Environment and
Minerals Division
*Climatology*

**Saskatchewan Research Council**

# CLIMATOLOGICAL REFERENCE STATION
# SASKATOON


C. Beaulieu
V. Wittrock

SRC Publication No. 10440-1E06

February 2006

**Saskatchewan Research Council**

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# ANNUAL SUMMARY 2005

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Saskatchewan Research Council
125 - 15 Innovation Boulevard
Saskatoon, SK S7N 2X8

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Although every caution has been taken to ensure the accuracy of data and information presented, errors may have occured. If errors are noticed, we would appreciate being informed so they can be corrected. Our data is subject to on-going quality assurance checks which may result in minor changes and updates to some values presented here and in previously presented reports.

Information and data contained in this report shall not be published, copied, placed in a retrieval system or distributed whole or in part without prior written consent of the Saskatchewan Research Council. All references made to this report shall be acknowledged.

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

Elaine Wheaton
Senior Research Scientist
306-933-8179
e-mail wheaton@src.sk.ca

Virginia Wittrock
Research Scientist
306-933-8122
e-mail wittrock@src.sk.ca

Carol Beaulieu
Research Technologist
306-933-8182
e-mail beaulieu@src.sk.ca

Climatology Section
Fax 306-933-7817
Saskatchewan Research Council
Web Site Home Page
http://www.src.sk.ca

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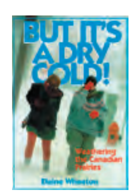


COVER PHOTOGRAPH
Hoar Frost on Saskatoon trees, nd
by CR Beaulieu, Climatology, SRC

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## CLIMATE REFERENCE STATION HISTORY

10 m tower for wind measurements at CRS, 2005. photo credit K. Potter

Meteorological observations were first taken at or near Saskatoon by the Royal Northwest Mounted Police in 1889 with only temperature being recorded. 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 May 1, 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, Miss E.S. Eby, continued to record the observations. Her brother, Mr. J.M. Eby, recorded the observations beginning in April 1931 until the station was closed October 31, 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 climatological station was established by the Physics Department of the University of Saskatchewan and continuous observations were kept twice daily until January 15, 1965. The longtime observer was Mr. Sidney Cox. The Saskatchewan Research Council took over the programme in the fall of 1963 at the newly established Climatological Reference Station at latitude 52°09'N, longitude 106°36'W and elevation 497 m asl[1]. The first observer was Terry Beck followed three years later by Orville Olm.[2] 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. Since 1992, the primary observer has been Carol Beaulieu assisted by Virginia Wittrock, Leanne Crone and Charlene Hudym.

In the summer of 1992, the CRS began to be converted to an automated system of data collection with the installation of a Campbell Scientific data logger and automatic sensors. Elements presently recorded at the site are temperature, precipitation, wind, solar radiation, relative humidity, barometric pressure, soil temperature and snow-on-the-ground (manual recordings). Temperature, precipitation and radiation data are submitted to Environment Canada.

[1] *Christiansen 1970; Environment Canada 1975*
[2] *Olm 2001*

# 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 observations.[1] A reference climatological 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 climate[2]. At our station, hourly readings are taken of elements which include temperature, precipitation amount, humidity, wind, and atmospheric pressure. Our supplemental observations include rate of rainfall, soil temperature, bright sunshine and solar radiation. 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 so 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, health and comfort.

The CRS also allows us to:

- evaluate long term climate trends - early warning system for increased frequencies of extreme events such as drought, floods, *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 implications for health, West Nile monitoring programme directed by Saskatchewan Health;
- do value-added research;
- be part of regional, national and global networks in an important agricultural and ecological area;
- facilitate development of additional programs - *e.g.* air quality, biodiversity, and climate change monitoring;
- have roles in various programs within SRC including SODAR Evaluation Project, spray drift work, Boreal Ecosystem Atmosphere Study (BOREAS), and collaborative research with the Western College of Veterinary Medicine and the College of Agriculture, University of Saskatchewan, for example; and
- provide climate data to governments, universities, insurance agencies, lawyers, agricultural sectors, chemical companies, schools, building science, construction firms, media, transportation studies, accident studies, wildlife studies, tourism groups and interested individuals.

*Belfort Weighing Gauge, 2005 photo credit: K. Potter*

### Goals

The goals of the Climate Reference Station are first, to maintain the high quality of data gathered over its more than forty 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

[1]*Environment Canada 1992*
[2]*World Meteorological Organization 1988*

## CLIMATE REFERENCE STATION OUTREACH 2005

This year, five schools, urban and rural, requested presentations on weather instruments and the climate of Saskatoon. Both were well received by students and staff with positive post-presentation feedback. Approximately 170 children from grades 1 to 6 participated in the outreach programme. The SPLIT programme (Schools Plant Legacy in Trees) requested the presentations for their participants. Students received hands-on experience with the weather instruments used to measure temperature, precipitation, wind and solar radiation. The computer presentation gave them a better understanding of Saskatoon's climate; past, present and future.

We were again pleased to cooperate with SaskHealth in its West Nile mosquito monitoring programme this year. A New Jersey Light Trap was installed to collect mosquitoes, including *Culex tarsalis*, the main vector that carries the West Nile virus, from May to September.

CRS began hosting a Sonic Detection and Ranging (SODAR) system in late 2005. SODAR is used to remotely measure the vertical turbulence structure and wind profile of the lower layer of the atmosphere. By using sound, it measures wind speed, wind direction and turbulent characteristics of the atmosphere without the necessity of erecting a 10m tower.

On June 27th, we held an open house at the Climate Reference Station to celebrate both our 41st anniversary and our supporters by unveiling a new sign. We were pleased with the attendance and news coverage of this event.


*The Honorable Eric Klein, Q.C., Minister responsible for SRC and Dr. Laurier Schramm, SRC President and CEO, June 27, 2005. photo credit: SRC Corporate Relations*

*SODAR at CRS, Jan 2006. photo credit: CR Beaulieu*

*CR Beaulieu presenting weather instruments, Nov. 2005. photo credit: J Falk*

*Virginia Wittrock and Leanne Crone monitoring the New Jersey Light Trap, June 2005. photo credit: K Potter*

# SUMMARIES FOR 2005

## Overview

Data concerning temperature, precipitation, wind speed and direction, bright sunshine, solar radiation, and soil temperature, recorded at the Saskatchewan Research Council (SRC) Climatological Reference Station (CRS) (52°09'N, 106°36'W, 497 m asl), are presented for the year 2005 and compared with the long-term (*circa* 1900-2004) and standard-period (1971-2000) records.

Average temperatures, ranging from 1.0°C to 5.9°C above normal for the last four months of 2005, insured that 2005 would be amongst the warmest years at the Climate Reference Station. The annual mean, 1.3°C above normal, was the 7th warmest year out of 42 at CRS. The annual maximum temperature was the 10th warmest and the annual minimum temperature was 5th warmest. The minimum is notable for its 1.8°C above normal temperature. January, with six days of -30°C temperatures, gave no indication of a warm year in the offing. As it turned out, these were the only really cold days of the year. February's monthly average maximum of 8.3°C broke the 2002 record by 0.4°C (2.1°C above normal). Nine daily high maximum records were set or tied during the year; four of which were in December. Only three daily low minimum temperatures were set, none of which were in the traditional cold months. Hot spells of above 30°C temperatures occurred on 11 days with six in July and three in August. Although the frost-free growing season was longer than normal with 136 days, it could not compensate for the below normal growing degree-days especially those that occurred in May and June. The last frost occurred on May 14th, four days earlier than normal and the first occurred September 28th, 14 days later than normal. With such a warm year, the cumulative heating degree-days were below normal throughout the year. Surprisingly, the cumulative cooling degree-days were also below normal indicating that the higher annual temperatures were not due to higher maximum temperatures but due to higher minimum temperatures.

Yearly precipitation was 39.8% above normal ranking 2004 as the 2nd wettest year out of 42; 60.1mm less than the record year of 1991. June and September contributed 52% of the total precipitation due to downpours on June 29th and September 10th and 11th. Seasonally, summer (JJA) was the wettest ever summer recorded at the station while autumn (SON) was the 4th wettest autumn. By late August, the total yearly rainfall had surpassed the annual normal. 2005 set 14 daily precipitation records; four of which were in June and three in September. June and September also set monthly maximum precipitation records. This year, with 135 precipitation days, was 23 days less than the record year of 2004. This makes it the 6th highest year for precipitation days.

Up until November 30th, bright sunshine hours were 96.0% of normal with the number of days slightly above normal. June set a dubious record for the least amount of bright sunshine hours for that month while October recorded 0.1 hour shy of 1988's record for the most hours for the month of October. Bright sunshine was not recorded at the site for December due to the instrument's routine calibration.

Extreme daily winds of over 51 km/h occurred 40 times. Spring and summer were the windiest seasons; each recording 16 days of winds over 51 km/h. May, July and September experienced 'Gale' winds (63-76 km/ h) while 'Violent Storm' winds were measured once from the SW during the early morning June 22nd. Extreme winds only combined twice with temperatures to produce extreme windchills; on January 21st it felt like -48°C and on January 22nd it felt like -50°C .

*Brett Smith checking the Diffuse pyranometer after re-calibration, 2005 photo credit: CR Beaulieu, 2005*

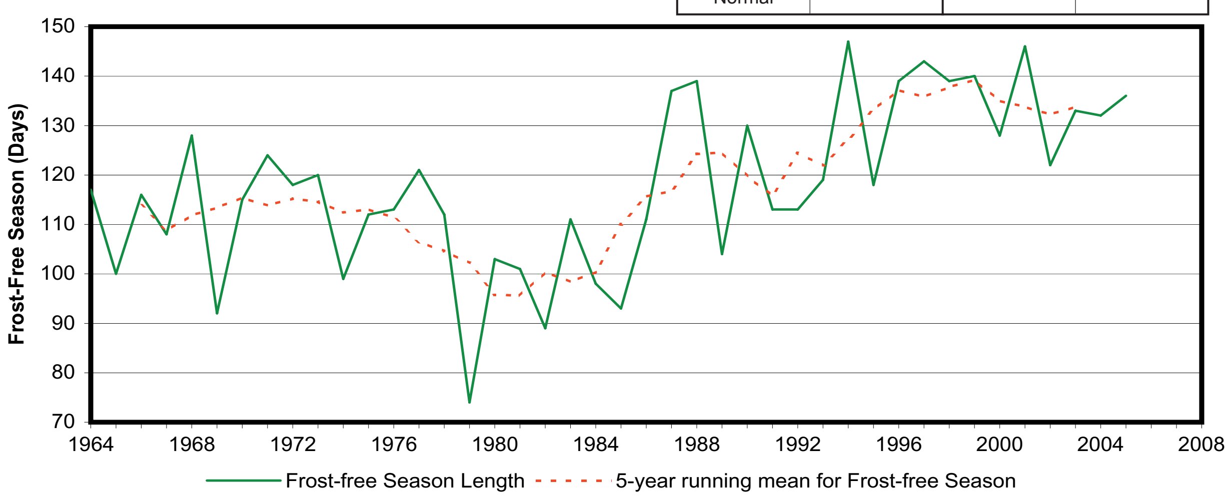
# Weather Events Summaries, 2005

**TEMPERATURE RANKINGS**
1964 to Present

| WARMEST ANNUAL MAXIMUM TEMPERATURE °C | | COLDEST ANNUAL MINIMUM TEMPERATURE °C | | WARMEST ANNUAL AVERAGE TEMPERATURE °C | | RANK-ING |
|---|---|---|---|---|---|---|
| 1987 | 11.6 | 1966 | -5.5 | 1987 | 5.4 | **1** |
| 2001 | 10.8 | 1979 | -5.3 | 2001 | 4.6 | **2** |
| 1981 | 10.5 | 1982 | -5.3 | 1981 | 4.5 | **3** |
| 1988 | 10.1 | 1965 | -5.3 | 1998 | 4.3 | **4** |
| 1998 | 10.1 | 1996 | -5.2 | 1999 | 4.2 | **5** |
| 1999 | 9.8 | 1975 | -5.1 | 1988 | 3.9 | **6** |
| 1976 | 9.5 | 1972 | -4.8 | 2005 | 3.8 | **7** |
| 1997 | 9.5 | 1985 | -4.8 | 1997 | 3.5 | **8** |
| 2003 | 9.3 | 1967 | -4.7 | 2003 | 3.4 | **9** |
| 2005 | 9.1 | 1974 | -4.7 | 1991 | 3.2 | **10** |
| 1986 | 9.0 | 1971 | -4.6 | 1986 | 3.2 | **11** |
| 1991 | 8.9 | 1969 | -4.6 | 1976 | 3.0 | **12** |
| 2000 | 8.8 | 1978 | -4.6 | 1992 | 3.0 | **13** |
| 1984 | 8.7 | 1970 | -4.0 | 2000 | 3.0 | **14** |
| 1990 | 8.7 | 1973 | -4.0 | 1984 | 2.9 | **15** |
| 1977 | 8.6 | 1980 | -3.8 | 1993 | 2.8 | **16** |
| 1980 | 8.6 | 1989 | -3.8 | 2004 | 2.8 | **17** |
| 1992 | 8.5 | 1977 | -3.6 | 2002 | 2.8 | **18** |
| 2002 | 8.5 | 1990 | -3.6 | 1964 | 2.7 | **19** |
| 1994 | 8.5 | 1976 | -3.5 | 1994 | 2.7 | **20** |
| 2004 | 8.4 | 1968 | -3.4 | 1990 | 2.6 | **21** |
| 1989 | 8.3 | 1995 | -3.4 | 1977 | 2.5 | **22** |
| 1964 | 8.2 | 1983 | -3.2 | 1980 | 2.4 | **23** |
| 1993 | 8.1 | 1994 | -3.2 | 1989 | 2.3 | **24** |
| 1995 | 7.9 | 1964 | -2.9 | 1995 | 2.3 | **25** |
| 1973 | 7.8 | 2000 | -2.9 | 1983 | 2.2 | **26** |
| 1968 | 7.7 | 1984 | -2.9 | 1968 | 2.2 | **27** |
| 1983 | 7.7 | 2002 | -2.9 | 1973 | 1.9 | **28** |
| 1978 | 7.4 | 2004 | -2.8 | 1970 | 1.7 | **29** |
| 1970 | 7.3 | 1986 | -2.6 | 1978 | 1.4 | **30** |
| 1974 | 7.1 | 1992 | -2.5 | 1971 | 1.2 | **31** |
| 1971 | 7.1 | 1991 | -2.5 | 1974 | 1.2 | **32** |
| 1967 | 7.0 | 1993 | -2.5 | 1967 | 1.1 | **33** |
| 1985 | 6.9 | 2003 | -2.5 | 1969 | 1.1 | **34** |
| 1975 | 6.9 | 1997 | -2.4 | 1985 | 1.1 | **35** |
| 1969 | 6.8 | 1988 | -2.3 | 1975 | 0.9 | **36** |
| 1979 | 6.5 | 2001 | -1.6 | 1972 | 0.6 | **37** |
| 1966 | 6.4 | 2005 | -1.6 | 1979 | 0.6 | **38** |
| 1965 | 6.3 | 1998 | -1.5 | 1965 | 0.5 | **39** |
| 1982 | 6.2 | 1981 | -1.5 | 1966 | 0.4 | **40** |
| 1996 | 6.1 | 1999 | -1.5 | 1996 | 0.4 | **41** |
| 1972 | 6.1 | 1987 | 0.8 | 1982 | 0.4 | **42** |

**DATES AND DURATION OF THE FROST-FREE SEASON**
1964 to Present

| YEAR | DATE OF LAST SPRING FROST | DATE OF FIRST FALL FROST | LENGTH OF SEASON (days) |
|---|---|---|---|
| 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 15 | 128 |
| 1969 | Jun 14 | Sept 25 | 92 |
| 1970 | May 19 | Sept 12 | 124 |
| 1971 | May 18 | Sept 20 | 115 |
| 1972 | May 08 | Sept 04 | 118 |
| 1973 | May 06 | Sept 14 | 120 |
| 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 | 112 |
| 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 |
| 1971-2000 Normal | May 18 | Sept 14 | 117 |



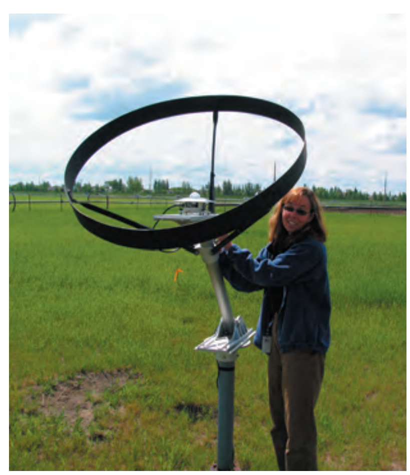
| NEW 2005 RECORDS | | | |
|---|---|---|---|
| TYPE | DATE | NEW RECORD | OLD RECORD/year |
| Daily Maximum Temperature (°C) | January 25 | 4.4 | 2.5/1993 |
| | February 2 | 8.3 | 6.5/1991 |
| | April 7 | 23.7 | 19.5/1987 |
| | June 22 | 32.0 | 31.7/1970 |
| | July 6 | 31.3 | 31.1/1975&79 |
| | December 9 | 7.4 | 6.1/1981 |
| | December 11 | 6.4 | 6.0/1980 |
| | December 25 | 5.3 | 5.0/1999 |
| | December 26 | 4.5 | 4.5/1989 |
| Daily Minimum Temperature (°C) | May 14 | -6.0 | -3.6/1997 |
| | July 28 | 5.8 | 6.0/1985 |
| | October 4 | -6.5 | -6.1/1974 |
| Daily Precipitation (mm) | February 4 | 7.7 | 3.6/1967 |
| | March 6 | 8.5 | 7.2/1988 |
| | June 18 | 18.0 | 17.4/1986 |
| | June 22 | 28.6 | 16.7/1991 |
| | June 28 | 8.6 | 6.6/1965 |
| | June 29 | 58.8 | 23.1/1971 |
| | July 30 | 9.2 | 8.0/1989 |
| | August 24 | 4.4 | 3.7/1989 |
| | August 30 | 7.6 | 7.2/2002 |
| | September 10 | 35.6 | 8.9/1974 |
| | September 11 | 25.4 | 17.8/1986 |
| | September 22 | 4.2 | 2.4/2002 |
| | October 27 | 1.3 | 1.0/1970&71 |
| | November 2 | 11.3 | 6.7/1984 |
| Monthly Maximum Temperature (C°) | February | 8.3 | 7.9/2002 |
| Monthly Precipitation (mm) | June | 171.0 | 160.1/1999 |
| | September | 81.6 | 71.6/1969 |
| Least Monthly Bright Sunshine Hours | June | 175.3 | 185.5/1998 |
| Most Monthly Bright Sunshine Hours | October | 208.0 | 208.1/1988 |

| EXTREME TEMPERATURES FOR 2005 | | | |
|---|---|---|---|
| COLD SPELL (less than or equal to -30°) | | HOT SPELL (greater than or equal to 30°C) | |
| DATE | TEMPERATURE °C | DATE | TEMPERATURE °C |
| January 5 | -31.2 | June 22 | 32.0 |
| January 13 | -32.8 | July 6 | 31.3 |
| January 14 | -34.5 | July 8 | 32.4 |
| January 15 | -30.7 | July 9 | 32.4 |
| January 16 | -33.2 | July 12 | 31.2 |
| January 22 | -30.3 | July 13 | 32.6 |
| | | July 31 | 32.8 |
| | | August 1 | 31.6 |
| | | August 5 | 31.5 |
| | | August 29 | 31.4 |
| | | September 3 | 30.8 |

*Brett Smith remounting the Global and Diffuse pyranometers after calibration, April, 2005*
*photo credit: CR Beaulieu*

| EXTREME DAILY WINDS FOR 2005 (km/h) | | |
|---|---|---|
| DATE | WIND SPEED/ DIRECTION | BEAUFORT WIND SCALE DESIGNATION* |
| January 21 | 59.7$^{N}$ | Strong Gale |
| January 22 | 54.4$^{SSE}$ | Near Gale |
| March 9 | 62.3$^{NW}$ | Near Gale |
| April 9 | 59.1$^{NNW}$ | Near Gale |
| April 10 | 54.8$^{NNW}$ | Near Gale |
| April 13 | 52.1$^{ESE}$ | Near Gale |
| April 14 | 61.3$^{W}$ | Near Gale |
| April 15 | 87.1$^{WSW}$ | Strong Gale |
| April 26 | 60.5$^{N}$ | Near Gale |
| April 27 | 51.7$^{NNW}$ | Near Gale |
| May 4 | 52.3$^{NNE}$ | Near Gale |
| May 6 | 55.6$^{S}$ | Near Gale |
| May 13 | 54.8$^{NNE}$ | Near Gale |
| May 16 | 52.8$^{SE}$ | Near Gale |
| May 17 | 56.7$^{ESE}$ | Near Gale |
| May 19 | 70.0$^{SW}$ | Gale |
| May 23 | 57.7$^{WNW}$ | Near Gale |
| May 24 | 52.4$^{WNW}$ | Near Gale |
| May 27 | 58.2$^{NW}$ | Near Gale |
| June 2 | 62.3$^{E}$ | Near Gale |
| June17 | 62.2$^{NNE}$ | Near Gale |
| June 18 | 79.9$^{NE}$ | Strong Gale |
| June 22 | 109.7$^{SW}$ | Violent Storm |
| June 23 | 61.3$^{WNW}$ | Near Gale |
| June 24 | 60.7$^{WNW}$ | Near Gale |
| July 1 | 63.5$^{NW}$ | Gale |
| July 13 | 52.9$^{NW}$ | Near Gale |
| July 14 | 54.5$^{W}$ | Near Gale |
| July 17 | 58.9$^{NNW}$ | Near Gale |
| July 19 | 53.3$^{WNW}$ | Near Gale |
| July 23 | 69.8$^{WNW}$ | Gale |
| July 24 | 56.2$^{WNW}$ | Near Gale |
| August 1 | 76.4$^{WSW}$ | Strong Gale |
| August 3 | 56.0$^{NW}$ | Near Gale |
| August 11 | 60.6$^{NW}$ | Near Gale |
| September 10 | 66.9$^{NNE}$ | Gale |
| September 11 | 56.0$^{NE}$ | Near Gale |
| September 27 | 51.9$^{NNE}$ | Near Gale |
| October 15 | 63.9$^{SE}$ | Gale |
| December 9 | 55.8$^{NW}$ | Near Gale |

