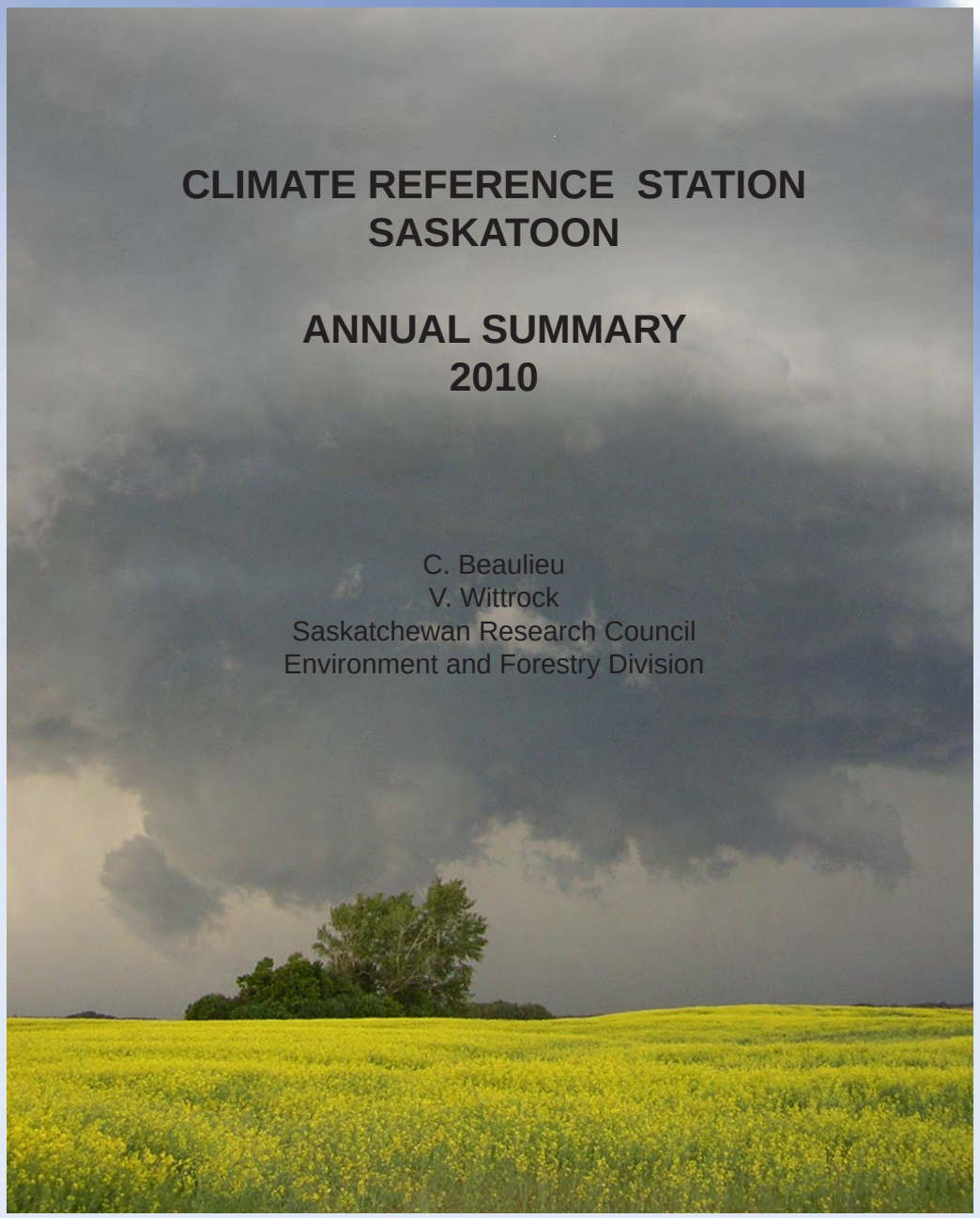
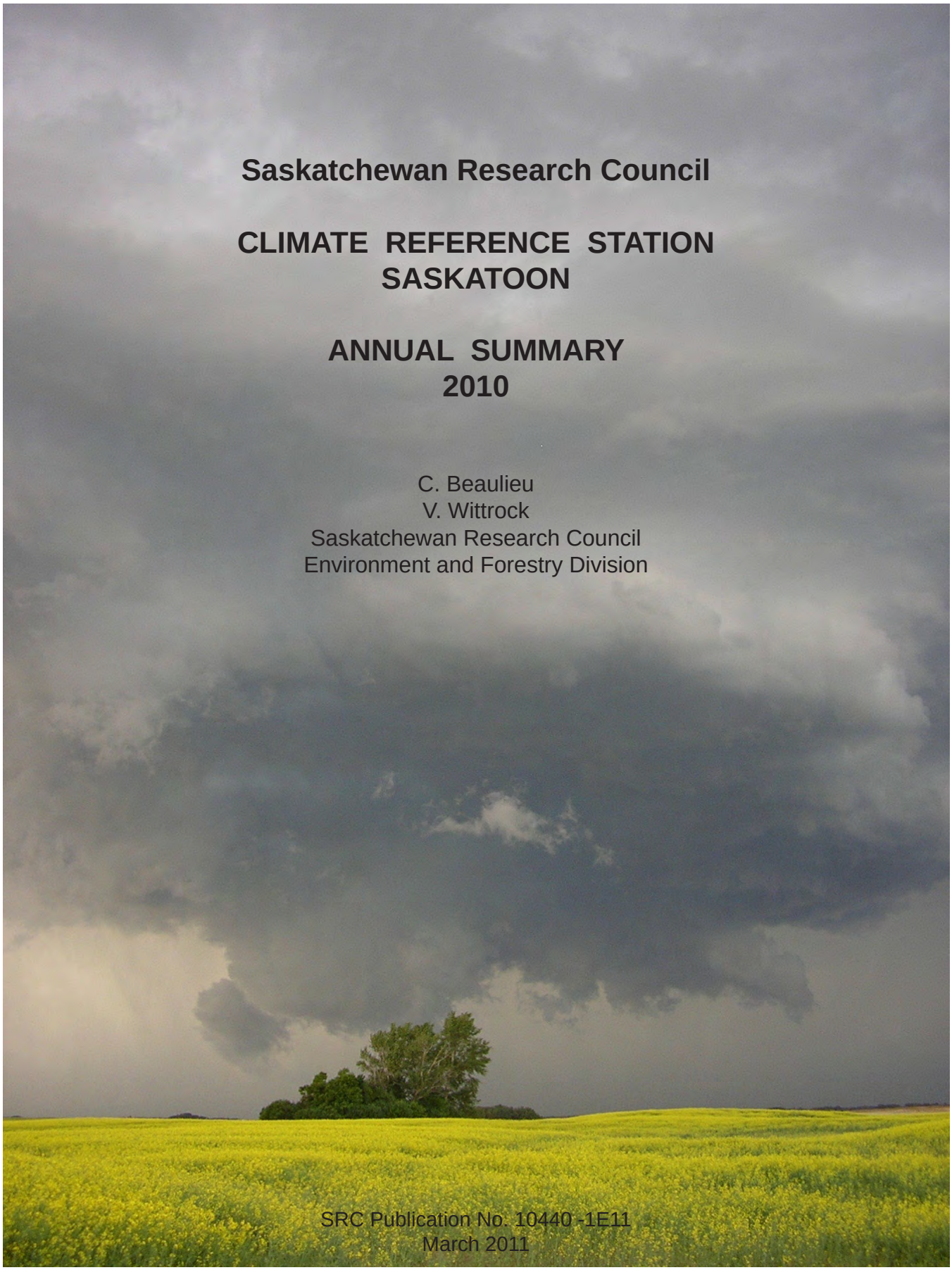


