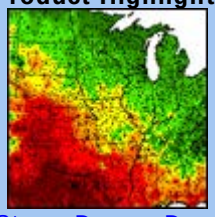
THE CLIMATE OBSERVER

A publication of the Midwestern Regional Climate Center

November 14, 2013

MRCC Product Highlight:



Stress Degree Days

Climate Cool Tool:

NWS Winter Weather Forecasts

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MRCC Midwestern Regional Climate Center

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The White Hurricane of 1913

Jim Keysor, Warning Coordination Meteorologist, NWS Gaylord, Michigan

Wave breaking on the shore of Lake Michigan. Published November 10, 1913 in the Chicago Tribune. *(photo courtesy NOAA 1913 storm website)*

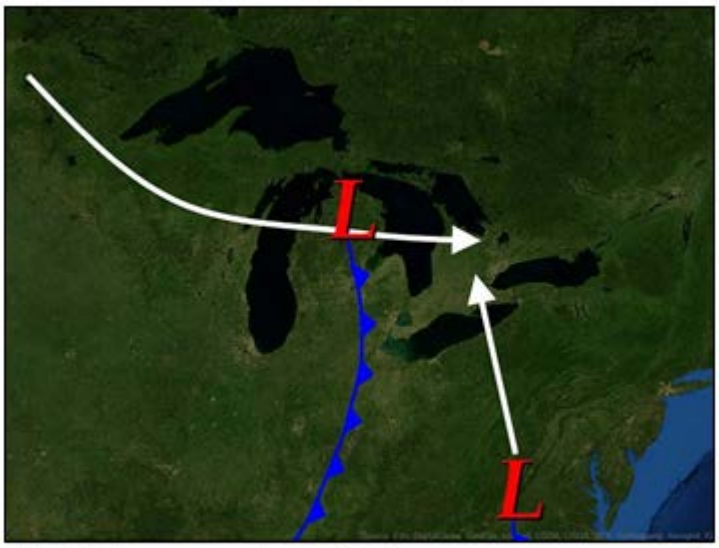
November is a month known for large storms on the Great Lakes and famous shipwrecks, but few storms compare to the White Hurricane. In November of 1913, the Great Lakes were struck by a massive storm system combining whiteout blizzard conditions and hurricane force winds. The storm lasted for four days, during which the region endured 90 mph winds and waves reaching 35 feet in height. With only basic technology available, shipping communication and weather prediction systems were not prepared for a storm of such devastating force. When the storm finally ended, the Great Lakes had seen a dozen major shipwrecks, an estimated 250 lives lost, and more than $5 million in damages (the equivalent of more than $117 million today).

Nicknamed the "White Hurricane" and the "Freshwater Fury", the 1913 storm remains the most devastating natural disaster to ever strike the Great Lakes. One hundred years later, NOAA commemorates the Storm of 1913 not only for the pivotal role it plays in the history of the Great Lakes but also for its enduring legacy. Shipping communication, weather prediction, and storm preparedness across the Great Lakes have all been shaped by the events of November 1913.