**Near Gale >=51 but < 63*  **Gale >=63 but <76*
**Strong Gale >=63 but <88*  **Violent Storm >=103 but <117*



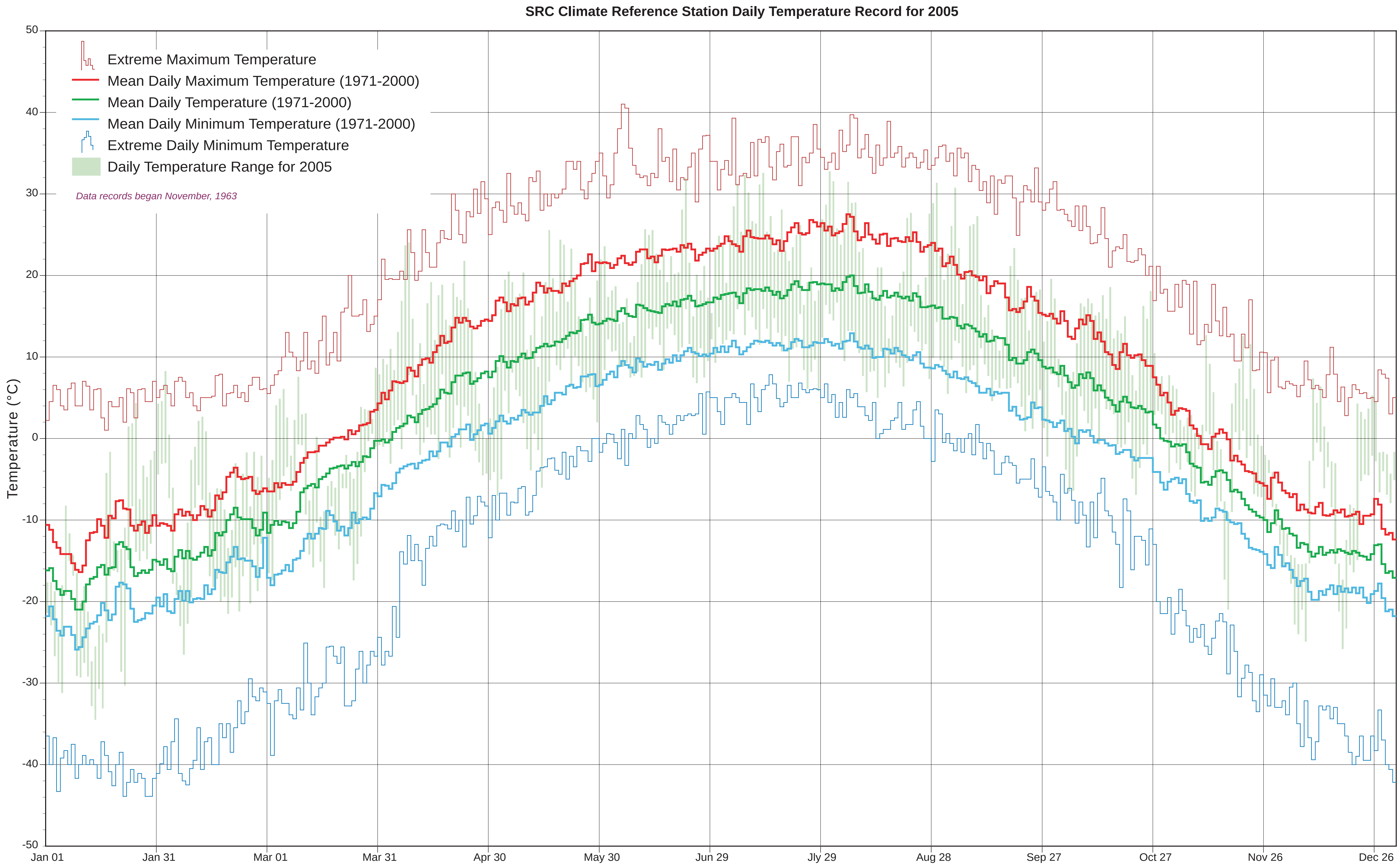
*Virginia Wittrock adjusting the Diffuse shade ring, June 2005*
*photo credit: Karen Potter*

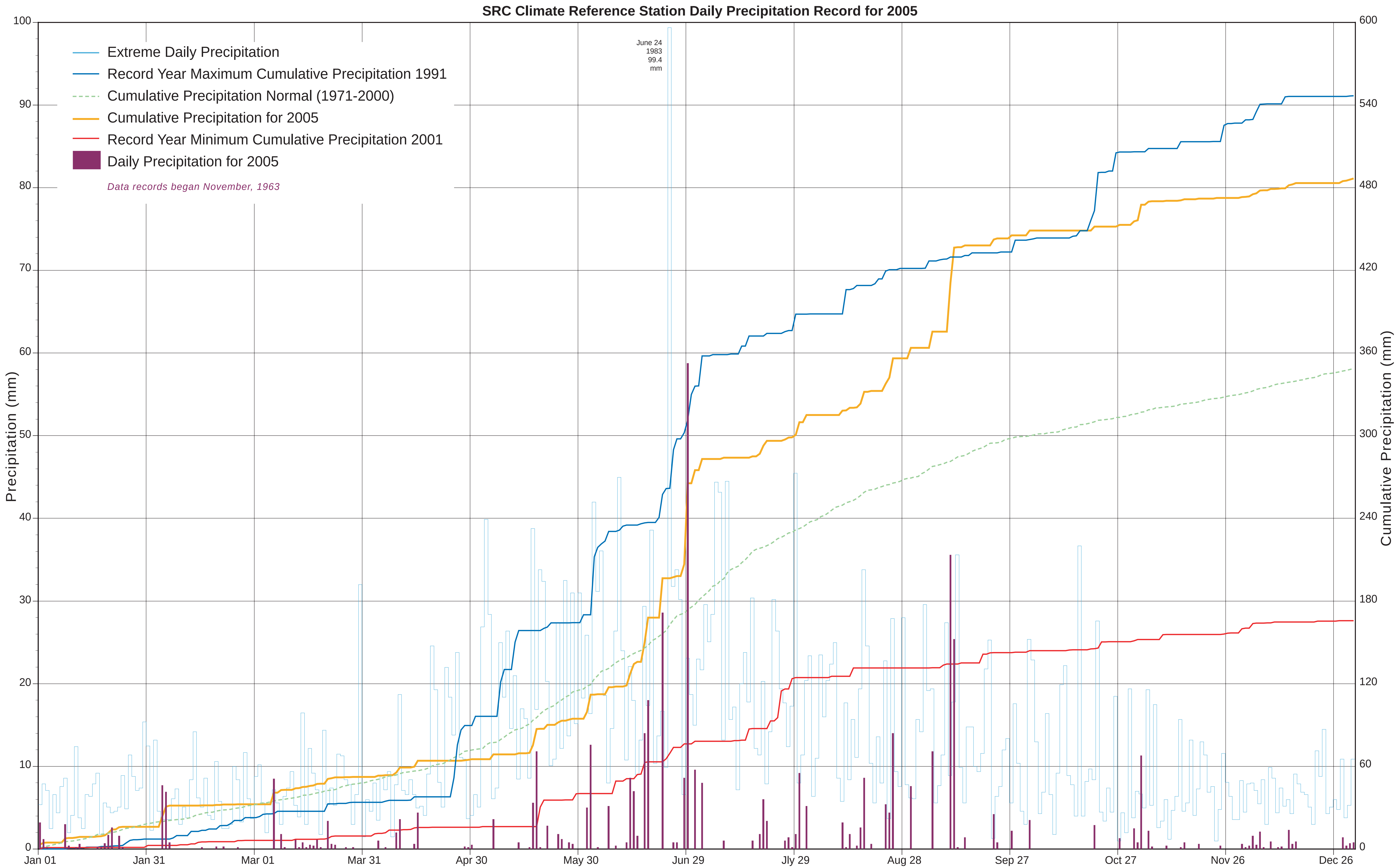
| ANNUAL AND SEASONAL PRECIPITATION RANKINGS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DRIEST YEARS (mm) | | DRIEST WINTER (Dec. Jan. Feb.) (mm) | | DRIEST SPRING (Mar. Apr. May) (mm) | | DRIEST SUMMER (Jun. Jly. Aug.) (mm) | | DRIEST AUTUMN (Sep. Oct. Nov.) (mm) | | RANKING |
| 2001 | 165.8 | 2002 | 12.1 | 2002 | 20.3 | 1984 | 70.2 | 1999 | 17.2 | 1 |
| 1987 | 232.4 | 1984 | 19.2 | 1998 | 29.8 | 1964 | 73.9 | 1994 | 21.0 | 2 |
| 2003 | 257.7 | 1993 | 22.0 | 2001 | 34.0 | 1977 | 81.9 | 1976 | 21.8 | 3 |
| 1998 | 263.3 | 1998 | 22.4 | 1980 | 42.2 | 2001 | 91.2 | 1987 | 27.4 | 4 |
| 1981 | 279.8 | 2001 | 23.1 | 1965 | 43.2 | 1985 | 91.8 | 2001 | 28.5 | 5 |
| 1964 | 282.7 | 2003 | 29.2 | 1981 | 54.3 | 1987 | 92.6 | 2000 | 31.2 | 6 |
| 1988 | 285.7 | 2004 | 29.3 | 2004 | 55.4 | 1969 | 105.5 | 1972 | 32.3 | 7 |
| 1992 | 288.1 | 1987 | 30.6 | 1992 | 55.5 | 1992 | 115.6 | 1990 | 33.9 | 8 |
| 1997 | 291.4 | 1995 | 31.3 | 1988 | 55.6 | 1997 | 116.4 | 1971 | 34.2 | 9 |
| 1984 | 293.1 | 1999 | 31.3 | 1999 | 56.5 | 1980 | 120.3 | 1988 | 38.1 | 10 |
| 1999 | 297.7 | 2000 | 31.7 | 1984 | 57.2 | 1981 | 124.9 | 1974 | 40.0 | 11 |
| 1993 | 300.0 | 1988 | 35.9 | 1996 | 58.8 | 2003 | 126.2 | 1975 | 48.8 | 12 |
| 1980 | 305.9 | 1982 | 37.0 | 2000 | 59.2 | 1972 | 133.3 | 2004 | 50.0 | 13 |
| 1990 | 309.8 | 1967 | 37.9 | 1971 | 61.1 | 1998 | 133.4 | 1966 | 50.2 | 14 |
| 2000 | 315.4 | 1991 | 40.3 | 1966 | 61.2 | 1979 | 135.9 | 1965 | 50.9 | 15 |
| 1972 | 317.9 | 1983 | 41.1 | 2003 | 61.8 | 1967 | 139.9 | 2003 | 51.2 | 16 |
| 2002 | 320.0 | 1977 | 43.1 | 2005 | 62.1 | 1978 | 142.5 | 1995 | 52.6 | 17 |
| 1995 | 327.7 | 1994 | 45.1 | 1993 | 62.2 | 1975 | 144.5 | 1979 | 53.4 | 18 |
| 1985 | 330.6 | 2005 | 45.4 | 1995 | 65.4 | 1990 | 144.5 | 1985 | 55.2 | 19 |
| 1976 | 331.8 | 1964 | 47.9 | 1970 | 65.7 | 1988 | 148.9 | 1970 | 56.4 | 20 |
| 1996 | 340.6 | 1997 | 48.0 | 1964 | 65.8 | 1989 | 149.9 | 1981 | 61.4 | 21 |
| 1994 | 341.4 | 1996 | 51.0 | 1969 | 68.5 | 1993 | 151.0 | 1997 | 61.6 | 22 |
| 1979 | 352.0 | 1981 | 52.2 | 1976 | 69.1 | 1996 | 154.4 | 1989 | 64.5 | 23 |
| 1967 | 354.3 | 1985 | 52.3 | 1972 | 71.6 | 1973 | 156.1 | 1977 | 65.4 | 24 |
| 1978 | 358.1 | 1970 | 52.7 | 1978 | 72.8 | 1995 | 164.4 | 1992 | 65.9 | 25 |
| 1965 | 358.8 | 1968 | 53.8 | 1973 | 73.1 | 1994 | 165.6 | 1980 | 66.6 | 26 |
| 1977 | 370.5 | 1966 | 54.7 | 1987 | 73.6 | 1976 | 169.4 | 1998 | 70.0 | 27 |
| 1966 | 376.9 | 1992 | 55.0 | 1967 | 78.0 | 2000 | 183.8 | 1968 | 71.3 | 28 |
| 1989 | 384.8 | 1990 | 55.6 | 1986 | 82.5 | 1999 | 194.2 | 2002 | 72.8 | 29 |
| 1970 | 388.8 | 1986 | 57.2 | 1990 | 87.2 | 1986 | 196.2 | 1993 | 73.1 | 30 |
| 1975 | 392.3 | 1989 | 57.9 | 1979 | 87.3 | 1974 | 205.5 | 1996 | 74.4 | 31 |
| 1973 | 393.3 | 1971 | 60.4 | 1997 | 88.2 | 1965 | 206.6 | 1967 | 76.8 | 32 |
| 2004 | 404.5 | 1979 | 61.3 | 1968 | 97.6 | 2002 | 206.8 | 1964 | 77.4 | 33 |
| 1986 | 411.3 | 1978 | 63.0 | 1989 | 101.7 | 1982 | 208.4 | 1982 | 81.5 | 34 |
| 1971 | 414.6 | 1973 | 63.2 | 1994 | 109.4 | 1983 | 215.8 | 1986 | 87.2 | 35 |
| 1969 | 427.4 | 1975 | 67.3 | 1982 | 110.8 | 1970 | 216.5 | 1973 | 88.2 | 36 |
| 1982 | 436.2 | 1965 | 69.3 | 1975 | 119.6 | 1966 | 222.0 | 1983 | 96.2 | 37 |
| 1968 | 443.1 | 1976 | 69.5 | 1983 | 125.2 | 1968 | 225.9 | 1991 | 105.4 | 38 |
| 1974 | 462.7 | 1980 | 73.0 | 1985 | 134.3 | 1971 | 248.8 | 2005 | 109.4 | 39 |
| 1983 | 471.6 | 1972 | 92.2 | 1991 | 147.3 | 1991 | 251.6 | 1978 | 111.4 | 40 |
| 2005 | 486.8 | 1974 | 92.2 | 1974 | 148.0 | 2004 | 260.0 | 1984 | 137.0 | 41 |
| 1991 | 546.9 | 1969 | 98.1 | 1977 | 164.1 | 2005 | 269.4 | 1969 | 151.8 | 42 |

| GREATEST EXTREME PRECIPITATION EVENTS (mm)* | | |
|---|---|---|
| PERIOD | DATE | AMOUNT |
| 0.5 hour | June 22 | 13.2 |
| 0.5 hour | September 11 | 9.6 |
| 1 hour | June 22 | 21.2 |
| 1 hour | September 11 | 15.0 |
| 2 hours | June 22 | 28.4 |
| 2 hours | June 29 | 19.6 |
| 12 hours | June 29 | 58.4 |
| 12 hours | September 10 | 35.4 |

**recorded daily by tipping bucket April 1st to October 3rd*

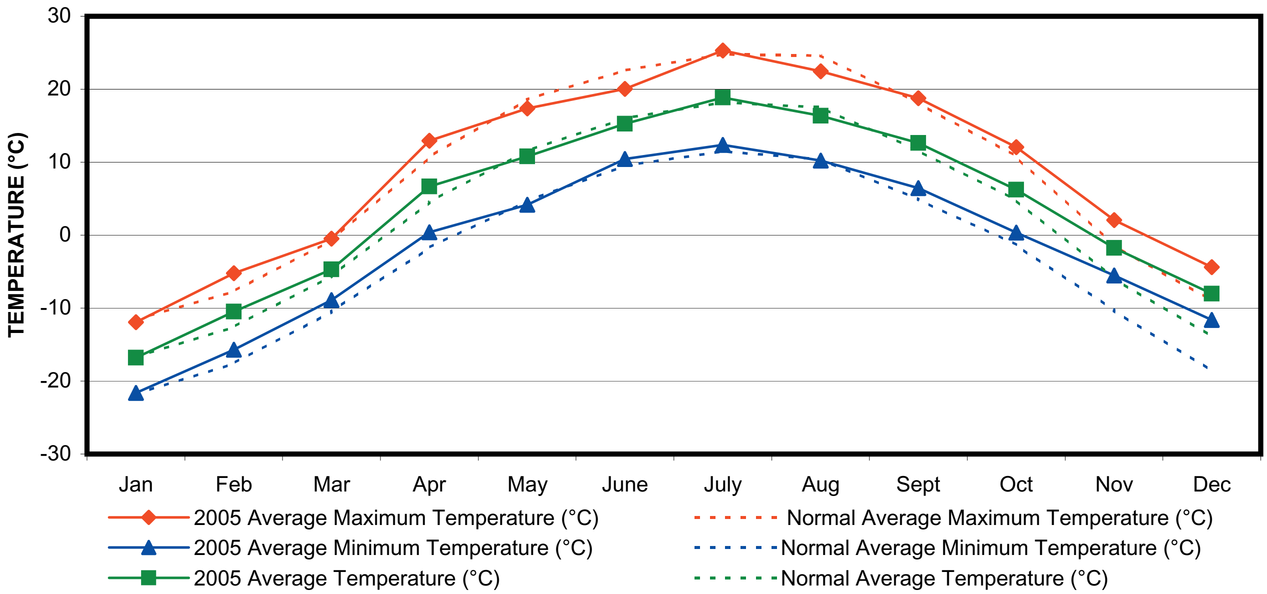
| DRIEST MONTH BY % OF NORMAL PRECIPITATION | | RANKING | DRIEST MONTH BY PRECIPITATION AMOUNT (mm) | |
|---|---|---|---|---|
| April | 54.2 | 1 | October | 10.2 |
| October | 62.2 | 2 | April | 12.8 |
| May | 66.4 | 3 | December | 13.5 |
| December | 73.8 | 4 | January | 16.0 |
| July | 76.5 | 5 | February | 16.4 |
| January | 87.9 | 6 | November | 17.6 |
| November | 118.9 | 7 | March | 19.9 |
| March | 122.8 | 8 | May | 29.4 |
| Feb | 123.3 | 9 | July | 44.4 |
| Aug | 149.2 | 10 | August | 54.0 |
| September | 277.6 | 11 | September | 81.6 |
| June | 287.4 | 12 | June | 171.0 |

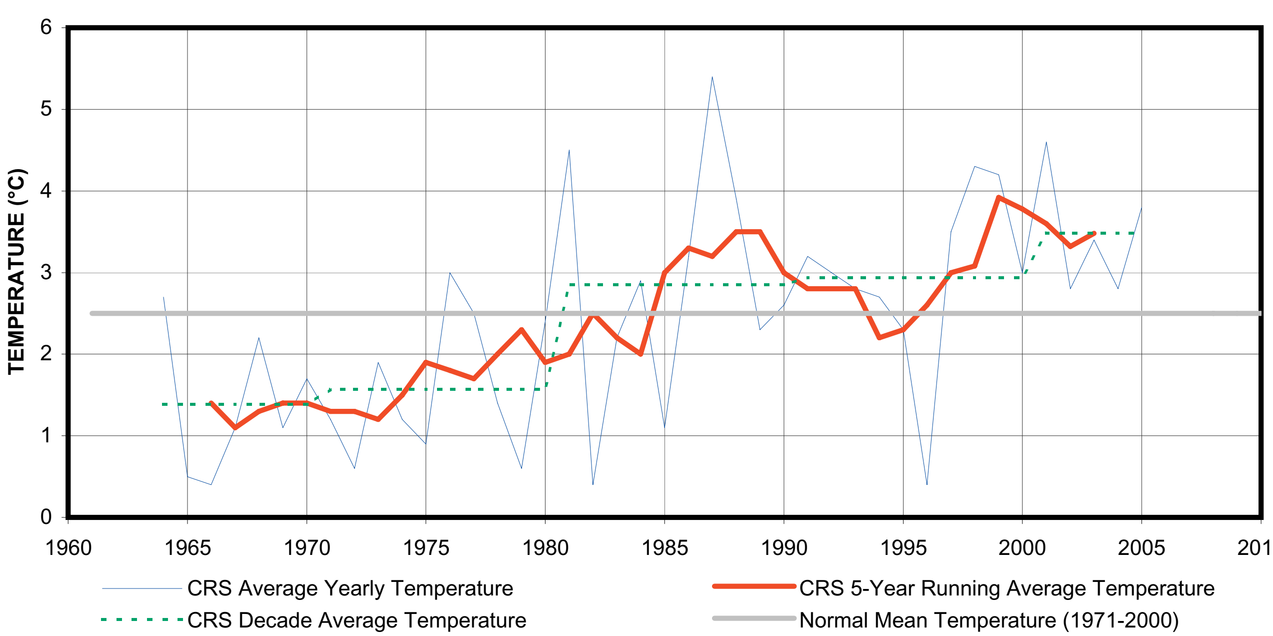

SRC Climate Reference Station Daily Temperature Record for 2005
Extreme Maximum Temperature
Mean Daily Maximum Temperature (1971-2000)
Mean Daily Temperature (1971-2000)
Mean Daily Minimum Temperature (1971-2000)
Extreme Daily Minimum Temperature
Daily Temperature Range for 2005
Data records began November, 1963
Temperature (°C)
50
40
30
20
10
0
-10
-20
-30
-40
-50
Jan 01
Jan 31
Mar 01
Mar 31
Apr 30
May 30
Jun 29
July 29
Aug 28
Sep 27
Oct 27
Nov 26
Dec 26


SRC Climate Reference Station Daily Precipitation Record for 2005
Extreme Daily Precipitation
Record Year Maximum Cumulative Precipitation 1991
Cumulative Precipitation Normal (1971-2000)
Cumulative Precipitation for 2005
Record Year Minimum Cumulative Precipitation 2001
Daily Precipitation for 2005
Data records began November, 1963
June 24
1983
99.4
mm
Precipitation (mm)
Cumulative Precipitation (mm)
0
10
20
30
40
50
60
70
80
90
100
0
60
120
180
240
300
360
420
480
540
600
Jan 01
Jan 31
Mar 01
Mar 31
Apr 30
May 30
Jun 29
Jly 29
Aug 28
Sep 27
Oct 27
Nov 26
Dec 26