CLIMATE REFERENCE STATION SASKATOON

ANNUAL SUMMARY 2010

C. Beaulieu
V. Wittrock
Saskatchewan Research Council
Environment and Forestry Division

SRC Publication No. 10440 - 1E11
March 2011



Saskatchewan Research Council

CLIMATE REFERENCE STATION SASKATOON

ANNUAL SUMMARY 2010

C. Beaulieu
V. Wittrock
Saskatchewan Research Council
Environment and Forestry Division

SRC Publication No. 10440 -1E11
March 2011

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

COVER PHOTOGRAPH
Approaching Storm July 25, 2010
photo credit: Bob Godwin

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The 2010 data was compiled and recorded by Carol Beaulieu with assistance from Virginia Wittrock, Evan Siemens and Dawn Bolin. Miss Beaulieu was responsible for the monitoring of the site while instrument maintenance was carried out by the personel of the Alternative Energy & Manufacturing/Development Engineering of the Saskatchewan Research Council (SRC). Virginia Wittrock and Elaine Wheaton assisted with the proofreading and editing of this report. Consultations with Larry Flysak of the Meteorological Service of Canada (MSC), Saskatoon, SK, were most helpful in verifying and comparing data.

This report is being provided for informational purposes only. While the Saskatchewan Research Council believes this report to be accurate, it may contain errors or inaccuracies. SRC assumes no responsibility for the accuracy or comprehensiveness of this data and reliance on this data is entirely at the user's own risk.

Please be aware that our data is subject to ongoing quality assurance reviews that may result in minor changes and updates to some values in our reports, including past reports. If you notice errors in our reports, please contact us so that we may correct them.

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
Distinguished 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

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION SPONSORS, 2010
WE GRATEFULLY ACKNOWLEDGE THE SUPPORT OF THE FOLLOWING:

SaskPower

CAMPBELL SCIENTIFIC CANADA CORP.

Ministry of Energy and Resources

Kipp & Zonen

Saskatchewan Ministry of Agriculture

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

University of Saskatchewan

Saskatchewan Watershed Authority

CLIMATE REFERENCE STATION HISTORY

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

Little is known about the very early observers; however, the records do show that Major T.H. Keenan took observations from March 1892 until March 1895, and Mr. George Will was the observer from January 1897 until April 1897. It is thought that T. H. Copeland was involved in the observational programme 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.

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 bright sunshine data are submitted to Environment Canada.

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

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

[1]Ladd, 2008

photo credit: CR Beaulieu

WHAT IS THE CLIMATE REFERENCE STATION?

The Saskatchewan Research Council's Climate Reference Station (SRC CRS) at Saskatoon is classified as a principal climatological station with supplementary climatological 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, half-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;
- 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 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 accident studies, agricultural sectors, authors, building science, chemical companies, construction firms, governments, insurance agencies, lawyers, media, recreation facilities, schools, tourism groups, transportation studies, universities, wildlife studies, and interested individuals.

Goals

The goals of the Climate Reference Station are first, to maintain the high quality of data gathered over its more than forty-five 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 CRS to be an extremely valuable climate information collection station.

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

photo credit: V. Wittrock, June 2009

ACTIVITIES ASSOCATED WITH THE CLIMATE REFERENCE STATION, 2010

St. Michael Community School hosted the sixth annual SPLIT programme (Schools Plant Legacy in Trees) and requested a presentation on climate for their kindergarten to grade 8 participants. Approximately 110 students received hands-on experience with the weather instruments or a computer presentation highlighting Saskatoon's climate; past, present and future and why consideration of the climate is necessary for the planning of the urban landscape. The rural school of Cory Park again requested a presention for their 23 children, grades 3/4, studing the climate of the area. A presentation for Brownell School, grades 2 to 3, was given for 19 students.

New soil temperature probes, at seven depths, were installed in the spring/summer of 2009. We have been receiving temperature data from these sensors and will be bringing this data on-line in 2011. The delay in publishing the soil temperature data was to allow the soil to settle around the probes for the most accurate of reading as possible.

photo credit: CR Beaulieu, April 2010

SUMMARIES FOR 2010

Overview

Data concerning temperature, precipitation, wind speed and direction, bright sunshine, solar radiation, and soil temperatures, recorded at the Saskatchewan Research Council (SRC) Climate Reference Station (CRS) (52°09'N, 106°36'W, 497 m asl), are presented for the year 2010 and compared with the long-term (*circa* 1900-2009) and standard-period/normal (1971-2000) records.

2010 was a case of 'you should be careful what you wish for as you might just get it'. Up until April 13th, it was feared another severe drought year was looming with cumulative precipitation values rivaling those of 2001; the driest year recorded at the station. On April 13th, the skies opened and the deluge began with 41.8mm of rain over nineteen hours. By the end of August the cumulative precipitation was above the 1991 annual record of 546.9mm. The inundation finished with a September drenching of over 100mm. By December 31st, a new annual record had been established at 707.4mm for any Saskatoon stations since recording started around 1900.[1] The number of rain events totalling amounts of at least 10mm or 25mm was 21 and 7 respectively. The torrent ended as it began with 44.2mm on September 10th.

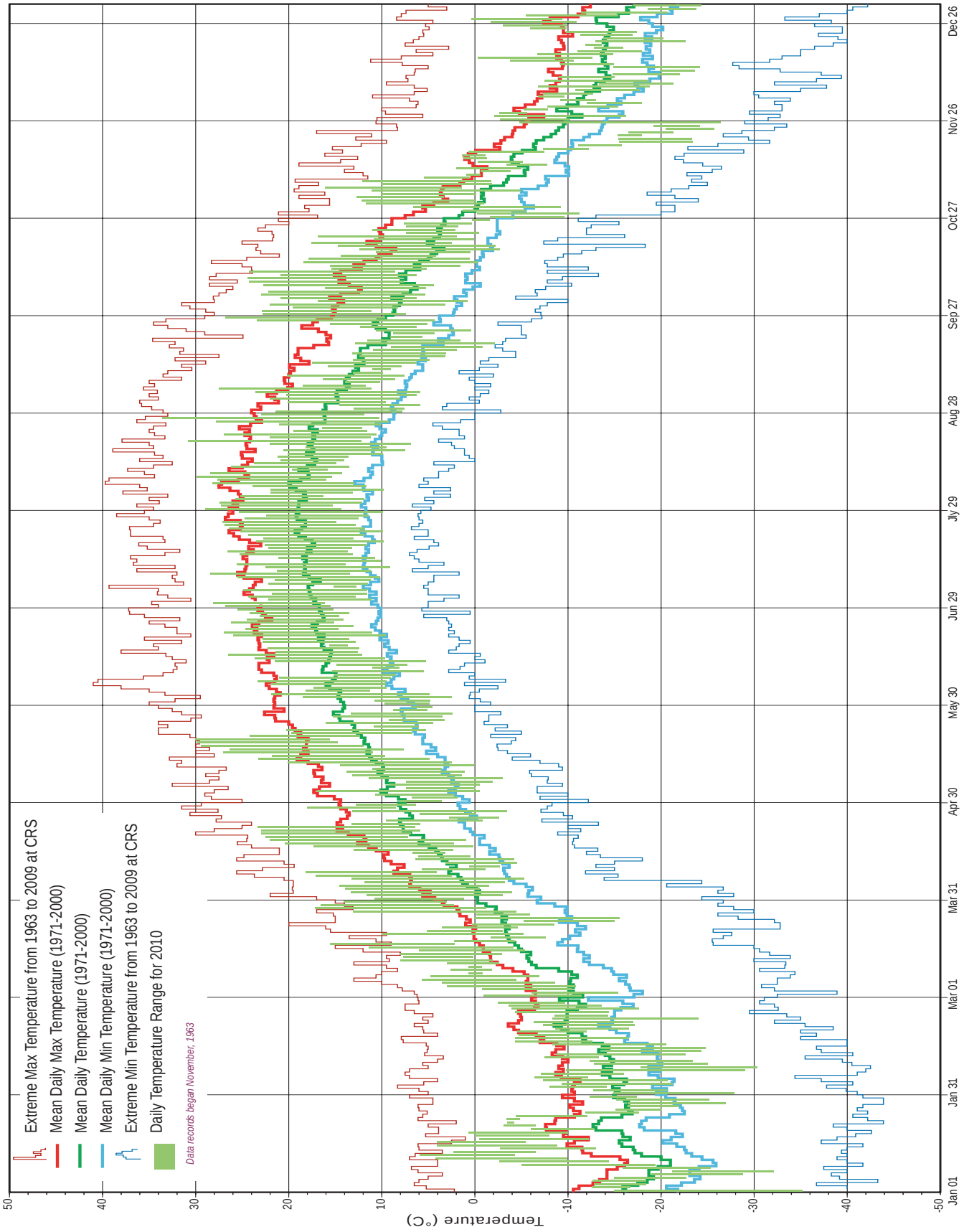
With precipitation hogging all of the attention, temperature was regulated to an "also ran" status. The year began with above normal temperatures for January, March and April then the maximum temperatures fell slightly below normal while the minimums continued to be slightly above. The annual mean temperature just made it into the top ten warmest years; coming in at 9th place. Spring temperatures were high with the minimum, at 0.2°C, being the second warmest spring recorded at the station. Extreme maximum temperature records occurred nine times with seven occurring during the spring. No record extreme low temperatures were measured. Cold and hot spells, where the temperature must be equal or less/greater than -30°C/30°C tied at three days apiece with no -40°C recorded. The growing season began on May 8th and ended on September 16th for a respectable 132 days.