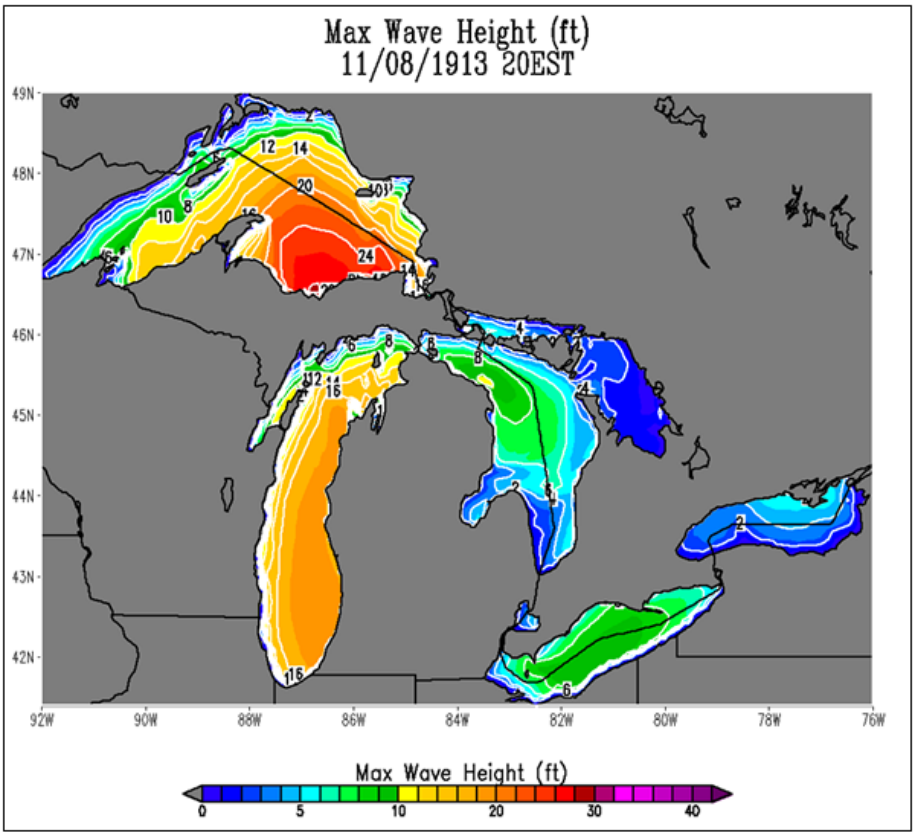
The storm of November 1913 began as two separate weather systems, hundreds of miles apart. The first system arrived in the Great Lakes on November 7th with Arctic air and strong winds. At the same time, a second and eventually much more powerful low pressure area was developing over the Mid-Atlantic States. As this second storm strengthened on November 8th and 9th, it worked north and eventually merged with the first system over the eastern Great Lakes. The result was a monster low pressure area

On the Road:
NC - Regional Climate Services Meeting
CA - AGU Fall Meeting
MI - Great Lakes Fruit, Vegetable and Farm Market EXPO

with widespread effects across all five big lakes. Few wind reports are available from the lakes themselves but hourly observations are available at some of the downwind ports. Lake Huron suffered the greatest losses during the storm, and winds measured downwind of the lake at Port Huron, Michigan, gusted to 50 to 60 mph. Winds were even stronger on Lake Erie with speeds of 50-70 mph with gusts near 85 mph. These winds, traveling over the large expanses of the unfrozen Great Lakes, helped to generate waves up to 35 feet. Changeable wind directions and extreme marine conditions led many ships to seek refuge at the southern end of Lake Huron where, unfortunately, many of them met their demise as they were torn apart or pushed onto the rocky coast.



The 1913 storm was the result of two storms that converged over the Great Lakes. (graphic courtesy NOAA 1913 storm website)