## Monthly Temperatures and Extreme Values for 2005 and Annual Temperatures (1964-2005)

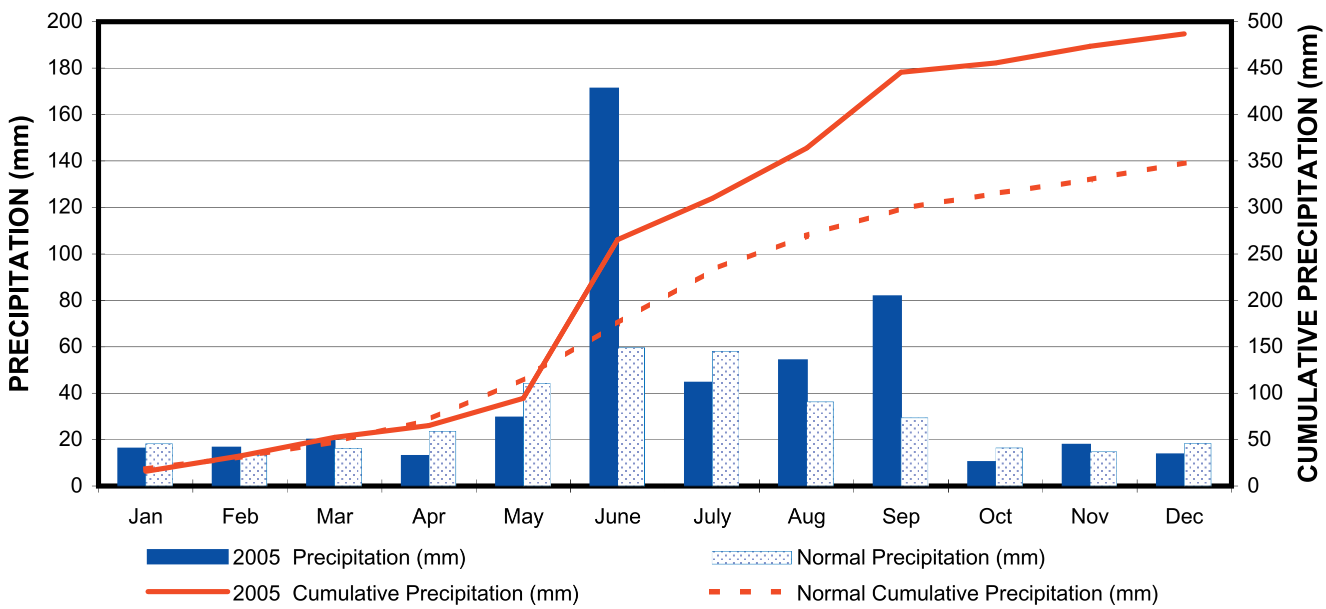
| MONTH | AVERAGE MAXIMUM TEMPERATURE (°C) | | AVERAGE MINIMUM TEMPERATURE (°C) | | AVERAGE TEMPERATURE (°C) | | EXTREME VALUES TEMPERATURE (°C) | |
|---|---|---|---|---|---|---|---|---|
| | 2005 | Normal | 2005 | Normal | 2005 | Normal | Maximum/Date | Minimum/Date |
| January | -11.9 | -11.6 | -21.6 | -21.8 | -16.8 | -16.7 | 4.4/25 | -34.5/14 |
| February | -5.2 | -7.7 | -15.7 | -17.6 | -10.5 | -12.6 | 8.3/02 | -26.5/07 |
| March | -0.5 | -0.7 | -8.9 | -10.5 | -4.7 | -5.6 | 8.7/30 | -18.3/16 |
| April | 12.9 | 10.7 | 0.4 | -1.7 | 6.7 | 4.5 | 24.1/08 | -5.1/30 |
| May | 17.4 | 18.6 | 4.2 | 4.7 | 10.8 | 11.6 | 25.6/16 | -7.0/02 |
| June | 20.1 | 22.6 | 10.5 | 9.5 | 15.3 | 16.0 | 32.0/22 | 6.8/25 |
| July | 25.3 | 24.8 | 12.4 | 11.5 | 18.9 | 18.2 | 32.8/31 | 5.8/28 |
| August | 22.5 | 24.6 | 10.2 | 10.4 | 16.4 | 17.5 | 31.6/01 | 5.0/13 |
| September | 18.8 | 18.1 | 6.4 | 4.9 | 12.6 | 11.6 | 30.8/03 | -2.2/28 |
| October | 12.1 | 10.8 | 0.3 | -1.3 | 6.2 | 4.8 | 18.6/15 | -6.9/22 |
| November | 2.1 | -1.4 | -5.5 | -10.3 | -1.7 | -5.9 | 12.7/10 | -21.0/16 |
| December | -4.4 | -9.0 | -11.6 | -18.6 | -8.0 | -13.9 | 7.4/09 | -25.8/17 |
| Average | 9.1 | 8.3 | -1.6 | -3.4 | 3.8 | 2.5 | | |

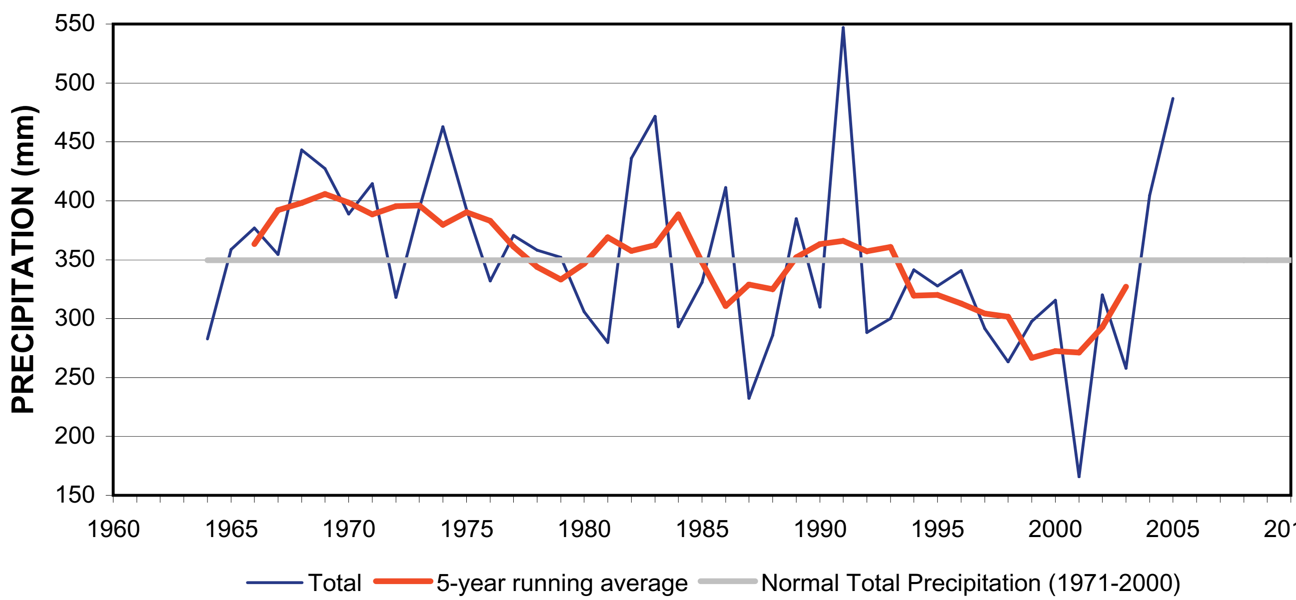


## Monthly Precipitation and Extreme Values for 2005 and Total Annual Precipitation (1964-2005)

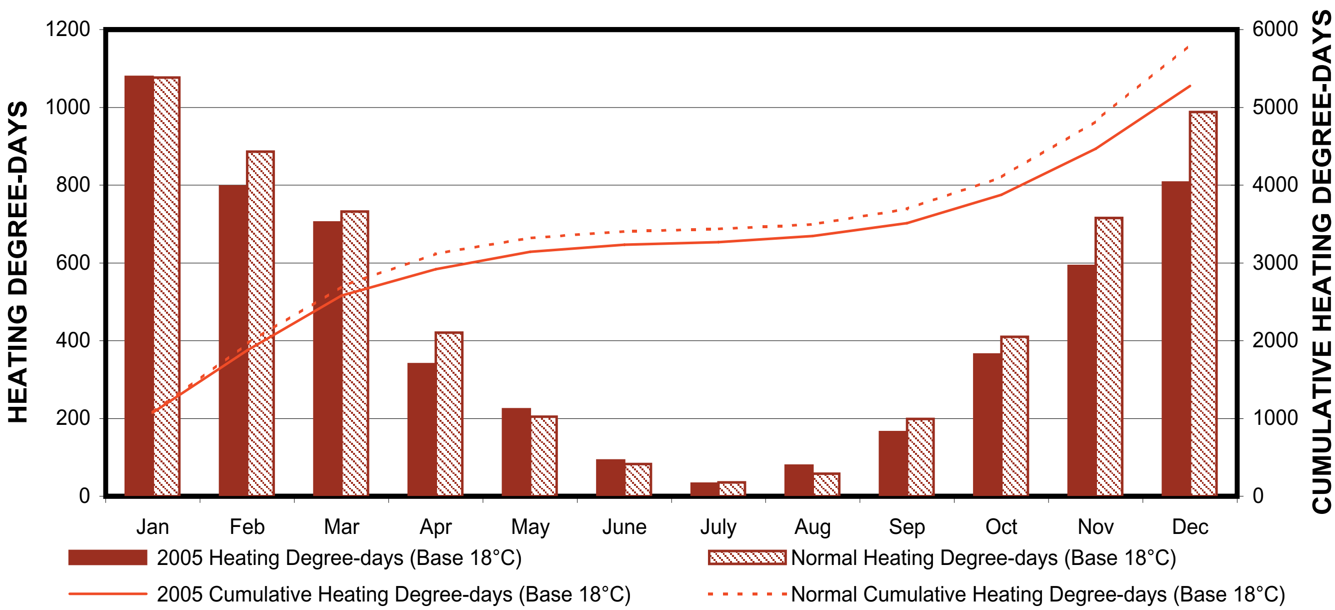
| MONTH | PRECIPITATION (mm) | | | CUMULATIVE PRECIPITATION (mm) | | | EXTREME DAILY PRECIPITATION (mm) |
|---|---|---|---|---|---|---|---|
| | 2005 | Normal | % of Normal | 2005 | Normal | % of Normal | Maximum/Date |
| January | 16.0 | 18.2 | 87.9 | 16.0 | 18.2 | 87.9 | 3.2/01 |
| February | 16.4 | 13.3 | 123.3 | 32.4 | 31.5 | 102.9 | 7.7/04 |
| March | 19.9 | 16.2 | 122.8 | 52.3 | 47.7 | 109.6 | 8.5/06 |
| April | 12.8 | 23.6 | 54.2 | 65.1 | 71.3 | 91.3 | 4.4/15 |
| May | 29.4 | 44.3 | 66.4 | 94.5 | 115.6 | 81.7 | 11.8/18 |
| June | 171.0 | 59.5 | 287.4 | 265.5 | 175.1 | 151.6 | 58.8/29 |
| July | 44.4 | 58.0 | 76.6 | 309.9 | 233.1 | 132.9 | 9.6/01 |
| August | 54.0 | 36.2 | 149.2 | 363.9 | 269.3 | 135.1 | 14.0/25 |
| September | 81.6 | 29.4 | 277.6 | 445.5 | 298.7 | 149.1 | 35.6/10 |
| October | 10.2 | 16.4 | 62.2 | 455.7 | 315.1 | 144.6 | 3.5/02 |
| November | 17.6 | 14.8 | 118.9 | 473.3 | 329.9 | 143.5 | 11.3/02 |
| December | 13.5 | 18.3 | 73.8 | 486.8 | 348.2 | 139.8 | 2.3/13 |
| Total | 486.8 | 348.2 | 139.8 | | | | |

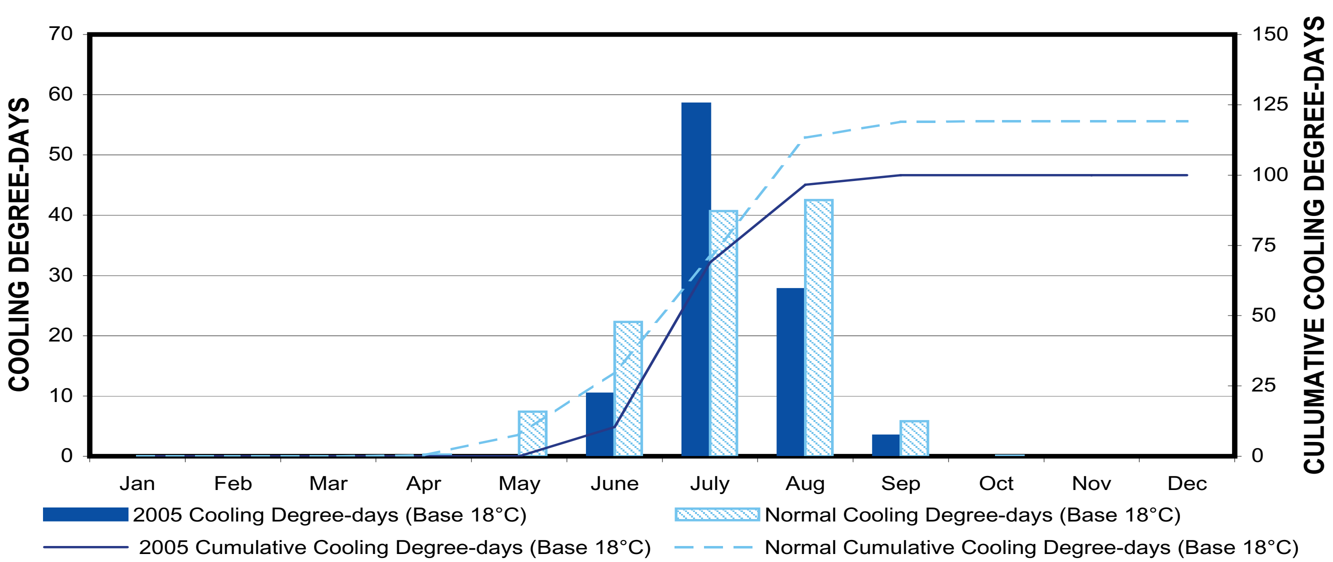


## Monthly Heating and Cooling Degree-days, 2005

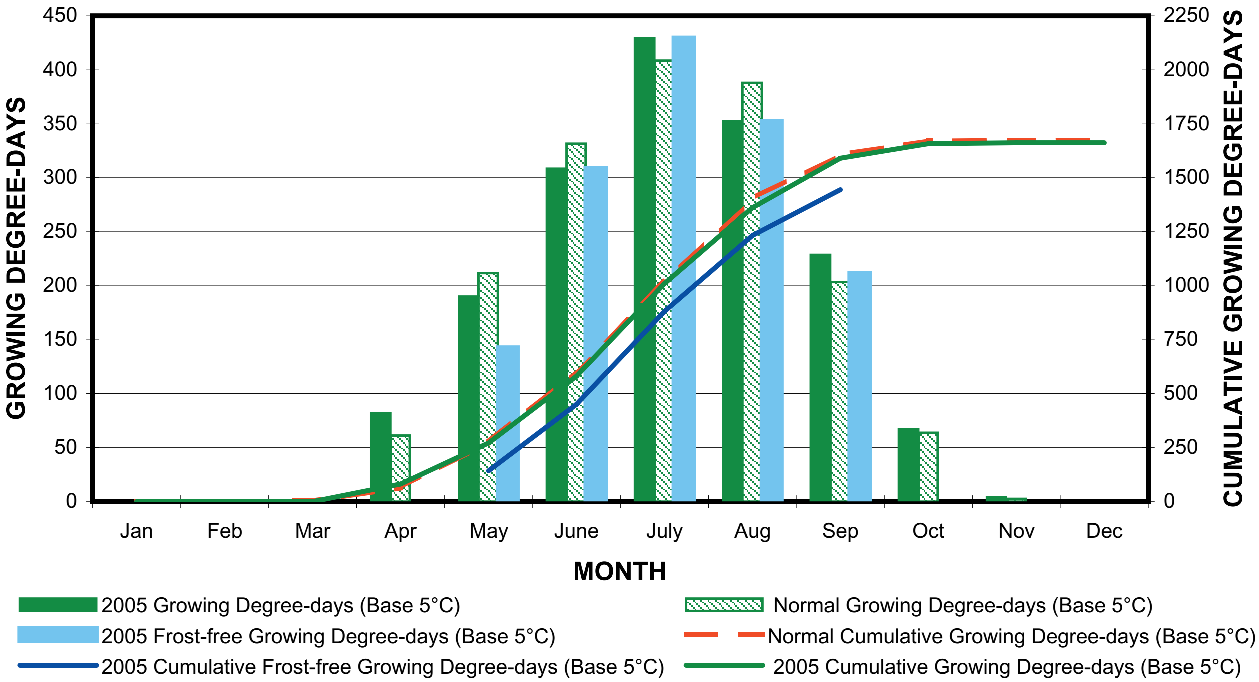
| MONTH | HEATING DEGREE-DAYS Base 18°C | | CUMULATIVE HEATING DEGREE-DAYS | | COOLING DEGREE-DAYS Base 18°C | | CUMULATIVE COOLING DEGREE-DAYS | |
|---|---|---|---|---|---|---|---|---|
| | 2005 | Normal | 2005 | Normal | 2005 | Normal | 2005 | Normal |
| January | 1078.4 | 1076.9 | 1078.4 | 1076.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 797.1 | 886.2 | 1875.5 | 1963.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 703.9 | 732.4 | 2579.4 | 2695.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| April | 339.6 | 420.7 | 2919.0 | 3116.2 | 0.0 | 0.3 | 0.0 | 0.3 |
| May | 223.7 | 204.4 | 3142.7 | 3320.6 | 0.0 | 7.4 | 0.0 | 7.7 |
| June | 91.9 | 82.8 | 3234.6 | 3403.4 | 10.4 | 22.3 | 10.4 | 30.0 |
| July | 32.1 | 35.3 | 3266.7 | 3438.7 | 58.5 | 40.7 | 68.9 | 70.7 |
| August | 78.5 | 57.7 | 3345.2 | 3496.4 | 27.7 | 42.5 | 100.0 | 113.2 |
| September | 164.7 | 198.9 | 3509.9 | 3695.3 | 3.4 | 5.8 | 100.0 | 119.0 |
| October | 364.8 | 410.2 | 3874.7 | 4105.5 | 0.0 | 0.1 | 100.0 | 119.1 |
| November | 592.2 | 715.8 | 4466.9 | 4821.3 | 0.0 | 0.0 | 100.0 | 119.1 |
| December | 806.7 | 987.7 | 5273.6 | 5809.0 | 0.0 | 0.0 | 100.0 | 119.1 |
| Total | 5273.6 | 5809.1 | | | 100.0 | 119.1 | | |



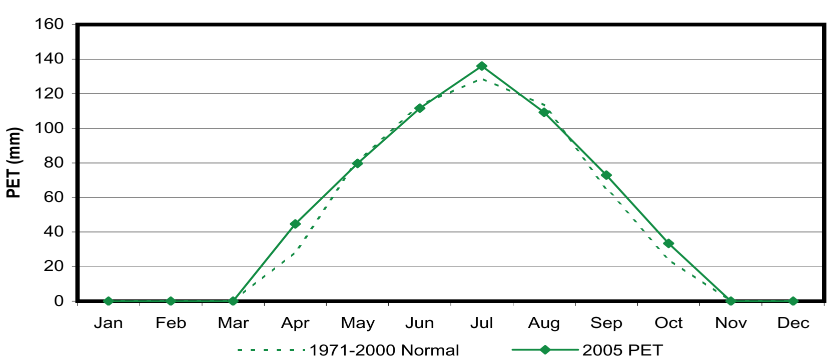



## Monthly Growing Degree-days, 2005

| MONTH | GROWING DEGREE-DAYS Base 5°C | | CUMULATIVE GROWING DD Base 5°C | | FROST-FREE GDD Base 5°C | |
|---|---|---|---|---|---|---|
| | 2005 | Normal | 2005 | Normal | 2005 | Cumulative |
| January | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| February | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| March | 0.0 | 2.4 | 0.0 | 2.4 | 0.0 | 0.0 |
| April | 82.2 | 61.3 | 82.2 | 63.7 | 0.0 | 0.0 |
| May | 189.9 | 211.6 | 272.1 | 275.3 | 142.6 | 67.7 |
| June | 308.5 | 331.5 | 580.6 | 606.8 | 308.5 | 335.2 |
| July | 429.4 | 408.4 | 1010.0 | 1015.2 | 429.4 | 741.2 |
| August | 352.2 | 387.8 | 1362.2 | 1403.0 | 352.2 | 1053.0 |
| September | 228.7 | 203.5 | 1590.9 | 1606.5 | 211.3 | 1257.0 |
| October | 66.9 | 63.7 | 1657.8 | 1670.2 | 0.0 | 1257.0 |
| November | 4.0 | 2.6 | 1661.8 | 1672.8 | 0.0 | 1257.0 |
| December | 0.0 | 0.1 | 1661.8 | 1672.9 | 0.0 | 1257.0 |
| Total | 1661.8 | 1672.9 | | | 1444.0 | |




## Potential Evaporation (PET) using the Thornthwaite Method, 2005




| MONTH | AVERAGE TEMP °C | PET (mm) | PET 1971-2000 Normal (mm) |
|---|---|---|---|
| Jan | -16.8 | 0.0 | 0.0 |
| Feb | -10.5 | 0.0 | 0.0 |
| Mar | -4.7 | 0.0 | 0.0 |
| Apr | 6.7 | 44.7 | 28.6 |
| May | 10.8 | 79.7 | 81.5 |
| June | 15.3 | 111.6 | 113.2 |
| July | 18.9 | 136.1 | 128.9 |
| Aug | 16.4 | 109.2 | 113.3 |
| Sept | 12.6 | 73.0 | 64.9 |
| Oct | 6.2 | 33.4 | 24.3 |
| Nov | -1.7 | 0.0 | 0.0 |
| Dec | -8.0 | 0.0 | 0.0 |

