

**CLIMATE REFERENCE STATION
SASKATOON
ANNUAL SUMMARY 2019**

**V. Wittrock
Saskatchewan Research Council
Air and Climate**



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COVER PHOTOGRAPHS

Report cover: Aerial view of the Saskatoon Climate Reference Station, SK 07 March 2019

Inside cover: All-season precipitation gauge with new 2 meter wind speed cup anemometer, Climate Reference Station, Saskatoon, SK 05 September 2019

photo credit: V. Wittrock

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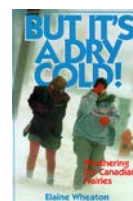
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Enquiries concerning the SRC Saskatoon Climate Reference Station (CRS), its data, measurement programs and publications or becoming a supporter are most welcome. For further information contact:

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 Monthly data sheets and annual summaries: <http://src.nu/crsdata>

**SASKATCHEWAN RESEARCH COUNCIL
 CLIMATE REFERENCE STATION SUPPORTERS, 2019-2020
 WE GRATEFULLY ACKNOWLEDGE THE SUPPORT OF THE FOLLOWING:**



SRC'S SASKATOON CLIMATE REFERENCE STATION HISTORY

Meteorological observations at or near Saskatoon were first taken by the Northwest Mounted Police in 1889 with the recording of temperature. There is some disagreement in the early records as to the exact location of the weather observing point, but the majority of the evidence indicates 52 15'N, 106 20'W, elevation 480m above sea level as the most probable location. This would place it at Clark's Crossing on the South Saskatchewan River, approximately 16 km northeast of the centre of the City of Saskatoon. At that time, there was a settlement at Clark's Crossing as well as 10 to 15 families on either side of the river where Saskatoon is now located.

Little is known about the very early observers; however, the records do show that Major T.H. Keenan took observations from March 1892 until March 1895, and Mr. George Will was the observer from January 1897 until April 1897. It is thought that T.H. Copeland was involved in the observational program from 1895 to 1 May 1901, at which time it was taken over by Mr. Eby, Sr. Mr. Eby Sr. recorded the observations until his death in 1921, at which time his daughter (E.S. Eby) continued to record the observations. Her brother (J.M. Eby) recorded the observations beginning in April 1931 until the station closed on 31 October 1942. The Eby station recorded temperature, precipitation and weather notes on fog, thunderstorms, winds and any unusual weather phenomena. Reports were made twice daily (morning and evening).

In 1916, a climate reference station was established by the University of Saskatchewan and continuous observations were kept twice daily until 15 January 1965. The longtime observer was Mr. Sidney Cox. The SRC took over the program in the fall of 1963 and moved it to a new location 52 09'N, 106 36'W and elevation 497 m above sea level¹. The first observer was Terry Beck followed three years later by Orville Olm². In 1967, Joe Calvert became the primary observer until his retirement in 1983. Ray Begrand succeeded Mr. Calvert until 1988 when Virginia Wittrock became the primary observer. Carol Beaulieu became primary observer in 1992 until her retirement summer of 2014. Virginia Wittrock is project manager (1992 to present) and primary observer and occasional weekly site maintenance assistance from K. Babich, K. Grismer and C. Bodnaryk.

In the summer of 1992, Saskatoon CRS began to be converted to an automated system of data collection with the installation of a Campbell Scientific data logger and automatic sensors. The updating, replacing, re-installing and adding of new sensors began in 2009 and was completed in 2012. Elements presently recorded at the Saskatoon CRS are temperature (maximum and minimum), precipitation, relative humidity, snow depth, wind (speed and direction), solar radiation (bright sunshine, global and diffuse), barometric pressure, grass level temperature, soil temperature (seven levels), and soil moisture (three levels). Soil moisture instruments became operational June 2019.

¹Christiansen 1970; Environment Canada 1975; ²Olm 2001

Mr. James Eby was one of the original members of the Temperance Colony Society. He filed his homestead in 1882 and returned with his family in 1883. He was the first president of the school board and served as the township supervisor for Nutana. While riding a horse in 1890, he was struck by lightning and was a partial invalid thereafter. In 1901, he and his daughter moved to Nutana where he served as a Federal Meteorologist for the next 20 years until his death in 1921 at the age of 77. He was buried, next to his wife, in the Nutana pioneer cemetery.¹

¹Ladd, 2008



photo: C. Beaulieu

WHAT IS THE CLIMATE REFERENCE STATION?

The Saskatchewan Research Council's Climate Reference Station (SRC CRS) at Saskatoon is classified as a principal climatological station with supplementary climatological observations¹. A climate reference station's data are intended for the purpose of determining climatic trends. This requires long periods (not less than thirty years) of homogeneous records, where man-made environmental changes have been or are expected to remain at a minimum. Ideally the records should be of sufficient length to enable the identification of secular changes of climate². At CRS Saskatoon, half-hourly readings are taken of elements (temperature, precipitation amount, humidity, wind and atmospheric pressure). Supplemental observations include rainfall intensity, soil temperature, bright sunshine, solar radiation (diffuse and global), snow depth, relative humidity, barometric pressure, soil moisture and grass level temperature. High quality and consistent climatological observations are maintained providing data sets to meet the current concerns of the effects of climatic change and increased variability.

Purpose and Benefits

The purpose of the SRC CRS is to provide a record of observed meteorological elements in order that the climate of the area and its changes can be accurately documented and described. Climatological data have assumed new importance as a result of social and environmental issues in which climate is a dominant factor. Climatological information assists in realizing new technological opportunities and social changes. It is necessary and valuable for areas such as agriculture, forestry, land use and facility placement, water and energy resources, as well as health and comfort.

The CRS allows us to:

- Evaluate long-term climatic trends – early warning system for increased frequencies of extreme events such as floods, droughts, etc.;
- Determine the impacts of climate events on society, economy, health and ecosystems – e.g., intense rainfall causing flooding and property damage, heat stress with its health implications;
- Do value-added research;
- Be part of regional, national and global networks in important agricultural and ecological areas;
- Facilitate development of additional programs – e.g., air quality, biodiversity and climate change monitoring
- Have roles in various programs within SRC including spray drift work, Boreal Ecosystem Atmospheric Study (BOREAS), and collaborative research with the Western College of Veterinary Medicine and the College of Agriculture, University of Saskatchewan; and
- Provide climate data to various industries, government organizations, non-government organizations, media outlets, institutions of learning, and interested individuals.

Goals

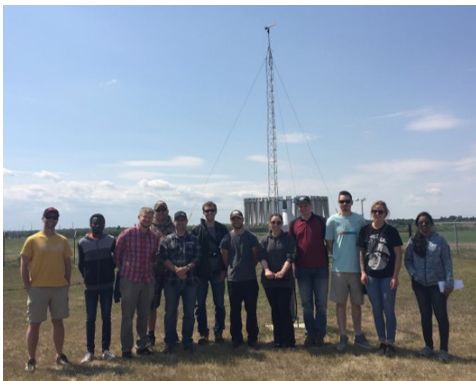
The goals of the CRS are first to maintain the high quality of data gathered over its fifty plus years of existence at its current location and, second to continue to monitor a large variety of elements. These various elements combined with the long-term collection period as well as the stable location allow SRC CRS at Saskatoon to be an extremely valuable climate information collection station.

¹Environment Canada 1992 ²World Meteorological Organization 1988

ACTIVITIES ASSOCIATED WITH THE SASKATOON CLIMATE REFERENCE STATION, 2019

The Saskatoon Climate Reference Station (CRS) had another busy year of activities. We continued to share important climate information from the CRS through monthly e-mails, media interviews, presentations and various social media. Monthly and annual climate information from both SRC's Saskatoon and Conservation Learning Centre CRSs is available online (<http://src.nu/crsdata>). Over the last 55+ years, SRC provided hands-on experience with our weather instruments to hundred of students (young and older), and gave presentations highlighting Saskatoon's climate: past, present and future. Three tours of CRS Saskatoon were provided in 2019. One was for select SRC personnel, one was for SaskPolytechnic students and their instructors from the School of Natural Resources and Built Environment and one was for the graduate students of the Subsurface Hydrology Research Group, School of Environment and Sustainability, University of Saskatchewan. On-site tours are not always possible, therefore we encourage you to undertake a virtual tour of our Saskatoon CRS at: <http://src.nu/1OLBg5H>.

The climate reference station has various types of maintenance undertaken in 2019. We added a cup anemometer (2 meters above ground level) to the all-season weighing gauge. We installed an HMP Air Temperature and Relative Humidity sensor that can accurately record extreme low and high temperatures (-80 to +60C). The Stevens HydraProbe Soil Moisture Sensors, with depths of 10, 20 and 50 cm, were activated for 01 June 2019.



Site tour: SaskPolytechnic Students and Instructors
June 2019
Photo: V. Wittrock

Grad students from the Subsurface Hydrology Resarch Group, School of Environment and Sustainability, University of Saskatchewan
September 2019
Photo: V. Wittrock



2 meter cup anemometer added to all season precipitation gauge
May 2019
Photo: V. Wittrock



Snow Depth Sensor maintenance
Nov 2019
Photo: V. Wittrock



Added HMP 155 Air Temperature & RH sensor (calibrated for -80 to +60C) to temperature array
May 2019
Photo: V. Wittrock

Stevens HydraProbe Soil Moisture Sensors began measurements
June 2019
Photo: K. Babich (Oct 2018)

SUMMARY FOR 2019

Data, including temperature, precipitation, wind speed and direction, bright sunshine, solar radiation, soil temperature, snow depth and soil moisture levels were recorded at the Saskatchewan Research Council's (SRC) Climate Reference Station (CRS) (52 09'N, 106 36'W, 497m asl) in Saskatoon, SK during 2019. It is compared in this report with the long-term (circa 1900-2018) and standard-period/normal (1981-2010) record.

2019 was the third year in a row that measured below the 1981-2010 average precipitation amounts and it was the thirteenth driest year at SRC's Saskatoon Climate Reference Station. From January 2018 to December 2019, the Saskatoon Climate Reference Station measured 18 out of 24 months with below normal precipitation amounts. Spring (March, April, May) were the driest on record with only 18.5 mm of precipitation recorded. The previous minimum was in 2009 with 19.0 mm. The first part of June was dry, but the rain started to fall on the 5th. Saskatoon CRS had two large rain events in June; on the 20th with 20.9 mm and 22nd with 32.4 mm. The year ended at being 83% of the cumulative normal.

No surprise to anyone, 2019 had below normal temperatures. The average yearly maximum was 0.7 C less than normal, and the average yearly minimum was 0.5 C less than normal. This was due in part to a cold February, in which the average monthly maximum temperature was colder than the normal monthly average minimum temperature. February 2019 was the second coldest February on record at SRC's Saskatoon CRS. February 1979 was the coldest with a mean monthly temperature of -23.4 C. 2019 did not get overly hot. July through November had below normal maximum temperatures. The low temperatures resulted in 38 fewer growing degree-days, 143.5 more heating degree-days and 28.4 fewer cooling degree days than normal for the year.

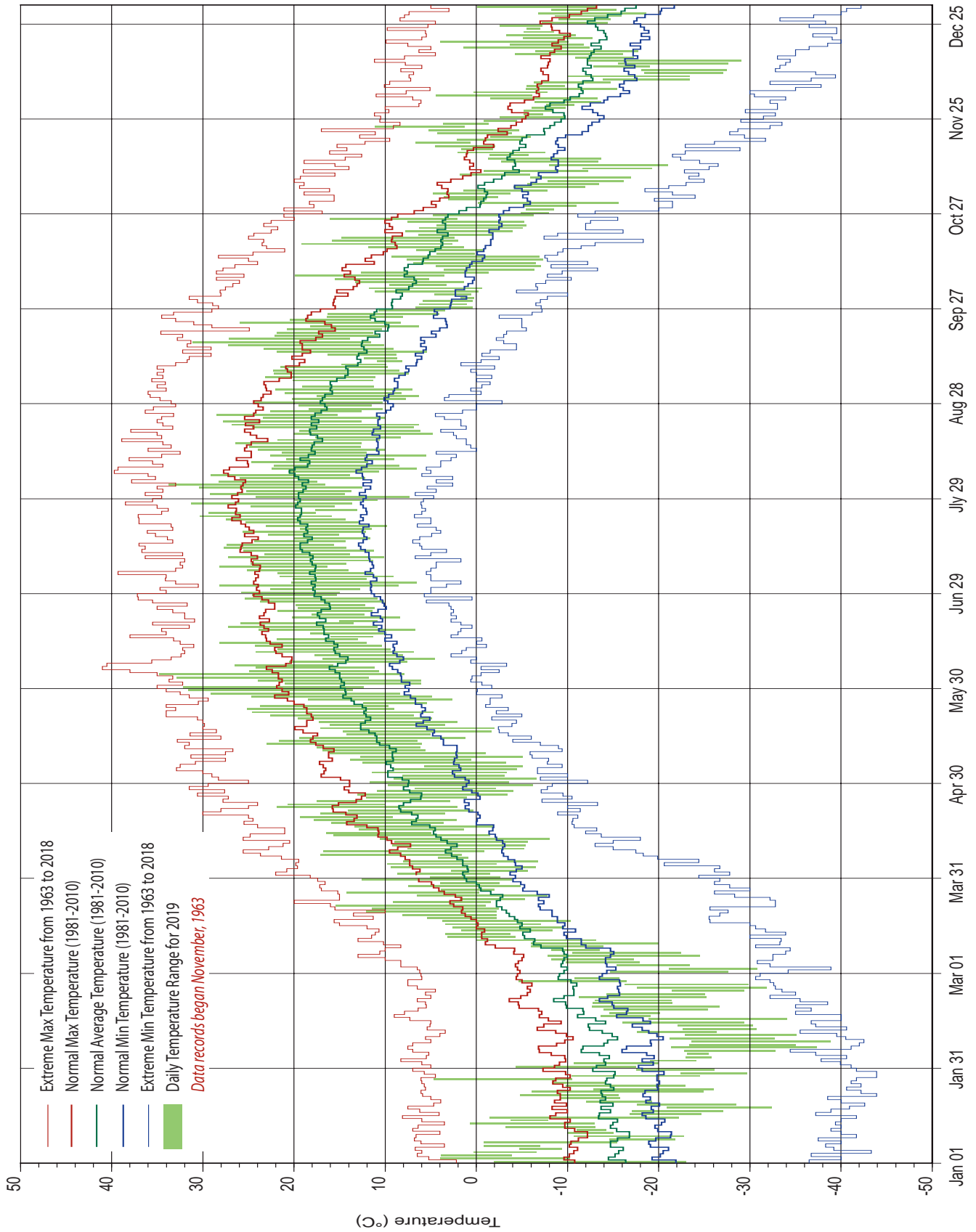
The frost-free period was 135 days in length (May 17 to Oct 2). Saskatoon had some chilly temperatures in August and September. In August the temperature went down to 4.8 on the 18th, and it came very close to freezing the last week of September on multiple days.

Cool February air temperatures and low snow pack resulted in soil temperatures going below 0 C at the 100 cm level from February 3 to March 22. It is the second year in a row that the 100 cm soil temperatures went below zero. Prior to 2018, the last time the 100 cm soil depth went below zero was in 2010. The 10 cm soil depth reached 0 C on March 20 and stayed at or above 0 C at that depth until November 5.

The dry conditions generally mean that the sun will be shining. This was definitely the case for the spring period of 2019. March 2019 recorded a record-breaking number of sunshine hours (273.9 hrs); the previous record was in 2014 with 253.5 hours. In addition, while not breaking records, April and May were both above normal levels for bright sunshine hours. The result of these extraordinarily sunny spring months was a new spring record of bright sunshine hours (890.4 hrs); the previous record occurred in 2015 with 872.8 hours. What was even more remarkable, the number of spring sunshine hours out numbered the number of summer sunshine hours by 64 hours. This has only happened once before in 1998.

The Saskatoon CRS also measured some high wind gusts in 2019. Gale winds were recorded eight times, strong gale winds were measured three times and one storm wind was measured. These wind events were usually associated with other weather events. For example, the 78 km/hr peak wind event on January 27 was associated with +4.7 C temperatures and 3.8 mm of freezing rain/snow. By January 29, the temperature had dropped to -29.7 C. The 97.3 km/hr wind gust on July 18 was associated with a thunderstorm; the Saskatoon CRS measured 4.0 mm of rain that day. The next day 17.8 mm of precipitation was measured.

DAILY TEMPERATURE



TEMPERATURE

| 2019 TEMPERATURE RECORDS | | | | | | | |
|---|--|----------------|----------------|---------------|---------------|------|------------|
| | TYPE | DATE | | NEW RECORD °C | OLD RECORD °C | YEAR | DAY |
| | | Month | Day | | | | |
| DAILY | Maximum | <i>Highest</i> | January | 17 | 6.2 | 4.7 | 2017 |
| | | | March | 20 | 12.1 | 10.0 | 2010 |
| | | | August | 2 | 33.8 | 33.0 | 1983 |
| | | <i>Lowest</i> | November | 23 | 11.1 | 9.1 | 2011 |
| | | | June | 20 | 15.0 | 15.3 | 1998 |
| | | | April | 19 | 9.2 | 8.5 | 2007 |
| | Minimum | <i>Highest</i> | September | 23 | 11.6 | 10.9 | 2014 |
| | | | November | 23 | 1.3 | -0.5 | 1988 |
| | | | <i>Lowest</i> | <i>None</i> | | | |
| | | Mean | <i>Highest</i> | March | 20 | 5.0 | 4.2 |
| | September | | | 20 | 15.6 | 15.3 | 2014, 2009 |
| | November | | | 23 | 6.2 | 3.0 | 1988 |
| | <i>Lowest</i> | | <i>None</i> | | | | |
| <i>Greatest Number of Daily Growing Degree-days</i> | | November | 23 | 1.2 | 0.0 | 1994 | |
| <i>Lowest Number of Daily Heating Degree-days</i> | | November | 23 | 11.8 | 15.0 | 1988 | |
| Monthly | <i>Greatest Number of Days <= -10°C</i> | | February | | 27 | 27 | 1979 |
| | <i>Greatest Number of Days <= -30°C</i> | | February | | 10 | 10 | 1972 |

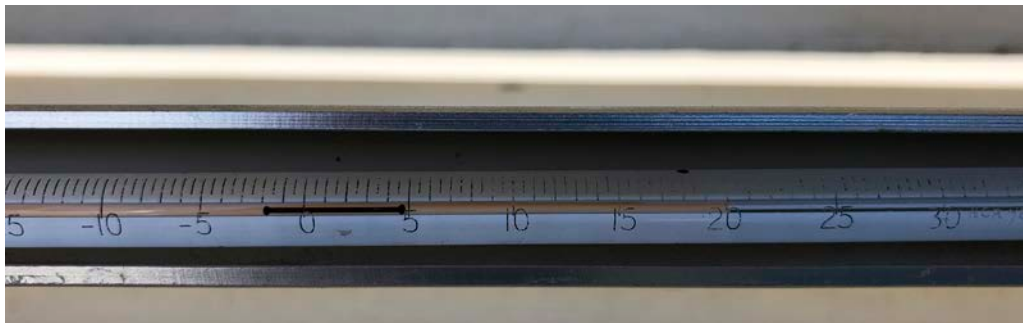


Downburst of rain
 July 13 2019
 (Photo: V. Wittrock)

TEMPERATURE

| 2019 EXTREME TEMPERATURES | | | |
|---------------------------------------|----------------|--|----------------|
| COLD (less than or equal to -30°C) | | HOT (greater than or equal to 30°C) | |
| DATE | TEMPERATURE °C | DATE | TEMPERATURE °C |
| January 18 | -32.4 | May 29 | 31.6 |
| February 5 | -32.8 | May 30 | 32.2 |
| February 6 | -37.3 | June 2 | 32.9 |
| February 7 | -35.0 | June 3 | 34.8 |
| February 8 | -38.9 | July 23 | 30.3 |
| February 9 | -32.7 | July 27 | 31.3 |
| February 10 | -35.1 | August 1 | 30.4 |
| February 12 | -30.7 | August 2 | 33.8 |
| February 13 | -30.3 | | |
| February 15 | -34.1 | | |
| February 25 | -31.8 | | |
| April 2 | -30.8 | | |

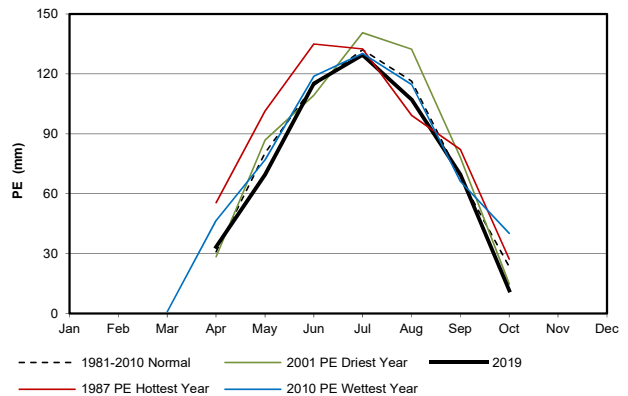
Coloured cells indicate extremes for the year



Very cool August 18 temperatures (4.8C)
August 2019
(Photo: V. Wittrock)

POTENTIAL EVAPOTRANSPIRATION (PE) using the Thornthwaite Method¹

| MONTH | PE (mm) 2018 | PE (mm) 2010 Wettest Year | PE (mm) 2001 Driest Year | PE (mm) 1987 Hottest Year | PE (mm) 1981-2010 Normal |
|-------|--------------|---------------------------|--------------------------|---------------------------|--------------------------|
| Jan | 0 | 0 | 0 | 0 | 0 |
| Feb | 0 | 0 | 0 | 0 | 0 |
| Mar | 0 | 0.9 | 0 | 0 | 0 |
| Apr | 33.3 | 46.5 | 28.5 | 55.5 | 30.9 |
| May | 69.6 | 77.0 | 86.8 | 101.4 | 80.5 |
| June | 115.2 | 118.8 | 109.3 | 135.0 | 114.2 |
| July | 129.5 | 130.2 | 140.6 | 132.5 | 132.1 |
| Aug | 107.1 | 114.6 | 132.4 | 99.2 | 116.3 |
| Sept | 69.6 | 66.1 | 78.1 | 82.1 | 67.9 |
| Oct | 11.5 | 40.1 | 14.8 | 27.3 | 23.4 |
| Nov | 0 | 0 | 0 | 0 | 0 |
| Dec | 0 | 0 | 0 | 0 | 0 |
| Total | 535.8 | 594.3 | 590.4 | 632.9 | 565.4 |



¹Thornthwaite and Mather 1955
Thornthwaite 1948

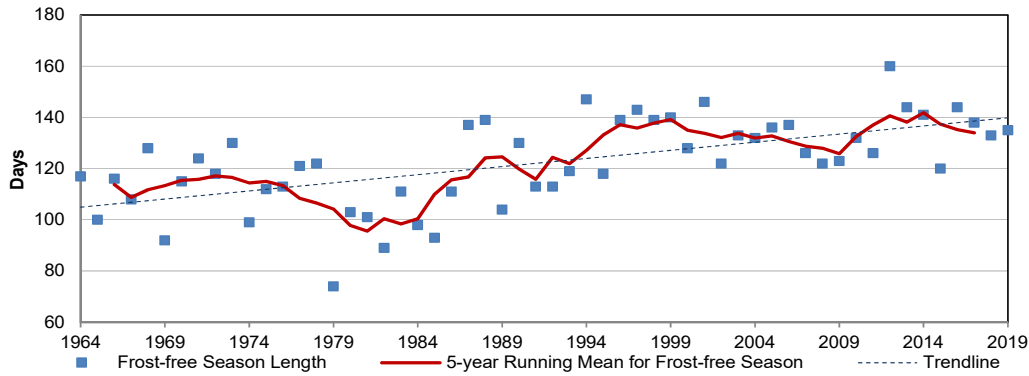


Temperature and Relative Humidity Sensors (automated)
September 2019
(Photo: V. Wittrock)

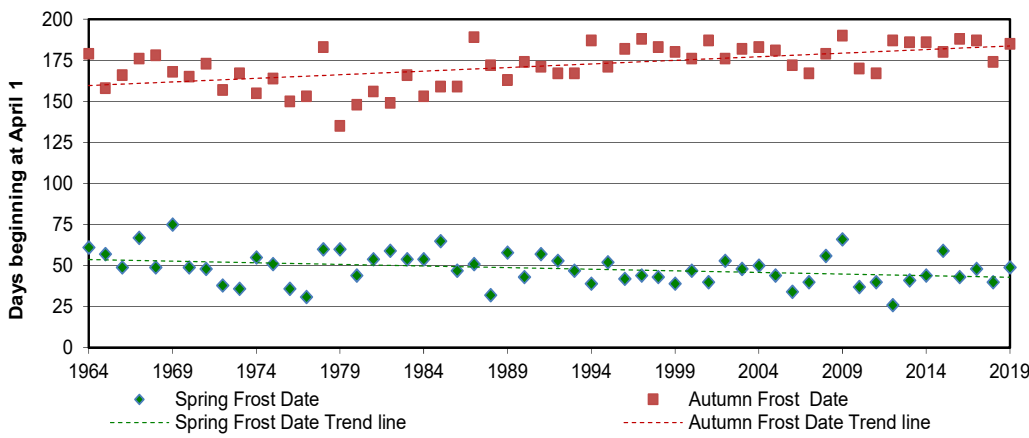


Minimum thermometer housed in Stevenson Screen (first fall frost temperature thermometer reading show temperature went down to -0.6C sometime between September 23 and October 4 2019). The first fall frost was recorded to be -0.2C on October 2. The temperature went down to -0.6C on October 3.
(Photo: V. Wittrock)

| DATES & DURATION OF THE FROST-FREE SEASON | | | |
|---|-------------------|------------------|--------------------------|
| YEAR | LAST SPRING FROST | FIRST FALL FROST | Frost-free Season Length |
| 1964 | May 31 | Sept 26 | 117 |
| 1965 | May 27 | Sept 05 | 100 |
| 1966 | May 19 | Sept 13 | 116 |
| 1967 | Jun 06 | Sept 23 | 108 |
| 1968 | May 19 | Sept 25 | 128 |
| 1969 | Jun 14 | Sept 15 | 92 |
| 1970 | May 19 | Sept 12 | 115 |
| 1971 | May 18 | Sept 20 | 124 |
| 1972 | May 08 | Sept 04 | 118 |
| 1973 | May 06 | Sept 14 | 130 |
| 1974 | May 25 | Sept 02 | 99 |
| 1975 | May 21 | Sept 11 | 112 |
| 1976 | May 06 | Aug 28 | 113 |
| 1977 | May 01 | Aug 31 | 121 |
| 1978 | May 30 | Sept 30 | 122 |
| 1979 | May 30 | Aug 13 | 74 |
| 1980 | May 14 | Aug 26 | 103 |
| 1981 | May 24 | Sept 03 | 101 |
| 1982 | May 29 | Aug 27 | 89 |
| 1983 | May 24 | Sept 13 | 111 |
| 1984 | May 24 | Aug 31 | 98 |
| 1985 | Jun 04 | Sept 06 | 93 |
| 1986 | May 17 | Sept 06 | 111 |
| 1987 | May 21 | Oct 06 | 137 |
| 1988 | May 02 | Sept 19 | 139 |
| 1989 | May 28 | Sept 10 | 104 |
| 1990 | May 13 | Sept 21 | 130 |
| 1991 | May 27 | Sept 18 | 113 |
| 1992 | May 23 | Sept 14 | 113 |
| 1993 | May 17 | Sept 14 | 119 |
| 1994 | May 09 | Oct 04 | 147 |
| 1995 | May 22 | Sept 18 | 118 |
| 1996 | May 12 | Sept 29 | 139 |
| 1997 | May 14 | Oct 05 | 143 |
| 1998 | May 13 | Sept 30 | 139 |
| 1999 | May 09 | Sept 27 | 140 |
| 2000 | May 17 | Sept 23 | 128 |
| 2001 | May 10 | Oct 04 | 146 |
| 2002 | May 23 | Sept 23 | 122 |
| 2003 | May 18 | Sept 29 | 133 |
| 2004 | May 20 | Sept 30 | 132 |
| 2005 | May 14 | Sept 28 | 136 |
| 2006 | May 04 | Sept 19 | 137 |
| 2007 | May 10 | Sept 14 | 126 |
| 2008 | May 26 | Sept 26 | 122 |
| 2009 | June 05 | Oct 07 | 123 |
| 2010 | May 07 | Sept 17 | 132 |
| 2011 | May 10 | Sept 14 | 126 |
| 2012 | April 26 | Oct 04 | 160 |
| 2013 | May 11 | Oct 04 | 144 |
| 2014 | May 14 | Oct 03 | 141 |
| 2015 | May 29 | Sept 27 | 120 |
| 2016 | May 13 | Oct 05 | 144 |
| 2017 | May 18 | Oct 04 | 138 |
| 2018 | May 10 | Sept 21 | 133 |
| 2019 | May 17 | Oct 02 | 135 |
| 1981-2010 Normal | May 18 | Sept 20 | 124 |



Frost-free Growing Season Duration



Frost-free Growing Season End Points



Gopher at Climate Station
May 2019
(Photo: V. Wittrock)