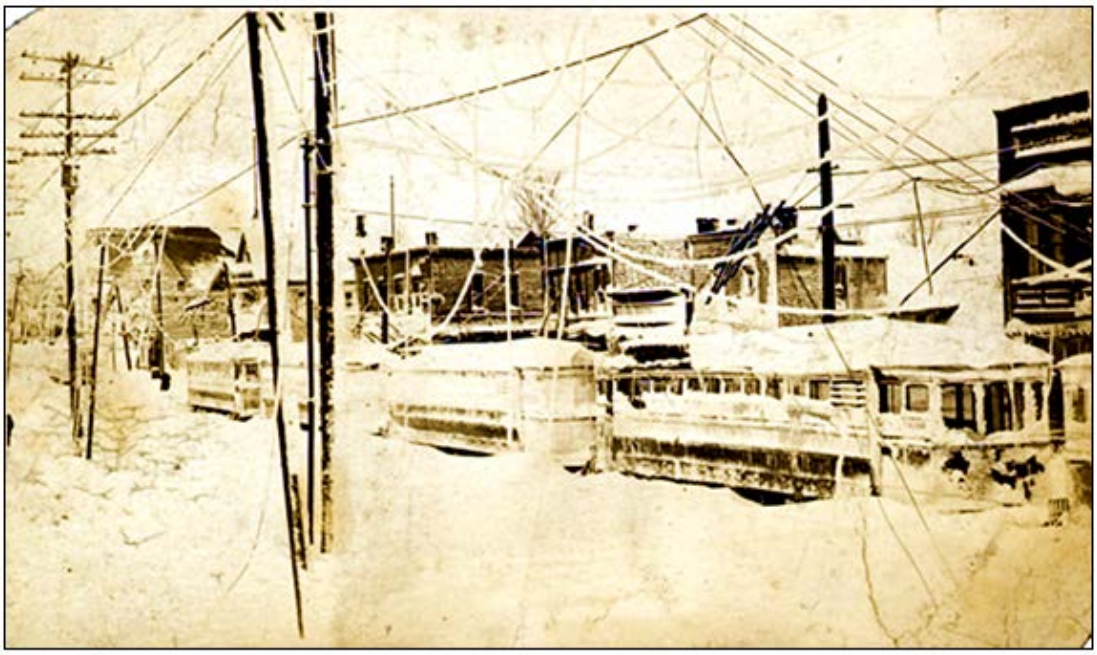


Simulation of the maximum wave height (feet) during the Great Lakes Storm of 1913. (graphic courtesy NOAA 1913 storm website)

A first-hand account of these extreme weather conditions:

> *"No lake master can recall in all his experience a storm of such unprecedented violence with such rapid changes in the direction of the wind and waves and its gusts of such fearful speed! Storms ordinarily of that velocity do not last over four or five hours, but this storm raged for sixteen hours continuously at an average velocity of sixty miles per hour, with frequent spurts of seventy and over."*
>
> -- Lake Carriers Association Report (1914)

The winds and rough seas were only part of the story, as an extensive area of snow and blinding snow squalls buried a number of locations in the Great Lakes region. Heavy system snow fell across eastern Ohio, West Virginia, and western Pennsylvania with moderate snowfall extending west to parts of Michigan. More noteworthy was the impressive and record-breaking lake effect snows that developed as the unseasonably cold air settled over the warm waters. The wind driven snows blinded ships trapped on the lakes and crippled cities with tremendous snow drifts of 5 to 6 feet.



A Cleveland streetcar after the 1913 storm. (photo courtesy NOAA 1913 storm website)

Cleveland was one of the hardest hit locations, with 17.4 inches of snow falling in a 24-hour window and a three-day total of 22.2 inches. This broke the previous 24-hour record snowfall by 4.4 inches. The storm paralyzed the city with nearly all businesses, factories, and schools closed on November 10th and 11th. Travel became nearly impossible, with most roads impassable and few streetcars able to run. The city suffered extensive power and telephone outages, and the telegraph lines were down for several days. Damage estimates in the Cleveland area alone were approximately 3.5 million dollars in 1913, equivalent to 82 million dollars in 2013.

The November 11th, 1913 Cleveland *Plain Dealer* newspaper said this about the storm: *"Cleveland lay in white and mighty solitude, mute and deaf to the outside world, a lonesome snowiness, storm-swept from end to end, when the violence of the two-day blizzard lessened late yesterday afternoon."*

The commemoration of this historic and deadly Great Lakes storm also provides us with the opportunity to see the many improvements spawned from this deadly disaster. The Storm of 1913 resulted in a renewed emphasis on placing wireless telegraph technology on Great Lakes ships. This allowed for much-improved communication while at sea and for improved weather updates as conditions changed. Weather forecasting also saw many improvements in the years following the storm including the development of a weather balloon network, enhanced forecast mapping, and more frequent weather updates. In response to sharp criticism of the shipping companies after the storm, the shipping industry developed new ship designs with greater stability and more longitudinal strength. In the end, it is these, and many other positive achievements, which will have the greatest lasting effect from the historic Storm of 1913.