# Sunrise and Sunset at Saskatoon, 2005 and 2006

(local time in hours and minutes)

| 2005 | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 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 | 17:06 | 8:46 | 17:55 | 7:52 | 18:47 | 6:40 | 19:41 | 5:36 | 20:32 | 4:52 | 21:18 | 4:50 | 21:30 | 5:28 | 20:56 | 6:18 | 19:53 | 7:08 | 18:43 | 8:02 | 17:37 | 8:53 | 16:58 |
| 2 | 9:15 | 17:07 | 8:45 | 17:57 | 7:49 | 18:49 | 6:38 | 19:43 | 5:34 | 20:34 | 4:51 | 21:19 | 4:51 | 21:30 | 5:30 | 20:55 | 6:20 | 19:51 | 7:10 | 18:41 | 8:04 | 17:35 | 8:55 | 16:57 |
| 3 | 9:15 | 17:08 | 8:43 | 17:58 | 7:47 | 18:50 | 6:36 | 19:45 | 5:32 | 20:36 | 4:50 | 21:20 | 4:52 | 21:29 | 5:31 | 20:53 | 6:22 | 19:49 | 7:11 | 18:39 | 8:06 | 17:34 | 8:56 | 16:57 |
| 4 | 9:15 | 17:09 | 8:41 | 18:00 | 7:45 | 18:52 | 6:34 | 19:46 | 5:30 | 20:38 | 4:49 | 21:21 | 4:53 | 21:29 | 5:33 | 20:51 | 6:23 | 19:46 | 7:13 | 18:36 | 8:08 | 17:32 | 8:57 | 16:56 |
| 5 | 9:14 | 17:10 | 8:40 | 18:02 | 7:43 | 18:54 | 6:31 | 19:48 | 5:28 | 20:39 | 4:49 | 21:22 | 4:54 | 21:28 | 5:34 | 20:49 | 6:25 | 19:44 | 7:15 | 18:34 | 8:10 | 17:30 | 8:59 | 16:56 |
| 6 | 9:14 | 17:12 | 8:38 | 18:04 | 7:41 | 18:56 | 6:29 | 19:50 | 5:27 | 20:41 | 4:48 | 21:23 | 4:55 | 21:28 | 5:36 | 20:48 | 6:27 | 19:42 | 7:16 | 18:32 | 8:11 | 17:28 | 9:00 | 16:55 |
| 7 | 9:13 | 17:13 | 8:36 | 18:06 | 7:38 | 18:58 | 6:27 | 19:51 | 5:25 | 20:42 | 4:48 | 21:24 | 4:55 | 21:27 | 5:38 | 20:46 | 6:28 | 19:39 | 7:18 | 18:30 | 8:13 | 17:27 | 9:01 | 16:55 |
| 8 | 9:13 | 17:14 | 8:34 | 18:08 | 7:36 | 18:59 | 6:24 | 19:53 | 5:23 | 20:44 | 4:47 | 21:25 | 4:56 | 21:26 | 5:39 | 20:44 | 6:30 | 19:37 | 7:20 | 18:27 | 8:15 | 17:25 | 9:02 | 16:55 |
| 9 | 9:12 | 17:16 | 8:33 | 18:10 | 7:34 | 19:01 | 6:22 | 19:55 | 5:21 | 20:46 | 4:47 | 21:25 | 4:57 | 21:26 | 5:41 | 20:42 | 6:32 | 19:35 | 7:22 | 18:25 | 8:17 | 17:23 | 9:03 | 16:55 |
| 10 | 9:12 | 17:17 | 8:31 | 18:12 | 7:31 | 19:03 | 6:20 | 19:57 | 5:20 | 20:47 | 4:46 | 21:26 | 4:58 | 21:25 | 5:42 | 20:40 | 6:33 | 19:33 | 7:23 | 18:23 | 8:19 | 17:22 | 9:04 | 16:54 |
| 11 | 9:11 | 17:19 | 8:29 | 18:13 | 7:29 | 19:05 | 6:18 | 19:58 | 5:18 | 20:49 | 4:46 | 21:27 | 5:00 | 21:24 | 5:44 | 20:38 | 6:35 | 19:30 | 7:25 | 18:21 | 8:20 | 17:20 | 9:06 | 16:54 |
| 12 | 9:10 | 17:20 | 8:27 | 18:15 | 7:27 | 19:06 | 6:15 | 20:00 | 5:16 | 20:50 | 4:46 | 21:27 | 5:01 | 21:23 | 5:46 | 20:36 | 6:36 | 19:28 | 7:27 | 18:18 | 8:22 | 17:19 | 9:07 | 16:54 |
| 13 | 9:10 | 17:22 | 8:25 | 18:17 | 7:25 | 19:08 | 6:13 | 20:02 | 5:15 | 20:52 | 4:46 | 21:28 | 5:02 | 21:22 | 5:47 | 20:34 | 6:38 | 19:25 | 7:28 | 18:16 | 8:24 | 17:17 | 9:07 | 16:54 |
| 14 | 9:09 | 17:23 | 8:23 | 18:19 | 7:22 | 19:10 | 6:11 | 20:04 | 5:13 | 20:54 | 4:45 | 21:29 | 5:03 | 21:21 | 5:49 | 20:32 | 6:40 | 19:23 | 7:30 | 18:14 | 8:26 | 17:16 | 9:08 | 16:54 |
| 15 | 9:08 | 17:25 | 8:21 | 18:21 | 7:20 | 19:12 | 6:09 | 20:05 | 5:12 | 20:55 | 4:45 | 21:29 | 5:04 | 21:20 | 5:51 | 20:30 | 6:41 | 19:21 | 7:32 | 18:12 | 8:27 | 17:14 | 9:09 | 16:54 |
| 16 | 9:07 | 17:26 | 8:19 | 18:23 | 7:18 | 19:13 | 6:07 | 20:07 | 5:10 | 20:57 | 4:45 | 21:30 | 5:05 | 21:19 | 5:52 | 20:28 | 6:43 | 19:18 | 7:34 | 18:10 | 8:29 | 17:13 | 9:10 | 16:55 |
| 17 | 9:06 | 17:28 | 8:17 | 18:25 | 7:15 | 19:15 | 6:05 | 20:09 | 5:09 | 20:58 | 4:45 | 21:30 | 5:07 | 21:18 | 5:54 | 20:26 | 6:45 | 19:16 | 7:35 | 18:07 | 8:31 | 17:12 | 9:11 | 16:55 |
| 18 | 9:05 | 17:30 | 8:15 | 18:27 | 7:13 | 19:17 | 6:02 | 20:10 | 5:07 | 21:00 | 4:45 | 21:30 | 5:08 | 21:17 | 5:55 | 20:24 | 6:46 | 19:14 | 7:37 | 18:05 | 8:33 | 17:10 | 9:11 | 16:55 |
| 19 | 9:04 | 17:31 | 8:13 | 18:28 | 7:11 | 19:19 | 6:00 | 20:12 | 5:06 | 21:01 | 4:45 | 21:31 | 5:09 | 21:16 | 5:57 | 20:22 | 6:48 | 19:11 | 7:39 | 18:03 | 8:34 | 17:09 | 9:12 | 16:56 |
| 20 | 9:03 | 17:33 | 8:11 | 18:30 | 7:08 | 19:20 | 5:58 | 20:14 | 5:05 | 21:03 | 4:45 | 21:31 | 5:11 | 21:14 | 5:59 | 20:20 | 6:50 | 19:09 | 7:41 | 18:01 | 8:36 | 17:08 | 9:13 | 16:56 |
| 21 | 9:02 | 17:35 | 8:09 | 18:32 | 7:06 | 19:22 | 5:56 | 20:16 | 5:03 | 21:04 | 4:46 | 21:31 | 5:12 | 21:13 | 6:00 | 20:18 | 6:51 | 19:07 | 7:43 | 17:59 | 8:38 | 17:07 | 9:13 | 16:56 |
| 22 | 9:00 | 17:36 | 8:07 | 18:34 | 7:04 | 19:24 | 5:54 | 20:17 | 5:02 | 21:05 | 4:46 | 21:31 | 5:13 | 21:12 | 6:02 | 20:15 | 6:53 | 19:04 | 7:44 | 17:57 | 8:39 | 17:06 | 9:14 | 16:57 |
| 23 | 8:59 | 17:37 | 8:05 | 18:36 | 7:01 | 19:26 | 5:52 | 20:19 | 5:01 | 21:07 | 4:46 | 21:31 | 5:15 | 21:10 | 6:04 | 20:13 | 6:55 | 19:02 | 7:46 | 17:55 | 8:41 | 17:05 | 9:14 | 16:58 |
| 24 | 8:58 | 17:40 | 8:03 | 18:38 | 6:59 | 19:27 | 5:50 | 20:21 | 5:00 | 21:08 | 4:47 | 21:31 | 5:16 | 21:09 | 6:05 | 20:11 | 6:56 | 19:00 | 7:48 | 17:53 | 8:43 | 17:04 | 9:14 | 16:58 |
| 25 | 8:57 | 17:42 | 8:00 | 18:39 | 6:57 | 19:29 | 5:48 | 20:22 | 4:58 | 21:09 | 4:47 | 21:31 | 5:18 | 21:07 | 6:07 | 20:09 | 6:58 | 18:57 | 7:50 | 17:51 | 8:44 | 17:03 | 9:15 | 16:59 |
| 26 | 8:55 | 17:44 | 7:58 | 18:41 | 6:54 | 19:31 | 5:46 | 20:24 | 4:57 | 21:11 | 4:47 | 21:31 | 5:19 | 21:06 | 6:09 | 20:07 | 7:00 | 18:55 | 7:51 | 17:49 | 8:46 | 17:02 | 9:15 | 17:00 |
| 27 | 8:54 | 17:45 | 7:56 | 18:43 | 6:52 | 19:33 | 5:44 | 20:26 | 4:56 | 21:12 | 4:48 | 21:31 | 5:21 | 21:04 | 6:10 | 20:05 | 7:01 | 18:53 | 7:53 | 17:47 | 8:47 | 17:01 | 9:15 | 17:01 |
| 28 | 8:52 | 17:47 | 7:54 | 18:45 | 6:50 | 19:34 | 5:42 | 20:27 | 4:55 | 21:13 | 4:48 | 21:31 | 5:22 | 21:03 | 6:12 | 20:02 | 7:03 | 18:50 | 7:55 | 17:45 | 8:49 | 17:00 | 9:15 | 17:01 |
| 29 | 8:51 | 17:49 | | | 6:48 | 19:36 | 5:40 | 20:29 | 4:54 | 21:15 | 4:49 | 21:31 | 5:24 | 21:01 | 6:14 | 20:00 | 7:05 | 18:48 | 7:57 | 17:43 | 8:50 | 16:59 | 9:15 | 17:02 |
| 30 | 8:49 | 17:51 | | | 6:45 | 19:38 | 5:38 | 20:31 | 4:53 | 21:16 | 4:50 | 21:31 | 5:25 | 21:00 | 6:15 | 19:58 | 7:06 | 18:46 | 7:59 | 17:41 | 8:52 | 16:59 | 9:15 | 17:03 |
| 31 | 8:48 | 17:53 | | | 6:43 | 19:39 | | | 4:52 | 21:17 | | | 5:27 | 20:58 | 6:17 | 19:56 | | | 8:01 | 17:39 | | | 9:15 | 17:0 |

Source: National Research Council, Canada, Hertzberg Institute of Astrophysics

Sunrise/set = corresponds to the upper limb of the sun appearing at the horizon

| 2006 | JANUARY | | FEBRUARY | | MARCH | | APRIL | | MAY | | JUNE | | JULY | | AUGUST | | SEPTEMBER | | OCTOBER | | NOVEMBER | | DECEMBER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 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 | 7:52 | 18:46 | 6:41 | 19:41 | 5:36 | 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 | 5:34 | 20:34 | 4:51 | 21:19 | 4:51 | 21:30 | 5:29 | 20:55 | 6:20 | 19:52 | 7:09 | 18:42 | 8:04 | 17:36 | 8:54 | 16:57 |
| 3 | 9:15 | 17:08 | 8:43 | 17:58 | 7:48 | 18:50 | 6:36 | 19:44 | 5:32 | 20:35 | 4:50 | 21:20 | 4:52 | 21:29 | 5:31 | 20:53 | 6:21 | 19:49 | 7:11 | 18:39 | 8:06 | 17:34 | 8:56 | 16:57 |
| 4 | 9:15 | 17:09 | 8:42 | 18:00 | 7:46 | 18:52 | 6:34 | 19:46 | 5:31 | 20:37 | 4:50 | 21:21 | 4:53 | 21:29 | 5:33 | 20:52 | 6:23 | 19:47 | 7:13 | 18:37 | 8:07 | 17:32 | 8:57 | 16:56 |
| 5 | 9:14 | 17:10 | 8:40 | 18:02 | 7:43 | 18:54 | 6:32 | 19:48 | 5:29 | 20:39 | 4:49 | 21:22 | 4:53 | 21:28 | 5:34 | 20:50 | 6:25 | 19:45 | 7:14 | 18:35 | 8:09 | 17:31 | 8:58 | 16:56 |
| 6 | 9:14 | 17:11 | 8:38 | 18:04 | 7:41 | 18:55 | 6:30 | 19:49 | 5:27 | 20:40 | 4:48 | 21:23 | 4:54 | 21:28 | 5:36 | 20:48 | 6:26 | 19:42 | 7:16 | 18:32 | 8:11 | 17:29 | 9:00 | 16:56 |
| 7 | 9:14 | 17:13 | 8:37 | 18:05 | 7:39 | 18:57 | 6:27 | 19:51 | 5:25 | 20:42 | 4:48 | 21:24 | 4:55 | 21:27 | 5:37 | 20:46 | 6:28 | 19:40 | 7:18 | 18:30 | 8:13 | 17:27 | 9:01 | 16:55 |
| 8 | 9:13 | 17:14 | 8:35 | 18:07 | 7:37 | 18:59 | 6:25 | 19:53 | 5:23 | 20:44 | 4:47 | 21:24 | 4:56 | 21:27 | 5:39 | 20:44 | 6:29 | 19:38 | 7:19 | 18:28 | 8:15 | 17:25 | 9:02 | 16:55 |
| 9 | 9:12 | 17:15 | 8:33 | 18:09 | 7:34 | 19:01 | 6:23 | 19:55 | 5:22 | 20:45 | 4:47 | 21:25 | 4:57 | 21:26 | 5:40 | 20:42 | 6:31 | 19:35 | 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 | 4:46 | 21:26 | 4:58 | 21:25 | 5:42 | 20:41 | 6:33 | 19:33 | 7:23 | 18:23 | 8:18 | 17:22 | 9:04 | 16:54 |
| 11 | 9:11 | 17:18 | 8:29 | 18:13 | 7:30 | 19:04 | 6:18 | 19:58 | 5:18 | 20:49 | 4:46 | 21:27 | 4:59 | 21:24 | 5:44 | 20:39 | 6:34 | 19:31 | 7:25 | 18:21 | 8:20 | 17:21 | 9:05 | 16:54 |
| 12 | 9:11 | 17:20 | 8:27 | 18:15 | 7:27 | 19:06 | 6:16 | 20:00 | 5:17 | 20:50 | 4:46 | 21:27 | 5:00 | 21:23 | 5:45 | 20:37 | 6:36 | 19:28 | 7:26 | 18:19 | 8:22 | 17:19 | 9:06 | 16:54 |
| 13 | 9:10 | 17:21 | 8:25 | 18:17 | 7:25 | 19:08 | 6:14 | 20:01 | 5:15 | 20:52 | 4:46 | 21:28 | 5:02 | 21:22 | 5:47 | 20:35 | 6:38 | 19:26 | 7:28 | 18:17 | 8:24 | 17:18 | 9:07 | 16:54 |
| 14 | 9:09 | 17:23 | 8:24 | 18:19 | 7:23 | 19:10 | 6:12 | 20:03 | 5:14 | 20:53 | 4:45 | 21:29 | 5:03 | 21:21 | 5:49 | 20:33 | 6:39 | 19:24 | 7:30 | 18:14 | 8:25 | 17:16 | 9:08 | 16:54 |
| 15 | 9:08 | 17:24 | 8:22 | 18:21 | 7:21 | 19:11 | 6:09 | 20:05 | 5:12 | 20:55 | 4:45 | 21:29 | 5:04 | 21:20 | 5:50 | 20:31 | 6:41 | 19:21 | 7:32 | 18:12 | 8:27 | 17:15 | 9:09 | 16:54 |
| 16 | 9:07 | 17:26 | 8:20 | 18:22 | 7:18 | 19:13 | 6:07 | 20:07 | 5:11 | 20:56 | 4:45 | 21:30 | 5:05 | 21:19 | 5:52 | 20:29 | 6:43 | 19:19 | 7:33 | 18:10 | 8:29 | 17:13 | 9:10 | 16:55 |
| 17 | 9:06 | 17:28 | 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 | 8:31 | 17:12 | 9:11 | 16:55 |
| 18 | 9:05 | 17:29 | 8:16 | 18:26 | 7:14 | 19:17 | 6:03 | 20:10 | 5:08 | 20:59 | 4:45 | 21:30 | 5:08 | 21:17 | 5:55 | 20:24 | 6:46 | 19:14 | 7:37 | 18:06 | 8:32 | 17:11 | 9:11 | 16:55 |
| 19 | 9:04 | 17:31 | 8:14 | 18:28 | 7:11 | 19:18 | 6:01 | 20:12 | 5:06 | 21:01 | 4:45 | 21:31 | 5:09 | 21:16 | 5:57 | 20:22 | 6:48 | 19:12 | 7:39 | 18:04 | 8:34 | 17:10 | 9:12 | 16:55 |
| 20 | 9:03 | 17:33 | 8:11 | 18:30 | 7:09 | 19:20 | 5:59 | 20:13 | 5:05 | 21:02 | 4:45 | 21:31 | 5:10 | 21:15 | 5:58 | 20:20 | 6:49 | 19:10 | 7:40 | 18:02 | 8:36 | 17:08 | 9:13 | 16:56 |
| 21 | 9:02 | 17:34 | 8:09 | 18:32 | 7:07 | 19:22 | 5:56 | 20:15 | 5:04 | 21:04 | 4:46 | 21:31 | 5:12 | 21:13 | 6:00 | 20:18 | 6:51 | 19:07 | 7:42 | 17:59 | 8:37 | 17:07 | 9:13 | 16:56 |
| 22 | 9:01 | 17:36 | 8:07 | 18:34 | 7:04 | 19:23 | 5:54 | 20:17 | 5:02 | 21:05 | 4:46 | 21:31 | 5:13 | 21:12 | 6:02 | 20:16 | 6:52 | 19:05 | 7:44 | 17:57 | 8:39 | 17:06 | 9:14 | 16:57 |
| 23 | 8:59 | 17:38 | 8:05 | 18:35 | 7:02 | 19:25 | 5:52 | 20:19 | 5:01 | 21:06 | 4:46 | 21:31 | 5:14 | 21:11 | 6:03 | 20:14 | 6:54 | 19:03 | 7:46 | 17:55 | 8:41 | 17:05 | 9:14 | 16:57 |
| 24 | 8:58 | 17:40 | 8:03 | 18:37 | 7:00 | 19:27 | 5:50 | 20:20 | 5:00 | 21:08 | 4:47 | 21:31 | 5:16 | 21:09 | 6:05 | 20:12 | 6:56 | 19:00 | 7:47 | 17:53 | 8:42 | 17:04 | 9:14 | 16:58 |
| 25 | 8:57 | 17:41 | 8:01 | 18:39 | 6:57 | 19:29 | 5:48 | 20:22 | 4:59 | 21:09 | 4:47 | 21:31 | 5:17 | 21:08 | 6:07 | 20:09 | 6:57 | 18:58 | 7:49 | 17:51 | 8:44 | 17:03 | 9:15 | 16:59 |
| 26 | 8:56 | 17:43 | 7:59 | 18:41 | 6:55 | 19:30 | 5:46 | 20:24 | 4:58 | 21:10 | 4:47 | 21:31 | 5:19 | 21:06 | 6:08 | 20:07 | 6:59 | 18:56 | 7:51 | 17:49 | 8:45 | 17:02 | 9:15 | 17:00 |
| 27 | 8:54 | 17:45 | 7:57 | 18:43 | 6:53 | 19:32 | 5:44 | 20:25 | 4:56 | 21:12 | 4:48 | 21:31 | 5:20 | 21:05 | 6:10 | 20:05 | 7:01 | 18:53 | 7:53 | 17:47 | 8:47 | 17:01 | 9:15 | 17:00 |
| 28 | 8:53 | 17:47 | 7:54 | 18:45 | 6:50 | 19:34 | 5:42 | 20:27 | 4:55 | 21:13 | 4:48 | 21:31 | 5:22 | 21:03 | 6:11 | 20:03 | 7:02 | 18:51 | 7:55 | 17:45 | 8:49 | 17:00 | 9:15 | 17:01 |
| 29 | 8:51 | 17:49 | | | 6:48 | 19:36 | 5:40 | 20:29 | 4:54 | 21:14 | 4:49 | 21:31 | 5:23 | 21:02 | 6:13 | 20:01 | 7:04 | 18:49 | 7:56 | 17:43 | 8:50 | 17:00 | 9:15 | 17:02 |
| 30 | 8:50 | 17:51 | | | 6:46 | 19:37 | 5:38 | 20:30 | 4:54 | 21:15 | 4:50 | 21:31 | 5:25 | 21:00 | 6:15 | 19:58 | 7:06 | 18:46 | 7:58 | 17:41 | 8:51 | 16:59 | 9:15 | 17:03 |
| 31 | 8:48 | 17:52 | | | 6:43 | 19:39 | | | 4:53 | 21:17 | | | 5:26 | 20:58 | 6:16 | 19:56 | | | 8:00 | 17:40 | | | 9:15 | 17:0 |

Source: National Research Council, Canada, Hertzberg Institute of Astrophysics

Sunrise/set = corresponds to the upper limb of the sun appearing at the horizon

*Campbell-Stokes Bright Sunshine Recorder*
*Used at CRS from 1965-1992*
*photo credit: CR Beaulieu, 1993*