TEMPERATURE RANKINGS

| AVERAGE ANNUAL TEMPERATURES °C | | | | | |
|--------------------------------|------|--------------|------|-----------|-----|
| MAXIMUM TEMP | | MINIMUM TEMP | | MEAN TEMP | |
| 1987 | 11.6 | 2016 | 0.1 | 1987 | 5.4 |
| 2001 | 10.8 | 2015 | -0.7 | 2016 | 5.3 |
| 1981 | 10.5 | 1987 | -0.8 | 2015 | 4.8 |
| 2016 | 10.4 | 2006 | -1.3 | 2001 | 4.6 |
| 2015 | 10.2 | 2012 | -1.3 | 1981 | 4.5 |
| 1988 | 10.1 | 1999 | -1.4 | 1998 | 4.3 |
| 1998 | 10.1 | 2017 | -1.4 | 1999 | 4.2 |
| 1999 | 9.8 | 2010 | -1.5 | 2006 | 4.2 |
| 2017 | 9.7 | 1981 | -1.5 | 2017 | 4.2 |
| 2006 | 9.6 | 1998 | -1.5 | 2012 | 4.0 |
| 2011 | 9.6 | 2005 | -1.6 | 1988 | 3.9 |
| 1976 | 9.5 | 2001 | -1.6 | 2011 | 3.8 |
| 1997 | 9.5 | 2011 | -2.1 | 2005 | 3.8 |
| 2003 | 9.3 | 2007 | -2.2 | 2010 | 3.7 |
| 2012 | 9.3 | 1988 | -2.3 | 1997 | 3.5 |
| 2005 | 9.1 | 1997 | -2.4 | 2003 | 3.4 |
| 1986 | 9.0 | 2003 | -2.5 | 1991 | 3.2 |
| 1991 | 8.9 | 1993 | -2.5 | 1986 | 3.2 |
| 2010 | 8.9 | 1991 | -2.5 | 2007 | 3.2 |
| 2000 | 8.8 | 1992 | -2.5 | 1976 | 3.0 |
| 1984 | 8.7 | 1986 | -2.6 | 1992 | 3.0 |
| 1990 | 8.7 | 2018 | -2.7 | 2000 | 3.0 |
| 1977 | 8.6 | 2004 | -2.8 | 1984 | 2.9 |
| 1980 | 8.6 | 2002 | -2.9 | 1993 | 2.8 |
| 2007 | 8.6 | 2014 | -2.9 | 2004 | 2.8 |
| 1992 | 8.5 | 1984 | -2.9 | 2018 | 2.8 |
| 2008 | 8.5 | 2000 | -2.9 | 2002 | 2.8 |
| 2002 | 8.5 | 1964 | -2.9 | 1964 | 2.7 |
| 1994 | 8.5 | 1994 | -3.2 | 1994 | 2.7 |
| 2004 | 8.4 | 2019 | -3.2 | 2008 | 2.6 |
| 1989 | 8.3 | 1983 | -3.2 | 1990 | 2.6 |
| 2018 | 8.3 | 2008 | -3.3 | 1977 | 2.5 |
| 1964 | 8.2 | 2013 | -3.3 | 2019 | 2.4 |
| 1993 | 8.1 | 1995 | -3.4 | 1980 | 2.4 |
| 2019 | 8.1 | 1968 | -3.4 | 2014 | 2.4 |
| 1995 | 7.9 | 1976 | -3.5 | 1989 | 2.3 |
| 1973 | 7.8 | 1990 | -3.6 | 1995 | 2.3 |
| 1968 | 7.7 | 1977 | -3.6 | 1983 | 2.2 |
| 2009 | 7.7 | 1989 | -3.8 | 2013 | 2.2 |
| 2013 | 7.7 | 1980 | -3.8 | 1968 | 2.2 |
| 1983 | 7.7 | 2009 | -3.8 | 2009 | 2.0 |
| 2014 | 7.6 | 1973 | -4.0 | 1973 | 1.9 |
| 1978 | 7.4 | 1970 | -4.0 | 1970 | 1.7 |
| 1970 | 7.3 | 1978 | -4.6 | 1978 | 1.4 |
| 1974 | 7.1 | 1969 | -4.6 | 1971 | 1.2 |
| 1971 | 7.1 | 1971 | -4.6 | 1974 | 1.2 |
| 1967 | 7.0 | 1974 | -4.7 | 1967 | 1.1 |
| 1985 | 6.9 | 1967 | -4.7 | 1969 | 1.1 |
| 1975 | 6.9 | 1985 | -4.8 | 1985 | 1.1 |
| 1969 | 6.8 | 1972 | -4.8 | 1975 | 0.9 |
| 1979 | 6.5 | 1975 | -5.1 | 1972 | 0.6 |
| 1966 | 6.4 | 1996 | -5.2 | 1979 | 0.6 |
| 1965 | 6.3 | 1965 | -5.3 | 1965 | 0.5 |
| 1982 | 6.2 | 1982 | -5.3 | 1966 | 0.4 |
| 1996 | 6.1 | 1979 | -5.3 | 1996 | 0.4 |
| 1972 | 6.1 | 1966 | -5.5 | 1982 | 0.4 |

| SEASONAL MAXIMUM AVERAGE TEMPERATURES °C | | | | | | | |
|--|-------|--------------|------|--------------|------|--------------|------|
| WINTER (DJF) | | SPRING (MAM) | | SUMMER (JJA) | | AUTUMN (SON) | |
| 2012 | -1.9 | 1977 | 12.9 | 2001 | 26.5 | 1987 | 13.1 |
| 1987 | -3.6 | 1987 | 12.7 | 2003 | 26.3 | 2011 | 12.6 |
| 2006 | -4.7 | 1988 | 12.6 | 1984 | 26.1 | 2009 | 12.1 |
| 2016 | -4.8 | 2016 | 12.5 | 1988 | 26.0 | 1994 | 11.8 |
| 1998 | -4.8 | 1981 | 12.1 | 1970 | 25.9 | 2001 | 11.8 |
| 2000 | -5.4 | 1998 | 12.0 | 2006 | 25.6 | 2008 | 11.8 |
| 1992 | -5.7 | 2001 | 11.9 | 1998 | 25.6 | 1999 | 11.4 |
| 2002 | -6.0 | 2015 | 11.7 | 1997 | 25.6 | 2015 | 11.3 |
| 2017 | -6.6 | 1994 | 11.5 | 2017 | 25.4 | 1981 | 11.1 |
| 1964 | -6.6 | 2010 | 11.4 | 2018 | 25.4 | 1997 | 11.0 |
| 1983 | -7.1 | 1993 | 11.4 | 1981 | 25.3 | 2005 | 11.0 |
| 1988 | -7.2 | 1980 | 11.3 | 1989 | 25.3 | 1976 | 10.8 |
| 2004 | -7.2 | 1986 | 11.1 | 2002 | 25.3 | 1980 | 10.8 |
| 1986 | -7.3 | 2000 | 11.0 | 2015 | 25.1 | 2016 | 10.8 |
| 1976 | -7.3 | 2012 | 10.9 | 1983 | 25.0 | 1974 | 10.6 |
| 1981 | -7.4 | 1992 | 10.8 | 1996 | 24.9 | 1979 | 10.6 |
| 1977 | -7.4 | 2019 | 10.6 | 1991 | 24.8 | 2004 | 10.5 |
| 2015 | -7.4 | 1991 | 10.5 | 1964 | 24.6 | 1998 | 10.4 |
| 2007 | -7.7 | 1976 | 10.4 | 2008 | 24.5 | 1967 | 10.4 |
| 2003 | -8.0 | 2017 | 10.2 | 2016 | 24.5 | 2000 | 10.3 |
| 2005 | -8.0 | 1984 | 10.2 | 2007 | 24.5 | 1988 | 10.3 |
| 1975 | -8.0 | 1999 | 10.1 | 1979 | 24.5 | 2013 | 10.1 |
| 1999 | -8.0 | 2007 | 10.1 | 1995 | 24.4 | 1975 | 9.9 |
| 1984 | -8.1 | 2006 | 10.1 | 2011 | 24.4 | 1989 | 9.8 |
| 1995 | -8.1 | 1968 | 10.0 | 2012 | 24.4 | 2007 | 9.8 |
| 1990 | -8.2 | 2004 | 10.0 | 1967 | 24.3 | 1990 | 9.7 |
| 2018 | -8.3 | 1985 | 10.0 | 1978 | 24.2 | 1968 | 9.7 |
| 1991 | -8.6 | 1990 | 10.0 | 1965 | 24.2 | 2010 | 9.6 |
| 1989 | -8.7 | 2005 | 9.9 | 1969 | 24.1 | 2003 | 9.4 |
| 2013 | -9.2 | 1973 | 9.9 | 1990 | 24.1 | 1970 | 9.3 |
| 2001 | -9.3 | 1978 | 9.7 | 1987 | 24.0 | 2014 | 9.2 |
| 1970 | -9.3 | 2003 | 9.4 | 1972 | 24.0 | 1983 | 9.2 |
| 2011 | -9.5 | 2008 | 9.1 | 1976 | 23.8 | 2017 | 9.1 |
| 1980 | -9.5 | 1972 | 9.1 | 1973 | 23.8 | 1992 | 8.8 |
| 2010 | -9.8 | 2018 | 8.8 | 2000 | 23.8 | 1971 | 8.8 |
| 2019 | -9.8 | 1971 | 8.6 | 2019 | 23.8 | 1964 | 8.8 |
| 1968 | -9.8 | 1969 | 8.3 | 2013 | 23.7 | 1978 | 8.7 |
| 2008 | -10.1 | 1995 | 8.3 | 1971 | 23.6 | 1977 | 8.7 |
| 1973 | -10.3 | 1989 | 8.2 | 1986 | 23.6 | 1966 | 8.6 |
| 1997 | -11.0 | 1964 | 8.2 | 1994 | 23.5 | 1995 | 8.6 |
| 1967 | -11.1 | 1966 | 8.1 | 1980 | 23.5 | 2019 | 8.5 |
| 1993 | -11.5 | 1997 | 7.6 | 1975 | 23.2 | 1993 | 8.4 |
| 1985 | -11.6 | 2011 | 7.5 | 1999 | 23.1 | 1982 | 8.3 |
| 2009 | -11.7 | 2009 | 7.4 | 2014 | 23.1 | 2012 | 8.2 |
| 2014 | -11.8 | 1983 | 7.0 | 2010 | 23.0 | 1969 | 8.0 |
| 1994 | -12.1 | 2014 | 6.8 | 1977 | 23.0 | 2002 | 7.8 |
| 1996 | -12.2 | 1982 | 6.7 | 2009 | 22.9 | 2006 | 7.5 |
| 1974 | -12.6 | 2013 | 6.4 | 1966 | 22.8 | 1986 | 7.3 |
| 1966 | -13.1 | 1996 | 6.3 | 1982 | 22.6 | 1965 | 7.3 |
| 1982 | -13.3 | 1970 | 6.1 | 2005 | 22.6 | 1973 | 7.3 |
| 1971 | -13.4 | 2002 | 5.8 | 1985 | 22.4 | 1991 | 7.0 |
| 1978 | -14.5 | 1965 | 5.7 | 1974 | 22.4 | 1972 | 6.6 |
| 1965 | -14.8 | 1979 | 4.8 | 1992 | 22.4 | 2018 | 6.5 |
| 1972 | -14.9 | 1974 | 4.7 | 1968 | 22.0 | 1996 | 6.2 |
| 1969 | -15.2 | 1975 | 4.4 | 2004 | 21.6 | 1984 | 5.6 |
| 1979 | -15.5 | 1967 | 4.4 | 1993 | 21.1 | 1985 | 4.5 |

TEMPERATURE RANKINGS

| SEASONAL MINIMUM AVERAGE TEMPERATURES °C | | | | | | | | SEASONAL MEAN AVERAGE TEMPERATURES °C | | | | | | | |
|--|-------|--------------|------|--------------|------|--------------|------|---------------------------------------|-------|--------------|------|--------------|------|--------------|------|
| WINTER (DJF) | | SPRING (MAM) | | SUMMER (JJA) | | AUTUMN (SON) | | WINTER (DJF) | | SPRING (MAM) | | SUMMER (JJA) | | AUTUMN (SON) | |
| 2012 | -12.6 | 2016 | 0.8 | 2012 | 12.9 | 2016 | 1.5 | 2012 | -7.3 | 2016 | 6.6 | 2003 | 19.4 | 2009 | 6.7 |
| 2016 | -12.6 | 1993 | 0.3 | 2015 | 12.6 | 2015 | 1.3 | 1987 | -8.6 | 1987 | 6.2 | 1988 | 19.2 | 2011 | 6.5 |
| 2006 | -13.2 | 2010 | 0.2 | 2006 | 12.5 | 2009 | 1.3 | 2016 | -8.7 | 1977 | 6.2 | 2001 | 19.1 | 1987 | 6.4 |
| 1998 | -13.4 | 2012 | 0.0 | 2003 | 12.5 | 2005 | 0.4 | 2006 | -8.9 | 1993 | 5.8 | 1970 | 19.1 | 2015 | 6.3 |
| 1987 | -13.6 | 1987 | -0.2 | 2016 | 12.4 | 2011 | 0.3 | 1998 | -9.1 | 2010 | 5.8 | 2006 | 19.1 | 2016 | 6.2 |
| 2017 | -14.7 | 1977 | -0.5 | 1988 | 12.3 | 2008 | 0.1 | 1992 | -10.3 | 1988 | 5.8 | 2015 | 18.9 | 2008 | 5.9 |
| 1992 | -14.9 | 1999 | -0.5 | 1970 | 12.3 | 1998 | 0.1 | 2000 | -10.6 | 1981 | 5.6 | 2002 | 18.8 | 2001 | 5.8 |
| 1964 | -15.0 | 1985 | -0.7 | 2002 | 12.2 | 1981 | 0.0 | 2017 | -10.7 | 2015 | 5.4 | 2018 | 18.8 | 2005 | 5.7 |
| 2002 | -15.5 | 1994 | -0.8 | 1991 | 12.2 | 2001 | -0.1 | 2002 | -10.8 | 2012 | 5.4 | 1984 | 18.7 | 1994 | 5.7 |
| 1983 | -15.6 | 2015 | -0.8 | 2018 | 12.0 | 1967 | -0.2 | 1964 | -10.8 | 1994 | 5.4 | 2012 | 18.7 | 1981 | 5.5 |
| 2000 | -15.8 | 1981 | -1.0 | 2013 | 12.0 | 1968 | -0.2 | 1983 | -11.4 | 2001 | 5.4 | 2017 | 18.7 | 1999 | 5.4 |
| 2015 | -16.0 | 1992 | -1.0 | 2014 | 11.9 | 1997 | -0.3 | 2015 | -11.7 | 1986 | 5.0 | 1998 | 18.6 | 1997 | 5.4 |
| 2004 | -16.7 | 2006 | -1.0 | 2017 | 11.9 | 1987 | -0.3 | 2004 | -12.0 | 1998 | 5.0 | 1997 | 18.5 | 1998 | 5.3 |
| 1999 | -16.8 | 1988 | -1.0 | 2011 | 11.8 | 2004 | -0.4 | 1981 | -12.3 | 1992 | 4.9 | 1991 | 18.5 | 1967 | 5.1 |
| 2007 | -17.0 | 1986 | -1.1 | 2001 | 11.7 | 1994 | -0.5 | 1986 | -12.3 | 2000 | 4.9 | 1989 | 18.5 | 2004 | 5.0 |
| 1981 | -17.1 | 2000 | -1.1 | 2007 | 11.7 | 1999 | -0.6 | 2007 | -12.4 | 1999 | 4.8 | 2016 | 18.4 | 1980 | 5.0 |
| 1995 | -17.2 | 2001 | -1.2 | 1989 | 11.6 | 1992 | -0.7 | 1999 | -12.4 | 1985 | 4.7 | 1983 | 18.1 | 1968 | 4.8 |
| 1986 | -17.3 | 2007 | -1.3 | 1998 | 11.6 | 2010 | -0.7 | 1988 | -12.5 | 2006 | 4.5 | 1981 | 18.1 | 1979 | 4.6 |
| 2003 | -17.5 | 2005 | -1.4 | 2010 | 11.5 | 1980 | -0.9 | 1976 | -12.6 | 2007 | 4.4 | 2011 | 18.1 | 1988 | 4.4 |
| 2018 | -17.5 | 1990 | -1.5 | 1997 | 11.5 | 2019 | -1.0 | 1995 | -12.7 | 1980 | 4.4 | 2007 | 18.1 | 2010 | 4.4 |
| 1988 | -17.8 | 2017 | -1.6 | 2008 | 11.3 | 2014 | -1.0 | 2003 | -12.7 | 1991 | 4.3 | 1996 | 18.1 | 2007 | 4.4 |
| 1976 | -17.8 | 1973 | -1.7 | 1984 | 11.2 | 1983 | -1.0 | 2005 | -12.9 | 2005 | 4.3 | 2008 | 17.9 | 2000 | 4.3 |
| 1984 | -17.8 | 1978 | -1.7 | 1996 | 11.2 | 1970 | -1.1 | 1984 | -13.0 | 1990 | 4.3 | 2013 | 17.9 | 2013 | 4.3 |
| 2005 | -17.8 | 1991 | -2.0 | 2019 | 11.2 | 2007 | -1.1 | 2018 | -13.0 | 2017 | 4.2 | 1964 | 17.8 | 1970 | 4.2 |
| 2011 | -18.3 | 1968 | -2.0 | 1983 | 11.2 | 1964 | -1.4 | 1977 | -13.1 | 1973 | 4.1 | 1995 | 17.7 | 1974 | 4.1 |
| 2013 | -18.4 | 1998 | -2.0 | 1964 | 11.0 | 1988 | -1.4 | 1975 | -13.3 | 1978 | 4.0 | 2014 | 17.6 | 2014 | 4.1 |
| 1975 | -18.5 | 1984 | -2.2 | 2005 | 11.0 | 1979 | -1.4 | 1990 | -13.7 | 1968 | 4.0 | 2019 | 17.5 | 1983 | 4.1 |
| 1970 | -18.7 | 2003 | -2.3 | 1972 | 11.0 | 2013 | -1.5 | 2013 | -13.8 | 1984 | 4.0 | 1972 | 17.5 | 1992 | 4.1 |
| 1977 | -18.8 | 1972 | -2.4 | 2000 | 11.0 | 2017 | -1.7 | 1989 | -13.8 | 2019 | 4.0 | 2000 | 17.4 | 1989 | 4.0 |
| 1989 | -18.9 | 2004 | -2.5 | 1981 | 10.9 | 2000 | -1.7 | 2011 | -14.0 | 2004 | 3.8 | 1990 | 17.4 | 1975 | 3.8 |
| 2001 | -19.0 | 1980 | -2.6 | 1995 | 10.8 | 1989 | -1.8 | 1991 | -14.0 | 2003 | 3.6 | 1965 | 17.4 | 2017 | 3.7 |
| 2010 | -19.1 | 2019 | -2.6 | 1990 | 10.7 | 1969 | -1.9 | 1970 | -14.0 | 1976 | 3.5 | 1987 | 17.3 | 2019 | 3.7 |
| 1990 | -19.1 | 2008 | -3.2 | 1999 | 10.7 | 2012 | -1.9 | 2001 | -14.2 | 1972 | 3.4 | 1979 | 17.3 | 1964 | 3.7 |
| 1991 | -19.3 | 2018 | -3.3 | 1987 | 10.6 | 1971 | -2.1 | 2010 | -14.5 | 2008 | 2.9 | 1976 | 17.2 | 1976 | 3.6 |
| 2008 | -19.5 | 1976 | -3.3 | 1994 | 10.6 | 2002 | -2.2 | 1980 | -14.6 | 2018 | 2.7 | 2010 | 17.2 | 2003 | 3.6 |
| 2019 | -19.5 | 1983 | -3.7 | 1965 | 10.5 | 2003 | -2.2 | 2019 | -14.7 | 1971 | 2.3 | 1994 | 17.1 | 1971 | 3.4 |
| 1980 | -19.6 | 1969 | -3.8 | 1976 | 10.5 | 1977 | -2.4 | 2008 | -14.8 | 1969 | 2.2 | 1978 | 17.0 | 1977 | 3.2 |
| 1968 | -20.0 | 1995 | -3.8 | 1971 | 10.3 | 1974 | -2.4 | 1968 | -15.0 | 1995 | 2.2 | 1971 | 17.0 | 1990 | 3.2 |
| 1973 | -20.3 | 1966 | -3.9 | 2009 | 10.3 | 1975 | -2.5 | 1973 | -15.4 | 1964 | 2.2 | 1973 | 17.0 | 2012 | 3.1 |
| 1993 | -20.5 | 1964 | -3.9 | 1973 | 10.0 | 1993 | -2.5 | 1993 | -16.0 | 1966 | 2.1 | 1999 | 16.9 | 1969 | 3.1 |
| 1994 | -20.8 | 2011 | -3.9 | 1979 | 10.0 | 1995 | -2.6 | 1967 | -16.1 | 1989 | 2.0 | 1967 | 16.9 | 1995 | 3.0 |
| 1967 | -21.1 | 1971 | -4.0 | 1966 | 9.9 | 2018 | -2.6 | 1997 | -16.2 | 2011 | 1.9 | 2005 | 16.8 | 1978 | 2.9 |
| 1997 | -21.3 | 2014 | -4.2 | 1993 | 9.9 | 1972 | -2.7 | 1994 | -16.5 | 1997 | 1.7 | 1969 | 16.7 | 1993 | 2.9 |
| 2009 | -21.4 | 1997 | -4.3 | 1975 | 9.8 | 2006 | -2.8 | 2009 | -16.6 | 1983 | 1.6 | 1986 | 16.6 | 2002 | 2.8 |
| 1996 | -21.9 | 1982 | -4.3 | 2004 | 9.7 | 1978 | -2.9 | 2014 | -16.9 | 2014 | 1.3 | 2009 | 16.6 | 2006 | 2.4 |
| 2014 | -22.0 | 1989 | -4.3 | 1978 | 9.7 | 1986 | -3.1 | 1996 | -17.1 | 1982 | 1.2 | 1980 | 16.6 | 1982 | 2.3 |
| 1974 | -22.6 | 1996 | -4.9 | 1980 | 9.6 | 1990 | -3.4 | 1985 | -17.3 | 2009 | 0.9 | 1975 | 16.5 | 1966 | 2.2 |
| 1985 | -22.9 | 2013 | -4.9 | 1982 | 9.6 | 1976 | -3.6 | 1974 | -17.6 | 1996 | 0.7 | 1966 | 16.4 | 1986 | 2.1 |
| 1971 | -23.1 | 1970 | -5.0 | 1986 | 9.6 | 1982 | -3.7 | 1971 | -18.3 | 2013 | 0.7 | 1982 | 16.2 | 2018 | 1.9 |
| 1982 | -23.6 | 2009 | -5.6 | 1974 | 9.6 | 1991 | -3.7 | 1966 | -18.4 | 1970 | 0.5 | 1974 | 16.0 | 1972 | 1.9 |
| 1966 | -23.6 | 1965 | -5.8 | 1967 | 9.5 | 1984 | -3.8 | 1982 | -18.5 | 1965 | -0.1 | 1977 | 15.9 | 1991 | 1.6 |
| 1969 | -24.0 | 1979 | -6.1 | 1969 | 9.4 | 1966 | -4.3 | 1965 | -19.4 | 1979 | -0.7 | 2004 | 15.7 | 1965 | 1.5 |
| 1965 | -24.0 | 1974 | -6.5 | 1968 | 9.2 | 1996 | -4.3 | 1978 | -19.5 | 1974 | -0.9 | 1992 | 15.6 | 1973 | 1.3 |
| 1978 | -24.5 | 1975 | -6.5 | 1992 | 8.8 | 1965 | -4.4 | 1969 | -19.6 | 2002 | -0.9 | 1968 | 15.6 | 1984 | 0.9 |
| 1972 | -25.0 | 1967 | -6.9 | 1977 | 8.8 | 1973 | -4.6 | 1972 | -20.0 | 1975 | -1.0 | 1993 | 15.5 | 1996 | 0.9 |
| 1979 | -25.2 | 2002 | -7.6 | 1985 | 8.2 | 1985 | -6.0 | 1979 | -20.4 | 1967 | -1.3 | 1985 | 15.3 | 1985 | -0.8 |

TEMPERATURE

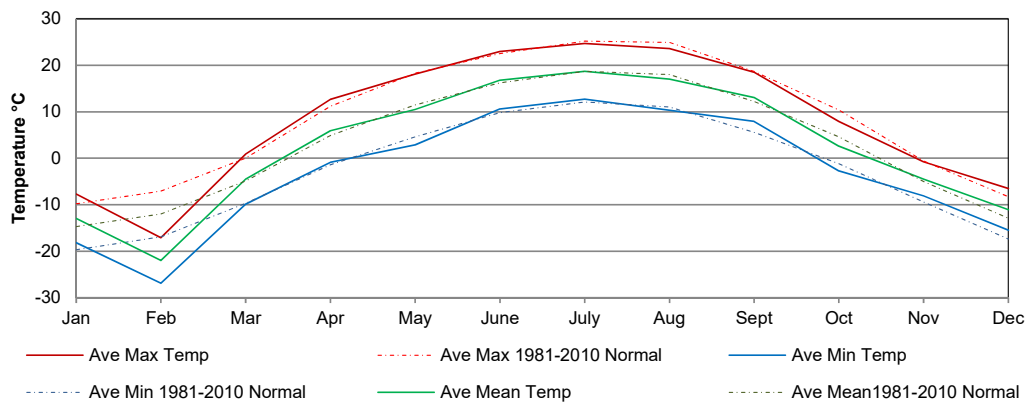
| MONTH | AVERAGE MAXIMUM TEMPERATURE (°C) | | AVERAGE MINIMUM TEMPERATURE (°C) | | AVERAGE TEMPERATURE (°C) | | EXTREME VALUES TEMPERATURE (°C) | | | | EXTREME VALUES FOR SASKATOON STATIONS | |
|-----------|----------------------------------|--------|----------------------------------|--------|--------------------------|--------|---------------------------------|------|-------|------|---|--|
| | 2019 | Normal | 2019 | Normal | 2019 | Normal | Max | Date | Min | Date | Max/Date | Min/Date |
| January | -7.7 | -9.8 | -18.2 | -19.7 | -13.0 | -14.7 | 4.7 | 27 | -32.4 | 18 | 11.0/1980/23 _{SWT} | -48.9/1893/31 _{SM} |
| February | -17.1 | -7.1 | -26.9 | -16.9 | -22.0 | -12.0 | -4.6 | 27 | -38.9 | 8 | 12.8/1931/19 _{SE} | -50.0/1893/01 _{SM} |
| March | 0.9 | 0.0 | -9.9 | -9.7 | -4.5 | -4.9 | 15.5 | 22 | -30.8 | 2 | 22.8/1910/23 _{SE} | -43.3/1897/14 _{SM} |
| April | 12.7 | 11.2 | -0.9 | -1.4 | 5.9 | 4.9 | 21.9 | 22 | -8.0 | 12 | 33.3/1952/28 _{SA,US} | -30.5/1979/01 _{SWT} |
| May | 18.1 | 18.3 | 2.9 | 4.6 | 10.5 | 11.5 | 32.2 | 30 | -6.6 | 1 | 37.2/1936/27 _{SE} | -12.8/1907/06 _{SE} |
| June | 23.0 | 22.5 | 10.6 | 9.8 | 16.8 | 16.2 | 34.8 | 3 | 4.6 | 8 | 41.5/1988/06 _{S2} | -3.9/1917/02 _{US} |
| July | 24.7 | 25.2 | 12.7 | 12.1 | 18.7 | 18.7 | 31.3 | 27 | 6.6 | 2 | 40.0/1919,1941,1946 _{SE,SA,US} | -0.6/1918/25 _{SE} |
| August | 23.6 | 24.9 | 10.3 | 11.0 | 17.0 | 18.0 | 33.8 | 2 | 4.8 | 18 | 39.7/1998/06 _{SRC} | -2.8/1901/23 _{SM&1976/28_{SRC}} |
| September | 18.5 | 18.7 | 7.9 | 5.6 | 13.1 | 12.2 | 31.1 | 16 | 0.3 | 30 | 35.6/1978/04 _{SRC} | -11.1/1908/28 _{SE} |
| October | 7.9 | 10.4 | -2.7 | -1.2 | 2.6 | 4.6 | 19.9 | 7 | -15.6 | 30 | 32.2/1943/05 _{SA,US} | -25.6/1919/26 _{SE,US} |
| November | -0.8 | -0.6 | -8.1 | -9.4 | -4.5 | -5.0 | 11.1 | 23 | -21.0 | 11 | 21.7/1903/03 _{SE} | -39.4/1893/30 _{SM} |
| December | -6.5 | -8.3 | -15.5 | -17.4 | -11.1 | -12.9 | 4.5 | 3 | -29.1 | 14 | 14.4/1939/05 _{SE} | -43.9/1892/22 _{SM} |
| Average | 8.1 | 8.8 | -3.2 | -2.7 | 2.5 | 3.0 | | | | | | |

Normal = 1981-2010

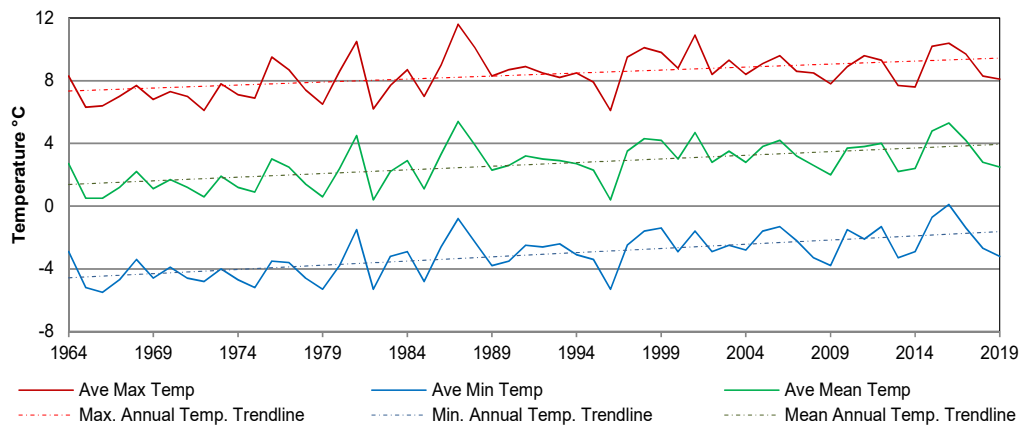
SE = Saskatoon Eby 1901-1942
 US = University of Saskatchewan 1915-1964
 SWT = Saskatoon Water Treatment Plant 1974 -
 SRC = Saskatchewan Research Council 1963-

SA = Saskatoon Diefenbaker Int'l Airport 1942-
 S2= Saskatoon 2 1977-1990
 SM = Saskatoon stations circa 1889 -1901
 (RNWMP etal)

Monthly

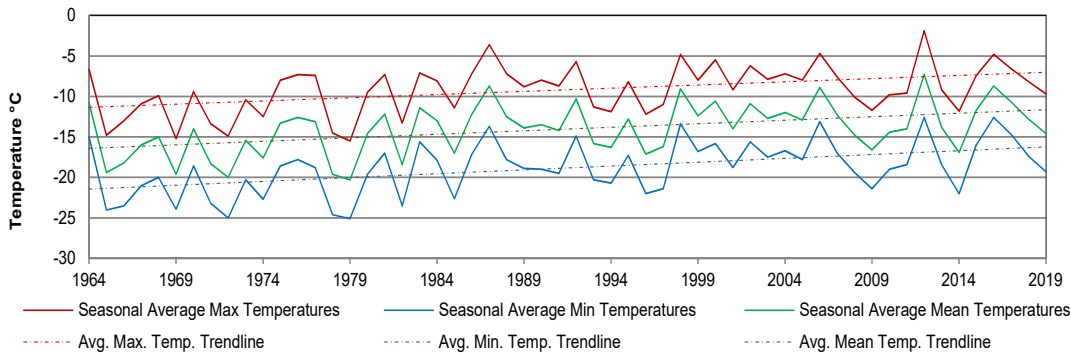


Annual

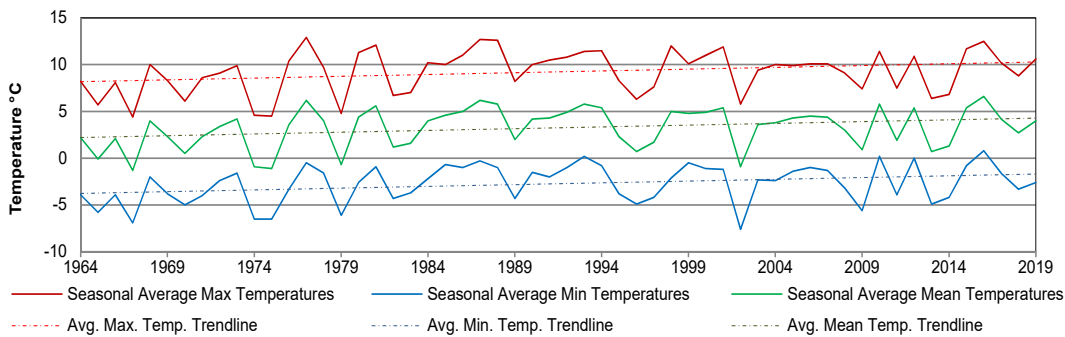


SEASONAL TEMPERATURES for 1964 to 2018

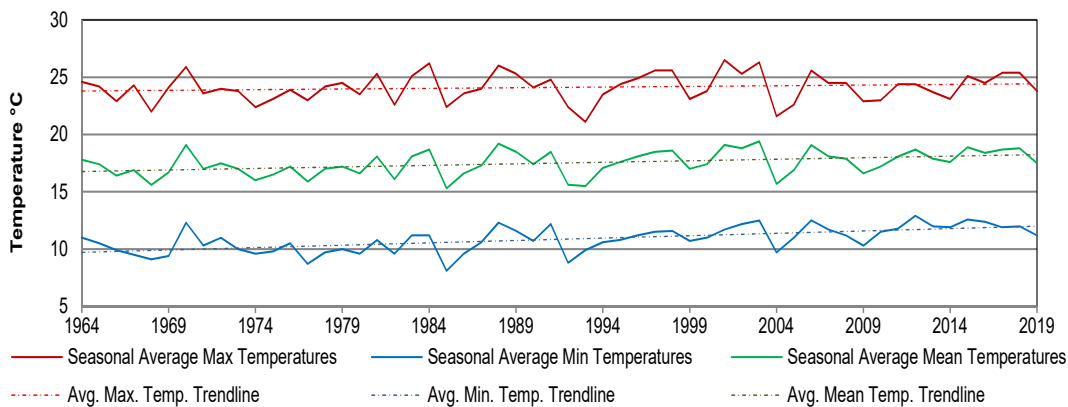
Winter (DJF)