Shipwrecks during the 1913 storm - click for large version

To learn more about this extreme and historic weather event, please visit the storm web site jointly produced by several NOAA agencies: http://www.regions.noaa.gov/great-lakes/centennial_anniversary_storm_of_1913/

Sources used for this article:

1. NOAA Regional Collaboration Centennial Anniversary 1913 Storm web page, Karen Clark, NOAA NWS Meteorologist, Sarah Jamison, NOAA NWS Hydrologist http://www.regions.noaa.gov/great-lakes/centennial_anniversary_storm_of_1913/
2. "Hell Hath' No Fury like a Great Lakes Fall Storm: Great Lakes White Hurricane November 1913," William R. Deedler, http://www.crh.noaa.gov/dtx/stm_1913.php
3. 1913 Storm presentation, John Boris, NOAA NWS meteorologist

For more information on this article or the Gaylord, MI NWS office , please contact Jim Keysor via email at james.keysor@noaa.gov.

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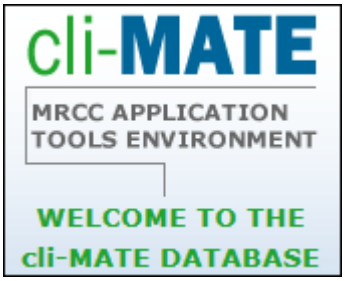
MRCC Launches Enhanced Online Climate Data System

Steve Hilberg, MRCC

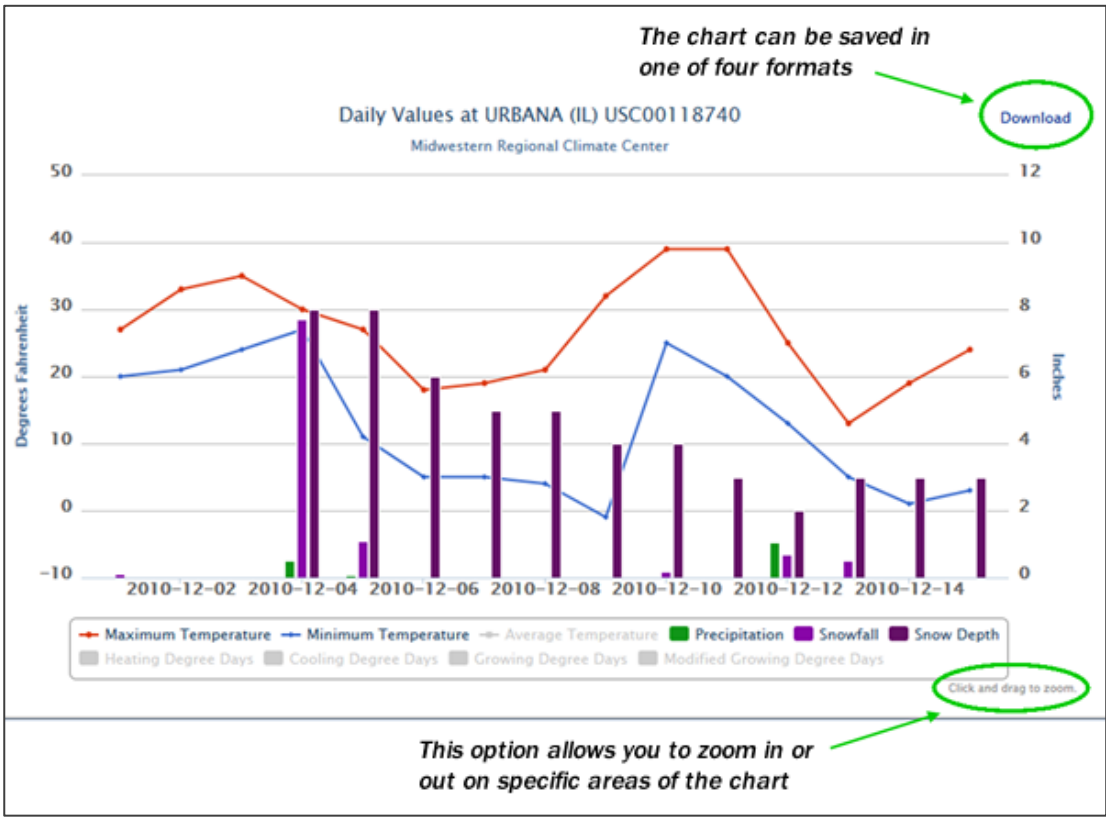


Hello cli-**MATE**, goodbye MACS.