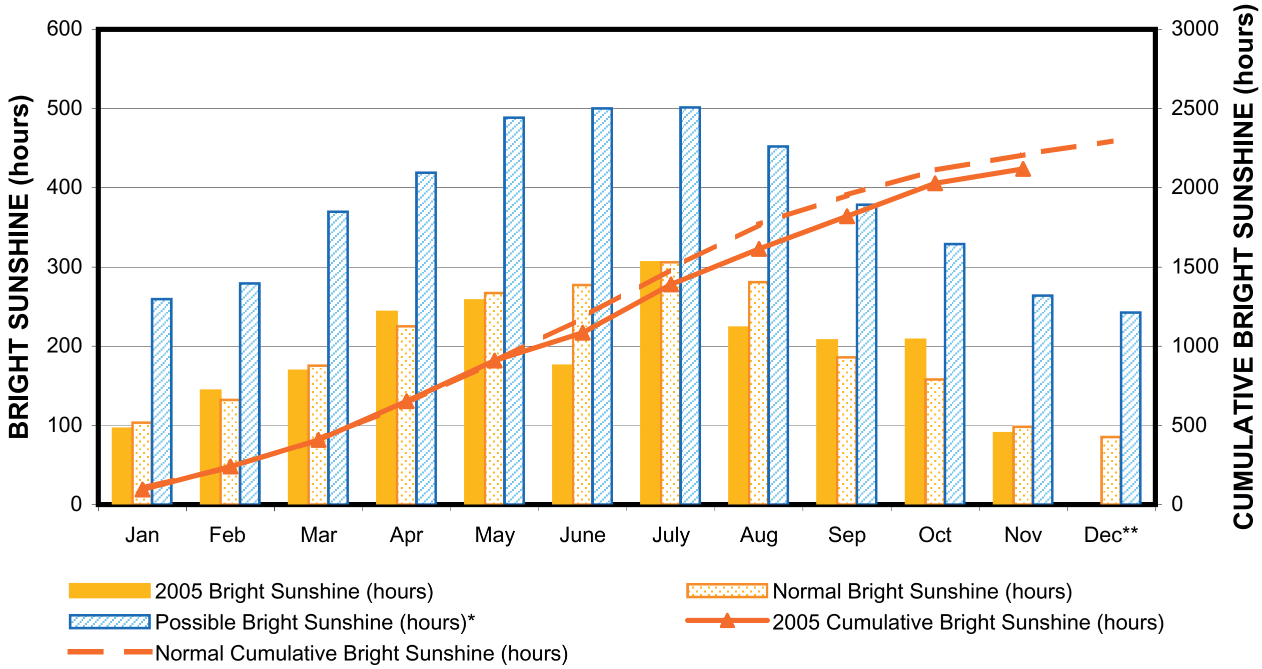
*CR Beaulieu with the old and new Bright Sunshine Recorders, 2003*
*photo credit: SRC Corporate Relations*

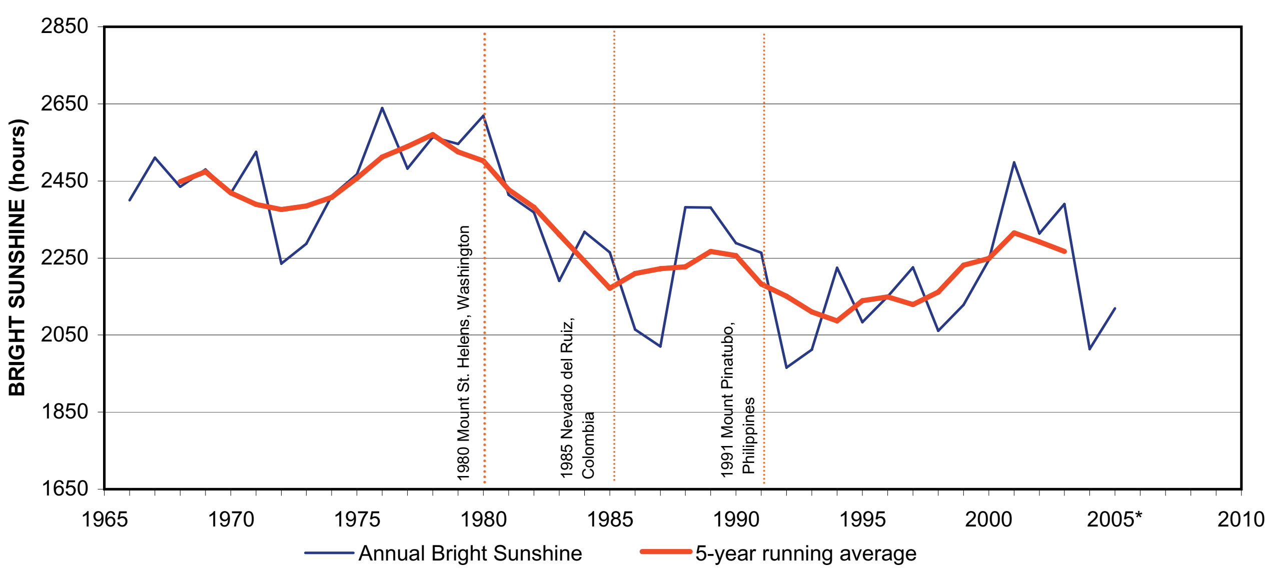
*Kipp & Zonen Auto Bright Sunshine Recorder*
*Used at CRS from 2001 to present*
*phot credit: CR Beaulieu, 2000*

## Bright Sunshine for 2005 and Annual Trend

| MONTH | BRIGHT SUNSHINE (hours) | | | | | CUMULATIVE BRIGHT SUNSHINE (hours) | | NUMBER OF BRIGHT SUNSHINE DAYS | |
|---|---|---|---|---|---|---|---|---|---|
| | 2005 | Normal | % of Normal | Possible* | % of Possible | 2005 | % of Normal | 2005 | NORMAL |
| January | 95.7 | 103.3 | 92.6 | 259.6 | 36.9 | 95.7 | 103.3 | 24 | 23.8 |
| February | 143.9 | 132.3 | 108.8 | 279.4 | 51.5 | 239.6 | 235.6 | 26 | 24.2 |
| March | 168.7 | 175.2 | 96.3 | 369.8 | 45.6 | 408.3 | 410.8 | 25 | 27.1 |
| April | 243.3 | 225.2 | 108.0 | 418.9 | 58.1 | 651.6 | 636.0 | 29 | 27.3 |
| May | 257.6 | 267.1 | 96.4 | 488.3 | 52.8 | 909.2 | 903.1 | 30 | 29.5 |
| June | 175.3 | 277.2 | 63.2 | 500.2 | 35.0 | 1084.5 | 1180.3 | 25 | 28.5 |
| July | 306.0 | 305.7 | 100.1 | 501.5 | 61.0 | 1390.5 | 1486.0 | 31 | 30.3 |
| August | 223.3 | 280.8 | 79.5 | 452.1 | 49.4 | 1613.8 | 1766.8 | 28 | 30.1 |
| September | 207.4 | 186.0 | 111.5 | 378.7 | 54.8 | 1821.2 | 1952.8 | 29 | 27.0 |
| October | 208.0 | 157.9 | 131.7 | 328.7 | 63.3 | 2029.2 | 2110.7 | 29 | 27.0 |
| November | 90.3 | 98.0 | 92.1 | 263.7 | 34.2 | 2119.5 | 2208.7 | 23 | 22.2 |
| December** | M | 85.4 | M | 242.3 | M | M | 2294.1 | M | 22.8 |
| Total | | 2294.1 | | 4483.2 | | | | | 319.8 |

*Possible bright sunshine hours calculated from Nat. Res. Council of Canada, Hertzberg Institute of Astrophysics sunrise/set table for 2005
**Bright sunshine recorder in for scheduled re-calibration check



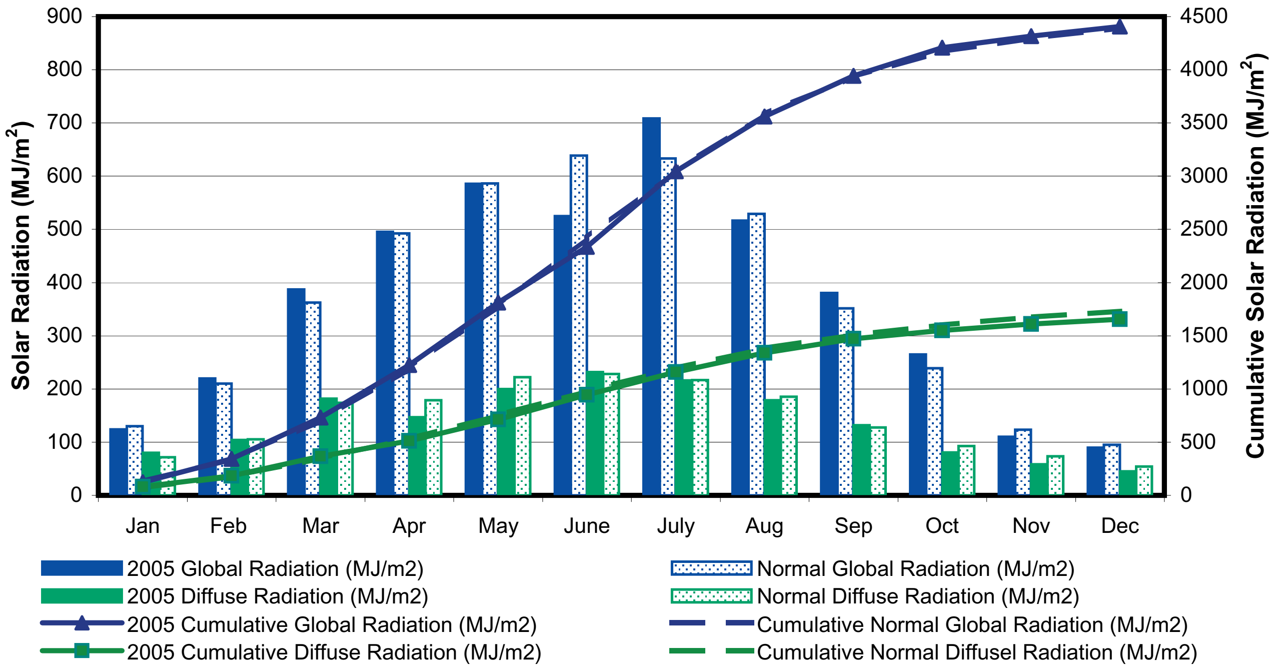
## Global and Diffuse Solar Radiation, 2005
**($MJ/m^2$)**

| DATE | JAN | | FEB | | MAR | | APR | | MAY | | JUN | | JULY | | AUG | | SEPT | | OCT | | NOV | | DEC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | G | D | G | D | G | D | G | D | G | D | G | D | G | D | G | D | G | D | G | D | G | D | G | D |
| 1 | 1.9 | 1.9 | 5.6 | 3.1 | 11.9 | 4.1 | 14.7 | 8.2 | 0.0 | 0.0 | 9.0 | 6.4 | 22.5 | 9.1 | 18.0 | 8.0 | 17.0 | 6.9 | 1.6 | 1.6 | 6.5 | 2.5 | 2.8 | 2.2 |
| 2 | 3.4 | 2.6 | 5.0 | 3.3 | 11.5 | 3.3 | 19.6 | 2.6 | 1.4 | 0.3 | 13.6 | 9.5 | 25.7 | 7.7 | 25.3 | 5.7 | 19.7 | 3.5 | 6.6 | 5.9 | 6.6 | 2.1 | 2.4 | 2.4 |
| 3 | 2.9 | 2.7 | 4.9 | 4.1 | 11.9 | 5.3 | 19.8 | 3.9 | 26.0 | 3.3 | 12.8 | 10.3 | 10.5 | 8.0 | 25.9 | 4.4 | 17.7 | 4.6 | 11.4 | 4.3 | 4.5 | 3.1 | 2.5 | 2.4 |
| 4 | 4.4 | 1.4 | 2.5 | 2.5 | 13.4 | 3.3 | 4.9 | 4.5 | 23.9 | 4.9 | 9.6 | 8.7 | 27.3 | 7.6 | 25.6 | 3.7 | 18.2 | 3.7 | 13.0 | 3.3 | 1.7 | 1.6 | 5.5 | 1.5 |
| 5 | 5.1 | 1.3 | 3.5 | 3.5 | 11.7 | 4.7 | 14.9 | 7.3 | 26.5 | 3.7 | 10.4 | 9.5 | 28.8 | 5.3 | 22.7 | 6.1 | 5.5 | 4.2 | 13.7 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 |
| 6 | 2.5 | 2.4 | 5.7 | 5.1 | 5.6 | 5.5 | 18.4 | 5.7 | 12.0 | 8.7 | 13.0 | 10.7 | 25.0 | 8.9 | 24.1 | 4.8 | 17.7 | 2.9 | 11.6 | 2.6 | 8.0 | 2.0 | 5.7 | 1.3 |
| 7 | 2.2 | 2.2 | 7.1 | 2.3 | 7.1 | 6.5 | 19.0 | 4.5 | 18.8 | 7.4 | 3.9 | 3.3 | 28.3 | 6.3 | 24.0 | 4.6 | 18.3 | 2.3 | 6.7 | 5.1 | 5.0 | 2.5 | 5.7 | 1.3 |
| 8 | 2.0 | 2.0 | 7.8 | 3.9 | 7.3 | 6.7 | 19.2 | 4.7 | 20.5 | 8.2 | 6.8 | 6.2 | 29.3 | 3.9 | 15.7 | 8.9 | 16.7 | 4.7 | 12.0 | 2.1 | 1.5 | 1.5 | 2.4 | 2.0 |
| 9 | 5.7 | 3.5 | 7.5 | 1.6 | 11.4 | 4.4 | 13.8 | 7.8 | 24.3 | 6.4 | 23.4 | 12.6 | 25.7 | 5.8 | 23.9 | 4.5 | 14.9 | 6.0 | 11.1 | 2.8 | 4.5 | 2.2 | 2.4 | 1.6 |
| 10 | 3.6 | 2.2 | 7.1 | 3.6 | 11.2 | 5.1 | 2.3 | 2.0 | 28.5 | 2.8 | 22.7 | 7.3 | 25.0 | 7.9 | 19.8 | 10.1 | 1.7 | 1.5 | 12.2 | 1.7 | 4.2 | 3.1 | 3.0 | 1.3 |
| 11 | 4.0 | 2.2 | 7.6 | 3.8 | 5.7 | 5.5 | 23.0 | 2.4 | 28.5 | 3.9 | 28.5 | 4.2 | 26.3 | 4.2 | 11.2 | 7.3 | 7.6 | 6.5 | 10.9 | 2.3 | 5.1 | 2.8 | 3.9 | 0.9 |
| 12 | 3.9 | 2.8 | 6.4 | 5.3 | 10.6 | 8.8 | 5.5 | 5.3 | 27.6 | 6.9 | 18.6 | 8.1 | 28.6 | 3.2 | 13.9 | 9.1 | 15.6 | 4.7 | 11.0 | 2.5 | 4.6 | 2.2 | 2.6 | 1.9 |
| 13 | 7.0 | 2.1 | 5.6 | 5.3 | 15.4 | 4.8 | 20.9 | 5.0 | 14.9 | 10.7 | 24.9 | 9.9 | 24.0 | 8.4 | 17.7 | 9.3 | 11.7 | 6.7 | 9.4 | 2.9 | 6.5 | 1.5 | 1.1 | 1.2 |
| 14 | 6.1 | 1.9 | 8.5 | 3.1 | 10.4 | 7.8 | 8.6 | 6.7 | 29.1 | 2.8 | 25.4 | 6.3 | 29.2 | 3.4 | 17.7 | 9.0 | 7.0 | 6.4 | 11.3 | 1.6 | 2.5 | 2.4 | 1.3 | 1.1 |
| 15 | 6.0 | 1.4 | 7.6 | 3.0 | 17.1 | 3.7 | 22.8 | 3.2 | 24.8 | 8.1 | 9.8 | 7.6 | 21.8 | 9.8 | 12.4 | 10.1 | 6.3 | 5.9 | 10.0 | 3.2 | 6.1 | 1.3 | 3.6 | 1.2 |
| 16 | 6.0 | 1.7 | 8.7 | 3.0 | 10.7 | 8.7 | 20.2 | 7.6 | 24.5 | 8.2 | 27.6 | 6.3 | 14.5 | 10.2 | 3.2 | 3.0 | 5.6 | 5.1 | 3.3 | 3.2 | 1.9 | 1.9 | 3.2 | 1.4 |
| 17 | 3.9 | 2.8 | 6.9 | 5.5 | 11.5 | 8.0 | 15.9 | 9.1 | 6.3 | 5.4 | 11.1 | 9.1 | 14.7 | 8.1 | 3.0 | 2.6 | 10.8 | 6.5 | 7.3 | 2.5 | 3.8 | 2.6 | 5.1 | 1.2 |
| 18 | 3.0 | 2.3 | 11.1 | 2.6 | 12.2 | 10.2 | 20.1 | 7.2 | 5.7 | 5.1 | 13.1 | 7.7 | 24.9 | 5.0 | 20.5 | 5.8 | 16.3 | 2.3 | 9.1 | 1.7 | 1.6 | 1.6 | 5.6 | 1.7 |
| 19 | 2.2 | 2.2 | 7.8 | 5.7 | 17.4 | 6.3 | 23.9 | 2.6 | 20.2 | 8.3 | 17.8 | 9.7 | 22.6 | 8.5 | 19.2 | 6.5 | 15.8 | 3.2 | 9.4 | 2.6 | 4.7 | 2.0 | 3.4 | 1.2 |
| 20 | 2.8 | 2.8 | 11.1 | 3.1 | 10.6 | 9.6 | 23.2 | 2.5 | 26.2 | 5.6 | 29.8 | 3.6 | 21.3 | 5.3 | 19.9 | 5.7 | 14.3 | 3.4 | 4.4 | 2.9 | 5.2 | 1.2 | 3.2 | 1.2 |
| 21 | 5.7 | 5.0 | 8.1 | 5.5 | 7.1 | 6.9 | 24.4 | 2.5 | 5.2 | 4.4 | 29.9 | 3.0 | 28.2 | 4.6 | 22.7 | 2.5 | 16.0 | 2.2 | 9.8 | 2.0 | 1.8 | 1.6 | 2.8 | 2.1 |
| 22 | 2.9 | 2.8 | 9.5 | 4.2 | 6.5 | 6.0 | 24.8 | 2.5 | 24.4 | 8.9 | 29.9 | 3.6 | 19.4 | 9.1 | 22.1 | 2.5 | 14.2 | 2.9 | 11.0 | 1.5 | 4.2 | 2.2 | 2.4 | 1.9 |
| 23 | 4.1 | 3.2 | 9.8 | 4.1 | 15.0 | 8.3 | 23.7 | 4.1 | 22.1 | 6.8 | 16.0 | 11.1 | 24.4 | 6.6 | 1.9 | 1.7 | 8.8 | 4.8 | 9.6 | 1.5 | 1.7 | 1.7 | 3.2 | 1.4 |
| 24 | 3.9 | 3.4 | 11.4 | 2.6 | 19.9 | 4.2 | 24.8 | 2.6 | 15.7 | 10.6 | 23.6 | 12.1 | 21.7 | 9.5 | 7.0 | 4.7 | 14.3 | 4.0 | 8.8 | 1.5 | 2.5 | 2.5 | 3.0 | 1.0 |
| 25 | 2.6 | 2.6 | 13.2 | 3.1 | 20.1 | 3.1 | 23.6 | 5.1 | 7.8 | 7.1 | 16.0 | 9.6 | 22.4 | 8.3 | 8.6 | 7.1 | 12.4 | 4.7 | 9.1 | 1.5 | 3.8 | 1.8 | 2.3 | 2.2 |
| 26 | 3.1 | 3.1 | 11.4 | 1.8 | 18.7 | 5.6 | 17.8 | 8.2 | 10.2 | 7.8 | 10.1 | 7.2 | 18.2 | 8.5 | 9.6 | 6.9 | 11.6 | 5.2 | 7.3 | 2.6 | 4.6 | 1.5 | 3.2 | 1.0 |
| 27 | 6.0 | 4.0 | 6.9 | 6.2 | 16.8 | 6.8 | 11.7 | 8.9 | 24.6 | 8.1 | 27.9 | 6.0 | 12.3 | 7.8 | 20.8 | 2.7 | 9.6 | 4.6 | 4.4 | 3.4 | 1.1 | 1.1 | 2.9 | 1.9 |
| 28 | 2.4 | 2.4 | 11.2 | 3.2 | 14.1 | 9.5 | 13.3 | 10.0 | 13.3 | 11.0 | 11.0 | 8.7 | 11.3 | 8.3 | 21.2 | 2.4 | 13.2 | 2.8 | 2.5 | 2.5 | 0.8 | 0.8 | 0.6 | 0.6 |
| 29 | 6.4 | 1.7 | | | 4.6 | 4.3 | 0.5 | 0.4 | 22.6 | 9.7 | 5.3 | 4.8 | 23.9 | 6.7 | 19.1 | 4.5 | 9.2 | 5.0 | 7.3 | 1.6 | 1.1 | 1.2 | 0.8 | 0.9 |
| 30 | 3.7 | 3.1 | | | 19.5 | 2.8 | | | 27.3 | 5.8 | 23.5 | 8.5 | 26.3 | 3.2 | 6.9 | 5.8 | 12.7 | 4.4 | 3.2 | 2.6 | 2.3 | 2.3 | 0.8 | 0.8 |
| 31 | 4.6 | 4.1 | | | 20.2 | 2.2 | | | 22.6 | 8.7 | | | 24.5 | 6.9 | 12.9 | 8.9 | | | 6.0 | 3.4 | | | 0.6 | 0.6 |
| TOTAL | 124.0 | 79.8 | 219.5 | 104.1 | 387.1 | 182.0 | 495.3 | 147.1 | 585.5 | 199.6 | 525.0 | 231.6 | 708.6 | 216.1 | 516.5 | 178.9 | 380.4 | 131.6 | 265.0 | 80.8 | 110.3 | 58.6 | 89.8 | 45.2 |

COMMENTS: G= Global Radiation D= Diffuse Radiation Units = MJ/m2

January 27: 1200hrs; Diffuse ring was found to have slipped; probably on the 25th. Skies had been cloudly up until the morning of the 27th. Measurement for the 27 are probably a liitle high for the diffuse but the previous days should be okay as they were mostly overcast