High winds and low temperatures combined to produce high risk wind chill values on 15 occasions. The year began with the highest wind chill value of -51 due to a temperature of -35°C and a wind speed of 10km/h. Average wind speeds for 2010 were between 10 and 18 km/h. Extreme wind speeds, over 70km/h, blasted during the months of March, April, May, June and July. The April 'storm' winds of 91km/h produced blizzard-like conditions even with the minimal amount of snow remaining on the ground and the 5cm of accompanying snow fall. Prevailing winds were from the southeast followed by west-northwest.

Above normal bright sunshine hours were recorded only for July, September, October and possibly January (estimated value). The year ended with totals for sunshine hours and days near normal. Overall the annual bright sunshine totaled 2272.8 hours for 316 days.

[1]Environment Canada 2002

DAILY TEMPERATURE



TEMPERATURE

TEMPERATURE RECORDS °C

TYPE				DATE	NEW RECORD	OLD RECORD/date
Daily	Maximum	Extreme High		Jan 16	4.1	2.5/1986
				Mar 14	8.0	8.0/1981&1999
				Mar 17	15.6	9.0/1991
				Mar 20	10.0	9.5/1986
				Mar 28	17.2	13.1/2000
				Mar 29	16.6	14.0/1990
				May 18	29.8	29.6/2006
				May 19	30.0	30.0/1964
				Oct 10	24.3	23.9/2000
		Low		April 25	2.8	4.2/2002
				May 30	9.7	11.7/1988
				May 31	10.8	11.5/1980
	Minimum	High		Jan 16	-5.4	-6.0/1986
				Jan 22	-4.2	-6.7/1976
				Mar 17	2.2	0.0/1966, 1973, 1987
				Mar 30	3.0	2.0/1990
				May 18	14.7	12.6/2006
				May 19	15.6	13.0/1980
				Sept 28	11.1	10.6/1966
				Sept 29	8.3	8.3/2006
				Oct 7	7.7	7.0/1980
				Nov 8	0.6	0.6/1970
				Nov 9	-0.6	-1.3/2001
		Extreme Low		none		
	Mean	High		Jan 16	-0.7	-1.8/1986
				Mar 13	4.0	4.0/1994
				Mar 17	8.9	4.5/1973
				Mar 28	8.0	6.3/1986
				Mar 29	9.5	7.8/1990
				Mar 30	8.6	8.0/1990
				May 18	22.3	21.1/2006
				May 19	22.8	19.8/1980
				Oct 7	16.0	15.5/1980
		Low		May 31	7.8	8.0/1980
Monthly	Max	Ave	Highest	March	5.1	4.0/ 1981, 1986, 2000
	Min	Low	Highest	March 25	-15.5	-18.3/(1973,01) (2005,16)
		Ave	Highest	Oct	1.2	1.0/2003
	Mean	Low	Highest	March 02	-10.8	-11.4/(1973,01)
		Ave	Highest	March	0.1	-0.3/1993
				Sept	7.6	7.4/1965, 2003
Most No. of Days during a month- when...	Max Temp. >0°C			March	25	25/1992&1994
	Max Temp. >10°C			March	7	6/1991&2000
	Max Temp. >20°C			October	8	8/1988
	Min Temp >0°C			March	5	5/1990, 1993, 2000
				October	21	19/2003
Degree -days	Heating		Least	March	555.0	568.7/1993
				October	322.8	329.7/1969
	Growing		Most	October	123.6	120.1/2003

EXTREME TEMPERATURES

COLD SPELL (less than or equal to -30°C)		HOT SPELL (greater than or equal to 30°C)	
DATE	TEMPERATURE °C	DATE	TEMPERATURE °C
January 1	-35.2	May 19	30.0
January 7	-32.1	August 19	30.8
February 8	-30.3	August 26	33.6

Coloured cells indicate extremes for the year

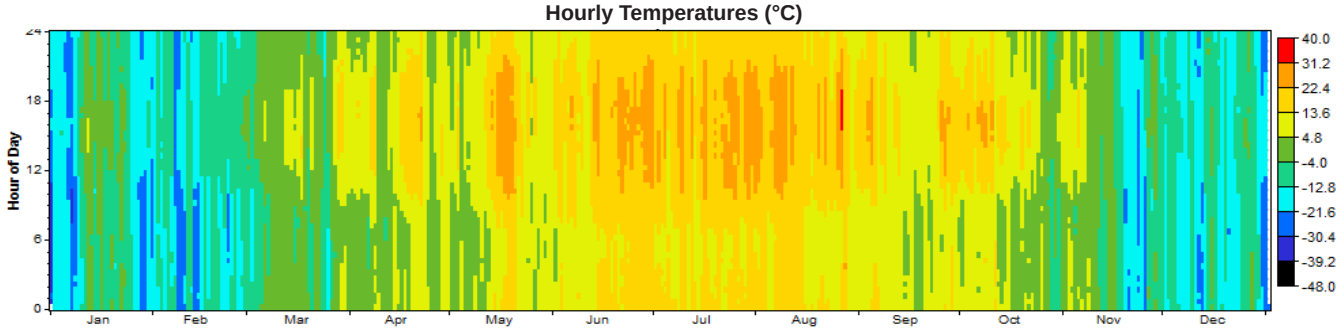
DATES & DURATION OF THE FROST-FREE SEASON