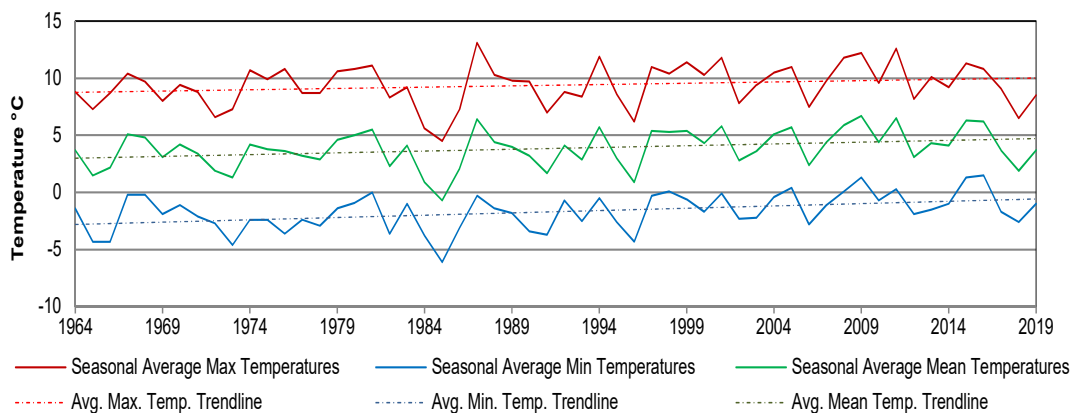
Spring (MAM)



Summer (JJA)

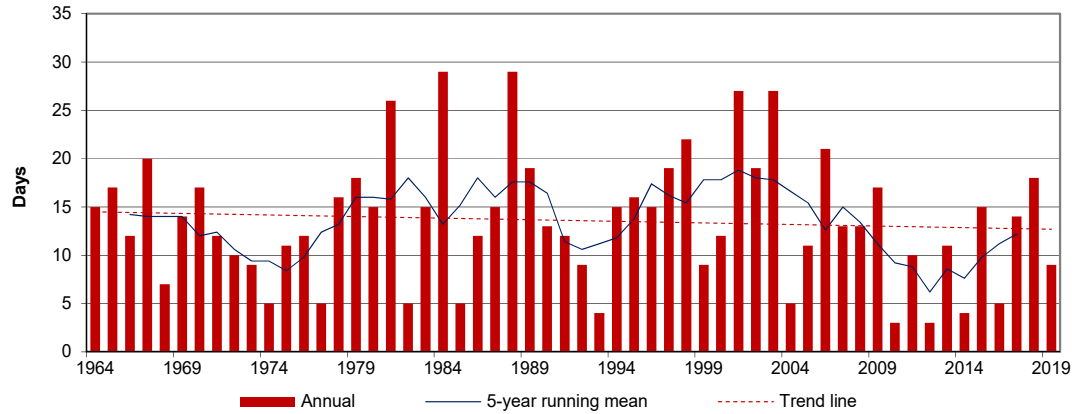


Autumn (SON)

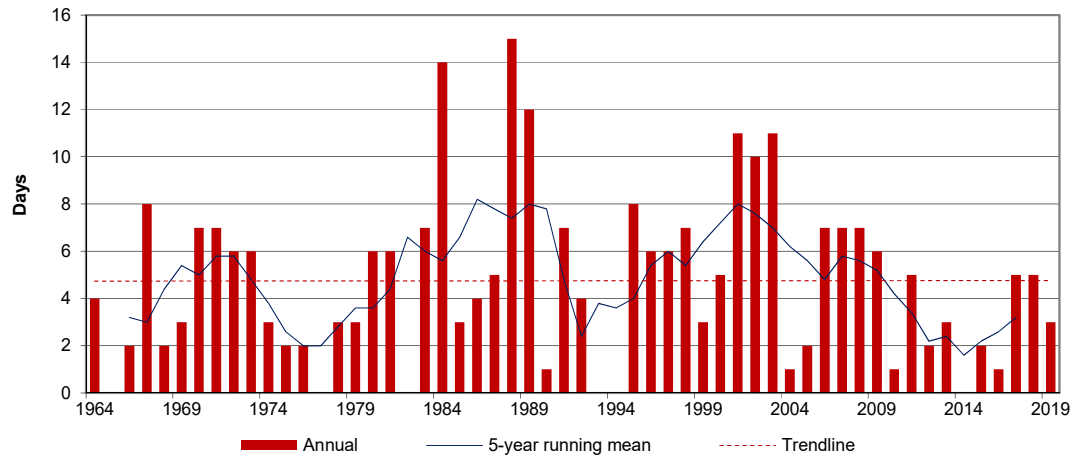


DAYS WITH TEMPERATURES GREATER THAN A SET POINT

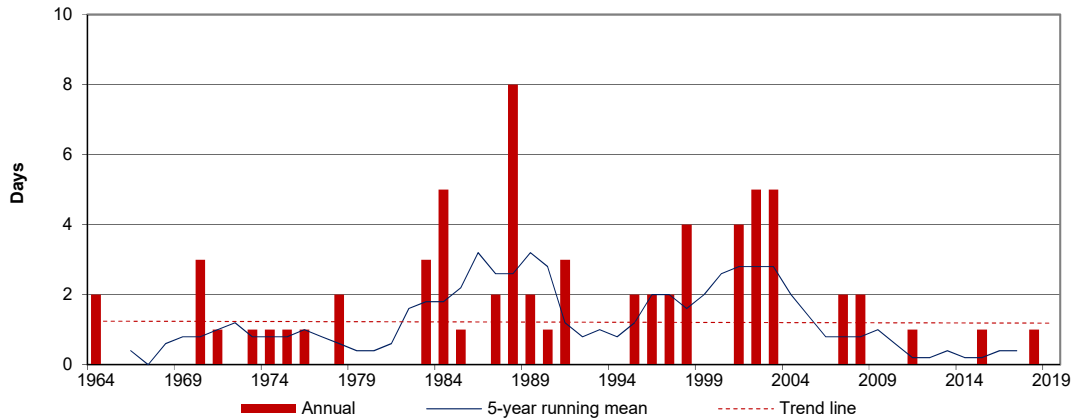
30°C or Greater



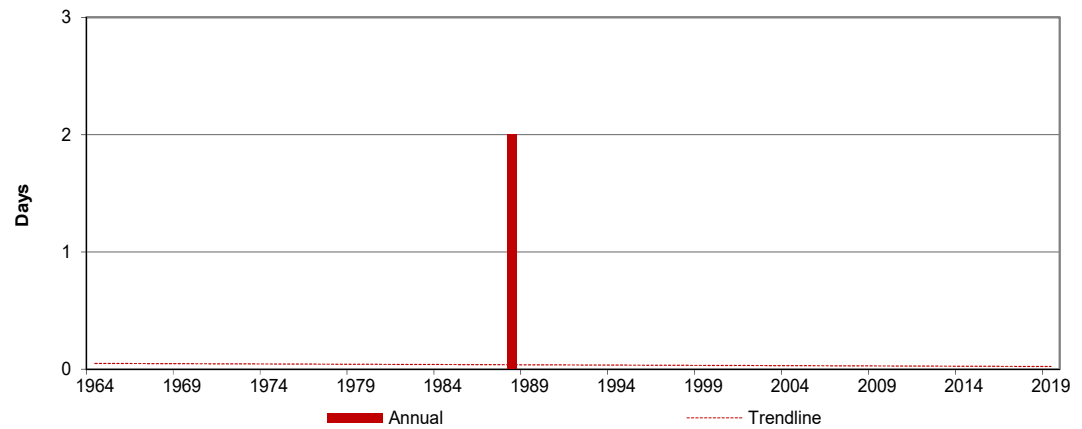
32°C or Greater



35°C or Greater

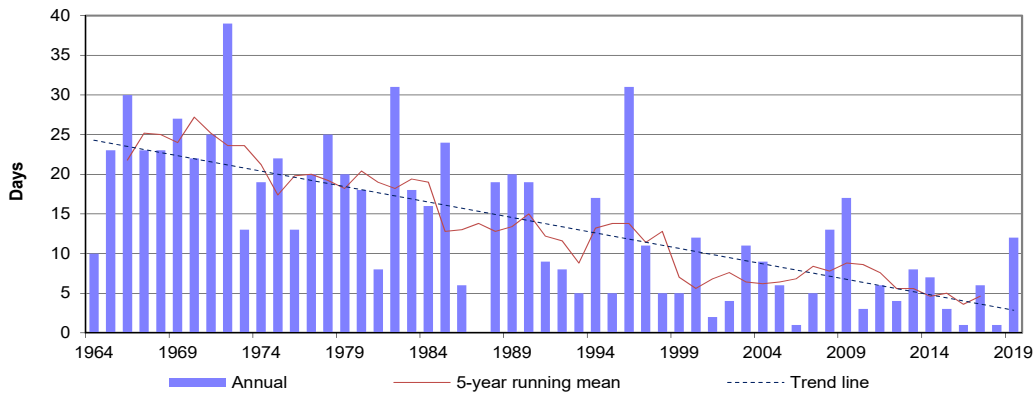


40°C or Greater

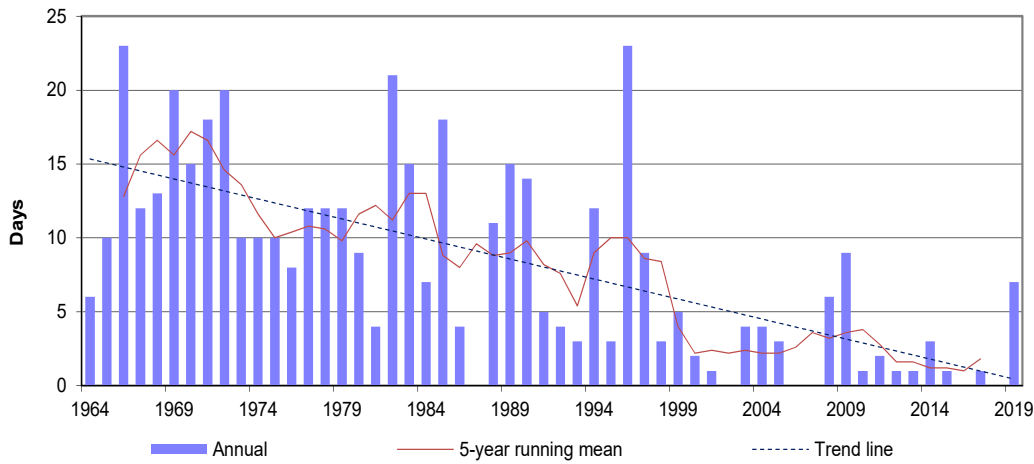


DAYS WITH TEMPERATURES LESS THAN A SET POINT

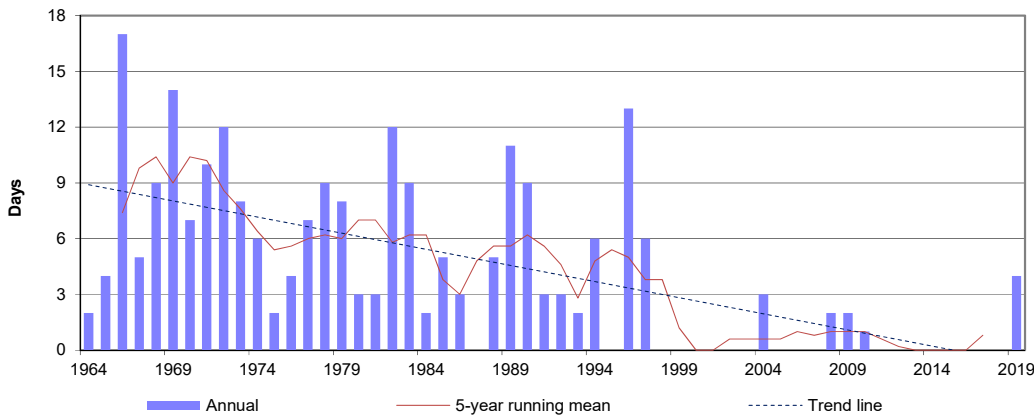
Minus 30°C or Less



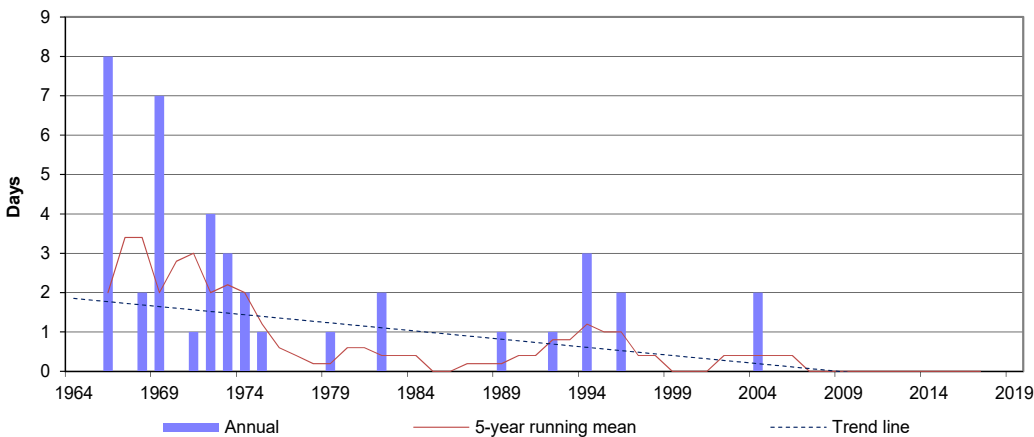
Minus 32.5°C or Less



Minus 35°C or Less

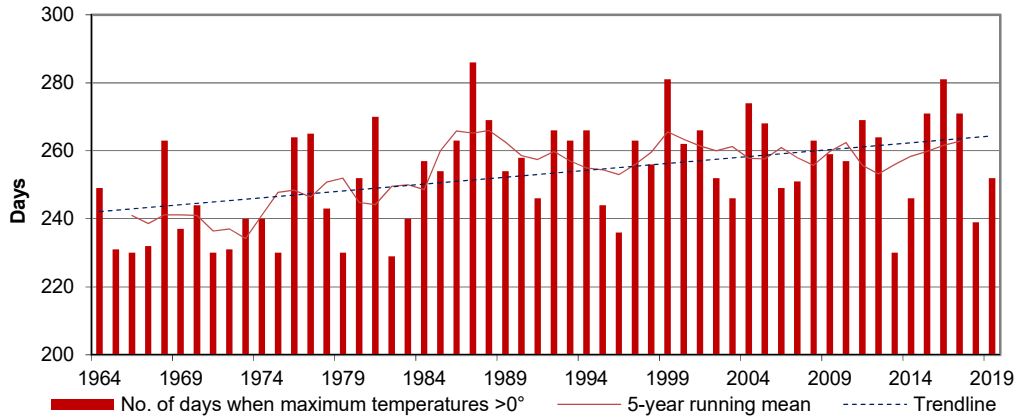


Minus 40°C or Less

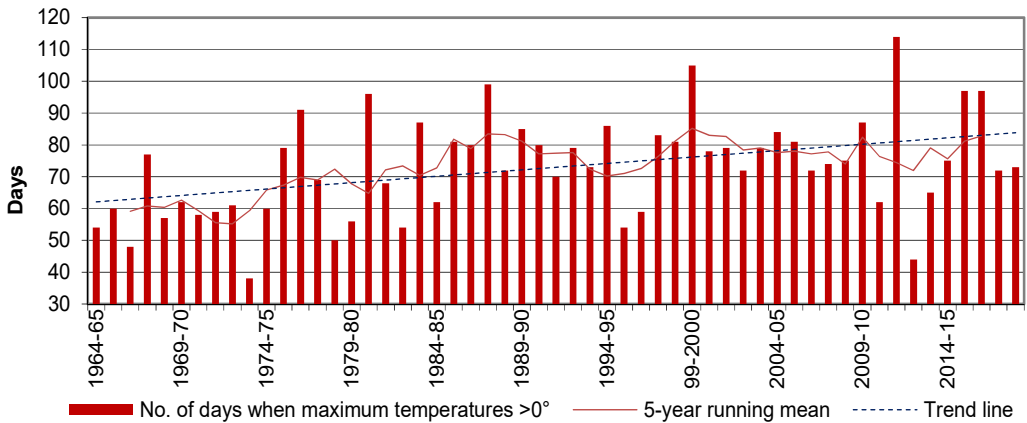


DAYS WITH TEMPERATURES GREATER THAN 0°C

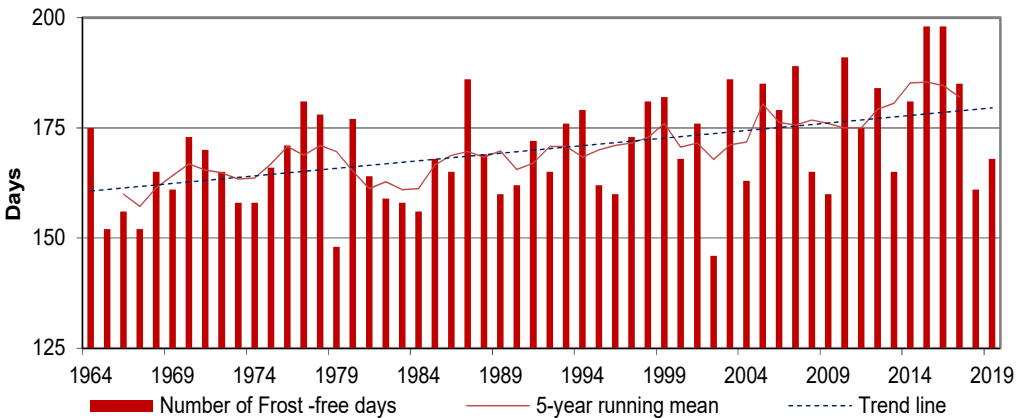
Maximum Temperature greater than 0°C (Thaw Days) Jan 1st to Dec 31st



Maximum Temperature greater than 0°C (Thaw Days) Oct 1st to Mar 31st (Cold Season)



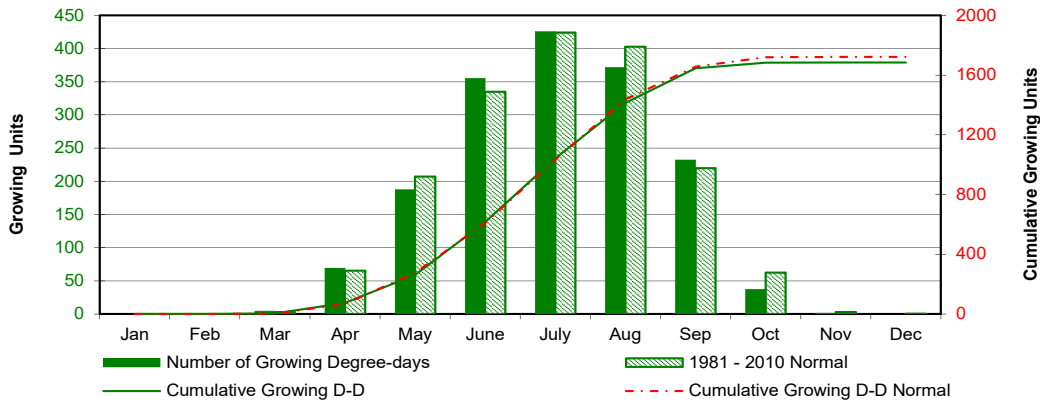
Minimum Temperature greater than 0°C (Frost-free Days)



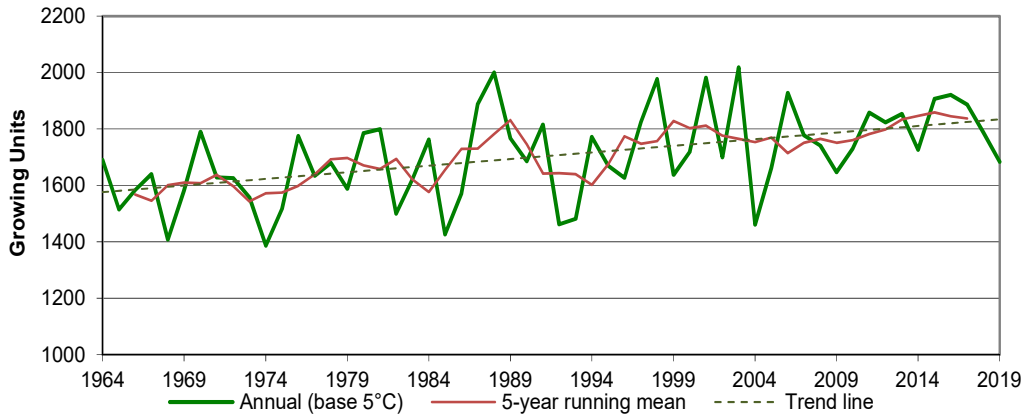
Panoramic view of climate station from the northeast corner of the site (September 5, 2019)
Photo: V. Wittrock

DEGREE-DAYS

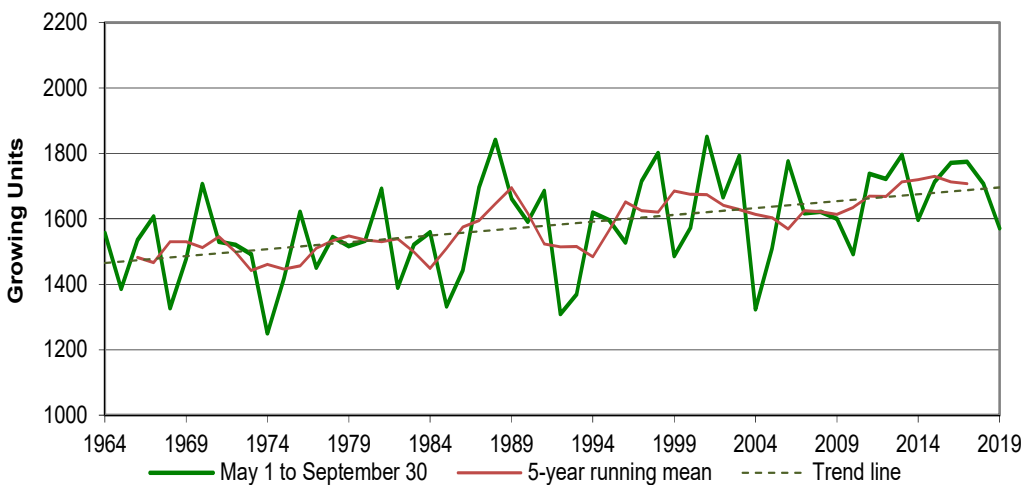
| MONTH | GROWING DEGREE-DAYS Base 5°C | | | HEATING DEGREE-DAYS Base 18°C | | | COOLING DEGREE-DAYS Base 18°C | | | EXTREME COOLING DEGREE-DAYS Base 24°C | | |
|-----------|---------------------------------|------------|--------|----------------------------------|------------|--------|----------------------------------|------------|--------|---|------------|--------|
| | 2019 | Cumulative | Normal | 2019 | Cumulative | Normal | 2019 | Cumulative | Normal | 2019 | Cumulative | Normal |
| January | 0.0 | 0.0 | 0.0 | 960.7 | 960.7 | 1015.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 0.0 | 0.0 | 0.0 | 1129.8 | 2090.5 | 848.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 4.3 | 4.3 | 3.0 | 698.4 | 2788.9 | 708.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 69.3 | 73.6 | 65.2 | 362.4 | 3151.3 | 402.4 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| May | 187.5 | 261.1 | 206.9 | 241.3 | 3392.6 | 209.3 | 9.7 | 9.7 | 6.3 | 0.0 | 0.0 | 0.1 |
| June | 355.3 | 616.4 | 334.8 | 55.2 | 3447.8 | 81.4 | 20.5 | 30.2 | 24.8 | 0.0 | 0.0 | 1.5 |
| July | 425.4 | 1041.8 | 424.0 | 24.0 | 3471.8 | 30.7 | 46.4 | 76.6 | 51.7 | 0.0 | 0.0 | 2.9 |
| August | 371.4 | 1413.2 | 402.8 | 60.5 | 3532.3 | 50.0 | 28.9 | 105.5 | 49.8 | 1.2 | 1.2 | 3.5 |
| September | 232.3 | 1645.5 | 219.9 | 149.0 | 3681.3 | 182.5 | 6.6 | 112.1 | 7.6 | 0.0 | 1.2 | 0.1 |
| October | 37.2 | 1682.7 | 62.2 | 477.8 | 4159.1 | 415.1 | 0.0 | 112.1 | 0.1 | 0.0 | 1.2 | 0.0 |
| November | 1.2 | 1683.9 | 2.9 | 674.7 | 4833.8 | 690.1 | 0.0 | 112.1 | 0.0 | 0.0 | 1.2 | 0.0 |
| December | 0.0 | 1683.9 | 0.1 | 900.8 | 5734.6 | 957.5 | 0.0 | 112.1 | 0.0 | 0.0 | 1.2 | 0.0 |



Growing Degree-days Monthly



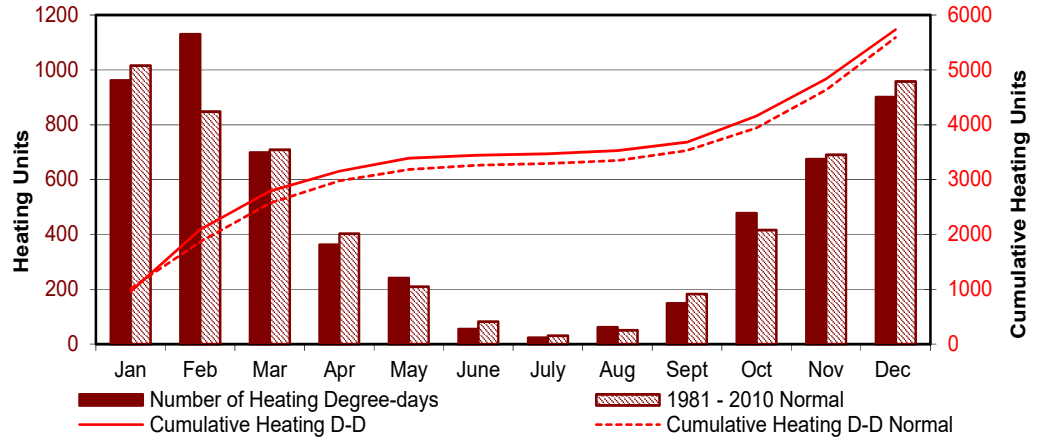
Growing Degree-days Annual



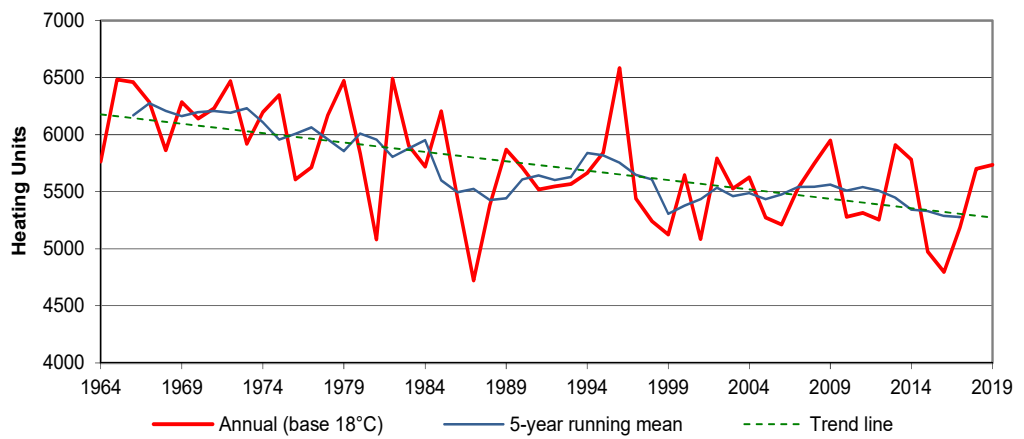
Growing Degree-days May 1 to September 30