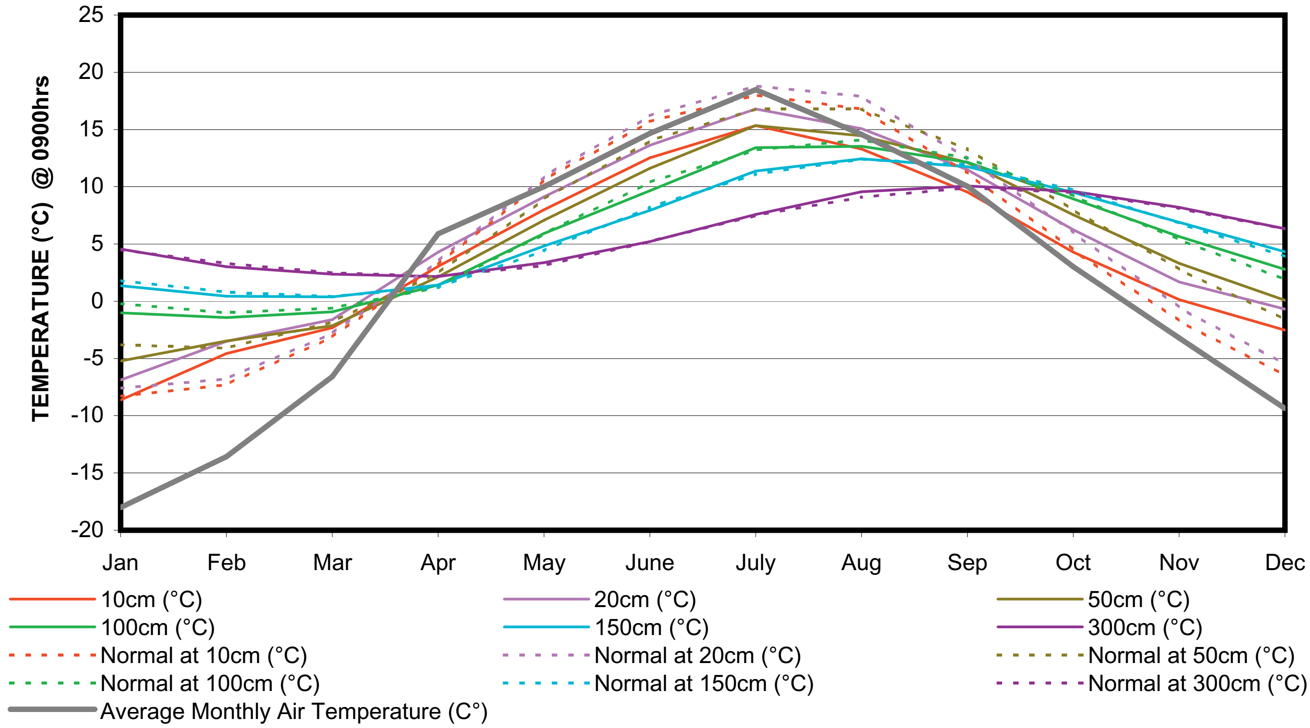
April 5th Diffuse replaced, Global replaced on March 15 Global and Diffuse new calibration numbers installed April 29. April 31-May 4 data logger problems.
December13, 28-31- Instruments covered by hoar frost - readings probably low

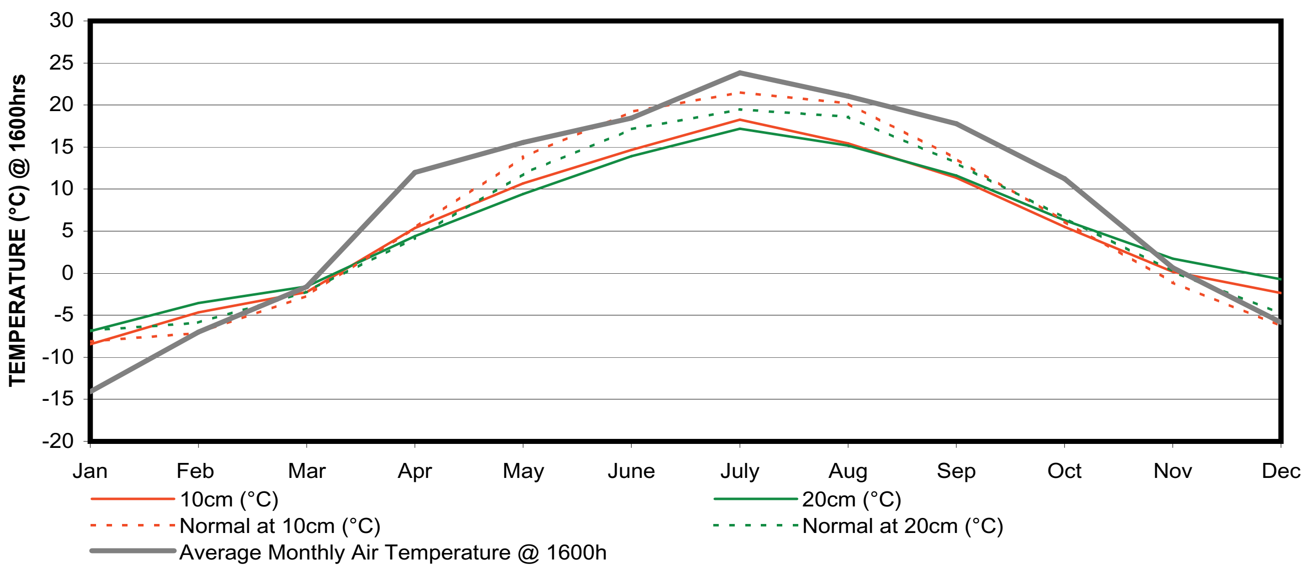


## Monthly Average Soil Temperatures, 2005

(10 to 300cm depths)

| MONTH | Mean Air Temp @ 0900h (°C) | SOIL TEMPERATURES (C°) @ 0900hrs | | | | | | | | | | | | SOIL TEMPERATURES @ 1600hrs | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10cm | | 20cm | | 50cm | | 100cm | | 150cm | | 300cm | | 10cm | | 20cm | |
| | | 2005 | NORM | 2005 | NORM | 2005 | NORM | 2005 | NORM | 2005 | NORM | 2005 | NORM | 2005 | NORM | 2005 | NORM |
| January | -18.0 | -8.6 | -8.3 | -6.9 | -7.6 | -5.2 | -3.8 | -1.0 | -0.2 | 1.4 | 1.8 | 4.5 | 4.5 | -8.5 | -8.1 | -6.9 | -6.8 |
| February | -13.6 | -4.6 | -7.3 | -3.5 | -6.8 | -3.5 | -4.1 | -1.4 | -1.0 | 0.4 | 0.8 | 3.0 | 3.3 | -4.7 | -7.1 | -3.5 | -5.9 |
| March | -6.6 | -2.3 | -3.1 | -1.6 | -2.8 | -2.1 | -1.8 | -0.9 | -0.6 | 0.4 | 0.4 | 2.4 | 2.5 | -2.3 | -2.7 | -1.6 | -2.2 |
| April | 5.9 | 3.1 | 3.2 | 4.3 | 3.5 | 2.1 | 2.5 | 1.4 | 1.2 | 1.4 | 1.2 | 2.2 | 2.2 | 5.4 | 5.4 | 4.4 | 4.2 |
| May | 10.0 | 8.0 | 10.6 | 9.1 | 10.9 | 7.1 | 8.9 | 5.9 | 5.9 | 4.8 | 4.4 | 3.4 | 3.1 | 10.7 | 13.8 | 9.4 | 11.8 |
| June | 14.7 | 12.5 | 15.7 | 13.6 | 16.2 | 11.6 | 14.0 | 9.7 | 10.4 | 8.0 | 8.2 | 5.2 | 5.2 | 14.7 | 19.2 | 13.9 | 17.1 |
| July | 18.5 | 15.4 | 18.0 | 16.8 | 18.8 | 15.4 | 16.8 | 13.4 | 13.2 | 11.4 | 11.1 | 7.6 | 7.5 | 18.3 | 21.5 | 17.2 | 19.5 |
| August | 14.6 | 13.3 | 16.8 | 15.1 | 17.9 | 14.5 | 16.8 | 13.5 | 14.1 | 12.4 | 12.4 | 9.6 | 9.1 | 15.5 | 20.2 | 15.2 | 18.6 |
| September | 10.0 | 9.5 | 11.2 | 11.5 | 12.5 | 12.1 | 13.3 | 12.1 | 12.5 | 11.8 | 11.9 | 10.1 | 9.9 | 11.4 | 13.6 | 11.6 | 13.1 |
| October | 3.0 | 4.3 | 4.5 | 6.3 | 6.0 | 7.5 | 8.0 | 8.9 | 9.2 | 9.5 | 9.7 | 9.6 | 9.5 | 5.5 | 6.2 | 6.3 | 6.6 |
| November | -3.2 | 0.1 | -1.7 | 1.7 | -0.5 | 3.3 | 2.8 | 5.7 | 5.4 | 6.9 | 6.8 | 8.2 | 8.1 | 0.2 | -1.1 | 1.7 | 0.2 |
| December | -9.4 | -2.5 | -6.5 | -0.7 | -5.5 | 0.1 | -1.6 | 2.8 | 1.9 | 4.3 | 3.9 | 6.3 | 6.3 | -2.4 | -6.3 | -0.7 | -4.8 |

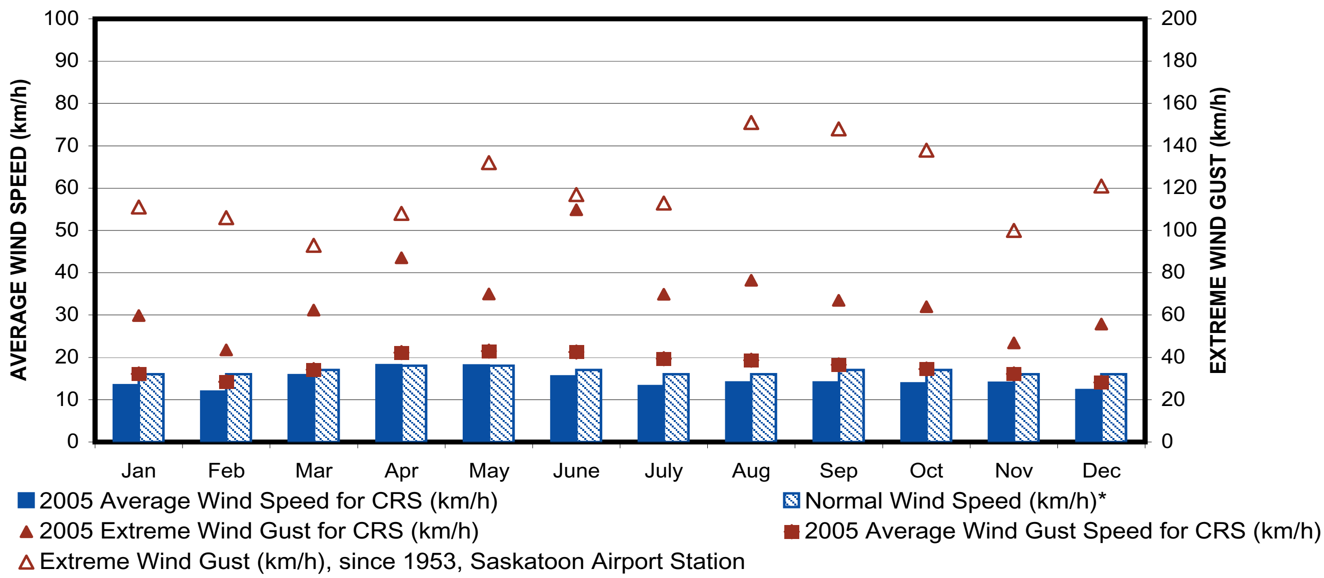


## Monthly Average Wind Speed and Extreme Gusts, 2005

| MONTH | AVERAGE WIND SPEED (km/h) | | | EXTREME GUST (km/h) | |
|---|---|---|---|---|---|
| | 2005 Average | Normal* | 2005 Average Wind Gust | 2005 Wind Gust for CRS (Speed/direction/date) | Extreme Wind Gust since 1953 (Saskatoon Airport Station) (Speed/direction/date) |
| January | 13.4 | 16.0 | 32.2 | 59.7$^{N}$21 | 111.0$^{W}$1986/11 |
| February | 11.9 | 16.0 | 28.4 | 43.6$^{NNE}$03 | 106.0$^{N}$1988/22 |
| March | 15.8 | 17.0 | 34.2 | 62.3$^{NW}$09 | 93.0$^{W}$1959/18 |
| April | 18.2 | 18.0 | 42.2 | 87.1$^{WSW}$15 | 108.0$^{W}$1959/06 |
| May | 18.1 | 18.0 | 42.9 | 70.0$^{SW}$18 | 132.0$^{SW}$1965/17 |
| June | 15.5 | 17.0 | 42.5 | 109.7$^{SW}$22 | 117.0$^{S}$1986/01 |
| July | 13.2 | 16.0 | 39.3 | 69.8$^{WNW}$23 | 113.0$^{E}$1955/05 |
| August | 14.1 | 16.0 | 38.7 | 76.4$^{WSW}$01 | 151.0$^{W}$1967/14 |
| September | 14.1 | 17.0 | 36.5 | 66.9$^{NNE}$10 | 148.0$^{W}$1967/22 |
| October | 13.9 | 17.0 | 34.5 | 63.9$^{SE}$15 | 138.0$^{NW}$1967/16 |
| November | 14.0 | 16.0 | 32.2 | 46.9$^{N}$14 | 100.0$^{W}$1976/17 |
| December | 12.3 | 16.0 | 28.2 | 55.8$^{NW}$09 | 121.0$^{W}$1955/12 |

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




## Windchill Calculation Chart[1]

(revised 2001)

| V \ T | 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 | -31 | -37 | -43 | -49 | -56 | -62 | -68 |
| **25** | 1 | -6 | -12 | -19 | -25 | -32 | -38 | -45 | -51 | -57 | -64 | -70 |
| **30** | 0 | -7 | -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 | -70 | -76 |
| **55** | -2 | -9 | -15 | -22 | -29 | -36 | -43 | -50 | -57 | -63 | -70 | -77 |
| **60** | -2 | -9 | -16 | -23 | -30 | -37 | -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 | -59 | -66 | -73 | -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:

| | |
|---|---|
| **-25** | Risk of frostbite in prolonged exposure |
| **-35** | Frostbite possible in 10 minutes with warm skin suddenly exposed Shorter time if skin is cool at the start. |
| **-60** | Frostbite possible in less than 2 minutes with warm skin suddenly exposed. Shorter time if skin is cool at the start. |

1: Environment Canada, 2001a, 2001b

where T = Air temperature (°C) and V = Observed wind speed at 10m elevation (km/h).

Saskatchewan Research Council

# Annual Weather Summary

latitude 52°09'N Longitude 106°36W asl 497 m Saskatoon

CRS estab. 1963

| | | 2005 VALUE | 2004 VALUE | NORMAL (1971-2000) OR EXTREME (1892-2004) |
|---|---|---|---|---|
| TEMPERATURE | Average annual maximum (°C) | 9.1 | 8.4 | 8.3 |
| | Extreme annual maximum (°C/date) | 32.8 July 31 | 32.9July 19 | 41.0 June 1988 |
| | Average annual minimum (°C) | -1.6 | -2.8 | -3.4 |
| | Extreme annual minimum (°C/date) | -34.5 January 14 | -41.0Jan 28 | -50.0 Feb. 1893 |
| | Annual **average** (°C) | 3.8 | 2.8 | 2.5 |
| | No.of Frost-free days (Temperature > 0°C) | 185 | 163 | 197.1 |
| DEGREE-DAYS | Annual growing (5°C base) | 1661.8 | 1460.9 | 1672.9 |
| | Annual frost-free growing (5°C base) | 1444.0 | 1257.0 | 1691.0 |
| | Annual heating (18°C base) | 5273.6 | 5627.3 | 5808.8 |
| | Annual cooling (18°C base) | 100.0 | 74.2 | 119.1 |
| PRECIPITATION | Annual total (mm) | 486.8 | 404.5 | 348.2 |
| | Greatest Daily (mm/date) | 58.8 June 29 | 44.4July 7 | 99.4 June 24, 1983 |
| | Greatest Monthly (mm/date) | 171.0 June | 95.4July | 160.1/June 1991 |
| | Measurable precipitation days (≥ 0.2mm) | 135 | 158 | 115.7 |
| WIND | Average monthly speed (km/h) | 14.5 | 13.0 | 16.6* |
| | Peak gust (speed/direction/date) | 109.7$^{SW}$June22 | 82.3$^{NNW}$Feb 10 | 151.0 $^{W}$Aug 14, 1967* |
| RADIATION | Total annual bright sunshine (hours) | 2119.5[A] | 2013.8 | 2294.1 |
| | % possible bright sunshine | 50.0[A] | 44.8 | 51.2 |
| | % normal bright sunshine | 96.0[A] | 87.8 | |
| | Bright Sunshine days | 299[A] | 301 | 319.9 |
| | % of normal Bright Sunshine days | 100.7[A] | 94.1 | |
| | Total annual global radiation(MJ/m$^2$) | 4407.0 | 4198.4 | 4391.9** |
| | Total annual diffuse radiation (MJ/m$^2$) | 1655.4 | 1736.1 | 1729.6** |

## For Your Information

**Normal and Extreme Values**

The 1971-2000 normals for CRS have been calculated from original data entered on computerized spreadsheets and checked for correctness. Where suitable, missing data has been replaced with data from the University of Saskatchewan, Kernen Farm station (2.5 km E of CRS) and the Meteorological Service of Canada Airport station (10 km WNW of CRS). Wind normals marked with '*' are from the MSC airport station. Global and Diffuse radiation normals are from 1961-1990 period and are marked with '**'. Extreme values are from the Saskatoon area weather stations extending back to 1882. The records from 1882 to 1901 have several large gaps.

**2005 Missing Values**

For missing data for diffuse/global instrument - refer to the 'Global and Diffuse Table'.

On April 29th, a new programme was entered into the datalogger with a loss of 3hours of data.

[A]Values are based on 11 months of data as December's data are missing due to routine recalibration.

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## January 2005

| | January 2005 | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | -11.9 | -14.6 | -11.6 | |
| | Extreme monthly maximum (°C/date) | 4.4/25 | 0.9/11 | 7.0/1986/11&1993/30 | 11.0/1980/23 $_{SWT}$ |
| | Average monthly **minimum** (°C) | -21.6 | -23.5 | -21.8 | |
| | Extreme monthly minimum (°C/date) | -34.5/14 | -41.0/28 | -43.9/1966/22&1969/28&29 | -48.9/1893/31 $_{SM}$ |
| | Monthly **average** (°C) | -16.8 | -19.1 | -16.7 | |
| | No. of Frost-free days (Temp. > 0°C) | 0 | 0 | 0 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date growing | 0.0 | 0.0 | 0.0 | |
| | Monthly heating (18°C base) | 1078.3 | 1149.9 | 1076.9 | |
| | Yearly total-to-date heating | 1078.3 | 1149.9 | 1076.9 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date cooling | 0.0 | 0.0 | 0.0 | |
| PRECIPITATION | Monthly total (mm) | 16.0 | 16.7 | 18.2 | 66.1/1911 $_{SE}$ |
| | Yearly total-to-date (mm) | 16.0 | 16.7 | 18.2 | |
| | Greatest daily (mm/date) | 3.2/01 | 3.5/30 | 15.4/1989/30 | 30.5/1893/23 $_{SM}$ |
| | Measurable precipitation days (≥ 0.2mm) | 14 | 14 | 11.3 | |
| WIND | Average monthly speed (km/h) | 13.4 | 13.8 | 16.0 $_{SA}$ | |
| | Peak gust (speed/direction/date) | $59.7^{N}$21 | $58.6^{ESE}$30 | | $111.0^{W}$1986/11 $_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 95.7 | 45.5 | 103.3 | |
| | % possible bright sunshine | 36.9 | 17.6 | 39.8 | |
| | % normal bright sunshine | 92.6 | 44.0 | | |
| | Bright Sunshine days | 24 | 17 | 23.8 | |
| | Monthly global radiation(MJ/m²) | 124.0 | 107.0 | 129.9 | |
| | Monthly diffuse radiation (MJ/m²) | 79.8 | 75.7 | 71.4 | |
| SOIL | Average temperature (°C) @ 9:00am grass level | -10.6 | -17.4 | | |
| | 10 cm/20 cm | -8.6/-6.9 | -9.6/-7.6 | -8.3/-7.6 | |
| | 50 cm/100cm | -5.2/-1.0 | -4.7/-0.7 | -3.8/-0.2 | |
| | 150 cm/300cm | 1.4/4.5 | 1.6/4.6 | 1.8/4.5 | |

**Saskatoon Stations**
**SM**=interrupted readings (NWMP) about 1892-1900
**SE**= Eby (pioneer) 1901-41
**SA**= S'toon Airport 1942-
**SWT**= S'toon Water Treatment Plant 1974-

**Normals**
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

January, named after the two-faced Roman god Janus, lived up to its name this year. Temperatures ranged from a balmy 4.4°C to a frigid -34.5°C. Twelve days recorded maximum temperatures above -10° while 14 days recorded minimum temperatures below -25°C. There were four days of above freezing temperatures at the end of the month to temper the -30°C temperatures measured at the beginning. On the 25th, a daily maximum temperature of 4.4°C replaced the old 1993 record of 2.5°C. Precipitation was variable with snow, rain and freezing-rain falling at various times during the month making walking and driving treacherous. Bright sunshine was 7.4% below normal with 12 days receiving less than one hour of sunshine and 7 days recording no bright sunshine.