YEAR	LAST SPRING FROST	FIRST FALL FROST	Frost-free Season Length
1964	May 31	Sept 26	117
1965	May 27	Sept 05	100
1966	May 19	Sept 13	116
1967	Jun 06	Sept 23	108
1968	May 19	Sept 25	128
1969	Jun 14	Sept 15	92
1970	May 19	Sept 12	115
1971	May 18	Sept 20	124
1972	May 08	Sept 04	118
1973	May 06	Sept 14	130
1974	May 25	Sept 02	99
1975	May 21	Sept 11	112
1976	May 06	Aug 28	113
1977	May 01	Aug 31	121
1978	May 30	Sept 30	122
1979	May 30	Aug 13	74
1980	May 14	Aug 26	103
1981	May 24	Sept 03	101
1982	May 29	Aug 27	89
1983	May 24	Sept 13	111
1984	May 24	Aug 31	98
1985	Jun 04	Sept 06	93
1986	May 17	Sept 06	111
1987	May 21	Oct 06	137
1988	May 02	Sept 19	139
1989	May 28	Sept 10	104
1990	May 13	Sept 21	130
1991	May 27	Sept 18	113
1992	May 23	Sept 14	113
1993	May 17	Sept 14	119
1994	May 09	Oct 04	147
1995	May 22	Sept 18	118
1996	May 12	Sept 29	139
1997	May 14	Oct 05	143
1998	May 13	Sept 30	139
1999	May 09	Sept 27	140
2000	May 17	Sept 23	128
2001	May 10	Oct 04	146
2002	May 23	Sept 23	122
2003	May 18	Sept 29	133
2004	May 20	Sept 30	132
2005	May 14	Sept 28	136
2006	May 04	Sept 19	137
2007	May 10	Sept 14	126
2008	May 26	Sept 26	122
2009	June 05	Oct 07	123
2010	May 07	Sept17	132
1971 - 2000 Normal	May 18	Sept 14	116.9
1981-2010 Normal	May 18	Sept 20	124.0

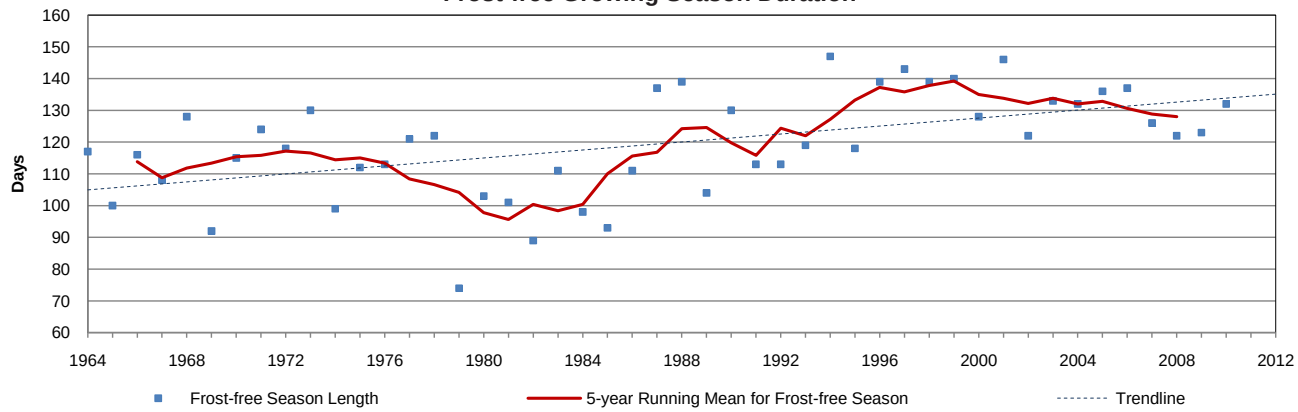
photo credit: CR Beaulieu, April 2010

TEMPERATURE

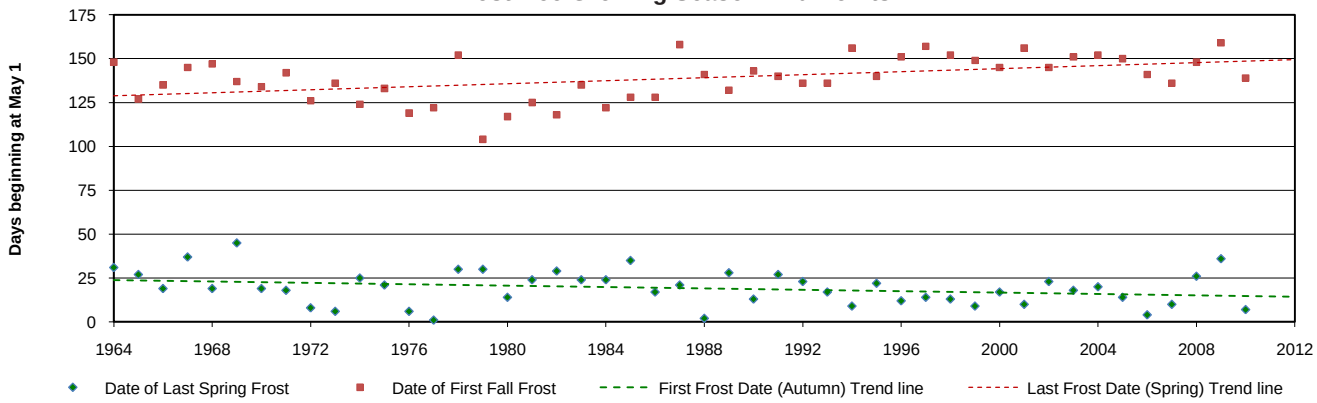
Hourly Temperatures (°C)



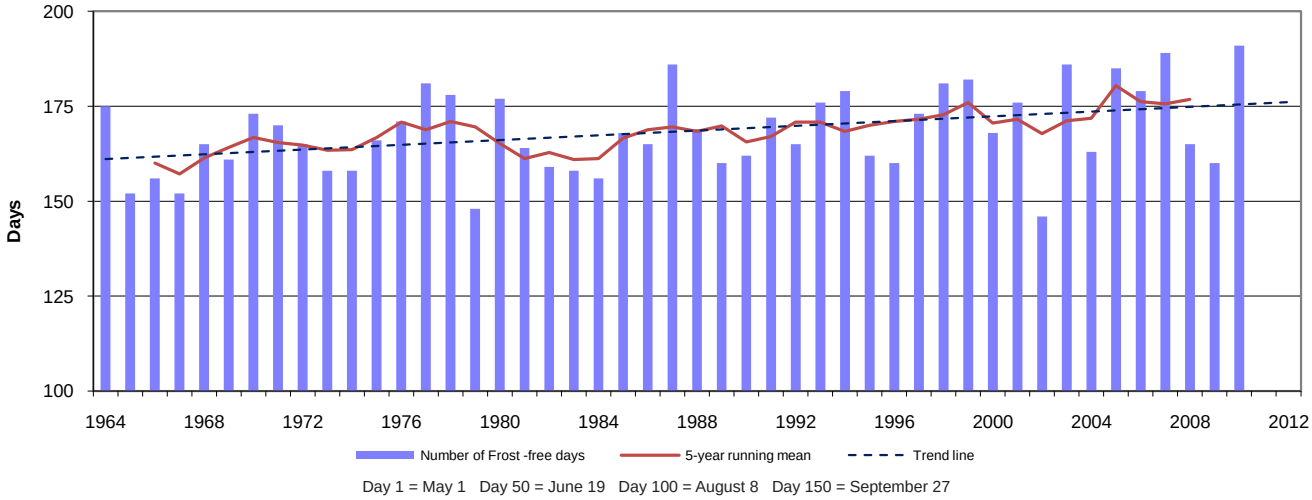
Frost-free Growing Season Duration



Frost-free Growing Season End Points



Total Number of Frost-free Days (Minimum Temperature >0°C)



