 brought snow to many northern Minnesota communities, in one of the latest spring snow storms on record. Duluth reported 3.6 inches, Grand Rapids 3.0 inches, and Mahnomen 2.0 inches. As far west as Milan (Chippewa County) reported 0.5 inches. Temperatures warmed into the 50s and 60s F the next day so the snow was very short-lived.

May 18, 2000 brought heavy thunderstorms and flash flooding to many southern Minnesota communities. Jackson, St Peter, Wells, Grand Meadow, Hokah, Preston, Rushford, and Rochester measured over 4 inches of rain. Huge drifts of hail stones piled up near Mankato and there was reported crop damage in many areas. Many roads were closed, one due to a mud slide in Winona County.

Most recently on May 18, 2002 a hard freeze visited many northern Minnesota communities. Many areas saw morning lows in the 20s F, while Tower reported just 18 degrees F and Embarrass was the coldest with 17 degrees F.

Outlook:

Generally a warm Saturday with chances for showers and thunderstorms. Cooling down on Sunday and Monday with a continued chance for showers. Drier on Tuesday. Warmer with another chance for showers by Thursday next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, May 25, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, May 25, 2012

HEADLINES

- Warm days
- Heavy rains May 23-24
- Weekly Weather potpourri
- MPR listener question
- Almanac for May 25th
- Past weather
- Word of the Week
- Outlook

Topic: Warm days in May

May 18th (last Friday) brought a warm day to the state with many observers reporting daytime highs in the 90s F, the warmest May 18th since 1998. Madison topped the list with a record-setting 97 degrees F. Other climate stations setting new temperature records on May 18th included: 95 degrees F at Browns Valley; 93 degrees F at Moorhead; 92 degrees F at Park Rapids; and 94 degrees F at Wheaton.

May 22-23 brought more record high temperatures to the region just ahead of heavy thunderstorms. Fargo, ND set a record on the 22nd with 93 degrees F. Then more record highs were set on Wednesday, May 23rd, including 92 degrees F at Amboy, 89

degrees F at MSP and Austin, and 87 degrees F at Lakefield (tied 2010). Strong south winds ushered in very moist air across the state on the 23rd. Between 8:00 pm and 9:00 pm the dewpoint at MSP Airport rose from 51 degrees F to a sticky 65 degrees F.

Topic: Heavy rains on May 23-24

Strong winds, hail, and very heavy thunderstorm rainfall visited the state over May 23-24 this week. Wind gusts to 75 mph were reported from New Ulm, and 71 mph at New Prague. Some western and southern counties reported half to one inch diameter hail as well.

The real story was in the number of reports of heavy rainfall, with many observers reporting 2 to over 5 inches. Those reporting record-setting rainfalls included: 4.77 inches at Buffalo; 3.46 inches at Gaylord; 3.81 inches at Glencoe; 2.58 inches at MSP Airport; 2.89 inches at Two Harbors; 3.64 inches at Waconia; 3.01 inches at Andover; 3.50 inches at Elk River; 2.12 inches at Floodwood; 2.87 inches at Forest Lake; 2.88 inches at New Ulm; 2.76 inches at Lakefield; 2.90 inches at Windom; and 3.50 inches at St Francis. Many other observers reported record-setting amounts of rainfall as well, adding to already above normal amounts for May. It was one of the heaviest doses of 24 hour rainfall ever measured in the state during the month of May, the amount of 4.77 inches at Buffalo (Wright County) breaking the all-time state record rainfall for May 24th (formerly 3.60 at Long Prairie in 1939).

Monthly total rainfall for May now exceeds 7 inches at many locations around the state including: Buffalo, Chaska, MSP, Hastings, Hutchinson, New Ulm, Milaca, Mora, Springfield, Jordan, Andover, Forest Lake, Chanhassen, Lakefield, Pipestone, Windom, Lamberton, and Rockford. The 8.18 inches at MSP airport marks the 2nd wettest all-time May (record is 10.33 inches in 1906) and wettest since 1965. The National Weather Service Forecast Office in Chanhassen has reported 9.22 inches of rainfall so far in May. This total is getting close to the state record rainfall for May of 11.70 inches at Winnebago back in 1908. So, with more rainfall forecast for the last week of the month, the record amount for May may be surpassed.

With one week to go in the month, May of 2012 on a statewide basis already ranks among the ten wettest dozen in state history. It is likely that these rainfall totals will be added to by the end of the month.

Weekly Weather Potpourri:

The National Oceanic and Atmospheric Administration is predicting a near-normal Atlantic Hurricane Season given the present atmospheric and oceanic measurements and patterns. This means 9-15 named storms with 4 to 8 of those strong enough to

reach hurricane status. Further, 1 to 3 of these storms may reach major hurricane status (category 3 or higher). You can read more at....

http://www.noaanews.noaa.gov/stories2012/20120524_atlantic_hurricane_season.html

Two major storms were operating in tropical waters this week. Typhoon Sanvu was spinning south of Japan in the western Pacific Ocean. It was producing wave heights over 30 feet with winds up to 90 mph and higher gusts. Sanvu is expected to weaken over the weekend as it pulls away from Japan to the east. It is not expected to make landfall. Hurricane Bud, the second named storm of the hurricane season, was off the west coast of Mexico in the Eastern Pacific Ocean with winds close to 110 mph and sea waves near 30 feet. It is expected to weaken towards the weekend, before making landfall. Bud will likely bring 6 to 10 inch rains to some coastal communities in Mexico.

Dr. Rick Knabb, former hurricane expert with The Weather Channel, was named last week as the new Director of the NOAA National Hurricane Center in Miami, FL. He replaces the retiring director Bill Read. Dr. Knabb returns to NOAA where he previously served as Deputy Director of the Central Pacific Hurricane Center in Hawaii. You can read more about him at....

http://www.noaanews.noaa.gov/stories2012/20120518_Rick_Knabb.html

The National Weather Service Forecast Office in Indianapolis has provided a climatology for the Indianapolis 500 Motor Race which takes place this Sunday (May 27th). The warmest race day was in 1937 with 92 degrees F, while the coldest race day was 1992 with just 58 degrees F. You can find more detail about historical weather for the race at....

http://www.crh.noaa.gov/ind/print_localdata.php?loc=txtdat&data=Indy500.txt

The National Weather Service has declared Friday, 25 May 2012, as Heat Awareness Day across the nation. For more information, including safety measures for children in motor vehicles and too much outdoor exposure when Heat Index Values are over 100 degrees you can consult the National Weather Service's webpage.....

<http://www.nws.noaa.gov/om/heat/>

MPR listener question: Two listeners wrote with a question about winds: High winds have limited the use of herbicides so far this crop season. Have wind speeds been higher than usual this month and for the spring season so far?

Answer: As a reminder to readers, at most climate stations in Minnesota April and May are two of the windiest months of the year based on historical mean values of wind speed. Using the MSP Airport measurements for frame of reference, mean wind speeds during March, April, and May have been near average or slightly below average this year. However, that is deceiving relative to the frequency of high wind gusts, which have been highly unusual in frequency. Listed below are the number of days with wind gusts greater than 30 mph, 40 mph, and 50 mph for the months of March, April, and May (so far) from MSP International Airport, along with the peak wind gust speed in parentheses:

March: 9 days with wind gusts of 30 mph or greater; 4 days with wind gusts of 40 mph or greater (peak 47 mph)

April: 14 days with wind gusts of 30 mph or greater; 2 days with wind gusts of 40 mph or greater (peak 44 mph)

May: 16 days with wind gusts of 30 mph or greater; 6 days with wind gusts of 40 mph; 2 days with wind gusts of 50 mph (peak 58 mph)

Normally these months bring wind gusts greater than 30 mph on only 5 or 6 days. Further very strong wind gusts have been reported this May at other locations around the state, including: 58 mph at Redwood Falls; 54 mph at Duluth; 46 mph at St Cloud and Rochester; and 45 mph at Mankato.

Twin Cities Almanac for May 25th:

The average MSP high temperature for this date is 72 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 51 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for May 25th:

MSP weather records for this date include: highest daily maximum temperature of 94 degrees F in 1978; lowest daily maximum temperature of 48 degrees F in 1904; lowest daily minimum temperature of 33 F in 1901; highest daily minimum temperature of 70 F in 1914; record precipitation of 1.76 inches in 1916; no snowfall on this date.

Average dew point for May 25th is 47 degrees F, with a maximum of 72 degrees F in 1916 and a minimum of 23 degrees F in 1934.

All-time state records for May 25th:

The state record high temperature for this date is 100 degrees F at Luverne (Rock County) in 1967; the state record low temperature for this date is 19 degrees F at Tower (St Louis County) in 1983. State record precipitation for this date is 4.32 inches at St James (Watonwan County) in 1953; and state record snowfall for this date is 4.0 inches at Baudette (Lake of the Woods County) in 1970.

Past Weather Features:

May 24-25, 1953 brought strong thunderstorms to southern Minnesota. Heavy rains flooded farm fields and roads, and many creeks and drainage ditches filled with runoff water. Some of the rainfall amounts included: 4.32 inches at St James; 4.28 inches at Pipestone; 3.52 inches at Windom; 3.34 inches at Comfrey; and 2.87 inches at Winnebago.

May 25-26, 1967 brought a heat wave to southern Minnesota as 24 communities reported afternoon highs in the 90s F. A strong cold front dropped temperatures into the 60s and 70s F on May 27th.

May 25, 1970 brought a late spring snow storm to north-central Minnesota where Baudette reported 4 inches, Big Falls reported 2.0 inches, and International Falls received 0.3 inches. The snow was followed by cold Canadian high pressure keeping daytime temperatures down into the 40s and 50s F over May 25-28.

May 25, 1983 brought a late spring hard freeze to northern counties as over 30 communities reported morning lows in the 20s F. In the Red River Valley some crops had to be replanted.

Word of the Week: ACE

This acronym stands for Accumulated Cyclone Energy (ACE) index which is used by the United Kingdom Meteorological Office to estimate the seasonal number of tropical storms in the North Atlantic. Using the ACE index the UK Met Office predicts 7-13 named storms for the 2012 season (June through November), with a most likely value of 10. This is slightly less than the seasonal average of 12. You can read more about the ACE index at....

<http://www.metoffice.gov.uk/news/releases/archive/2012/tropical-storm-forecast>

Outlook:

An unsettled weekend weather wise with mostly cloudy skies and roller coaster temperature pattern. Showers and thunderstorms are likely each day, with a warm and

sultry day on Sunday as temperatures reach the 90s F in some locations. Cooler temperatures by Monday and cooler yet on Tuesday but drier. Chances for showers return on Wednesday and Thursday next week to conclude the wet May.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, June 1, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 1, 2012

HEADLINES

- Preliminary Climate Summary for May 2012
- Strong, persistent, warm temperatures
- Cold May 31st
- Weekly Weather potpourri
- MPR listener question
- Almanac for June 1st
- Past weather
- Outlook

Topic: Preliminary Climate Summary for May 2012

In the simplest of terms May was warm and wet. Mean temperatures for the month were 2 to 5 degrees warmer than normal, with several days in the 90s F. The extremes for the month were 97 degrees F at Madison on the 18th, and just 24 degrees F at Brimson and Embarrass on the 16th. Minnesota reported the coldest temperature in the nation just twice during the month.

Rainfall during May was abundant and above normal in all areas of the state except the northwest. Many individual climate observers saw their wettest ever May. Some of these included:

Pipestone with 11.06 inches
Windom with 10.83 inches
Lamberton with 9.87 inches
Hawley 6.72 inches
Floodwood 9.14 inches
New Ulm with 12.39 inches
Milaca with 10.46 inches
Sandstone 10.84 inches
Forest Lake with 11.29 inches
Chanhassen with 11.21 inches
Chaska with 10.69 inches

For many observers over half the days of May brought measurable rainfall (16-18 days), and there were many heavy thunderstorms. Overall, taking the average of all rainfall observations in the state it was the 4th wettest May of all time, averaging near 6 inches of rainfall. Only 1938, 1962, and 1908 were wetter on a statewide basis.

Another unusual feature of May was the frequency of strong winds. MSP Airport reported wind gusts over 30 mph on 19 days during the month, and six days with gusts over 40 mph. Some maximum wind gust during the month included: 58 mph at MSP; 62 mph at Alexandria; 69 mph at Rochester; and 74 mph at St Cloud.

Topic: Strong, persistent warm temperatures

Since June of 2011, 10 of 11 months have brought warmer than normal temperatures to Minnesota. According to Pete Boulay of the Minnesota State Climatology Office, this is the warmest spring ever (March-May) for some observers, including St Cloud, MSP, and Rochester among others. You can read more about the warm spring at....

http://www.climate.umn.edu/doc/journal/warm_spring2012.htm

In addition because January and February were warmer than normal as well, the first five months of 2012 (Jan-May) tie 1987 for the warmest such period in history. For the Twin Cities nearly 70 percent of all days in 2012 so far have seen above normal temperatures.

Topic: Cold May 31st

The month of May ended with some record-setting cold temperatures up north. International Falls tied their record low for May 31st with a reading of 29 degrees F. Grand Marais set a new record low with 28 degrees F, while Crane Lake reported a new record low as well with the same reading. Though not record-setting for the date

Embarrass and Silver Bay reported lows of 27 degrees F, the coldest readings in the USA that day.

Weekly Weather Potpourri:

The Joint Typhoon Warning Center was monitoring tropical storm Mawar located east of the Philippines this week in the western Pacific Ocean. This system is expected to develop into a typhoon over the weekend producing winds up to 100 mph and wave heights up to 20 feet. It is expected to remain out to sea, but bring heavy rains to parts of southern Japan next week.

The Social Brands 100 list was released this week. It is a ranking of brands (products and services) most commonly referenced and utilized by the social media (Facebook, Twitter, YouTube, Google, and blogs). Among the top ten was the United Kingdom Meteorological Office, the highest ranking service brand was ranked 9th. Just like our National Weather Service they have been striving to garner more public engagement through the use of social media. You can read more about this at...

<http://www.metoffice.gov.uk/news/releases/archive/2012/met-office-social-brands-100>

NOAA released a new science fact sheet this week, "Atlantic Hurricanes, Climate Variability and Global Warming." You can find copies on the web at....

http://nrc.noaa.gov/plans_docs/SoS_Fact_Sheet_Hurricanes_and_Climate_FINAL_May2012.pdf

Mid-summer like temperatures are arriving in some parts of the northern hemisphere this week, as Blythe (CA), Imperial (CA), and Needles (CA) hit 112 degrees F, while Yuma (AZ) and Parker (AZ) hit 113 degrees F and 114 degrees F, respectively. Elsewhere, parts of Iran and Pakistan reached 119 degrees F this week, while Mecca in Saudia Arabia saw the thermometer climb to 122 degrees F, with more hot weather expected into the weekend.

NASA announced this week that it will use its pilot-less research aircraft, "Global Hawks" to fly over hurricanes and make specialized measurements to help better understand the dynamics of their formation, intensification, and dissipation. These aircraft can fly at altitudes of 60,000 ft. You can read more about the use of these aircraft at....

<http://www.sciencedaily.com/releases/2012/06/120601123402.htm>

MPR listener question: With all the rain this month, have most Minnesota rivers risen to normal or above normal flows?

Answer: Yes, indeed. The Mississippi River basin, Minnesota River Basin, and St Croix River Basin have all risen to normal or higher than normal volumes of flow. Even some of the northeastern Minnesota watersheds which had been extremely low, like the Pigeon River, have risen to above normal flow levels. The only section of the state showing some below normal flow levels are some of the smaller watersheds along the Red River Valley, including the Marsh River, Thief River, Wild Rice River, and Roseau River.

Twin Cities Almanac for June 1st:

The average MSP high temperature for this date is 73 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 54 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for June 1st:

MSP weather records for this date include: highest daily maximum temperature of 92 degrees F in 1939; lowest daily maximum temperature of 51 degrees F in 1945; lowest daily minimum temperature of 37 F in 1946; highest daily minimum temperature of 72 F in 1939; record precipitation of 2.16 inches in 1944; and a trace of snow was reported at the St Paul downtown airport on this date in 1946.

Average dew point for June 1st is 48 degrees F, with a maximum of 73 degrees F in 1944 and a minimum of 29 degrees F in 1910.

All-time state records for June 1st:

The state record high temperature for this date is 104 degrees F at Faribault (Rice County) and at Chaska (Carver County) in 1934; the state record low temperature for this date is 15 degrees F at Bigfork (Itasca County) in 1964. State record precipitation for this date is 7.98 inches at Stillwater (Washington County) in 1965; and Grand Portage (Cook County) still has one inch of snow cover on this date in 1897.

Past Weather Features:

Significant frost damaged both agronomic crops and vegetable crops on June 1, 1897. Nine counties reported morning lows in the 20s F. Farmers reported some damage to wheat, barley, rye and oat crops. Temperatures in the 20s F were observed as far south as Houston and Winona Counties.

June 1, 1934 brought record heat to over two dozen communities in the state. Temperatures broke the century mark (100 F) in 7 communities, and the overnight low at Winona never fell below 79 degrees F. For residents of Faribault June of 1934 brought six days with temperatures over 100 degrees F.

Overnight thunderstorms brought high winds, large hail, and heavy rains on June 1, 1965. Crops near Young America were damaged by large hail and had to be replanted. Lightning caused damage to buildings in Stillwater and Hastings. St Paul downtown received nearly 5 inches of rain, Hastings nearly 6 inches, and Forest Lake 6.50 inches. Flooded roads and highways were reported in many communities. Stillwater reported over 7 inches of rainfall, their most ever in a single day.

Outlook:

Warming up to above normal temperatures over the weekend, with a chance for widely scattered showers on Sunday. Warmer yet on Monday and Tuesday with a chance for showers returning by Wednesday and Thursday next week. Following the trend it looks like warmer than normal temperatures will dominate the first half of June.

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/>

NOTE: News releases were current as of the date of issue. If you have a question on older releases, use the news release search (upper left-hand column of the [News main page](#)) or the main Extension search (upper right of this page) to locate more recent information.

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Minnesota WeatherTalk Newsletter for Friday, June 8, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 8, 2012

HEADLINES

- Profound warm temperature signal
- Weekly Weather potpourri
- MPR listener question
- Almanac for June 8th
- Past weather
- Outlook

Topic: Profound warm temperature signal over the past year

There have been many reports of the extraordinary warm temperatures which have marked the past twelve months, actually the past 14 months across our region. This trend has been noted by scientists at all measurement scales: Twin Cities; statewide (MN); national (USA); hemispheric (northern); and global. Paul Huttner (MPR), Paul Douglas (Star Tribune), Pete Boulay and Greg Spoden (MN-State Climatology Office), Tom Hultquist and Ross Carlyon (National Weather Service), Professor Robert Weisman (St Cloud State University), and NOAA's National Climatic Data Center have all provided perspectives on this strong warming trend. I thought I might as well share some thoughts as well.

Over the past twelve months (June 2011 to May 2012) in Minnesota, monthly temperature values have been colder than normal only once, during June of 2011. All

months since then, with the lone exception of September, 2011 (when temperatures were near normal) have been warmer than normal. Further, on a statewide basis five months have ranked in the top ten warmest historically for Minnesota, including: July 2011; October 2011; December 2011; January 2012; and March 2012 (warmest in state history). Over the 12 month period from June 2011 to May 2012, nearly 68 percent of all days brought above normal temperatures to Minnesota, and since November of 2011, 71 percent of all days have seen above normal temperatures.

The number of station daily maximum temperature records set over the past 12 months (June, 2011 to May 2012) has been remarkable. Among the network of daily climate observers in Minnesota (over 160 volunteer and automated stations) I have estimated the number of daily high maximum temperature records set by month (ignoring the hundreds of high minimum temperature records that have been set). The listing below shows the number of daily maximum temperature records set by month across the state of Minnesota:

June 2011 27 record maximum temperature values
July 2011 26 record maximum temperature values
August 2011 2 record maximum temperature values
September 2011 12 record maximum temperature values
October 2011 58 record maximum temperature values
November 2011 11 record maximum temperature values
December 2011 69 record maximum temperature values
January 2012 191 record maximum temperature values
February 2012 12 record maximum temperature values
March 2012 434 record maximum temperature values
April 2012 14 record maximum temperature values
May 2012 35 record maximum temperature values

The estimated total number of daily maximum temperature records set or tied in Minnesota over the past 12 months is at least 900, bearing in mind a like or greater number of record high minimum temperatures is a probable value as well.

During the same period from June 2011 to May 2012, 13 new statewide high temperature records were set, and one was tied. This level of statewide extremes in maximum temperature has not been seen since the 1930s. These records include:

103 degrees F at MSP on June 7, 2011
54 degrees F at Marshall on January 4, 2012
63 degrees F at Canby on January 5, 2012
59 degrees F at Marshall on January 10, 2012
66 degrees F at Amboy and Milan on March 10, 2012
68 degrees F at Marshall on March 11, 2012
74 degrees F at Rochester on March 14, 2012

82 degrees F at Redwood Falls on March 16, 2012
82 degrees F at Madison on March 17, 2012
84 degrees F at Canby on March 18, 2012 (tied state record)
84 degrees F at Madison on March 19, 2012
80 degrees F at Redwood Falls on March 20, 2012
90 degrees F at Luverne on April 1, 2012
88 degrees F at Pipestone on April 2, 2012

From a trend analysis point of view, this is one of the strongest warming trends ever seen in the Minnesota climate records. For the NOAA-Climate Prediction Center it will be difficult to ignore this trend in making mid-range and seasonal outlooks for the rest of the summer and autumn.

Further web resources for examination of this warming trend can be found at:

http://www.climate.umn.edu/doc/journal/warm_spring2012.htm
http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=83901&source=0

<http://www.ncdc.noaa.gov/sotc/>><http://www.ncdc.noaa.gov/sotc/national/2012/5>><http://www.ncdc.noaa.gov/sotc/national/2012/5>
<http://www.ncdc.noaa.gov/sotc/>

Weekly Weather Potpourri:

Among NOAA news releases this week was a story about the record warm spring across the country and the second warmest May in history. You can read more at...

<http://www.ncdc.noaa.gov/sotc/>

NOAA-National Weather Service in Las Vegas reports that Death Valley, CA started the first week of June hot, with daytime temperatures ranging from 112 to 120 degrees F over the first four days. Las Vegas was cooler with highs ranging from 100 to 107 degrees F. Phoenix saw 101 to 111 degrees F each day.

A paper from Cornell University (Greene and Monger) published this week in Oceanography suggests that the continued melting of Arctic sea ice will influence the atmospheric circulation patterns in the mid latitudes of the northern hemisphere in a manner that may bring stronger winter storms, with associated stronger winds and heavier precipitation. You can read more about this at...

<http://www.sciencedaily.com/releases/2012/06/120606132420.htm>

The U.S. Department of Interior announced that this coming Saturday, June 9th is "Get Outdoors Day", and admission to any of the country's 397 national parks will be free to the public. More information can be found at....

<http://www.nationalgetoutdoorsday.org/>
<http://www.nps.gov/findapark/feefreeparks.htm>

The National Center for Atmospheric Research announced this past week that their scientists are working on new "weather-savvy car technologies" that will use wireless enabled vehicles with sensors to transmit updates of weather and road conditions to a central database which can then relay alerts to other drivers in the area. The goal is to reduce weather related driving mishaps by using mobile devices for sensing and transmitting environmental conditions. You can read more about this at...

<https://www2.ucar.edu/atmosnews/impacts/weather-savvy-cars-drivers>

The NOAA Storm Prediction Center received five reports of tornadoes in Wyoming, and five more in Colorado on Thursday (June 7) this week. An unusually strong tornado near Wheatland, WY destroyed several homes and derailed a train, while another tornado near Kiowa, CO destroyed several homes as well. Several reports of large hail were also filed.

MPR listener question: Can emission plumes from ethanol plants and power plants contaminate National Weather Service radar echoes and therefore lead to incorrect estimates of precipitation?

Answer: Indeed, this can happen. Each National Weather Service Forecast Office can tweak its own radar algorithms to reduce the impact of ground clutter or false echoes, especially when they know the source of the contamination. More often than not the source of the contamination comes from objects that are within a 25 mile radius of the radar. Perhaps the installation of the new dual polarity radar systems slated for later this year will further reduce any impacts of contamination in the radar signal.

Twin Cities Almanac for June 8th:

The average MSP high temperature for this date is 75 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 55 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for June 8th:

MSP weather records for this date include: highest daily maximum temperature of 102 degrees F in 1985; lowest daily maximum temperature of 54 degrees F in 1937; lowest daily minimum temperature of 36 F in 1885; highest daily minimum temperature of 70 F in 1959 and 1976 (tentatively broken by a reading of 72 F on June 8, 2012); and record precipitation of 2.12 inches in 1918.

Average dew point for June 8th is 53 degrees F, with a maximum of 78 degrees F in 1911 and a minimum of 31 degrees F in 1980.

All-time state records for June 8th:

The state record high temperature for this date is 102 degrees F at several places in multiple years, most recently in 1985 at MSP, Farmington, Chaska, and Owatonna. The state record low temperature for this date is 20 degrees F at Sawbill Camp (Cook County) in 1935. State record precipitation for this date is 8.07 inches at Thief River Falls (Pennington County) in 2001; and no snowfall has been reported on this date.

Past Weather Features:

June 8-9, 1911 brought a heat wave to many southern and western counties in Minnesota. Many communities reported temperatures in the 90s F, while Worthington, Winnebago, and Redwood Falls topped the century mark on the thermometer.

Between 5:30 pm and 10:00 pm on June 8, 1920 three tornadoes caused damage in Minnesota. The first, an F-3 (158-206 mph winds) moved 10 miles across Wilkin County, destroying 20 farm buildings and derailing a train. Two people were killed by that storm. The second tornado, also an F-3 touched down near Campbell and completely destroyed a farm there, killing two people. The third tornado struck near Brainerd after dark. It was an F-2 (winds 113-157 mph) and it mostly damaged farm buildings in the area.

June 8, 1935 brought a summer hard freeze to parts of northern Minnesota, damaging gardens and crops. Park Rapids, Roseau, Baudette, Hallock, Bemidji, Big Falls, and Itasca State Park all reported lows in the 20s F.

Strong thunderstorms brought heavy rainfall to southern Minnesota on June 8, 1953. Many crop fields were flooded and some roads washed out. Fairmont and Worthington reported over 3 inches of rainfall, while New Ulm reported over 5 inches. The observer at St James reported a record 6.10 inches of rainfall.

An early summer heat wave prevailed across southern Minnesota over June 7-9, 1985 bringing three consecutive days with daytime temperatures in the 90s F. Some topped the century mark, including Chaska, St James, St Peter, Owatonna, and Farmington which all reported 102 degrees F.

Outlook:

A warm and humid weekend, with chances for thunderstorms late Saturday in the north and statewide later on Sunday afternoon and evening. Some of the storms on Sunday could be severe. Temperatures will top 90 F in many places. Much cooler on Monday and Tuesday as temperatures fall back to near normal. Another chance for showers and thunderstorms by late Wednesday and into 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

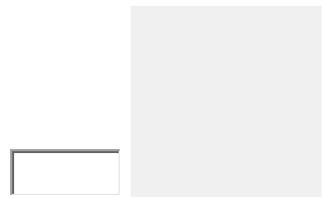
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Minnesota WeatherTalk Newsletter for Friday, June 15, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 15, 2012

HEADLINES

- Strong winds on June 10th
- Cold June 12th and 13th up north
- Record heavy rain and hail on June 14th
- Weekly Weather potpourri
- MPR listener question
- Almanac for June 15th
- Past weather
- Outlook

Topic: Strong winds on Sunday, June 10th

Both weekend days (June 9-10) brought temperatures in the 90s F to many areas, including 93 F at Milan and Crookston, and 94 F at Wheaton and Madison. Then, late afternoon and evening on Sunday, June 10th saw strong thunderstorms cross the state of Minnesota. A tornado was reported near Belle Plaine in Scott County (preliminary estimates are an EF-0 with winds of 65-85 mph) where some farm buildings were damaged, and there were at least 30 other reports of very strong winds, including 63 mph at Kabetogama Lake up north. Olivia reported winds to 59 mph and MSP airport recorded a wind of 52 mph, just around the time all of the tree damage was reported in

the Highland Park neighborhood of St Paul. Many other communities reported winds over 40 mph. The cold front associated with the thunderstorms brought a rapid change in temperature, as the MSP airport reading fell from 87 degrees F to just 69 degrees F between 9:00 pm and 10:00 pm.

The rainfall was welcome in most areas. Some observers reported over 1 inch, including Belle Plaine, Princeton, Cambridge, St Peter, Little Falls, Rush City, and Plymouth. For many it was the first significant rainfall of the month.

Topic: Cold June 12th and 13th up north

Many northern Minnesota observers reported low temperatures in the 30s F on Tuesday, June 12th and Wednesday, June 13th. On Tuesday morning St Vincent reported 38 degrees F, while Fosston measured 37 degrees F. Hallock reported 36 degrees F, and Warroad reported a record-tying 32 degrees F (tied with June 12, 1969). Then on Wednesday morning Brimson reported a near-record 34 degrees F, while Hibbing and Embarrass recorded 36 F and 37 F, respectively. Some SD and ND communities across Minnesota's western border reported record-setting low temperatures as well. Northeastern Minnesota communities like Ely and Grand Marais did not see daytime highs climb out of the 50s F on June 12th as a result of the cool Canadian high pressure system that dominated the state.

Topic: Heavy rain and hail on June 14th

A low pressure system moving across southern Canada brought strong winds, hail, and heavy rains to many parts of Minnesota on Thursday, June 14th. There were numerous reports of hail from one half inch to one inch in diameter. Very strong winds brought down power lines along Hwy 2 in St Louis County. Some areas of central and eastern Minnesota received rainfalls from a half inch to over one inch during the morning and early afternoon. But the BIG STORY was the very heavy, record-setting rainfalls across Steele, Rice, Le Sueur, Dakota, and Goodhue Counties. Observers in these counties reported from 2 to 8 inches of rainfall during the afternoon and evening. Some record-setting amounts included 2.22 inches at Montgomery, 2.86 inches at Farmington, 6.37 inches at Red Wing Dam, and 8.83 inches at Cannon Falls. The rainfall at Cannon Falls was a new all-time statewide record for the month of June surpassing 8.67 inches at Minneota on June 17, 1957. As a result of the heavy rainfalls the Cannon River and Little Cannon River rose several feet and exceeded flood stage, causing road closures and evacuation of some homes. More information on the rainfall and flooding can be found at...

http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mpx&storyid=84240&source=0
http://www.climate.umn.edu/doc/journal/flood14_150612.htm

Weekly Weather Potpourri:

NOAA-National Weather Service in Mobile, AL reported some tremendous rainfalls last weekend (June 9-10) across coastal Alabama and the Florida Panhandle. Some of the rainfall totals included: Pensacola, FL 15.05 inches; Orange Beach, AL 11.32 inches; Mobile, AL 12.90 inches; Brentwood, FL 14.57 inches; and Myrtle Grove, FL 17.50 inches. Many city streets were flooded. You can read more at....

http://www.srh.noaa.gov/news/display_cmsstory.php?wfo=mob&storyid=84142&source=0

NOAA-National Hurricane Center was monitoring Hurricane Carlotta in the Eastern Pacific off the southern coast of Mexico. It was producing sustained winds of 80 mph with gusts to 90 mph, and sea waves of 25 feet. Carlotta was expected to strengthen before making landfall in Mexico over the weekend. It may bring rainfalls of 6 to 10 inches to some areas.