DEGREE-DAYS

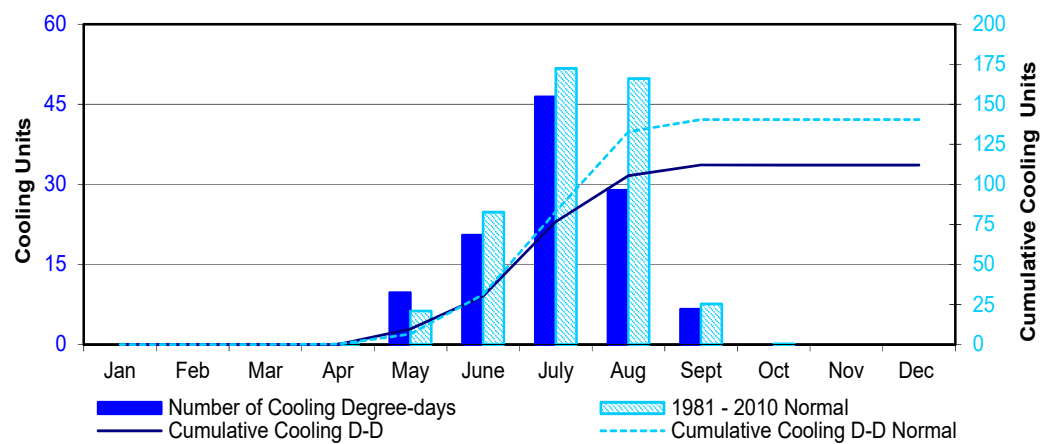
Heating Degree-days Monthly



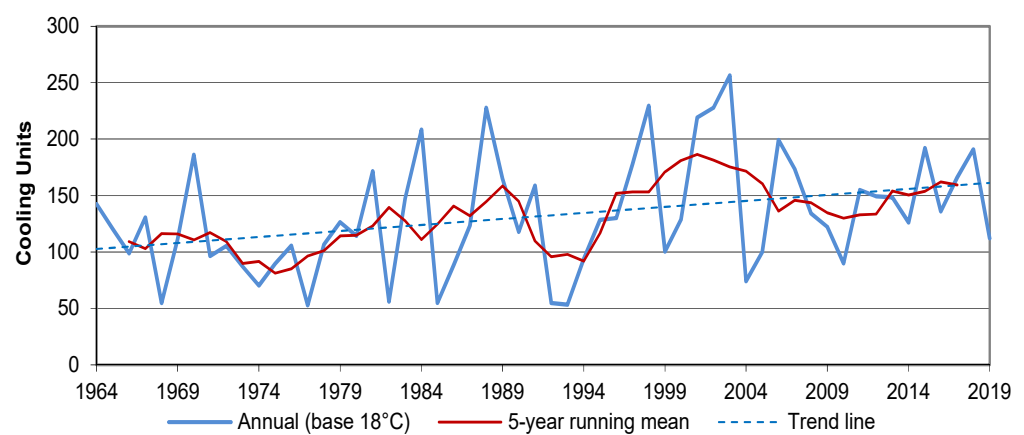
Heating Degree-days Annual



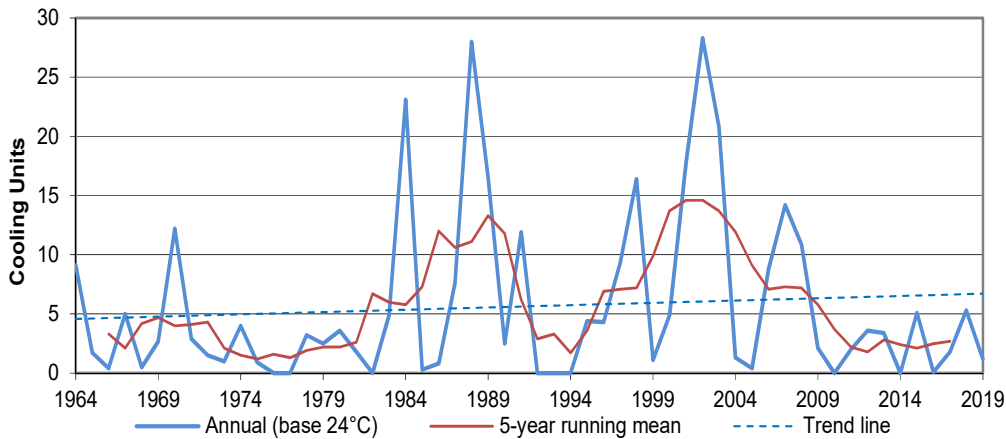
Cooling Degree-days Monthly



Cooling Degree-days Annual



DEGREE-DAYS



**Extreme Cooling
Degree-days
Annual**

TEMPERATURE GRID °C

| 2019 | JAN | FEB | MAR | APR | MAY | JUN | JULY | AUG | SEP | OCT | NOV | DEC |
|------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|
| 1 | -1.9 | -10.7 | -14.7 | 8.7 | 9.0 | 24.0 | 28.2 | 30.4 | 22.0 | 4.6 | 3.6 | -6.4 |
| 2 | 4.0 | -19.0 | -21.1 | 2.8 | 8.1 | 32.9 | 20.3 | 33.8 | 19.1 | 11.1 | 4.8 | -1.5 |
| 3 | 3.9 | -23.0 | -15.4 | 9.4 | 11.5 | 34.8 | 20.1 | 28.3 | 25.6 | 11.8 | 1.4 | 4.5 |
| 4 | 0.3 | -23.1 | -9.8 | 9.8 | 9.0 | 24.9 | 21.6 | 26.0 | 20.1 | 9.6 | -4.1 | 0.3 |
| 5 | -4.7 | -22.8 | -8.2 | 8.0 | 5.7 | 24.2 | 21.8 | 29.1 | 23.2 | 13.3 | -5.6 | -5.4 |
| 6 | -0.8 | -21.3 | -7.8 | 4.2 | 12.5 | 26.5 | 25.1 | 20.6 | 22.2 | 15.5 | -7.8 | -5.5 |
| 7 | -0.8 | -23.3 | -10.5 | 17.1 | 13.9 | 20.5 | 28.2 | 22.5 | 22.3 | 19.9 | -5.9 | -6.3 |
| 8 | -14.6 | -23.6 | -8.2 | 16.8 | 12.7 | 16.9 | 24.8 | 22.2 | 21.5 | 12.7 | 1.8 | -13.9 |
| 9 | -10.7 | -21.2 | -6.0 | 7.6 | 16.1 | 17.8 | 24.5 | 24.7 | 14.8 | 3.6 | -0.8 | -10.1 |
| 10 | -10.0 | -22.9 | -6.0 | 9.2 | 16.9 | 24.2 | 27.2 | 20.9 | 10.9 | 4.4 | -11.6 | -18.4 |
| 11 | -11.0 | -17.6 | 0.0 | 9.0 | 17.5 | 21.8 | 23.2 | 22.6 | 12.3 | 6.9 | -8.0 | -18.1 |
| 12 | -3.2 | -22.6 | 3.2 | 10.6 | 23.0 | 24.3 | 25.6 | 21.3 | 16.3 | 7.6 | -2.7 | -12.8 |
| 13 | 0.7 | -22.1 | 3.4 | 15.7 | 21.7 | 28.2 | 27.7 | 24.0 | 21.9 | 9.3 | -1.3 | -15.5 |
| 14 | -3.8 | -16.0 | 1.7 | 16.5 | 19.4 | 21.9 | 27.4 | 24.9 | 23.3 | 4.4 | -1.4 | -12.2 |
| 15 | -1.4 | -18.9 | 2.6 | 12.9 | 14.2 | 16.0 | 24.4 | 26.4 | 27.2 | 6.6 | 2.1 | -10.8 |
| 16 | -16.8 | -13.6 | 3.4 | 13.4 | 14.7 | 18.2 | 20.0 | 21.8 | 31.1 | 11.9 | 1.7 | -4.2 |
| 17 | -17.1 | -14.6 | 3.8 | 15.9 | 17.1 | 23.9 | 22.9 | 17.7 | 27.1 | 19.2 | 4.5 | -6.4 |
| 18 | -20.9 | -14.0 | 5.4 | 17.9 | 16.1 | 27.2 | 25.6 | 20.0 | 22.1 | 15.9 | 6.7 | 1.4 |
| 19 | -17.6 | -12.7 | 8.1 | 19.4 | 17.3 | 25.9 | 19.3 | 19.4 | 21.9 | 14.8 | 2.1 | -3.7 |
| 20 | -12.0 | -12.8 | 12.1 | 17.1 | 19.6 | 15.0 | 23.1 | 24.6 | 20.8 | 6.4 | -1.5 | 4.0 |
| 21 | -9.2 | -13.0 | 11.5 | 14.1 | 22.6 | 20.2 | 25.3 | 26.8 | 18.2 | 7.8 | 4.3 | -5.1 |
| 22 | -4.8 | -11.2 | 15.5 | 21.9 | 24.6 | 18.1 | 27.5 | 27.8 | 26.0 | 6.3 | 5.2 | -3.3 |
| 23 | -6.1 | -14.3 | 9.1 | 20.7 | 25.1 | 21.8 | 30.3 | 23.4 | 20.5 | 4.4 | 11.1 | -5.2 |
| 24 | -12.8 | -21.4 | 1.8 | 17.5 | 23.8 | 19.6 | 29.4 | 28.5 | 16.4 | 7.6 | 3.7 | -5.5 |
| 25 | -9.8 | -17.6 | 6.5 | 12.1 | 12.4 | 19.8 | 17.7 | 22.6 | 16.3 | 16.1 | -0.8 | -2.6 |
| 26 | -8.3 | -16.2 | 14.2 | 13.0 | 18.5 | 23.7 | 24.8 | 18.4 | 10.8 | 4.8 | -2.6 | -7.2 |
| 27 | 4.7 | -4.6 | 3.9 | 10.9 | 24.7 | 25.4 | 31.3 | 19.5 | 6.7 | -4.9 | -5.2 | -9.0 |
| 28 | -10.4 | -10.8 | 7.5 | 6.8 | 29.1 | 24.6 | 20.0 | 24.4 | 6.3 | -5.4 | -5.2 | -8.6 |
| 29 | -22.4 | | 4.0 | 9.7 | 31.6 | 25.8 | 24.2 | 20.2 | 5.9 | -5.3 | -6.1 | -6.8 |
| 30 | -17.5 | | 12.6 | 11.7 | 32.2 | 22.6 | 29.2 | 17.5 | 1.8 | -0.2 | -7.6 | -8.2 |
| 31 | -4.3 | | 5.1 | | 21.0 | | 25.2 | 21.0 | | 3.1 | | -0.1 |

**Maximum Temperature °C
Daily**



SRC CRS Saskatoon
11 June 2019
Photo: V. Wittrock

TEMPERATURE GRID °C

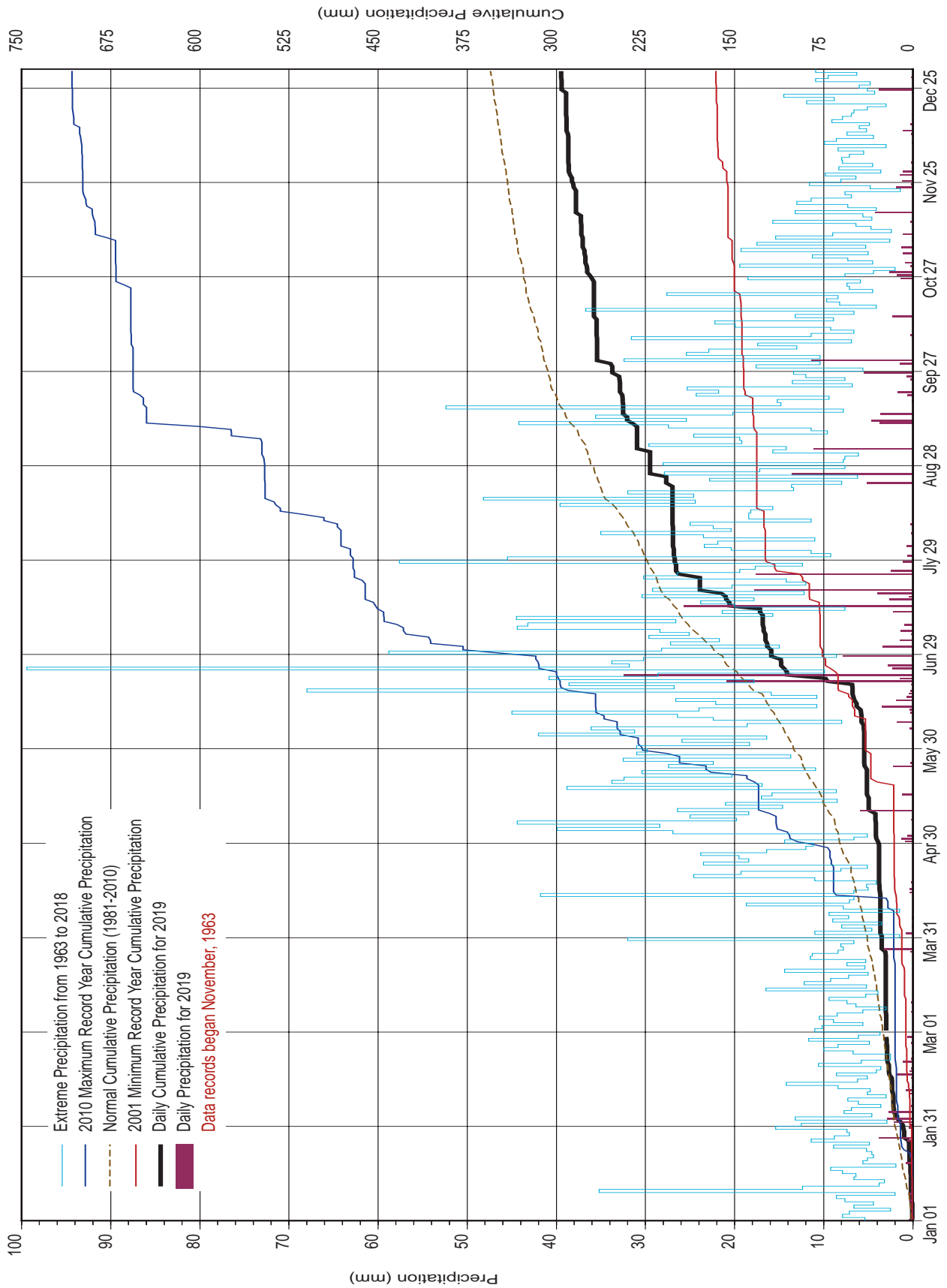
Minimum Temperature °C
Daily

| 2019 | JAN | FEB | MAR | APR | MAY | JUN | JLY | AUG | SEP | OCT | NOV | DEC |
|------|-------|-------|-------|------|------|------|------|------|------|-------|-------|-------|
| 1 | -23.0 | -20.0 | -27.6 | -1.5 | -6.6 | 6.1 | 8.6 | 12.5 | 7.0 | 0.6 | -2.3 | -13.7 |
| 2 | -10.2 | -24.1 | -30.8 | -5.6 | -3.1 | 11.8 | 6.6 | 16.6 | 11.3 | -0.2 | -3.7 | -13.2 |
| 3 | -3.9 | -25.8 | -23.4 | -6.5 | -3.3 | 7.9 | 12.0 | 17.5 | 0.0 | -0.6 | -7.8 | -6.1 |
| 4 | -6.6 | -25.4 | -17.9 | -2.2 | -4.4 | 10.7 | 9.1 | 12.2 | 11.3 | 3.3 | -11.9 | -7.8 |
| 5 | -9.3 | -32.8 | -17.2 | -6.8 | -5.1 | 11.2 | 11.3 | 13.9 | 11.1 | 1.4 | -13.4 | -15.4 |
| 6 | -7.0 | -37.3 | -24.5 | 0.9 | -3.2 | 15.7 | 14.0 | 10.7 | 7.4 | 5.2 | -16.1 | -9.7 |
| 7 | -15.4 | -35.0 | -22.4 | 1.6 | 0.6 | 7.6 | 16.4 | 6.6 | 8.5 | 3.5 | -16.9 | -14.7 |
| 8 | -21.8 | -38.9 | -13.5 | -0.9 | -5.1 | 4.6 | 14.3 | 8.5 | 9.8 | -1.3 | -5.9 | -23.4 |
| 9 | -22.8 | -32.7 | -13.9 | -5.2 | -1.0 | 8.1 | 11.3 | 11.9 | 9.9 | -6.3 | -12.2 | -23.4 |
| 10 | -15.1 | -35.1 | -20.0 | -5.4 | 5.6 | 6.9 | 10.1 | 9.0 | 8.1 | -7.1 | -19.2 | -27.1 |
| 11 | -14.2 | -26.3 | -13.1 | -5.6 | 6.1 | 9.4 | 13.9 | 5.5 | 8.7 | -6.5 | -21.0 | -27.4 |
| 12 | -13.1 | -30.7 | -4.2 | -8.0 | 6.0 | 10.4 | 11.3 | 12.0 | 8.8 | -7.3 | -13.3 | -19.0 |
| 13 | -13.0 | -30.3 | -3.7 | -1.5 | 6.5 | 12.1 | 14.3 | 10.1 | 5.4 | -6.9 | -13.7 | -27.6 |
| 14 | -7.9 | -29.3 | -8.3 | 5.0 | 1.2 | 13.0 | 15.7 | 12.7 | 9.1 | 0.2 | -5.7 | -29.1 |
| 15 | -22.2 | -34.1 | -9.6 | 1.4 | 5.0 | 11.4 | 14.4 | 12.6 | 10.1 | -0.7 | -7.5 | -17.2 |
| 16 | -24.6 | -19.1 | -7.1 | -1.8 | -1.6 | 9.9 | 11.7 | 10.6 | 11.6 | 1.4 | -1.8 | -16.1 |
| 17 | -27.1 | -20.2 | -10.3 | 3.6 | -2.0 | 6.7 | 15.1 | 8.3 | 13.9 | 2.7 | -2.1 | -17.7 |
| 18 | -32.4 | -25.4 | -2.2 | 2.2 | 3.5 | 10.9 | 12.1 | 4.8 | 10.8 | 2.0 | 0.7 | -12.4 |
| 19 | -28.5 | -26.7 | -2.2 | 9.2 | 2.1 | 13.5 | 11.5 | 6.1 | 11.3 | 2.4 | -5.1 | -11.8 |
| 20 | -19.2 | -21.5 | -2.2 | 3.5 | 4.9 | 10.9 | 9.9 | 6.9 | 10.4 | -1.7 | -5.9 | -10.1 |
| 21 | -15.7 | -21.4 | -2.4 | 0.4 | 6.9 | 8.4 | 12.9 | 6.3 | 6.3 | -4.0 | -3.9 | -12.7 |
| 22 | -15.6 | -25.2 | -1.0 | 2.1 | 4.7 | 12.3 | 14.4 | 12.6 | 8.3 | -5.1 | -4.7 | -10.9 |
| 23 | -24.9 | -25.1 | -1.6 | 10.0 | 9.0 | 11.4 | 15.9 | 10.0 | 11.6 | -5.4 | 1.3 | -8.5 |
| 24 | -26.0 | -29.3 | -5.3 | 2.9 | 9.7 | 11.2 | 17.7 | 15.2 | 8.1 | -5.2 | -1.3 | -7.0 |
| 25 | -22.9 | -31.8 | -7.8 | 1.1 | 5.4 | 12.2 | 13.1 | 12.6 | 4.1 | 2.1 | -4.4 | -7.2 |
| 26 | -14.1 | -29.8 | -0.3 | -3.4 | 2.7 | 10.1 | 15.6 | 10.3 | 3.5 | -6.2 | -9.8 | -14.4 |
| 27 | -10.5 | -16.4 | -2.0 | -4.1 | 4.9 | 10.9 | 13.7 | 11.5 | 0.4 | -8.0 | -7.3 | -14.7 |
| 28 | -24.5 | -15.7 | -4.8 | -2.1 | 8.4 | 15.3 | 10.9 | 10.3 | 1.1 | -8.5 | -8.4 | -15.9 |
| 29 | -29.7 | | -2.5 | -6.2 | 13.6 | 15.0 | 7.4 | 7.8 | 0.4 | -11.0 | -9.8 | -18.6 |
| 30 | -26.1 | | -3.9 | -3.6 | 12.4 | 12.8 | 14.4 | 6.3 | 0.3 | -15.6 | -10.7 | -15.3 |
| 31 | -17.5 | | -2.6 | | 6.1 | | 13.7 | 8.2 | | -1.1 | | -13.1 |

Average Temperature °C
Daily

| 2019 | JAN | FEB | MAR | APR | MAY | JUN | JLY | AUG | SEP | OCT | NOV | DEC |
|------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|
| 1 | -12.5 | -15.4 | -21.2 | 3.6 | 1.2 | 15.1 | 18.4 | 21.5 | 14.5 | 2.6 | 0.7 | -10.1 |
| 2 | -3.1 | -21.6 | -26.0 | -1.4 | 2.5 | 22.4 | 13.5 | 25.2 | 15.2 | 5.5 | 0.6 | -7.4 |
| 3 | 0.0 | -24.4 | -19.4 | 1.5 | 4.1 | 21.4 | 16.1 | 22.9 | 0.0 | 5.6 | -3.2 | -0.8 |
| 4 | -3.2 | -24.3 | -13.9 | 3.8 | 2.3 | 17.8 | 15.4 | 19.1 | 15.7 | 6.5 | -8.0 | -3.8 |
| 5 | -7.0 | -27.8 | -12.7 | 0.6 | 0.3 | 17.7 | 16.6 | 21.5 | 17.2 | 7.4 | -9.5 | -10.4 |
| 6 | -3.9 | -29.3 | -16.2 | 2.6 | 4.7 | 21.1 | 19.6 | 15.7 | 14.8 | 10.4 | -12.0 | -7.6 |
| 7 | -8.1 | -29.2 | -16.5 | 9.4 | 7.3 | 14.1 | 22.3 | 14.6 | 15.4 | 11.7 | -11.4 | -10.5 |
| 8 | -18.2 | -31.3 | -10.9 | 8.0 | 3.8 | 10.8 | 19.6 | 15.4 | 15.7 | 5.7 | -2.1 | -18.7 |
| 9 | -16.8 | -27.0 | -10.0 | 1.2 | 7.6 | 13.0 | 17.9 | 18.3 | 12.4 | -1.4 | -6.5 | -16.8 |
| 10 | -12.6 | -29.0 | -13.0 | 1.9 | 11.3 | 15.6 | 18.7 | 15.0 | 9.5 | -1.4 | -15.4 | -22.8 |
| 11 | -12.6 | -22.0 | -6.6 | 1.7 | 11.8 | 15.6 | 18.6 | 14.1 | 10.5 | 0.2 | -14.5 | -22.8 |
| 12 | -8.2 | -26.7 | -0.5 | 1.3 | 14.5 | 17.4 | 18.5 | 16.7 | 12.6 | 0.2 | -8.0 | -15.9 |
| 13 | -6.2 | -26.2 | -0.2 | 7.1 | 14.1 | 20.2 | 21.0 | 17.1 | 13.7 | 1.2 | -7.5 | -21.6 |
| 14 | -5.9 | -22.7 | -3.3 | 10.8 | 10.3 | 17.5 | 21.6 | 18.8 | 16.2 | 2.3 | -3.6 | -20.7 |
| 15 | -11.8 | -26.5 | -3.5 | 7.2 | 9.6 | 13.7 | 19.4 | 19.5 | 18.7 | 3.0 | -2.7 | -14.0 |
| 16 | -20.7 | -16.4 | -1.9 | 5.8 | 6.6 | 14.1 | 15.9 | 16.2 | 21.4 | 6.7 | -0.1 | -10.2 |
| 17 | -22.1 | -17.4 | -3.3 | 9.8 | 7.6 | 15.3 | 19.0 | 13.0 | 20.5 | 11.0 | 1.2 | -12.1 |
| 18 | -26.7 | -19.7 | 1.6 | 10.1 | 9.8 | 19.1 | 18.9 | 12.4 | 16.5 | 9.0 | 3.7 | -5.5 |
| 19 | -23.1 | -19.7 | 3.0 | 14.3 | 9.7 | 19.7 | 15.4 | 12.8 | 16.6 | 8.6 | -1.5 | -7.8 |
| 20 | -15.6 | -17.2 | 5.0 | 10.3 | 12.3 | 13.0 | 16.5 | 15.8 | 15.6 | 2.4 | -3.7 | -3.1 |
| 21 | -12.5 | -17.2 | 4.6 | 7.3 | 14.8 | 14.3 | 19.1 | 16.6 | 12.3 | 1.9 | 0.2 | -8.9 |
| 22 | -10.2 | -18.2 | 7.3 | 12.0 | 14.7 | 15.2 | 21.0 | 20.2 | 17.2 | 0.6 | 0.3 | -7.1 |
| 23 | -15.5 | -19.7 | 3.8 | 15.4 | 17.1 | 16.6 | 23.1 | 16.7 | 16.1 | -0.5 | 6.2 | -6.9 |
| 24 | -19.4 | -25.4 | -1.8 | 10.2 | 16.8 | 15.4 | 23.6 | 21.9 | 12.3 | 1.2 | 1.2 | -6.3 |
| 25 | -16.4 | -24.7 | -0.7 | 6.6 | 8.9 | 16.0 | 15.4 | 17.6 | 10.2 | 9.1 | -2.6 | -4.9 |
| 26 | -11.2 | -23.0 | 7.0 | 4.8 | 10.6 | 16.9 | 20.2 | 14.4 | 7.2 | -0.7 | -6.2 | -10.8 |
| 27 | -2.9 | -10.5 | 1.0 | 3.4 | 14.8 | 18.2 | 22.5 | 15.5 | 3.6 | -6.5 | -6.3 | -11.9 |
| 28 | -17.5 | -13.3 | 1.4 | 2.4 | 18.8 | 20.0 | 15.5 | 17.4 | 3.7 | -7.0 | -6.8 | -12.3 |
| 29 | -26.1 | | 0.8 | 1.8 | 22.6 | 20.4 | 15.8 | 14.0 | 3.2 | -8.2 | -8.0 | -12.7 |
| 30 | -21.8 | | 4.4 | 4.1 | 22.3 | 17.7 | 21.8 | 11.9 | 1.1 | -7.9 | -9.2 | -11.8 |
| 31 | -10.9 | | 1.3 | | 13.6 | | 19.5 | 14.6 | | 1.0 | | -6.6 |

DAILY PRECIPITATION



PRECIPITATION

| 2019 PRECIPITATION RECORDS | | | | | |
|---------------------------------------|--------|-----|------------|------------|------|
| TYPE | DATE | | NEW RECORD | OLD Record | YEAR |
| | Month | Day | | | |
| Greatest Daily (mm) | June | 20 | 20.9 | 17.8 | 2014 |
| | June | 22 | 32.4 | 28.6 | 2005 |
| | July | 14 | 15.7 | 20.0 | 1982 |
| Number of days => 15mm | July | | 3 | 3 | 2012 |
| Lowest total precipitation | Spring | | 18.5 | 19 | 2009 |
| Lowest daily maximum for entire month | April | | 0.9 | 1.0 | 1994 |

| 2019 EXTREME PRECIPITATION EVENTS | | |
|--|--------------------------|----------------|
| PERIOD | DATE (time) | AMOUNT (mm) |
| 0.5 hour* | July 14 (03:30-04:00) | 20.2 |
| | July 24 (19:00-19:30) | 15.0 |
| 1 hour* | July 14 (03:00-04:00) | 20.4 |
| | July 24 (19:00-20:00) | 15.0 |
| 2 hours* | July 14 (03:00-05:00) | 20.6 |
| | July 24 (19:00-21:00) | 15.0 |
| 6 hours* | July 14 (01:00-06:00) | 20.8 |
| | June 22 (0:00-06:00) | 20.3 |
| 12 hours* | June 21-22 (23:00-10:30) | 27.2 |
| | July 13-14 (18:00-06:00) | 20.8 |
| 24 hours* | June 21-22 (20:00-19:30) | 34.6 |
| | July 14-15 (0:30-0:00) | 26.8 |
| Greatest amount over more than one day | June 21-22 | 33.9 |
| | July 14 | 26.8 |
| Longest wet spells | January 29-February 4 | 7 days (8.7mm) |
| | November 24-30 | 7 days (6.1mm) |
| Longest dry spells | March 11-25 | 15 days |
| | April 18-29 | 12 days |
| | August 10-21 | 12 days |

**recorded by the tipping bucket gauge*



Funnel clouds in the Saskatoon region
13 July 2019
Photo: V. Wittrock

| RANKING BY DRIEST MONTH | | | |
|---------------------------|-------|---------------------------|------|
| % OF NORMAL PRECIPITATION | | PRECIPITATION AMOUNT (mm) | |
| APRIL | 12.7 | APRIL | 2.9 |
| MARCH | 28.3 | MARCH | 3.9 |
| MAY | 29.7 | DECEMBER | 6.1 |
| AUGUST | 42.8 | JANUARY | 8.4 |
| DECEMBER | 48.0 | OCTOBER | 9.6 |
| OCTOBER | 50.0 | MAY | 11.7 |
| JANUARY | 54.2 | FEBRUARY | 14.2 |
| NOVEMBER | 106.7 | NOVEMBER | 14.3 |
| JUNE | 117.1 | AUGUST | 19.9 |
| SEPTEMBER | 121.1 | SEPTEMBER | 44.8 |
| JULY | 139.2 | JUNE | 78.0 |
| FEBRUARY | 152.7 | JULY | 82.1 |

PRECIPITATION

| RANKING BY | | | | | |
|---------------------------|------------------------------|------|------------------------------|------|----|
| Total Number of Dry Days* | Maximum Length of Dry Spell* | | Maximum Length of Wet Spell* | | |
| 2001 | 282 | 1976 | 48 | 2003 | 21 |
| 1964 | 280 | 1993 | 40 | 1968 | 14 |
| 1984 | 278 | 2000 | 40 | 1969 | 14 |
| 1988 | 275 | 1965 | 37 | 1997 | 12 |
| 1965 | 271 | 1980 | 36 | 2013 | 11 |
| 1966 | 267 | 1997 | 36 | 2014 | 11 |
| 1986 | 267 | 2002 | 35 | 1977 | 10 |
| 1997 | 267 | 1964 | 31 | 1980 | 10 |
| 1981 | 266 | 1984 | 30 | 1989 | 10 |
| 1987 | 266 | 2009 | 30 | 2004 | 10 |
| 1967 | 265 | 2010 | 29 | 2008 | 10 |
| 1994 | 264 | 2017 | 29 | 1983 | 9 |
| 1968 | 260 | 1966 | 28 | 1986 | 9 |
| 1990 | 260 | 1974 | 28 | 2010 | 9 |
| 2015 | 259 | 2012 | 28 | 1965 | 8 |
| 1998 | 259 | 1968 | 27 | 1972 | 8 |
| 1985 | 258 | 2004 | 25 | 1974 | 8 |
| 1993 | 258 | 2013 | 25 | 2005 | 8 |
| 1995 | 258 | 1972 | 23 | 2009 | 8 |
| 1999 | 258 | 1973 | 23 | 2011 | 8 |
| 2002 | 258 | 1996 | 23 | 2016 | 8 |
| 1996 | 256 | 1977 | 22 | 1973 | 7 |
| 2003 | 255 | 1987 | 22 | 1976 | 7 |
| 2018 | 255 | 1978 | 21 | 1982 | 7 |
| 1976 | 251 | 1982 | 21 | 1992 | 7 |
| 1992 | 250 | 2001 | 21 | 1993 | 7 |
| 2000 | 248 | 2015 | 21 | 2000 | 7 |
| 2009 | 246 | 1969 | 20 | 2002 | 7 |
| 2008 | 245 | 1986 | 20 | 2012 | 7 |
| 1980 | 244 | 1999 | 20 | 2019 | 7 |
| 2012 | 244 | 2011 | 20 | 1964 | 6 |
| 2014 | 244 | 1967 | 19 | 1966 | 6 |
| 1971 | 243 | 1981 | 19 | 1970 | 6 |
| 2013 | 243 | 1988 | 19 | 1975 | 6 |
| 2017 | 242 | 2008 | 19 | 1978 | 6 |
| 1989 | 241 | 2018 | 19 | 1979 | 6 |
| 1970 | 240 | 1994 | 18 | 1981 | 6 |
| 1979 | 239 | 1995 | 18 | 1988 | 6 |
| 2011 | 239 | 2003 | 18 | 1991 | 6 |
| 1972 | 238 | 1975 | 17 | 1994 | 6 |
| 1977 | 238 | 1979 | 17 | 1996 | 6 |
| 2007 | 237 | 1985 | 17 | 2006 | 6 |
| 1975 | 235 | 1998 | 17 | 2007 | 6 |
| 1991 | 234 | 2014 | 17 | 1971 | 5 |
| 1983 | 233 | 2005 | 17 | 1985 | 5 |
| 2010 | 233 | 1983 | 16 | 1987 | 5 |
| 2019 | 233 | 1990 | 16 | 1990 | 5 |
| 2005 | 231 | 1991 | 16 | 1995 | 5 |
| 1974 | 229 | 1992 | 16 | 1998 | 5 |
| 1982 | 229 | 1971 | 15 | 1999 | 5 |
| 2006 | 227 | 2007 | 15 | 2015 | 5 |
| 1978 | 224 | 2019 | 15 | 2017 | 5 |
| 2016 | 222 | 1989 | 14 | 2018 | 5 |
| 1969 | 218 | 1970 | 13 | 1967 | 4 |
| 2004 | 208 | 2006 | 13 | 1984 | 4 |
| 1973 | 200 | 2016 | 12 | 2001 | 4 |

*For this report, a dry day is defined as a day on which precipitation is not recorded; a dry spell is 2+ consecutive days of no precipitation; a wet spell is 2+ consecutive days of precipitation.