Day 1 = May 1 Day 50 = June 19 Day 100 = August 8 Day 150 = September 27

TEMPERATURE RANKINGS

ANNUAL AVERAGE TEMPERATURES °C

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

SEASONAL MAXIMUM AVERAGE TEMPERATURES °C

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

TEMPERATURE RANKINGS

SEASONAL MINIMUM AVERAGE TEMPERATURES °C

WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2006	-13.2	1993	0.3	2006	12.5	2009	1.3
1998	-13.4	2010	0.2	2003	12.5	2005	0.4
1987	-13.6	1987	-0.2	1988	12.3	2008	0.1
1992	-14.9	1977	-0.5	1970	12.3	1998	0.1
1964	-15.0	1999	-0.5	2002	12.2	1981	0.0
2002	-15.5	1985	-0.7	1991	12.2	2001	-0.1
1983	-15.6	1994	-0.8	2001	11.7	1967	-0.2
2000	-15.8	1981	-1.0	2007	11.7	1968	-0.2
2004	-16.7	1992	-1.0	1989	11.6	1997	-0.3
1999	-16.8	2006	-1.0	1998	11.6	1987	-0.3
2007	-17.0	1988	-1.0	2010	11.5	2004	-0.4
1981	-17.1	1986	-1.1	1997	11.5	1994	-0.5
1995	-17.2	2000	-1.1	2008	11.3	1999	-0.6
1986	-17.3	2001	-1.2	1984	11.2	1992	-0.7
2003	-17.5	2007	-1.3	1996	11.2	2010	-0.7
1988	-17.8	2005	-1.4	1983	11.2	1980	-0.9
1976	-17.8	1990	-1.5	1964	11.0	1983	-1.0
1984	-17.8	1973	-1.7	2005	11.0	1970	-1.1
2005	-17.8	1978	-1.7	1972	11.0	2007	-1.1
1975	-18.5	1991	-2.0	2000	11.0	1964	-1.4
1970	-18.7	1968	-2.0	1981	10.9	1988	-1.4
1977	-18.8	1998	-2.0	1995	10.8	1979	-1.4
1989	-18.9	1984	-2.2	1990	10.7	2000	-1.7
2001	-19.0	2003	-2.3	1999	10.7	1989	-1.8
2010	-19.1	1972	-2.4	1987	10.6	1969	-1.9
1990	-19.1	2004	-2.5	1994	10.6	1971	-2.1
1991	-19.3	1980	-2.6	1965	10.5	2002	-2.2
2008	-19.5	2008	-3.2	1976	10.5	2003	-2.2
1980	-19.6	1976	-3.3	1971	10.3	1977	-2.4
1968	-20.0	1983	-3.7	2009	10.3	1974	-2.4
1973	-20.3	1969	-3.8	1973	10.0	1975	-2.5
1993	-20.5	1995	-3.8	1979	10.0	1993	-2.5
1994	-20.8	1966	-3.9	1966	9.9	1995	-2.6
1967	-21.1	1964	-3.9	1993	9.9	1972	-2.7
1997	-21.3	1971	-4.0	1975	9.8	2006	-2.8
2009	-21.4	1997	-4.3	2004	9.7	1978	-2.9
1996	-21.9	1982	-4.3	1978	9.7	1986	-3.1
1974	-22.6	1989	-4.3	1980	9.6	1990	-3.4
1985	-22.9	1996	-4.9	1982	9.6	1976	-3.6
1971	-23.1	1970	-5.0	1986	9.6	1982	-3.7
1982	-23.6	2009	-5.6	1974	9.6	1991	-3.7
1966	-23.6	1965	-5.8	1967	9.5	1984	-3.8
1969	-24.0	1979	-6.1	1969	9.4	1966	-4.3
1965	-24.0	1974	-6.5	1968	9.2	1996	-4.3
1978	-24.5	1975	-6.5	1992	8.8	1965	-4.4
1972	-25.0	1967	-6.9	1977	8.8	1973	-4.6
1979	-25.2	2002	-7.6	1985	8.2	1985	-6.0

SEASONAL MEAN AVERAGE TEMPERATURES °C

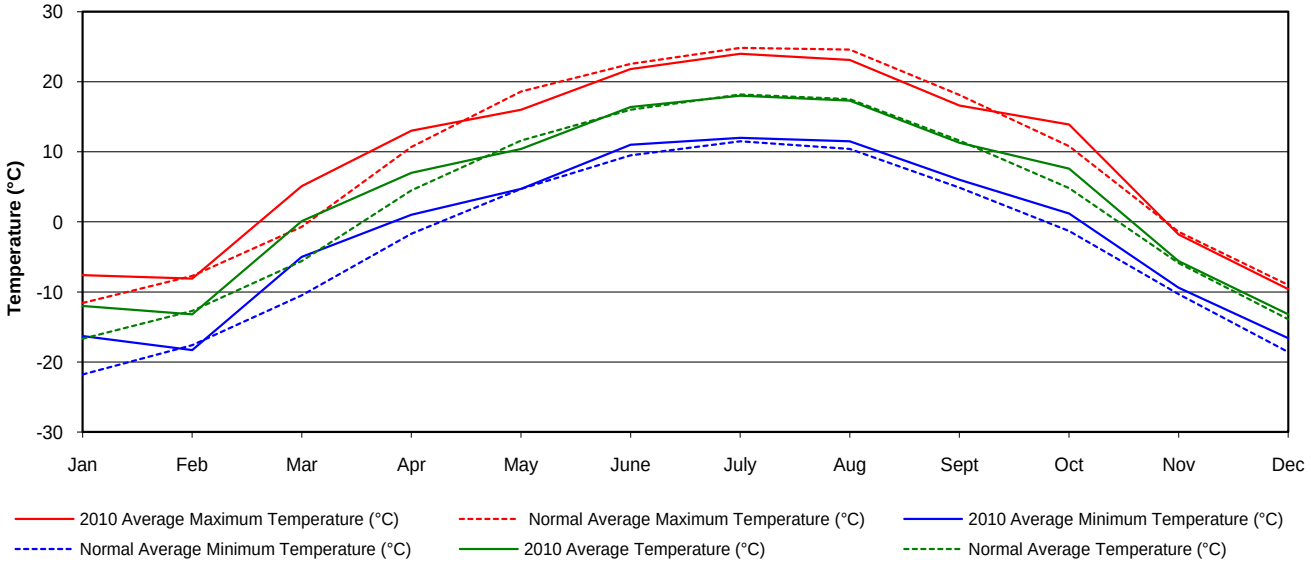
WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
1987	-8.6	1987	6.2	2003	19.4	2009	6.7
2006	-8.9	1977	6.2	1988	19.2	1987	6.4
1998	-9.1	1993	5.8	2001	19.1	2008	5.9
1992	-10.3	2010	5.8	1970	19.1	2001	5.8
2000	-10.6	1988	5.8	2006	19.1	2005	5.7
2002	-10.8	1981	5.6	2002	18.8	1994	5.7
1964	-10.8	1994	5.4	1984	18.7	1981	5.5
1983	-11.4	2001	5.4	1998	18.6	1999	5.4
2004	-12.0	1986	5.0	1997	18.5	1997	5.4
1981	-12.3	1998	5.0	1991	18.5	1998	5.3
1986	-12.3	1992	4.9	1989	18.5	1967	5.1
2007	-12.4	2000	4.9	1983	18.1	2004	5.0
1999	-12.4	1999	4.8	1981	18.1	1980	5.0
1988	-12.5	1985	4.7	2007	18.1	1968	4.8
1976	-12.6	2006	4.5	1996	18.1	1979	4.6
1995	-12.7	2007	4.4	2008	17.9	1988	4.4
2003	-12.7	1980	4.4	1964	17.8	2010	4.4
2005	-12.9	1991	4.3	1995	17.7	2007	4.4
1984	-13.0	2005	4.3	1972	17.5	2000	4.3
1977	-13.1	1990	4.3	2000	17.4	1970	4.2
1975	-13.3	1973	4.1	1990	17.4	1974	4.1
1990	-13.7	1978	4.0	1965	17.4	1983	4.1
1989	-13.8	1968	4.0	1987	17.3	1992	4.1
1991	-14.0	1984	4.0	1979	17.3	1989	4.0
1970	-14.0	2004	3.8	1976	17.2	1975	3.8
2001	-14.2	2003	3.6	2010	17.2	1964	3.7
2010	-14.5	1976	3.5	1994	17.1	1976	3.6
1980	-14.6	1972	3.4	1978	17.0	2003	3.6
2008	-14.8	2008	2.9	1971	17.0	1971	3.4
1968	-15.0	1971	2.3	1973	17.0	1977	3.2
1973	-15.4	1969	2.2	1999	16.9	1990	3.2
1993	-16.0	1995	2.2	1967	16.9	1969	3.1
1967	-16.1	1964	2.2	2005	16.8	1995	3.0
1997	-16.2	1966	2.1	1969	16.7	1978	2.9
1994	-16.5	1989	2.0	1986	16.6	1993	2.9
2009	-16.6	1997	1.7	2009	16.6	2002	2.8
1996	-17.1	1983	1.6	1980	16.6	2006	2.4
1985	-17.3	1982	1.2	1975	16.5	1982	2.3
1974	-17.6	2009	0.9	1966	16.4	1966	2.2
1971	-18.3	1996	0.7	1982	16.2	1986	2.1
1966	-18.4	1970	0.5	1974	16.0	1972	1.9
1982	-18.5	1965	-0.1	1977	15.9	1991	1.6
1965	-19.4	1979	-0.7	2004	15.7	1965	1.5
1978	-19.5	1974	-0.9	1992	15.6	1973	1.3
1969	-19.6	2002	-0.9	1968	15.6	1984	0.9
1972	-20.0	1975	-1.0	1993	15.5	1996	0.9
1979	-20.4	1967	-1.3	1985	15.3	1985	-0.8