Typhoon Guchol was intensifying off the east coast of the Philippines in the Western Pacific Ocean. It was producing sea waves near 35 feet and winds up to 115 mph. Fortunately it is expected to remain out to sea as it grows stronger over the weekend and heads north towards Kyoto and the south coast of Japan.

Dr. Robert Simpson, former Director of NOAA's National Hurricane Center, and originator of the Saffir-Simpson scale used in hurricane forecasting will turn 100 years old later this year. Retired in Washington, D.C. he was interviewed for a recent article in USA Today. You can find the article at....

<http://www.usatoday.com/weather/hurricane/story/2012-06-13/hurricane-simpson/55605488/1>

MPR listener question: What causes thunderstorms to dissipate rapidly?

Answer: Since mature thunderstorms are fed by warm, moist air rising within the clouds the rainfall itself and the down drafts of the storm pulling cooler air to the surface tend to cause the dissipation of the storm. Also these storms may be impeded by wind shear aloft which does not allow the vertical motion to create high cloud tops. In addition animated satellite and radar imagery show that storms encountering an

extremely dry or cold landscape may weaken rapidly and die off. This can certainly happen over the relatively cool waters of Lake Superior in the summer.

Twin Cities Almanac for June 15th:

The average MSP high temperature for this date is 78 degrees F (plus or minus 7 degrees F standard deviation), while the average low is 59 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for June 15th:

MSP weather records for this date include: highest daily maximum temperature of 94 degrees F in 1913; lowest daily maximum temperature of 61 degrees F in 1945; lowest daily minimum temperature of 41 F in 1989; highest daily minimum temperature of 71 F in 2007; and record precipitation of 2.80 inches in 1874.

Average dew point for June 15th is 54 degrees F, with a maximum of 73 degrees F in 1952 and a minimum of 32 degrees F in 1961.

All-time state records for June 15th:

The state record high temperature for this date is 106 degrees F at Lambertton (Redwood County) in 1979. The state record low temperature for this date is 24 degrees F at Meadowlands (St Louis County) and at Roseau (Roseau County) in 1917. State record precipitation for this date is 7.50 inches at Albert Lea (Freeborn County) in 1978; and no snowfall has been reported on this date.

Past Weather Features:

June 15, 1874 brought thunderstorms that produced 2.80 inches of rainfall in the Twin Cities, and a rapid rise in the Mississippi River. That was the wettest June ever for the Twin Cities Metro Area. The month saw rainfall on 18 different days, and on four of those days it rained over 1 inch. June 1874 brought a total of 11.67 inches of rainfall, nearly a third of the entire year's precipitation for the Twin Cities Metro Area. Further north at Ft Ripley they received 9.30 inches of June rainfall, also a record.

June 15, 1892 also brought heavy thunderstorms to southern Minnesota communities. St Charles reported 2.69 inches, Blooming Prairie 4.50 inches, Sheldon 4.52 inches, and Grand Meadow reported 5.00 inches. Many fields were flooded and roads washed out.

June 15-19, 1913 brought a five day Heat Wave to Minnesota, with over 40 communities recording daytime highs in the 90s F. On June 15th it was 93 degrees F as far north as Two Harbors, still a record for the date there. At Farmington the mercury reached 100 degrees F. Other June Heat Waves occurred over June 15-19, 1933, and June 13-15, 1979, when many counties reported temperatures in the 90s F and some saw consecutive days with afternoon highs over 100 degrees F.

June 15, 1917 brought a hard freeze to some northern Minnesota communities. Meadowlands and Roseau reported morning lows of just 24 degrees F, while Pokagama Dam, Duluth, and Beardsley reported 28 degrees F. Light frost was observed as far south as Zumbrota.

June 14-15, 1978 brought heavy thunderstorms to parts of Freeborn, Faribault, and Blue Earth Counties in southern Minnesota. Rainfalls of 3 to 7 inches produced flash flooding and many road closures due to high water. Numerous basements were flooded in Albert Lea. Some of the rainfall amounts included 7.50 inches at Albert Lea, 5.50 inches at Blue Earth, and 3.51 inches at Winnebago.

On June 16, 1992 a total of 27 tornadoes were reported across Minnesota, including the last F-5 (winds 261 mph or greater) ever reported in the state. This F-5 tornado traveled from Leota to Chandler between 5:00 and 5:30 pm that afternoon, on the ground for 16 miles and at times a quarter of a mile in diameter. About the same time an F-4 tornado (winds 207-260 mph) was traveling through Lake Wilson, also in Murray County. These two tornadoes caused over \$14 million in damages. Of the 25 other tornadoes reported that day, 6 were F-3 (158-206 mph), 15 were F-2 (113-157 mph), and 4 were F-1 (72-112 mph). Overall 20 counties reported tornado damage or damage from severe thunderstorm winds, totaling over \$80 million.

Outlook:

Somewhat warmer than normal temperatures over the weekend with a chance for showers and thunderstorms on Saturday afternoon and evening. Some could be severe. Mostly dry and warm on Sunday, with a chance for showers by evening. Generally unsettled with a continued chance for showers through Thursday next week, then cooler and drier towards the end of the week.

Further Information:

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

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Minnesota WeatherTalk Newsletter for Friday, June 22, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 22, 2012

HEADLINES

- Another Traumatic June Flash Flood
- Record total rainfall values for June
- New Seasonal Climate Outlook
- Weekly Weather potpourri
- MPR listener question
- Almanac for June 22nd
- Past weather
- Outlook

Topic: Another Traumatic June Flash Flood

Following the devastating flash flooding in Goodhue, Rice, and Dakota Counties last Thursday and Friday (June 14-15) and the hail and wind storms of June 17 and 19 earlier this week (hail up to 1.5 inches in diameter and wind gusts up to 83 mph), another larger and more traumatic flash flood encompassed much of northeastern Minnesota over June 19-21 (Tue-Thu) this week. A slow moving thunderstorm complex brought 3 to 10 inches of rainfall over portions of Cook, Lake, St Louis, Carlton, Itasca, Cass, Crow Wing, and Aitkin Counties. A report filed by a National Weather Service employee in NE Duluth mentioned a measurement of 10.10 inches of

rainfall in the northeastern part of Duluth. Officially the National Weather Service in Duluth reported new record daily rainfalls back to back, 4.14 inches on the 19th, followed by 3.11 inches on the 20th, for a total of 7.25 inches. The climate record from Duluth shows very few stormy periods that are analogous to what happened there this week. Arguments can be made that thunderstorms on September 5-6, 1876 (6.48 inches); July 20-22, 1909 (7.83 inches), and August 15-21, 1972 (7.91 inches) might be comparable, but of course the Duluth neighborhoods and landscape in general were vastly different in those times. It is expected that damage to infrastructure in Duluth will be considerable this time around, perhaps approaching or exceeding \$100 million, compounded by a prolonged recovery and reconstruction period.

Some other observers reported record rainfalls: on June 19th, Grand Rapids with 4.78 inches, Hibbing with 2.57 inches, and Moose Lake with 3.12 inches; on June 20th, Wright with 6.11 inches, Two Harbors with 4.65 inches, Pine River Dam with 4.24 inches, Brainerd with 4.20 inches, Aitkin with 3.86 inches, and Grand Portage with 3.40 inches. This is just a sampling, as too many other observers reported record rainfall to report here.

Additionally a new statewide daily rainfall record was set on June 20th, with 7.41 inches reported from the Island Lake cooperative observer in St Louis County (about 18 miles north of Duluth). This broke the old statewide record for June 20th of 5.93 inches at Georgetown in 2000. This was the 2nd statewide daily rainfall record broken this month. Last week Cannon Falls set a new statewide rainfall record with 8.83 inches on June 14th, and this was associated with flash flooding over Goodhue, Rice, and Dakota Counties.

The St Louis River near Scanlon reported a new all-time record flood crest near 16.62 feet (flow volume over 45,000 cfs, about 15 times normal volume) beating the old flood crest record of 15.8 ft on May 9, 1950. The Kettle River at Sandstone also set a new record flood crest with 17.55 feet, surpassing 15.38 feet on July 23, 1972. In fact many other watersheds flooded including the Knife River, Crow Wing River, Pigeon River, Cloquet River, and Mississippi River at Aitkin among others. The discharge volume on these watersheds flooded many roads, highways and parks.

This type of storm reminds us that climate is changing in Minnesota. Not only in terms of quantity of precipitation, but in the character of precipitation as well. In recent decades a larger fraction of our annual total precipitation is coming in the form of intense thunderstorms.

Topic: June monthly rainfall totals approaching record values

Many Minnesota weather observers are reporting near-record rainfall amounts for the month (and it is only June 22nd!). Red Wing Dam has reported a record 10.95 inches for June so far. Cannon Falls now reports 15.11 inches for June which is only the 4th time in Minnesota's climate history that an observer has reported 15 or more inches for June, the others were 15.00 inches at Milaca in 1944, 15.48 inches at Camp Norris in 2002, and 15.63 inches at Delano in 2002. With 8 days left in the month, Cannon Falls may yet surpass Delano for the largest June rainfall total in state history.

Duluth, of course, has already set a new June total rainfall record with 9.51 inches, while Two Harbors has also reported a record June rainfall of 9.33 inches. Other northeastern Minnesota climate stations reporting record amounts of June rainfall include Wright with 12.19 inches and Island Lake Reservoir with 10.65 inches.

More on the Duluth storm and flooding can be found at....

http://climate.umn.edu/doc/journal/duluth_flooding_120620.htm
http://www.crh.noaa.gov/dlh/?n=june2012_duluth_flood

Topic: New Seasonal Climate Outlook

The NOAA Climate Prediction Center released the new seasonal outlooks on Thursday this week. For the period July through September the outlook favors above normal temperatures for southern Minnesota, and equal chances for above or below normal temperatures for northern counties. The precipitation outlook is for equal chances of above or below normal values over the period. Our current trend certainly favors wetter than normal conditions, as we are experiencing one of the wettest starts to a growing season in many eastern sections of the state.

Topic: Weekly Weather potpourri

The NOAA National Hurricane Center was watching the development of a low pressure system off the Yucatan Peninsula this week. It may develop into a tropical storm which would have implications for the southeastern coastal states of the USA this weekend and next week. They were sending out a air force reconnaissance aircraft to make measurements of this storm system.

In the Western Pacific, Typhoon Guchol lashed southwestern Japan with heavy rains and high winds this week. Rains of several inches (3 to 6 inch amounts) were accompanied by winds up to 81 mph. Weather conditions caused the disruption and stoppage of airline and rail services for a time. Yet, more rainfall was expected this weekend across Japan.

A recent paper in the journal Science documents a historical correlation between unusual warm periods in the Arctic Region with similar periods in the West Antarctic Ice Sheet. The correlation and the magnitude of the warm periods back 2.8 million years came as somewhat of a surprise to the international team of scientists who extracted lake sediment cores from the Arctic Region. You can read more about this paper at.....

<http://www.sciencedaily.com/releases/2012/06/120621151506.htm>

MPR listener question: This last winter you spent a good deal of time speaking about the threat of drought for this growing season. Now we are experiencing one of the wettest ever early growing seasons in Minnesota. Has this relatively rapid reversal in the moisture pattern ever occurred in the past?

Answer: Indeed, this is what happened to end the very damaging 1976 drought in Minnesota. Having barely survived the 1976 drought many western Minnesota farmers were pessimistic about 1977. Average statewide precipitation in 1976 was less than 16 inches. But then 1977 delivered the wettest year of the 20th Century with a statewide average precipitation of nearly 34 inches. All was good that year. Similarly a 1910 drought (statewide precipitation under 15 inches) brought bankruptcy to many Minnesota farmers (including my grandfather), but then 1911 brought a wet year (statewide average of nearly 28 inches of precipitation) and all was well again.

So, though rare in frequency, these dramatic and rapid reversals in moisture patterns have indeed happened in our Minnesota past.

Twin Cities Almanac for June 22nd:

The average MSP high temperature for this date is 79 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 60 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for June 22nd:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1911; lowest daily maximum temperature of 57 degrees F in 1906; lowest daily minimum temperature of 42 F in 1960; highest daily minimum temperature of 75 F in 1923; and record precipitation of 2.12 inches in 1930.

Average dew point for June 22nd is 56 degrees F, with a maximum of 80 degrees F in 1983 and a minimum of 27 degrees F in 1972.

All-time state records for June 22nd:

The state record high temperature for this date is 107 degrees F at Canby (Yellow Medicine County) in 1988. The state record low temperature for this date is 20 degrees F at Kelliher (Beltrami County) in 2001. State record precipitation for this date is 5.42 inches at Itasca State Park (Clearwater County) in 1957; and no snowfall has been reported on this date.

Past Weather Features:

June 22, 1917 brought frost to northern Minnesota. International Falls reported 31 degrees F, while Brainerd reported just 30 degrees F. At the Experimental Farm near Duluth it was just 29 degrees F with damaged produce crops. It was also 29 F at Cloquet. Further inland at Meadowlands the thermometer fell to 28 degrees F.

June 22, 1957 saw strong thunderstorms cross the state bringing hail, high winds, and heavy rainfalls. Many observers reported over 3 inches of rain, while Winsted, Young America, St James and Hinckley reported over 4 inches. Many roads and farm fields were flooded.

In 1988 June 22nd marked the end of a five-day Heat Wave that plagued the state. Many observers reported five consecutive days with afternoon temperatures in the 90s F, causing crops to wilt and show signs of moisture stress. Later that month observers at Canby and Browns Valley would report temperatures as high as 107 degrees F.

About 4:00 pm on June 22, 1919 an F-5 (winds 261 mph) raced across Otter Tail County and leveled 400 buildings in Fergus Falls leaving "a vast acreage of kindling." The famous Lake Alice Grand Hotel was destroyed. The funnel traveled 20 miles on the ground and at times was 400 yards across. It injured 200 people and killed 57 others. It took Fergus Falls a decade to rebuild.

Outlook:

Chance of showers and thunderstorms on Saturday, then drier with near seasonal temperatures for Sunday through Wednesday. Getting warmer towards the end of next week with a chance for showers and thunderstorms returning.

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 29, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, June 29, 2012

HEADLINES

- Preliminary Climate Summary for June
- New record for Twin Cities Heating Degree Days
- Weekly Weather potpourri
- MPR listener question
- Almanac for June 29th
- Past weather
- Outlook

Topic: Preliminary Climate Summary for June, 2012

Mean monthly temperatures for June were 2 to 5 degrees F warmer than normal, the 9th consecutive month with warmer than normal conditions going back to last September (2011). In fact the first half of this year has been warmer than any year since 1987. Extremes for the month ranged from 98 degrees F at New Ulm (June 27) to 30 degrees F at Embarrass (June 1st). Some observers reported 7 days with high temperatures of 90 degrees F or higher, and the National Weather Service had to issue Heat Advisories (Heat Index up to 105 degrees F) for a some areas. On a few days and nights dewpoints climbed into the 70s F, making for uncomfortable sleeping.

Minnesota did not report the lowest temperature in the nation on any days during the month of June.

Rainfall for June was generally above normal for most observers (the 3rd consecutive month for some), except for those in northwestern and southwestern counties, most of which reported below normal rainfall. For some June total rainfall was record-setting, including Cannon Falls (15.11"), Wright (13.03"), Island Lake (11.06"), Red Wing Dam (10.95"), Moose Lake (10.42"), Duluth (10.03"), and Two Harbors (9.49"). The two most notable events of the month were the flash floods on June 14-15 in southeastern counties (Cannon Falls 8.83") and on June 19-20 in northeastern counties (7-10 inches in the Duluth area). Many observers reported measurable rainfall on 13-15 days during the month.

Winds in June were far diminished compared with April and May, and closer to normal. There were a few reports of exceptionally strong wind gusts over 70 mph on June 17th (near Appleton), and over 80 mph on June 19th (Scott County). The associated thunderstorms on these dates brought large hail as well. A weak tornado touched down near Belle Plaine on June 10th. June was the 4th consecutive month (Mar, Apr, May, Jun) with at least one tornado report filed in the state.

Topic: New Record Low Annual Heating Degree Days for the Twin Cities

The Minnesota State Climatology Office noted this week as the annual Heating Degree Day (HDD) season (July 1 to June 30) comes to an end, that 2011-2012 brought a new record low number for HDD with only 5852. The previous record low value was 6611 recorded in 2005-2006. HDD are calculated using the mean daily temperature when it falls below a base of 65 degrees F. Thus on a day with a mean daily temperature value (maximum + minimum/2) of 50 F, the HDD value would be 15. These are accumulated daily as an index for energy use to heat homes and commercial buildings.

Topic: Weekly Weather potpourri

Tropical Storm Debby spun off the coast of the Florida panhandle bringing record amounts of rainfall to some areas this week. Tallahassee reported 8.80 inches from the storm, while Apalachicola reported nearly 13 inches. Further east and south Gainesville reported nearly 14 inches, while Tampa reported nearly 10 inches. Some cooperative observers reported over 20 inches, and many streets were flooded. Several tornadoes were reported associated with Tropical Storm Debby as well.

Elsewhere thunderstorm rains were bringing some relief and help to fire fighters in Colorado, where wildfires have been burning this week. Earlier in the week

temperatures in the upper 90s F to over 100 degrees F had combined with single digit relative humidity readings and moderate winds had allowed many wildfires to spread rapidly. Hundreds of homes have been destroyed by these fires.

Tropical Storm Doksuri was spinning southeast of Hong Kong in the Western Pacific Ocean with winds up to 70 mph and sea waves over 20 feet. It was expected to bring heavy rainfall to areas south of Hong Kong over the weekend, before dissipating.

In science news, it was reported this week that scientists from Cardiff, Denmark, Sweden, and Russia have discovered a 3 billion year old impact crater in West Greenland. This is the oldest known impact crater on Earth from among 180 other known sites. This one was probably caused by an asteroid or comet. You can read more about it at...

<http://www.sciencedaily.com/releases/2012/06/120628164658.htm>

NASA and NOAA announced this week the deployment of new sensors aboard the Suomi NPP polar-orbiting satellite are already assisting forecasting with numerical weather prediction. This represents a record speed for deployment of satellite data following launch, because it has only been seven months since the satellite went into orbit. Usually, there is a longer test and calibration period before the data are utilized. You can read more about this new satellite system at...

<http://www.sciencedaily.com/releases/2012/06/120626113751.htm>

MPR listener question: It is coming up on the anniversary of the famous BWCA "blow down" on July 4, 1999, called a "derecho" storm. What type of storm is this and how frequent are they?

Answer: Yes, indeed, arguably the most destructive storm of this type, the derecho of July 4, 1999 brought a 600 square mile swath of straight line winds, 80-100 mph, across the BWCA leveling 250,000 acres of timber valued at \$12-\$18 million. This storm was highly organized as it traveled 1300 miles from eastern North Dakota to the New England states.

Derecho is a Spanish term meaning "direct" or "straight ahead." It was used back in 1888 by Dr. Gustavus Hinrichs of the University of Iowa to describe the strong winds that accompanied severe thunderstorms and to distinguish them from the rotating winds of a tornado. Derechos usually arise from a mesoscale convective complex composed of an organized cluster of interacting thunderstorms. They typically show up as a bow echo on Doppler radar systems. Fortunately these storms are rare,

averaging 10-12 per year across the USA, and only appearing in Minnesota about every 5-6 years, mostly in the months of June, July, or August.

Twin Cities Almanac for June 29th:

The average MSP high temperature for this date is 81 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 61 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for June 29th:

MSP weather records for this date include: highest daily maximum temperature of 102 degrees F in 1931; lowest daily maximum temperature of 64 degrees F in 1959; lowest daily minimum temperature of 47 F in 1924; highest daily minimum temperature of 83 F in 1931; and record precipitation of 3.48 inches in 1877.

Average dew point for June 29th is 58 degrees F, with a maximum of 77 degrees F in 19963 and a minimum of 38 degrees F in 1988.

All-time state records for June 29th:

The state record high temperature for this date is 110 degrees F at Canby (Yellow Medicine County) in 1931. The state record low temperature for this date is 27 degrees F at Pine River Dam (Crow Wing County) in 1925. State record precipitation for this date is 6.37 inches at Worthington (Nobles County) in 1969; and no snowfall has been reported on this date.

Past Weather Features:

June 29-30, 1877 brought some heavy thunderstorms to parts of Minnesota, with 3.48 inches at St Paul. Elsewhere Fort Ripley saw 1.70 inches and Duluth reported 1.50 inches. In fact it was a wet June in Duluth with over 5 inches of rainfall, and measurable rainfall on 16 days.

June 24-30, 1931 brought the worst June Heat Wave in Minnesota history. Over two dozen Minnesota communities reported daytime highs of 100 degrees F or greater. Overnight lows at Canby never fell below 87 degrees F on the 28th and 29th. Crops wilted in the heat. July 1st brought some relief as temperatures dropped back into the 70s and 80s F.

Intense thunderstorms brought flooding rains to southern Minnesota on June 29, 1969. Worthington reported a record 6.37 inches, while Luverne received 3.64 inches. Pipestone reported 3.08 inches, Albert Lea 2.56 inches, and Slayton 2.12 inches.

In the drought year of 1988 June 29 brought frost to northern Minnesota. Brimson was 29 degrees F and Gunflint Lake dropped to 30 degrees F. Cotton, Isabella, Tower and Mora also reported frosts.

Outlook:

Warmer than normal temperatures continuing into the weekend and next week. Chances for scattered and isolated showers and thunderstorms each day, particularly on Tuesday. General dominance of high pressure next week will keep most places dry.

Further Information:

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

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

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Minnesota WeatherTalk Newsletter for Friday, July 6th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 6th, 2012

HEADLINES

- Records set or tied on July 4th
- Building a legacy of heat
- Thunderstorms up north
- Extreme monthly rainfall totals at Windom
- Weekly Weather potpourri
- MPR listener question
- Almanac for July 6th
- Past weather
- Outlook

Topic: Records set or tied on July 4th

It was the warmest 4th of July in many years for much of southern and central Minnesota. Some records set or tied included:

Maximum temperature of 101 degrees F at MSP Airport

Minimum temperature of 81 degrees F at MSP Airport

77 degrees F dewpoint at MSP Airport

Minimum temperature of 80 degrees F at St Paul
Minimum temperature of 81 degrees F at Minnesota City
Minimum temperature of 79 degrees F at Marshall
Minimum temperature of 81 degrees F at La Crosse, WI
Minimum temperature of 74 degrees F at Fargo, ND

Maximum temperature of 103 degrees F at La Crosse, WI
Maximum temperature of 97 degrees F at St Cloud
Maximum temperature of 100 degrees F at Theilman, MN
Maximum temperature of 98 degrees F at Eau Claire, WI

Heat Index values ranged from 102 to 118 degrees F around the state on July 4th as well, perhaps the highest in history for the date in some places.

Some of the heat lingered overnight through July 5th with record warm minimum temperature of 78 degrees F at Hutchinson and Red Wing Dam, 79 degrees F at MSP Airport. La Crosse, WI also set a record low temperature value with 79 degrees F, and Rochester tied the record warmest low temperature with a reading of 73 degrees F. MSP Airport was also reporting a potential record warm minimum temperature on Friday morning (July 6th) with a reading of 78 degrees F, but that may not hold up until midnight.

Topic: Summer of 2012 is building a legacy of heat

July is continuing a 9-month trend of above normal temperatures in Minnesota. In the Twin Cities Metro Area we have already seen 16 days with daytime highs of 90 degrees F or greater, and 8 nights when the temperature never fell below 70 degrees F. On average (1981-2010) the Twin Cities records 13 days each year with daytime highs of 90 degrees F or greater, and 11 nights when the nighttime temperature does not fall below 70 degrees F. Temperatures are expected to cool next week, but still average somewhat above normal. Lower dewpoints will help freshen the air.

Topic: July 4th brings more thunderstorms in the north

Though much of southern Minnesota was dominated by heat on July 4th, many northern Minnesota communities reported strong thunderstorms, with heavy rain and high winds. This was the second episode of high winds and thunderstorm rains during the week as many northern Minnesota counties also reported them on July 2nd. The July 4th winds near Brainerd were measured at 58 mph, and near Bemidji wind gusts peaked at 60 mph. Some power lines were knocked down, and some trees damaged. Among those reporting heavier doses of rainfall were Brainerd 0.75 inches, Waskish 1.00 inches, Hallock 1.14 inches, Isle 1.27 inches, Northome 1.82 inches,

Kabetogama 1.85 inches, and Bruno (Pine County) 2.45 inches. The last number was a record July 4th rainfall at Bruno.

Yet more thunderstorms crossed northern Minnesota early on July 6th (Fri) depositing from 1 to 2 inches of new rainfall in places. In fact the first week of July was rather wet for some northern observers with 2 inches or more reported from Isabella, Gull Lake, Kabetogama, Brainerd, Mora, Onamia, Moose Lake, and Sandy Lake. Much of the rest of the state suffered from heat and lack of rainfall through the first week of the month.

Topic: Extreme monthly rainfall totals back to back at Windom

Windom is located in Cottonwood County of southwestern Minnesota. May of 2012 was their wettest in history with 10.90 inches of rainfall. Heavy thunderstorms delivered over 1.50 inches on four separate days. Then June, 2012 was their driest in history, with only 8 rainy days, totaling 0.75 inches for the month.

Topic: Weekly Weather potpourri

The United Kingdom Meteorological Office reports that June of 2012 was the wettest on record country-wide, with average monthly rainfall close to 6 inches. There were many days with prolonged rainfall and the month was characterized by a lack of sunshine. They further note that the period from April through June was also the wettest historically. You can read more about this at....

<http://www.metoffice.gov.uk/news/releases/archive/2012/wettest-June>

It has been a busy summer for NOAA IMETS. These incident meteorologists are deployed to areas where local forecasts are needed in support of coping with hazardous situations that pose a threat to public safety. Wildfires in the western states (MT, UT, and CO) have already consumed nearly 800,000 acres this summer and NOAA has dispatched a number of IMETS to help firefighters by delivering timely weather forecast information. You can read more about the work of the IMETS at the NOAA web site:

http://www.noaa.gov/features/03_protecting/imets_2012.html

Severe thunderstorms and even a tornado were reported from Canada this week. A tornado touched down on Tuesday (July 3rd) in Didsbury, north of Calgary, Alberta. It damaged buildings in the area. In addition strong thunderstorms brought heavy rainfall to southern parts of Saskatchewan and southern Manitoba. Moose Jaw reported nearly 2 inches from a thunderstorm rain earlier this week.

NOAA reported this week that St Louis, MO has recorded 8 consecutive days with temperature at or above 100 degrees F. This is the most since July of 1936. Atlanta, GA has reported 4 new high temperature records this week as well. The heat has combined with lack of rainfall to produce further drought in states like IL, IN, OH, KY, MO, and AK.

MPR listener question: I have had my air conditioning on continuously since June 27th. Generally I don't open my windows to air out the house until the temperature falls to 60 degrees F or lower at night. So what are my prospects for airing out the house this month?

Answer: Hmmmm.....I don't see an overnight low of 60 degrees F or cooler in the Twin Cities, at least through mid-July. We usually get about 8-9 nights during July when the temperature falls that low, but this month is tracking to be very much warmer than normal. Perhaps you could open the windows for a couple of hours in the early morning this weekend when temperatures are expected to be in the mid-60s F.

Twin Cities Almanac for July 6th:

The average MSP high temperature for this date is 83 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 63 degrees F (plus or minus 6 degrees F standard deviation).

MSP Local Records for July 6th:

MSP weather records for this date include: highest daily maximum temperature of 104 degrees F in 1936; lowest daily maximum temperature of 60 degrees F in 1972; lowest daily minimum temperature of 49 F in 1875 and 1942; highest daily minimum temperature of 77 F in 1988; and record precipitation of 2.32 inches in 1877.

Average dew point for July 6th is 60 degrees F, with a maximum of 77 degrees F in 1928 and a minimum of 36 degrees F in 1883.

All-time state records for July 6th:

The state record high temperature for this date is 114 degrees F at Moorhead (Clay County) in 1936. The state record low temperature for this date is 30 degrees F at Cotton (St Louis County) in 1969. State record precipitation for this date is 5.30 inches at Minnesota City (Winona County) in 1978; and no snowfall has been reported on this date.

Past Weather Features:

July 6, 1936 was arguably the hottest day in Minnesota history as 3 dozen Minnesota communities reported daytime highs of 100 degrees F or greater. Many set all-time high temperature records for any date, including Moorhead with a reading of 114 degrees F. The 1936 July Heat Wave was especially brutal with little respite. Over 900 Minnesotans lost their lives due to the heat.

July 5-6, 1943 brought strong thunderstorms and flash floods to many southern Minnesota communities. Theilman received 4.65 inches and Zumbrota 5.28 inches causing the Zumbro River to reach flood stage. St Peter reported 5.46 inches and Albert Lea 6.25 inches. Many basements were flood and roads closed in those areas.

A Heat Wave prevailed from July 2-10, 1948 as fourteen Minnesota communities reported temperatures of 100 degrees F or higher. For many areas the Heat Wave was made especially difficult because it did not cool off at night. Most temperatures remained in the 70s F.

July 5-6, 1978 brought one of the worst flash floods to Rochester, MN. Evening thunderstorms on Wednesday, the 5th, carried over into the early morning hours of Thursday, the 6th. Many observers in southeastern Minnesota reported over 2 inches of rainfall. Spring Grove received 4.58 inches, while Minnesota City reported 5.30 inches. Rochester reported a whopping 6.74 inches. The storm caused the Zumbro River to exceed its banks and flood many sections of the city, especially the southern neighborhoods and the northeast. Five people were drowned and many roads and bridges washed out. Over 80 percent of the city was without power, and the sewage treatment plant was overwhelmed with flood waters. This flood, and a second one later in the summer, served as motivation for flood mitigation work on the Zumbro River in later years.

July 4-8, 1988 brought another Heat Wave to Minnesota with 40 communities reporting daytime highs of 100 degrees F or greater. This Heat Wave in combination with drought dealt a severe blow to Minnesota crops.

July 6, 1997 was a cold morning in northern counties as 13 observers reported temperatures in the 30s F. Both Embarrass and Tower reported mid-summer frost with readings of 32 degrees F.