Tipping Bucket rain gauge
29 April 2019
Photo: V. Wittrock



All-Season Precipitation Weighing Gauge
with 2 meter anemometer
05 September 2019
Photo: V. Wittrock

PRECIPITATION RANKINGS

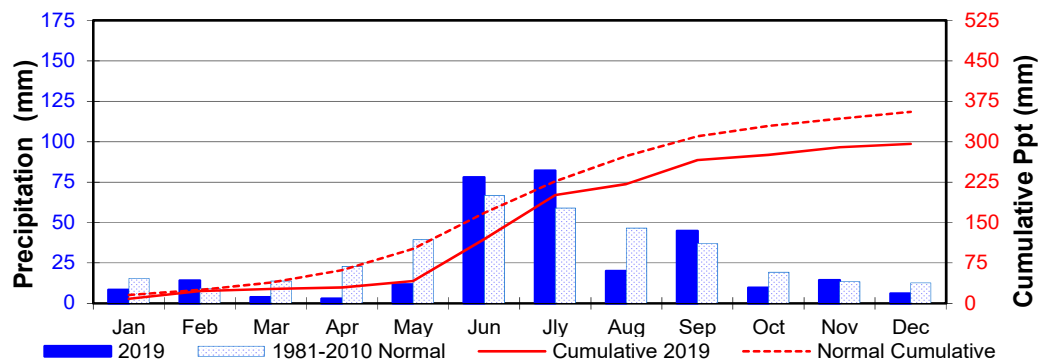
| RANKING BY WETTEST YEAR (mm) | | | | | | | | | |
|------------------------------|-------|--------------|------|--------------|-------|--------------|-------|--------------|-------|
| ANNUAL (JAN-DEC) | | WINTER (DJF) | | SPRING (MAM) | | SUMMER (JJA) | | AUTUMN (SON) | |
| 2010 | 707.4 | 1969 | 98.1 | 2010 | 216.1 | 2010 | 316.4 | 2006 | 203.4 |
| 1991 | 546.9 | 1972 | 92.2 | 2012 | 184.3 | 2005 | 269.4 | 1969 | 151.8 |
| 2006 | 517.5 | 1974 | 92.2 | 1977 | 164.1 | 2012 | 266.0 | 2010 | 151.1 |
| 2012 | 501.1 | 2007 | 74.7 | 2014 | 162.4 | 2004 | 260.0 | 1984 | 137.0 |
| 2005 | 486.8 | 1980 | 73.0 | 1974 | 148.0 | 1991 | 251.6 | 1978 | 111.4 |
| 1983 | 471.6 | 1976 | 69.5 | 1991 | 147.3 | 1971 | 248.8 | 2005 | 109.4 |
| 1974 | 462.7 | 1965 | 69.3 | 1985 | 134.3 | 2007 | 231.0 | 1991 | 105.4 |
| 2014 | 452.7 | 1975 | 67.3 | 1983 | 125.2 | 1968 | 225.9 | 2015 | 99.2 |
| 1968 | 443.1 | 1973 | 63.2 | 1975 | 119.6 | 1966 | 222.0 | 1983 | 96.2 |
| 1982 | 436.2 | 1978 | 63.0 | 1982 | 110.8 | 1970 | 216.5 | 1973 | 88.2 |
| 1969 | 427.4 | 1979 | 61.3 | 1994 | 109.4 | 1983 | 215.8 | 1986 | 87.2 |
| 1971 | 414.6 | 1971 | 60.4 | 2006 | 101.8 | 2009 | 212.8 | 1982 | 81.5 |
| 2007 | 413.9 | 1989 | 57.9 | 1989 | 101.7 | 1982 | 208.4 | 1964 | 77.4 |
| 1986 | 411.3 | 1986 | 57.2 | 1968 | 97.6 | 2002 | 206.8 | 2016 | 77.4 |
| 2004 | 404.5 | 1990 | 55.6 | 1997 | 88.2 | 1965 | 206.6 | 1967 | 76.8 |
| 1973 | 393.3 | 1992 | 55.0 | 1979 | 87.3 | 2014 | 206.2 | 1996 | 74.4 |
| 1975 | 392.3 | 1966 | 54.7 | 1990 | 87.2 | 1974 | 205.5 | 1993 | 73.1 |
| 1970 | 388.8 | 1968 | 53.8 | 1986 | 82.5 | 1986 | 196.2 | 2002 | 72.8 |
| 1989 | 384.8 | 1970 | 52.7 | 2017 | 79.9 | 1999 | 194.2 | 1968 | 71.3 |
| 1966 | 376.9 | 1985 | 52.3 | 1967 | 78.0 | 2008 | 191.2 | 1998 | 70.0 |
| 1977 | 370.5 | 1981 | 52.2 | 1987 | 73.6 | 2016 | 188.9 | 2019 | 68.7 |
| 2016 | 363.6 | 1996 | 51.0 | 1973 | 73.1 | 2011 | 186.6 | 1980 | 66.6 |
| 1965 | 358.8 | 1997 | 48.0 | 1978 | 72.8 | 2013 | 185.3 | 1992 | 65.9 |
| 1978 | 358.1 | 1964 | 47.9 | 1972 | 71.6 | 2006 | 183.8 | 2011 | 65.7 |
| 1967 | 354.3 | 2005 | 45.4 | 1976 | 69.1 | 2000 | 183.8 | 1977 | 65.4 |
| 1979 | 352.0 | 1994 | 45.1 | 1969 | 68.5 | 2019 | 180.0 | 2018 | 65.0 |
| 1994 | 341.4 | 1977 | 43.1 | 1964 | 65.8 | 1976 | 169.4 | 2014 | 64.9 |
| 2015 | 340.7 | 1983 | 41.1 | 1970 | 65.7 | 1994 | 165.6 | 1989 | 64.5 |
| 1996 | 340.6 | 2013 | 41.1 | 1995 | 65.4 | 1995 | 164.4 | 2008 | 64.4 |
| 1976 | 331.8 | 1991 | 40.3 | 2007 | 64.7 | 2015 | 156.4 | 2017 | 62.2 |
| 1985 | 330.6 | 2009 | 38.8 | 1993 | 62.2 | 1973 | 156.1 | 1997 | 61.6 |
| 1995 | 327.7 | 1967 | 37.9 | 2005 | 62.1 | 1996 | 154.4 | 1981 | 61.4 |
| 2011 | 320.6 | 1982 | 37.0 | 2003 | 61.8 | 1993 | 151.0 | 2009 | 56.5 |
| 2002 | 320.0 | 1988 | 35.9 | 1966 | 61.2 | 1989 | 149.9 | 1970 | 56.4 |
| 2009 | 319.3 | 2014 | 34.9 | 1971 | 61.1 | 1988 | 148.9 | 1985 | 55.2 |
| 2013 | 318.4 | 2011 | 32.3 | 2000 | 59.2 | 1975 | 144.5 | 1979 | 53.4 |
| 1972 | 317.9 | 2016 | 32.1 | 2016 | 59.0 | 1990 | 144.5 | 1995 | 52.6 |
| 2000 | 315.4 | 2006 | 32.0 | 1996 | 58.8 | 1978 | 142.5 | 2003 | 51.2 |
| 2008 | 313.8 | 2000 | 31.7 | 1984 | 57.2 | 1967 | 139.9 | 1965 | 50.9 |
| 1990 | 309.8 | 1995 | 31.3 | 1999 | 56.5 | 1979 | 135.9 | 1966 | 50.2 |
| 1980 | 305.9 | 1999 | 31.3 | 1988 | 55.6 | 1998 | 133.4 | 2004 | 50.0 |
| 1993 | 300.0 | 1987 | 30.6 | 1992 | 55.5 | 1972 | 133.3 | 1975 | 48.8 |
| 1999 | 297.7 | 2004 | 29.3 | 2004 | 55.4 | 2003 | 126.2 | 2007 | 45.3 |
| 2019 | 295.9 | 2003 | 29.2 | 1981 | 54.3 | 1981 | 124.9 | 1974 | 40.0 |
| 1984 | 293.1 | 2015 | 29.1 | 2015 | 54.2 | 1980 | 120.3 | 1988 | 38.1 |
| 1997 | 291.4 | 2017 | 28.4 | 2018 | 51.8 | 1997 | 116.4 | 1971 | 34.2 |
| 1992 | 288.1 | 2019 | 25.8 | 2013 | 51.0 | 1992 | 115.6 | 1990 | 33.9 |
| 1988 | 285.7 | 2001 | 23.1 | 1965 | 43.2 | 1969 | 105.5 | 1972 | 32.3 |
| 1964 | 282.7 | 2010 | 22.5 | 1980 | 42.2 | 2017 | 92.7 | 2013 | 31.6 |
| 1981 | 279.8 | 1998 | 22.4 | 2011 | 41.3 | 1987 | 92.6 | 2000 | 31.2 |
| 1998 | 263.3 | 1993 | 22.0 | 2001 | 34.0 | 1985 | 91.8 | 2012 | 29.1 |
| 2003 | 257.7 | 2008 | 21.6 | 1998 | 29.8 | 2001 | 91.2 | 2001 | 28.5 |
| 2017 | 257.1 | 1984 | 19.2 | 2008 | 29.8 | 1977 | 81.9 | 1987 | 27.4 |
| 1987 | 232.4 | 2018 | 19.0 | 2002 | 20.3 | 2018 | 81.4 | 1976 | 21.8 |
| 2018 | 216.3 | 2012 | 13.5 | 2009 | 19.0 | 1964 | 73.9 | 1994 | 21.0 |
| 2001 | 165.8 | 2002 | 12.1 | 2019 | 18.5 | 1984 | 70.2 | 1999 | 17.2 |

| ANNUAL RANKING BY DAYS WITH PRECIPITATION | | | | | | | | | |
|---|-----|--------------|----|--------------|----|--------------|----|--------------|----|
| ANNUAL (JAN-DEC) | | WINTER (DJF) | | SPRING (MAM) | | SUMMER (JJA) | | AUTUMN (SON) | |
| 2004 | 158 | 1969 | 61 | 2004 | 44 | 2010 | 45 | 2006 | 38 |
| 1969 | 147 | 1974 | 57 | 2012 | 39 | 1978 | 43 | 1978 | 36 |
| 2016 | 143 | 1972 | 48 | 1979 | 37 | 2012 | 43 | 2007 | 36 |
| 1978 | 139 | 1979 | 48 | 1974 | 36 | 1982 | 42 | 2004 | 34 |
| 2006 | 139 | 2019 | 45 | 1983 | 36 | 1991 | 42 | 1992 | 33 |
| 1974 | 136 | 2009 | 43 | 2005 | 36 | 2004 | 42 | 2019 | 33 |
| 1982 | 136 | 1976 | 41 | 2006 | 36 | 2014 | 41 | 1969 | 32 |
| 2005 | 135 | 1983 | 41 | 1975 | 35 | 1994 | 41 | 1970 | 32 |
| 1983 | 132 | 2017 | 41 | 2017 | 35 | 2005 | 40 | 1983 | 32 |
| 2010 | 132 | 1970 | 40 | 1982 | 34 | 2016 | 40 | 2016 | 32 |
| 2019 | 132 | 1971 | 40 | 1997 | 32 | 1976 | 39 | 1989 | 31 |
| 1991 | 131 | 1978 | 40 | 2000 | 32 | 1973 | 38 | 2018 | 31 |
| 1975 | 130 | 2011 | 40 | 1977 | 31 | 1974 | 38 | 2014 | 30 |
| 1977 | 129 | 2016 | 39 | 1993 | 31 | 1981 | 38 | 1977 | 30 |
| 1972 | 128 | 2005 | 37 | 1999 | 31 | 2019 | 38 | 1991 | 30 |
| 2007 | 128 | 2014 | 36 | 1969 | 30 | 1986 | 37 | 2010 | 30 |
| 1973 | 127 | 1973 | 36 | 1989 | 30 | 1972 | 36 | 1984 | 29 |
| 2011 | 127 | 1980 | 36 | 1995 | 30 | 1989 | 36 | 2002 | 29 |
| 1970 | 126 | 1981 | 36 | 2003 | 30 | 2002 | 36 | 1985 | 28 |
| 1979 | 126 | 2006 | 36 | 2007 | 30 | 2008 | 36 | 1967 | 27 |
| 1989 | 124 | 1982 | 34 | 2011 | 30 | 2009 | 36 | 2008 | 27 |
| 1980 | 123 | 1975 | 33 | 2013 | 29 | 1966 | 35 | 2017 | 27 |
| 2013 | 123 | 1991 | 33 | 2014 | 28 | 1975 | 35 | 1973 | 25 |
| 1971 | 122 | 2003 | 33 | 2010 | 28 | 1980 | 35 | 1975 | 25 |
| 2017 | 122 | 1977 | 31 | 2018 | 28 | 1987 | 35 | 2003 | 25 |
| 2014 | 121 | 1992 | 30 | 1987 | 27 | 1993 | 35 | 1965 | 24 |
| 2008 | 121 | 1997 | 30 | 1990 | 27 | 2000 | 35 | 1981 | 24 |
| 2012 | 120 | 2000 | 30 | 1991 | 27 | 2006 | 35 | 1996 | 24 |
| 2009 | 119 | 2007 | 30 | 2016 | 27 | 2013 | 35 | 1998 | 24 |
| 2000 | 118 | 2015 | 30 | 1970 | 26 | 1996 | 34 | 2001 | 24 |
| 1992 | 116 | 2004 | 29 | 1971 | 26 | 1997 | 34 | 2011 | 24 |
| 1976 | 115 | 2010 | 29 | 1973 | 26 | 1999 | 34 | 2015 | 24 |
| 1981 | 113 | 1965 | 27 | 1985 | 25 | 1968 | 33 | 1971 | 23 |
| 2018 | 112 | 1989 | 27 | 2008 | 25 | 1977 | 33 | 1980 | 23 |
| 1996 | 110 | 1990 | 27 | 1984 | 24 | 1992 | 33 | 1986 | 23 |
| 2003 | 110 | 1998 | 27 | 1996 | 24 | 1988 | 32 | 2009 | 23 |
| 1985 | 107 | 1966 | 26 | 2009 | 24 | 1990 | 32 | 1968 | 22 |
| 1995 | 107 | 1967 | 26 | 1972 | 23 | 1995 | 32 | 1972 | 22 |
| 1999 | 107 | 1986 | 26 | 1976 | 23 | 1971 | 31 | 1993 | 22 |
| 2002 | 107 | 2008 | 26 | 1978 | 22 | 1983 | 31 | 2005 | 22 |
| 1968 | 106 | 1968 | 25 | 1980 | 22 | 2007 | 31 | 2012 | 22 |
| 1993 | 106 | 1999 | 25 | 1986 | 22 | 1965 | 29 | 1979 | 21 |
| 1998 | 106 | 1964 | 24 | 1998 | 22 | 2018 | 29 | 1995 | 20 |
| 1990 | 105 | 1993 | 24 | 2002 | 22 | 1964 | 28 | 2013 | 20 |
| 2015 | 104 | 1996 | 24 | 2015 | 22 | 1970 | 28 | 1982 | 19 |
| 1987 | 102 | 2013 | 24 | 1967 | 21 | 1979 | 28 | 1988 | 19 |
| 1994 | 101 | 1988 | 23 | 1981 | 21 | 1998 | 28 | 2000 | 19 |
| 1967 | 100 | 1994 | 23 | 1992 | 20 | 1969 | 27 | 1964 | 18 |
| 1966 | 98 | 2001 | 23 | 1994 | 20 | 2015 | 27 | 1990 | 18 |
| 1986 | 98 | 1985 | 22 | 2001 | 20 | 2003 | 26 | 1966 | 17 |
| 1997 | 98 | 1995 | 21 | 1968 | 19 | 1967 | 25 | 1994 | 15 |
| 1965 | 94 | 2018 | 21 | 1988 | 19 | 1985 | 25 | 1987 | 14 |
| 1988 | 91 | 1987 | 19 | 1966 | 18 | 2011 | 25 | 1997 | 14 |
| 1984 | 88 | 2012 | 19 | 2019 | 18 | 2017 | 24 | 1974 | 13 |
| 1964 | 86 | 1984 | 18 | 1965 | 16 | 2001 | 23 | 1999 | 13 |
| 2001 | 84 | 2002 | 16 | 1964 | 14 | 1984 | 18 | 1976 | 9 |

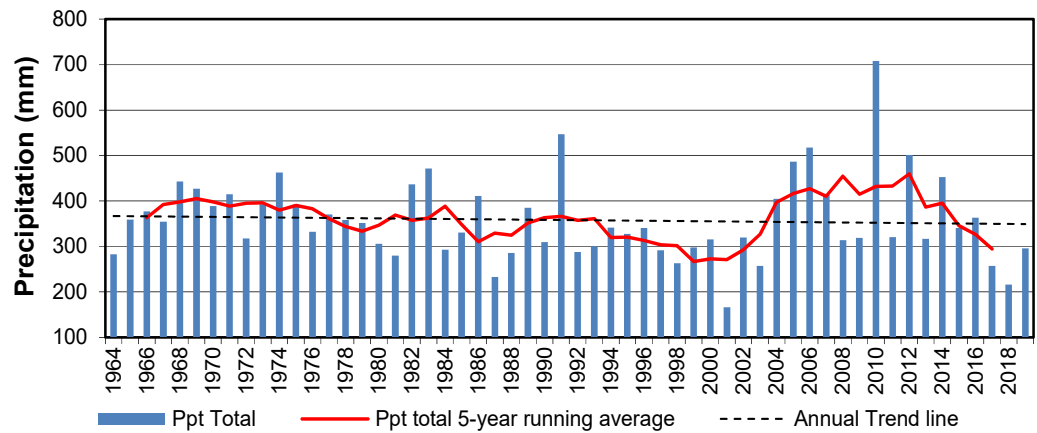
PRECIPITATION

| MONTH | MONTHLY PRECIPITATION (mm) | | | | EXTREME VALUES (mm) | | | STATION | OPERATIONAL PERIOD |
|-----------|----------------------------|--------|-----------------|------------------------|---------------------|--------------------|---------------------------|--|--------------------|
| | 2019 | NORMAL | CUMULATIVE 2019 | % OF CUMULATIVE NORMAL | CRS Maximum | CRS Minimum | SASKATOON AREA Maximum | | |
| January | 8.4 | 15.5 | 8.4 | 54.2 | 48.6/1969 | 2.6/2001 | 66.1/1911 ^{SE} | SM Saskatoon stations circa (NWHP et al) | 1889-1901 |
| February | 14.2 | 9.3 | 22.6 | 91.1 | 40.2/1979 | 1.9/2012 | 43.7/1924 ^{SE} | SE Saskatoon Eby | 1901-42 |
| March | 3.9 | 13.8 | 26.5 | 68.7 | 57.1/1967 | 0.8/2010 | 59.0/1927 ^{SE} | US University of Saskatchewan | 1915-64 |
| April | 2.9 | 22.9 | 29.4 | 47.8 | 83.5/2014 | 2.4/1988, 89, 2007 | 86.1/1955 ^{US} | S Saskatoon | 1941-42 |
| May | 11.7 | 39.4 | 41.1 | 40.7 | 145.3/1977 | 0.2/2002 | 178.0/1977 ^{SWT} | SA S'toon Diefenbaker In'l Airport | 1942-2008 |
| June | 78.0 | 66.6 | 119.1 | 71.1 | 171.0/2005 | 13.0/1985 | 186.8/1942 ^S | NRC National Research Council | 1952-66 |
| July | 82.1 | 59.0 | 201.2 | 88.8 | 125.9/1971 | 13.0/1984 | 162.9/1928 ^{SE} | SRC Sask. Research Council | 1963- |
| August | 19.9 | 46.5 | 221.1 | 81.0 | 105.2/2007 | 7.0/2001 | 178.9/1954 ^{NRC} | SWT S'toon Water Treatment Plant | 1974-2006 |
| September | 44.8 | 37.0 | 265.9 | 85.8 | 128.4/2006 | 0.8/1995 | 128.4/2006 ^{SRC} | SC Saskatoon Central Ave | 1974-89 |
| October | 9.6 | 19.2 | 275.5 | 83.7 | 69.8/1969 | 0.0/2000 | 69.8/1969 ^{SRC} | S2 Saskatoon 2 | 1977-90 |
| November | 14.3 | 13.4 | 289.8 | 84.6 | 48.2/1973 | 0.4/2009 | 57.3/1940 ^{SE} | K Saskatoon Kernen Farm | 1993-2004 |
| December | 6.1 | 12.7 | 295.9 | 83.3 | 43.0/1977 | 1.2/1997 | 59.2/1956 ^{SA} | KCS Saskatoon Kernen Farm CS | 1996-2008 |
| Total | 295.9 | 355.2 | | | 707.4/2010 | 165.8/2001 | 707.4/2010 ^{SRC} | RCS Environment Canada | 2008- |

Monthly



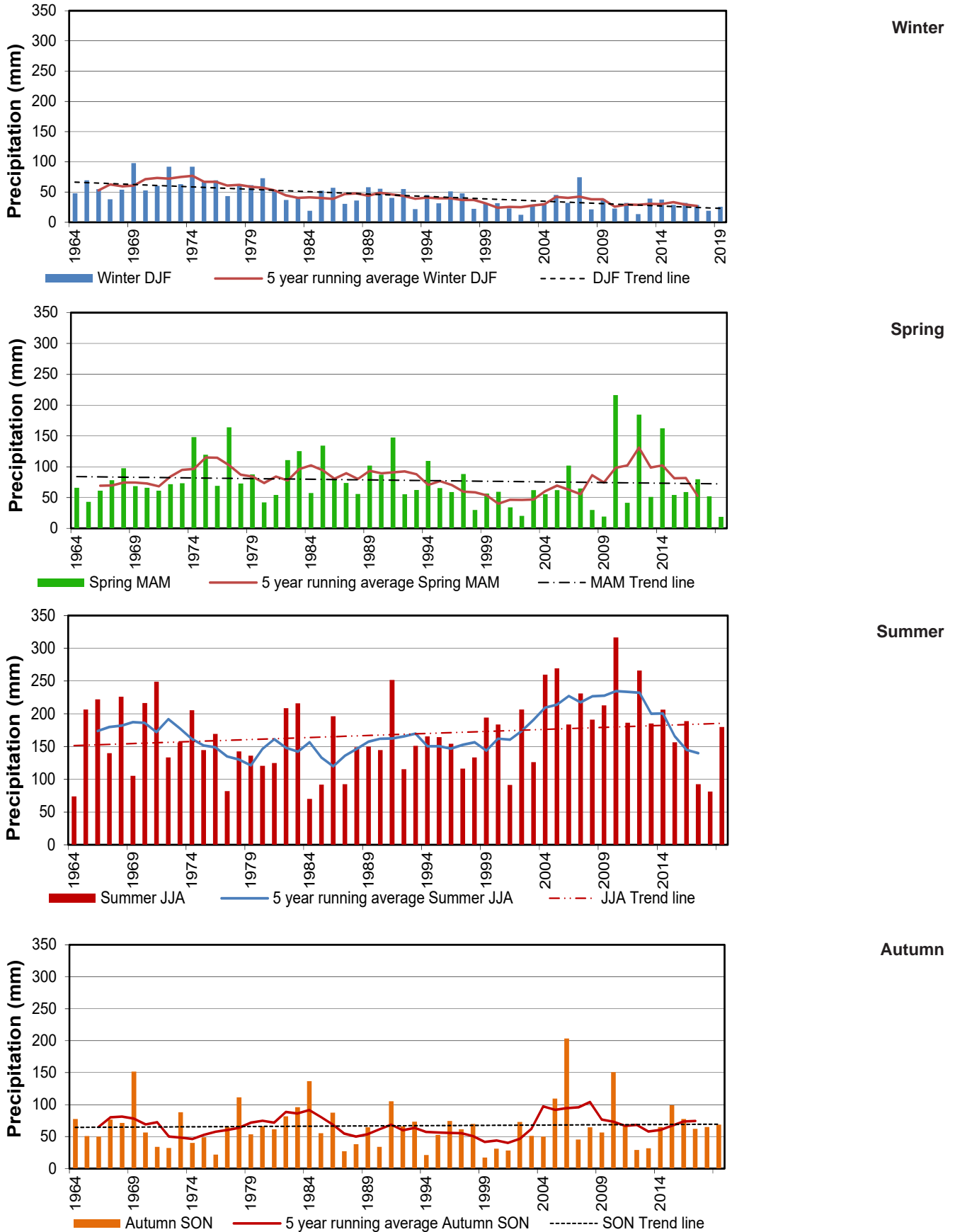
Annual



Snow depth sensors
 Left photo manual;
 Right photo automated
 February 7 2019
 Photo: V. Wittrock



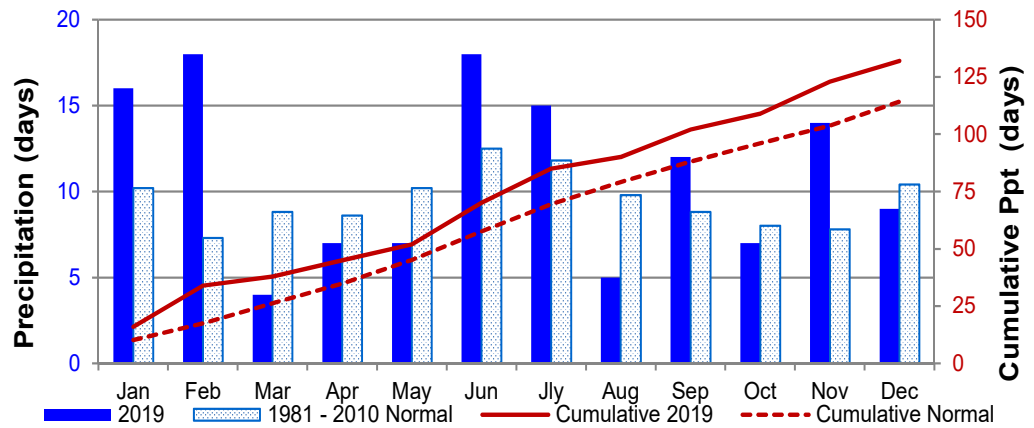
SEASONAL PRECIPITATION for 1964 to 2019



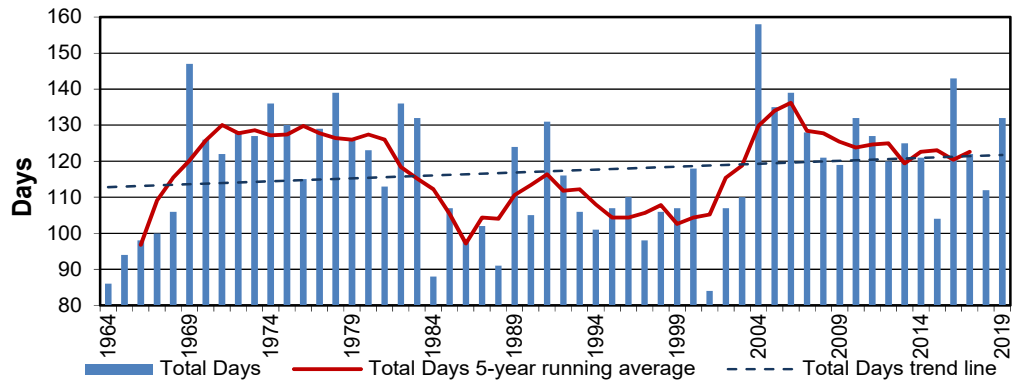
PRECIPITATION

| MONTH | NUMBER OF DAYS WITH MEASURABLE PRECIPITATION | | | | | EXTREME VALUES | |
|-----------|--|-----------------|--------|-------------------|------------------------|----------------|---------------------------|
| | 2019 | CUMULATIVE 2019 | Normal | CUMULATIVE NORMAL | % OF CUMULATIVE NORMAL | CRS Maximum | CRS Minimum |
| January | 16 | 16 | 10.2 | 10.2 | 156.9 | 25/1974 | 3/2001 |
| February | 18 | 34 | 7.3 | 17.5 | 194.3 | 20/1969 | 2/1984 |
| March | 4 | 38 | 8.8 | 26.3 | 144.5 | 19/2004 | 2/1990, 92, 94 2007, 2010 |
| April | 7 | 45 | 8.6 | 34.9 | 128.9 | 17/2003 | 2/1964 |
| May | 7 | 52 | 10.2 | 45.1 | 115.3 | 19/1989 | 1/2002 |
| June | 18 | 70 | 12.5 | 57.6 | 121.5 | 21/1991 | 7/1964&1968 |
| July | 15 | 85 | 11.8 | 69.4 | 122.5 | 19/1986 | 4/1984 |
| August | 5 | 90 | 9.8 | 79.2 | 113.6 | 18/2002 | 2/2001 |
| September | 12 | 102 | 8.8 | 88 | 115.9 | 19/1977 | 2/1995, 2012, 13, 17 |
| October | 7 | 109 | 8.0 | 96 | 113.5 | 16/2004 | 0/2000 |
| November | 14 | 123 | 7.8 | 103.8 | 118.5 | 18/1970 | 1/1986, 74, 76, 90, 2009 |
| December | 9 | 132 | 10.4 | 114.2 | 115.6 | 21/2013 | 2/1997 |
| Total | 132 | | 114.2 | | | 158/2004 | 84/2001 |

Monthly Days



Annual Days

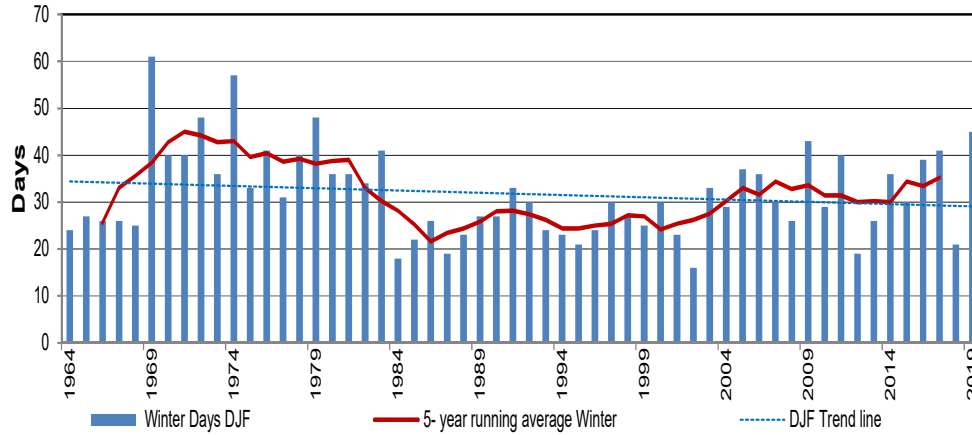


The small snow cover disappeared quickly in March 2019.
 Left photo: March 7
 Right photo: March 28
 Photo: V. Wittrock

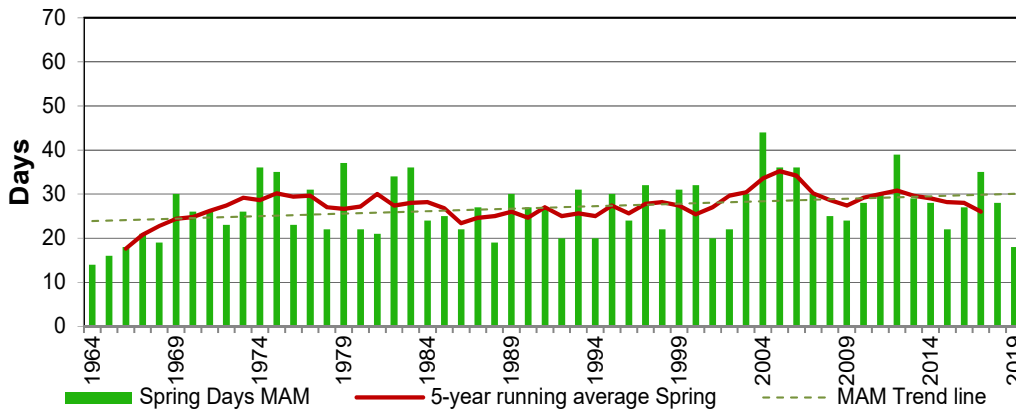


SEASONAL PRECIPITATION DAYS for 1964 to 2019

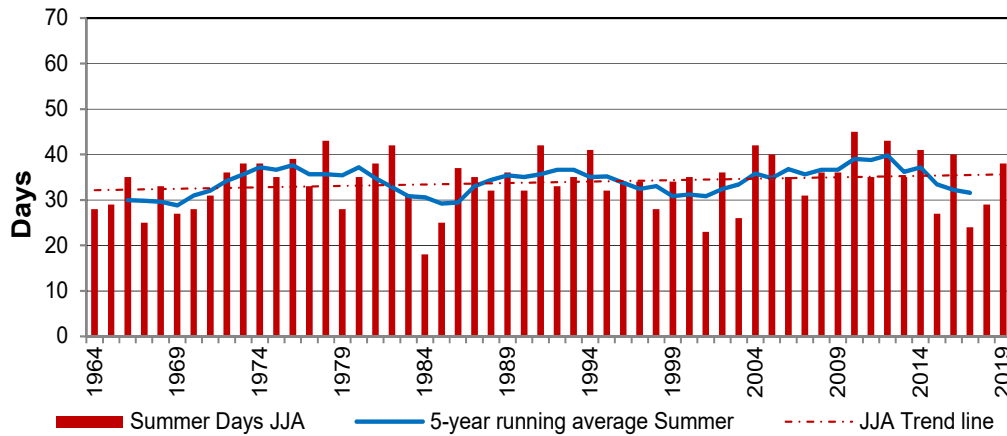
Winter Days



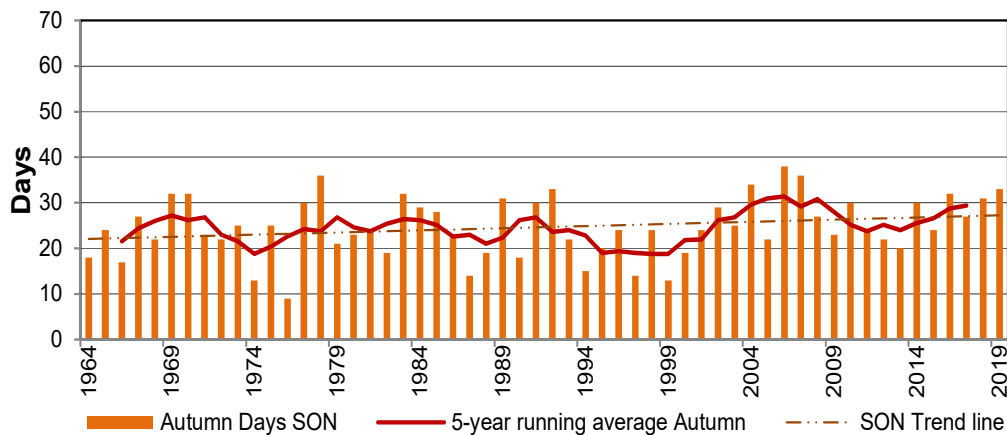
Spring Days



Summer Days



Autumn Days

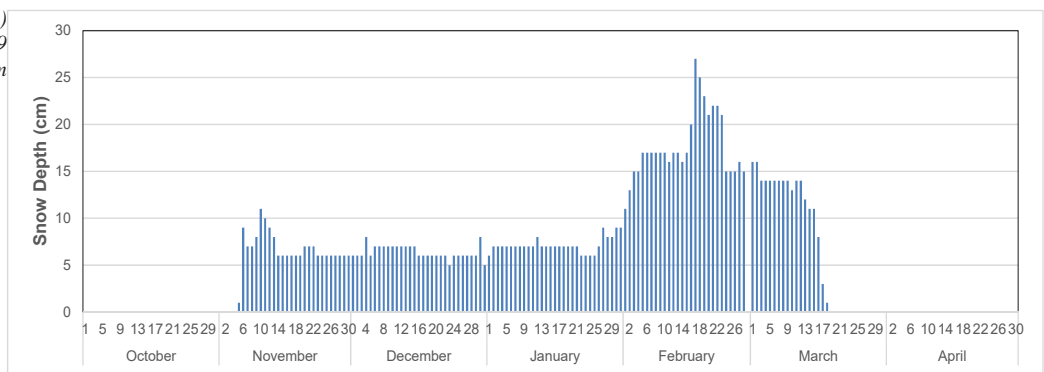


PRECIPITATION GRID (mm)