TEMPERATURE

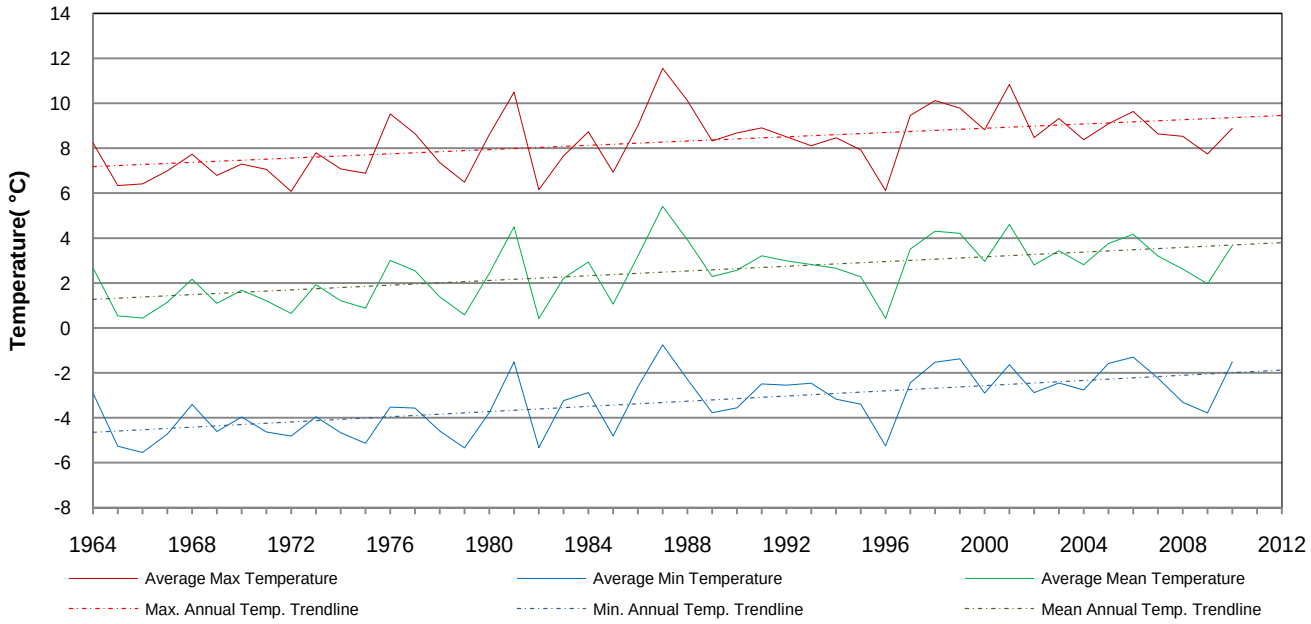
MONTH	AVERAGE MAXIMUM TEMPERATURE (°C)		AVERAGE MINIMUM TEMPERATURE (°C)		AVERAGE TEMPERATURE (°C)		EXTREME VALUES TEMPERATURE (°C)		EXTREME VALUES FOR SASKATOON STATIONS	
	2010	Normal	2010	Normal	2010	Normal	Max/Date	Min/Date	Max/Date	Min/Date
January	-7.6	-11.6	-16.3	-21.8	-12.0	-16.7	5.9/12	-35.2/01	11.0/1980/23$_{SWT}$	-48.9/1893/31$_{SM}$
February	-7.9	-7.7	-18.3	-17.6	-13.2	-12.7	-2.5/28	-30.3/08	12.8/1931/19$_{SE}$	-50.0/1893/01$_{SM}$
March	5.1	-0.7	-5.0	-10.5	0.1	-5.6	17.2/28	-15.5/25	22.8/1910/23$_{SE}$	-43.3/1897/14$_{SM}$
April	13.0	10.7	1.0	-1.7	7.0	4.5	23.3/22	-5.3/06	33.3/1952/28$_{SA\,US}$	-30.5/1979/01$_{SWT}$
May	16.0	18.6	4.7	4.7	10.4	11.6	30.0/19	-3.0/07	37.2/1936/27$_{SE}$	-12.8/1907/06$_{SE}$
June	21.8	22.6	11.0	9.5	16.4	16.0	28.1/30	2.5/01	41.5/1988/06$_{S2}$	-3.9/1917/02$_{US}$
July	24.0	24.8	12.0	11.5	18.0	18.2	29.0/29	9.1/11	40.0/1919,1941,1946$_{SE\,SA\,US}$	-0.6/1918/25$_{SE}$
August	23.1	24.6	11.5	10.4	17.3	17.5	33.6/26	5.9/30	39.7/1998/06$_{SRC}$	-2.8/1901/23SM&1976/28$_{SRC}$
September	16.6	18.1	6.0	4.9	11.3	11.6	27.5/04	-2.1/18	35.6/1978/04$_{SRC}$	-11.1/1908/28$_{SE}$
October	13.9	10.8	1.2	-1.3	7.6	4.8	24.4/08	-11.2/28	32.2/1943/05$_{SA\,US}$	-25.6/1919/26$_{SE\,US}$
November	-1.8	-1.4	-9.4	-10.3	-5.6	-5.9	16.1/05	-26.4/25	21.7/1903/03$_{SE}$	-39.4/1893/30$_{SM}$
December	-9.6	-9.0	-16.6	-18.6	-13.2	-13.9	0.4/27	-24.3/31	14.4/1939/05$_{SE}$	-43.9/1892/22$_{SM}$
Average	8.9	8.3	-1.5	-3.4	3.7	2.5				