Outlook:

Cooler temperatures with a chance for scattered showers and thunderstorms on Saturday and Sunday. Then drier for several days with near seasonal average

temperatures prevailing across the state.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, July 13th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 13th, 2012

HEADLINES

- Warmest first 10 days of July
- Drought expands
- Weekly Weather potpourri
- MPR listener question
- Almanac for July 13th
- Past weather
- Outlook

Topic: Warmest first 10 days of July

For the Twin Cities, and perhaps a few other climate stations, the first ten days of July 2012 have been the warmest in history based on mean temperature values. Seven of the first ten days brought daytime temperatures of 90 F or greater (two days were over 100 F), and on five nights the temperature remained above the 70 degrees F mark. These values produced a mean temperature of 82.7 degrees F, or 9 degrees F warmer than normal. The following is a list of the top ten warmest first ten days of July in the Twin Cities area going back to 1871:

1. 82.7 F in 2012
2. 82.4 F in 1948

3. 82.2 F in 1936
4. 81.2 F in 1989
5. 81.2 F in 1949
6. 80.8 F in 1937
7. 80.0 F in 1974
8. 79.2 F in 2002
9. 79.1 F in 2011
10. 79.0 F in 1988

The warmth, combined with the relative absence of significant rainfall has produced stress on some crops, as well as other landscape vegetation. Those with irrigation have been applying water to keep up with crop demands and many homeowners have been watering more than usual. Despite some widespread showers across the state early Friday morning (July 13) these trends of warmth and dryness are expected to continue for most of the month of July. A few who benefited from significant rainfall on Friday morning included: Warroad (1.18 inches), Stillwater (1.60 inches), Lake Elmo (1.63 inches), and Spring Grove (2.95 inches).

Topic: Drought expands

Though April and May surplus rainfall brought alleviation of drought across much of southern Minnesota, a deficiency in rainfall since June 1st has brought a return of moderate drought to many areas. Places like Lamberton, Pipestone, Windom, Worthington, Preston, Rushford, and Spring Valley have only seen less than half of normal rainfall since June 1st and crops are showing some signs of stress. This week these places were put in a moderate drought status by the U.S. Drought Monitor, while northwestern Minnesota counties remained in a moderate drought status where they have been the past several weeks. This is worrisome, though Minnesota is not as bad off as many parts of IA, IL, IN, OH, and MO where severe or extreme drought occupies a large share of the landscape. In fact nearly 56 percent of the USA land area is in moderate drought or worse, the highest percentage measured in the past 12 years. USDA Secretary Tom Vilsack declared 1016 counties in 26 states to be drought disasters this week based on the designation of "severe drought" by the weekly US Drought Monitor for eight weeks or longer. USDA also cut the estimate for USA corn production this year by 12 percent because of drought and heat stress that has already occurred. You can examine more geographic aspects of drought at the Drought Monitor web site and others:

<http://droughtmonitor.unl.edu/monitor.html>

or

<http://news.yahoo.com/blogs/lookout/us-natural-disaster-area-drought-150130308.html>

or

<http://blogs.usda.gov/2012/07/12/agricultural-weather-and-drought-update-%E2%80%93-71212/>

Topic: Weekly Weather potpourri

NOAA's National Hurricane Center was monitoring the development of Tropical Storm Fabio off the west coast of Mexico in the Eastern Pacific Ocean this week. It is expected to strengthen into a hurricane over the weekend and perhaps bring a rainfall threat to Baja California next week.

On southern Japan's Kyushu a slow moving frontal system brought record-setting rainfall this week (up to 20 inches in places) to some places causing mudslides, road closures and widespread flooding. Some observers reported rainfall intensity of up to 4 inches per hour. Unfortunately more rainfall is expected over the same area this weekend.

The United Kingdom Meteorological Office this week offers a synopsis of the research on climate change and extreme weather events and episodes. They note that the incidence of heat wave episodes has been inflated by climate change, while the incidence of extreme cold events has been diminished. You can read more at....

<http://www.metoffice.gov.uk/news/releases/archive/2012/bams-state-of-the-climate>

NOAA reported this week that strong thunderstorms over Sierra Leone and Nigeria in West Africa brought flash flooding, causing some damages and fatalities. A boat off the coast of Sierra Leone overturned in one of the strong storms and it was reported that at least 30 people drowned. Rainfalls of 3-4 inches were common and a second consecutive week of thunderstorm rainfalls was expected to begin this weekend.

Environment Canada reported some record warm highs and lows in Manitoba this week. At Winnipeg the high on Wednesday (July 11) was 94 degrees F with a warm low of 69 degrees F, and a dewpoint of 71 degrees F, producing a Heat Index of 101 degrees F. Further north, at Churchill (nearly 59 degrees N latitude) along the southwestern shore of Hudson Bay it reached 89 degrees F with an overnight low of 63 degrees F, and a dewpoint of 68 degrees F (Heat Index reached 93 F).

MPR listener question: Thanks to NOAA's ThreadEx Project (threaded extremes using the Army Signal Corps data), the National Weather Service official climate record for the Twin Cities starts in 1871 for daily precipitation, and 1872 for daily high and low temperatures. My question: how many record daily climate values (high and low temperatures, and precipitation) that still stand today were established during that first year of observation (1871 and 1872), over 140 years ago?

Answer: Good question. To the best of my knowledge there are still two daily precipitation records from 1871 (0.85 inches on Jan 23 and 1.28 inches on Apr 19); there are four daily low temperature records from 1872 (-13 F on Nov 27, -27 F on Dec 23, -31 F on Dec 24, and -24 F on Dec 27); and there are two cold maximum daily temperature records from 1872 (-1 F on Nov 28 and -10 on Dec 21). In fact the week leading up to Christmas that year was the coldest in history with a mean daily temperature of -18 degrees F over December 18-24, 1872. So in total there are still 8 daily climate records in the Twin Cities that have survived from 1871-1872.

Twin Cities Almanac for July 13th:

The average MSP high temperature for this date is 83 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 63 degrees F (plus or minus 6 degrees F standard deviation).

MSP Local Records for July 13th:

MSP weather records for this date include: highest daily maximum temperature of 105 degrees F in 1936; lowest daily maximum temperature of 65 degrees F in 1975; lowest daily minimum temperature of 50 F in 1926 and 1990; highest daily minimum temperature of 86 F in 1936; and record precipitation of 2.03 inches in 1919.

Average dew point for July 13th is 60 degrees F, with a maximum of 80 degrees F in 1995 and a minimum of 40 degrees F in 1926.

All-time state records for July 13th:

The state record high temperature for this date is 111 degrees F at Minnesota City (Winona County) in 1995. The state record low temperature for this date is 32 degrees F at Sawbill Camp (Cook County) in 1940 and at Brimson (St Louis County) in 1990. State record precipitation for this date is 5.02 inches at Indus (Koochiching County) in 1999; and no snowfall has been reported on this date.

Past Weather Features:

July 13, 1890 brought severe weather to parts of eastern Minnesota. About 4:30 pm an F-3 (winds 158-206 mph) tornado touched down in Anoka County and traveled 10 miles southeast through Ramsey County. It destroyed over 50 cottages on Turtle, Snail, Vadnais, and Gervais Lakes, killing 6 people and injuring 30 others. The same thunderstorm complex destroyed the town of Newport, and downburst winds overturned the excursion boat, Seawing, on Lake Pepin, drowning about half of its 200 occupants, the worst boating disaster in state history.

July 13-14, 1919 brought heavy thunderstorms to eastern Minnesota. Maple Plain and Minneapolis reported over 2 inches, while downtown St Paul received over 3 inches. It was the heaviest rain of that summer.

From July 6 to July 14, 1936 eight days were over 100 degrees in the Twin Cities, and the early morning low on the 13th was 86 degrees F, the highest minimum temperature ever measured in the Twin Cities. In fact seven times that month the overnight low did not drop below 80 degrees F.

July 13-14, 1970 brought heavy thunderstorms to southwestern and south-central Minnesota. Lamberton, Minneota, Tracy, Mankato, New Ulm, and Marshall reported over 2 inches of rainfall, while Worthington and St James reported nearly 3.50 inches. Windom received 5.69 inches and reported street flooding.

About 3:00 pm on the afternoon of July 13, 1974 an F-2 tornado (winds 113-157 mph) traveled 7 miles across Ottertail County and destroyed several trailers and a machine shed near Fergus Falls. Fortunately there were no injuries or deaths attributed to this storm.

Over July 12-14, 1990 a brief cold spell visited northeastern Minnesota. Observers at Brimson, Cotton, Duluth, and Isabella reported temperatures in the 30s F. On the 13th Brimson started out at 32 degrees F and warmed up to 80 degrees F by afternoon.

On July 13, 1995 a Heat Wave brought daytime temperatures of 100 degrees or higher to 25 Minnesota communities. With dewpoints in the 70s F the Heat Index soared and ranged from 105 to 115 degrees F that day. This spell of heat was also the cause of many deaths in the city of Chicago, especially in neighborhoods without air conditioning.

Outlook:

Warm under partly cloudy skies Saturday with a chance for showers in eastern Minnesota. Then chance of widely scattered showers in the north on Sunday and Monday. Mostly dry until late next week with increasing temperatures towards the

weekend.

Further Information:

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

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

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Minnesota WeatherTalk Newsletter for Friday, July 20th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, July 20th, 2012

HEADLINES

- Random pattern in thunderstorms this month
- New Seasonal Climate Outlooks
- Hot weather continues
- Weekly Weather potpourri
- MPR listener question
- Almanac for July 20th
- Past weather
- Outlook

Topic: Random pattern of thunderstorms prevails this month

Much of the state has been missed by significant rainfalls this month, leading to more Minnesota counties placed in drought status by the U.S. Drought Monitor. Portions of Rock and Nobles, as well as Clay, Norman, Polk, Mahnomon, Pennington, Red Lake, Marshall, and Beltrami Counties were placed in the "severe drought" category this week. Much of the rest of northwestern and southwestern Minnesota remains in moderate drought. Elsewhere portions of southern Wisconsin, southern Illinois, Indiana and northern Missouri were placed in the "extreme drought" category.

Despite this, some areas have seen significant, even record-setting amounts of rainfall. On Friday, July 13th International Falls received a record 2.68 inches while Spring Grove received a record 2.95 inches. On July 18th (Wednesday this week) Bethel, Isanti, and Rice received over 2 inches of rainfall, while Milaca reported 1.35 inches and Spring Valley received 1.51 inches. For the month of July so far, the random pattern of thunderstorm activity has produced normal or above normal rainfall amounts for a handful of observers in widely dispersed sections of the state including: Brainerd (4.17"), International Falls (4.02"), Spring Grove (3.91"), Stillwater (3.73"), Milaca (3.43"), Kabetogama (3.40"), Moose Lake (3.38"), Mora (3.31"), Ottertail (3.11"), and Hallock (2.28")

Topic: New Seasonal Climate Outlooks

The NOAA Climate Prediction Center issued new seasonal climate outlooks on Thursday (July 19) covering the period from August through October. For Minnesota the outlooks favor warmer and drier conditions to prevail in August. For the August through October period continuation of the above normal temperature trend of the past year is expected, while precipitation is expected to be below normal in the southeastern part of the state.

Topic: Hot weather continues

Temperatures across the region remained well above normal again this week. According to Greg Spoden of the Minnesota State Climatology Office the temperature pattern so far this month is on pace to give us one of the warmest Julys in history. Many places reported Heat Index Values of 100 F or greater again this week, and there were some record temperatures set. On July 16th Milan reported a record warm overnight low of 76 degrees F after a daytime high of 100 degrees F. Then on July 17th Madison (Lac Qui Parle County) reported a record high of 100 degrees F and La Crosse, WI also reported a record high of 100 degrees F. Fortunately cloud cover and somewhat cooler air prevailed on July 18 and 19 holding temperatures down in the 70s and 80s F many places. But a return of the heat is expected this weekend.

Topic: 25th Anniversary of the Twin Cities greatest rainfall

Between 7:00 pm and 1:00 am the night of July 23 (a Thursday), 1987 a severe thunderstorm complex brought ten inches of rain to MSP International Airport, by far the most ever measured in a single day there. For three consecutive hours, 7-10 pm, the rainfall intensity exceeded 2 inches per hour (a once in 25 year occurrence), and for two hours, 8-10 pm, the intensity exceeded 2.50 inches per hour (a once in 100 year occurrence). The maximum rainfall rate brought 1.55 inches in only

30 minutes. Earlier that week the Twin Cities had received over 4 inches of rainfall and soils were saturated. Needless, to say most of the Metro Area landscape experienced flash flooding that night.

Dewpoints remained in the low to mid 70s F during the storm, while air temperatures fell from the low 90s into the low 70s F. Flood waters closed many roads and much of the Interstate Highway system around the Twin Cities. Thousands of basements were flooded, and some roofs collapsed. Storm sewers spouted like geysers, leaving manhole covers scattered on roads and sidewalks. This storm combined with other thunderstorm events during that month produced the wettest month in history for most climate observers in the Twin Cities Metro area. July 1987 record total rainfall included..
MSP International Airport 17.90" Edina 17.91" Richfield 17.44"
Fridley 15.33" Chaska 14.67" Brooklyn Park 14.60"
Stillwater 14.04" Moundsview 12.66" Rosemount 12.08"

In fact for the Twin Cities the 1987 total annual precipitation was about 32 inches.....nearly 56 percent of that fell in one month (July) and over 30 percent of that annual total fell in six hours.

Topic: Weekly Weather potpourri

Because much of Indiana is in extreme drought, the first ever mandatory water restrictions were put into place by the Indianapolis Metro Area. Stream and river flows are extremely low around the state of Indiana as well.

Earlier this month NASA scientists analyzed imagery data from the Moderate Resolution Imaging Spectroradiometer (MODIS) sensor on board the Terra satellite and found that it accurately depicted the drought which has encompassed much of the USA. Minnesota looks relatively lush compared to much of the rest of the nation. You can view the image and read the discussion at.....

<http://earthobservatory.nasa.gov/IOTD/view.php?id=78553&src=share>

The forecast for the British Open Golf Tournament at Royal Lytham this weekend is for somewhat unsettled weather, with occasional showers and perhaps gusty winds at times. Conditions may be especially challenging for the world's best golfers.

The NOAA Storm Prediction Center has received only three reports of tornadoes far this month, unusually low for July. However with drought so widespread across the mid-section of the nation this might be expected.

MPR listener question: Can you please explain the difference between relative humidity and dewpoint one more time?

Answer: Sure. Relative humidity, expressed as a percentage, is a measure of the relative content of water vapor in the air compared to the maximum amount it could hold at a given air temperature. During the summer months daytime relative humidity commonly varies from 35 to 60 percent. Humans can tolerate a wide range in relative humidity as long as the temperature ranges between 35 and 75 degrees F. Dewpoint, measured in degrees F, is the temperature at which the water vapor content of the air is at saturation (100 percent relative humidity) and the vapor would condense to droplets. Generally when dewpoints are above 65 degrees F in the summer we start to feel uncomfortable, and when they are above 70 degrees F everyone is uncomfortable regardless of the air temperature and relative humidity. More often than not in the summertime when dewpoints are above 70 degrees F the National Weather Service has to issue a Heat Advisory because the high water vapor content of the air makes a temperature of 85-95 degrees F feel several degrees higher (translated to a Heat Index Value) and effects our own thermoregulation, not letting us easily dissipate our own body heat. The fact is in the summertime dewpoint relates more to our comfort and health, than relative humidity does. At an air temperature of 95 degrees F, with a dewpoint of 78 degrees F, the relative humidity is only 58 percent (not bad for human comfort), but the Heat Index is 111 degrees F (really bad for human comfort and health).

Twin Cities Almanac for July 20th:

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

MSP Local Records for July 20th:

MSP weather records for this date include: highest daily maximum temperature of 102 degrees F in 1901; lowest daily maximum temperature of 62 degrees F in 1912; lowest daily minimum temperature of 51 F in 1950; highest daily minimum temperature of 80 F in 2011; and record precipitation of 2.75 inches in 1987.

Average dew point for July 20th is 62 degrees F, with a maximum of 80 degrees F in 2002 and a minimum of 42 degrees F in 1947.

All-time state records for July 20th:

The state record high temperature for this date is 110 degrees F at New London (Kandiyohi County) in 1901. The state record low temperature for this date is 30 degrees F at Fort Ripley (Crow Wing County) in 1871. State record precipitation for this date is 10.75 inches at Beaulieu (Mahnommen County) in 1909; and no snowfall has been reported on this date.

Past Weather Features:

Widespread frost visited central Minnesota over July 20-21, 1871. The observer at Fort Ripley reported consecutive morning low temperatures of 30 degrees F and 34 degrees F.

July 20, 1901 was the middle of a 7 day Heat Wave with temperatures in the 90s F all the way into the Iron Range. Over 30 Minnesota communities reported afternoon highs of 100 degrees F or higher. The overnight low at St Cloud never fell below 80 F. The Heat Wave broke on July 26th as temperatures fell into the 70s and 80s F.

One of the heaviest thunderstorms to cross northern Minnesota occurred over July 19-20, 1909. It brought over 11 inches to Bagley and Beaulieu, and nearly 9 inches to Fosston. Walker reported nearly 6 inches, while Park Rapids had 4.33 inches. Some farm fields were underwater for days.

A 5 day Heat Wave gripped Minnesota over July 17-21, 1932. Over a dozen communities reported temperatures of 100 degrees F or higher. Crops wilted and dry soil below around with the wind. Milan reported an overnight low of 81 degrees F on the 20th.

Last year, July 17-20, 2011, brought a Heat Wave to Minnesota with Heat Index values ranging from 105 F to 130 F. These were driven by high dewpoints as the Twin Cities recorded a temperature of 96 degrees F on the 20th with a dewpoint of 76 degrees F, producing a Heat Index of 110 F. The Heat Wave broke as temperatures fell off into the 80s on July 21st. But, July of 2011 was the 5th warmest in Minnesota history.

Outlook:

Continued warmer than normal temperatures over the weekend and into next week. Slight chances for showers and thunderstorms Saturday and Sunday, but widely scattered. Another chance for showers by Wednesday next week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, August 10, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 10, 2012

HEADLINES

- Lack of tornadoes in July
- August brings relief
- Info from Farmfest 2012
- Weekly Weather potpourri
- MPR listener question
- Almanac for August 10th
- Past weather
- Outlook

Topic: Lack of tornadoes in July

The dominance of heat and lack of rainfall across the USA had a silver lining.....fewer severe storms and the smallest number of tornadoes reported in July during the modern era with just 24 nationwide. In fact according to Dr. Harold Brooks of NOAA the USA reported fewer July tornadoes than the Canadian province of Saskatchewan which had plenty of thunderstorms and tornadoes (nearly 30). You can read more about this at the Climate Central web site:

<http://www.climatecentral.org/news/us-loses-to-canada-in-july-tornado-competition/>

Topic: August bringing a respite from July heat and dryness

So far August has brought more seasonable temperatures to Minnesota, and thankfully moisture for some areas, including portions of some of the 28 Minnesota counties in severe drought status. Through the first ten days Halstad, Itasca State Park, Bemidji, Gull Lake, Cass Lake, Park Rapids, Ottertail, Redwood Falls, Worthington, Albert Lea, Owatonna, and La Crescent have received over 1.50 inches. A few areas have received over 2 inches including Spring Grove, Zumbrota, Lamberton, Morris, and Wheaton. Caledonia in Houston County already reports over 3 inches. August 4-5 brought the first back to back days with below normal temperatures since late June, and August 10th brought the coldest temperatures (39 F at Crane Lake, Big Fork, and Orr) and lowest dewpoints since June 13th.

For the first time in many months the NOAA Climate Prediction Center is forecasting a persistent spell of cooler and wetter than normal weather for Minnesota during the mid-August period. This will continue to bring welcome relief to Minnesota agriculture, though it may be too late to boost corn yields. It will likely help soybeans, pasture grasses, and alfalfa fields.

Topic: Bullet points from Farmfest 2012

-Severe drought prevails in 28 Minnesota counties, yet just 16 percent of the corn crop is in poor to very poor condition, and just 13 percent of soybeans, relatively small percentages when compared to the crop conditions in so many other states (IL, IA, MO, IN)

-Drought has pushed major commodity prices high (corn \$8.29/bu, soybean \$16.31/bu) and they may go higher yet. This may lead to higher food prices and higher costs for livestock feeding as the supply chain in these crops is suppressed by lower yield estimates.

-Congress left for recess with many pieces of legislation unsettled, including the new Farm Bill and other agricultural legislation.

-August weather is expected to bring some relief from stress in Minnesota's crops (with cooler and wetter conditions), but the same relief from the weather pattern may not prevail in other Midwestern states to the south.

-This is the 8th consecutive summer that severe drought has appeared somewhere on the Minnesota landscape (2005-2012), a persistence pattern than has not appeared since the Dust Bowl Era of the 1930s.

Topic: Weekly Weather potpourri

USDA Secretary Tom Vilsack designated Rock County, Minnesota as a drought disaster this week, eligible for special federal program assistance. This will include the contiguous counties of Murray, Pipestone, and Nobles as well.

NOAA released an updated North Atlantic Tropical Storm Seasonal Outlook this week. They raised the expected numbers of tropical storms for the current season to a range of 12-17, and expected hurricanes to 5-8. There have already been 6 named storms this season the latest being Ernesto. You can read more at their web site:

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

NOAA also stated that July of 2012 was the warmest month in history for the USA surpassing July of 1936. Persistence of hot temperatures was the signature climate pattern in July with little respite of the heat, except for the odd day or two. As a marker of this persistence 15 nights in the Twin Cities area never dropped below 70 degrees F during the month. NOAA also noted that 63 percent of the nation's landscape was in drought during July, and over 2 million acres had been consumed by wildfires.

<http://www.ncdc.noaa.gov/sotc/>

Persistent heavy rains from a series of tropical storms brought flooding rains to portions of the Philippines this week, including the Manila area. Rivers flowed out of their banks and some dams overflowed displacing much of the population. The flooding caused at least 43 deaths.

The Brazilian Weather Service has sent representatives to the London Olympics to study how the United Kingdom Meteorological Service has monitored and forecasted weather for the Olympic Games venues. They will learn as much as they can to take home and prepare for their responsibilities of forecasting for the next Olympic Games in Rio in 2016.

Heat prevailed in the southwestern sections of the USA this week. On Wednesday, August 8th Tucson, AZ reported 108 degrees F, Las Vegas, NV 110 degrees F, Phoenix, AZ 114 degrees F, Thermal, CA 115 degrees F, Needle, CA 118 degrees F, and Death Valley, CA 127 degrees F. In many of these areas the overnight low temperature remained in the 90s F.

MPR listener question: I know that you said July was the 10th month in a row with above normal mean temperature, but the forecast shows we are in for a spell of below normal temperatures in August. When was the last time the August mean temperature was below normal?

Answer: The last time August mean temperature was below normal was in 2009, and just barely. That August 15 of the 31 days brought below normal temperatures. Of the top 10 coldest months of August in the Twin Cities climate record only two (1992 and 2004) are of recent vintage. See list below:

Coldest Mean Temperatures in August from the Twin Cities Climate Record (1871-2011)

65.0 F in 1890
65.1 F in 1903
65.5 F in 1915
65.9 F in 1992
66.1 F in 1977
66.2 F in 1967
66.3 F in 2004
66.3 F in 1904
66.5 F in 1902
66.5 F in 1885

So far through the first 9 days of the month the mean temperature is about 74 degrees F, so we would have to see considerably colder weather prevail for the balance of the month to make the top ten coldest.

Twin Cities Almanac for August 10th:

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

MSP Local Records for August 10th:

MSP weather records for this date include: highest daily maximum temperature of 101 degrees F in 1947; lowest daily maximum temperature of 59 degrees F in 1888 and 2004; lowest daily minimum temperature of 46 F in 1904; highest daily minimum temperature of 80 F in 1944; and record precipitation of 2.47 inches in 2010.

Average dew point for August 10th is 58 degrees F, with a maximum of 75 degrees F in 1938 and 2010 and a minimum of 37 degrees F in 1982.

All-time state records for August 10th:

The state record high temperature for this date is 110 degrees F at Beardsley (Big Stone County) in 1947. The state record low temperature for this date is 27 degrees F

at Duluth Experiment Station (St Louis County) in 1923. State record precipitation for this date is 7.72 inches at Mankato (Blue Earth County) in 1948; and no snowfall has been reported on this date.

Past Weather Features:

Probably the hottest August 10th in Minnesota history was 1947 when 24 communities reported afternoon temperatures of 100 degrees F or higher. As far north as Detroit Lakes the mercury hit 100 degrees F. The heat wave lasted from August 8-11 with little respite. The overnight low at Beardsley on the 10th was a very uncomfortable 82 degrees F. Finally on the 12th temperatures dropped by 20 to 30 degrees F and brought relief.

The next year, August 9-10, 1948 brought intense thunderstorms to parts of central Minnesota. Buffalo, Cokato, and Le Sueur received over 4 inches of rainfall, while Faribault, Mankato, and Winsted reported over 7 inches, still a record amount today.

Intense thunderstorms brought heavy rains, high winds, and flash flooding to southwestern and south-central Minnesota on August 10, 1994. Mankato, New Ulm, Owatonna, St Peter, Worthington, and Lake Wilson reported over 4 inches of rain. Minneota, Redwood Falls, and Windom reported over 5 inches, while Marshall and Vesta reported over 6 inches.

Outlook:

Seasonable temperatures over the weekend with a chance for scattered showers and thunderstorms late Saturday and early Sunday. Near normal to slightly below normal temperatures next week, with a chance for showers and thunderstorms again by Wednesday and Thursday.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, August 17th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 17th, 2012

HEADLINES

- Beneficial rains for some
- Record cold in places
- New Seasonal Climate Outlooks
- Weekly Weather potpourri
- MPR listener question
- Almanac for August 17th
- Past weather
- Outlook

Topic: Beneficial rainfall for some

The first half of August brought some significant rainfall to many areas of the state, and in somewhat heavy doses in places. Thunderstorms brought 1.56 inches to International Falls and 1.40 inches to Red Wing Dam on August 15th. Some areas south of the Twin Cities (New Prague, Farmington, Rosemount) also received over 1 inch from fast moving thunderstorms on the 15th. In addition some hail over 1 inch in diameter fell over western counties on the 15th.

Many observers have reported over 2 inches for the month so far, while some locations (Preston, Lanesboro, Caledonia, Grand Portage) have received over 3

inches, as much as 3.59 inches at Grand Portage and 3.57 inches at Caldonia. The rainfall so far this month has kept the Minnesota drought stricken area from expanding in size this month.

Temperatures are averaging from 1 to 3 degrees F cooler than normal so far this month. For six consecutive days over August 9-14 daily temperatures were cooler than normal, a stretch of cooler than normal weather not seen since June 22-28, 2011 (15 months ago). Many observers have already reported overnight lows in the 30s F this month. Meanwhile at the Amundsen-Scott Station at the South Pole (Antarctica) it was -77 degrees F this week.

Despite cooler than normal temperatures, crops are rapidly maturing well ahead of the normal calendar pace. Corn will be ready for early harvest, while sugar beets are already being lifted in some places.

Topic: Record cold in places

August 16th brought a record-tying low temperature to International Falls with a reading of 41 degrees F (tied 1958). But more significantly a strong Canadian high pressure ridge brought the coldest August 17th (Fri) since 1963 to many parts of the state. New record low temperatures were set at: Silver Bay (34 F); Hibbing (34 F); Crane Lake (36 F); Princeton (37 F); Austin (38 F); and Waseca (39 F). In addition many observers reported tying their record cold low temperatures on August 17th including, 36 degrees F at Fosston (tied 2007), 37 degrees F at Little Falls (tied 1999); 37 degrees F at Hallock (tied 1904); and 39 degrees F at Park Rapids (tied 1896). For many these were the coldest readings since May 16th last spring.

Topic: New Seasonal Climate Outlooks

The NOAA Climate Prediction Center issued new seasonal climate outlooks on Thursday (August 16th) covering the period from September to November. September is expected to be warmer than normal for much of the nation's midsection, following a trend of recent years. Over September to November Minnesota is expected to see above normal temperatures prevail, a pattern associated with a developing El Nino episode. The CPC sees equal chances for above or below normal precipitation across Minnesota during this period.

NOAA also released a new Drought Outlook this week, covering the period through November 30th. The outlook calls for drought improvement in Minnesota, northeastern Iowa, southern Wisconsin, and northern Illinois. Unfortunately the outlook favors drought persistence in southwestern Iowa, Nebraska, Missouri, and southern Illinois. You can read more about this at...

<http://www.drought.gov/portal/server.pt/community/forecasting>

Topic: Weekly Weather potpourri

Typhoon Kai-Tak located southeast of Hong Kong was being monitored carefully this week. It packed winds up to 90 mph, producing sea waves of 25 feet. Kai-Tak is expected to bring heavy rains to areas between Hong Kong and Hanoi this weekend.

Tropical Storm Gordon formed in the North Atlantic on August 16th east of Bermuda. It is expected to strengthen slightly and perhaps become a hurricane over the weekend as it head toward the Azores. Gordon is the 7th named storm of the North Atlantic Tropical Storm season. The National Hurricane Center was also monitoring a depression in the southern Gulf of Mexico which may become a tropical storm over the weekend.

A recent study published in the journal Geology documents a 7000 year history of climate in the Nile Delta of Egypt. Based on interpretations of pollen and charcoal records from river sediments researchers have found evidence for mega-droughts in the region at 5000 years ago, 4200 years ago, and 3000 years ago. The mega-drought 4200 years ago was associated with the collapse Egypt's Old Kingdom. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/08/120816110839.htm>

On Thursday (Aug 16) parts of Siberia reported strong thunderstorms with heavy rain and large hail, some the size of hen's eggs. Hundreds of cars were damaged by the hailstones. Following the passage of the thunderstorm the temperature dropped from 90 degrees F to just 61 degrees F.

MPR listener question: Here in the Twin Cities we recorded daytime highs of 92 F and 90 F on August 1st and 2nd, but since then we have not seen 90 degrees F. How often does August produce no 90 F days in the Twin Cities climate record, and do you think we'll see another 90 F this month?

Answer: According to the Twin Cities climate record about 1 year in 9 August brings no days with temperatures of 90s degrees F or greater. In fact just last year was such an August. Given the present forecast for the balance of the month I see a very low probability for another 90 F day in the Twin Cities. However, bear in mind that about 40 percent of the time September brings at least one 90 F day to the Twin Cities.

Twin Cities Almanac for August 17th:

The average MSP high temperature for this date is 82 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 61 degrees F (plus or minus 6 degrees F standard deviation).

MSP Local Records for August 17th:

MSP weather records for this date include: highest daily maximum temperature of 100 degrees F in 1947; lowest daily maximum temperature of 63 degrees F in 1997; lowest daily minimum temperature of 42 F in 1962; highest daily minimum temperature of 73 F in 1922, 1934, and 1972; and record precipitation of 1.62 inches in 1905.

Average dew point for August 17th is 59 degrees F, with a maximum of 80 degrees F in 2002 and a minimum of 42 degrees F in 1947.

All-time state records for August 17th:

The state record high temperature for this date is 105 degrees F at Campbell (Wilkin County) in 1988. The state record low temperature for this date is 29 degrees F at Tower (St Louis County) in 1981. State record precipitation for this date is 5.00 inches at Le Center (Le Sueur County) in 1948; and no snowfall has been reported on this date.

Past Weather Features:

August 17, 1963 brought cold temperatures to parts of northern Minnesota. Frost was reported at Cook, Virginia and Bigfork. Temperatures rebounded to the mid-80s F by the 20th.