In early October, the MRCC launched a new online climate data system where users can obtain a myriad of weather and climate data on various time (hourly, daily, monthly, seasonal, annual) and spatial (individual station, climate division, state) scales. The best part is that all of the climate data and value-added information is available free of charge.

The new system is called cli-**MATE** (MRCC Application Tools Environment) and replaces the subscription-based MACS (MRCC Applied Climate System). The phase-in began in early October, and by the end of the month the changeover was complete. cli-**MATE** has replaced MACS on the homepage tab. The look and feel of cli-**MATE** will be familiar to former MACS users, but cli-**MATE** offers an expanded menu of value-added products, particularly charts and graphs.

Graphical products are produced using Highcharts software. This allows us to provide users with customizable and interactive charts of climate data. Any chart displayed can be downloaded and saved as a PNG, JPEG, PDF, or SVG document. When you move the mouse pointer over the chart area, data are displayed for the individual points on the chart.



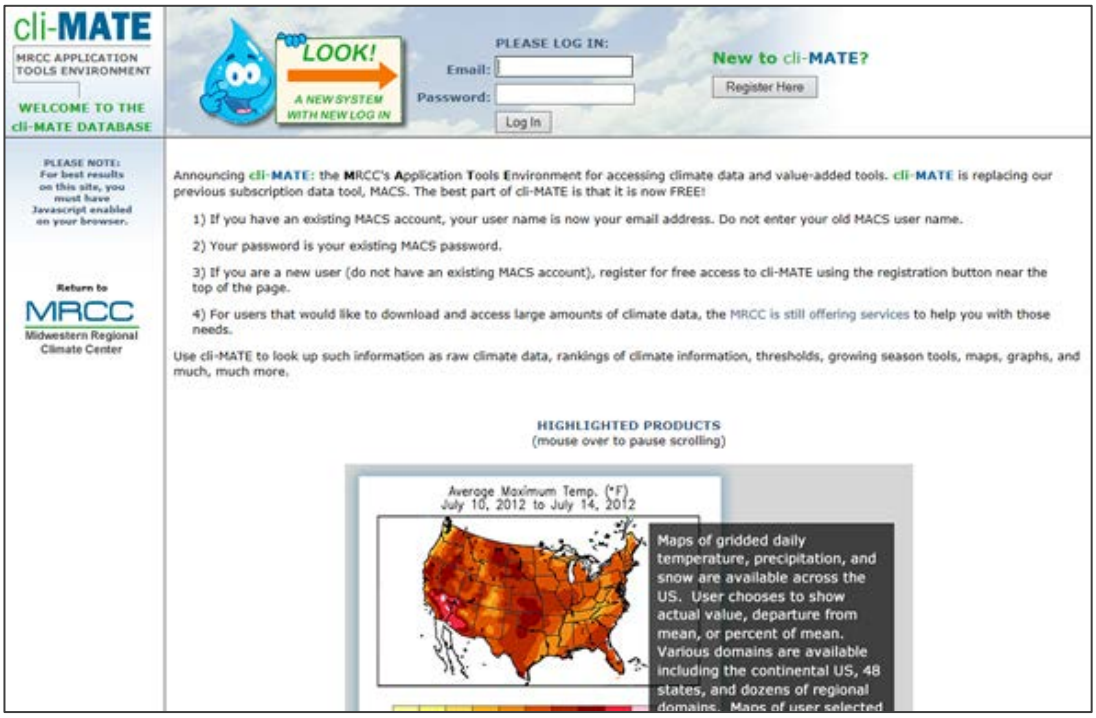
This is a chart of the daily values for the Urbana, IL Cooperative Station from December 1-15, 2010.

Real-time and historical climate data are available on cli-**MATE** from around the United States. Users have access to tabular and graphical presentations of climate data, growing season statistics, degree day products and graphs, freeze statistics, ranking of climate values, gridded maps of climate data and averages over various regions and much more.