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

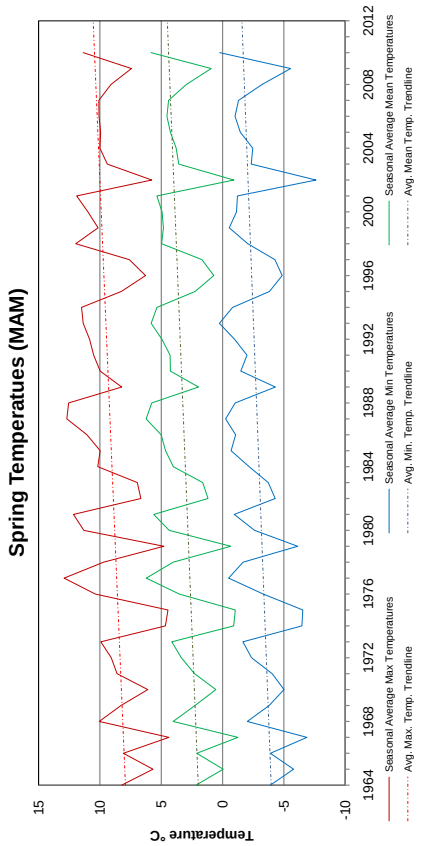
SA = Saskatoon Diefenbaker Int'l Airport 1942-
S2= Saskatoon 2 1977-1990
SM = Saskatoon stations circa 1889 - 1901(RNWMP *etal)*