Another cold August 17 in 1981 when several northern communities reported frost. Cotton, Hoyt Lakes, Virginia, Meadowlands, Hibbing, and Tower reported frost on that date

The hottest August 17th in history was probably 1988 when over 20 Minnesota communities reported afternoon temperatures of 100 degrees F or greater. Actually the August heat wave lasted from the 15th to the 17th, finally breaking with the passage of a cold front on the 18th which dropped daytime highs by 25 degrees F.

Outlook:

Cooler than normal weekend under mostly sunny skies. Warming trend begins on Tuesday and will push temperatures back close to normal with another chance for showers and thunderstorms 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/>

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Minnesota WeatherTalk Newsletter for Friday, August 24th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 24th, 2012

HEADLINES

- Drought update
- See you at the State Fair
- Early fall colors
- 20th Anniversary of Andrew
- Weekly Weather potpourri
- MPR listener question
- Almanac for August 24th
- Past weather
- Outlook

Topic: Drought holding status quo in Minnesota

The U.S. Drought Monitor showed that the drought status in Minnesota this week remained about the same as the previous two weeks, with all or parts of 28 counties still affected by severe drought. Rainfall for the week ranged from 0.20 inches to over 2 inches around the state and remained very spotty in distribution. Most observers are reporting less than normal rainfall for the month. Some hail ranging from half to one inch in diameter was reported in central Minnesota communities on Wednesday this week, and on Thursday (Aug 23) the National Weather Service issued a tornado

warning for areas in Carver County (the first tornado warning in Minnesota since May). Strong winds were reported (62 mph near Hutchinson in some counties, along with intense rainfall amounts (2.85 inches at Watertown, 2.68 inches at New Prague, and 1.76 inches at Jordan). The outlook continues to favor above normal rainfall for the last part of August and first part of September. Fifty percent of the state's corn crop was already in the dent stage, and corn was maturing rapidly towards what will be an early harvest season.

Topic: See you at the State Fair

Though I am no longer broadcasting the Minnesota Weather Quiz from the State Fair on Minnesota Public Radio, I will be at the Fairgrounds MPR booth (Judson and Nelson Streets) on Sunday, September 2nd at noon with Morning Edition newscaster Phil Picardi. We will talk weather headlines from 2012 and take questions from the audience. If you are planning to attend the State Fair that day, please drop by for a chat.

Topic: Early fall color in the cards this year?

With an early green-up this spring and a dry weather pattern prevailing in so many places around the state leaf color change may be early and somewhat accelerated this fall. In anticipation of this Minnesota citizens may want to start monitoring the fall leaf color reports on the DNR web site

http://www.dnr.state.mn.us/fall_colors/index.html

Typically the earliest leaf color changes are found in northeastern counties and Canadian border counties.

Topic: 20th Anniversary of Hurricane Andrew

On August 24th, 1992 Hurricane Andrew, a category 5 storm (winds 157 mph or greater) struck Homestead, FL and crossed the Florida Peninsula, devastating much of the landscape. When all was said and done the storm accounted for 39 deaths and nearly \$27 billion in damages, the costliest hurricane ever. The National Weather Service in Miami, FL has issued a narrative about this great storm which you can find on their web site:

<http://www.srh.noaa.gov/mfl/?n=andrew>

Topic: Weekly Weather potpourri

Typhoon Bolaven, south of Japan in the Western Pacific is expected to gain strength over the next two days and become a super typhoon (winds over 130 mph). Peak wind gusts may exceed 160 mph, and sea wave heights already at 47 feet may exceed 50 feet. This large storm will bring rain to Kyoto in Japan and strong wind and storm surge to South Korea by next week.

Typhoon Tembin was over southernmost Taiwan and bringing heavy rains, winds up to 100 mph and sea waves approaching 40 feet. It was very slow moving and expected to remain a typhoon well into next week as it meanders around in the South China Sea.

The National Ice Center in Colorado reported this week that the extent of Arctic sea ice is expected to shrink next week to a new record low level, breaking the record of 1.66 million square miles of sea ice at the end of summer in 2007. The remarkable loss in Arctic sea ice this year is due to a very early spring warm up at high latitude, as well as a very warm summer. You can read more at the National Ice Center web site:

<http://nsidc.org/arcticseaicenews/>

The NOAA Storm Prediction Center continues to report a very low number of tornadoes in the USA this month. Less than 20 reports have been filed so far, following a record low number of just 24 in the month of July. Widespread drought in the central USA has certainly suppressed the severe weather activity since June.

MPR listener question: Will Tropical Storm Isaac become a hurricane and threaten the Tampa, FL area next week while the GOP convention is going on?

Answer: There is such a threat, but the probability of this happening is uncertain still. If Isaac tracks into the Gulf of Mexico, both ocean temperature and winds aloft conditions appear to favor strengthening to hurricane status. As it moves north in the Gulf the track of the storm could bend to the east towards the Florida coastline. There will be much more certain information available on the track of Isaac by late Saturday and Sunday. You can follow the tracking forecasts, roughly every six hours at the NOAA National Hurricane Center web site:

<http://www.nhc.noaa.gov/>

Twin Cities Almanac for August 24th:

The average MSP high temperature for this date is 79 degrees F (plus or minus 8 degrees F standard deviation), while the average low is 59 degrees F (plus or minus 6 degrees F standard deviation).

MSP Local Records for August 24th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1948; lowest daily maximum temperature of 56 degrees F in 1915; lowest daily minimum temperature of 43 F in 1887; highest daily minimum temperature of 76 F in 1948; and record precipitation of 4.08 inches in 1893.

Average dew point for August 24th is 58 degrees F, with a maximum of 75 degrees F in 1975 and 2011 and a minimum of 27 degrees F in 1934.

All-time state records for August 24th:

The state record high temperature for this date is 107 degrees F at Worthington (Nobles County) and Pipestone in 1936. The state record low temperature for this date is 22 degrees F at Tower (St Louis County) in 1977. State record precipitation for this date is 5.96 inches at Windom (Cottonwood County) in 1940; and no snowfall has been reported on this date.

Past Weather Features:

On August 24, 1893 strong thunderstorms brought heavy rain to the Twin Cities area. A number of observers reported 3-4 inches of rainfall.

August 24, 1940 brought heavy thunderstorms to southwestern and south-central counties of Minnesota as many observers reported 3 to 5 inches of rainfall, with flooded out roads and farm fields.

August 24, 1948 was probably the hottest in state history with over 80 communities reporting daytime temperatures of 90 F or higher. It was the middle of a six day heat wave for most, as day after day reached or exceeded 90 degrees F. In some places the overnight low did not fall below 80 degrees.

Outlook:

Somewhat warm temperatures this weekend with a chance for showers and thunderstorms on Saturday. Continued warm into next week with another chance for showers by Wednesday.

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Minnesota WeatherTalk Newsletter for Friday, August 31, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, August 31, 2012

HEADLINES

- Preliminary climate summary for August
- Warm Wednesday
- Invitation to the State Fair, Sept 2nd
- August 23 tornado confirmed
- Soil moisture reserves down
- New AMS statement on climate change
- Weekly Weather potpourri
- MPR listener questions
- Almanac for August 31st
- Past weather
- Outlook

Topic: Preliminary climate summary for August 2012

The mean monthly temperature for August was very close to normal for most observers in Minnesota, often plus or minus 1 degrees F from the historical average. Extremes temperatures for the month ranged from 99 degrees F at several southern locations on August 30th to just 33 degrees F at Embarrass on the 17th. Minnesota

reported the coldest temperature in the 48 contiguous states on August 10th with a reading of 38 degrees F at International Falls.

August continued with a drier than normal weather pattern as most observers reported below normal rainfall amounts for the month. There were a few exceptions as Morris (3.26 inches), Grand Marais (3.39 inches), Winsted (nearly 6 inches), and Grand Portage (3.78 inches) received above normal monthly amounts.

Crop maturation advanced very rapidly during August and by the end of the month some corn fields were nearly ready for harvest, and soybeans were yellowing and dropping leaves.

Topic: Invitation to the State Fair on Sept 2nd

Newscaster and radio host Phil Picardi and I will be at the Minnesota Public Radio Booth on the State Fair Grounds (corner of Judson and Nelson) at noon this Sunday, September 2nd to talk weather. It won't be a program to broadcast on FM91.1, but we will enjoy chatting with a live audience. We'll discuss the big weather happenings of this year and take questions from the audience. If you are in the area or plan to come to the State Fair anyway, please drop by at noon. I'd love to see you there.

Topic: Warm Wednesday and Thursday

A bubble of warm air brought some record-setting temperatures to the Dakotas and parts of Minnesota on Wednesday (Aug 29) and Thursday (Aug 30) this week. In the Dakotas Chamberlain, SD reported 112 degrees F, Pierre, SD had 111 degrees F, and Sioux Falls, SD reached a high of 100 degrees F, then hit a record 104 degrees F on Thursday, August 30th. The airport at Grand Forks, ND reported 97 degrees F, while Rochester, MN reached 92 degrees F tying the record for August 29th from 1945. Eau Claire, WI tied a record high with 97 degrees F on Thursday (Aug 30th), while La Crosse, WI set a new record with an identical reading of 97 degrees F. So many western communities reported daytime highs in the 90s F that several schools dismissed students early as their non-air conditioned classrooms heated up. Fortunately a cool front brought relief with lower temperatures and dewpoints by Thursday night.

Topic: August 23 tornado in Carver County confirmed

Todd Krause of the National Weather Service in Chanhassen confirmed this week that an EF-0 (winds 65-85 mph) tornado northeast of Plato in Carver County on August 23rd, damaging corn fields and trees, and destroying a barn. It was on the ground for 3.2 miles. The same relatively small but intense thunderstorm system brought 5.40

inches of rain to Winsted (McLeod County), 3.26 inches to Montrose (Wright County), 2.85 inches to Watertown (Carver County), and 1.76 inches to Jordan (Scott County). August is the fifth month this year to bring a tornado to Minnesota. There were also tornado reports in March, April, May, and June.

Topic: Crop condition holding steady and soil moisture reserves way down

The Weekly Weather and Crop Report for Minnesota showed just 17 percent of the state's corn acreage was in very poor to poor condition, and 12 percent of the state's soybean acreage was in similar conditions. That means that the balance of Minnesota's 15 plus million acres of corn and soybeans is in fair to excellent condition as the harvest season approaches. This is far better off than most states which were more adversely affected by drought this year.

With the lack of abundant rainfall in August, soil moisture conditions are extremely depleted. The University of Minnesota Southwest Research and Outreach Center (SWROC) at Lamberton reports less than 2 inches of stored moisture in the top 5 feet of soil, while the Southern Minnesota ROC at Waseca reports just a little over 3 inches stored in their soil profile. Further north at the Northwestern ROC at Crookston, the stored soil moisture values are less than 1 inch in the top 5 feet. Obviously larger than normal amounts of rainfall are desperately needed to recharge soils this fall before winter freeze-up. Fortunately it looks like September may start out wetter than normal.

Topic: New AMS statement on climate change

Given the building body of scientific evidence about the Earth climate system and how it is changing, the American Meteorological Society earlier this month issued a new statement on climate change and a new statement on climate services. These are carefully crafted statements to reflect scientific assessment, value of the data, and implications for our future. If you are interested in reading these statements I encourage you to view their web site.....

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

Topic: Weekly Weather potpourri

Earlier this week the NOAA National Ice Center reported the lowest amount of Arctic Sea Ice observed since satellite observations began in 1979. The report on August 26th showed 1.58 million square miles of ice cover in the Arctic Sea, breaking the record low from 2007 of 1.61 million square miles. You can read more about this at....

http://www.natice.noaa.gov/products/products_on_demand.html

or

<http://www.climatewatch.noaa.gov/article/2012/arctic-sea-ice-breaks-2007-record-low>

Additionally in western and central sections of Lake Superior this week surface water temperatures were ranging as high as 73-74 degrees F, not bad for swimming in some places. Even around Isle Royal National Park water temperatures were ranging from 65 to 68 degrees F.

Following a path taken by Typhoon Bolaven last weekend, Tropical Storm Tembin was headed for South Korea this week with heavy rains, high seas, and winds over 50 mph. This long-lived storm which tormented Taiwan earlier was expected to dissipate by the weekend. Tropical Storm Ilean was spinning off the southwest coast of Baja California, but it was not a threat to land. Tropical Storm Kirk was in the middle of the North Atlantic Ocean and posing no threat either, while another tropical storm was expected to develop over the weekend in the central North Atlantic Ocean as well.

The BBC Weather Center in London reports that the United Kingdom is recording one of its wettest summers in history, with a country-wide mean total rainfall of over 12 inches since June 1st. Despite this near historical wetness the weather abated during most of the Olympic Games and did not cause as much disruption as once anticipated.

MPR listener question: I heard that the all-time high temperature record for the Minnesota State Fair was changed this week, due to the variable historical dates that the State Fair has been hosted at the Fairgrounds. What is the new temperature record?

Answer: Yes, that is correct. When I studied the history of State Fair weather earlier and published this my book Minnesota Weather Almanac I thought the record high temperature was 97 degrees F on September 1, 1913, and tied on August 24, 2003. Recent research by the Minnesota State Climatology Office shows that in 1931 (warmest year in Minnesota history) the State Fair was held from September 5-12 (an 8 day run). On September 10th the daytime high was 104 degrees F, which is now the record high for the State Fair, and also the record highest September temperature ever measured in the Twin Cities. You can read more about State Fair weather records at....

http://www.climate.umn.edu/doc/journal/state_fair_weather_12.htm

MPR listener question: What positive purpose does nature have in mind for hurricanes to form?

Answer: Hurricanes are one of nature's mechanism for balancing out disparities in moisture and heat within the Earth climate system. They help redistribute the excess heat and moisture that accumulate in tropical latitudes and disperse this to higher latitude positions. Additionally they are the major supplier of moisture (rainfall) to many landscapes such as Mexico and Japan which receives over half of its annual rainfall from typhoons. Hurricanes sculpt the landscape in terms of reshaping dunes and inland waterways, and they periodically rearrange coral reefs. They have also been the savior of certain civilizations as on more than one occasion historically China attempted to invade Japan only to lose most of their fleet of ships to a typhoon.

Twin Cities Almanac for August 31st:

The average MSP high temperature for this date is 78 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 58 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for August 31st:

MSP weather records for this date include: highest daily maximum temperature of 94 degrees F in 1898 and 1907; lowest daily maximum temperature of 56 degrees F in 1944; lowest daily minimum temperature of 40 F in 1974; highest daily minimum temperature of 75 F in 1898 and 1961; and record precipitation of 1.50 inches in 1914.

Average dew point for August 31st is 57 degrees F, with a maximum of 75 degrees F in 1960 and a minimum of 34 degrees F in 1949.

All-time state records for August 24th:

The state record high temperature for this date is 100 degrees F at Beardsley (Big Stone County) and New London (Kandiyohi County) in 1898. The state record low temperature for this date is 23 degrees F at Cotton (St Louis County) in 1970. State record precipitation for this date is 5.85 inches at Crookston (Polk County) in 1908; and there was a trace of snowfall at Duluth on this date in 1949, earliest ever.

Past Weather Features:

Probably the hottest August 31st in state history was in 1898 when over three dozen Minnesota communities reported daytime highs of 90 degrees F or higher. Actually August 31st that year was the middle of a five-day Heat Wave that plagued much of the state. Relief finally came with five consecutive days of rain in early September.

August 31, 1906 brought frost to many parts of northern Minnesota as areas from International Falls to Ely saw overnight lows drop to 27 to 31 degrees F. A similar and even more widespread cold snap occurred on August 31, 1970 when temperatures across the north ranged from 23 to 31 degrees F.

August 31, 1947 brought a F-3 tornado (winds 158-206 mph) to Le Sueur County. Between 8:00 and 8:30 pm the tornado moved 17 miles across the landscape south of Le Center, destroying rural homes and barns. One person was killed and eight were injured by this storm.

About 2:30 pm on August 31, 1975 an enormous F-2 tornado (winds 113-157 mph) moved 6 miles across Clay County northeast of Moorhead. At times this funnel was nearly one mile wide. Fortunately it traveled primarily over agricultural fields and destroyed only one barn.

August 31, 1989 brought severe thunderstorms and widespread large hail to many parts of the state. Hail as large as baseballs was observed in parts of McLeod and Wright Counties. Further north heavy rainfall amounts set records as well. Georgetown reported 5.57 inches of rain, Park Rapids 4.38 inches, and Deep Portage 4.29 inches. Record amounts of rainfall were also reported from Moose Lake (4.42 inches), Sandy Lake (4.23 inches), and Wright (3.80 inches).

Outlook:

Warm over the weekend, with increasing chances for showers and thunderstorms by late Saturday and early Sunday, mostly in central and northern areas. Somewhat cooler on Monday (Labor Day) with more seasonable temperatures. Another chance for showers and thunderstorms by late Tuesday and Wednesday with closer to seasonable temperatures later in the week.

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Minnesota WeatherTalk Newsletter for Friday, September 7th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, September 7th, 2012

HEADLINES

- Dryness continues
- Signals of warmth
- Fall brings mixed emotions
- Weekly Weather potpourri
- MPR listener questions
- Almanac for September 7th
- Past weather
- Outlook

Topic: Dryness continuing into September

Not only was the 12-day run of the State Fair dry (only .08 inches), but the drought picture worsened across the state according to the latest US Drought Monitor. Some southwestern and south-central counties (9 in total) were placed in the Extreme Drought category this week, while many others continued to be in the Severe Drought category (another 23 counties). Little widespread rainfall has occurred across the state since the week of August 22nd. Normal amounts of September rainfall range from 2.50 to 3.50 inches, but the first week of September brought little relief to most places. Only Orr (1.12"), Rushford (1.15"), Lake City (1.16"), Preston (1.34"), and

Lanesboro (1.40") reported over an inch during the first week, while Caledonia received 2.57 inches. Much of this fell with the thunderstorms that crossed the state on September 4th bringing high winds and hail to many areas.

Minnesota Agricultural Statistics reports that topsoil moisture is short or very short for 63 percent of their respondents, and measured soil moisture values in the top five feet of soil at the University of Minnesota Research and Outreach Centers remains historically low for this time of year.

Topic: Topic: Signals of warmth

Pete Boulay of the MN State Climatology Office pointed out this week that the Twin Cities climate record for this year show 30 days with a daytime maximum temperature of 90 degrees F or higher. The annual average is about 13 days, and further this is the most since 1988 when there were 44 such days. Currently the 30 days with 90 F or better ties for 9th in the Twin Cities climate records back to 1871. You can read more about this at.....

http://www.climate.umn.edu/doc/journal/msp90_2012.htm

Another interesting signal of warmth is the number of nights that the temperature has not fallen below 70s degrees F in the Twin Cities. This year that number is 23 nights. Further, this is the 7th year since 2001 (58 percent of all years) that 20 or more nights have not seen the overnight low drop below 70 degrees F. Such occurrences used to be a rarity, as from 1871 to 1999 (129 years) there were only 12 years when the number of nights that remained at 70 F or above totaled 20 or more (about 8 percent of all years). This is a striking shift in climate pattern that may be associated with both urbanization and climate change.

Topic: Fall brings mixed emotions

The month of September brings very perceptible changes....declining day length (roughly 20 minutes per week), falling temperatures (average temperature declines about 3-4 degrees F per week), onset of foliage color change, and for some areas the first frost.

Many people are concerned about the first fall frost. Those suffering from the high pollen (asthma) would prefer to see a frost soon, while many gardeners hope that a frost holds off until the end of the month or later. Average first frost dates range from the September 7th to the 14th in far northeastern counties to the first and second weeks of October in many southern counties.

Fall color changes are eagerly anticipated by many Minnesota residents who like to admire the beauty of nature in the northern woods or from a drive along some of the major river valleys. The Department of Natural Resources web site keeps abreast of color changes around the state.....

http://www.dnr.state.mn.us/fall_colors/index.html

The first September overnight lows in the 30s F were reported from Embarrass, Crane Lake, Pine River, and Hibbing on Thursday morning this week. Such temperatures will accelerate the autumn color change in those areas.

Topic: Weekly Weather potpourri

The NOAA National Hurricane Center was tracking hurricanes Leslie and Michael (the 12th and 13th named storms this season) over the North Atlantic Ocean this week. Leslie was expected to pass over Bermuda on Monday next week, while Michael is expected to remain far away from any land.

Contrary to most of the central USA, the United Kingdom reported its 2nd wettest summer in history (trailing only 1912). The average June-August rainfall total was nearly 15 inches across that country, following a wetter than normal spring season for most. You can read about this at...

<http://www.metoffice.gov.uk/news/releases/archive/2012/second-wettest-summer>

Scientists from Cornell University reported this week that the glacial ice fields of southern Patagonia in the Andes of South America are diminishing at an accelerating rate. In southern Chile the volume of runoff released annually from these ice fields in recent years is 50 percent higher than it was prior to the year 2000. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/09/120905110537.htm>

MPR listener question: What was the highest dewpoint in the Twin Cities this summer?

Answer: The highest dewpoint reported from the MSP Airport this summer was 77 degrees F on July 4th. That was a sticky, hot day, as the air temperature reached 101 degrees F and the Heat Index reached 108 degrees F, both setting new 4th of July records for the Twin Cities. The overnight low was also a record warm 81 degrees F. There were 180 hours this summer when the dewpoint in the Twin Cities reached 70 degrees F or higher. This number was not record-setting but was a bit above average.

Twin Cities Almanac for September 7th:

The average MSP high temperature for this date is 76 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 56 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for September 7th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1976; lowest daily maximum temperature of 52 degrees F in 1911; lowest daily minimum temperature of 40 F in 1956; highest daily minimum temperature of 75 F in 2002; and record precipitation of 2.16 inches in 1964.

Average dew point for September 7th is 54 degrees F, with a maximum of 75 degrees F in 1985 and a minimum of 34 degrees F in 1956 and 1995.

All-time state records for September 7th:

The state record high temperature for this date is 104 degrees F at Wadena (Wadena County) in 1931. The state record low temperature for this date is 20 degrees F at Tower (St Louis County) in 1986. State record precipitation for this date is 4.65 inches at Remer (Cass County) in 1991; and there has not been any snowfall reported on this date.

Past Weather Features:

September 7th brought a Heat Wave to Minnesota in 1931, 1976, and 1978. In 1931 a 7-day Heat Wave began on September 7th bringing multiple 100 degree F days to many areas, the hottest September spell of weather in history, peaking with 111 degrees F at Beardsley on the 11th. In 1976, a shorter 2-day Heat Wave prevailed over September 6-7, bringing 90 F temperatures to dozens of cities, peaking with 104 degrees F at Luverne on the 6th. In 1978 an 8-day Heat Wave prevailed in southern Minnesota counties over September 5-12 bringing consecutive days with 90 F and higher temperatures. The peak of the heat produced 103 degrees F at Montevideo and Redwood Falls on the 7th.

September 7, 1986 brought an early frost to many northern Minnesota communities. Cotton, Tower, Isabella, and Cloquet saw overnight lows fall into the 20s F. Temperatures rebounded in classic Indian Summer fashion and brought daytime highs in the 70s and 80s F for much of the rest of the month that year.

September 6, 1995 brought four tornadoes to Steele and Rice Counties in southern Minnesota. The worst one, an F-2 (winds 113-157 mph), was on the ground for two miles around Morristown. It destroyed a number of farm buildings, overturned some wagons of grain, and damaged a home. Fortunately there were no deaths or injuries.

Outlook:

The weekend will start out with near seasonal average temperatures on Saturday, then warm Sunday and Monday. Little chance for rainfall until next Wednesday and Thursday, followed by cooler temperatures.

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Minnesota WeatherTalk Newsletter for Friday, September 14th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, September 14th, 2012

HEADLINES

- Last gasp of summer
- Small dose of rain
- Coldest of the season up north
- Weekly Weather potpourri
- MPR listener questions
- Almanac for September 14th
- Past weather
- Outlook

Topic: Last gasp for summer September 11th?

Strong south winds ushered in some very hot air across much of the state on Tuesday, September 11th. Many observers reported afternoon temperatures reaching into the 90s F, and in some locations new record high temperatures were set, including:

99 degrees F at Madison, 97 degrees F at Marshall, Owatonna, and Mankato, 96 degrees F at St Cloud, Lamberton, and Sioux Falls (SD), 95 degrees F at Luverne, and 94 degrees F at Waseca (tied record from 1948). MSP Airport reported 95 degrees F, just 1 degree F shy of the record for September 11th, and the first time a temperature that high has been recorded so late in September since 1939. A cold front caused

temperatures to drop by 30-40 degrees F on Wednesday (Sept 12). At Madison in Lac Qui Parle County, the temperature fell from 99 degrees F at 3:30 pm on the 11th to 59 degrees F at 3:30 am on the morning of the 12th. On the St Paul Campus temperatures fell by 36 degrees F in less than 12 hours.

Topic: Topic: Small dose of rain

September 12th brought some much needed rainfall, albeit generally light, to parts of southern Minnesota. Those getting more than a quarter of an inch included: Preston (.45), Luverne (.45), Austin (.50), Caledonia (.75), La Crescent (.55), Spring Grove (.65), Harmony (.70), and La Crescent (.44). Much more rainfall is needed to recharge soils in most of the state, as the US Drought Monitor update released on September 12th still shows all or portions of 37 Minnesota counties to be in severe or extreme drought. You can read more about this at...

http://climate.umn.edu/doc/journal/drought_2012.htm

Topic: Coldest of the season up north

On Friday morning, September 14th the coldest temperatures of the fall season so far prevailed in northern communities. Both Grand Forks, ND and Tower, MN reported 29 degrees F, while Waskish, International Falls, Hibbing, Cook, Crane Lake, Bigfork, and Babbitt reported lows of just 28 degrees F. Embarrass, MN fell to 26 degrees F, coldest in the state. A warm up is seen for the weekend before another round of cold temperatures intrudes on Monday and Tuesday of next week.

Topic: Weekly Weather potpourri

A national drought perspective was provided this week by Brad Rippey of the USDA World Agricultural Outlook Board, highlighting the major features of the USA drought. Excerpts include:

Crops and cattle in drought have begun to rise again. Overall, drought has shifted toward the north and west in recent weeks.

- U.S. corn in drought stands at 84%, up a percentage point from a week ago. The corn harvest is underway, 15% complete nationally by September 9.
- Soybeans in drought also rose a point – to 81%. The soybean harvest is underway in a few areas, 4% complete nationally by September 9.
- Hay in drought rose 3 points to 66%, tying the high set on July 17 and 24.
- Cattle in drought reached a new high, rising 2 points to 74%.
- Winter wheat in drought is added this week, as planting is underway (4% complete). Nearly three-quarters (74%) of the winter wheat area is in drought.

- Due to expansion of drought in the nation's mid-section, contiguous U.S. drought coverage reached a record-high 64.16% on September 11. The former record of 63.86% had been set on July 24.

The World Meteorological Organization (WMO) in Geneva, Switzerland issued a news release this week which invalidates the former world record high temperature reading of 136.4 degrees F from El Azizia, Libya (southwest of Tripoli) on September 13, 1922. The WMO Commission on Climate Extremes thoroughly investigated the record and found a number of concerns, including problematic instrumentation, observation site that was over a paved surface, and poor matching to surrounding measurements. With this declared invalidation, Furnace Creek in Death Valley now holds the world record high temperature with 134 degrees F, measured on July 10, 1913. On July 11 this past summer Death Valley reported a high of 128 degrees F, with an overnight low of 98 degrees F.

Dr. Nir Krakauer of City College of New York published a recent study to show that the Plant Hardiness Zones in the USA are shifting with climate change. His work suggests that the Plant Hardiness Zones released by the USDA earlier this year are really out of date as climate continues to change and winters become milder. You can read about his analysis at...

<http://www.sciencedaily.com/releases/2012/09/120913151130.htm>

September is National Preparedness Month and there are many resources available at the FEMA web site to assess your community's ability to deal with emergencies. You can get involved in regional discussions about disaster preparedness, read about building a supply kit for emergencies, join the national preparedness coalition, or get recommendations for developing a business emergency plan.

<http://community.fema.gov/connect.ti/READYNPM>

Super Typhoon Sanba in the Western Pacific Ocean was gathering strength this week and heading towards southern Japan and eventually South Korea. It packed winds of 165 mph with higher gusts and it was producing wave heights over 50 feet. It is expected to bring very heavy rains and high winds to Kadena, in southern Japan by the weekend.

MPR listener question: A number of people have recently asked whether we recorded above normal sunshine during the 2012 summer season in Minnesota.

Answer: The answer to this question is yes. Based on June-August sky conditions reported from MSP Airport, there were 11 percent more clear sky days, 39 percent

more partly cloudy days, and close to 80 percent less totally cloudy days. In addition, the measurements of solar radiation (total solar energy) from the University of Minnesota Research and Outreach Center at Waseca show 11 percent more solar radiation than average in June, 6 percent more than average in July, and 7 percent more than average in August. Of course there is a historical correlation between drought and more sunshine, and that was evident this year.

Twin Cities Almanac for September 14th:

The average MSP high temperature for this date is 71 degrees F (plus or minus 9 degrees F standard deviation), while the average low is 52 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for September 14th:

MSP weather records for this date include: highest daily maximum temperature of 98 degrees F in 1939 lowest daily maximum temperature of 48 degrees F in 1903; lowest daily minimum temperature of 33 F in 1996; highest daily minimum temperature of 74 F in 1939; and record precipitation of 1.60 inches in 1994.

Average dew point for September 14th is 47 degrees F, with a maximum of 73 degrees F in 1994 and a minimum of 25 degrees F in 2011.

All-time state records for September 14th:

The state record high temperature for this date is 103 degrees F at Redwood Falls (Redwood County) in 1939. The state record low temperature for this date is 18 degrees F at Cook (St Louis County) in 1964. State record precipitation for this date is 9.22 inches at Bricelyn (Faribault County) in 2004; and the state record snowfall for this date is 0.3 inches at International Falls (Koochiching County) in 1964.

Past Weather Features:

Light frost was reported in the Twin Cities area on September 14, 1873. The official temperature dropped to 35 degrees F. It was the first of 9 nights when the temperature fell into the 30s F during September, one of the coldest in state history.

A trace of snowfall was measured in both Minneapolis and St Paul back on September 15, 1916. It was the start of the worst snow season in the Twin Cities since that of 1880-1881 (estimated 110 inches in St Paul). Twin Cities snowfall for 1916-1917 totaled 84.9 inches. In fact, statewide it turned out to be a very challenging winter, with nearly 82 inches of snowfall at Duluth and 99 inches at Stillwater.

September 14, 1923 brought a killing frost to Minnesota, with a number of observers reporting morning lows in the 20s F. Campbell, New Ulm, and Zumbrota all reported temperatures in the 20s F as the growing season came to an abrupt end.

An autumn Heat Wave had a grip on the state over September 13-15, 1939, as most observers reported temperatures in the 90s F. New Ulm, St Peter, and Tracy reached 100 degrees F. Fortunately a strong cold front ended the hot spell of weather on the 16th, dropping temperatures by 25-20 degrees F.