Using the data and value-added tools available on cli-**MATE**, users can answer questions like: “How many growing degree days have there been in my location since I planted my crops on April 16th?”, “When does the first measurable snowfall typically occur each season in my city?”, or “This summer it hardly rained in my town, how does this compare to the driest summer on record?”

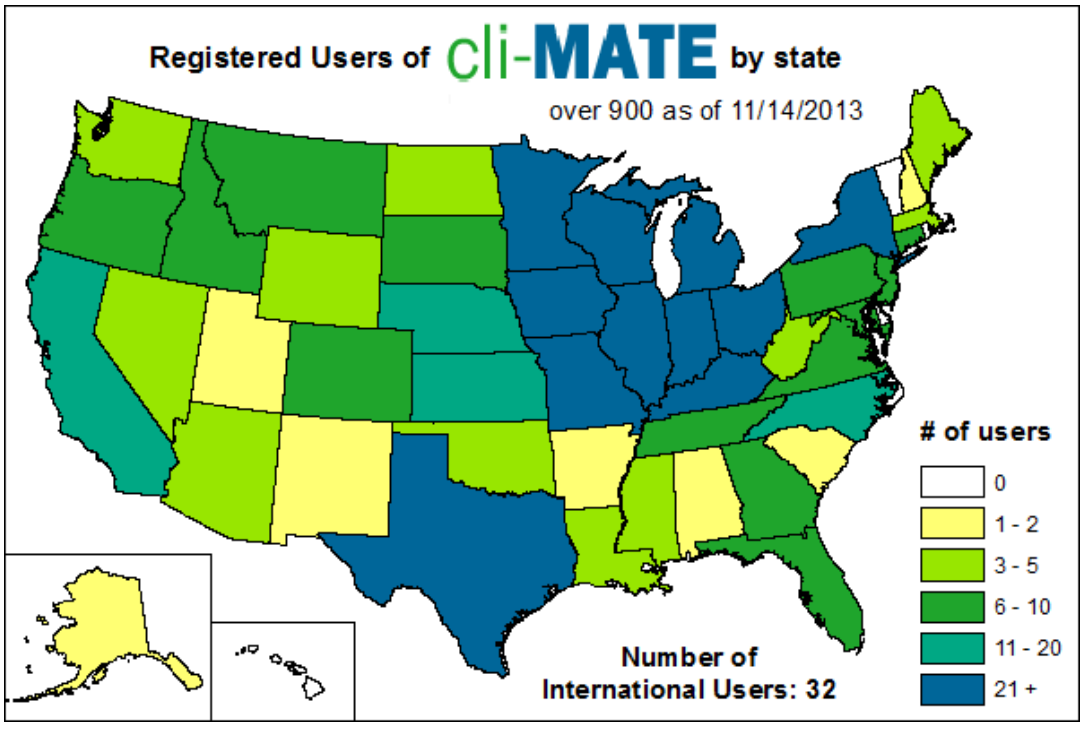
Additional data presentations and tools are being developed and will be added to the system as they are completed. Data available through cli-**MATE** includes daily observations from the U.S. Cooperative Network, hourly weather observations from airports throughout the U.S., and daily precipitation measurements from the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS).

There is no charge to use cli-**MATE**, but users need to register before they can have access to the data and products. Users can register by clicking on the “Register Here” button at the top right of the cli-MATE homepage.



The cli-MATE login page on the MRCC web site.

For users that would like to download and access large amounts of climate data, the MRCC is still offering services to help you with those needs through our service office (email: mrcc@isws.illinois.edu).



*For more information on this article or the MRCC's cli-**MATE** system, please contact our Service Office via email at mrcc@isws.illinois.edu or phone at (217) 244-8226.*

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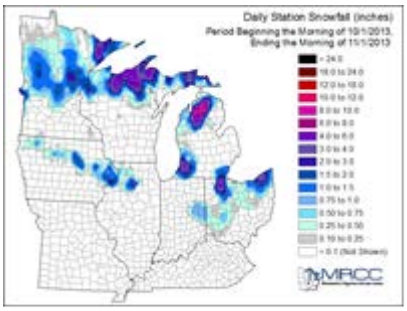
Midwest Climate at a Glance - October



Above normal temperatures kicked off the month of October across the region, however, an unseasonably warm start to October was followed by a much cooler second half of the month. The seasonal transition this fall was enhanced, with temperatures dropping about 15°F from the first to the last half of the month.