Wide ranging temperatures during the month of January are not uncommon but in 1966, Pincher Creek, AB experienced one of the most bizarre fluctuations within an eight hour period. On January 6th the temperature was -24.4° at 7AM, 0.6° at 8AM and -21.7° at 9AM. The temperature remained steady until 3PM when it once again rose to 2.2°[1]

[1]Phillips, 1988

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## February 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | -5.2 | -10.1 | -7.7 | |
| | Extreme monthly maximum (°C/date) | 8.3/02 | -1.5/07 | 7.9/2002/17 | $12.8/1931/19_{SE}$ |
| | Average monthly **minimum** (°C) | -15.7 | -20.2 | -17.6 | |
| | Extreme monthly minimum (°C/date) | -26.5/07 | -33.5/24 | -41.1/1972/06 | $-50.0/1893/01_{SM}$ |
| | Monthly **average** (°C) | -10.5 | -15.2 | -12.6 | |
| | No.of Frost-free days (Temp. > 0°C) | 0 | 0 | 0.2 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date growing | 0.0 | 0.0 | 0.0 | |
| | Monthly heating (18°C base) | 797.1 | 928.7 | 886.2 | |
| | Yearly total-to-date heating | 1875.5 | 1961.8 | 1963.1 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date cooling | 0.0 | 0.0 | 0.0 | |
| PRECIPITATION | Monthly total (mm) | 16.4 | 8.1 | 13.3 | $43.7/1924_{SE}$ |
| | Yearly total-to-date (mm) | 32.4 | 15.3 | 31.5 | |
| | Greatest daily (mm/date) | 7.7/04 | 4.1/17 | 14.2/1979/13 | $30.0/1962/03_{SA}$ |
| | Measurable precipitation days (≥ 0.2mm) | 7 | 12 | 8.9 | |
| WIND | Average monthly speed (km/h) | 11.9 | 13.3 | 16.0 | |
| | Peak gust (speed/direction/date) | $43.6^{NNE}03$ | $57.7^{N}11$ | | $106.0^{N}1988/22_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 143.9 | 110.0 | 132.3 | |
| | % possible bright sunshine | 51.5 | 39.5 | 47.4 | |
| | % normal bright sunshine | 108.8 | 83.1 | | |
| | Bright Sunshine days | 26 | 19 | 24.2 | |
| | Monthly global radiation(MJ/m$^2$) | 219.5 | 202.1 | 210.1 | |
| | Monthly diffuse radiation (MJ/m$^2$) | 104.1 | 107.6 | 105.3 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | -5.2 | -7.5 | | |
| | 10 cm/20 cm | -4.6/-3.5 | -7.3/-6.1 | -7.3/-6.8 | |
| | 50 cm/100cm | -3.5/-1.4 | -4.7/-1.7 | -4.1/-1.0 | |
| | 150 cm/300cm | 0.4/3.0 | 0.2/3.1 | 0.8/3.3 | |

*Normals*
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

*Saskatoon Stations*
**SM**=interrupted readings (NWMP) about 1892-1900
**SE**= Eby (pioneer) 1901-41
**SA**= S'toon Airport 1942-Present

### For Your Information

Bright, white and warm all describe February 2005. We experienced 11.6 hours above average bright sunshine with three out of twenty-six bright sunshine days recording less than one hour. The two days of no bright sunshine were devoted to increasing the surface albedo with the accumulation of 14.6cm of new, white snow. By the 9th, the snow had settled to a 23cm depth on the ground; 13cm more than the beginning of the month. By February 28th, snow depth was still a respectable 21cm. Temperatures were ideal for outdoor enthusiasts taking advantage of the new snow. The first half of the month had six maximum temperatures above 0ºC while the last half only had two temperatures below -10ºC for the daytime maximum. On the 2nd, a new monthly maximum record was set at 8.3ºC breaking the 2002 record of 7.9ºC by 0.4ºC. Since the New Year, the station has recorded 10 days with temperatures above freezing during what is usually the coldest time of year.

The coldest, official temperature recorded in Canada was at Snag, Yukon on February 3rd, 1947. The weather observer used a small fine file to scratch directly on to the thermometer where the alcohol had fallen as it was below the last mark. After recalibration, -63ºC was accepted setting the mark for the coldest day in North America as well as Canada. That winter had been an exceptionally cold with six days in December and 11 days in January recording temperatures below -50ºC. From January 27th to February 5th temperatures remained below -55ºC. Unofficially, colder temperatures have been reported. On January 7, 1982, near Fort Nelson, B.C. a temperature of -71.1ºC was reported from a research site studying permafrost. This was the result of intense cold air ponding in the mountain valley overnight. The nearby airport reported only -42ºC.[1]

[1]Phillips, 1998.

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# Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

40th years

CRS estab. 1963

## March 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | -0.5 | 2.2 | -0.7 | |
| | Extreme monthly maximum (°C/date) | 8.7/30 | 15.0/30 | 20.0/1993/23 | 22.8/1910/23 $_{SE}$ |
| | Average monthly **minimum** (°C) | -8.9 | -8.6 | -10.5 | |
| | Extreme monthly minimum (°C/date) | -18.3/16 | -25.7/03 | -38.9/1972/02 | -43.3/1897/14 $_{SM}$ |
| | Monthly **average** (°C) | -4.7 | -3.2 | -5.6 | |
| | No. of Frost-free days (Temp. > 0°C) | 1 | 2 | 1.2 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 0.0 | 5.0 | 2.4 | |
| | Yearly total-to-date growing | 0.0 | 5.0 | 2.4 | |
| | Monthly heating (18°C base) | 703.9 | 658.3 | 732.4 | |
| | Yearly total-to-date heating | 2579.4 | 2593.7 | 2695.5 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date cooling | 0.0 | 0.0 | 0.0 | |
| PRECIPITATION | Monthly total (mm) | 19.9 | 19.4 | 16.2 | 59.0/1927 $_{SE}$ |
| | Yearly total-to-date (mm) | 52.3 | 45.5 | 47.7 | |
| | Greatest daily (mm/date) | 8.5/06 | 2.7/27 | 32.0/1967/30 | 32.0/1967/30 |
| | Measurable precipitation days (≥ 0.2mm) | 16 | 19 | 9.0 | |
| WIND | Average monthly speed (km/h) | 15.8 | 16.5 | 17.0 | |
| | Peak gust (speed/direction/date) | 62.3 $^{NW}$ 09 | 75.4 $^{NW}$ 10 | | 93.0 $^{W}$ 1959/18 |
| RADIATION | Monthly bright sunshine (hours) | 168.7 | 170.7 | 175.2 | |
| | % possible bright sunshine | 45.6 | 46.1 | 47.4 | |
| | % normal bright sunshine | 96.3 | 97.4 | | |
| | Bright Sunshine days | 25 | 30 | 27.1 | |
| | Monthly global radiation(MJ/m$^2$) | 387.1 | 384.5 | 362.4 | |
| | Monthly diffuse radiation (MJ/m$^2$) | 182.0 | 174.7 | 173.9 | |
| SOIL | Average temperature (°C) @ 9:00am grass level | -1.9 | -1.7 | | |
| | 10 cm/20 cm | -2.3/-1.6 | -1.0/-0.2 | -2.7/-2.2 | |
| | 50 cm/100cm | -2.1/-0.9 | -1.2/-0.1 | -1.8/-0.6 | |
| | 150 cm/300cm | 0.4/2.4 | 0.7/2.5 | 0.4/2.5 | |

**Saskatoon Stations**
**SM**=interrupted readings (NWMP) about 1892-1900
**SE**= Eby (pioneer) 1901-41

**Normals**
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

"In like a lamb and out like a lamb with a lion prowling around in between" could described March 2005. Maximum daily temperatures ranged between -9.6ºC and 8.7ºC while the minimum temperatures ranged between -18.3ºC and 0.6ºC. March 29th recorded the first frost-free day of 2005. Precipitation, 3.7mm above normal, was delivered over a near record period of 16 days. Only March 2004 had more precipitation days with 19. Mid-March tabulated 12 continuous days of precipitation with the exception of the 20th when only a trace was observed. Bright sunshine was below normal for both the number of days and hours. As soil temperatures begin to warm, it appears that the frost zone this winter reached the 150cm level but not the 300cm level.

Animals are often associated with the weather and weather events. The expression, *"raining cats and dogs"* stems from the folk belief that felines and canines have the ability to influence the weather. These attributions may stem partly from the powers and characteristics of the Norse gods and their attendant creatures and partly to both animals' sensitivity to changes in the weather. Cats are associated with torrential rain while storm winds are the dog's province.[1]

[1]Gibson, 2003

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Saskatchewan Research Council

# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## April 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 12.9 | 12.2 | 10.7 | |
| | Extreme monthly maximum (°C/date) | 24.1/08 | 25.9/27 | 31.5/2001/28 | 33.3/1952/28 SA US |
| | Average monthly **minimum** (°C) | 0.4 | -1.1 | -1.7 | |
| | Extreme monthly minimum (°C/date) | -5.1/30 | -6.7/09 | -27.8/1979/01 | -30.5/1979/01 SWT |
| | Monthly **average** (°C) | 6.7 | 5.6 | 4.5 | |
| | No.of Frost-free days (Temp. > 0°C) | 17 | 8 | 10.6 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 82.2 | 52.8 | 61.3 | |
| | Yearly total-to-date growing | 82.2 | 57.8 | 63.7 | |
| | Monthly heating (18°C base) | 339.6 | 372.7 | 420.7 | |
| | Yearly total-to-date heating | 2919.0 | 2966.4 | 3116.2 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.3 | |
| | Yearly total-to-date cooling | 0.0 | 0.0 | 0.3 | |
| PRECIPITATION | Monthly total (mm) | 12.8 | 8.2 | 23.6 | 86.1/1955 US |
| | Yearly total-to-date (mm) | 65.1 | 53.7 | 71.3 | |
| | Greatest daily (mm/date) | 4.4/15 | 2.2/29 | 24.6/1985/19 | 30.2/1955/19 US |
| | Measurable precipitation days (≥ 0.2mm) | 9 | 11 | 8.4 | |
| WIND | Average monthly speed (km/h) | 18.2 | 16.5 | 18.0 | |
| | Peak gust (speed/direction/date) | 87.1 WSW 15 | 79.7 NW 24 | | 108.0 W 1959/06 |
| RADIATION | Monthly bright sunshine (hours) | 243.3 | 226.8 | 225.2 | |
| | % possible bright sunshine | 58.1 | 54.0 | 53.8 | |
| | % normal bright sunshine | 108.0 | 100.7 | | |
| | Bright Sunshine days | 29 | 28 | 27.3 | |
| | Monthly global radiation(MJ/m²) | 495.3* | 485.0 | 492.2 | |
| | Monthly diffuse radiation (MJ/m²) | 147.1* | 191.9 | 178.5 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 11.5 | 8.9 | | |
| | 10 cm/20 cm | 3.1/4.3** | 4.4/5.6 | 3.2/3.5 | |
| | 50 cm/100cm | 2.1/1.4** | 3.8/3.0 | 2.5/1.2 | |
| | 150 cm/300cm | 1.4/2.2** | 2.5/2.6 | 1.2/2.2 | |

*Saskatoon Stations*
**SA**= S'toon Airport 1942-
**US**= Univ. of SK 1915-64
**SWT**= S'toon Water Treatment Plant 1974-

*Normals*
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

*Missing data*
* 3 days of data
** 1 day of data

### For Your Information

A pleasant April had gardening enthusiasts outside earlier than usual. Mean temperatures were 2.2°C above normal accompanied by seven extra frost-free days. On April 8th, a record daily maximum temperature of 24.1°C broke the old 1987 record of 19.5°C. Temperatures remained warm until the last days of the month when colder weather, along with snow, was experienced. Precipitation was a little more than half of normal. During the night of April 14th and the morning of the 15th, rain, slush and snow fell. As this was accompanied by 61.3 to 87.1km/h wind gusts, the total of 5.0mm may be low. Along with spring temperatures, bright sunshine hours were higher than normal with only one day not receiving some bright sunshine.

In the early morning hours of April 29, 1903, 82 million tonnes of limestone slide down the face of Turtle Mountain and buried part of the mining town of Frank, Alberta. In less than 100 seconds, the rockslide/avalanche [150 metres deep (50 stories), 425 metres long, (4 ½ football fields) and one kilometre wide] roared down into the valley and partially up the other side. Of the 100 people in the path of the slide, only 23 escaped. The cause of the slide is thought to have been a combination of the unstable nature of the mountain (the Indians of the area called it "The Mountain that Walked"), coal mining inside the mountain, water action in summit cracks and the severe weather conditions at the time.[1]

[1]Anon., nd

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# Monthly Weather Summary

SRC smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

40th years CRS estab. 1963

## May 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 17.4 | 15.6 | 18.6 | |
| | Extreme monthly maximum (°C/date) | 25.6/16 | 26.6/18 | 35.0/1988/30 | 37.2/1936/27$_{SE}$ |
| | Average monthly **minimum** (°C) | 4.2 | 2.4 | 4.7 | |
| | Extreme monthly minimum (°C/date) | -7.0/02 | -7.4/10 | -10.0/1967/02 | -12.8/1907/06$_{SE}$ |
| | Monthly **average** (°C) | 10.8 | 9.0 | 11.6 | |
| | No. of Frost-free days (Temp. > 0°C) | 24 | 20 | 25.6 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 189.9 | 134.8 | 211.6 | |
| | Yearly total-to-date growing | 272.1 | 192.6 | 275.3 | |
| | Monthly heating (18°C base) | 223.7 | 278.9 | 204.4 | |
| | Yearly total-to-date heating | 3142.6 | 3245.3 | 3320.6 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 7.4 | |
| | Yearly total-to-date cooling | 0.0 | 0.0 | 7.7 | |
| PRECIPITATION | Monthly total (mm) | 29.4 | 27.8 | 44.3 | 178.0/1977$_{SWT}$ |
| | Yearly total-to-date (mm) | 94.5 | 81.5 | 115.6 | |
| | Greatest daily (mm/date) | 11.8/18 | 5.2/05 | 39.9/1985/04 | 59.0/1999/18$_{SA}$ |
| | Measurable precipitation days (≥ 0.2mm) | 11 | 14 | 9.8 | |
| WIND | Average monthly speed (km/h) | 18.1 | 16.5 | 18.0 | |
| | Peak gust (speed/direction/date) | $70.0^{SW}18$ | $62.7^{S}28$ | | $132.0^{SW}1965/17_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 257.6 | 224.8 | 267.1 | |
| | % possible bright sunshine | 52.8 | 46.0 | 54.7 | |
| | % normal bright sunshine | 96.4 | 84.2 | | |
| | Bright Sunshine days | 30 | 28 | 29.5 | |
| | Monthly global radiation(MJ/m$^2$) | 585.5* | 577.6 | 586.3 | |
| | Monthly diffuse radiation (MJ/m$^2$) | 199.6* | 226.7 | 222.2 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 19.2 | 13.4 | | |
| | 10 cm/20 cm | 8.0/9.1 | 4.9/6.1 | 10.6/10.9 | |
| | 50 cm/100cm | 7.1/5.9 | 5.2/2.7 | 8.9/5.9 | |
| | 150 cm/300cm | 4.8/3.4 | 2.3/1.7 | 4.4/3.1 | |

**Saskatoon Stations**
**SE**= Eby (pioneer) 1901-41
**SA**= S'toon Airport 1942-
**SWT**= S'toon Water Treatment Plant 1974-

**Normals**
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

**Missing data**
* 2 days of data

### For Your Information

May's temperatures were slightly below normal with only eight days experiencing temperatures over 20°C. A daily minimum record of -6.0°C, recorded on the 14th, ended the frost season and, hopefully, the growing season has officially begun. This is potentially four days early than the normal date of May 18th. The earliest frost-free date for CRS is May 2, 1977 while the latest date is June 15, 1969. Rainfall was 66% of normal increasing the yearly deficit to 82% of normal. From the 16th to the 19th, 17.8mm or 60% of the total rain for the month was measured. While the average daily winds were normal, the station recorded 28 hours when the maximum wind gusts were 'Near Gale' force (51-62km/h) and 1hour of 'Gale' force (63-75km/h) winds. Sixteen days recorded maximum daily winds under 40 km/h.

In 1787, Francis Beaufort went to sea as a 13 year-old cabin boy. Even at this age, he recognized the value of being weather-wise and began keeping a meteorological journal; a practice he continued for his 68 years of service. He was knighted for his many contributions with the two most notable being his standardization of wind discriptions (Beaufort Scale) and weather notation codes which are the foundation of the present world-wide systems used today, 170 years later.[1]

[1]Heidorn, 1998

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## June 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 20.1 | 19.8 | 22.6 | |
| | Extreme monthly maximum (°C/date) | 32.0/22 | 30.4/29 | 41.0/1988/05 | 41.5/1988/06 S2 |
| | Average monthly **minimum** (°C) | 10.5 | 8.0 | 9.5 | |
| | Extreme monthly minimum (°C/date) | 6.8/25 | 2.5/23 | -3.3/1967/06 | -3.9/1917/02 US |
| | Monthly **average** (°C) | 15.3 | 13.9 | 16.0 | |
| | No.of Frost-free days (Temp. > 0°C) | 30 | 30 | 29.9 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 308.5 | 267.5 | 331.5 | |
| | Yearly total-to-date growing | 580.6 | 460.1 | 606.8 | |
| | Monthly heating (18°C base) | 91.9 | 131.5 | 82.8 | |
| | Yearly total-to-date heating | 3234.5 | 3376.8 | 3403.4 | |
| | Monthly cooling (18°C base) | 10.4 | 9.0 | 22.3 | |
| | Yearly total-to-date cooling | 10.4 | 9.0 | 30.0 | |
| PRECIPITATION | Monthly total (mm) | 171.0 | 88.2 | 59.5 | 186.8/1942 S |
| | Yearly total-to-date (mm) | 265.5 | 169.7 | 175.1 | |
| | Greatest daily (mm/date) | 58.8/29 | 24.0/11 | 99.4/1983/24 | 99.4/1983/24 SRC |
| | Measurable precipitation days (≥ 0.2mm) | 16 | 13 | 12.5 | |
| WIND | Average monthly speed (km/h) | 15.5 | 13.4 | 17.0 | |
| | Peak gust (speed/direction/date) | 109.7 SW 22 | 60.3 N 07 | | 117.0 S 1986/01 SA |
| RADIATION | Monthly bright sunshine (hours) | 175.3 | 247.1 | 277.2 | |
| | % possible bright sunshine | 35.0 | 49.4 | 55.4 | |
| | % normal bright sunshine | 63.2 | 89.1 | | |
| | Bright Sunshine days | 25 | 27 | 28.5 | |
| | Monthly global radiation(MJ/m²) | 525.0 | 591.4 | 638.7 | |
| | Monthly diffuse radiation (MJ/m²) | 231.6 | 203.0 | 228.1 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 21.0 | 20.1 | | |
| | 10 cm/20 cm | 12.5/13.6 | 12.9/13.7 | 15.7/16.2 | |
| | 50 cm/100cm | 11.6/9.7 | 11.4/9.2 | 14.0/10.4 | |
| | 150 cm/300cm | 8.0/5.2 | 7.5/3.0 | 8.2/5.2 | |

*Saskatoon Stations*
**SA**= S'toon Airport 1942-
**US**= Univ. of SK 1915-64
**SRC**= SK Res. Council 1963-
**S**= Saskatoon 1941-42
**S2**=Saskatoon 2 1977-90

*Normals*
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

No doubt 'ark building' was on the minds of a few people during the 67.4mm of rain which fell during the 28th and the 29th. Daily as well as monthly rainfall records were drowned in the deluge. Along with four new daily records, a new monthly record of 171.0mm will replace the old 160.1mm record set in 1991. The monthly rainfall was 111.5mm or 287% greater than normal. Ten days recorded rainfall amounts greater than 5mm; two more than the previous 1991 record. Other area stations report similar monthly rainfall amounts with the airport and Kernen Farm reporting preliminary totals of 160.5mm and 173.2mm respectfully.[1] June was cooler than normal with only one new daily maximum temperature record being set. On the 22nd the maximum temperature of 32.0°C inched above the old 1970 record of 31.7°C. Wind gusts over 51km/h were recorded on six days including one early morning wind on June 22nd measuring 109.7 km/h.
Wind descriptions have changed over the years. In Manitoba in 1891, an 'amateur' cyclone destroyed the upper storey of a log cabin depositing the unconscious family on the ground among the broken furniture and building materials.[2] This leaves one to wonder what a 'professional' cyclone would have done.