An F-2 tornado (winds 113-157 mph) touched down about 3:45 pm on September 14, 1941 near Gilman in Benton County. It was on the ground for 8 miles and torn the roof off many homes. it also destroyed barns and out buildings on at least three farms.

On September 14-15, 2004 a stalled frontal boundary over southern Minnesota produced a series of thunderstorms which created widespread flash flooding in Martin, Faribault, Freeborn, Mower, and Dodge Counties. In those areas from 8 to 13 inches of rainfall was received over a 36 hour period. There were many mudslides and road closures in one of the largest flash flood events in state history.

Outlook:

Warmer over the weekend with highs from the lower 70s to lower 80s F. Increasing clouds late Sunday and a chance for showers and thunderstorms into Monday, then cooler for Tuesday and Wednesday next week. There will be another chance for rainfall by late next 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, September 21st, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, September 21st, 2012

HEADLINES

- Cold temperatures, dry air
- Windy Wednesday
- New Seasonal Climate Outlook
- Weekly Weather potpourri
- MPR listener questions
- Almanac for September 21st
- Past weather
- Outlook

Topic: Cold temperatures, dry air

Both Tuesday and Wednesday brought cold temperatures to many northern Minnesota communities. High pressure, clear skies, and a dry air mass were conducive to significant overnight drops in temperature. Some communities set new low temperature records, including

For Tuesday, September 18th:
32 degrees F at Grand Forks, ND
28 degrees F at Wright
27 degrees F at Floodwood

26 degrees F at Kabetogama
24 degrees F at Orr
22 degrees F at Hibbing
21 degrees F at Babbitt
20 degrees F at International Falls and Embarrass
19 degrees F at Warroad (this was the lowest reading in the nation on September 18th)

For Wednesday, September 19th:

27 degrees F at Silver Bay and Grand Marais
25 degrees F at Kabetogama
23 degrees F at Orr
21 degrees F at Warraod
20 degrees F at Embarrass (this was the lowest in the nation on September 19th)

The air was so dry that dewpoints were in the low 20s F, far more typical of late November than mid-September. After relative humidity in many places ranged from 20 to 30 percent. As a result of the very dry air and windy conditions during the day, the National Weather Service issued a number of Red Flag warnings this week around the state.

More overnight temperatures in the 20s and 30s F are expected over the coming weekend.

Topic: Windy Wednesday

A moderately strong low pressure system passing across southern Canada on Wednesday brought high winds to Minnesota. Most locations reported winds up to 30 mph or greater, while a few saw winds exceed 40 mph. Those reporting winds between 40 and 45 mph included Glenwood, Park Rapids, Detroit Lakes, Thief River Falls, Madison, Willmar, and Windom. Winds were strong enough to temporarily stop field harvesting of the corn crop in some areas during the late afternoon period.

Topic: New climate outlooks

On Thursday of this week the NOAA Climate Prediction Center issued new seasonal climate outlooks. The temperature outlook for Minnesota favors above normal values over the October-December period. Actually this trend is seen for about 75 percent of the USA based on dynamical models and past trends. Little emphasis is placed on El Nino at the moment because it remains in a neutral state. The precipitation outlooks shows equal chances for above or below normal values over the October-December period across most of the USA except the southeastern and mid-Atlantic states which are expected to see above normal values.

Topic: Weekly Weather potpourri

Excerpt from this week's report out of USDA/OCE-World Agricultural Outlook Board.....

"Crops and cattle in drought continued to rise. Overall, drought has shifted toward the north and west in recent weeks.

-U.S. corn in drought stands at 85%, up a percentage point from a week ago. The corn harvest is underway, 26% complete nationally by September 16.

-Soybeans in drought also rose a point – to 82%. The soybean harvest has accelerated, and stood at 10% complete nationally as of September 16.

-Hay in drought likewise rose 1 point to 67%, eclipsing the 66% high set on July 17 and 24.

-Cattle in drought reached a new high, rising 1 point to 75%.

-Winter wheat in drought was added last week, as planting is underway (11% complete). Nearly three-quarters (74%) of winter wheat areas are in drought.

-Due to expansion of drought in the nation's mid-section, contiguous U.S. drought coverage reached a record-high 64.82% on September 11, eclipsing last week's mark of 64.16%. The former record of 63.86% had been set earlier in the summer on July 24.

-The forecast features little if any rain over the next 5 to 7 days in most of the severe-to-extreme drought areas, particularly the Great Plains."

A new analysis of climate models published this week reveals both their strengths and their weaknesses.....according to the Science Daily web site..."the study is one of the first to systematically address a long standing, fundamental question asked not only by climate scientists and weather forecasters, but the public as well: How good are Earth system models at predicting the surface air temperature trend at different geographical and time scales?" This paper, written by Dr. Xubin Xeng (University of Arizona) and his research colleagues is published in Journal of Geophysical Research-Atmospheres shows that climate models have skill in depicting climate patterns across multiple decades (at least 3 or more), and at continental spatial scales. The models are not so good at year by year, or decadal scales. You can read more at....

<http://www.sciencedaily.com/releases/2012/09/120919191216.htm>

The International Cloud Appreciation Society is advocating for the naming of a new cloud type, "undulatus asperatus" (aka "agitated waves") which have been photographed in a number of places, including Cedar Rapids, Iowa. It is distinctive looking wave form cloud which Gavin Pretor_Pinney, President of the Cloud Appreciation Society thinks is deserving of recognition in the world cloud atlas published by the World Meteorological Society. You can read more about it at...

<http://www.usatoday.com/weather/story/2012/09/19/recognition-sought-for-new-cloud-variety/57803214/1>

Incidentally, the Cloud Appreciation Society announced recently the availability of its 2013 Cloudspotting Calendar. You can order one online by going to their web site:

<http://cloudappreciationsociety.org/shop/>

The National Snow and Ice Data Center (NSIDC) in Colorado announced this week that satellite monitoring of the Arctic Sea this month showed the lowest level of sea ice measured in the satellite monitoring era (since 1979). The new record minimum is almost 300,000 square miles less than the previous record low amount measured in September of 2007. You can read more at...

<http://www.sciencedaily.com/releases/2012/09/120919191214.htm>

MPR listener question: I saw where Paul Huttner mentioned a chance for snow showers earlier this week. I have never seen a September snow here. How often does the Twin Cities see a September snowfall?

Answer: In the modern National Weather Service records for the Twin Cities which date back to 1891, there are 13 reports of September snowfalls of a trace or greater, three of which came in September of 1942. In the older Pioneer Era records for the Twin Cities (1820-1890) there were only 4 reports of a trace of snowfall in September. The most recent measurable amount of snowfall was September 24, 1985 when 0.4 inches was reported at MSP International Airport. So historically you could say that September brings at least a trace of snowfall to the Twin Cities only about 8-9 percent of the time, once every 12 years or so.

Twin Cities Almanac for September 21st:

The average MSP high temperature for this date is 70 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 51 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for September 21st:

MSP weather records for this date include: highest daily maximum temperature of 94 degrees F in 1937 lowest daily maximum temperature of 46 degrees F in 1913 and 1995; lowest daily minimum temperature of 32 F in 1974; highest daily minimum temperature of 66 F in 1891 and 1908; and record precipitation of 2.07 inches in 1986; Record snowfall is a trace in 1995.

Average dew point for September 21st is 46 degrees F, with a maximum of 69 degrees F in 1924 and 1970 and a minimum of 22 degrees F in 1974.

All-time state records for September 21st:

The state record high temperature for this date is 101 degrees F at Wheaton (Traverse County) in 1937. The state record low temperature for this date is 13 degrees F at Alborn (St Louis County) in 1934. State record precipitation for this date is 3.95 inches at Lamberton (Redwood County) in 1968; and the state record snowfall for this date is 0.5 inches at International Falls (Koochiching County) and Walker (Cass County) in 1974 and at Park Rapids (Hubbard County) in 1995.

Past Weather Features:

Heavy late season thunderstorms brought very heavy rains to some parts of Minnesota on September 21, 1870. Ft Snelling reported 1.70 inches, while Ft Ripley reported 3.06 inches and Litchfield received 3.80 inches, still a record for the date in that community.

September 21-22, 1895 saw heavy thunderstorms cross the southern part of the state dropping 2 to 5 inches of rainfall and flooding many fields around Hutchinson, Worthington, and St Cloud. Harvest was delayed for many days in those areas.

September 21, 1904 brought an abrupt end to the growing season with many observers reporting temperatures in the 20s F. Pokegama Dam fell as low as 15 degrees F. Near Worthington the temperature dropped to 29 degrees F damaging some recently harvested potatoes.

September 21, 1934 brought another hard freeze to the state with many observers reporting temperatures in the 20s F, as far south as St Peter. Pokegama Dam reached a low of 15 degrees F, tying their record for the date.

September 21, 1937 was the hottest on record with over 24 communities reporting daytime highs between 90 and 98 degrees F. For many it was the latest seasonal reading of such high temperatures.

September 21-22, 1986 was notable for the thunderstorms which disrupted harvesting in many southern Minnesota counties. Areas from Austin and Zumbrota, north to Farmington were hit with 2-4 inch rainfalls. Zumbrota (11.72 inches) and Red Wing (11.51 inches) ended up with record amounts of September rainfall that year.

September 21, 1995 was cold with temperatures in the 30s and 40s F in northern Minnesota communities. Brief snow showers brought some areas a trace up to 1 inch of snowfall. Baudette reported a record amount of 2.0 inches.

Outlook:

Cooler than normal weekend coming up, with a chance for frost/freeze on Saturday night in many areas (that have yet to see one). Warming up on Monday to near normal temperatures with little chance for significant precipitation next week under mostly sunny skies.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, September 28th, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, September 28th, 2012

HEADLINES

- Preliminary September climate summary
- Weekly Weather potpourri
- MPR listener questions
- Almanac for September 28th
- Past weather
- Outlook

Topic: Preliminary September climate summary

Mean monthly temperature values for most southern Minnesota observers ranged from 1 to 2 degrees F warmer than normal, while several northern Minnesota communities reported monthly means that were 1 to 2 degrees F cooler than normal. The extremes for the month were 98 degrees F at Brownton (McLeod County) on the 12th and just 16 degrees F at Warroad on the 21st. Many observers reported overnight lows in the teens and 20s F and some reported new record lows (for example 19 F at Warroad on the 18th and 16 F there on the 21st were both new daily record lows). Killing frosts were widespread in nearly all areas during the month, but crops were fully mature and suffered little damage. Minnesota reported the coldest temperature in the 48 contiguous states on six days during the month.

The real story for September was the dryness due to absence of rainfall. Many observers reported measurable rainfall amounts on only 2-3 days, resulting in one of the driest Septembers in history on a statewide basis. The driest September was 1952 when the statewide average rainfall was just 0.57 inches. This year's statewide value will be close to that one. Many observers clearly reported their driest September in history, including Windom (0.30"), Moorhead (0.19"), Willmar (0.14"), Collegeville (0.08"), and Morris (0.03"). For Morris and Collegeville it was one of their driest months in history as well.

At the University of Minnesota Research and Outreach Centers located at Crookston, Morris, and Lamberton, measured stored soil moisture values in the top 5 feet of soil were at or below the all-time lowest values ever measured for the end of September. In addition the flow volume measured on many Minnesota rivers was below the historical 10th percentile, indicating extremely low water levels.

As of the end of September the U.S. Drought Monitor placed all or parts of 45 Minnesota counties in severe to extreme drought, most notably in southwestern, south-central and northwestern Minnesota. In total over 35 percent of Minnesota's landscape was designated to be in severe or extreme drought, the largest fraction of the state since the fall of 2006. The only Minnesota county not designated to be drier than normal is Cook in the far northeast.

The DNR reports very high wildfire danger ratings in many western and northwestern counties. A number of counties in northwestern and north-central Minnesota have burning restrictions in place. The National Weather Service issued a number of Red Flag Warnings during the month due to high fire danger ratings. Wild fires were reported this week near Warroad, Park Rapids, Cloquet and Little Falls.

Peak wind gusts over 40 mph were reported from a number of observers during September. Rochester reported peak winds of 55 mph on September 4-5.

Topic: Weekly Weather potpourri

From Brad Rippey, Office of the USDA Chief Economist, USA highlights for the drought-monitoring period ending on September 25 include:

- Nearly two-thirds (65.45%) of the contiguous U.S. is in drought. This is a new U.S. Drought Monitor record (January 2000 to present).
- Corn in drought stands at 84%, down from a July peak of 89%.
- Soybeans in drought are at 80%, down from a July high of 88%.
- Hay in drought continues to rise (currently 69%), due to the westward shift of the core drought area into the Plains' major hay production areas.
- Cattle in drought continues to rise (currently 76%), due to the westward shift of the

core drought area into the Plains' major cattle areas.

-Winter wheat in drought stands at 73%. Nationally, planting is one-quarter (25%) complete. Soil moisture shortages are most acute across the northwestern half of the Plains.

NOAA is seeking citizen interested in helping to classify the intensity of historical tropical storms and hurricanes. In a project titled CycloneCenter.org NOAA describes the need for citizens to analyze color-enhanced satellite images from 30 years of tropical storm monitoring. They hope to use the resulting data sets to gain a better understanding of the intensification and dissipation of tropical storms and enhance forecasting capabilities. If you want to participate in the CycloneCenter.org project you can learn more about it at...

<http://www.ncdc.noaa.gov/news/cyclonecenterorg-released>

Super Typhoon Jelawat was spinning in the western Pacific Ocean this week off the east coast of Taiwan. It was producing winds of 150 mph with higher gusts, and sea wave heights near 50 feet. The storm is expected to bring high seas, strong winds and heavy rains to Kyoto, Japan this coming weekend.

The NOAA Storm Prediction Center has filed only 26 reports of tornadoes in the USA so far in September. This is less than half the historical average for September and continues the trend of low tornado numbers that started in the month of July. The record lowest year for September tornadoes in the USA was 1952 when only 1 report was filed.

An article published this week in Science provides an analysis of paleo-climates in Utah and Nevada (14,000 to 20,000 years ago) that supports the hypothesis that a stronger summer monsoon season in the desert southwest fed and maintained the massive glacial lakes that were on the landscape then. Clearly the North America weather pattern was vastly different when ice occupied much of Canada. In this wetter period the earliest settlements were established by native people in much of the desert southwest. You can read more about this study at...

<http://www.sciencedaily.com/releases/2012/09/120927144234.htm>

MPR listener question: You mentioned the high winds observed around the state this year. But have there also been an unusual number of days with south or southeast winds?

Answer: Examining the climate of wind direction for southern Minnesota using monthly wind roses, I find that wind blows from the south to southeast direction about

20 to 30 percent of the time during the April through September period. The peak month for southeast winds is August. Taking the data from this year (2012) south to southeast winds were more frequent and stronger than average during the months of April, May, June, and July this year. The S-SE winds have been less frequent than average during August and September. The peak strength of south-southeast winds occurred in May and June as several days brought winds from that direction at peak wind speeds over 40 mph.

Twin Cities Almanac for September 28th:

The average MSP high temperature for this date is 65 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 45 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for September 28th:

MSP weather records for this date include: highest daily maximum temperature of 91 degrees F in 1898; lowest daily maximum temperature of 43 degrees F in 1908; lowest daily minimum temperature of 26 F in 1942; highest daily minimum temperature of 64 F in 1905; and record precipitation of 1.21 inches in 1891; Record snowfall is a trace in 1907 and 1945.

Average dew point for September 28th is 44 degrees F, with a maximum of 70 degrees F in 1971 and a minimum of 24 degrees F in 1942.

All-time state records for September 28th:

The state record high temperature for this date is 97 degrees F at Argyle (Marshall County) in 1952. The state record low temperature for this date is 15 degrees F at Pipestone (Pipestone County) and Tower (St Louis County) in 1899 and at Grand Rapids (Itasca County) and Alborn (St Louis County) in 1942. State record precipitation for this date is 3.65 inches at St Peter (Nicollet County) in 1901; and the state record snowfall for this date is 2.0 inches at Ada (Norman County) and Detroit Lakes (Becker County) in 1899.

Past Weather Features:

An early season snow storm crossed northern Minnesota on September 28, 1899 bringing snow from Fergus Falls to Mount Iron in the northeast. Ada, Park Rapids, Moorhead, and Detroit Lakes all received over 1 inch of new snow. Following the snow storm, temperatures plummeted into the teens F in some areas.

Thunderstorms brought heavy rain to parts of southern Minnesota on September 28, 1901. Fairmont and Winnebago received over 1.50 inches of rainfall, while St Peter received a record-setting 3.65 inches.

September of 1952 was the driest in state history. In addition over the 27th and 28th strong south winds brought unusually warm weather for so late in the season. Over 20 Minnesota communities saw the mercury reach 90 degrees F or greater over these two days. There were a number of wild fires reported that month.

September 28-29, 1965 brought thunderstorms and heavy rains to southern Minnesota. Over 2 inches of rainfall was reported in Winona, Spring Grove, Preston, Lanesboro, Austin, Caledonia, Slayton, and Bricelyn. Over 4 inches of rain fell in Harmony, producing some local street flooding. In fact Harmony reported their wettest September in history with 13.43 inches of rainfall.

Outlook:

Warm and dry, with plenty of sunshine to end the month of September this weekend. And warm early next week as well, with a chance for showers in the northeast. Much cooler by Thursday and Friday as a more fall-like air mass invades the region.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, October 5, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 5, 2012

HEADLINES

- October snow storm and temperature drop
- October wildfires
- Weekly Weather potpourri
- MPR listener questions
- Almanac for October 5th
- Past weather
- Word of the Week
- Outlook

Topic: October snowfall and temperature drop

The season's first significant winter storm crossed northwestern Minnesota this week over Wednesday night and Thursday, bringing strong winds, dramatic temperature falls, and significant snowfall to some places. Record snowfall reports for October 4th included:

4.5 inches at Hallock

6 inches at Karlstad (plagued earlier in the week by wildfires) and Crookston

7 inches at Roseau

3.0 inches at Grygla

3.5 inches at Grand Forks, ND
4.0 inches at Red Lake Falls, Thief River Falls, and Ada
8 inches at Angus
14 inches near Badger in Roseau County

All of these amounts broke the all-time state record snowfall for October 4th in Minnesota of 1.5 inches at Ashby (Grant County) in 1903. Lesser, though measurable amounts of snowfall were also reported from Bemidji, International Falls, Hibbing, Ely, and Cook. For many in eastern North Dakota and northwestern Minnesota, this was the heaviest, and most significant early October snow storm since October 2, 1950. In far northern areas more snow is expected to fall on Friday, October 5th as well. Some lake-effect snow accumulation may occur around Lake of the Woods and threaten the state record snowfall amount for October 5th which is 4.0 inches at Indus (near International Falls) in 1952.

Supported by strong southerly winds ahead of the cold front temperatures soared on Wednesday into the 70s and 80s F in many parts of the state. Milan in Chippewa County hit a high of 83 degrees, while Madison (Lac Qui Parle County) reached 81 degrees. With the passage of the cold front Wednesday night, temperatures plummeted by over 40 degrees F in a period of about 16 hours. Milan fell from 83 F to 39 F, Madison from 81 F to 37 F, Fergus Falls from 75 F to 34 F, and Fort Ridgely from 80 F to 33 F.

Strong winds caused blowing and drifting of snow in northwestern Minnesota, along with very low visibility. Winds peaked overnight Wednesday and into Thursday ranging from 30 to 40 mph, especially in western areas of the state. These winds ushered in a much colder air mass, pushing temperatures to below normal values for the first time this month, and that looks like where we will stay for sometime. In fact, earlier this week the NOAA Climate Prediction Center revised their earlier monthly outlook for October and now call for temperatures to average cooler than normal for the entire month. Unfortunately we also desperately need surplus precipitation, but it is hard to see that feature in any of the forecast models.

Though uncommon, significant October snowfalls and blizzards have occurred in Minnesota's past.

Other significant October snowfalls and blizzards include:

October 11-14, 1820 up to 11 inches at Old Fort Snelling
October 21-22, 1835 brought the first 6 inch snowfall of the season to Ft Snelling and was a precursor to a harsh winter for the Great Lakes Region
October 16-18, 1880 paralyzing blizzard (drifts up to 20 feet) in southwestern

Minnesota, written about by Laura Ingalls Wilder

October 18-20, 1916 a blizzard struck northwestern Minnesota with 5 to 16 inches of snow and zero visibility

October 23-24, 1933 brought a heavy snow to northeastern Minnesota, with amounts ranging from 7 to 11.5 inches

October 1-2, 1950 brought 1-5 inches of snow across northwestern Minnesota counties

October 7-11, 1970 brought some heavy snowfall to northern counties, record setting amounts of 6-14 inches for some, producing some road closures

October 4-6, 2000 brought snow to many northern Minnesota communities. Thief River Falls, Roseau, and Littlefork reported over 2 inches, while Baudette and Thorhult reported over 3 inches.

October 24-25, 2001 a blizzard with 55 mph hit northwestern Minnesota bringing snowfall of 10-14 inches, and huge drifts
October 12-13, 2006 brought snowfall to northeastern Minnesota, including 4-5 inches at Cook and Babbitt.

Topic: October wildfires

A number of wild fires were reported this week along and east of Hwy 59 in northwestern Minnesota between the towns of Hallock and Thief River Falls. The one at Karlstad forced evacuation of residents on Tuesday, October 2nd, but most were under control later on October 3rd, and dampened significantly by the snowfall on October 3-4. Wild fires are actually fairly common during the month of October, especially following summer drought. This was evident to Minnesota citizens even back in the 19th Century.

Much of the 19th Century fire history in Minnesota is documented from weather observer records, most notably those from Old Ft Snelling. From 1833 to 1874 observers noted prairie fires or forest fires in the Big Woods of southern Minnesota during 17 different Octobers (over 40 percent of those years). Sometimes the nighttime observer would note that the sky was bright in all directions as a result of these fires. In October of 1856 the infant communities of Henderson and Le Sueur were seriously damaged by wildfires. During October of 1861 wildfires burned most of the vegetation off the Dayton's Bluff area above St Paul. Perhaps the worst case of October wildfires happened in 1871. Following a serious summer drought prairie fires started near Breckenridge (Wilkin County) in early October and spread eastward and southward so that by the 7th fires were burning in Cokato, Howard Lake, Dassel, Lynd, Marshall, Windom, and New Ulm. The St Paul observer noted that "smoke hangs like fog.....

the air is full of cinders....and burnt spears of grass and twig fill everywhere." A summary of damages and deaths from those fires was never published for Minnesota, but that same month brought the devastating fires to Wisconsin (Peshtigo) and

western Michigan (worst ever in those states), and the famous Chicago fire (started in Mrs O'Leary's barn on October 8th). Those fires killed thousands of citizens in one of the worst fire outbreaks in USA history.

Topic: Weekly Weather potpourri

Bob Henson from the National Center for Atmospheric Research in Boulder, CO offers an opinion about whether or not an El Nino episode will evolve yet this year and affect our winter season weather pattern. It is generally pessimistic that El Nino will have much effect on the North America weather pattern this winter, but you can read it at....

<https://www2.ucar.edu/atmosnews/opinion/8019/now-you-see-el-nino-now-you-don-t>

The Joint Typhoon Warning Center was putting out warnings for Tropical Storms Maliksi and Gaemi in the Western Pacific Ocean this week. Tropical Storm Maliksi was off the east coast of Japan and slowly moving northeast, producing winds of 60 mph and wave heights of 18 feet. It was expected to dissipate by the weekend. Tropical Storm Gaemi was off the east coast of Vietnam and moving slowly towards the east with winds of 70 mph and sea waves of 21 feet. It was expected to weaken as it approached the coast of Vietnam this weekend.

Brad Rippey of the USDA World Agricultural Outlook Board once again provided a synopsis of drought in the USA this week. His summary statements include:

(as of October 2, 2012_>

-Nearly two-thirds (64.58%) of contiguous U.S. is in drought. The U.S. Drought Monitor record (January 2000 to present) was set a week ago, with 65.45% in drought.

-Hay in drought fell slightly to 67%, down two percentage points from last week's peak.

-Cattle in drought fell to 73%, down three percentage points from last week's peak.

-Winter wheat in drought stands at 71%. Nationally, planting was 40% complete by September 30. More than one-tenth (12%) of the crop had emerged, but emergence has been hampered by drought in several Central and Northwestern States, including South Dakota, Nebraska, Colorado, Oregon, and Montana.

All or parts of at least 55 Minnesota counties remain in severe or extreme drought this week according to the US Drought Monitor, and 96 percent of the state landscape is in moderate drought or worse. Most of the counties in extreme drought are in northwestern, southwestern, and south-central Minnesota. Much of the state's corn and soybean harvest is complete, and farmers will probably wrap up the fall harvest in

another week or two. Similar to last year, fall soil sampling and fall tillage will be problematic in some areas because soils are so dry.

A new report from researchers in Australia documents that the fall season (April-May in the southern hemisphere) is becoming drier in recent years as the sub-tropical dry zone expands southward. South eastern Australia autumn dryness is related to a shift poleward in the major storm tracks across the region. This is a mechanistic explanation for the severe droughts that prevailed there over the 1997-2009 period. You can read more at....

<http://www.sciencedaily.com/releases/2012/10/121003195132.htm>

An expert panel will call on Congress to create a Weather Commission to advise policy makers and lawmakers on weather/climate threats to the nation and mitigation of economic and infrastructure vulnerabilities to significant impacts from weather events and climate episodes. "Weather is immeasurably important to public safety and our economic competitiveness.....and "improved weather information can be an engine of economic growth" are quotes from their recently release report. Can you read more about this at the UCAR web site....

<https://www2.ucar.edu/atmosnews/news>

MPR listener question: What do you think the weather will be like for the Twin Cities Marathon on Sunday morning (Oct 7)?

Answer: This may be one of the coldest ever Twin Cities Marathons. Temperatures may start out in the upper 20s F to lower 30s F with little or no wind. By the end of the race the temperatures may be in the low to mid 40s F. On the bright side, skies will be sunny, winds will remain light from the southwest, and it will be dry with no precipitation expected. It may be an environment more uncomfortable for the spectators than the runners.

Twin Cities Almanac for October 5th:

The average MSP high temperature for this date is 64 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 44 degrees F (plus or minus 7 degrees F standard deviation).

MSP Local Records for October 5th:

MSP weather records for this date include: highest daily maximum temperature of 88 degrees F in 2011; lowest daily maximum temperature of 37 degrees F in 1952;

lowest daily minimum temperature of 25 F in 1952; highest daily minimum temperature of 63 F in 2007; and record precipitation of 2.31 inches in 1911; Record snowfall is a trace in 1952 and 1991.

Average dew point for October 5th is 42 degrees F, with a maximum of 67 degrees F in 2005 and 2007 and a minimum of 14 degrees F in 1935 and 1952.

All-time state records for October 5th:

The state record high temperature for this date is 98 degrees F at Beardsley (Big Stone County) in 1963. The state record low temperature for this date is 11 degrees F at Pine River Dam (Crow Wing County) in 1988 and at Tower (St Louis County) in 2000. State record precipitation for this date is 6.61 inches at Wild River State Park (Chisago County) in 2005; and the state record snowfall for this date is 4.0 inches at Indus (Koochiching County) in 1952.

Past Weather Features:

October 4-7, 1879 brought a taste of summer to Minnesota as temperatures soared into the 80s F for 4 consecutive days in many areas. Duluth reported a high of 78 degrees F on October 4, a record at the time, while the Twin Cities reached a high of 87 degrees F on the 5th, a record high not broken until 2011.

October 5-6, 1911 brought heavy thunderstorms to portions of southern and central Minnesota. Rainfall amounts ranging from 3-5 inches were reported from Pipestone, New Ulm, Mankato, St Peter, Redwood Falls, Farmington, Zumbrota, St Paul, Stillwater, and Glencoe. Farm fields were flooded for days.

October 5, 1935 was one of the coldest in state history. Several observers reported lows in the teens F, including 13 degrees F at Argyle, Hallock, and Beardsley, 14 degrees F at New Ulm, Crookston, Detroit Lakes, and Campbell, and 16 degrees F at Big Falls, Pokegama Dam, and Wadena. The daytime high at Albert Lea was only 39 degrees F, and only 36 degrees F at Brainerd.

The warmest October 5th in state history was in 1963 when over 30 Minnesota communities saw the temperature rise to 90 degrees F or higher, topped by 98 degrees F at Beardsley, the highest temperature ever measured in state so late in the year.

October 4-6, 2000 brought snow to many northern Minnesota communities. Thief River Falls, Roseau, and Littlefork reported over 2 inches, while Baudette and Thorhult reported over 3 inches. After the snowfall temperatures fell into the low to

mid 20s F in many areas, and as low as 18 degrees F at Embarrass and 11 degrees F at Tower.

One of the worst ever October flash floods occurred over October 4-5, 2005 in east-central Minnesota. Heavy thunderstorms persisted over eastern Minnesota and western Wisconsin on these two days, resulting in rainfall totals that ranged from 5 to 9 inches across parts of Pine, Isanti, Chisago, Washington, Morrison, Anoka, and Dakota Counties. Several roads were flooded, and I-35 was closed for a time between Rock Creek (Pine County) and Harris (Chisago County). All-time record single day rainfall totals for October were reported from Wild River State Park (6.61"), St Francis (6.24"), Mora (5.78"), Hinckley (5.43"), Cambridge (5.20"), and Stillwater (5.04"), among others.

It was 90 degrees F on October 5, 2011 (last year) at Granite Falls, MN. Today's high is expected to be in the mid 40s F there.

Word of the Week: Roebber Method

The National Weather Service uses the Roebber Method in snowfall forecasting. It is based on research done by Paul Roebber of the University of Wisconsin-Milwaukee. The Roebber Method helps in determining the snow/water ration or snow density. Important factors considered in this method include solar radiation, vertical temperature structure, vertical relative humidity structure, and surface condition in terms of compaction and snowpack metamorphism. The Roebber Method was developed in 2002 and is still in use. In fact this method was used by forecasters for estimating snowfall from the winter storm in the Red River Valley this week. You can read more about the Roebber Method at:

<http://www.cimms.ou.edu/~schultz/snowdensity/paper.shtml>

Outlook:

Cool and dry weekend coming up with temperatures well below normal. Warming trend on Monday, with increasing clouds and a chance for scattered precipitation. Temperatures will be closer to seasonal normals. Then cooler again for the rest of next week, with a chance for precipitation towards next weekend.

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, October 12, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 12, 2012

HEADLINES

- Downward trend in temperature
- SMM Climate Science Workshop
- Weekly Weather potpourri
- MPR listener questions
- Almanac for October 12th
- Past weather
- Outlook

Topic: Downward trend in temperature

Many observers have reported below normal temperatures so far this month. In northern locations 9 of the first 11 days have been cooler than normal, with many chilly mornings in the 20s F. Friday morning, October 12th brought the coldest temperatures of the season so far to many areas. Many observers reported overnight lows in the teens F. Some of the lowest readings included 16 degrees F at Wadena and International Falls, 15 degrees at Brimson and Babbitt, and 14 degrees F at Hinckley and Embarrass. If this pattern persists we may see a significantly cooler than normal month in Minnesota for the first time since May of 2011. In addition shallow soil

temperatures (4 inch depth) have fallen by 15-20 degrees F or more since the first of the month, and are now mostly in the 40s F.