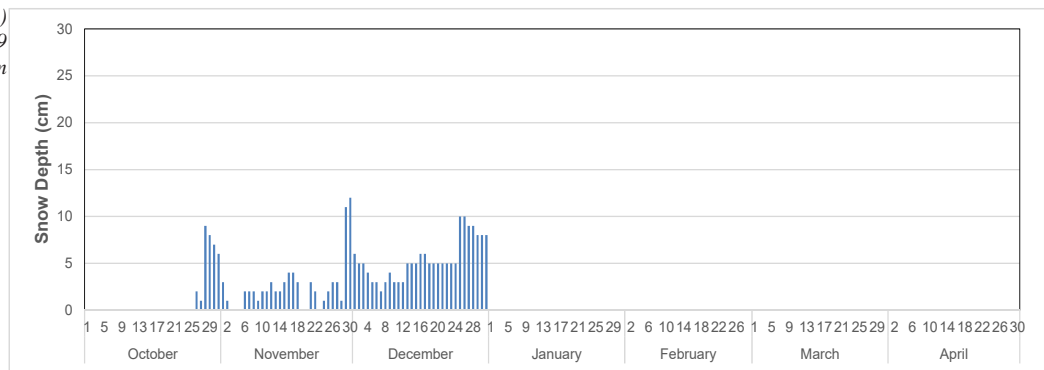
Precipitation Daily

| 2019 | JAN | FEB | MAR | APR | MAY | JUN | JLY | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|------|------|------|------|-----|-----|-----|
| 1 | 0.5 | 2.1 | 0.0 | 0.8 | 1.3 | 0.0 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | 0.0 | 2.9 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.7 | 11.1 | 0.0 | 0.0 | 0.2 |
| 3 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 |
| 4 | 0.1 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 1.3 | 0.0 |
| 6 | 0.2 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 1.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | 0.4 | 0.0 | 0.2 | 0.0 | 0.2 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| 8 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 | 0.3 | 0.1 | 0.1 |
| 9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.3 | 0.0 | 0.0 | 1.1 | 0.0 |
| 10 | 0.0 | 0.3 | 0.2 | 0.0 | 5.9 | 0.3 | 0.0 | 0.0 | 3.7 | 0.0 | 0.0 | 0.0 |
| 11 | 0.2 | 0.8 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 4.6 | 0.0 | 0.0 | 0.2 |
| 12 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 3.5 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 |
| 13 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.6 | 0.0 | 0.3 | 0.0 |
| 14 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 1.9 | 25.7 | 0.0 | 0.0 | 2.3 | 0.0 | 0.3 |
| 15 | 0.0 | 0.2 | 0.0 | 0.4 | 1.2 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16 | 0.1 | 1.9 | 0.0 | 0.0 | 0.0 | 0.5 | 2.6 | 0.0 | 0.0 | 0.0 | 4.2 | 0.0 |
| 17 | 0.0 | 0.4 | 0.0 | 0.2 | 0.0 | 0.3 | 0.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| 18 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 17.8 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 |
| 20 | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 20.9 | 0.0 | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 |
| 21 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 32.4 | 0.0 | 5.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 23 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 24 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 2.3 | 17.6 | 0.0 | 0.3 | 0.0 | 1.9 | 0.1 |
| 25 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 2.8 | 2.5 | 13.6 | 0.7 | 0.0 | 0.2 | 3.8 |
| 26 | 0.6 | 0.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.5 | 1.4 | 1.2 | 0.0 |
| 27 | 3.8 | 0.0 | 3.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 1.8 | 0.1 | 0.0 |
| 28 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 7.9 | 1.1 | 0.0 | 0.0 | 2.6 | 1.5 | 0.0 |
| 29 | 0.1 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 1.1 | 0.2 |
| 30 | 0.5 | | 0.0 | 0.9 | 0.0 | 0.0 | 0.6 | 0.0 | 11.4 | 0.3 | 0.1 | 0.0 |
| 31 | 0.3 | | 0.0 | | 0.0 | | 0.0 | 0.0 | | 0.9 | | 0.0 |

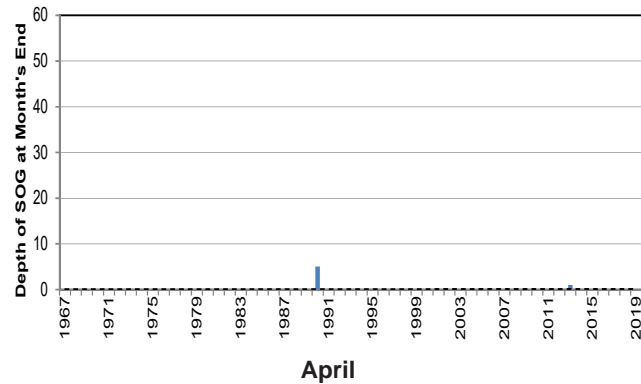
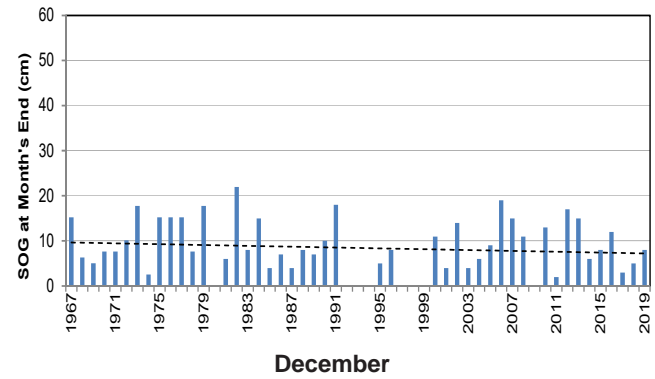
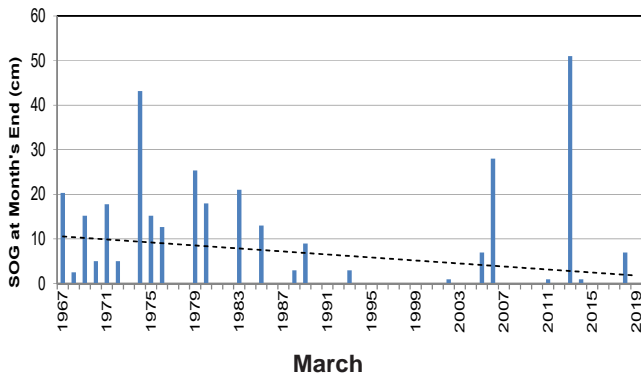
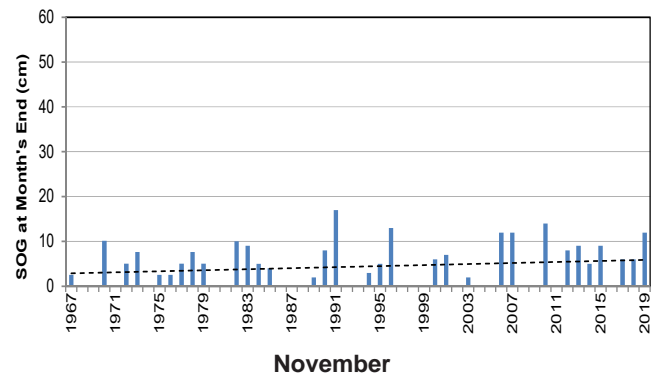
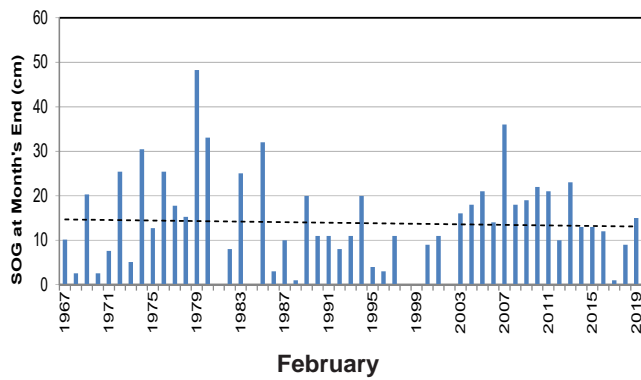
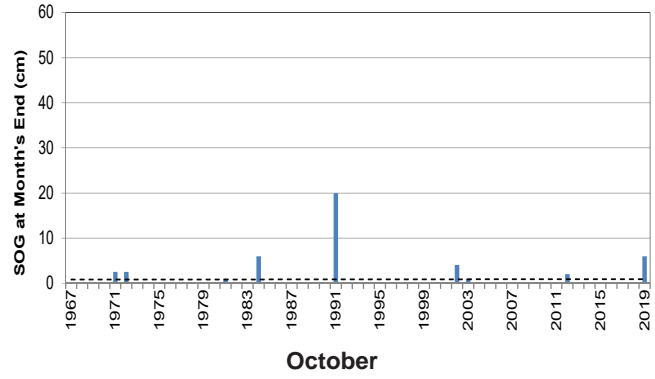
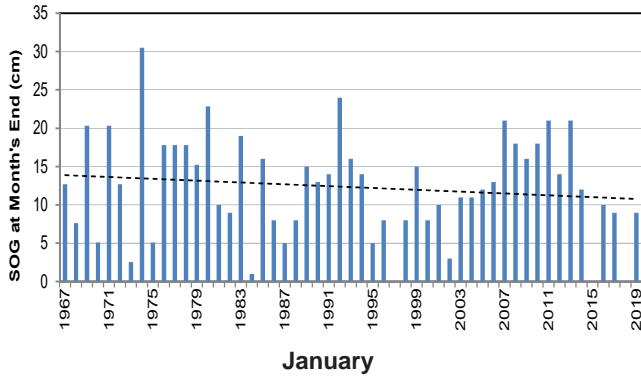
*Snow-on-the-Ground (cm)
October 2018 to April 2019
Daily, 9am*



*Snow-on-the-Ground (cm)
October 2019 to December 2019
Daily, 9am*



SNOW-ON-THE-GROUND (SOG) ON LAST DAY OF MONTH



Automated Snow Depth Sensor 19 February 2019
Photo: V. Wittrock

RADIATION

Sunrise/Sunset Tables for Saskatoon, 2019 & 2020¹

| 2019 DATE | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
|--------------|---------|-------|----------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|--------|-------|-----------|-------|---------|-------|----------|-------|----------|-------|
| | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET |
| 1 | 9:15 | 17:05 | 8:47 | 17:54 | 7:53 | 18:46 | 6:41 | 19:40 | 5:37 | 20:32 | 4:52 | 21:18 | 4:50 | 21:30 | 5:28 | 20:57 | 6:18 | 19:54 | 7:07 | 18:44 | 8:02 | 17:38 | 8:53 | 16:58 |
| 2 | 9:15 | 17:06 | 8:45 | 17:56 | 7:50 | 18:48 | 6:39 | 19:42 | 5:35 | 20:34 | 4:51 | 21:19 | 4:51 | 21:30 | 5:29 | 20:55 | 6:19 | 19:52 | 7:09 | 18:42 | 8:03 | 17:36 | 8:54 | 16:58 |
| 3 | 9:15 | 17:07 | 8:44 | 17:57 | 7:48 | 18:50 | 6:37 | 19:44 | 5:33 | 20:35 | 4:50 | 21:20 | 4:52 | 21:30 | 5:31 | 20:54 | 6:21 | 19:50 | 7:11 | 18:40 | 8:05 | 17:34 | 8:55 | 16:57 |
| 4 | 9:15 | 17:09 | 8:42 | 18:00 | 7:46 | 18:51 | 6:34 | 19:46 | 5:31 | 20:37 | 4:50 | 21:21 | 4:52 | 21:29 | 5:32 | 20:52 | 6:23 | 19:47 | 7:12 | 18:37 | 8:07 | 17:33 | 8:57 | 16:56 |
| 5 | 9:14 | 17:10 | 8:40 | 18:01 | 7:44 | 18:53 | 6:32 | 19:47 | 5:29 | 20:39 | 4:49 | 21:22 | 4:53 | 21:29 | 5:34 | 20:50 | 6:24 | 19:45 | 7:14 | 18:35 | 8:09 | 17:31 | 8:58 | 16:56 |
| 6 | 9:14 | 17:11 | 8:39 | 18:03 | 7:41 | 18:55 | 6:30 | 19:49 | 5:27 | 20:40 | 4:48 | 21:23 | 4:54 | 21:28 | 5:35 | 20:48 | 6:26 | 19:43 | 7:16 | 18:33 | 8:11 | 17:29 | 8:59 | 16:56 |
| 7 | 9:14 | 17:12 | 8:37 | 18:05 | 7:39 | 18:57 | 6:28 | 19:51 | 5:25 | 20:42 | 4:48 | 21:23 | 4:55 | 21:27 | 5:37 | 20:46 | 6:28 | 19:40 | 7:17 | 18:30 | 8:12 | 17:27 | 9:01 | 16:55 |
| 8 | 9:13 | 17:14 | 8:35 | 18:07 | 7:37 | 18:59 | 6:25 | 19:53 | 5:24 | 20:43 | 4:47 | 21:24 | 4:56 | 21:27 | 5:39 | 20:45 | 6:29 | 19:38 | 7:19 | 18:28 | 8:14 | 17:26 | 9:02 | 16:55 |
| 9 | 9:13 | 17:15 | 8:33 | 18:09 | 7:35 | 19:00 | 6:23 | 19:54 | 5:22 | 20:45 | 4:47 | 21:25 | 4:57 | 21:26 | 5:40 | 20:43 | 6:31 | 19:36 | 7:21 | 18:26 | 8:16 | 17:24 | 9:03 | 16:55 |
| 10 | 9:12 | 17:17 | 8:31 | 18:11 | 7:32 | 19:02 | 6:21 | 19:56 | 5:20 | 20:47 | 4:47 | 21:26 | 4:58 | 21:25 | 5:42 | 20:41 | 6:33 | 19:33 | 7:23 | 18:24 | 8:18 | 17:22 | 9:04 | 16:54 |
| 11 | 9:11 | 17:18 | 8:29 | 18:13 | 7:30 | 19:04 | 6:19 | 19:58 | 5:19 | 20:48 | 4:46 | 21:27 | 4:59 | 21:24 | 5:44 | 20:39 | 6:34 | 19:31 | 7:24 | 18:21 | 8:20 | 17:21 | 9:05 | 16:54 |
| 12 | 9:11 | 17:19 | 8:28 | 18:15 | 7:28 | 19:06 | 6:16 | 19:59 | 5:17 | 20:50 | 4:46 | 21:27 | 5:00 | 21:23 | 5:45 | 20:37 | 6:36 | 19:29 | 7:26 | 18:19 | 8:21 | 17:19 | 9:06 | 16:54 |
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| 14 | 9:09 | 17:23 | 8:24 | 18:18 | 7:23 | 19:09 | 6:12 | 20:03 | 5:14 | 20:53 | 4:45 | 21:28 | 5:03 | 21:22 | 5:48 | 20:33 | 6:39 | 19:24 | 7:29 | 18:15 | 8:25 | 17:16 | 9:08 | 16:54 |
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| 16 | 9:07 | 17:26 | 8:20 | 18:22 | 7:19 | 19:13 | 6:08 | 20:06 | 5:11 | 20:56 | 4:45 | 21:29 | 5:05 | 21:19 | 5:52 | 20:29 | 6:42 | 19:19 | 7:33 | 18:10 | 8:29 | 17:14 | 9:10 | 16:55 |
| 17 | 9:06 | 17:27 | 8:18 | 18:24 | 7:16 | 19:15 | 6:05 | 20:08 | 5:09 | 20:58 | 4:45 | 21:30 | 5:06 | 21:18 | 5:53 | 20:27 | 6:44 | 19:17 | 7:35 | 18:08 | 8:30 | 17:12 | 9:10 | 16:55 |
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| 26 | 8:56 | 17:43 | 7:59 | 18:41 | 6:55 | 19:30 | 5:46 | 20:23 | 4:58 | 21:10 | 4:47 | 21:31 | 5:19 | 21:07 | 6:08 | 20:08 | 6:59 | 18:56 | 7:51 | 17:50 | 8:45 | 17:02 | 9:15 | 16:59 |
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| 28 | 8:53 | 17:47 | 7:55 | 18:44 | 6:51 | 19:34 | 5:42 | 20:27 | 4:56 | 21:13 | 4:48 | 21:31 | 5:22 | 21:04 | 6:11 | 20:03 | 7:02 | 18:51 | 7:54 | 17:46 | 8:48 | 17:00 | 9:15 | 17:01 |
| 29 | 8:51 | 17:48 | 7:53 | 18:46 | 6:48 | 19:35 | 5:40 | 20:28 | 4:55 | 21:14 | 4:49 | 21:31 | 5:23 | 21:02 | 6:13 | 20:01 | 7:04 | 18:49 | 7:56 | 17:44 | 8:50 | 17:00 | 9:15 | 17:02 |
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| 31 | 8:48 | 17:52 | 7:49 | 18:50 | 6:44 | 19:39 | 5:37 | 20:30 | 4:53 | 21:16 | 4:52 | 21:31 | 5:26 | 20:59 | 6:16 | 19:56 | 7:08 | 18:45 | 7:59 | 17:40 | 8:52 | 16:58 | 9:15 | 17:04 |

| 2020 DATE | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
|--------------|---------|-------|----------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|--------|-------|-----------|-------|---------|-------|----------|-------|----------|-------|
| | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET | RISE | SET |
| 1 | 9:15 | 17:05 | 8:47 | 17:53 | 7:51 | 18:47 | 6:40 | 19:42 | 5:35 | 20:33 | 4:51 | 21:18 | 4:51 | 21:30 | 5:29 | 20:56 | 6:19 | 19:52 | 7:09 | 18:42 | 8:03 | 17:37 | 8:54 | 16:58 |
| 2 | 9:15 | 17:06 | 8:46 | 17:55 | 7:49 | 18:49 | 6:37 | 19:44 | 5:33 | 20:35 | 4:51 | 21:19 | 4:51 | 21:30 | 5:30 | 20:54 | 6:21 | 19:50 | 7:10 | 18:40 | 8:05 | 17:35 | 8:55 | 16:57 |
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| 12 | 9:11 | 17:19 | 8:28 | 18:14 | 7:26 | 19:07 | 6:15 | 20:01 | 5:16 | 20:51 | 4:46 | 21:28 | 5:01 | 21:23 | 5:46 | 20:35 | 6:37 | 19:27 | 7:27 | 18:18 | 8:23 | 17:18 | 9:07 | 16:54 |
| 13 | 9:10 | 17:21 | 8:26 | 18:16 | 7:24 | 19:09 | 6:12 | 20:02 | 5:14 | 20:53 | 4:46 | 21:28 | 5:02 | 21:22 | 5:48 | 20:33 | 6:39 | 19:25 | 7:29 | 18:15 | 8:25 | 17:17 | 9:08 | 16:54 |
| 14 | 9:09 | 17:22 | 8:24 | 18:18 | 7:21 | 19:11 | 6:10 | 20:04 | 5:13 | 20:54 | 4:45 | 21:29 | 5:03 | 21:21 | 5:50 | 20:31 | 6:40 | 19:22 | 7:31 | 18:13 | 8:26 | 17:15 | 9:09 | 16:54 |
| 15 | 9:08 | 17:24 | 8:22 | 18:20 | 7:19 | 19:12 | 6:08 | 20:06 | 5:11 | 20:56 | 4:45 | 21:29 | 5:05 | 21:20 | 5:51 | 20:29 | 6:42 | 19:20 | 7:33 | 18:11 | 8:28 | 17:14 | 9:10 | 16:55 |
| 16 | 9:07 | 17:25 | 8:20 | 18:22 | 7:17 | 19:14 | 6:06 | 20:08 | 5:10 | 20:57 | 4:45 | 21:30 | 5:06 | 21:19 | 5:53 | 20:27 | 6:44 | 19:18 | 7:34 | 18:09 | 8:30 | 17:13 | 9:10 | 16:55 |
| 17 | 9:07 | 17:27 | 8:18 | 18:23 | 7:14 | 19:16 | 6:04 | 20:09 | 5:08 | 20:59 | 4:45 | | | | | | | | | | | | | |

RADIATION

| MONTH | BRIGHT SUNSHINE (HOURS) | | | | | 2019 CUMULATIVE (HOURS) | NORMAL CUMULATIVE (HOURS) | BRIGHT SUNSHINE DAYS | | | | |
|-------|-------------------------|--------|-------------|--------------------|---------------|-------------------------|---------------------------|----------------------|-----------------------|------------------------|--------------------------|----------------------------|
| | 2019 | NORMAL | % OF NORMAL | POSSIBLE SUNSHINE* | % OF POSSIBLE | | | 2019 NUMBER OF DAYS | NORMAL NUMBER OF DAYS | 2019 CUMULATIVE (DAYS) | NORMAL CUMULATIVE (DAYS) | 2019 WITH MORE THAN 1 HOUR |
| JAN | 98.9 | 101.0 | 97.9 | 259.0 | 38.2 | 98.9 | 101.0 | 22 | 23.4 | 22 | 23.4 | 19 |
| FEB | 161.7 | 132.6 | 121.9 | 278.7 | 58.0 | 260.6 | 233.6 | 23 | 23.9 | 45 | 47.3 | 21 |
| MAR | 273.9 | 182.0 | 150.5 | 369.0 | 74.2 | 534.5 | 415.6 | 31 | 27.4 | 76 | 74.7 | 30 |
| APR | 286.7 | 227.2 | 126.2 | 418.2 | 68.6 | 821.2 | 642.8 | 29 | 27.6 | 105 | 102.3 | 29 |
| MAY | 329.8 | 256.9 | 128.4 | 487.4 | 67.7 | 1151.0 | 899.7 | 31 | 29.3 | 136 | 131.6 | 31 |
| JUNE | 250.1 | 258.2 | 96.9 | 500.1 | 50.0 | 1401.1 | 1157.9 | 29 | 28.0 | 165 | 159.6 | 28 |
| JULY | 304.6 | 298.8 | 101.9 | 502.0 | 60.7 | 1705.7 | 1456.7 | 30 | 30.3 | 195 | 189.9 | 29 |
| AUG | 271.7 | 271.3 | 100.1 | 452.8 | 60.0 | 1977.4 | 1728.0 | 31 | 29.9 | 226 | 219.8 | 31 |
| SEP | 173.1 | 197.4 | 87.7 | 379.4 | 45.6 | 2150.5 | 1925.4 | 24 | 27.3 | 250 | 247.1 | 24 |
| OCT | 156.6 | 156.1 | 100.3 | 329.5 | 47.5 | 2307.1 | 2081.5 | 25 | 26.7 | 275 | 273.8 | 24 |
| NOV | 70.9 | 97.0 | 73.1 | 264.3 | 26.8 | 2378.0 | 2178.5 | 22 | 22.5 | 297 | 296.3 | 15 |
| DEC | 103.1 | 85.7 | 120.3 | 242.4 | 42.5 | 2481.1 | 2264.2 | 25 | 22.6 | 322 | 318.9 | 21 |
| TOTAL | 2481.1 | 2264.2 | 109.6 | 4482.8 | 55.3 | | | 322 | 318.9 | | | 302 |

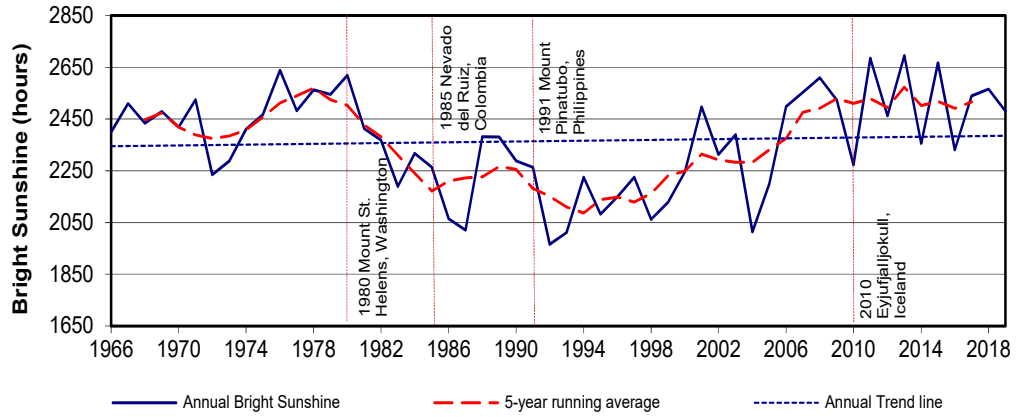
* National Research Council, Canada, Hertzberg Institute of Astrophysics

Global and Diffuse Radiation (MJ/m²)

| DATE | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
|------------------|---------|---------|----------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|-----------|---------|---------|---------|----------|---------|----------|---------|
| | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse | Global | Diffuse |
| 1 | 1.9 | 1.3 | 2.7 | 2.3 | 12.3 | 5.1 | 13.5 | 5.9 | 19.1 | 6.2 | 25.8 | 7.7 | 21.3 | 3.2 | 22.6 | 5.1 | 18.4 | 3.2 | 4.0 | 3.2 | 4.6 | 3.0 | 3.8 | 1.3 |
| 2 | 2.1 | 1.7 | 3.9 | 3.1 | 14.6 | 2.6 | 12.4 | 6.1 | 7.9 | 4.6 | 22.2 | 8.3 | 20.7 | 7.6 | 23.1 | 2.8 | 8.5 | 5.3 | 13.5 | 1.9 | 6.0 | 1.7 | 2.8 | 1.7 |
| 3 | 3.7 | 0.8 | 3.6 | 3.0 | 11.7 | 4.6 | 14.9 | 6.7 | 7.3 | 4.5 | 25.0 | 8.2 | 20.2 | 8.2 | 22.7 | 5.7 | 5.0 | 1.3 | 8.8 | 4.1 | 1.9 | 1.5 | 4.1 | 1.1 |
| 4 | 1.9 | 1.4 | 4.3 | 3.5 | 9.6 | 5.8 | 17.6 | 4.4 | 24.4 | 2.6 | 27.8 | 4.2 | 25.1 | 6.5 | 23.5 | 4.9 | 6.8 | 4.1 | 6.0 | 3.8 | 4.2 | 3.0 | 2.2 | 1.8 |
| 5 | 2.4 | 1.9 | 8.4 | 1.9 | 13.9 | 1.8 | 19.9 | 2.5 | 11.6 | 6.1 | 29.2 | 3.6 | 15.7 | 9.0 | 24.1 | 4.4 | 16.7 | 3.8 | 8.8 | 3.0 | 3.3 | 2.2 | 2.2 | 1.5 |
| 6 | 1.3 | 1.1 | 8.8 | 2.6 | 12.6 | 3.9 | 3.1 | 2.4 | 25.0 | 3.1 | 11.9 | 7.8 | 25.0 | 6.0 | 12.4 | 7.7 | 18.2 | 3.5 | 11.3 | 2.9 | 7.3 | 2.3 | 2.3 | 1.5 |
| 7 | 1.6 | 1.4 | 7.5 | 2.0 | 11.6 | 3.8 | 18.1 | 3.5 | 21.6 | 4.9 | 21.0 | 9.6 | 26.1 | 5.7 | 23.1 | 5.0 | 16.9 | 5.0 | 12.0 | 2.9 | 7.3 | 2.5 | 1.2 | 0.9 |
| 8 | 4.0 | 0.9 | 7.8 | 1.8 | 14.2 | 2.6 | 20.1 | 2.2 | 27.2 | 3.2 | 24.6 | 8.2 | 22.7 | 7.4 | 16.3 | 7.6 | 15.0 | 5.7 | 3.0 | 2.4 | 2.3 | 1.9 | 4.8 | 1.0 |
| 9 | 1.7 | 1.4 | 9.8 | 1.8 | 13.3 | 2.1 | 11.2 | 4.6 | 26.4 | 4.0 | 23.7 | 7.2 | 23.8 | 6.7 | 13.7 | 6.7 | 5.6 | 4.3 | 9.4 | 3.6 | 4.0 | 2.9 | 3.8 | 1.0 |
| 10 | 4.1 | 0.9 | 7.5 | 2.5 | 14.7 | 2.2 | 19.4 | 4.5 | 16.6 | 8.2 | 25.6 | 4.9 | 23.0 | 7.5 | 21.7 | 6.0 | 4.7 | 3.7 | 9.6 | 2.7 | 4.7 | 3.1 | 4.9 | 1.0 |
| 11 | 2.8 | 2.1 | 4.2 | 3.4 | 12.3 | 5.6 | 20.8 | 3.3 | 19.0 | 15.6 | 20.9 | 8.2 | 23.7 | 7.1 | 19.2 | 7.4 | 3.1 | 2.4 | 11.7 | 1.7 | 7.5 | 1.3 | 3.4 | 2.1 |
| 12 | 4.6 | 1.4 | 7.3 | 3.1 | 10.1 | 7.2 | 20.7 | 4.4 | 17.2 | 13.8 | 17.2 | 5.2 | 23.4 | 6.1 | 13.9 | 7.5 | 8.2 | 5.5 | 12.7 | 1.4 | 2.6 | 2.1 | 1.5 | 1.3 |
| 13 | 4.2 | 1.0 | 8.7 | 2.1 | 14.1 | 3.2 | 21.3 | 2.4 | 18.6 | 7.4 | 15.1 | 8.1 | 21.3 | 6.9 | 20.8 | 5.8 | 17.0 | 2.6 | 9.9 | 3.1 | 3.3 | 2.3 | 3.8 | 1.5 |
| 14 | 3.8 | 1.9 | 9.2 | 2.7 | 14.4 | 2.5 | 13.9 | 6.3 | 21.0 | 6.2 | 11.3 | 7.1 | 24.8 | 5.6 | 20.4 | 6.7 | 14.4 | 4.2 | 1.5 | 1.2 | 4.1 | 1.4 | 4.6 | 1.1 |
| 15 | 4.8 | 0.9 | 9.3 | 3.3 | 12.1 | 5.5 | 14.4 | 5.8 | 9.0 | 6.0 | 6.6 | 5.1 | 25.8 | 4.9 | 19.4 | 6.8 | 14.3 | 3.4 | 8.1 | 3.7 | 2.2 | 1.8 | 3.3 | 1.1 |
| 16 | 2.3 | 1.9 | 5.6 | 4.5 | 15.3 | 1.7 | 21.1 | 3.4 | 27.6 | 3.2 | 14.5 | 10.0 | 9.9 | 5.6 | 9.9 | 6.5 | 15.3 | 4.2 | 10.3 | 1.1 | 1.4 | 1.2 | 2.5 | 1.6 |
| 17 | 6.0 | 0.9 | 6.9 | 5.3 | 15.8 | 2.1 | 18.5 | 4.5 | 24.0 | 3.4 | 26.8 | 6.5 | 16.5 | 7.0 | 22.3 | 5.7 | 14.0 | 3.5 | 7.5 | 3.7 | 3.1 | 2.4 | 2.3 | 1.8 |
| 18 | 5.0 | 1.9 | 11.0 | 1.8 | 15.2 | 1.8 | 22.1 | 2.7 | 27.6 | 3.4 | 26.7 | 5.2 | 21.9 | 5.1 | 16.0 | 6.0 | 16.0 | 2.3 | 9.8 | 1.9 | 2.2 | 1.7 | 2.9 | 0.8 |
| 19 | 2.7 | 2.2 | 10.4 | 2.3 | 15.2 | 2.2 | 21.7 | 4.2 | 28.6 | 3.0 | 21.5 | 6.8 | 7.9 | 5.1 | 20.6 | 4.8 | 9.8 | 5.3 | 9.3 | 1.5 | 1.7 | 1.4 | 2.1 | 1.7 |
| 20 | 3.2 | 2.6 | 7.8 | 4.8 | 15.6 | 1.8 | 19.3 | 4.6 | 28.2 | 4.0 | 6.3 | 4.7 | 20.2 | 7.7 | 22.7 | 2.8 | 10.4 | 3.2 | 4.5 | 2.7 | 4.4 | 1.2 | 3.2 | 1.2 |
| 21 | 2.3 | 1.7 | 9.9 | 3.0 | 16.4 | 1.5 | 18.7 | 4.8 | 26.8 | 4.3 | 18.2 | 9.7 | 25.3 | 6.2 | 21.5 | 3.9 | 15.1 | 3.5 | 9.8 | 1.5 | 5.0 | 1.0 | 1.2 | 1.0 |
| 22 | 5.3 | 2.2 | 10.9 | 2.2 | 16.1 | 1.6 | 21.1 | 5.6 | 23.2 | 5.8 | 7.2 | 5.0 | 26.4 | 3.5 | 13.1 | 3.8 | 15.4 | 1.5 | 7.8 | 2.7 | 3.9 | 1.4 | 3.9 | 1.2 |
| 23 | 4.9 | 1.3 | 8.4 | 5.6 | 16.1 | 1.9 | 19.8 | 6.5 | 22.6 | 7.6 | 19.8 | 7.5 | 24.0 | 5.3 | 19.7 | 3.6 | 12.2 | 4.0 | 2.8 | 2.2 | 3.9 | 1.0 | 1.3 | 1.0 |
| 24 | 5.4 | 1.7 | 13.0 | 2.0 | 15.0 | 3.0 | 23.6 | 3.5 | 17.6 | 8.8 | 17.7 | 7.6 | 14.0 | 5.1 | 16.6 | 5.3 | 9.8 | 4.4 | 5.6 | 3.4 | 1.5 | 1.0 | 1.0 | 0.8 |
| 25 | 3.0 | 2.0 | 11.2 | 2.1 | 14.2 | 4.9 | 19.1 | 5.7 | 6.9 | 4.7 | 19.0 | 8.9 | 4.7 | 3.6 | 13.8 | 5.5 | 11.1 | 4.1 | 5.6 | 2.9 | 2.2 | 1.2 | 1.3 | 1.1 |
| 26 | 2.3 | 2.0 | 10.6 | 2.3 | 12.1 | 5.6 | 17.7 | 8.9 | 25.1 | 7.4 | 28.4 | 4.3 | 25.4 | 2.9 | 14.7 | 6.8 | 4.9 | 3.8 | 3.4 | 2.6 | 1.6 | 1.2 | 4.2 | 1.0 |
| 27 | 2.4 | 2.0 | 9.6 | 5.5 | 6.0 | 4.7 | 20.8 | 6.5 | 28.8 | 3.3 | 18.3 | 8.3 | 25.9 | 3.0 | 14.3 | 5.8 | 7.6 | 5.0 | 4.1 | 3.2 | 2.3 | 1.7 | 5.6 | 1.0 |
| 28 | 6.8 | 1.0 | 8.9 | 6.6 | 17.1 | 2.8 | 16.9 | 8.4 | 24.6 | 8.1 | 15.6 | 7.0 | 16.0 | 7.2 | 14.9 | 4.9 | 6.5 | 4.4 | 4.9 | 3.9 | 2.0 | 1.6 | 5.0 | 1.1 |
| 29 | 6.4 | 1.8 | | | 13.4 | 5.6 | 21.1 | 5.2 | 28.2 | 4.0 | 21.3 | 4.6 | 25.6 | 4.2 | 18.0 | 4.3 | 4.2 | 3.3 | 5.2 | 4.0 | 2.3 | 1.9 | 4.7 | 1.2 |
| 30 | 4.2 | 2.9 | | | 13.5 | 4.8 | 20.7 | 4.6 | 24.6 | 5.1 | 23.5 | 7.0 | 22.0 | 5.5 | 7.5 | 5.3 | 4.3 | 3.4 | 7.1 | 3.7 | 1.9 | 1.6 | 3.3 | 1.9 |
| 31 | 2.9 | 2.4 | | | 16.5 | 4.5 | | | 23.2 | 7.6 | | | 25.5 | 4.1 | 14.8 | 6.3 | | | 2.9 | 2.4 | | | 4.3 | 1.3 |
| TOTAL | 110.0 | 50.6 | 227.2 | 87.1 | 425.0 | 109.0 | 543.5 | 144.1 | 659.5 | 180.1 | 592.7 | 206.5 | 653.8 | 179.5 | 557.3 | 171.4 | 329.4 | 113.9 | 230.9 | 85.0 | 104.7 | 54.5 | 97.5 | 39.6 |
| 1971-2000 NORMAL | 129.9 | 71.4 | 210.1 | 105.3 | 362.4 | 173.9 | 492.2 | 178.5 | 586.3 | 222.2 | 638.7 | 228.1 | 633.5 | 216.5 | 529.0 | 185.6 | 351.8 | 127.6 | 239.1 | 92.6 | 123.7 | 73.6 | 95.2 | 54.3 |
| 1981-2010 NORMAL | 126.9 | 68.7 | 213.0 | 104.0 | 371.9 | 162.9 | 486.9 | 186.2 | 603.5 | 218.5 | 625.7 | 224.4 | 650.6 | 209.9 | 542.1 | 179.0 | 374.1 | 123.2 | 239.0 | 96.7 | 127.2 | 63.4 | 100.0 | 50.0 |