October also brought near normal to slightly above normal precipitation to the Midwest, with the greatest monthly precipitation totals of 6" to 8" in portions of western Missouri and northern Michigan. The first snow of the season fell in northern parts of the Midwest in the latter half of the month, with reported snowfall in portions of the upper Midwest. Other areas that received snowfall in October include areas of the Great Lakes due to light lake-effect snow and in northern and eastern Iowa, northwest Illinois, and even east-central Indiana. Read more...

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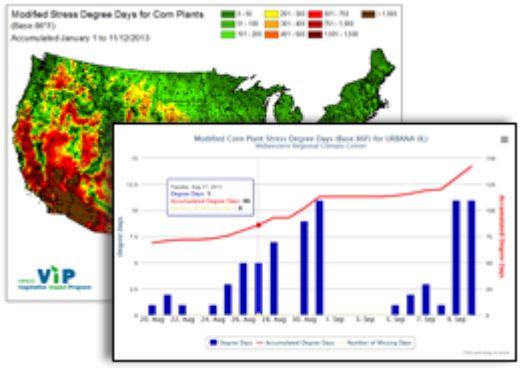
MRCC Product Highlight



Stress Degree Days (SDD) are a way of monitoring the cumulative effects of high heat on a corn crop. Temperatures above 86°F have a detrimental effect on corn growth. Although modified growing degree days limit their accumulation for these high heat days, growers can also watch SDD to monitor the negative aspects of these high temperature days. MRCC has both a spatial map of the current year's accumulated SDD for the region in our VIP section and also an option in the station-based degree day tool in cli-MATE. The station-based tool allows you to customize the threshold, accumulation period, and dates shown (including past years).

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Climate Cool Tool

Probability graphics for snow and freezing rain are available from the Weather Prediction Center Winter Weather Forecasts page. These graphics indicate the probability (potential) for a location to receive specific thresholds of accumulated snow or ice. Snowfall - closed lines represent the probability (slight, moderate, and high) that enclosed areas will

receive equal to or greater than a specific threshold accumulation (4", 8" or 12") of snowfall in a 24 hour period. Freezing Rain - depicts the probability in the same manner and time period as snowfall, but with an accumulation threshold of .25" (one quarter of an inch) of freezing rain.

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MRCC On The Road

Asheville, NC (Nov 19-21) – Regional Climate Services Meeting

Beth Hall will be attending the Regional Climate Center (RCC) Contract Kickoff Meeting hosted by the National Climatic Data Center (NCDC) and the Regional Climate Service directors.

San Francisco, CA (Dec 9-13) – AGU Fall Meeting

Beth Hall will be presenting "A Community Frost/Freeze Susceptibility Operational Guidance Tool" at the annual American Geophysical Union's Fall Meeting.

Grand Rapids, MI (December 10-11) – Great Lakes Fruit, Vegetable, and Farm Market EXPO

Molly Woloszyn will be meeting with blueberry growers during the Great Lakes EXPO to discuss what weather or climate products exist or could be developed to help them make management decisions. The EXPO will also provide an opportunity to connect with other growers in the region and to discuss various VIP products, including the Frost/Freeze Guidance project.

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Need Climate Data?
Ask about our Online Climate Data Resources (MACS) or Request some data!

Can't Find a Climate Product?
Let us know!

Email us your local climate impacts! We are constantly keeping a log of how climate is impacting our region, and our information would not be complete with YOUR help!

Have something to share as a feature article in an upcoming *The Climate Observer* issue, or interested in being contacted for an article interview? Please let us know!

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The MRCC is a partner in a national climate service program that includes the NOAA National Climatic Data Center, Regional Climate Centers, and State Climate Offices.
MRCC is based at the Illinois State Water Survey, a division of the Prairie Research Institute
at University of Illinois Urbana-Champaign.