Lake Superior surface water temperatures reached a maximum of 70 to 75 degrees F this summer, but have plummeted several degrees this month. Currently many areas of the lake are reporting surface temperatures in the upper 30s to low 40s F. Other smaller lakes around Minnesota have also seen a decline of surface water temperature. Lake Minnetonka has fallen from the low 60s F at the start of the month to just 50 degrees F late this week. Similarly Lake Mille Lacs has dropped from 59 degrees F to start the month to just 45 degrees F by October 11th. At Lake of the Woods water temperature has fallen from the low 50s F to start October to 39 degrees F on October 11th.

Topic: SMM climate science workshop

The Science Museum of Minnesota in collaboration with the Yale Forum on Climate Change and the Media organized a climate science workshop for broadcast meteorologists at the Science Museum in downtown St Paul on Saturday, October 6th. It was well attended by a number of broadcast meteorologists from our region. Scientists from around the country presented their studies on how climate is changing and what the consequences are. In addition there were useful presentations on how to communicate climate science and resources to use in teaching younger students, and the general viewing audience which is the focus of broadcasters. In general it was a excellent program and hopefully provided our region's broadcast meteorologists with more tools and resources to engage the public about climate science. Both Paul Douglas and Paul Huttner described the workshop and highlighted some of the bullet points in their blogs this week. You can explore this information at...

http://minnesota.publicradio.org/collections/special/columns/updraft/archive/2012/10/science_museum_climate_confere.shtml

or

http://www.startribune.com/blogs/paul_douglas_on_weather.html

It occurred to me that such workshops would be most useful to some of our political leaders as well, as it would advance their scientific literacy and provoke more productive public discussion on the topic of climate change.

Topic: Weekly Weather potpourri

The United Kingdom Met Office earlier this month announced a series of educational videos and experiments they are making available to school teachers via their web site. There are several lessons offered, including topics such as hurricanes, precipitation, clouds, air masses, and climate. If you are a teacher and want to review this material you can find it at the Met Office web site..

<http://www.metoffice.gov.uk/education/teachers/videos>

Bill McAuliffe posted a good article in the Star Tribune this week about the state drought and its effect on Minnesota watersheds. The flow volume on many rivers is extremely low. The St Louis River near Scanlon in NE Minnesota was at record volume during the flood in June, and is now the 2nd lowest height in more than 60 years. You can read more about Minnesota's drought and rivers at.....

<http://www.startribune.com/local/173624371.html>

A NOAA research team from the Pacific Marine Environmental Laboratory in Seattle, WA released findings of a study this week that revealed changing wind patterns in the Arctic which may affect weather across North America and Europe. During the 2007-2012 period prevalent arctic winds shifted from a west-east flow orientation aloft to a more north-south orientation. The new wave pattern brings warmer air to the arctic during the summer, and transports more cold air to lower latitude. These changing wind patterns are linked to the dramatic loss of arctic sea ice in recent years. You can read more at

http://www.noaanews.noaa.gov/stories2012/20121010_arcticwinds.html

This week NOAA also released a summary of national climate conditions during September. Nationally it was the 23rd warmest September on record, and the 16th consecutive month with above normal temperatures. It was also a dry month, with near record setting low statewide values for monthly precipitation in Minnesota, Montana, North Dakota, and South Dakota. For the 2012 year so far the period from January to September has been the warmest first nine months in the USA climate records nationally. You can read more at....

<http://www.ncdc.noaa.gov/sotc/national/2012/9>

Typhoon Prapiroon was spinning in the Western Pacific several hundred miles south of Okinawa, Japan. The storm was producing winds of 110 mph with gusts over 130 mph, and sea wave heights over 40 feet. This typhoon is expected to remain out to sea southeast of Japan over the next several days.

The NOAA National Hurricane Center was tracking two tropical low pressure systems in the North Atlantic: Tropical Storm Patty NE of Cuba was expected to meander near the Bahamas over the weekend, while a tropical depression just north of Trinidad and Tobago was expected to develop into the 17th named tropical storm (Rafael) of the season over the weekend. NOAA-NHC meteorologists were also tracking the development of a tropical storm system off the west coast of Mexico in the Eastern Pacific.

MPR listener question: How long ago did the National Weather Service begins it hurricane forecasting service?

Answer: Hurricane forecasting services started in Cuba in the 1870s. The US Army Signal Corps Service initiated hurricane warning services based in Jamaica and Cuba in the 1890s, then moved them to Washington, D.C. in 1902. The first season long, 24-hour hurricane forecast and warning service was initiated in 1935 by the Weather Service, using coordinated regional offices. The Miami office opened in 1943, and during the 1950s the National Weather Service consolidated hurricane forecasting expertise there as it evolved into the National Hurricane Center (NHC). It has remained in the Miami, FL area since then, though occupying different hurricane resistant buildings. In 1988, NHC took over responsibility for forecasts and warnings related to hurricanes in the Eastern Pacific as well as the North Atlantic.

Twin Cities Almanac for October 12th:

The average MSP high temperature for this date is 59 degrees F (plus or minus 12 degrees F standard deviation), while the average low is 41 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for October 12th:

MSP weather records for this date include: highest daily maximum temperature of 87 degrees F in 1975; lowest daily maximum temperature of 32 degrees F in 1909; lowest daily minimum temperature of 23 F in 1917; highest daily minimum temperature of 63 F in 1997; and record precipitation of 1.43 inches in 1997; Record snowfall is 2.50 inches in 2009.

Average dew point for October 12th is 39 degrees F, with a maximum of 64 degrees F in 1997 and a minimum of 14 degrees F in 1992.

All-time state records for October 12th:

The state record high temperature for this date is 89 degrees F at North Mankato (Nicollet County) in 1975. The state record low temperature for this date is 0 degrees F at Fosston (Polk County) in 1917, the earliest autumn reading of 0 F in state history. State record precipitation for this date is 2.62 inches at Harmony (Fillmore County) in 1986; and the state record snowfall for this date is 7.0 inches at Bird Island (Renville County) and Jordan (Scott County) in 1959.

Past Weather Features:

Late season thunderstorms brought heavy rains to central Minnesota over October 11-12, 1899. Montevideo, Colleagueville, and New London all received over 2 inches of rainfall. Fortunately the autumn harvest had been wrapped up and the rainfall was welcome to recharge the soil.

Perhaps the coldest October 12 in state history occurred in 1917. Storms had already brought traces of snow to northern parts of the state and an arctic air mass caused temperatures to plummet to record-setting levels, including 0 degrees F at Fosston, 5 degrees F at Angus, 6 degrees F at Hallock, and 9 degrees F at Thief River Falls. It was just 11 degrees F as far south as Pipestone. 1917 was the 2nd coldest October in Minnesota history (trailing only 1925).

Unseasonably cold temperatures visited the state again on October 12, 1919 when many observers reported overnight lows in the single digits F. Overall it was a cold and dry October in 1919 that brought below zero F temperatures to some parts of Minnesota.

A deep and strong low pressure system crossed the state on October 10, 1949 bringing long-lived destructive winds to many areas. Called an "inland hurricane" by the press, the storm brought 100 mph winds to Rochester, and winds up to 89 mph to the Twin Cities. The storm was blamed for 4 deaths and 81 injuries in the state. Wind-driven waves on Lake Minnetonka caused some serious shoreline erosion and damage to boats. You can read more about this storm in a review by Pete Boulay of the MN State Climatology Office at

http://www.climate.umn.edu/doc/journal/windstorm_19491010.htm

An early winter storm brought 2-3 inches of snowfall to many areas of the state over October 11-12, 1959. Two or more inches fell at Hallock, Detroit Lakes, Milan, Redwood Falls, Willman, and Minneapolis-St Paul. It was short-lived, but another round of snowfall later in the month help set new total October snowfall records at Hallock (9.5"), Farmington (8.2"), and Young America (5.5").

Fueled by strong south winds and bright, sunny skies, October 12, 1975 was very warm. Over 33 Minnesota communities saw the thermometer reach 80 degrees F or higher, topped by 89 degrees F at North Mankato.

October 11-12, 1986 brought heavy rains to many parts of southern Minnesota, helping to top off a very wet year. Many areas received over 2 inches of rainfall, while Winona and Zumbrota observers reported over 2.50 inches.

October 11-13, 1995 brought very warm temperatures to the state as many observers reported consecutive days in the 80s F. Even Iron Range observers saw the thermometer soar into the 80s F. At some southern Minnesota locations overnight minimum temperatures never dropped below 60 degrees F.

Outlook:

Warmer with showers and thunderstorms possible on Saturday, also heavy rain in some spots, mostly central and southern counties. Continued chance for showers early Sunday. Milder temperatures next week with a chance for showers again late Tuesday and Wednesday. Potential exists for a changing weather pattern that may bring more precipitation to us during the second half of October.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, October 26, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, October 26, 2012

HEADLINES

- Significant rains
- Great Storm of Oct 26, 2010
- 20th Anniversary Kuehnast Event, Nov 8th
- Weekly Weather potpourri
- MPR listener questions
- Almanac for October 26th
- Past weather
- Outlook

Topic: Significant rains for some

Small scale, but intense thunderstorms brought some heavy rainfall to parts of Minnesota early on Tuesday (Oct 23) this week. International Falls reported 1.07 inches, their heaviest rainfall since August 15th. Many others reported a quarter inch amounts or greater. Some of the largest amounts of rainfall were:

Champlin reported 2.11", Andover 1.64", Royalton 1.27", Maple Grove 1.69", Grand Marais 1.31", Waskish 1.16", and Little Falls 1.25"

The residual surface water vapor from the recent rainfall also contributed to dense fog advisories released by the National Weather Service this week.

Then over Wednesday night and Thursday additional persistent rains fell in southeastern Minnesota where Lanesboro and Harmony reported 2.15 inches, Spring Valley 1.77 inches, Winona 1.70 inches, Zumbro Falls 1.67 inches and Chatfield 1.30 inches. Elsewhere in eastern counties snow and snow flurries were widely reported on Thursday, though most were not significant amounts. Among those getting measurable snowfalls were Babbitt and Cook with 3 inches and Ely with 4.8 inches.

Total rainfall for the week was equivalent to an entire month of October for some, but these observers were few and far between. There was relatively little change in drought status across the state. You can find more on this at.....

http://climate.umn.edu/doc/journal/drought_2012.htm

Topic: The Great Storm of October 26, 2010

Only two years ago a record-setting storm crossed the state. It was a strong, winter-type mid-latitude cyclone that encompassed much of the USA landscape, with a central low pressure core that passed directly across northern Minnesota. A number of weather observers reported new low barometric pressure readings, including 28.36 inches at Duluth, 28.23 inches at International Falls, and a statewide record of just 28.21 inches at Bigfork, MN (Itasca County), equivalent to a Category 3 hurricane. With such low pressure came extreme winds. Wind gusts of 60-65 mph were reported from any locations in the state, as well as in Wisconsin and Ontario, Canada. Wind-driven waves reached 26 feet at Campbell's Point on the northeast side (Canada) of Lake Superior. Fortunately all shipping on the lake had found safe port or harbor. In satellite image of the Earth that day, this storm was the single largest atmospheric disturbance visible, dwarfing Typhoon Chaba in the Western Pacific in scale.

Record amounts of rainfall and snowfall were reported as well from this storm. Some of the record amounts of precipitation included 3.49 inches at Two Harbors, 3.11 inches at Brainerd, 2.94 inches at Duluth AP, 2.91 inches at Cloquet, 2.79 inches at Moose Lake, 2.62 inches at Hibbing, 2.42 inches at Brimson, 2.02 inches at Mahnomen, and 2.00 inches at Thorhult. Some of the snowfall amounts included 5.0 inches at Brimson, 7 inches at Island Lake, and 7.7 inches at Duluth and Two Harbors.

Topic: 20th Anniversary Kuehnast Event, November 8th

The 20th Annual Kuehnast Lecture Program will take place from 1:00 pm to 5:00 pm on Thursday November 8, 2012 at the University of Minnesota St Paul Campus Student Center Theater. It is free and open to the public. The program will feature a "Mini-Climate School" with 50 minute lectures by three outstanding scientists: David Phillips, senior climatologist with Environment Canada (Ottawa) will present "Canada: No Longer the Cold, White North"; Sue Grimmond, from King's College (London, UK) will present "Current Advances in Monitoring and Modeling Urban Climates"; and Harold Brooks from the NOAA National Severe Storms Lab in Oklahoma will present "Severe Thunderstorms and Climate Change." For more on this program you can go to:

http://www.climate.umn.edu/doc/journal/kuehnast_lecture/lecture20.htm

Topic: Weekly Weather potpourri

The NOAA National Hurricane Center was busy with forecasts and advisories on Hurricane Sandy and Tropical Storm Tony this week. After passing over Cuba and the Bahamas Hurricane Sandy is expected to bring rainfall and strong winds to portions of eastern FL, GA, SC, NC into the weekend, then VA, MD, NY and NJ by Tuesday. Sandy is expected to bring heavy rains and high winds to the east coast states early next week. TS Tony dissipated at sea by Friday. Sandy and Tony are the 18th and 19th named Tropical Storms of the North Atlantic Hurricane Season this year.

In the Western Pacific Ocean Tropical Storm Son-Tinh was bringing heavy rains and winds as high as 85-90 mph to parts of the Philippines. It was expected to head towards the north coast of Vietnam this weekend with high winds, heavy rain and sea waves of 24-30 feet. Remnants of Tropical Storm Murjan in the northern Indian Ocean off the horn of Africa was expected to bring heavy rain to the Somalia coast.

According to the Minnesota DNR the number of wildfires reported in September statewide was 186, the most in the month of September since 1976. Thankfully with the change in the weather this week the incidents of wildfires are expected to diminish.

A new NASA study shows that since 1978 the Arctic Ocean sea ice extent has shrunk, while that of Antarctica has grown. The loss and gain in sea ice at the poles is not symmetric. There has been a relatively larger loss of Arctic sea ice than gain in Antarctic sea ice. You can read more about this study at:

<http://www.sciencedaily.com/releases/2012/10/121023172212.htm>

MPR listener question: With the potential for Hurricane Sandy to strike the eastern coastal states next week and inflict a good deal of damage, I am wondering about the potential for disruption on Election Day the following Tuesday in terms of getting to the polls or infrastructure problems (street flooding, buildings damaged, etc). Have there been situations in past elections when the weather has caused major disruption?

Answer: On Election Day (ranging from November 2-8) in the USA the weather can be highly variable across the nation. On November 6, 1894 there was a fresh foot of snow in CT, along with high winds which hindered voter turnout. On November 8, 1960 there was an all day rain in Illinois, thought to have prevented a larger voter turnout for Nixon. In Minnesota foul weather has prevailed on Election Day a number of times, notably 1910 and 1936. On November 3, 1936 there was extreme cold (windchill values -25 to -30 F), heavy snow, and icy sidewalks. Nevertheless in Minnesota voter turnout was 1.1 million, more than 70 percent of the registered voters. I have not heard of hurricane weather and associated damages affecting Election Day.

MPR listener question: In an opinion piece I read recently in the newspaper about energy subsidies the author said, "but since the wind generally blows at night, when people use electricity the least, it cannot form a dependable part of the baseload supply." Is this assertion on when the wind blows correct?

Answer: No, it is not correct for our region of the country. Though there is large seasonal variability in wind speed (November and April usually show the highest mean wind speeds), wind studies in Minnesota and surrounding states have shown that mean wind speeds are about 150 to 200 percent higher during the day than they are at night. This is because the energy from the sun heats the Earth's surface and mixes the lower atmosphere.

Twin Cities Almanac for October 26th:

The average MSP high temperature for this date is 54 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 36 degrees F (plus or minus 9 degrees F standard deviation).

MSP Local Records for October 26th:

MSP weather records for this date include: highest daily maximum temperature of 83 degrees F in 1955; lowest daily maximum temperature of 32 degrees F in 1919; lowest daily minimum temperature of 16 F in 1962; highest daily minimum temperature of 59 F in 1989; and record precipitation of 1.54 inches in 1941; Record snowfall is 1.3 inches in 1959.

Average dew point for October 26th is 34 degrees F, with a maximum of 61 degrees F in 2000 and a minimum of 6 degrees F in 1936.

All-time state records for October 26th:

The state record high temperature for this date is 93 degrees F at Chatfield (Olmsted and Fillmore Counties) in 1927. The state record low temperature for this date is -16 degrees F at Roseau (Roseau County) in 1936, the earliest autumn reading of 0 F in state history. State record precipitation for this date is 3.49 inches at Two Harbors (Lake County) in 2010; and the state record snowfall for this date is 10.5 inches at Park Rapids (Hubbard County) in 1913.

Past Weather Features:

An early winter storm brought snow to northern counties on October 26, 1913. Amounts ranged from over 10 inches at Park Rapids to just 2 inches at Pokegama Dam.

October 25-27, 1927 brought a strong Indian Summer spell of weather to southern Minnesota. Fifteen Minnesota communities saw the thermometer climb into the 80s F, and Chatfield reported consecutive daytime highs in the 90s F.

October 23-25, 1936 brought one of the coldest spells of weather ever for the month. Many daily temperature records were set with overnight lows in single digits, and afternoon highs only in the 20s and 30s F. Nine Minnesota communities reported temperatures below 0 degrees F, and northern lakes began to show ice cover.

A strong low pressure system crossed the state over October 26-27, 1941 bringing thunderstorms, high winds, rain, sleet, and snow. Many observers reported 1-2 inches of precipitation.

The very next year, October 24-26, 1942 brought one of the biggest October snow storms in state history. Blowing and drifting snow actually closed some roads as Bigfork reported 6.5 inches, Pine River Dam 7.1 inches, Babbitt 7.2 inches, Orr and Detroit Lakes 8.5 inches, Meadowlands and Pokegama Dam 11.0 inches, and Sandy Lake Dam 15.0 inches.

October 25-26, 1955 was perhaps the warmest in history statewide with over 35 communities reporting daytime highs in the 80s F. Many Twin Cities employees took lunch outside, while some played hooky and took to the golf course. Temperatures crashed by the end of the month with daytime highs in the 30s F.

October 26-27, 1959 brought snow followed by cold temperatures. From 1 to 6 inches of snow fell across northern Minnesota, followed by temperatures plummeting into the teens F.

Perhaps the stormiest October 26th occurred in 2010 when many observers reported record low barometric pressure readings, record high wind speeds, and record amounts of precipitation (see write up above).

Outlook:

Cool and cloudy weekend coming up. Slight chance of snow in the west and south late Saturday and into Sunday. A bit of a warming trend starting on Wednesday, but temperatures will likely remain cooler than normal most of next week, with little chance for precipitation.

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/>

NOTE: News releases were current as of the date of issue. If you have a question on older releases, use the news release search (upper left-hand column of the [News main page](#)) or the main Extension search (upper right of this page) to locate more recent information.

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Minnesota WeatherTalk Newsletter for Friday, November 2, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 2, 2012

HEADLINES

- Climate Trivia or Climate Change?
- October Climate Summary
- Sandy's Aftermath
- 20th Anniversary Kuehnast Program
- Weekly Weather potpourri
- MPR listener questions
- Almanac for November 2nd
- Past weather
- Outlook

Topic: Climate Trivia or Climate Change?

According to Pete Boulay of the Minnesota State Climatology Office for many southern climate stations in Minnesota, including the Twin Cities and Rochester this year produced a climate anomaly worth noting. For the first time in history the average temperature for March (2012) was warmer than the average temperature for October (2012). This is a statistical singularity, but with changes in the extent of polar ice, and changing upper air patterns over North America perhaps this will happen again.

Topic: October Climate Summary

Most Minnesota observers reported mean October temperatures that were 1 to 2 degrees F cooler than normal, breaking a long string of months with above normal temperatures. Extremes for the month ranged from 87 degrees F at Wheaton on the 1st to just 8 degrees F at Babbitt on the 31st.

Precipitation for October was generally less than normal, except for some northern and southeastern counties where surplus precipitation was reported, mostly thanks to storms over the 4th and 5th and over the 24th and 25th. Those reporting surplus October precipitation included: 4.37 inches at Waskish, 4.35 inches at Hallock, 4.21 inches at Grand Portage, 3.63 inches at Argyle, 3.50 inches at Grand Marais, 3.92 inches at Lanesboro, 3.82 inches at La Crescent, 3.76 inches at Spring Grove, and 3.69 inches at Caledonia. Some record setting snowfall amounts occurred during the storm of October 4th. Those reporting significant snowfall in October included: 14 inches at Badger (Roseau County), 8.5 inches at Camp Norris, 8 inches at Angus, 7.1 inches at Orr, 7 inches at Roseau, 6 inches at Babbitt and Karlstad, and 5.8 inches at Cass Lake and Cook.

Despite the good news that some Minnesota observers reported above normal October precipitation, drought kept its grip on much of the state during the month. Some observers reported less than one inch for the month, and most places across the middle of the state as well as the southwest and south-central counties were well below normal values. The dry October followed an unusually dry September as well, resulting in the 3rd driest September-October combination in history on a statewide basis, trailing only 1952 and 1976. As we end October well over 40 percent of the state's landscape remains in severe to extreme drought condition according to the USA Drought Monitor.

Topic: Super Storm Sandy's Aftermath

Sandy proved to be one of the largest hurricane born storms to ever affect the eastern USA. It was well forecasted by the NOAA National Weather Service, at least partially due to more frequent instrumented balloon launches (6 hourly radiosondes) which provide valuable data updates for their forecast models. In terms of overall economic consequence estimated from insured losses, commerce disruption, and damage to infrastructure it may rival or surpass 2005's Hurricane Katrina (estimated loss of \$146 billion in 2012 dollars). Most damages were from winds and floods (both storm surge and heavy rains).

Wind gusts of 50 to 80 mph were reported along the eastern coast, with a maximum of 90 mph at Islip, NY. Rainfall amounts were commonly 4 to 10 inches, with some higher amounts (record-setting in most cases), including 10.20 inches at Georgetown,

DE, 11.91 inches at Wildwood Crest, NJ, and 12.55 inches at Easton, MD. In higher elevations 20 to 30 inches of snowfall was reported from portions of WV, VA, MD, NC, and TN (36" at Snowshoe, WV). Power outages affected nearly 8 million citizens, while hundreds of roads were closed along with bridges and tunnels. At least 88 deaths in the US states have been blamed on Sandy.

Jeff Masters and Christopher Burt of the Weather Underground also reported that Sandy brought new barometric low pressure records to many cities, including:

28.00 inches at Atlantic City, NJ

28.23 inches at Philadelphia, PA

28.31 inches at Trenton, NJ

28.46 inches at Harrisburg, PA

28.49 inches at Baltimore, MD

More about Superstorm Sandy can be found on Paul Huttner's Updraft blog at:

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

Topic: Catch the 20th Anniversary Kuehnast Program

If you want to become more educated about climate science and climate change, please plan to attend the 20th Anniversary Kuehnast Program, "a mini-climate school" which will be held at the University of Minnesota St Paul Campus Student Center Theater on Thursday, November 8th, from 1:00pm to 5:00 pm. It is free and open to the public. We have three outstanding speakers lined up: David Phillips, senior climatologist with Environment Canada (Ottawa) will present "Canada: No Longer the Cold, White North"; Sue Grimmond, from King's College (London, UK) will present "Current Advances in Monitoring and Modeling Urban Climates"; and Harold Brooks, research meteorologist at the NOAA National Severe Storms Lab in Oklahoma will present "Severe Thunderstorms and Climate Change." Following the program we will go to the Bell Museum on the Minneapolis campus for the opening of the Smithsonian Exhibit on soils, called "Dig It." You can read more about the November 8th program at.....

http://www.climate.umn.edu/doc/journal/kuehnast_lecture/lecture20.htm

Topic: Weekly Weather potpourri

Highlights from the summary statements of Brad Rippey, USDA World Food and Outlook Board meteorologist this week concerning the USA Drought:

-About sixty percent (60.16%) of contiguous U.S. remains in drought, although this week's value is down 1.63 percentage points from last week and down more than five points from the September 25 peak of 65.45%. Drought-easing or drought-eradicating rainfall has recently been heaviest in the Great Lakes region, the eastern Corn Belt, and of course in the Mid-Atlantic States associated with Hurricane Sandy.

-Hay in drought dipped to 62%, down two percentage points from a week ago and down seven points from the September 25 peak.

-Cattle in drought also fell two percentage points to 69%, and is down seven points from September 25.

-Winter wheat in drought decreased for the sixth consecutive week, although drought still covers nearly two-thirds (65%) of the production area. In some of the hardest-hit drought areas, winter wheat has been very slow to emerge this fall and the crop is running out of time before cold weather permanently arrives.

-Over the next week, a fairly benign weather pattern can be expected across much of the U.S. Cool weather may limit further winter wheat development in the Great Lakes region and parts of the East, but late-season warmth will dominate primary production areas of the Plains and Northwest. Despite the Plains' warmth, soil moisture shortages will continue to hamper wheat emergence and growth across the northwestern half of the High Plains.

-Computer simulations are suggesting the possibility of a strong storm system (a nor'easter) developing near the Mid-Atlantic or New England coast around the middle of next week. Atlantic beaches and coastal areas hammered by Hurricane Sandy will be especially vulnerable to additional damage if such a storm forms.

Across North America this week Eureka, Canada reported -27 degrees F while Death Valley, CA reported 89 degrees F.

A study released this week from the University of Maryland documents the potential infrastructure impact of sea level rise over the next 50 years in the Washington D.C. area. Many historical buildings, along with museums and government buildings will be threatened by this change. You can read more about this study at.....

<http://www.sciencedaily.com/releases/2012/11/121101104957.htm>

Two Mississippi State University economists discussed the potential financial impacts of Super Storm Sandy this week. They expect at least a \$60 billion economic loss would result from disrupted work time, reduced tax revenues, and loss of commerce. You can read more of their comments at....

<http://www.sciencedaily.com/releases/2012/10/121030142242.htm>

MPR listener question: My husband and I listen to you and Cathy every Friday from our home in Minnetonka. We are running behind schedule on our fall chores, and still need to plant bulbs in the garden. Can you tell me what the soil temperatures are now and when you think they will freeze?

Answer: Thanks for listening. Soil temperatures a few inches below the surface have tailed off into the upper 30s to low 40s F. So, there is still plenty of time to rake, dig, plant bulbs, and apply mulch or straw. Normally our soils in the Twin Cities area do not freeze up until the first of December or so. With somewhat milder weather expected through mid-November I think soil temperatures will moderate in the 30s and 40s F for a while.

Twin Cities Almanac for November 2nd:

The average MSP high temperature for this date is 49 degrees F (plus or minus 12 degrees F standard deviation), while the average low is 32 degrees F (plus or minus 9 degrees F standard deviation).

MSP Local Records for November 2nd:

MSP weather records for this date include: highest daily maximum temperature of 72 degrees F in 1978; lowest daily maximum temperature of 16 degrees F in 1951; lowest daily minimum temperature of 9 F in 1951; highest daily minimum temperature of 57 F in 1938; and record precipitation of 0.72 inches in 1901; Record snowfall is 5.3 inches in 1992.

Average dew point for November 2nd is 32 degrees F, with a maximum of 61 degrees F in 1987 and a minimum of -5 degrees F in 1951.

All-time state records for November 2nd:

The state record high temperature for this date is 80 degrees F at Canby (Yellow Medicine County) in 1965. The state record low temperature for this date is -11 degrees F at Moose Lake (Carlton County) in 1951. State record precipitation for this date is 2.76 inches at Maple Plain (Hennepin County) in 1961; and the state record snowfall for this date is 24.0 inches at Two Harbors (Lake County) in 1991.

Past Weather Features:

November 1st is a significant date in America's weather history. On that date in 1870 systematic weather observations were taken at 24 sites across the nation, all of which were operated by observers in the U.S. Army's Signal Corps. Their observations were

telegraphed to Headquarters in Washington, DC so that a national weather map could be drawn. These observations made on that morning were the first large-scale, synchronous (or synoptic) observations taken across the nation by the predecessor of the current National Weather Service. Seven days later, the mapped analysis of the weather caused the Signal Corps to issue its first winter storm warning to the public on Nov 8, 1870 for the Great Lakes Region.

November 1-2, 1935 brought extreme cold to northern Minnesota with many observers reporting lows below zero F, and single digit low temperatures were reported in the lower Red River Valley. Moorhead reached a high of only 16 degrees F on the 2nd. The remainder of the month was very cold as well.

Another extreme cold period came over November 2-3, 1951 as over 35 Minnesota communities saw the thermometer drop below 0 degrees F. It was -1 degrees F at St Cloud on November 2nd, the earliest below zero temperature ever reported in the fall season there.

A strong winter storm brought a mixture of rain, sleet, and snow to the state over November 2-3, 1961. Gaylord, Maple Plain, St James, Windom, and Young America all reported over 2 inches of precipitation (a whole month's worth in 2 days), while up north at Thorhult the observer recorded 6 inches of snowfall.

November 2, 1965 seemed a bit like summer as over 40 Minnesota communities reported daytime highs in the 70s F. It was short-lived, as daytime temperatures fell off into the 40s F by November 4th.

November 2-4, 1978 was possibly the mildest ever spell of early November weather with over 60 communities reporting temperatures in the 70s F. Golf courses opened and did a good business. It was a last gasp of Indian Summer as the second half of the month was dominated by heavy snow and cold temperatures.

Many snowfall and cold temperature records were set around the state over November 1-3, 1991 during the famous Halloween Blizzard. Several observers reported 15-30 inches of snowfall and many below 0 F overnight temperature readings. In fact that was the snowiest November in history for observers at Duluth, Two Harbors, and Bruno where over 50 inches of snow was recorded.

On November 1, 2000, at about 5:30 pm a tornado touched down near Prinsburg in Kandiyohi County. It traveled across a rural landscape for about half a mile, with a funnel diameter of about 30 yards. Unfortunately it destroyed a storage shed, tipped another shed on its side, and ripped off a portion of the roof on a third building of a family farm. Fortunately there were no injuries. This rare November event represents

one of only a few tornadoes that have been recorded this month in Minnesota history. The historical probability of a November tornado in Minnesota is less than 0.3 percent.

Outlook:

Mostly cloudy Saturday with a slight chance of snow in the north, continued cooler than normal temperatures. Chance of light rain or snow Saturday night and early Sunday. Getting warmer on Monday and Tuesday with a chance for mixed precipitation. Warmer yet deeper into next week with a chance for another more significant storm near the end of the week.