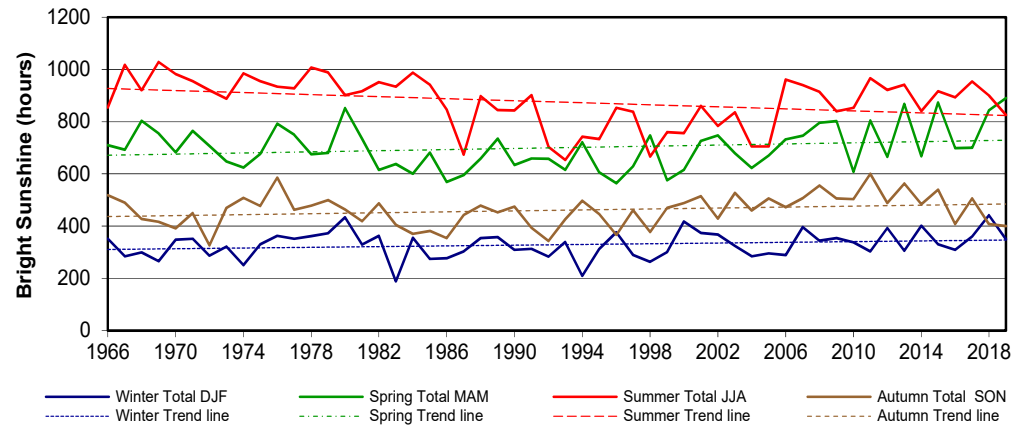
RADIATION

Annual Bright Sunshine Hours

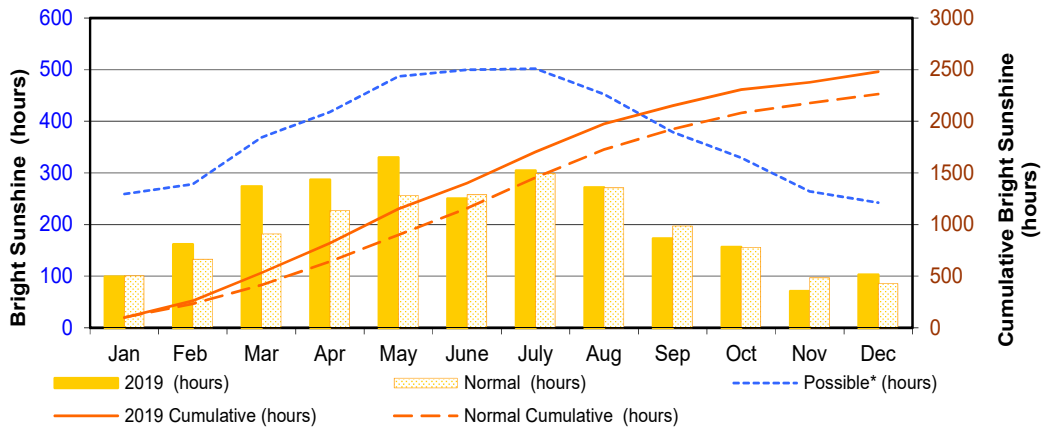


Goble, 2002; U.S. Geological Survey, n.d.

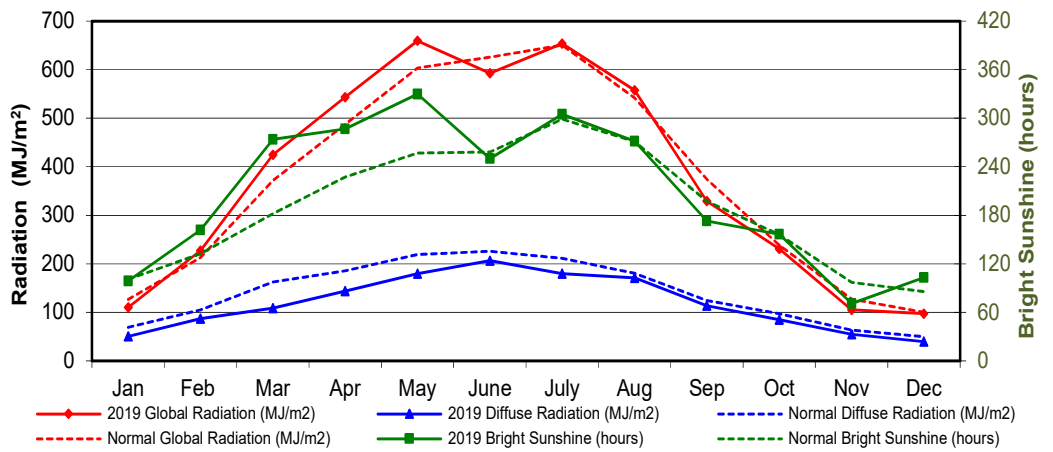
Seasonal Bright Sunshine Hours



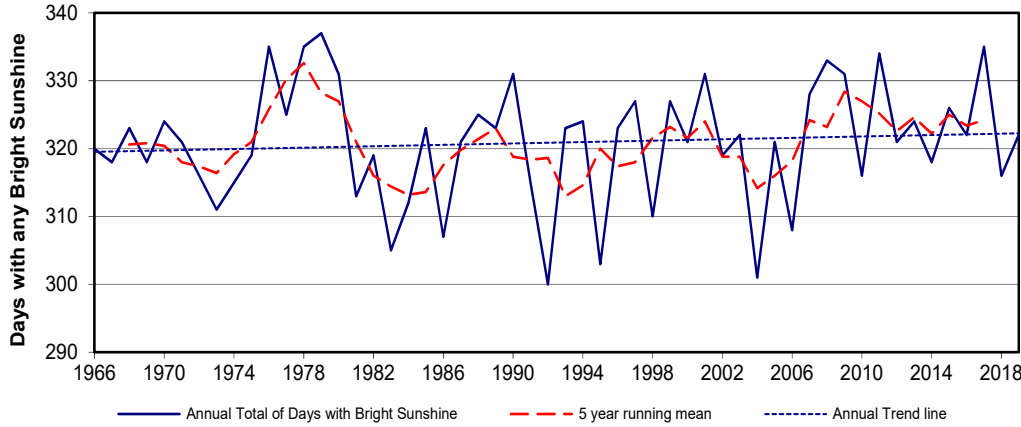
Monthly Bright Sunshine Hours



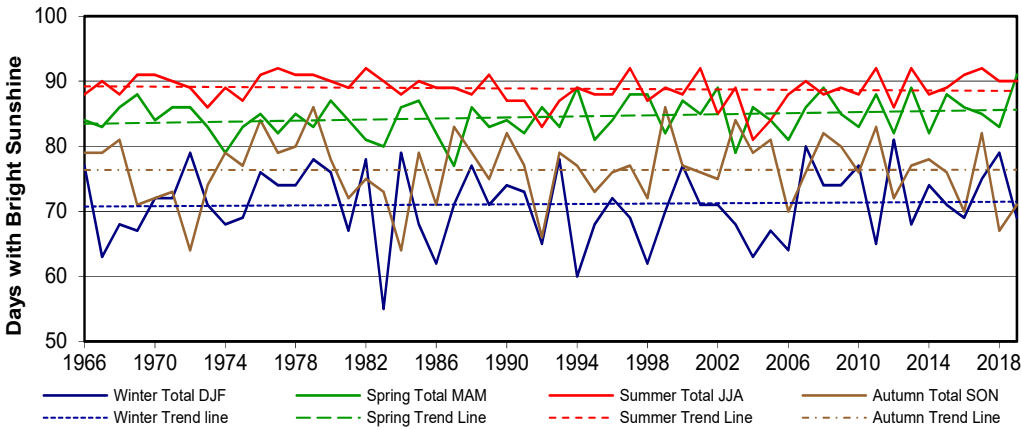
Monthly Comparison Bright Sunshine Hours, Global & Diffuse Radiation



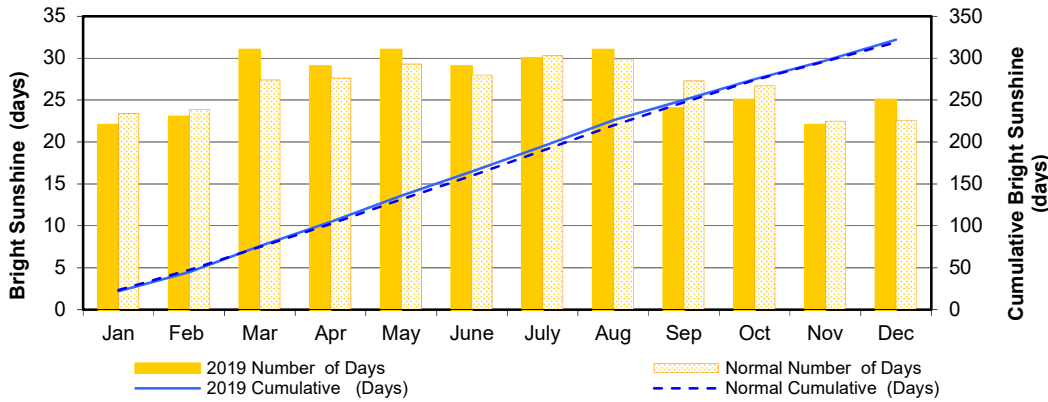
RADIATION



Annual Bright Sunshine Days



Seasonal Bright Sunshine Days



Monthly Bright Sunshine Days

| 2019 BRIGHT SUNSHINE RECORDS | | | | |
|---|--------------|------------|------------|------------|
| TYPE | DATE | NEW RECORD | OLD Record | YEAR |
| Greatest Monthly Hours | March | 273.9 | 253.5 | 2014 |
| Number of days >= 5 hours | April | 29 | 28 | 2011 |
| number of hours | Spring (MAM) | 890.4 | 872.8 | 2015 |
| number of days | Spring (MAM) | 91 | 89 | 1994, 2002 |
| # of days greater or equal to 1 hour | Spring (MAM) | 90 | 88 | 1994 |
| % of Bright Sunshine hours vs Possible Daylight Hours | Spring (MAM) | 69.9 | 68.5 | 2015 |

RADIATION Bright Sunshine Ranking

| % OF ACTUAL TO POSSIBLE HOURS BRIGHT SUNSHINE | | | | | |
|---|--------------|--------------|--------------|--------------|-----------|
| % ANNUAL | WINTER % DJF | SPRING % MAM | SUMMER % JJA | AUTUMN % SON | |
| 2011 | 59.9 | 2018 56.6 | 2019 69.9 | 1969 70.7 | 2011 61.7 |
| 2013 | 59.9 | 1980 55.0 | 2015 68.5 | 1967 69.8 | 1976 60.3 |
| 2015 | 59.5 | 2000 52.8 | 1980 66.7 | 1978 69.2 | 2013 58 |
| 1976 | 58.8 | 2014 51.4 | 2018 66.1 | 1979 67.9 | 2008 57.3 |
| 1980 | 58.3 | 2007 50.9 | 2013 64 | 1984 67.9 | 2015 55.5 |
| 2008 | 58.1 | 2012 49.7 | 2011 63.1 | 1974 67.7 | 1966 53.3 |
| 2018 | 57.2 | 1979 47.9 | 1968 63.0 | 1970 67.5 | 2001 52.9 |
| 1978 | 57.2 | 2001 47.8 | 2009 62.8 | 2011 66.4 | 1974 52.2 |
| 2007 | 57.0 | 1996 47.7 | 2008 62.2 | 2006 66.1 | 2017 52.1 |
| 1979 | 56.8 | 2002 47.1 | 1976 62.1 | 2017 65.6 | 2007 52.1 |
| 2017 | 56.7 | 1982 46.6 | 1971 60.1 | 1975 65.6 | 2009 52.1 |
| 1971 | 56.3 | 1978 46.4 | 1969 59.2 | 1971 65.6 | 2005 52.1 |
| 2009 | 56.3 | 2017 46.1 | 1977 58.8 | 1982 65.4 | 2010 51.8 |
| 1967 | 56.0 | 1976 46.0 | 2002 58.6 | 1985 64.8 | 1979 51.3 |
| 2006 | 55.7 | 1989 45.8 | 1998 58.6 | 2013 64.7 | 1994 51.1 |
| 2001 | 55.7 | 2009 45.3 | 2007 58.6 | 2007 64.7 | 2012 50.4 |
| 1977 | 55.4 | 1971 45.2 | 1989 57.6 | 1976 64.2 | 2000 50.3 |
| 2019 | 55.3 | 1966 45.1 | 1981 57.6 | 1983 64.2 | 1967 50.2 |
| 1969 | 55.3 | 1977 45.0 | 2006 57.4 | 1977 63.8 | 1982 50.0 |
| 1975 | 55.0 | 1984 44.9 | 2001 56.9 | 2012 63.5 | 2014 49.7 |
| 2012 | 54.8 | 1988 44.8 | 1994 56.6 | 1968 63.3 | 1988 49.3 |
| 1968 | 54.2 | 2019 44.8 | 1966 55.7 | 1972 63.3 | 1978 49.1 |
| 1970 | 53.9 | 1970 44.6 | 1972 55.4 | 1981 63.1 | 2003 49.1 |
| 1981 | 53.8 | 2008 43.5 | 2017 54.9 | 2015 63.0 | 1975 48.9 |
| 1974 | 53.8 | 1993 43.4 | 2016 54.6 | 2008 62.9 | 1990 48.7 |
| 1966 | 53.5 | 2010 43.3 | 1967 54.4 | 1980 62.0 | 2006 48.5 |
| 1989 | 53.1 | 1975 42.4 | 1970 53.6 | 2018 62.0 | 1973 48.3 |
| 1988 | 53.0 | 2015 42.3 | 1979 53.4 | 1991 61.9 | 1980 47.7 |
| 1982 | 52.8 | 1981 42.2 | 1985 53.4 | 1988 61.8 | 1977 47.6 |
| 2014 | 52.5 | 2003 41.6 | 2003 53.3 | 2016 61.4 | 1997 47.5 |
| 2003 | 52.1 | 1973 41.2 | 1975 53.1 | 1973 61.1 | 2004 47.4 |
| 2016 | 51.9 | 1991 40.2 | 1978 53.0 | 2001 59.2 | 1989 46.5 |
| 2002 | 51.6 | 1995 40.2 | 2005 52.4 | 2010 58.7 | 1971 46.2 |
| 1984 | 51.6 | 1990 39.7 | 2014 52.4 | 1996 58.7 | 1995 45.8 |
| 1990 | 51.0 | 2013 39.1 | 2012 52 | 1966 58.7 | 1987 45.5 |
| 1973 | 51.0 | 2016 39.1 | 1991 51.7 | 1986 58.2 | 1999 44.2 |
| 2010 | 50.7 | 1987 38.9 | 1988 51.6 | 1989 58.1 | 2002 44.1 |
| 1985 | 50.5 | 2011 38.8 | 1992 51.5 | 1990 58.0 | 1968 44.0 |
| 1991 | 50.5 | 1999 38.5 | 1973 50.8 | 2009 57.8 | 1993 43.8 |
| 2000 | 50.0 | 1968 38.0 | 1983 50.1 | 2014 57.8 | 1981 43.1 |
| 1972 | 49.8 | 2005 37.9 | 1990 49.8 | 1997 57.7 | 1969 42.9 |
| 1997 | 49.6 | 2006 37.1 | 1997 49.3 | 2003 57.4 | 2016 42.0 |
| 1994 | 49.6 | 1997 37.0 | 1974 49.0 | 2019 56.8 | 2018 42.0 |
| 2005 | 49.1 | 1967 36.5 | 2004 48.7 | 2002 53.8 | 1983 41.5 |
| 1983 | 48.9 | 1972 36.3 | 1982 48.3 | 1999 52.2 | 2019 41.2 |
| 1996 | 47.9 | 2004 35.9 | 1993 48.2 | 2000 52.1 | 1991 40.4 |
| 1999 | 46.5 | 1992 35.9 | 2000 48.1 | 1994 51.0 | 1970 40.2 |
| 1995 | 46.5 | 1986 35.6 | 2010 47.6 | 1995 50.5 | 1985 39.3 |
| 1986 | 46.0 | 1985 35.1 | 1995 47.6 | 2004 48.5 | 1998 38.9 |
| 1998 | 46.0 | 1969 34.0 | 1984 47.0 | 2005 48.5 | 1984 38.1 |
| 1987 | 45.1 | 1998 33.7 | 1987 46.8 | 1992 48.4 | 1996 37.7 |
| 1993 | 44.9 | 1974 32.2 | 1999 45.2 | 1987 46.3 | 1986 36.4 |
| 2004 | 44.8 | 1994 26.9 | 1986 44.7 | 1998 45.8 | 1992 35.3 |
| 1992 | 43.8 | 1983 24.2 | 1996 44.1 | 1993 44.9 | 1972 33.6 |

| DAYS WITH BRIGHT SUNSHINE | | | | | |
|---------------------------|------------|------------|------------|------------|---------|
| ANNUAL | WINTER DJF | SPRING MAM | SUMMER JJA | AUTUMN SON | |
| 1979 | 337 | 2012 81 | 2019 91 | 1977 92 | 1979 86 |
| 1976 | 335 | 2007 80 | 1994 89 | 1982 92 | 1999 86 |
| 1978 | 335 | 1972 79 | 2002 89 | 1997 92 | 2014 81 |
| 2017 | 335 | 1984 79 | 2008 89 | 2001 92 | 1976 84 |
| 2011 | 334 | 2018 79 | 2014 84 | 2011 92 | 2003 84 |
| 2014 | 321 | 1979 78 | 1969 88 | 2013 92 | 1987 83 |
| 2008 | 333 | 1982 78 | 1997 88 | 2017 92 | 2011 83 |
| 1980 | 331 | 1993 78 | 1998 88 | 2014 86 | 1990 82 |
| 1990 | 331 | 1966 77 | 2011 88 | 1969 91 | 2008 82 |
| 2001 | 331 | 1988 77 | 2013 88 | 1970 91 | 2017 82 |
| 2009 | 331 | 2000 77 | 2015 88 | 1976 91 | 1968 81 |
| 2007 | 328 | 1976 76 | 1980 87 | 1978 91 | 2005 81 |
| 1997 | 327 | 1980 76 | 1985 87 | 1979 91 | 1978 80 |
| 1999 | 327 | 2017 75 | 2000 87 | 1989 91 | 2009 80 |
| 2015 | 326 | 1977 74 | 1968 86 | 2016 91 | 1966 79 |
| 1977 | 325 | 1978 74 | 1971 86 | 1967 90 | 1967 79 |
| 1988 | 325 | 1990 74 | 1972 86 | 1971 90 | 1974 79 |
| 1970 | 324 | 2008 74 | 1984 86 | 1980 90 | 1977 79 |
| 1994 | 324 | 2009 74 | 1988 86 | 1983 90 | 1985 79 |
| 1968 | 323 | 1991 73 | 1992 86 | 1985 90 | 1988 79 |
| 1985 | 323 | 2014 62 | 2004 86 | 2007 90 | 1993 79 |
| 1989 | 323 | 1970 72 | 2007 86 | 2018 90 | 2004 79 |
| 1993 | 323 | 1971 72 | 2016 86 | 2019 90 | 1980 78 |
| 1996 | 323 | 1996 72 | 1976 85 | 1972 89 | 1975 77 |
| 2013 | 323 | 1973 71 | 1978 85 | 1974 89 | 1991 77 |
| 2003 | 322 | 1987 71 | 2001 85 | 1981 89 | 1994 77 |
| 2016 | 322 | 1989 71 | 2009 85 | 1986 89 | 1997 77 |
| 2019 | 322 | 2001 71 | 2017 85 | 1987 89 | 2000 77 |
| 1971 | 321 | 2002 71 | 1966 84 | 1994 89 | 2013 77 |
| 1987 | 321 | 2015 71 | 1970 84 | 1999 89 | 1996 76 |
| 2000 | 321 | 1999 70 | 1981 84 | 2003 89 | 2001 76 |
| 2005 | 321 | 1975 69 | 1990 84 | 2009 89 | 2007 76 |
| 2012 | 321 | 1997 69 | 1996 84 | 2015 89 | 2010 76 |
| 1966 | 320 | 2016 69 | 2005 84 | 1966 88 | 2015 76 |
| 1975 | 319 | 2019 69 | 1967 83 | 1968 88 | 1982 75 |
| 1982 | 319 | 1968 68 | 1973 83 | 1984 88 | 1989 75 |
| 2002 | 319 | 1974 68 | 1975 83 | 1988 88 | 2002 75 |
| 1967 | 318 | 1985 68 | 1979 83 | 1995 88 | 1973 74 |
| 1969 | 318 | 1995 68 | 1989 83 | 1996 88 | 1971 73 |
| 1972 | 316 | 2003 68 | 1993 83 | 2000 88 | 1983 73 |
| 2010 | 316 | 2013 68 | 2010 83 | 2006 88 | 1995 73 |
| 2018 | 316 | 1969 67 | 2018 83 | 2008 88 | 1970 72 |
| 1974 | 315 | 1981 67 | 1977 82 | 2010 88 | 1981 72 |
| 1991 | 315 | 2005 67 | 1986 82 | 1975 87 | 1998 72 |
| 1981 | 313 | 1992 65 | 1991 82 | 1990 87 | 2012 72 |
| 1984 | 312 | 2011 65 | 1999 82 | 1991 87 | 1969 71 |
| 1973 | 311 | 2006 64 | 2012 82 | 1993 87 | 1986 71 |
| 1998 | 310 | 1967 63 | 1982 81 | 1998 87 | 2019 71 |
| 2006 | 308 | 2004 63 | 1995 81 | 1973 86 | 2006 70 |
| 1986 | 307 | 1986 62 | 2006 81 | 2012 86 | 2016 70 |
| 1983 | 305 | 1998 62 | 1983 80 | 2002 85 | 2018 67 |
| 1995 | 303 | 1994 60 | 1974 79 | 2005 84 | 1992 66 |
| 2004 | 301 | 1983 55 | 2003 79 | 1992 83 | 1972 64 |
| 1992 | 300 | 2010 44 | 1987 77 | 2004 81 | 1984 64 |

WIND

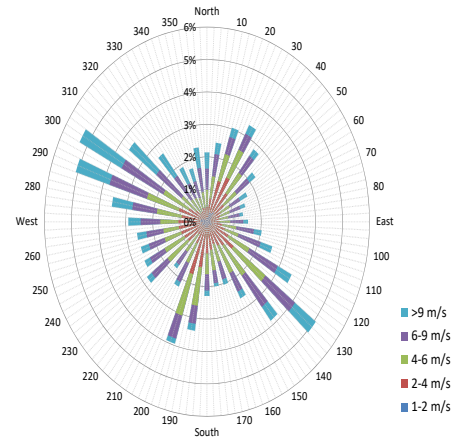
| MONTH | AVERAGE WIND SPEED (km/h) | | | HIGHEST INSTANTANEOUS WIND SPEED (km/h) | | | | | | |
|-----------|---------------------------|---------|--------------------------|--|-----|----|--|----|----|------|
| | 2019 Average | Normal* | 2019 1/2 Hr. Max Average | 2019 for CRS (Speed / direction / date) | | | Since 1953 (Saskatoon Diefenbaker Int'l. Airport) (Speed / direction / day / year) | | | |
| January | 15.1 | 16 | 22.2 | 78.0 | N | 27 | 111 | W | 11 | 1986 |
| February | 11.6 | 16 | 16.5 | 51.0 | N | 23 | 106 | N | 22 | 1988 |
| March | 14.4 | 17 | 21.1 | 59.1 | ENE | 23 | 93 | W | 18 | 1959 |
| April | 17.4 | 18 | 26.8 | 63.9 | WNW | 24 | 108 | W | 06 | 1959 |
| May | 14.6 | 18 | 22.5 | 62.5 | NW | 3 | 132 | SW | 17 | 1965 |
| June | 14.6 | 17 | 23.1 | 66.2 | NNE | 3 | 117 | SW | 01 | 1986 |
| July | 13.7 | 16 | 22.3 | 97.3 | WNW | 18 | 113 | E | 05 | 1955 |
| August | 13.9 | 16 | 22.0 | 67.8 | WNW | 28 | 151 | W | 14 | 1967 |
| September | 13.2 | 17 | 20.4 | 76.5 | WNW | 25 | 148 | W | 22 | 1967 |
| October | 13.8 | 17 | 21.2 | 61.0 | WNW | 25 | 138 | NW | 16 | 1967 |
| November | 12.8 | 16 | 19.1 | 54.0 | NW | 18 | 100 | W | 17 | 1967 |
| December | 11.7 | 16 | 17.3 | 53.4 | SE | 19 | 121 | W | 12 | 1955 |

*1961-90 Normals used are from the Environment Canada, Saskatoon Diefenbaker International Airport station, 1993