[1] Flysak, 2005, Environment Canada 2006a,b . [2] Phillips, 2004

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## July 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 25.3 | 23.9 | 24.8 | |
| | Extreme monthly maximum (°C/date) | 32.8/31 | 32.9/19 | 39.3/ 2001/05 | 40.0/1919/17&1941/19&1946/30 SEUSSA |
| | Average monthly **minimum** (°C) | 12.4 | 12.3 | 11.5 | |
| | Extreme monthly minimum (°C/date) | 5.8/28 | 4.7/29 | 1.7/1967/02&1978/09 | -0.6/1918/25 SE |
| | Monthly **average** (°C) | 18.9 | 18.1 | 18.2 | |
| | No. of Frost-free days (Temp. > 0°C) | 31 | 31 | 31 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 429.4 | 406.0 | 408.4 | |
| | Yearly total-to-date growing | 1010.0 | 866.1 | 1015.2 | |
| | Monthly heating (18°C base) | 32.1 | 48.1 | 35.3 | |
| | Yearly total-to-date heating | 3266.6 | 3424.9 | 3438.7 | |
| | Monthly cooling (18°C base) | 58.5 | 51.1 | 40.7 | |
| | Yearly total-to-date cooling | 68.9 | 60.1 | 70.7 | |
| PRECIPITATION | Monthly total (mm) | 44.4 | 95.4 | 58.0 | 162.9/1928 SE |
| | Yearly total-to-date (mm) | 309.9 | 265.1 | 233.1 | |
| | Greatest daily (mm/date) | 9.6/01 | 44.4/07 | 45.5/1968/29 | 79.2/1946/03 US |
| | Measurable precipitation days (≥ 0.2mm) | 12 | 15 | 12.0 | |
| WIND | Average monthly speed (km/h) | 13.2 | 13.0 | 16.0 | |
| | Peak gust (speed/direction/date) | 69.8 WNW 23 | 74.2 NNW 20 | | 113.0 E 1955/05 SA |
| RADIATION | Monthly bright sunshine (hours) | 306.0 | 243.1 | 305.7 | |
| | % possible bright sunshine | 61.0 | 48.5 | 61.0 | |
| | % normal bright sunshine | 100.1 | 79.5 | | |
| | Bright Sunshine days | 31 | 27 | 30.3 | |
| | Monthly global radiation(MJ/m²) | 708.6 | 587.8 | 633.5 | |
| | Monthly diffuse radiation (MJ/m²) | 216.1 | 244.2 | 216.5 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 25.0 | 23.0 | | |
| | 10 cm/20 cm | 15.4/16.8 | 16.5/17.4 | 18.0/18.8 | |
| | 50 cm/100cm | 15.4/13.4 | 15.8/12.8 | 16.8/13.2 | |
| | 150 cm/300cm | 11.4/7.6 | 10.5/7.1 | 11.1/7.5 | |

*Saskatoon Stations*

**SE**= Eby (pioneer) 1901-41
**SA**= S'toon Airport 1942-
**US**= Univ. of SK 1915-64

*Normals*

Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

**Highlights for July:**

Record maximum daily temperatures
July 6 new = 31.3°C; old 31.1°C/ 1975&79

Record minimum daily temperature
July 28 new = 5.8°C; old 6.0°C/1985

Days with maximum temperature > 30°C = 6
Days with maximum temperature > 32°C = 3
Days with extreme cooling degree-days (base 24) = 2

Record daily precipitation
July 30 new = 9.2; old 8.0/1989
Days with precipitation > 5 mm = 4

*The show must go on! Wind and rain struck Winnipeg on July 5, 1939 extensively damaging the Conklin Fair show rides. The Ferris wheels were moved more than 2 metres. A crew of 300 immediately began repairing the damage to prepare for the next day's visitors.* Phillips, 2004

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## August 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 22.5 | 21.2 | 24.6 | |
| | Extreme monthly maximum (°C/date) | 31.6/01 | 30.7/06 | 39.7/1998/06 | $39.7/1998/06_{SRC}$ |
| | Average monthly **minimum** (°C) | 10.2 | 8.9 | 10.4 | |
| | Extreme monthly minimum (°C/date) | 5.0/13 | 1.5/20 | -2.8/1976/28 | $-2.8/1901/23\&1976/28_{SM\ SRC}$ |
| | Monthly **average** (°C) | 16.4 | 15.1 | 17.5 | |
| | No.of Frost-free days (Temp. > 0°C) | 31 | 31 | 30.8 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 352.2 | 311.8 | 387.8 | |
| | Yearly total-to-date growing | 1362.2 | 1177.9 | 1403.0 | |
| | Monthly heating (18°C base) | 78.5 | 105.3 | 57.7 | |
| | Yearly total-to-date heating | 3345.2 | 3530.2 | 3496.4 | |
| | Monthly cooling (18°C base) | 27.7 | 14.1 | 42.5 | |
| | Yearly total-to-date cooling | 96.6 | 74.2 | 113.2 | |
| PRECIPITATION | Monthly total (mm) | 54.0 | 76.4 | 36.2 | $178.9/1954_{NRC}$ |
| | Yearly total-to-date (mm) | 363.9 | 341.5 | 269.3 | |
| | Greatest daily (mm/date) | 14.0/25 | 28.0/28 | 33.8/1998/17 | $84.3/1945/03_{SA}$ |
| | Measurable precipitation days (≥ 0.2mm) | 12 | 14 | 9.8 | |
| WIND | Average monthly speed (km/h) | 14.1 | 12.3 | 16.0 | |
| | Peak gust (speed/direction/date) | $76.4^{WSW}01$ | $67.7^{N}17$ | | $151.0^{W}1967/14_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 223.3 | 215.3 | 280.8 | |
| | % possible bright sunshine | 49.4 | 47.7 | 62.1 | |
| | % normal bright sunshine | 79.5 | 76.7 | | |
| | Bright Sunshine days | 28 | 27 | 30.1 | |
| | Monthly global radiation(MJ/m²) | 516.5 | 488.8 | 529.0 | |
| | Monthly diffuse radiation (MJ/m²) | 178.9 | 179.9 | 185.6 | |
| SOIL | Average temperature (°C) @ 9:00am grass level | 20.2 | 20.1 | | |
| | 10 cm/20 cm | 13.3/15.1 | 14.3/15.7 | 16.8/17.9 | |
| | 50 cm/100cm | 14.5/13.5 | 14.7/13.4 | 16.8/14.1 | |
| | 150 cm/300cm | 12.4/9.6 | 11.9/9.0 | 12.4/9.1 | |

*Saskatoon Stations*
**SM**=interrupted readings (NWMP) about 1892-1901
**SA**= S'toon Airport 1942-
**NRC**= Nat. Res. Council 1952-66
**SRC**= SK Res. Council 1963-

*Normals*
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

If you felt cheated on the hot weather this August, the statistics show you are right as the maximum monthly mean was 2.1° lower than normal. Normally August averages five days over 30°C, two days over 32°C and 1 day over 35°C but this year only three days recorded temperatures between 30°C and 32°C. Cooling degree-days were 65% of normal. Bright sunshine was 57.5 hours less than normal. If you were a duck, August was ideal with 49% extra precipitation. With August's precipitation, the station has now received more than it normally records for the whole year. Two new daily precipitation records were set. The 24th recorded 0.7mm more than the old 1989 record of 3.7mm and the 30th dripped by the 2002 record of 7.2mm by 0.4mm.

How does Saskatchewan rank, weather-wise, with the rest of Canada? We rank "Number 1" for the most sunny days in cold months, most sunny days year-round and the lowest annual snowfall. For the fewest fog days, fewest annual snow days, most sunny days in warm months, sunniest summer and sunniest year-round, we rank second. We come in third for most annual dry days, most thunderstorm days, sunniest fall, and sunniest winter and spring combined.[1]

[1]Envirnoment Canada 2005

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# Monthly Weather Summary

smart science solutions

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

40th years

CRS estab. 1963

## September 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 18.8 | 17.8 | 18.1 | |
| | Extreme monthly maximum (°C/date) | 30.8/03 | 23.5/28 | 35.6/1978/04 | 35.6/1978/04 SRC |
| | Average monthly **minimum** (°C) | 6.4 | 5.6 | 4.9 | |
| | Extreme monthly minimum (°C/date) | -2.2/28 | -2.5/30 | -7.8/1974/30 | -11.1/1908/28 SE |
| | Monthly **average** (°C) | 12.6 | 11.8 | 11.6 | |
| | No. of Frost-free days (Temp. > 0°C) | 29 | 29 | 25.6 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 228.7 | 204.0 | 203.5 | |
| | Yearly total-to-date growing | 1590.9 | 1381.9 | 1606.5 | |
| | Monthly heating (18°C base) | 164.7 | 187.3 | 198.9 | |
| | Yearly total-to-date heating | 3509.9 | 3717.5 | 3695.3 | |
| | Monthly cooling (18°C base) | 3.4 | 0.0 | 5.8 | |
| | Yearly total-to-date cooling | 100.0 | 74.2 | 119.0 | |
| PRECIPITATION | Monthly total (mm) | 81.6 | 23.2 | 29.4 | 111.7/1921 US |
| | Yearly total-to-date (mm) | 445.5 | 364.7 | 298.7 | |
| | Greatest daily (mm/date) | 35.6/10 | 9.4/20 | 35.6/1993/12 | 44.2/1931/12 US |
| | Measurable precipitation days (≥ 0.2mm) | 8 | 15 | 8.4 | |
| WIND | Average monthly speed (km/h) | 14.1 | 12.9 | 17.0 | |
| | Peak gust (speed/direction/date) | 66.9 NNE 10 | 67.5 N 30 | | 148.0 W 1967/22 SA |
| RADIATION | Monthly bright sunshine (hours) | 207.4 | 188.6 | 186.0 | |
| | % possible bright sunshine | 54.8 | 49.9 | 49.1 | |
| | % normal bright sunshine | 111.5 | 101.4 | | |
| | Bright Sunshine days | 29 | 27 | 27.0 | |
| | Monthly global radiation(MJ/m²) | 380.4 | 352.8 | 351.8 | |
| | Monthly diffuse radiation (MJ/m²) | 131.6 | 127.8 | 127.6 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 15.9 | 12.8 | | |
| | 10 cm/20 cm | 9.5/11.5 | 10.0/11.6 | 11.2/12.5 | |
| | 50 cm/100cm | 12.1/12.1 | 11.8/11.7 | 13.3/12.5 | |
| | 150 cm/300cm | 11.8/10.1 | 11.2/9.6 | 11.9/9.9 | |

*Saskatoon Stations*
**SE**= Eby (pioneer) 1901-41
**SA**= S'toon Airport 1942-
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**SRC**= SK Res. Council 1963-

*Normals*
Global and diffuse radiation = 1961-1990
Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

September: the month of leaves turning color, of the gardens and fields being harvested, of cooler temperatures but usually not of overwhelming rainfall events such as were experienced on the 10th and 11th. Due to the steady afternoon and evening downpour of the 10th, coupled with the continued rainfall of the 11th, 61.0mm of rain accumulated over a 37 hour period. Daily records for CRS were easily washed out on both days. Almost 75% of the monthly total fell during this period; double the normal precipitation for the entire month. With an additional 20.6mm falling during the rest of the month, the old 71.6mm monthly record set in 1969 was easily surpassed. The cumulative total, 445.5mm, is 3.5mm more than the 1991 September cumulative total. 1991 is the wettest year on record at CRS. If moderate precipitation continues for the rest of the year, 2005 may be the new "wettest year" at CRS. In spite of the rain, temperatures were slightly above normal and surprisingly, the bright sunshine was 5.6% or 21.4 hours above normal.

On September 8, 1952 the CBC had it's first official national television broadcast. What was the subject of the show? A subject of interest to all Canadians across the country – the weather of course![1]

1 Heidorn, 2003

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# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## October 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 12.1 | 9.2 | 10.8 | |
| | Extreme monthly maximum (°C/date) | 18.6/15 | 27.8/09 | 28.5/1980/06&1984/08 | 32.2/1943/05$_{SAUS}$ |
| | Average monthly **minimum** (°C) | 0.3 | -1.0 | -1.3 | |
| | Extreme monthly minimum (°C/date) | -6.9/22 | -8.5/26 | -21.5/1991/29,30 | -25.6/1919/26$_{SEUS}$ |
| | Monthly **average** (°C) | 6.2 | 4.1 | 4.8 | |
| | No.of Frost-free days (Temp. > 0°C) | 17 | 10 | 11.6 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 66.9 | 74.6 | 63.7 | |
| | Yearly total-to-date growing | 1657.8 | 1456.1 | 1670.2 | |
| | Monthly heating (18°C base) | 364.8 | 431.1 | 410.2 | |
| | Yearly total-to-date heating | 3874.7 | 4148.6 | 4105.5 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.1 | |
| | Yearly total-to-date cooling | 100.0 | 74.2 | 119.1 | |
| PRECIPITATION | Monthly total (mm) | 10.2 | 26.1 | 16.4 | 69.8/1969$_{SRC}$ |
| | Yearly total-to-date (mm) | 455.7 | 390.8 | 315.1 | |
| | Greatest daily (mm/date) | 3.5/02 | 8.2/18 | 36.7/1984/16 | 41.7/1924/12&1969/03$_{SESA}$ |
| | Measurable precipitation days (≥ 0.2mm) | 4 | 16 | 6.3 | |
| WIND | Average monthly speed (km/h) | 13.9 | 13.9 | 17.0 | |
| | Peak gust (speed/direction/date) | 63.9$^{SE}$15 | 69.3$^{N}$14 | | 138.0$^{NW}$1967/16$_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 208.0 | 141.3 | 157.9 | |
| | % possible bright sunshine | 63.3 | 43.0 | 48.0 | |
| | % normal bright sunshine | 131.7 | 89.5 | | |
| | Bright Sunshine days | 29 | 23 | 27.0 | |
| | Monthly global radiation(MJ/m$^2$) | 265.0 | 220.4 | 239.1 | |
| | Monthly diffuse radiation (MJ/m$^2$) | 80.8 | 99.0 | 92.6 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 7.8 | 3.9 | | |
| | 10 cm/20 cm | 4.3/6.3 | 0.6/2.4 | 4.5/6.0 | |
| | 50 cm/100cm | 7.5/8.9 | 5.0/5.5 | 8.0/9.2 | |
| | 150 cm/300cm | 9.5/9.6 | 6.8/6.9 | 9.7/9.5 | |

*Saskatoon Stations*
**SE**= Eby (pioneer) 1901-41
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*Normals*
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Soil Temperatures = 1961-1990
Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

It was delightful to be outside this October with its above seasonal temperatures and below average precipitation. The above seasonal temperatures were accompanied by above average bright sunshine and below average winds. The monthly average temperature was 1.4°C above normal. Only one daily average temperature was below 0°C. Even though we had only four days with measurable precipitation, a daily record was broken. On October 27th, the old 1.0mm set in 1970 and tied in 1971 was replaced with 1.3mm. Gardeners and dog walkers alike enjoyed an extra 50 hours of sunshine more than normal. High winds were recorded on the 15th, when winds reach 'Gale' force (63-75kph) during the late afternoon.

Parents and children alike watch the thermometer and barometer as October 31st arrives. Hallowe'en is much more pleasant when the weather co-operates. Since 1964, when CRS was established, 13 Hallowe'ens have had measurable precipitation, with six out of the past seven years recording some form of precipitation. Normal average temperatures for October 31st range between -5.3°C and 4.4°C. During the past 15 years, 7 years have been colder than -5.3°C.

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Saskatchewan Research Council

# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## November 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | 2.1 | 4.4 | -1.4 | |
| | Extreme monthly maximum (°C/date) | 12.7/10 | 14.8/15 | 19.4/1975/04 | $21.7/1903/03_{SE}$ |
| | Average monthly **minimum** (°C) | -5.5 | -5.8 | -10.3 | |
| | Extreme monthly minimum (°C/date) | -21.0/16 | -13.6/28 | -33.5/1985/24 | $-39.4/1893/30_{SM}$ |
| | Monthly **average** (°C) | -1.7 | -0.7 | -5.9 | |
| | No. of Frost-free days (Temp. > 0°C) | 5 | 2 | 1.2 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 4.0 | 4.4 | 2.6 | |
| | Yearly total-to-date growing | 1661.8 | 1460.9 | 1672.8 | |
| | Monthly heating (18°C base) | 592.2 | 561.6 | 715.8 | |
| | Yearly total-to-date heating | 4466.9 | 4710.2 | 4821.3 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date cooling | 100.0 | 74.2 | 119.1 | |
| PRECIPITATION | Monthly total (mm) | 17.6 | 0.7 | 14.8 | $57.3/1940_{SE}$ |
| | Yearly total-to-date (mm) | 473.3 | 391.5 | 329.9 | |
| | Greatest daily (mm/date) | 11.3/02 | 0.3/02 | 19.3/1978/04 | $27.9/1938/01_{US}$ |
| | Measurable precipitation days (≥ 0.2mm) | 10 | 3 | 7.9 | |
| WIND | Average monthly speed (km/h) | 14.0 | 13.8 | $16.0_{SA}$ | |
| | Peak gust (speed/direction/date) | $46.9^{N}14$ | $60.1^{NNW}22$ | | $100.0^{W}1976/17_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | 90.3 | 129.5 | 98.0 | |
| | % possible bright sunshine | 34.2 | 49.2 | 37.2 | |
| | % normal bright sunshine | 92.1 | 132.1 | | |
| | Bright Sunshine days | 23 | 29 | 22.2 | |
| | Monthly global radiation($MJ/m^2$) | 110.3 | 127.7 | 123.7 | |
| | Monthly diffuse radiation ($MJ/m^2$) | 58.6 | 58.7 | 73.6 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | 2.6 | -3.0 | | |
| | 10 cm/20 cm | 0.1/1.7 | -0.7/0.8 | -1.7/-0.5 | |
| | 50 cm/100cm | 3.3/5.7 | 2.3/4.9 | 2.8/5.4 | |
| | 150 cm/300cm | 6.9/8.2 | 6.4/7.9 | 6.8/8.1 | |

*Saskatoon Stations*
**SM**=interrupted readings (NWMP) about 1892-1900
**SE**= Eby (pioneer) 1901-41
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*Normals*
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Wind Normal and Extreme are from Saskatoon Airport

### For Your Information

November's average maximum and minimum temperatures were 3.5°C to 4.8°C above normal respectively. Even though temperatures went above freezing twenty times this month, they did not break any records for extremes temperatures. Die-hard golfers and other outdoor enthusiasts enjoyed the unexpected mild weather. Colder weather occurred mid-month and then again for the last few days. Precipitation was slightly above normal with one daily record being set on the 2nd when 11.3cm of snow fell breaking the 1984 record of 6.7cm. Precipitation was observed on 15 days. With the warm air temperatures, soil temperatures in the upper levels are above normal but the 100cm, 150cm and 300cm levels are near normal. Bright sunshine occurred on 23 days with total hours being 7.9% below normal.
Mild weather was hoped for on November 22nd, 2003 when the largest professional outdoor hockey game, witnessed by over 57 thousand fans, took place in Edmonton. Unfortunately temperatures dropped to -20°C coupled with a wind chill of -28C. Amazingly, most fans stuck around. Only one person suffered mild hypothermia – and it wasn't the streaker![1]

[1]Phillips 2004

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Saskatchewan Research Council

# Monthly Weather Summary

latitude 52°09'N Longitude 106°36'W asl 497 m Saskatoon

CRS estab. 1963

## December 2005

| | | 2005 VALUE | 2004 VALUE | NORMAL OR EXTREME FOR CRS 1971-2000 | EXTREME FOR SASKATOON STATIONS |
|---|---|---|---|---|---|
| TEMPERATURE | Average monthly **maximum** (°C) | -4.4 | -6.9 | -9.0 | |
| | Extreme monthly maximum (°C/date) | 7.4/09 | 11.0/03 | 11.2/1997/14 | 14.4/1939/05$_{SE}$ |
| | Average monthly **minimum** (°C) | -11.6 | -16.2 | -18.6 | |
| | Extreme monthly minimum (°C/date) | -25.8/17 | -29.7/23 | -42.2/1973/31 | -43.9/1892/22$_{SM}$ |
| | Monthly **average** (°C) | -8.0 | -11.6 | -13.9 | |
| | No.of Frost-free days (Temp. > 0°C) | 0 | 0 | 0.2 | |
| DEGREE-DAYS | Monthly growing (5°C base) | 0.0 | 0.0 | 0.1 | |
| | Yearly total-to-date growing | 1661.8 | 1460.9 | 1672.9 | |
| | Monthly heating (18°C base) | 806.7 | 917.1 | 987.7 | |
| | Yearly total-to-date heating | 5273.6 | 5627.3 | 5809.0 | |
| | Monthly cooling (18°C base) | 0.0 | 0.0 | 0.0 | |
| | Yearly total-to-date cooling | 100.0 | 74.2 | 119.1 | |
| PRECIPITATION | Monthly total (mm) | 13.5 | 13.0 | 18.3 | 59.2/1956$_{SA}$ |
| | Yearly total-to-date (mm) | 486.8 | 404.5 | 348.2 | |
| | Greatest daily (mm/date) | 2.3/13 | 2.3/02 | 14.5/1973/23 | 28.4/1936/02$_{SE}$ |
| | Measurable precipitation days (≥ 0.2mm) | 16 | 16 | 11.4 | |
| WIND | Average monthly speed (km/h) | 12.3 | 15.2 | 16.0 | |
| | Peak gust (speed/direction/date) | 55.8$^{NW}$09 | 75.4$^{WNW}$19 | | 121$^{W}$1955/12$_{SA}$ |
| RADIATION | Monthly bright sunshine (hours) | not available | 56.3 | 85.4 | |
| | % possible bright sunshine | not available | 23.2 | 35.2 | |
| | % normal bright sunshine | not available | 65.9 | | |
| | Bright Sunshine days | not available | 17 | 22.8 | |
| | Monthly global radiation(MJ/m$^2$) | 89.8 | 74.3 | 95.2 | |
| | Monthly diffuse radiation (MJ/m$^2$) | 45.2 | 53.5 | 54.3 | |
| SOIL | Average temperature (°C) @ 9:00am — grass level | -2.0 | -9.5 | | |
| | 10 cm/20 cm | -2.5/-0.7 | -4.9/-3.1 | -6.5/-5.5 | |
| | 50 cm/100cm | 0.1/2.8 | -1.2/2.2 | -1.6/1.9 | |
| | 150 cm/300cm | 4.3/6.3 | 4.1/6.3 | 3.9/6.3 | |

**Saskatoon Stations**
**SM**=interrupted readings (NWMP) about 1892-1900
**SE**= Eby (pioneer) 1901-41
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**Normals**
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### For Your Information

December temperatures ranged from 4.6°C to 7.0°C above normal for the monthly average maximum and minimum respectfully. The monthly mean of -8.0°C is the 7th warmest December recorded at CRS since 1963. Daily maximum records were set on the 9th, 11th, and 25th and tied on the 26th. The warm temperatures are reflected in the lower heating degree-days and especially in the above normal soil temperatures. Although precipitation occurred on 16 days, the monthly total was 4.8mm below average. Any snow accumulation was greatly reduced with 10 days of above 0°C temperatures. This year was the second wettest year at CRS with 486.8mm recorded; 138.6 mm or 39.8% above normal.

The term "Winter" conjures up different images to different people: *Eric Pinder* "...winter weather is often cold enough to make a polar bear purr." *Clyde Moore* "There's one good thing about snow, it makes your lawn look as nice as your neighbour's." *Pierre Berton* "Old Tyme Winter: The images that that phrase evokes are almost invariably nostalgic -- appealing, even comforting, and, yes, warm. What a word to apply to the memory of a climate so frigid it could freeze the eyelids together!" *Norman Pressman* "Winter tends to be a season which dwellers of cold regions try vehemently to deny."[1]

[1]Heidorn, 2001

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# INSTRUMENTS USED AT SASKATOON SRC CRS AND 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* 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.

Mathematically:

CDD = (T - 18°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°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°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 from the following data sets:

Saskatoon, SRC:1963 to present
Saskatoon, University of Saskatchewan:1916 to 1963
Saskatoon, City:1892 to present

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 (1971-2000)** 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, 1971 to December 31st, 2000. 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.

**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 Evaportranspiration; m = % of day length for the month as compared to the year; T = Temperatue °C when T is less than or equal to 0; otherwise T = O; 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. For particulars on precipitation measurement procedures and instruments, the reader is referred to the Environment Canada publication "*Manual of Climatological Observation*'*s*", 2nd Ed., January, 1978. 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 the Belfort 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, January, and February; spring as March, April and May; summer as June, July and August; and fall as September, October and November. (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 l, 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/m$^2$). (To facilitate comparison with past years' data: 1.0 MJ/m$^2$ = 23.895 langleys). Comparison is provided with a provisional average based on 16 years of data (l975-1990).

**SPELLS -** Temperature spells are defined as a sequence of 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. For details concerning measurement procedures, the reader is referred to the Environment Canada publication, "*Manual of Climatological Observations"*, 2nd Ed., January, 1978.

*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 (Environment Canada 2001a).

**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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