Further Information:

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

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

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Minnesota WeatherTalk Newsletter for Friday, November 9, 2012

To: MPR's Morning Edition

From: Mark Seeley, University of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 9, 2012

HEADLINES

- Highlights of the Kuehnast Mini-Climate School
- Soils exhibit opens at Bell Museum
- Cool, dry pattern continues
- Weekly Weather potpourri
- MPR listener questions
- Almanac for November 9th
- Past weather
- Outlook

Topic: Highlights of the Kuehnast Mini-Climate School

The 20th Anniversary Kuehnast Endowment Event was held at the St Paul Campus on Thursday, November 8th. The format was a "mini-climate school" with presentations on three important topics: Canada's Climate; Urban Climates; and Severe Weather in a Changing Climate. Some highlights are described below:

David Phillips from Environment Canada asked the critical question: "Is climate changing faster than we can adapt?" Certainly temperatures are changing across Canada: Western provinces are warming more significantly than eastern provinces, especially in winter and spring, while polar regions are warming remarkably in fall

and winter. The number of unusually warm nights is increasing, and glaciers for the most part are retreating. Extreme weather is in evidence, especially in the variability of wet versus dry growing seasons for Canada's farmers. Episodes of very strong winds are increasing in some areas as well.

Sue Grimmond from Kings College, London spoke about the need for cities to adapt and become more efficient in their energy and water use. The variability in land cover, mixture of architecture, and impermeable surfaces affect the climates of urban areas in many ways: wind flow and dispersion of pollutants, air quality, surface runoff, human comfort, and radiation balance among many attributes. More widespread monitoring and modeling is being done worldwide in big cities to better understand the urban climate. Albedo (reflectivity) of roofing materials, along with vegetation and green space have large effects in modifying the climate of cities, especially those that have little of these characteristics in place. More monitoring of city environments is likely in the future with continued development of economical sensor technologies and computer capacities to process the data and use them in real time.

Harold Brooks from the NOAA Severe Storms Laboratory in Oklahoma said the occurrence and distribution of severe convective storms is becoming more variable. The intensity of tornadoes and hail is a function of wind shear aloft. In a modeled future climate for our area, convective energy (updrafts) is expected to go up, but wind shear is expected to go down, offsetting each other somewhat, though the environment overall is expected to be more favorable for severe storms. He has mapped areas of severe convective storms worldwide. In more northern latitudes tornadoes may come earlier in the year, while in some areas like China, hail may become less frequent.

A recorded version of the Kuehnast 20th Anniversary presentations will be available next week on our web site. If you wish to view it, please go to.....

http://www.climate.umn.edu/doc/journal/kuehnast_lecture/lecture20.htm

Topic: "Dig It: The Secrets of the Soil" opens at the Bell Museum

The Smithsonian Exhibit on American Soils "Dig It: The Secrets of the Soil" opened at the University of Minnesota Bell Museum (Minneapolis Campus) on Thursday, November 8th. It will be there for a 9 month stay. It is a fascinating exhibit on the distribution of important soil properties and the value of soils to our nation, with several visual and interactive displays. I would encourage all school science teachers to consider planning a field trip to the Bell Museum to share this wonderful exhibit with students, perhaps even motivate some science fair projects. You can read more about it and plan your visit by going to:

<http://www.bellmuseum.umn.edu/>

Topic: Cool, dry climate pattern continues

Through the first full week of November the cool, dry weather pattern that dominated October has continued. Most observers report average temperatures that are cooler than normal, with teens F at night and 30s and 40s F during the day. Precipitation so far this month has been a few tenths of an inch, as only a few places have reported over 0.40 inches. Minnesota's drought situation has remained static with over 40 percent of the landscape still in severe or extreme drought. A winter storm is expected to bring some significant precipitation to northwestern counties into the weekend.

Topic: Weekly Weather potpourri

The NOAA National Weather Service is observing Winter Hazards Awareness Week in Minnesota. There are many educational and information based materials available on their web site, including winter automobile safety recommendations. You can read more at....

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

Highlights for the drought-monitoring period ending 7 am EST on November 6 from Brad Rippey of the USDA Office of the Chief Economist include:

- The portion of the contiguous U.S. in drought fell below sixty percent for the first time since July 3 and currently stands at 59.48%
- Hay in drought dipped to 61%, down one percentage point from a week ago and down eight points from the September 25 peak.
- Cattle in drought remained unchanged at 69%, but is down seven points from September 25.
- Winter wheat in drought also remained steady at 65%, ending a six-week decline in drought coverage. In some of the hardest-hit drought areas, winter wheat has been very slow to emerge this fall – and the crop is running out of time before cold weather permanently arrives. For example, only 33% of South Dakota's crop had emerged by November 4, versus the five-year average of 93%.
- Nearly one-fifth (19 percent) of the U.S. winter wheat was rated in very poor to poor condition by November 4a list topped by South Dakota (52 percent very poor to poor), Nebraska (49 percent), Oklahoma (30 percent), Colorado (28 percent), and Texas (24 percent).

The current edition of the Minnesota Conservation Volunteer magazine (Nov-Dec) showcases articles on Rainy Lake and the Rainy River. Both are well worth reading.

A report on the October World Meteorological Congress suggests that government weather services will move forward with a Global Framework for Climate Services intended to better serve decision makers in water, agriculture, food security, health and disaster risk management among all nations. The framework hopes to set some protocol and data standards for climate services which obviously need to be shared across country borders. You can read more at...

<http://www.metoffice.gov.uk/news/releases/archive/2012/gfcs-agreed>

Environment Canada recently published a review of climate trends and variations in 2012. Canada reported a wetter and warmer than normal summer. In fact for some areas it was among the warmest summers on record. You can read more at....

<http://www.ec.gc.ca/adsc-cmda/default.asp?lang=En&n=30EDCA67-1>

MPR listener question: Is it true that November is generally the cloudiest month of the year for most of Minnesota?

Answer: Yes, approximately two-thirds of all November days are completely cloudy, slightly more in northern communities. Only about one day in six is sunny. It is no wonder that those who suffer from Seasonal Affective Disorder generally start to show symptoms in November, with both shortening days and dominate cloudiness.

Twin Cities Almanac for November 9th:

The average MSP high temperature for this date is 43 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 28 degrees F (plus or minus 8 degrees F standard deviation).

MSP Local Records for November 9th:

MSP weather records for this date include: highest daily maximum temperature of 70 degrees F in 1999; lowest daily maximum temperature of 22 degrees F in 1945; lowest daily minimum temperature of 12 F in 1945; highest daily minimum temperature of 52 F in 1999; and record precipitation of 1.28 inches in 1970; Record snowfall is 4.5 inches in 1983.

Average dew point for November 9th is 26 degrees F, with a maximum of 54 degrees F in 1977 and a minimum of -1 degrees F in 1913.

All-time state records for November 9th:

The state record high temperature for this date is 83 degrees F at Springfield (Brown County) in 1999. The state record low temperature for this date is -15 degrees F at Milan (Chippewa County) in 1921. State record precipitation for this date is 3.08 inches at Cloquet (Carlton County) in 1983; and the state record snowfall for this date is 26.0 inches at St James (Watonwan County) in 1943.

Past Weather Features:

November 9th of 1921 and 1945 brought severe cold to Minnesota with many stations reporting below 0 degrees F morning lows and highs only in the 20s and 30s F. Temperatures remained cold for the balance of the month in 1921, but moderated significantly in 1945.

Over November 6-9, 1943 a major winter storm crossed Minnesota bringing high winds and a mixture of precipitation. Rain, sleet, glaze, and snow were reported around the state, bringing down power lines in northern Minnesota. Many parts of central and northern Minnesota reported 10 to 25 inches of snowfall, with drifts up to 15 feet in depth blocking roads in western counties. Hundreds of autos were abandoned on roads and trains were delayed for up to 48 hours. The locomotive of a train stranded near Windom was completely encased in a snow drift. High waves on Lake Superior caused some erosion damage, but most ships were safely anchored in Duluth Harbor. Farmers reported some loss of livestock and turkeys.

November 8-10, 1977 brought another major winter storm to the state, this time depositing 7-12 inches of snow in central and northern Minnesota. Some roads were closed for a brief period of time.

November 8-9, 1999 was the warmest in state history, with over 80 communities reporting daytime highs in the 70s F, and several locations even reporting 80s F. Golf courses were open for business, and many people took lunch outside. A sharp cool down came on the 10th with traces of snow in some places. Despite the brief cool down, November of 1999 was the 4th warmest in state history.

Outlook:

Chance of mixed, wintry precipitation on Saturday in the central and north, with possible thunderstorms in the south. Chance of rain or snow on Sunday, then cloudy and cold on Monday. Cold temperatures will give more to more seasonable temperatures by mid-week. Generally dry as well.

Further Information:

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

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Minnesota WeatherTalk Newsletter for Friday, November 16, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 16, 2012

HEADLINES

- Roller coaster weekend
- Little change in drought status
- Follow up on Kuehnast Program
- New Seasonal Climate Outlook
- Weekly Weather potpourri
- MPR listener questions
- Almanac for November 16th
- Past weather
- Outlook

Topic: Roller coaster weekend

A low pressure system brought strong southeastern winds to the state late Saturday, November 10th (Anniversary of the sinking of the Edmund Fitzgerald on Lake Superior in 1975), raising both temperatures and dewpoints to record-setting levels. MSP airport set a new high dewpoint record with a reading of 56 degrees F (breaking the form record of 55 degrees F in 1909) at 4:00 pm in the afternoon and also set a new high temperature record with a reading of 69 degrees F. It was the warmest November 10th since 1999. Several other Minnesota communities set record high

temperatures that day as well including 75 degrees F at Rochester and Winnebago, 74 degrees F at Waseca, Fairmont (tied record), Albert Lea, and Wells, 72 degrees F at Zumbrota, Grand Meadow, and Preston, 71 degrees at Red Wing, 70 degrees F at Redwood Falls (tied record), 68 degrees F at Minnesota City, and 67 degrees F at La Crescent.

By evening thunderstorms had developed in many areas delivering up to 0.50 inches of rain in some places. Three rare November EF-0 tornadoes (winds 65-85 mph) were reported by the National Weather Service, one near Burnsville, another in Eagan, and a third around Mendota Heights. These tornadoes caused damage to many trees and also knocked down some power lines. In addition some straight line winds caused damage to trees as well. This incident was only the 4th time in Minnesota history that tornadoes have been documented in the month of November, and the 2nd latest fall date for such an occurrence. The others were: November 16, 1931, November 2, 1938, and November 1, 2000. You can read more at....

<http://www.climate.umn.edu/doc/journal/tornado121110.htm>

Following the passage of the cold front on Sunday, November 11, temperatures fell by over 40 degrees F in 24-hours (Rochester went from 75 F to 28 F) and many observers reported measurable snowfall, for the most part less than half an inch. Some observers reporting significant snowfall this week included 1 inch at International Falls and Grand Rapids, 1.5 inches at Cook, 1.7 inches at Moorhead, 2 inches at Lake Kabetogama, and 3.0 inches at Red Lake Falls. In the Twin Cities Metro Area, snow and ice caused many accidents on Monday morning (Nov 12).

On Monday (Nov 12) some observers reported daytime highs in the teens and twenties F, over 20 degrees F below normal. Fortunately the cold snap was short-lived and by Tuesday and Wednesday temperatures returned to near seasonal normals. Nevertheless the cold snap froze some soils down to 2-3 inches, and thin coats of ice began to form on many inland lakes. Friday morning brought the first single digit temperature readings of the fall season with 9 degrees F reported at Embarrass, Floodwood, Orr, Crane Lake, Cotton, and Hibbing.

Topic: Little change in drought status

Despite some reports of rain and snow this week, there is little change in Minnesota's drought status. Over 40 percent of the state's landscape remains in severe to extreme drought, with the most notable areas in northwestern and southwestern counties. Most observers reporting over an inch of precipitation so far this month are not in the drought-stricken areas of the state. These observers include Orr, Cook, Tower, Leech Lake, Silver Bay, Cloquet, La Crescent, and Caledonia. Unfortunately little moisture

improvement is seen in the near future as the outlook through next week favors a warm and dry pattern across the state. You can read more about Minnesota's drought situation at.....

http://climate.umn.edu/doc/journal/drought_2012.htm

Topic: Follow up on Kuehnast Program

Approximately 250-300 people attended the Kuehnast Program's "mini-climate school" last Thursday (Nov 8) to hear presentations about Canada's climate, urban climates, and climate change implications for severe weather. The sessions were recorded and the archived versions are now available online for viewing by those who missed the program. You can find the recorded presentations at:

http://www.climate.umn.edu/doc/journal/kuehnast_lecture/lecture20.htm

Topic: New Seasonal Climate Outlook

New seasonal climate outlooks were released by the NOAA Climate Prediction Center on Thursday this week. For the December through February period they call for below normal temperatures across the high plains and western Great Lakes states, including Minnesota. This is based on some dynamical models as well as a persistent negative phase in the Pacific Decadal Oscillation (PDO), a measure of disparity in the sea surface temperature of the north-central Pacific Ocean and the eastern sections of the north Pacific around the Aleutian Islands and the Gulf of Alaska that persists for decades. You can read more about this at....

http://en.wikipedia.org/wiki/Pacific_decadal_oscillation

The precipitation outlook for remains one of equal chances for above or below normal values covering the December through February period.

Topic: Weekly Weather potpourri

NOAA announced this week that through new data sharing agreements it will have access to wind data collected by two of the nation's largest wind generator power producers in Oregon and Florida. These data will assist NOAA scientists in fine tuning forecast models. You can read more about this arrangement at the NOAA web site:

http://www.noaanews.noaa.gov/stories2012/20121114_windfarm.html

In South America where summer is approaching parts of southern Argentina reported high temperatures of 95-100 degrees F this week. These temperature values are on the order of 15 to 30 degrees F warmer than normal for this time of year.

A paper published in the current Bulletin of the American Meteorologist Society documents how the convective thunderstorm flash flooding in the high Himalayan desert during August of 2010 (8 inches or more of rainfall) was similar in dynamical characteristics to the famous flash floods in the USA at Big Thompson Canyon (CO) in 1976, and in the Black Hills of South Dakota in 1972. Satellite derived characteristics in these storms that are similar may help forecasters predict such storms in the future. You can read more at...

<http://www.sciencedaily.com/releases/2012/11/121113151127.htm>

The World Weather Observations (WOW) web site operated by the United Kingdom Met Office is gearing up to expand their worldwide weather monitoring. You can view current observations from their network by going to.....

<http://wow.metoffice.gov.uk/>

MPR listener question: Was the interval between the Twin Cities tornado reports of Saturday night (Nov 10) and the measurement of subsequent snowfall in the area a record short one? Has this ever happened before?

Answer: The tornadoes occurred on Saturday night (Nov 10) near 11:00 pm, with a temperature of about 66 degrees F and a dewpoint of 55 degrees F. A little more than 12 hours later (11:40 am Sunday, Nov 11) the temperature was 30 degrees F with a dewpoint of 27 degrees F and a trace of snow was being reported. In another 24 hours 0.2 inches of snow was reported and the high and low temperature were 27 degrees F and 19 degrees F, respectively. Scanning the climate records for the Twin Cities I can find nothing analogous to this rapid shift from tornado occurrence to snowfall. The closest analogy for the Twin Cities is from November 16, 1931 when a tornado occurred near Maple Plain, and two days later the observer there reported a trace of snow. Elsewhere there are only two similar stories: On March 21, 1953 a tornado was reported near St Cloud, MN, and two days later on the 23rd St Cloud reported a low of 21 degree F with a trace of snow; and March 18, 1968 a tornado was reported near the Watonwan and Martin County border, followed three days later on the 21st by a trace of snowfall in the area.

MPR listener question: I wondered why the National Weather Service uses average temperatures from only 30 years to define what is "normal" for a location? Why not longer periods of time?

Answer: This standard period length for averaging climate measurements is mandated by the World Meteorological Organization (WMO) for all government weather services. It is the minimal period of time required to provide meaningful statistics, but more importantly it helps to maximize the number of climate stations for which averages can be computed. This is especially important for countries that do not have lengthy climate records. This standard helps scientists compare the averages from climate stations over a wide geographic area. In Minnesota we do have some community climate records that go back well over 100 years.

Twin Cities Almanac for November 16th:

The average MSP high temperature for this date is 42 degrees F (plus or minus 12 degrees F standard deviation), while the average low is 26 degrees F (plus or minus 10 degrees F standard deviation).

MSP Local Records for November 16th:

MSP weather records for this date include: highest daily maximum temperature of 68 degrees F in 1953; lowest daily maximum temperature of 17 degrees F in 1927; lowest daily minimum temperature of -2 F in 1933; highest daily minimum temperature of 50 F in 19138; and record precipitation of 1.27 inches in 1996; Record snowfall is 10.5 inches in 1909.

Average dew point for November 16th is 27 degrees F, with a maximum of 59 degrees F in 1931 and a minimum of -10 degrees F in 1959.

All-time state records for November 16th:

The state record high temperature for this date is 75 degrees F at Marshall (Lyon County) in 1939, at Wheaton (Traverse County) in 1953, and at Marshall and Milan (Chippewa County) in 2001. The state record low temperature for this date is -27 degrees F at Big Falls (Koochiching County) in 1933. State record precipitation for this date is 4.10 inches at Two Harbors (Lake County) in 1909; and the state record snowfall for this date is 18.0 inches at Fairmont (Martin County) in 1909.

Past Weather Features:

One of the snowiest mid-November periods in state history occurred over the 13th to the 16th in 1909. Many observers reported 6 to 12 inches, and some received up to 20 inches. Over 20 inches fell at Fosston and Fairmont.

November 16-17, 1911 brought 2 to 8 inches of snowfall to eastern Minnesota communities, including the Twin Cities area. Following the snowfall temperatures fell into the single digits F.

Well after dark, at 9:35 pm on November 16, 1931 a tornado touched down in Hennepin County near Maple Plain. It pack winds of 113-157 mph (F-2) and was on the ground for 5 miles. All barns and outbuildings of one farm were destroyed by these winds. This remains the latest fall season tornado ever reported in Minnesota.

November 16, 1933 brought arctic cold air to the state, as 36 communities saw the thermometer fall below 0 degrees F with daytime highs just in the teens F. Fortunately by month's end 50 degrees F returned to many places providing some relief from the cold.

Over November 15-16, 1939 a spell of Indian Summer weather prevailed as most observers reported daytime highs in the 60s F. Six communities topped out at 70 degrees F or higher. It was generally a warm, sunny, and dry (5th driest in state history) November that year.

November 15-17, 1953 was the warmest such period in state history. At least 36 Minnesota communities reported daytime highs of 70 degrees F or higher. It was the last gasp of mild fall weather as snow dominated the Minnesota landscape from November 20th to 30th. Some observers reported at least a trace of snowfall everyday during that interval.

A major winter storm crossed the state over November 15-17, 1996 bringing a mixture of rain, freezing rain, sleet, and snow. Some areas of northwestern Minnesota received over a foot of snow, while heavy rain fell in eastern sections of the state, setting record amounts in some cases. Many observers reported over a month's worth of precipitation, 2-3 inch amounts. Bruno, Santiago, and Wolf Ridge reported over 4 inches in one of the wettest periods in November history.

One of the mildest mid-November periods occurred over November 10-18, 2001 with many daytime temperature reaching the 60s F. Dewpoints were summer like as well ranging from the 50s to lower 60s F. Many golf course were open for business.

Outlook:

Above normal temperatures are expected to dominate the weather into the weekend and next week, as temperatures average several degrees warmer than average and we see frequent sunny skies. Little chance for precipitation, except for Monday. Then dry and mild much of next week through Thanksgiving Day.

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, November 23, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 23, 2012

HEADLINES

- Record warmth, then temperature crash
- Thanksgiving climatology
- Weekly Weather potpourri
- MPR listener questions
- Almanac for November 23rd
- Past weather
- Outlook

Topic: Record warmth this week, then temperature crash

From Saturday, November 17th to Thanksgiving (Nov 23) temperatures averaged 12 to 25 degrees F warmer than normal around the state, with frequent sunny skies, similar to last year's spell of mild weather over November 23-26, 2011. Some new record high temperatures were reported around the state over Sunday through Thursday, including:

54 degrees F at Hibbing on November 18, 2012

53 degrees F at Hibbing on November 19, 2012

54 degrees F at International Falls on November 19, 2012

55 degrees F at Pokegama Dam (tied record), and Bigfork on November 19, 2012
56 degrees F at Cass Lake and Brainerd on November 19, 2012
57 degrees F at Grand Rapids on November 19, 2012

60 degrees F at Sherburn, Chaska, and Wells on November 20, 2012
63 degrees F at Marshall on November 20, 2012
62 degrees F at Forest Lake on November 20, 2012
57 degrees F at Brainerd on November 20, 2012

Numerous high temperature records were set on November 21st, too many to list here. Some observers reported 70 degrees F or higher, including 70 degrees F at Rochester and Sherburn, and 71 degrees F at Winnebago. Others setting records on Wednesday, November 21st included 69 degrees F at Fairmont and Waseca, and 68 degrees F at Marshall and Worthington. Numerous record warm minimum temperature records were set as well.

Thanksgiving Day (Nov 22) brought a record 60 degrees F to the Twin Cities (just after midnight) and 62 degrees F at Eau Claire, as well as a record tying 52 degrees F to Duluth. But, then the other shoe dropped during late in the day as temperatures plummeted, falling into the 20s F with windchill conditions in the teens and single digits. Snow was also reported by many observers, including 1 to 4 inches in central counties and 5-10 inches in northeastern counties. Many places reported wind gusts of 40 to 50 mph.

Topic: Thanksgiving Climatology

The mild temperatures of the recent holiday were a significant anomaly. Many locations saw afternoon highs in the 50s F. For the Twin Cities it was only the 11th time in past 141 years that Thanksgiving Day has brought a temperature of 50 degrees F or greater. It is interesting to note that 5 of those years have come since 1998. For southern Minnesota communities it was another dry Thanksgiving which is typical historically, as over 70 percent of the time the holiday brings a trace or no precipitation. You can read more about Thanksgiving climatology on our web site at...

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

Topic: Weekly Weather potpourri

Parts of the United Kingdom received heavy rains this week, especially in the southwestern sections and in the Midlands where 2-3 inches of rain brought some street flooding. There were disruptions to traffic as well as railroads. Further rains were expected going into the weekend.

A article published recently in the International Journal of Climatology provides a documented data base of 195 coastal storm surge events dating back to 1880. A total of 62 data sources were used. This data base will be of value for coastal communities in planning for potential storm surge events. You can read more about it at...

<http://onlinelibrary.wiley.com/doi/10.1002/joc.2425/full>

According to a recent article in Geophysical Research Letters the accelerated loss of water from the Himalayan glaciers will lead to an overall shrinkage of almost 10 percent over the next several decades. As a result the fresh water discharged from this melting combined with the rainy season may lead to more flooding. You can read more about this article at....

<http://www.sciencedaily.com/releases/2012/11/121116124650.htm>

MPR listener question: How often do we end November in the Twin Cities area without any measurable snow cover? Seems like we might be headed for that this year.

Answer: It is more common than you think. The climatology for the Twin Cities area shows that about 50 percent of the time there is no measurable snow cover on November 30th. This is somewhat surprising to many citizens.

Twin Cities Almanac for November 23rd:

The average MSP high temperature for this date is 34 degrees F (plus or minus 10 degrees F standard deviation), while the average low is 20 degrees F (plus or minus 10 degrees F standard deviation).

MSP Local Records for November 23rd:

MSP weather records for this date include: highest daily maximum temperature of 55 degrees F in 1905; lowest daily maximum temperature of 7 degrees F in 1898; lowest daily minimum temperature of -6 F in 1898; highest daily minimum temperature of 46 F in 2009; and record precipitation of 0.89 inches in 1983; Record snowfall is 11.4 inches in 1983.

Average dew point for November 23rd is 19 degrees F, with a maximum of 50 degrees F in 1905 and a minimum of -18 degrees F in 1950.

All-time state records for November 23rd:

The state record high temperature for this date is 65 degrees F at Marshall (Lyon County) in 1974. The state record low temperature for this date is -31 degrees F at Tower (St Louis County) in 1898. State record precipitation for this date is 1.81 inches at Beaver Bay (Lake County) in 1983; and the state record snowfall for this date is 18.0 inches at Babbitt (St Louis County) in 1983.

Past Weather Features:

Probably the coldest November 23rd in state history occurred in 1898. Following a heavy snowfall over November 21-22 (up to 13 inches at Pokegama Dam), nearly every observer in the state reported an overnight low below zero F. Northern observers reported values from -14 to -31 degrees F, while at Crookston the temperature never rose above -1 F during the day.

Another cold wave gripped the state on November 23, 1900 when two dozen communities reported morning low temperatures that were below zero F. This followed a significant snowfall over November 19-21 as Arctic air settled over the state keeping temperatures cold until the 29th.

A strong winter storm passed across the northern part of the state on November 23, 1954. Winds of 60 mph were reported, along with some damages. In Wadena at least 9 store fronts were blown in and street signs and antennas knocked down. A nearby barn was blow off its foundation.

November 23, 1974 brought a very warm day to southwestern Minnesota communities. Many set net record highs with daytime readings in the 60s F, including Lamberton, Marshall, Pipestone, Tracy, Tyler, Worthington, Windom, and Springfield. It was a brief mild spell of weather as temperatures fell off into the 20s and 30s F the next day (Nov 24th).

November 23-24, 1983 brought very heavy snowfall to eastern sections of the state. Many observers reported amounts ranging from 10 to 20 inches. Visibilities were near zero in some areas and many Thanksgiving travelers were stranded or rescued by state troopers in 4-wheel drive vehicles.

November of 1985 brought both heavy snowfall and very cold temperatures. A strong Arctic cold front caused temperatures to plummet by 40 F or more on November 23rd. At New London (Kandiyohi County) the temperature dropped from a high of 36 degrees F to a low of -18 degrees F.

Outlook:

Cool weekend with chances for light snow in the northeast and southwest. Continued near normal to cooler than normal much of next week with some moderation in temperature toward the end of the week. Generally a dry week.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, November 30, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, November 30, 2012

HEADLINES

- Preliminary November climate summary
- Snow lover's forecast
- Weekly Weather potpourri
- MPR listener questions
- Almanac for November 30th
- Past weather
- Outlook

Topic: Preliminary November climate summary

Most observers reported average monthly temperatures for November that ranged from 2 to 4 degrees F warmer than normal, with the larger positive departures in temperatures coming in southern counties. Extremes for the month ranged from -11 degrees F at Fosston (Polk County) on the 26th to 75 degrees F on the 10th at Rochester, Amboy, and Winnebago. The warm day on the 10th also brought extremely rare November tornadoes to the state. These storms were reported from Burnsville, Eagan, Mendota Heights and Mahtomedi, and were the 2nd latest autumn tornadoes in Minnesota history (there was a tornado near Maple Plain back on November 16, 1931).

Nearly all observers reported below normal precipitation for the month of November, except for a few spots in northeastern Minnesota where reports of 1.50 to 2.50 inches occurred. Grand Marais topped the list with 2.76 inches. Northern Minnesota observers also measured snowfall this month. Some receiving significant amounts included International Falls with 8.6", Duluth with 10.1", Red Lake Falls with 14.0", and Isabella with 17.0"

Ice began to form on many areas lakes during the second half of the month and many soils froze down to a depth of 4 inches. There was relatively more sun in the second half of the month than the first, and there were two very windy days on the 10th and 22nd when many places saw gusts over 40 mph.

The extent of drought worsened during November and many stream flow volumes were very low. Over 83 percent of the state's landscape is in severe to extreme drought as we end November. There will likely be little change in drought status during the winter months. You can read the latest drought update on our web site at...

http://climate.umn.edu/doc/journal/drought_2012.htm

Topic: A snow lover's forecast

The National Weather Service in Medford, OR issued the following forecast for Mount Shasta in California this weekend. For snow lovers it must have brought all smiles, but look at the wind speeds!

-Friday Snow showers. The snow could be heavy at times. Temperature falling to around 15 by 4pm. Wind chill values as low as -13. Windy, with a south southwest wind 80 to 85 mph decreasing to 70 to 75 mph in the afternoon. Winds could gust as high as 115 mph. Chance of precipitation is 100%. New snow accumulation of 23 to 29 inches possible.

-Friday Night Snow. The snow could be heavy at times. Low around 14. Wind chill values as low as -13. Windy, with a south southwest wind 70 to 80 mph, with gusts as high as 115 mph. Chance of precipitation is 100%. New snow accumulation of 21 to 27 inches possible.

-Saturday Snow. The snow could be heavy at times. High near 19. Windy, with a southwest wind 75 to 80 mph, with gusts as high as 115 mph. Chance of precipitation is 100%. New snow accumulation of 22 to 28 inches possible.

-Saturday Night Snow. The snow could be heavy at times. Low around 17. Windy. Chance of precipitation is 100%. New snow accumulation of 29 to 35 inches possible.

-Sunday Snow. The snow could be heavy at times. High near 18. Windy. Chance of

precipitation is 100%. New snow accumulation of 11 to 17 inches possible.
-Sunday Night Snow showers likely. Cloudy, with a low around 9. Windy.

Topic: Weekly Weather potpourri

A paper published in Science this week by Andrew Shepherd et al documents the accelerated loss in ice mass from Greenland and Antarctica over the period from 1992 to 2011. The study is based on an ensemble of data from satellite observations over the period and is the most comprehensive in recent years. Approximately 20 percent of the sea level rise observed over this period has been the result of this ice melt. You can read more about this paper at....

<http://www.sciencemag.org/content/338/6111/1183>

Typhoon Bopha was spinning this week in the western Pacific Ocean southeast of the Philippines. Winds on Friday ranged from 75-90 mph creating sea waves of 25-30 feet. Bopha is expected to intensify and bring strong winds, storm surge, and heavy rain to the Philippines by the middle of next week.

A huge tornado struck the city of Taranto, Italy on Wednesday (Nov 28) this week. It caused at least 20 injuries and damaged or destroyed several buildings and structures, including one of Europe's largest steel mills. Tornadoes, and especially in November, are relatively rare in Italy.

The United Kingdom Meteorological Office this week released an analysis of three global temperature data sets all showing the likelihood of 2012 ending up somewhere between the 4th and 14th warmest year since 1850. The analysis includes data up through October and is shown in degrees C. You can view these data sets graphically at their web site.....

<http://www.metoffice.gov.uk/news/releases/archive/2012/global-temperatures-2012>

A weekly summary from Brad Rippey of the USDA-World Agricultural Outlook Board summarizes the extent and impact of drought in the USA. Some of the highlights include:

- The portion of the contiguous U.S. in drought rose for the second consecutive week and currently stands at 62.65%. This represents the largest portion of the U.S. in drought since October 9.
- The portion of the contiguous U.S. in the worst category – D4, or exceptional drought – remained virtually unchanged at 6% (rounded) for the sixteenth consecutive week (August 14 – November 27).

-Hay in drought increased to 65%, up three percentage points from a week ago and up five points from November 13.

-Cattle in drought rose to 73%, up two points for the second consecutive week.

-Winter wheat in drought climbed a point to 65%, the second one-point increase in a row. The crop continues to struggle mightily in some of the hardest-hit drought areas. In South Dakota, for example, only 60% of the winter wheat had emerged by November 25, versus the five-year average of 100%.