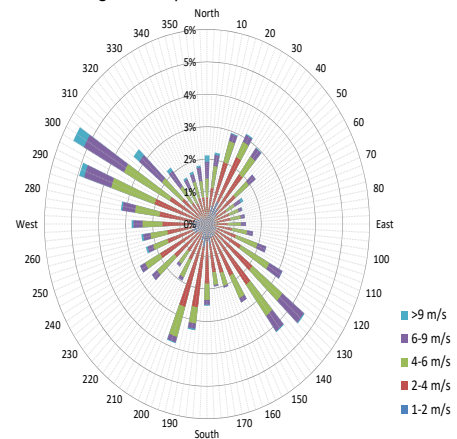


10 Metre Tower with Wind Speed and Direction
05 September 2019
photo: V. Wittrock

1/2 hr Maximum Wind Speed and Direction Saskatoon 2019

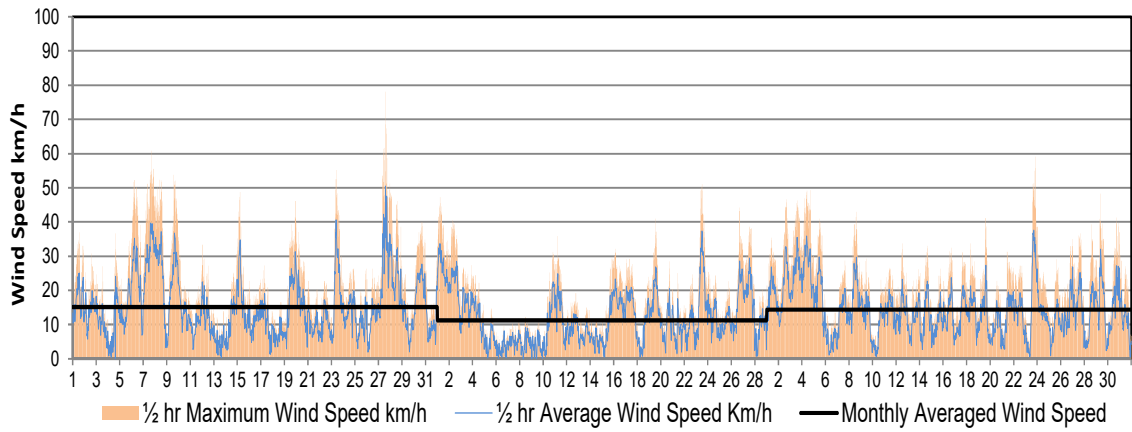


10 minute Average Wind Speed and Direction Saskatoon 2019

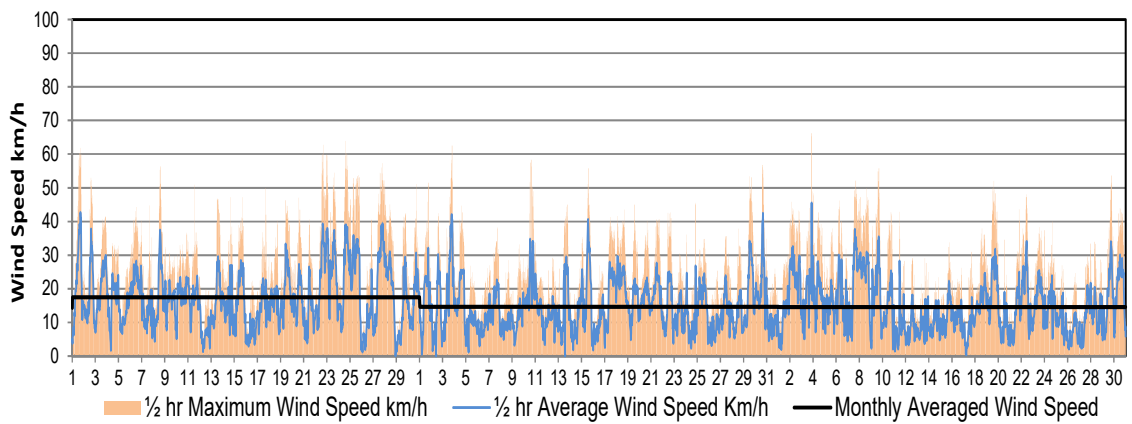


WIND Daily Wind Speed and Maximum Gust Wind Speed

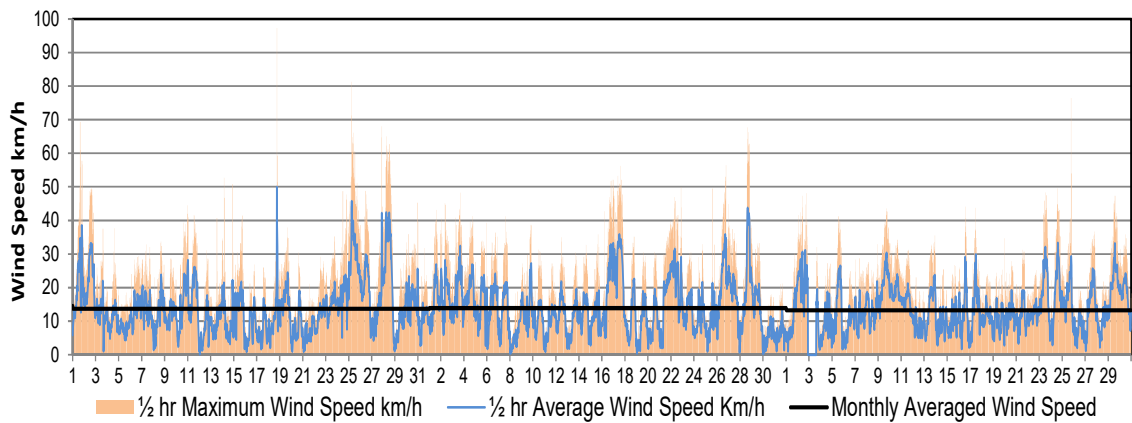
January
February
March



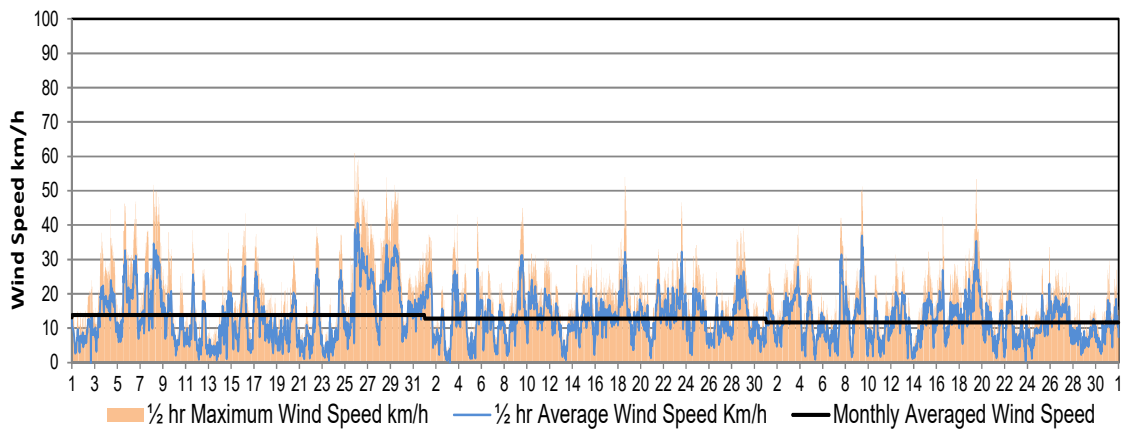
April
May
June



July
August
September



October
November
December



WIND

| EXTREME DAILY WINDS (km/h) | | | |
|----------------------------|-----|--------------------------|-------------------------------------|
| Month | Day | WIND SPEED/ DIRECTION | BEAUFORT WIND SCALE DESIGNATION* |
| January | 6 | 52.3 SE | Near Gale |
| | 7 | 60.8 WNW | Near Gale |
| | 8 | 52.3 WNW | Near Gale |
| | 9 | 53.8 ESE | Near Gale |
| | 23 | 55.2 N | Near Gale |
| | 27 | 78.0 N | Strong Gale |
| February | 23 | 51.0 N | Near Gale |
| March | 23 | 59.1 ENE | Near Gale |
| April | 1 | 61.9 WNW | Near Gale |
| | 2 | 52.9 NW | Near Gale |
| | 8 | 56.5 WNW | Near Gale |
| | 11 | 50.9 SSE | Near Gale |
| | 17 | 50.0 W | Near Gale |
| | 22 | 62.7 S | Gale |
| | 23 | 59.6 SSW | Near Gale |
| | 24 | 63.9 WNW | Gale |
| | 25 | 53.8 WNW | Near Gale |
| | 27 | 57.3 NE | Near Gale |
| | 30 | 51.1 WNW | Near Gale |
| May | 1 | 51.5 WSW | Near Gale |
| | 3 | 62.5 NW | Gale |
| | 10 | 58.4 N | Near Gale |
| | 15 | 55.8 NNE | Near Gale |
| | 29 | 53.4 W | Near Gale |
| | 30 | 56.8 N | Near Gale |
| June | 3 | 66.2 NNE | Gale |
| | 7 | 52.1 WSW | Near Gale |
| | 9 | 55.8 W | Near Gale |
| | 19 | 52.1 SE | Near Gale |
| | 29 | 53.6 WSW | Near Gale |
| July | 1 | 69.4 W | Gale |
| | 14 | 52.8 NW | Near Gale |
| | 18 | 97.3 WNW | Storm |
| | 25 | 81.3 W | Strong Gale |
| | 27 | 68.0 WNW | Gale |
| | 28 | 65.1 W | Gale |
| August | 16 | 52.1 WNW | Near Gale |
| | 17 | 56.2 WNW | Near Gale |
| | 26 | 56.4 NW | Near Gale |
| | 28 | 67.8 WNW | Gale |
| September | 25 | 76.5 WNW | Strong Gale |
| October | 8 | 51.7 N | Near Gale |
| | 25 | 61.0 WNW | Near Gale |
| | 26 | 59.1 NW | Near Gale |
| | 28 | 53.9 N | Near Gale |
| | 29 | 51.7 NW | Near Gale |
| November | 18 | 54.0 NW | Near Gale |
| December | 9 | 51.2 N | Near Gale |
| | 19 | 53.4 SE | Near Gale |

| WINDCHILL CALCULATION CHART ¹ | | | | | | | | | | | | | |
|--|-----|-----|-----|------|------|------|------|------|------|------|------|------|--|
| T°C km/h Speed | T°C | | | | | | | | | | | | |
| | 5° | 0° | -5° | -10° | -15° | -20° | -25° | -30° | -35° | -40° | -45° | -50° | |
| 5 | 4 | -2 | -7 | -13 | -19 | -24 | -30 | -36 | -41 | -47 | -53 | -58 | |
| 10 | 3 | -3 | -9 | -15 | -21 | -27 | -33 | -39 | -45 | -51 | -57 | -63 | |
| 15 | 2 | -4 | -11 | -17 | -23 | -29 | -35 | -41 | -48 | -54 | -60 | -66 | |
| 20 | 1 | -5 | -12 | -18 | -24 | -30 | -37 | -43 | -49 | -56 | -62 | -67 | |
| 25 | 1 | -6 | -12 | -19 | -25 | -32 | -38 | -44 | -51 | -57 | -64 | -70 | |
| 30 | 0 | -6 | -13 | -20 | -26 | -33 | -39 | -46 | -52 | -59 | -65 | -72 | |
| 35 | 0 | -7 | -14 | -20 | -27 | -33 | -40 | -47 | -53 | -60 | -66 | -73 | |
| 40 | -1 | -7 | -14 | -21 | -27 | -34 | -41 | -48 | -54 | -61 | -68 | -74 | |
| 45 | -1 | -8 | -15 | -21 | -28 | -35 | -42 | -48 | -55 | -62 | -69 | -75 | |
| 50 | -1 | -8 | -15 | -22 | -29 | -35 | -42 | -49 | -56 | -63 | -69 | -76 | |
| 55 | -2 | -8 | -15 | -22 | -29 | -36 | -43 | -50 | -57 | -63 | -70 | -77 | |
| 60 | -2 | -9 | -16 | -23 | -30 | -36 | -43 | -50 | -57 | -64 | -71 | -78 | |
| 65 | -2 | -9 | -16 | -23 | -30 | -37 | -44 | -51 | -58 | -65 | -72 | -79 | |
| 70 | -2 | -9 | -16 | -23 | -30 | -37 | -44 | -51 | -58 | -65 | -72 | -80 | |
| 75 | -3 | -10 | -17 | -24 | -31 | -38 | -45 | -52 | -59 | -66 | -73 | -80 | |
| 80 | -3 | -10 | -17 | -24 | -31 | -38 | -45 | -52 | -60 | -67 | -74 | -81 | |

| Approximate Thresholds | | |
|------------------------|----------------|--|
| -10 | Low | Risk of hypothermia if outside for long periods without adequate protection. |
| -28 | Risky | Risk of frostnip/frostbite on extremities. Exposed skin can freeze in 10 - 30 min. |
| -40 | High Risk | High risk of frostbite. Exposed skin can freeze in 5 - 10 minutes. |
| -48 | Very High Risk | Serious risk of frostbite. Exposed skin can freeze in 2 - 5 minutes. |
| -55 | Extreme Risk | Outdoor conditions are hazardous. Exposed skin can freeze in 2 minutes or less. |

1: Environment Canada, 2004b

| EXTREME DAILY WIND CHILL | | | | | | | | | | | | | |
|--------------------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| | JAN | FEB | MAR | APR | MAY | JUN | JULY | AUG | SEP | OCT | NOV | DEC | |
| 1 | -34 | -33 | -40 | -7 | -9 | | | | | | -6 | -20 | |
| 2 | -16 | -38 | -45 | -12 | -7 | | | | | | -8 | -20 | |
| 3 | -8 | -39 | -37 | -14 | -7 | | | | | -4 | -15 | -13 | |
| 4 | -11 | -38 | -30 | -9 | -10 | | | | | | -20 | -16 | |
| 5 | -19 | -39 | -25 | -12 | -9 | | | | | | -23 | -21 | |
| 6 | -16 | -45 | -32 | | -7 | | | | | | -25 | -17 | |
| 7 | -28 | -45 | -34 | | | | | | | | -22 | -25 | |
| 8 | -31 | -47 | -24 | -5 | -10 | | | | | | -7 | -12 | -33 |
| 9 | -31 | -41 | -21 | -10 | -2 | | | | | -12 | -20 | -32 | |
| 10 | -23 | -43 | -24 | -12 | | | | | | -11 | -29 | -36 | |
| 11 | -23 | -39 | -22 | -11 | | | | | | -10 | -31 | -35 | |
| 12 | -24 | -42 | -10 | -12 | | | | | | -11 | -22 | -29 | |
| 13 | -19 | -39 | -10 | -6 | | | | | | -10 | -19 | -34 | |
| 14 | -16 | -39 | -13 | | | | | | | | -13 | -36 | |
| 15 | -33 | -42 | -15 | | | | | | | | -5 | -15 | -25 |
| 16 | -34 | -31 | -12 | -5 | -4 | | | | | | -8 | -22 | |
| 17 | -36 | -31 | -16 | | -6 | | | | | | -8 | -27 | |
| 18 | -42 | -38 | -9 | | | | | | | | | -22 | |
| 19 | -38 | -39 | -8 | | | | | | | | -12 | -22 | |
| 20 | -33 | -29 | -7 | | | | | | | -7 | -13 | -17 | |
| 21 | -24 | -30 | -7 | | | | | | | -8 | -9 | -19 | |
| 22 | -22 | -34 | -7 | | | | | | | -10 | -11 | -18 | |
| 23 | -37 | -36 | -9 | | | | | | | -8 | | -13 | |
| 24 | -37 | -41 | -11 | | | | | | | -10 | -8 | -13 | |
| 25 | -30 | -43 | -13 | | | | | | | | -10 | -15 | |
| 26 | -23 | -40 | -4 | -6 | | | | | | -15 | -16 | -24 | |
| 27 | -22 | -27 | -6 | -9 | | | | | | -18 | -14 | -24 | |
| 28 | -37 | -24 | -8 | -9 | | | | | | -18 | -18 | -22 | |
| 29 | -42 | | -7 | -11 | | | | | | -21 | -19 | -25 | |
| 30 | -41 | | -8 | -9 | | | | | | -23 | -16 | -22 | |
| 31 | -28 | | -8 | | | | | | | -6 | | -22 | |

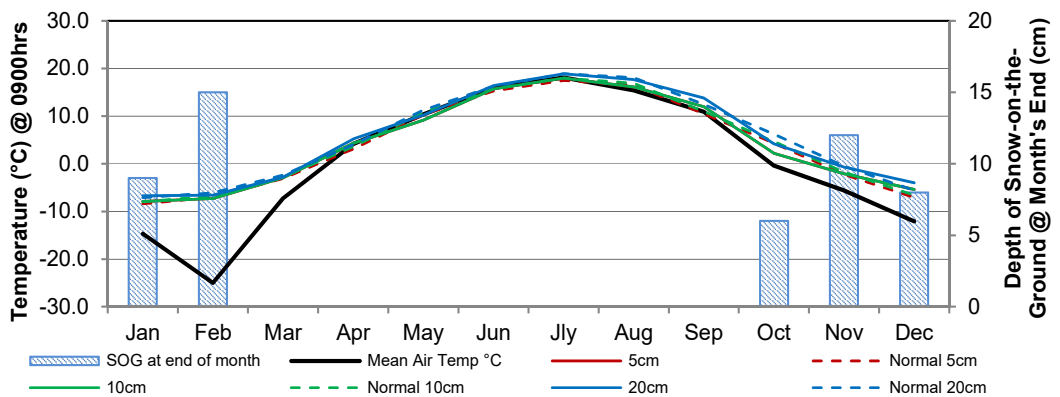
*Near Gale >=50 but < 62 *Gale >=62 but <75
 *Strong Gale >=75 but <89 *Storm >=89 but <103
 *Violent Storm >=103 but <117

SOIL TEMPERATURES AND DEPTH OF SNOW-ON-THE-GROUND @ MONTH END

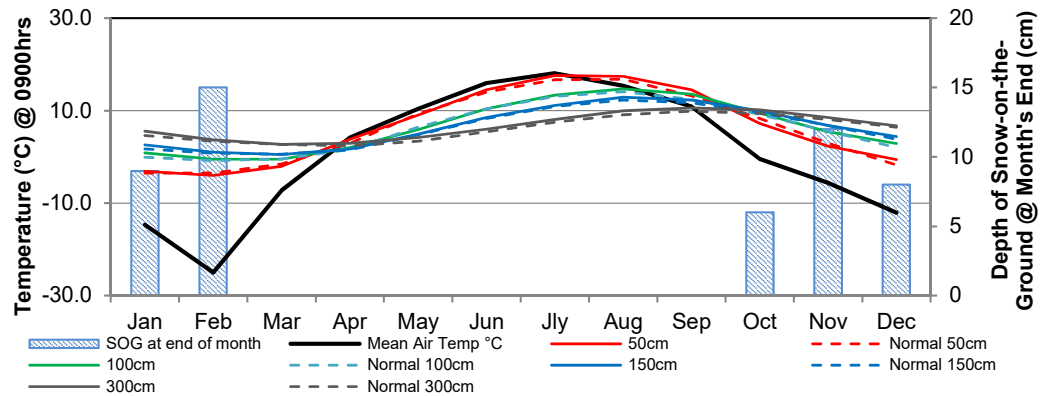
| MONTH | Mean Air Temp @ 0900h (°C) | SOIL TEMPERATURES (°C) @ 0900h | | | | | | | | | | | | | | Mean Air Temp @ 1600h (°C) | SOIL TEMPERATURES (°C) @ 1600h | | | | | |
|-----------|----------------------------|--------------------------------|------|------|------|------|------|------|------|-------|------|-------|------|-------|------|----------------------------|--------------------------------|------|------|------|------|------|
| | | 5cm | | 10cm | | 20cm | | 50cm | | 100cm | | 150cm | | 300cm | | | 5cm | | 10cm | | 20cm | |
| | | 2019 | NORM | 2019 | NORM | 2019 | NORM | 2019 | NORM | 2019 | NORM | 2019 | NORM | 2019 | NORM | | 2019 | NORM | 2019 | NORM | 2019 | NORM |
| January | -14.7 | -7.9 | -8.4 | -7.9 | -8.0 | -6.7 | -7.1 | -3.1 | -3.5 | 0.9 | -0.1 | 2.6 | 1.7 | 5.6 | 4.6 | -11.0 | -7.6 | -8.4 | -7.3 | -7.8 | -6.8 | -6.2 |
| February | -25.0 | -7.3 | -7.0 | -7.3 | -6.7 | -6.6 | -6.1 | -4.0 | -3.5 | -0.5 | -0.8 | 1.0 | 0.8 | 3.7 | 3.4 | -19.1 | -7.3 | -7.1 | -6.9 | -6.6 | -6.6 | -5.2 |
| March | -7.2 | -2.9 | -3.1 | -2.9 | -2.8 | -2.8 | -2.4 | -2.0 | -1.5 | -0.5 | -0.4 | 0.5 | 0.6 | 2.7 | 2.7 | 0.1 | -2.2 | -2.9 | -2.4 | -2.6 | -2.7 | -1.8 |
| April | 4.2 | 4.3 | 3.1 | 4.3 | 3.6 | 5.2 | 4.0 | 3.8 | 3.0 | 2.0 | 1.6 | 1.7 | 1.5 | 3.0 | 2.4 | 11.4 | 9.1 | 6.0 | 7.5 | 5.5 | 5.4 | 4.6 |
| May | 10.4 | 9.2 | 10.3 | 9.2 | 10.8 | 10.2 | 11.3 | 9.0 | 9.3 | 5.9 | 6.4 | 4.9 | 4.8 | 4.2 | 3.4 | 16.1 | 15.2 | 14.2 | 13.3 | 13.6 | 10.5 | 12.0 |
| June | 16.0 | 15.7 | 15.3 | 15.7 | 15.7 | 16.4 | 16.3 | 14.5 | 14.0 | 10.4 | 10.4 | 8.5 | 8.3 | 6.0 | 5.4 | 21.5 | 20.9 | 20.0 | 19.2 | 19.0 | 16.6 | 17.1 |
| July | 18.1 | 18.0 | 17.5 | 18.0 | 18.0 | 18.9 | 18.9 | 17.6 | 16.7 | 13.4 | 13.1 | 11.1 | 10.9 | 8.1 | 7.5 | 23.2 | 23.4 | 22.1 | 21.9 | 21.3 | 19.2 | 19.5 |
| August | 15.4 | 16.1 | 16.5 | 16.1 | 16.9 | 17.7 | 18.1 | 17.4 | 16.8 | 14.7 | 14.1 | 12.9 | 12.3 | 10.0 | 9.1 | 22.5 | 21.3 | 20.6 | 19.9 | 20.0 | 17.8 | 18.6 |
| September | 10.9 | 12.0 | 10.5 | 12.0 | 11.0 | 13.8 | 12.5 | 14.5 | 13.2 | 13.6 | 12.4 | 12.3 | 11.7 | 10.6 | 9.9 | 17.5 | 16.0 | 13.9 | 15.1 | 13.4 | 13.7 | 13.1 |
| October | -0.4 | 2.2 | 4.3 | 2.2 | 4.7 | 4.2 | 6.2 | 7.2 | 8.3 | 9.5 | 9.2 | 10.0 | 9.6 | 10.2 | 9.4 | 6.6 | 4.2 | 6.1 | 4.0 | 6.4 | 4.1 | 6.9 |
| November | -5.6 | -2.1 | -2.2 | -2.1 | -1.7 | -0.7 | -0.5 | 2.3 | 3.0 | 5.4 | 5.6 | 6.8 | 6.8 | 8.5 | 8.1 | -2.3 | -1.6 | -1.4 | -1.3 | -1.2 | -0.8 | 0.3 |
| December | -12.1 | -5.4 | -7.1 | -5.4 | -6.6 | -4.0 | -5.6 | -0.6 | -1.7 | 2.9 | 2.0 | 4.4 | 3.8 | 6.7 | 6.4 | -8.4 | -5.0 | -6.6 | -4.6 | -6.3 | -4.0 | -4.6 |

Normal temperatures (1971-2000) for our site are provided by Environment Canada 2004a

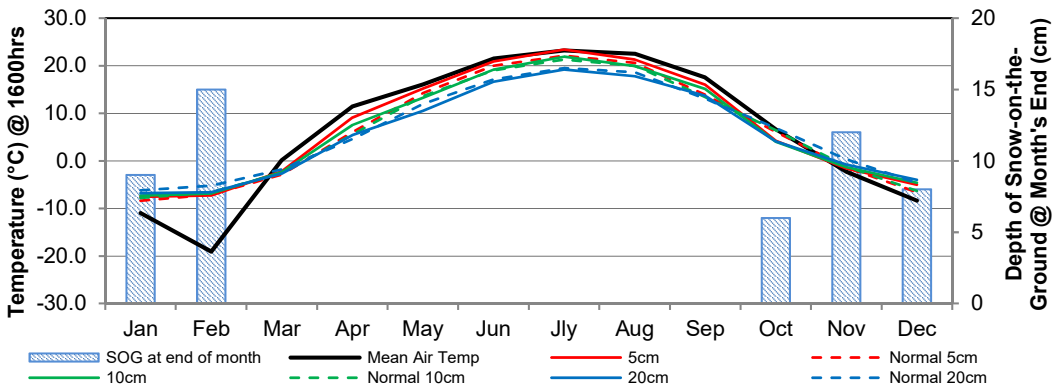
Monthly Soil Temperatures @ 0900h



Monthly Soil Temperatures @ 0900h



Monthly Soil Temperatures @ 1600h



GLOSSARY OF TERMS

(Unless otherwise stated, source for definitions of terms is Environment Canada, 1978)

BEAUFORT WIND SCALE was developed by Admiral Sir Francis Beaufort in 1805 and adopted by the British Navy in 1838. It consisted of 13 degrees of wind strength, from calm to hurricane, based upon the effects of various wind strengths upon the amount of canvas carried by the fully rigged frigates of the period. Over the years it has been modified as needed and in 1946 the scale values (Force Numbers) were defined by ranges of wind speed as measured at a height of 10 meters above the surface. In effect, this transformed the 'Beaufort Wind Force Scale' into the 'Beaufort Wind Speed Scale'. This scale is the current standard scale for visual observations of the wind (Heidorn, 1998).

BRIGHT SUNSHINE is the unobstructed direct radiation from the sun, as opposed to the shading of a location by clouds or by other atmospheric obstructions.

Number of Days is defined as the total number of days when at least 0.1 of an hour of bright sunshine was recorded.

Percentage Possible refers to the ratio of measured bright sunshine hours to the total possible daylight hours in a given period, expressed as a percentage.

Possible daylight hours (hours of illumination) are taken from the sunrise/set tables provided by the National Research Council of Canada, Herzberg Institute of Astrophysics, Victoria, BC.

Total is the sum of the daily bright sunshine values in hours and tenths of hours as measured by an automated sunshine recorder using voltaic cells.

DEGREE-DAY is an index for various temperature related calculations.

Cooling (CDD) is the cooling requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of greater than 18°C is considered uncomfortable and supplementary cooling is required. On a specific day, the amount by which 18°C is less than the daily average temperature defines the number of cooling degree-days for that day. A temperature base of 24° C is sometimes used as an index of extreme cooling degree-days to indicate potential heat stress. (Environment Canada 2012)

Mathematically: $CDD = (T - 18^{\circ}C)$, for that day, where T = daily mean temperature in °C if T is equal to or less than 18°C, CDD = 0.

Monthly and annual values of CDD are obtained by summing daily values.

Growing (GDD) is the growing requirement in order for plant growth to proceed. The air temperature must exceed a critical value appropriate to the plant species in question. For many members of the grass family, including most commercial cereals grown on the prairies, a base temperature of 5.0°C has been established. On a specified day, the difference between the daily average temperature and the 5.0°C base temperature defines the number of growing degree-days.

Mathematically: $GDD = (T - 5.0^{\circ}C)$, for that day, where T = daily mean temperature in °C if T is equal to or less than 5.0°C, GDD = 0.

Daily GDD values are summed to provide totals for the appropriate month, growing season or year.

Heating (HDD) is the heating requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of less than 18°C is considered uncomfortable and supplementary heating is required. On a specific day, the amount by which 18°C exceeds the daily average temperature defines the number of heating degree-days for that day.

Mathematically:

$HDD = (18^{\circ}C - T)$, for that day, where T = daily mean temperature in °C if T is equal to or greater than 18°C, HDD = 0.

Monthly and annual values of HDD are obtained by summing daily values.

EXTREME is the highest or lowest value of a particular element recorded during the period in question.

EXTREME ALL YEARS Temporal comparisons at a point are also of value in some types of climatic studies. Therefore, it is desirable to produce the maximum length of reliable climatic record to carry out studies over a period of time. Data are drawn mainly from the following data sets:

SRC: 1963 to present

Saskatoon Airport: 1942 to present

University of Saskatchewan: 1916 to 1963

Eby station: 1901-1941

NWMP: circa 1892 to circa 1900 (sporadic)

Station locations, exposures and measurement procedures were subject to change during this time period. Data are not adjusted and users are cautioned accordingly.

FROST is recorded on each occasion when the daily minimum temperature is equal to or less than 0°C.

NORMAL VALUE (1981-2010) In climatology it is often useful to make spatial comparisons of particular element values over a common time period. At an interior continental site such as Saskatoon, a period of 30 years is required to produce statistically stable estimates of the more variable elements. To facilitate spatial comparisons, the World Meteorological Organization recommends the standard normal (average) period of thirty years. The current normal period for data analysis at CRS is from January 1st, 1981 to December 31st, 2010. Data derived from CRS conform to this standard, except where noted. The normals for CRS have been calculated using the data collected during this standard period. Where gaps existed, data from the nearest climate station were used and referenced as to being used. (Environment Canada, 1993, 2002, 2004a)

POTENTIAL EVAPOTRANSPIRATION (Thornthwaite Method) is the amount of water which will be lost from a surface completely covered with vegetation if there is sufficient water in the soil at all times for the use of the vegetation. It is computed by means of an empirical formula involving mean monthly temperature and average length of day.

Mathematically: $PET = mT^a$ where PET = Potential of Evapotranspiration; m = % of day length for the month as compared to the year; T = Temperature °C when T is less than or equal to 0; otherwise T = 0; and a = yearly heat index. (Thornthwaite and Mather, 1955)

PRECIPITATION

Day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water. An asterisk (*) appearing in the average column denotes the occurrence of measurable precipitation on one or more occasions, and that the calculated 30-year average amounts to less than a trace. The so-called climatological day, beginning at 9 a.m. standard time on the date of reference and ending at 9 a.m. the next morning, was employed in record keeping up to January 1994. On February 1, 1994, after consultation with Environment Canada, record keeping was changed to the 24-hour period of 0000 hours - 2400 hours to conform to their reporting of climatological statistics.

Total is the sum of the daily recorded precipitation. The snowfall component of precipitation is recorded as an equivalent amount of liquid water. The notation "T" refers to a trace of precipitation (less than 0.2 mm water equivalent). As of August 7, 1993, total precipitation was measured using a weighing gauge for the winter season and the tipping bucket during frost-free period.

SEASONS Meteorologists prefer to divide the year into four 3-month periods based primarily on temperature. Thus winter is defined as December (previous year), January, and February (DJF); spring as March, April and May (MAM); summer as June, July and August (JJA); and fall as September, October and November (SON). (Lutgens and Tarbuck, 1992)

SOIL TEMPERATURE under a short grass surface with normal snow accumulation, is measured according to procedures outlined in the Environment Canada publication "*Soil Temperature*" January 1, 1976. Depths below surface at which soil temperature measurements are made are: 5 cm, 10 cm, 20 cm, 50 cm, 100 cm, 150 cm and 300 cm. Since soil temperature is affected by profile structure and water content, extrapolation of the measured data is difficult.

SOLAR RADIATION

Diffuse - Total is radiation reaching the earth's surface after having been scattered from the direct solar beam. The instrument used is an Eppley pyranometer with a shade ring (See SOLAR RADIATION-Global- Total).

Global - Total is the sum of the direct solar and diffuse radiation during the period in question. Measurements are carried out on a horizontal surface near ground level and integrated over the whole celestial dome, summing the diffuse and direct components of the solar beam. The temperature-compensated Eppley pyranometer is used. The standard metric unit of measurement is the megajoule per square metre (MJ/m²). (To facilitate comparison with past years' data: 1.0 MJ/m² = 23.895 langley). Comparison is provided with a provisional average based on 16 years of data (1975-1990).

SPELLS Temperature spells are defined as days when the daily maximum temperature is higher than or equal to 30°C (hot spell) or the daily minimum temperature is lower than or equal to -30°C (cold spell).

SUNRISE/SUNSET times have been included in this report. They have been acquired from the National Research Council, Canada, Herzberg Institute of Astrophysics.

TEMPERATURE

Average Annual is the average of the daily average temperatures in degrees Celsius (°C) for one year.

Average Daily is defined as the arithmetic mean of the daily maximum temperature in degrees Celsius (°C) and the daily minimum temperature in degrees Celsius (°C) for the day in question.

Average Maximum is the average of the daily maximum temperatures in degrees Celsius (°C) average over the appropriate time periods.

Average Minimum is the average of the daily minimum temperatures in degrees Celsius (°C) averaged over the appropriate time periods. Refer to TEMPERATURE-Average Maximum concerning measurement procedures.

Average Monthly is the average of the daily average temperatures in degrees Celsius (°C) for the month under consideration.

WIND CHILL describes a sensation, the way we feel as a result of the combined cooling effect of temperature and wind. This feeling can't be measured using an instrument, so a mathematical formula was developed in 1939 that related air temperature and wind speed to the cooling sensation. This formula was revised in 2001 by a team of scientists and medical experts from Canada and the U.S. with the Canadian Department of National Defence contributing human volunteers. The new index is based on the loss of heat from the face.

Mathematically: $WC = 13.12 + (0.6215 \times T) - (11.37 \times V^{0.16}) + (0.3965 \times T \times V^{0.16})$; where WC = wind chill; T= air temperature °C; V= standard wind speed km/h. (Environment Canada 2004b).

WAVES Temperature waves are defined as a sequence of three or more days when the daily maximum/minimum temperatures are higher/lower than, or equal to, a set temperature. For a heat wave the temperature is 32°C. (Environment Canada 2005).

WIND SPEED

Average is the average of the hourly wind speeds for the period in question measured in kilometres per hour (km/h). Average hourly wind speeds are obtained from a RM Young Wind Monitor anemometer at a height of 10 m.

Peak Gust refers to the highest instantaneous value recorded by the anemometer system for the period of reference, irrespective of direction and/or duration. Comparison is with published data for Environment Canada, Saskatoon Airport station.

see also **Beaufort Wind Scale**

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