-On the strength of wheat's struggles in most of the Hard Red Winter Wheat Belt, from South Dakota to Texas, U.S. winter wheat conditions are the worst at this time of year since records of this type were initiated in the mid-1980s. More than one-quarter (26 percent) of the U.S. winter wheat was rated in very poor to poor condition on November 25.

A paper published this week by Dr. Ben Santer (Lawrence-Livermore National Lab) and colleagues in the Proceedings of the National Academy of Sciences shows that recent tropospheric warming and stratospheric cooling within the Earth's atmosphere is related to human activity. The measurements and models show a higher rate of warmer over the Arctic and a muted warming or even cooling over Antarctica. You can read more about this paper at....

<http://www.sciencedaily.com/releases/2012/11/121129143504.htm>

Skywarn Recognition Day is Saturday, December 1st. The National Weather Service and American Radio Relay League will celebrate and salute the many Skywarn volunteer radio operators who assist with Severe Weather Operations and communications when these storms threaten the public.

MPR listener question: With the relative absence of snow around the Twin Cities Metro area so far this autumn I am worried about having enough snow to cross country ski this winter. What can you tell me about prospects for snow next month in December?

Answer: The long-term average December snowfall (125 years) in the Twin Cities area is 8.9 inches. In six of the last ten years we have exceeded that, including the record amount of 33.6 inches in 2010. In addition the mid-range climate models are suggesting that we will see above normal precipitation across the state during the first two weeks of December. So I would tend to be optimistic that we'll see some better conditions for skiing materialize next month. Record amounts of 40 or more inches during December have been observed in some northern locations over the years as well, including Duluth, Two Harbors, and Virginia.

Twin Cities Almanac for November 30th:

The average MSP high temperature for this date is 33 degrees F (plus or minus 11 degrees F standard deviation), while the average low is 17 degrees F (plus or minus 12 degrees F standard deviation).

MSP Local Records for November 30th:

MSP weather records for this date include: highest daily maximum temperature of 62 degrees F in 1922; lowest daily maximum temperature of 2 degrees F in 1896; lowest daily minimum temperature of -17 F in 1964; highest daily minimum temperature of 42 F in 1962; and record precipitation of 0.84 inches in 1934; Record snowfall is 8.0 inches in 1934.

Average dew point for November 30th is 17 degrees F, with a maximum of 48 degrees F in 1922 and a minimum of -21 degrees F in 1964.

All-time state records for November 30th:

The state record high temperature for this date is 68 degrees F at Montevideo (Chippewa County) in 1922. The state record low temperature for this date is -45 degrees F at Pokegama Dam (Itasca County) in 1896. State record precipitation for this date is 2.64 inches at Waseca (Waseca County) in 1991; and the state record snowfall for this date is 18.0 inches at Willmar (Kandiyohi County) in 1985.

Past Weather Features:

Far and away the coldest November 30 in Minnesota history occurred in 1896. The month had brought abundant snowfall, 15 to 30 inches for many observers. An Arctic high pressure system crossed the state over November 29 to December 2nd, causing temperatures to plummet and setting all-time record cold for the month of November. On November 30th seven communities reported temperatures of -30 degrees F or colder, with Pokegama Dam recording -45 degrees F. Even daytime temperatures were extraordinary, as Roseau reported a high of only -19 degrees F that day.

November of 1922 was dominated by warm temperatures, cloudy skies, and abundant rainfall (not snowfall). On November 30th over a dozen Minnesota communities reported daytime highs in the 60s F, setting records for the date.

November 29-30, 1985 brought a winter storm to Minnesota with considerable snowfall in some areas. Duluth reported nearly a foot, while Willmar received over 18 inches. To end the month the observer at Tower, MN reported a snow depth of 49 inches, requiring snowshoes to walk outside.

Another snowy November was 1991 when the observer at Bruno (Pine County) reported a monthly total of 58.6 inches of snowfall. Duluth and Two Harbors also saw totals of over 50 inches. One of the bigger winter storms that month struck on the 30th bringing 10 to 16 inches of new snow to many communities.

Words of the Week: Earmuffs

Sometimes called "earlaps", earmuffs were invented by a young Chester Greenwood (15 years old) of Farmington, Maine in 1873. He grew tired of having cold ears when he was ice skating on frozen ponds in the winter, so he made small ear-shaped wire loops which he asked his grandmother to cover with pieces of fur. He soon refined this model for earmuffs and patented them in 1877. Demand was greater than expected, so he built a factory in Farmington, Maine. This and other inventions later in life made him a rich man. He died in 1937, but as a lasting tribute, the first day of winter (solstice) in Maine is referred to as "Chester Greenwood Day." So think about Chester Greenwood, the young inventor of 139 years ago, when you are putting on your next pair of stylish earmuffs.

Outlook:

Fog in areas early Saturday with chance for rain, and possibly light snow in the northeast by Saturday night. Dry on Sunday as temperatures will continue to be warmer than normal through the weekend. On Monday temperatures may even approach record high levels, then cool for the middle of next week. Increasing chances for precipitation on Monday, with rain in the south and snow in the north. Then warming again toward the end of next week with chances for snow on Thursday and Friday.

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Minnesota WeatherTalk Newsletter for Friday, December 7, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 7, 2012

HEADLINES

- Mild Monday
- Temperature extremes in December
- Weekly Weather potpourri
- MPR listener questions
- Almanac for December 7th
- Past weather
- Outlook

Topic: Mild Monday

Warm, moist air dominated southern Minnesota on Monday, December 3rd. Many observers reported daytime high temperatures in the 50s and 60s F (in the range of 20 to 30 degrees F above normal). Some observers reported new records for the date, including 63 degrees F at Preston, 62 degrees F at Rochester, Caledonia, Theilman, and Madison (tied record from 1941), 61 degrees F at Marshall, 59 degrees F at Austin, Grand Meadow, and 58 degrees F at Browns Valley. In addition, some observers reported record warm minimum temperatures for the date as well, before a cold front caused temperatures to plummet. Preston after setting a record high of 63 degrees F, fell to a low of only 14 degrees F the next day.

MSP airport reported a noontime dewpoint on December 3rd of 54 degrees F, breaking the record for the date of 52 degrees F set back in 1951. According to the State Climatology Office it was at least the 12th new daily dewpoint record set at MSP this year. Other locations also reported mid-June like dewpoints in the 50s F including 52 degrees F at Mankato, and 55 degrees F at Waseca, Red Wing, and Rochester. By December 4th dewpoints had fallen into the mid-teens F, putting a distinct chill in the air.

Topic: Temperature extremes in December

There have been three years when December temperatures have reached 70 degrees F in Minnesota, 1939, 1941, and 1998. The all-time high is 74 degrees F at Wheaton on December 9th of 1939. Canby and Long Prairie reported 72 degrees F and 71 degrees F, on December 3 and 4 of 1941, respectively. Fifty-seven years later Chaska reported 70 degrees F on December 1, 1998, and a few days later Campbell and Redwood Falls reported 70 degrees F on the 6th. In December 1998 a number of citizens were still golfing the first week December, something to brag about.

On the other end of extremes, Pokegama Dam reported -57 degrees F on December 31, 1898, the state record low for the month. As recently as 1993, Tower reported -50 degrees F on December 27th, only two days after Christmas. Last December (2011) many northern Minnesota observers reported only 5 days with below 0 degrees F readings in the morning, while in some southern Minnesota observers reported no days in December with below zero F temperature readings. 2011 brought the 8th warmest December in state history.

Topic: Weekly Weather potpourri

Environment Canada released winter season climate outlooks earlier this month covering the December through February period. Their model suggest a warmer than normal winter along the border with the central and eastern USA (including Ontario and Quebec), and a wetter than winter as well, especially in Manitoba, Ontario, and Quebec. You can read more about these outlooks at their web site.....

<http://www.weatheroffice.gc.ca/saisons/>

After traveling across the southern parts of the Philippines during the week Typhoon Bopha had weakened to a tropical storm and was expected to dissipate over the South China Sea. On Tuesday and Wednesday (Dec 4-5) Bopha raked the large southern Philippines island of Mindanao with winds of 110 mph, heavy rains and high seas. There were many reports of power outages and washed-out roads. Hundreds of citizens were reported dead or missing and thousands were left homeless due to

damages from the storm. NASA's TRMM satellite captured Bopha in 3-D near its peak intensity. You can view images and read about this at.....

<http://www.sciencedaily.com/releases/2012/12/121206104251.htm>

Another tropical cyclone formed in the Southern Indian Ocean south of Diego Garcia this week. It was expected to strengthen over the weekend.

A report card on Arctic Sea Ice was released by NOAA this week. It provides data and analysis for snow and ice conditions in the high northern latitudes. You can find text and images from this report at the NOAA web site.....

http://www.noaanews.noaa.gov/stories2012/20121205_arcticreportcard.html

Briefing highlight statements from Brad Rippey of the USDA World Agricultural Outlook Board for the drought-monitoring period ending 7 am EST on December 4 include:

-There was little change in overall U.S. drought coverage, as improvements in the Far West were offset by some drought expansion in the Southeast. The portion of the contiguous U.S. in drought fell slightly (less than one-third of a percentage point) and currently stands at 62.37%.

-The portion of the contiguous U.S. in the worst category D4, or exceptional drought remained virtually unchanged at 6% (rounded) for the seventeenth consecutive week (August 14 December 4).

-Hay in drought was unchanged at 65%. However, that value is up five points from November 13.

-Cattle in drought was also unchanged at 73%. That value is up four points from November 13.

-Winter wheat in drought was unchanged at 65%, after being as low as 63% in mid-November.

-NOTE: Since the 1950s, there have been only two years when U.S. winter wheat abandonment reached or exceeded one-quarter of the crop: 1988-89 (25% abandonment) and 2001-02 (29%). Current U.S. winter wheat conditions are lower than those observed late in the year in both 1988 and 2001 and for that matter, current conditions are the lowest on record for this time of year (period of record, 1986-2012). The 1988-89 crop was planted during the drought of 1988 and was further harmed by a severe cold wave in February 1989. The 2001-02 crop was adversely affected by a La Niña-driven drought.

NOAA released a video update this week concerning the drought impact on agriculture and water resources in the USA as we enter the winter season. Short in

length it is still well worth viewing. You can find it under the NOAA Climatewatch section....

<http://www.climatewatch.noaa.gov/video/2012/water-waning-into-winter>

MPR listener question: It seems odd to me that so much of the state is designated to be in severe or extreme drought. I looked up precipitation totals at some locations in the state since January 1st of this year and some are in the surplus:

Chanhassen 31.15 inches, +1.30 inches

Duluth 29.69 inches, +2.07 inches

International Falls 23.96 inches, +0.59 inches

Even MSP airport shows 27.95 inches, only 1.45 inches short of normal

Given these numbers it is hard to understand why so much of the state is in drought.

Answer: Indeed, some observers have reported surplus precipitation for the year. Consider the community of Wright in Carlton County where they have reported 39.01 inches, 9.56 inches above normal. Bear in mind that 20 to 30 percent of the yearly precipitation in some northeastern communities came from one thunderstorm over June 20-21 (leading to the flooding at Duluth, Two Harbors and other communities). Nevertheless, many observers in the state are reporting significant shortages of precipitation in 2012. Some of these include:

Moorhead 16.42 inches, -7.89 inches from normal

Red Lake Falls 14.86 inches, -9.10 inches from normal

Madison (Lac Qui Parle County) 17.14 inches, -7.31 inches from normal

Grand Meadow 24.70 inches, -9.81 inches from normal

Waseca 24.57 inches, -10.01 inches from normal

Albert Lea 22.77 inches, -10.46 inches from normal

Austin 20.64 inches, -12.90 inches from normal

You can read more about the geographic distribution of precipitation and drought at our web site.....

http://climate.umn.edu/doc/journal/drought_2012.htm

Twin Cities Almanac for December 7th:

The average MSP high temperature for this date is 29 degrees F (plus or minus 12 degrees F standard deviation), while the average low is 14 degrees F (plus or minus 13 degrees F standard deviation).

MSP Local Records for December 7th:

MSP weather records for this date include: highest daily maximum temperature of 54 degrees F in 1939; lowest daily maximum temperature of -1 degrees F in 1882; lowest daily minimum temperature of -20 F in 1972; highest daily minimum temperature of 41 F in 1894; and record precipitation of 0.56 inches in 1883; Record snowfall is 6.30 inches in 1927.

Average dew point for December 7th is 14 degrees F, with a maximum of 39 degrees F in 1951 and a minimum of -29 degrees F in 1972.

All-time state records for December 7th:

The state record high temperature for this date is 69 degrees F at Grand Marais (Cook County) in 1913. The state record low temperature for this date is -42 degrees F at Pokegama Dam (Itasca County) in 1936 and at Tower (St Louis County) in 1976. State record precipitation for this date is 1.31 inches at Lynd (Lyon County) in 1927; and the state record snowfall for this date is 12.0 inches at Chaska (Carver County) in 1927.

Past Weather Features:

Very warm and sunny weather dominated the state in early December of 1913. Indeed that December was perhaps the sunniest in Minnesota history with 16 perfectly clear days noted during a month that is usually dominated by cloud cover. Many observers reported temperatures that were 15 to 25 degrees F above normal.

December 6-8, 1916 brought a strong winter storm to northern Minnesota. High winds and heavy snow caused large drifts across the landscape. Warroad measured 10 inches of snowfall, Roseau 10.5 inches, and a foot of snow fell at Baudette. It was a precursor to a long, snowy winter (196-1917) in much of the state.

December 6-7, 1927 brought another strong winter storm to parts of Minnesota with a mixture of precipitation. Where snow was the dominant form of precipitation some of the amounts were record-setting, including 19.5 inches at Maple Plain, 14 inches at Chaska, 11.3 inches at St Paul, 10.5 inches at Winona, 10 inches at Canby and Tracy, and 9 inches at Willmar and Campbell. Following the storm temperatures plummeted to below 0 F readings.

Arctic air dominated Minnesota on December 7, 1936 with 25 communities reporting morning lows ranging from -20 to -40 degrees F. The temperature rose no higher than -8 degrees F at Baudette and Virginia that day, and few observers reported readings about 0 degrees F.

December 4-12, 1939 was one of the warmest stretches of winter weather in state history. Over 30 communities reported daytime highs in the 50s F, some even reached the 60s F. An arctic cold front brought temperatures back to below 0 F readings by the 13th, but only temporarily. December 1939 proved to be the warmest in state history.

Probably the coldest December 7th in state history came in 1976. Over 60 communities reported morning lows of -20 to -40 degrees F. The daytime high at Cook, MN only reached -10 degrees F and many record cold values were reported.

Outlook:

Winter storms over the weekend. Scattered snow Friday night into Saturday (perhaps 0.5 to 3 inches), then a more formidable storm Saturday night into Sunday. This second storm may bring amounts ranging from 3 to 7 inches with strong winds. Travel conditions on Sunday may be impacted. Sharply colder Monday and Tuesday, with lows falling into the single digits and below 0 F readings. Warmer on Wednesday with increasing cloudiness and a chance for more precipitation.

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, December 14, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 14, 2012

HEADLINES

- Heavy snow
- New dewpoint records in 2012
- Weekly Weather potpourri
- MPR listener questions
- Almanac for December 14th
- Past weather
- Outlook

Topic: Heavy snow

Sunday, December 9th brought snow to much of the region, and some record-setting values to a few Minnesota communities. Among those with long-term climate histories reporting record snowfalls were: MSP-Airport with 10.5 inches; St Cloud Regional Airport with 11 inches; Montevideo with 12 inches; Milan with 10 inches; Chanhassen with 13.6 inches; Forest Lake with 13.5 inches; Marshall with 6 inches; and Hastings with 12 inches. According to Greg Spoden of the Minnesota State Climatology Office the 10.5 inches measured at MSP-Airport is the 4th largest daily amount for the month of December in history for the Twin Cities, trailing only 16.3 inches on December 11, 2010, 12 inches on December 28, 1982, and 10.8 inches on

December 17, 1908. Many other observers reported amounts ranging from 8 to 17 inches. For some the liquid content of the snowfall was the greatest amount of moisture received in a single day since late July. Some of the record amounts of precipitation reported for December 9th included: 0.87 inches at MSP, 0.35 inches at Rochester, 0.49 inches at Winona, 0.82 inches at Milan, 0.87 inches at St Cloud, and 0.97 inches at Marshall.

December total snowfalls are already above normal in a number of areas. Madison, Montevideo, Chisago City, and Forest Lake have reported over 17 inches. Bird Island, Chanhassen, Red Wing, Hastings, and Redwood Falls have reported over 14 inches, while Princeton and Stillwater report over 13 inches.

Topic: New dewpoint records in 2012

Tracking as the warmest year in USA history, 2012 has already produced thousands of new daily temperature records within the nation's climate network. The Minnesota State Climatology Office also reports that several new dewpoint records were set during 2012. For the Twin Cities 12 new record daily high dewpoints (a measure of moist air) were set during the year, along with 4 new record low dewpoints (a measure of dry air). Those new record high dewpoints included 8 consecutive days in March, plus other dates:

3/16 57 F

3/17 60 F

3/18 59 F

3/19 60 F

3/20 59 F

3/21 56 F

3/22 60 F

3/23 60 F

4/16 63 F

5/27 70 F

11/10 56 F

12/03 54 F

Those new record low dewpoints included:

8/17 39 F

10/07 14 F

10/11 11 F

10/12 10 F

Topic: Weekly Weather potpourri

According to a new AP-GfK poll from over 1000 adult cell phone and landline users during the week of November 29-December 3rd (following Super Storm Sandy) four out of five Americans think temperatures are rising and that this is leading to weather and climate issues that pose serious problems. These poll results also showed a higher fraction of those who trust scientists only a little think that temperatures are rising and causing problems. You can read more about this recent poll at....

<http://ap-gfkipoll.com/uncategorized/our-latest-poll-findings-18>

The weekly Drought Update from Brad Rippey with the USDA World Agricultural Outlook Board includes the following comments:

- The portion of the contiguous U.S. in the worst category – D4, or exceptional drought – remained virtually unchanged at 6% (rounded) for the eighteenth consecutive week (August 14 – December 11).
- Hay in drought fell slightly to 64%, but has been at or above 60% for 23 consecutive weeks – since July 10.
- Cattle in drought was unchanged at 73%, and has been greater than two-thirds of the domestic inventory for 23 consecutive weeks (July 10 – December 11).
- Winter wheat in drought was down slightly to 63%, although the hard red winter wheat belt – especially from South Dakota to Texas – remains deeply entrenched in drought.

NOAA reports this week that 2012 is virtually certain to be the warmest year of record in the USA regardless of what the rest of December brings. You can read more at....

<http://www.ncdc.noaa.gov/sotc/>

An article in the current edition of Science describes how the insurance industry is documenting climate change and making adjustments for it. Insured losses due to weather and climate-related damages and disasters have average \$50 billion per year recently, and more than doubled each decade since the 1980s. The industry is trying to diversify its exposure to such risks and more accurately price its insurance policies. You can read more about this study at....

<http://www.sciencedaily.com/releases/2012/12/121213142311.htm>

Located near Pago Pago in the Southern Pacific Ocean, Cyclone Evan was producing over 30 foot sea waves with its 110 mph winds this week. It caused serious flooding and wind damage on the island late this week and was expected to strengthen before passing over Fiji this weekend. Slow dissipation will occur by the end of next week.

MPR listener question: With the recent heavy snowfall I was wondering what the greatest depth of snow has been for Minnesota, and perhaps in the Twin Cities area as well?

Answer: The greatest depth of snow recorded in Minnesota history was on March 28, 1950 at Pigeon River Bridge in Cook County, near the Canadian Border. The measured snow depth was 75 inches (as tall as I am). In the Twin Cities climate records the greatest depth of snow was 38 inches on January 23, 1982. The Twin Cities received 46.4 inches of snowfall that January, a record as well.

Twin Cities Almanac for December 14th:

The average MSP high temperature for this date is 25 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 11 degrees F (plus or minus 15 degrees F standard deviation).

MSP Local Records for December 14th:

MSP weather records for this date include: highest daily maximum temperature of 55 degrees F in 1998; lowest daily maximum temperature of -14 degrees F in 1901; lowest daily minimum temperature of -27 F in 1901; highest daily minimum temperature of 38 F in 1891; and record precipitation of 1.50 inches in 1891; Record snowfall is 5.2 inches in 1996.

Average dew point for December 14th is 10 degrees F, with a maximum of 39 degrees F in 1928 and a minimum of -22 degrees F in 1985.

All-time state records for December 14th:

The state record high temperature for this date is 60 degrees F at Pipestone (Pipestone County) in 1912. The state record low temperature for this date is -48 degrees F at Detroit Lakes (Becker County) in 1901. State record precipitation for this date is 2.38 inches at Red Wing (Goodhue County) in 1891; and the state record snowfall for this date is 14.3 inches at Moorhead (Clay County) in 1927.

Past Weather Features:

Over December 13-14, 1891 a winter storm brought heavy rainfall to many southern Minnesota communities. Amounts ranged from 1 to 2 inches with mild temperatures in the 40s and 50s F. Farmington reported 2.50 inches a record amount of precipitation for two days in December.

December 13-15, 1901 brought Arctic cold to Minnesota, producing several record setting low temperatures. On the 14th over 30 Minnesota communities reported lows of -30 degrees F or colder, and several observers recorded minimum below -40 degrees F. At Beardsley the daytime high only reached -23 degrees F.

December 14-14, 1912 brought Indian Summer-like temperatures to southern Minnesota. At least a dozen communities reported daytime high temperatures of 50 degrees F or greater under sunny skies and south winds. Temperatures remained relatively mild for the rest of the month.

December 14-16, 1927 brought a strong winter storm to Minnesota producing a heavy snowfall. Many observers reported over 10 inches of snow. Some of the larger amounts included 20.3 inches at Moorhead, 18 inches at Grand Marais, 16 inches at Pigeon River Bridge, 13 inches at New Ulm, 12 inches at Detroit Lakes and Brainerd, and 10 inches at Willmar and Fort Ripley.

December 14, 1998 brought mild temperatures to Minnesota as dozens of cities reported daytime highs in the 50s F. The mild air kept temperatures above the freezing mark overnight as well.

Outlook: Warmer than normal temperatures with mixed precipitation on Saturday. Freezing rain and rain in some places, then snow later in the day, with accumulations of a few inches in central and northern areas. Drier on Sunday, Monday, and Tuesday with continued warmer than normal temperatures. Then another winter storm for Wednesday and Thursday with possible significant snowfalls.

Further Information:

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Minnesota WeatherTalk Newsletter for Friday, December 21, 2012

To: MPR's Morning Edition

From: Mark Seeley, Univ. of Minnesota, Dept of Soil, Water, and Climate

Subject: Minnesota WeatherTalk Newsletter for Friday, December 21, 2012

A WISH FOR MERRY HOLIDAYS AND A HAPPY NEW YEAR TO ALL
MINNESOTA WEATHERTALK CONTRIBUTORS AND READERS!

HEADLINES

- No Minnesota WeatherTalk Newsletter for Dec 28 (vacation)
- Top weather-related events of 2012
- Winter storm of Dec 19-20
- Record temperature trend at Rochester
- Weekly Weather potpourri
- MPR listener questions
- Almanac for December 21st
- Past weather
- Outlook

Topic: Top 5 weather-related events for Minnesota in 2012

The Minnesota State Climatology Office (Pete Boulay and Greg Spoden) put together the top 5 weather-related events for the year. The list includes:

1. Outrageously mild March, breaking the previous record warm March of 1910. Earliest 80 F temperature readings, earliest ice-out dates on many lakes, one of the

earliest springs of all-time.

2. Northeastern Minnesota flood of June 19-20, concentrated in Carlton, St Louis, and Lake Counties where 8-10" of rain fell (Duluth). Severe damage to homes and infrastructure, FEMA declared disaster

3. Widespread drought, with over 83 percent of the Minnesota landscape in severe to extreme drought and most counties eligible for disaster assistance through USDA. Low flows and lake levels as well

4. Hot July, on a statewide basis the 2nd hottest of all-time (1936 is 1st), with Heat Index values well over 110 degrees F on some days, and some overnight lows in the 80s F

5. Non-winter of 2011-2012, on a statewide basis Jan-Mar was the warmest in history. Fewest ever seasonal Heating Degree Days, and also little snowfall except for the far north

For more discussion and details you can visit our web site and vote on these at....

http://www.climate.umn.edu/doc/journal/top_five_2012.htm

Topic: Winter Storm of Dec 19-20

A strong winter storm passed over the region on Wednesday and Thursday (Dec 19-20) this week, bringing significant snowfall, high winds and blizzard conditions, especially in southeastern Minnesota, much of Iowa, southern Wisconsin, and northwestern Illinois. Difficult driving conditions were widespread (multiple accidents in IA and WI) and there were many reports of school delays and closures, especially in Iowa and Wisconsin. Preliminary snowfall amounts were record-setting for a number of communities on December 20th, including 13.3 inches at Madison, WI. Some of the Minnesota communities reporting record-setting amounts included:

9.7 inches at Minnesota City

6.6 inches at Wabasha

7 inches at Harmony, Grand Meadow, and Lake City

6.5 inches at Winona

6 inches at Spring Valley and Zumbro Falls

Several other observers reported 3 to 5 inches along the I90 corridor in southern Minnesota, while along I80 in Iowa amounts were even greater. A number of total snowfall reports over a foot came from Iowa (Des Moines 12.4") and Wisconsin (Madison 15.2"). All the snow was accompanied by winds ranging up to 35-40 mph or greater.

A relatively snowy December has already been reported by a number of Minnesota observers, including 19 inches at Cottage Grove and Madison (Lac Qui Parle County), 18.5 inches at Granite Falls, 18.1 inches at Forest Lake 17.9 inches at Marshall, 17.8

inches at Montevideo, and 17 inches at Lake City and Chisago City. More snow is forecast for the balance of the month as we near New Years.

Topic: Temperature record set at Rochester, MN

The National Weather Service reported this week that Rochester, MN has set a new record for the lack of sub-zero temperature readings in that city. They have seen a period of 335 days without a single below 0 F temperature reading (dating back to January 22 of this year). This breaks the old record of 333 days set in 1987.

Topic: Weekly Weather potpourri

NOAA reported this week that there were 11 weather and climate extremes during 2012 that produced at least \$1 billion in losses. These included 7 severe weather/tornado events, two tropical storm/hurricane events, and a year-long drought and associated wildfires. NOAA further estimates that the grand total in losses due to weather events and climate episodes in 2012 will exceed the total from last year (2011), surpassing \$60 billion, mostly from drought and Super Storm Sandy. You can read more from a NOAA release at....

<http://www.ncdc.noaa.gov/news/preliminary-info-2012-us-billion-dollar-extreme-weatherclimate-events>

The weekly Drought Update (Dec 18) from Brad Rippey with the USDA World Agricultural Outlook Board includes the following comments:

- There was another small drop less than one-tenth of a percentage point in overall U.S. drought coverage, from 61.87% last week to 61.79% on December 18.
- However, the portion of the contiguous U.S. in the worst category D4, or exceptional drought crept upward to 6.64%, the greatest U.S. coverage since November 22, 2011.
- Hay in drought (64%), cattle in drought (73%), and winter wheat in drought (63%) were all unchanged from the previous week.
- Hay in drought has been at or above 60% and cattle in drought has been greater than two-thirds of the domestic inventory for 24 consecutive weeks (July 10 December 18).
- On the central Plains, winter wheat benefited from widespread snow on December 19. Any improvement in the central Plains' drought situation will be reflected next week.

This week the United Kingdom Meteorological Office issued a global temperature forecast for 2013. They used recent trends in global climate data sets to estimate that 2013 will likely be one of the warmest ten years since 1850. You can read more about

their prediction and how they have computed the rankings for other years at their web site:

<http://www.metoffice.gov.uk/news/releases/archive/2012/2013-global-forecast>

Weather reports from Europe indicate that the skiing season for the Alps is off to a great start. Early December snowfall has been heavy and powdery in the French, Swiss, and Italian Alps. Observers say conditions are great and comparable to the early skiing seasons of 1965, 1992, and 2007. You can read more at....

<http://www.bbc.com/travel/blog/20121219-serious-snowfall-in-the-alps-this-december>

Parts of Russia are reporting one of the coldest Decembers in 70 years with many reports of daytime high temperatures remaining below 0 degrees F even in areas around Moscow. Overnight lows in Siberia have been as cold as -58 degrees F, near record values for December. Jakutsk reported a high on Thursday (Dec 20) of -22 degrees F.

MPR listener question: It seems that below zero degrees F temperatures readings in the Twin Cities are less frequent than they once were. Is this true?

Answer: Yes, indeed. From 1871 to 1990 the Twin Cities recorded an average of 29-30 days per year with an overnight low below 0 F. Since 1990 the average has been about 19-20 days. Further in 2006 and this year (2012) there have been only 3 such days, second only to 1931 when there were just 2 days with below 0 F lows.

Twin Cities Almanac for December 21st:

The average MSP high temperature for this date is 25 degrees F (plus or minus 13 degrees F standard deviation), while the average low is 11 degrees F (plus or minus 15 degrees F standard deviation).

MSP Local Records for December 21st:

MSP weather records for this date include: highest daily maximum temperature of 56 degrees F in 1877; lowest daily maximum temperature of -10 degrees F in 1872; lowest daily minimum temperature of -24 F in 1916; highest daily minimum temperature of 38 F in 1877; and record precipitation of 0.71 inches in 2006; Record snowfall is 5.3 inches in 1920.

Average dew point for December 21st is 10 degrees F, with a maximum of 47 degrees F in 1967 and a minimum of -33 degrees F in 1989.

All-time state records for December 21st:

The state record high temperature for this date is 64 degrees F at Lynd (Lyon County) in 1908. The state record low temperature for this date is -49 degrees F at Hallock (Kittson County) in 1916. State record precipitation for this date is 1.45 inches at Bricelyn (Faribault County) in 1948; and the state record snowfall for this date is 12.0 inches at Tracy (Lyon County) in 1920.

Past Weather Features:

This week in 1877 was one of the mildest spells of December weather in the history of the Twin Cities. December 21-23 brought three consecutive days with daytime highs in the 50s F and overnight lows in the upper 30s to mid 40s F.

December 21, 1916 was probably the coldest in history, with at least 45 Minnesota communities reporting morning lows of -30 degrees F or colder. In western Minnesota Angus never rose above -15 degrees F during the day. For many communities temperatures remained below 0 F until Christmas Eve when they rose into the single digits and teens F.

December 21-22, 1920 brought a heavy snow storm to southern Minnesota, with many observers reporting 6-12 inches of fresh snow. Blowing and drifting made traveling difficult for the Christmas season.

December 20 21, 1967 brought a very mild spell of weather to much of Minnesota. Over 20 communities reported daytime highs of 50 degrees F or higher. A strong cold front brought an abrupt end to the mild spell as temperatures plummeted into the single digits on December 22nd and snow fell on Christmas Eve.

Outlook:

Cooler than normal temperatures over the weekend, but under some sunny skies. Some chance of snow on Monday under cloudy skies, then cooler again for Christmas Day (Tue). General cooler for the balance of next week as well, with some below 0 F readings.

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