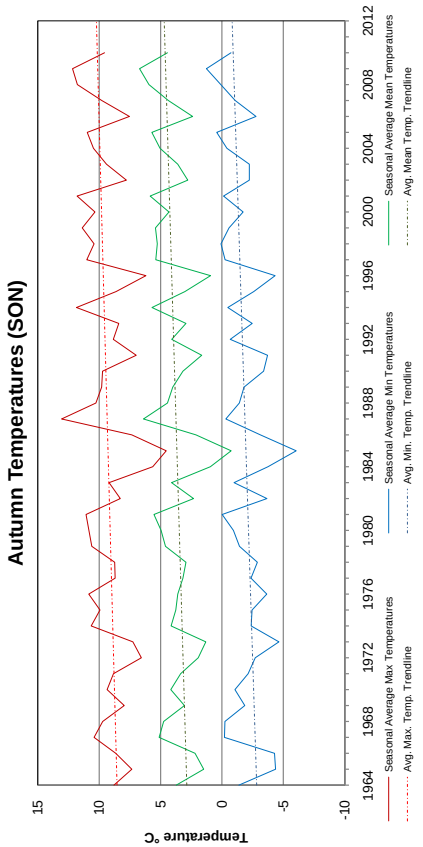


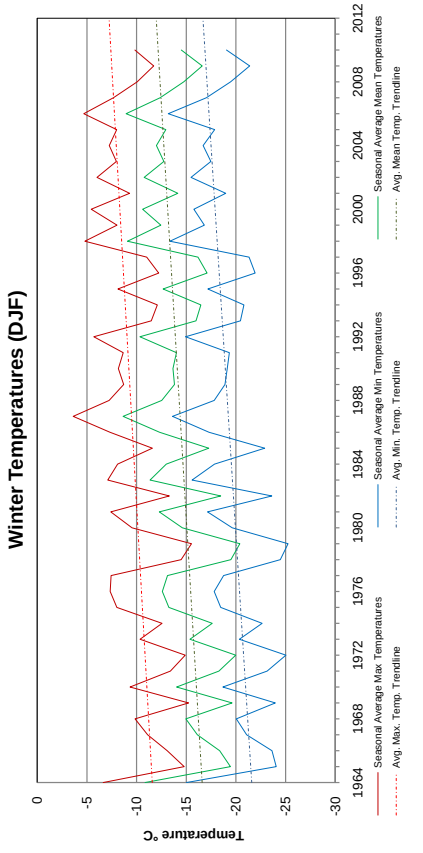
Annual Temperatures

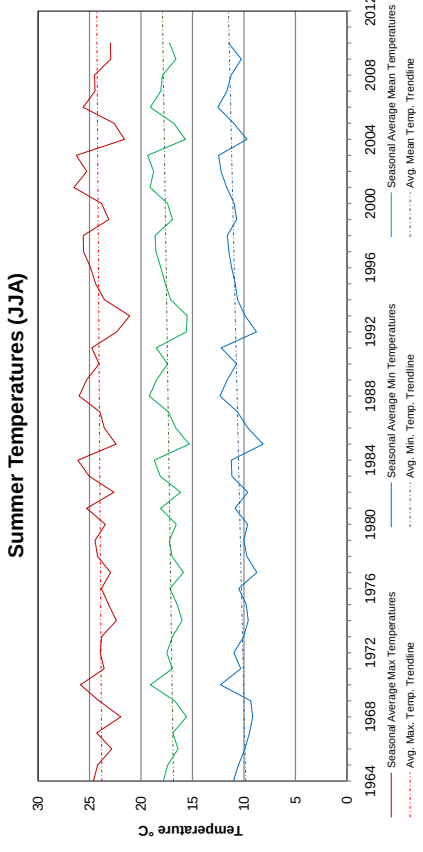


SEASONAL TEMPERATURES for 1964 to 2010

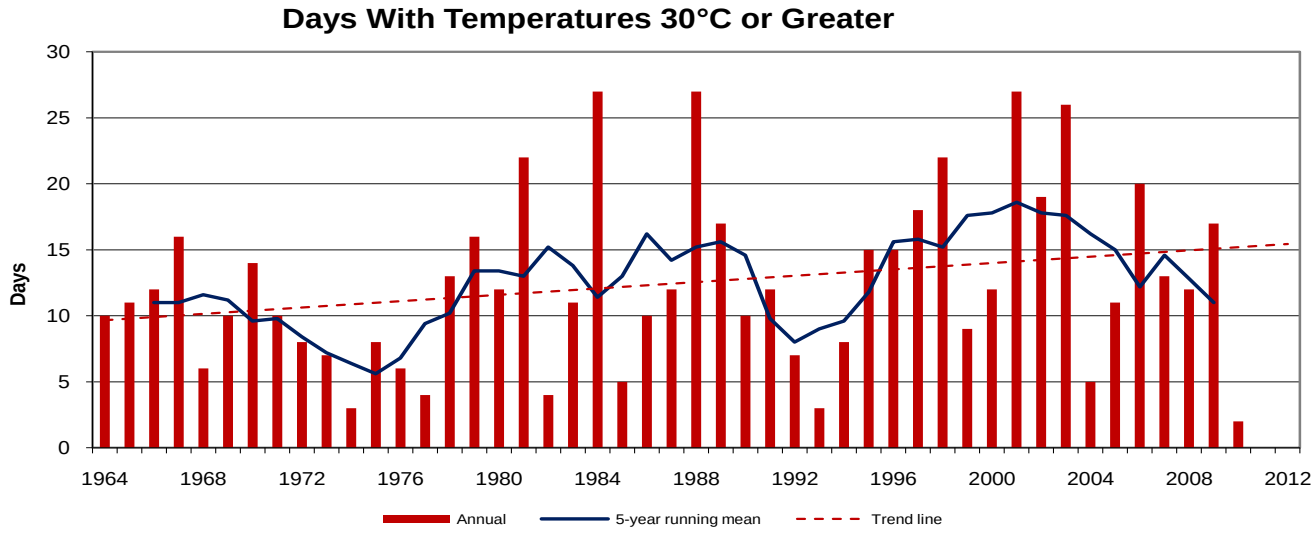


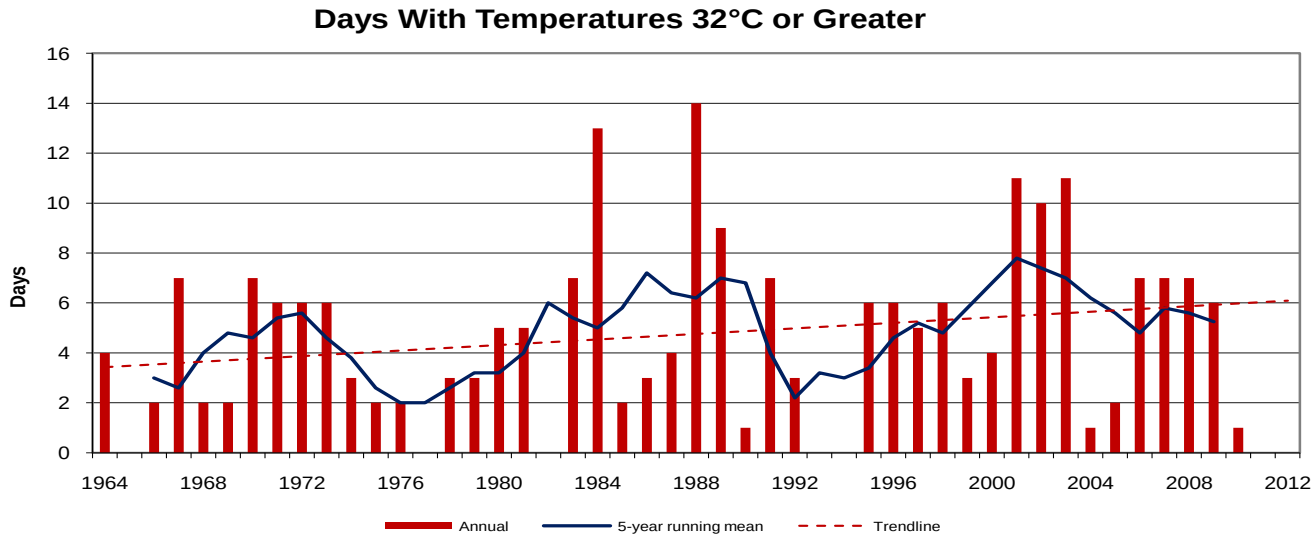


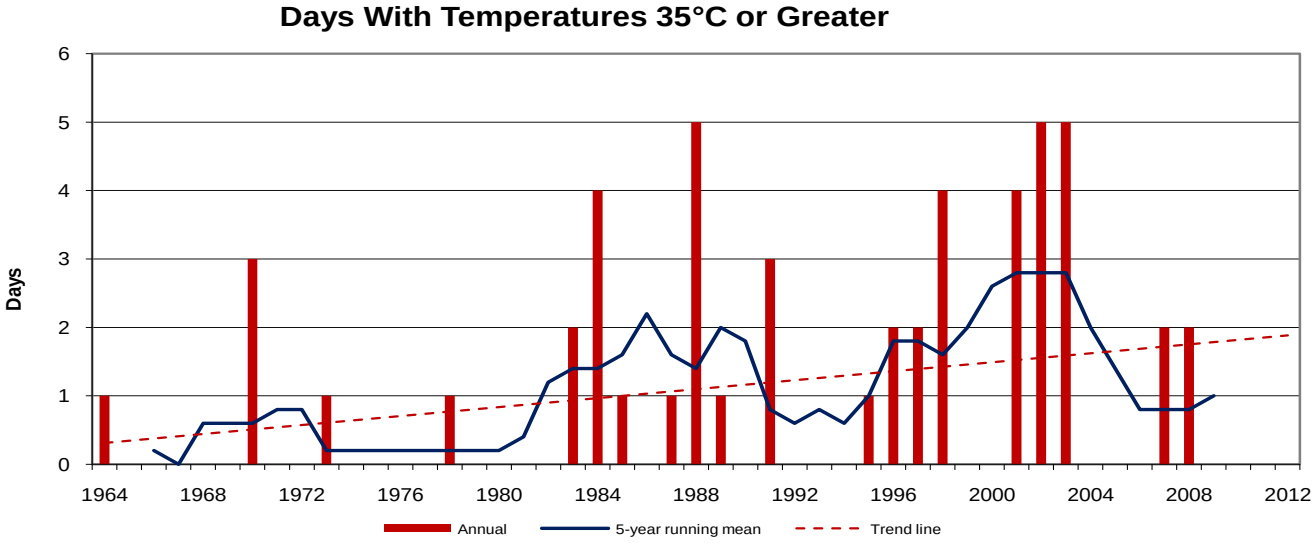




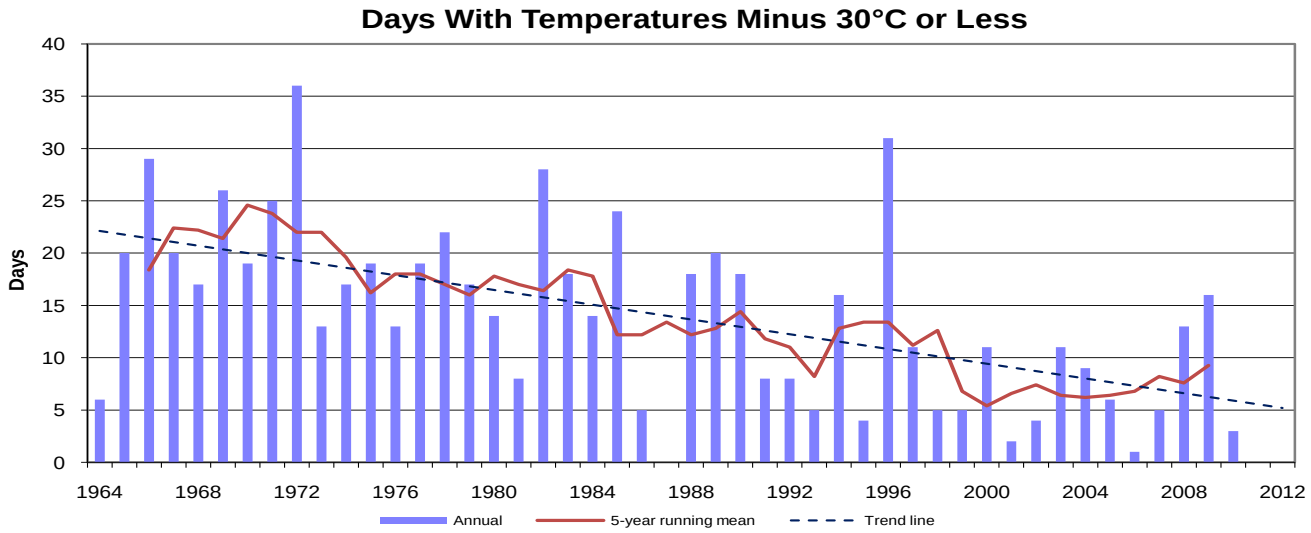
ANNUAL DAYS WITH TEMPERATURES GREATER THAN A SET POINT

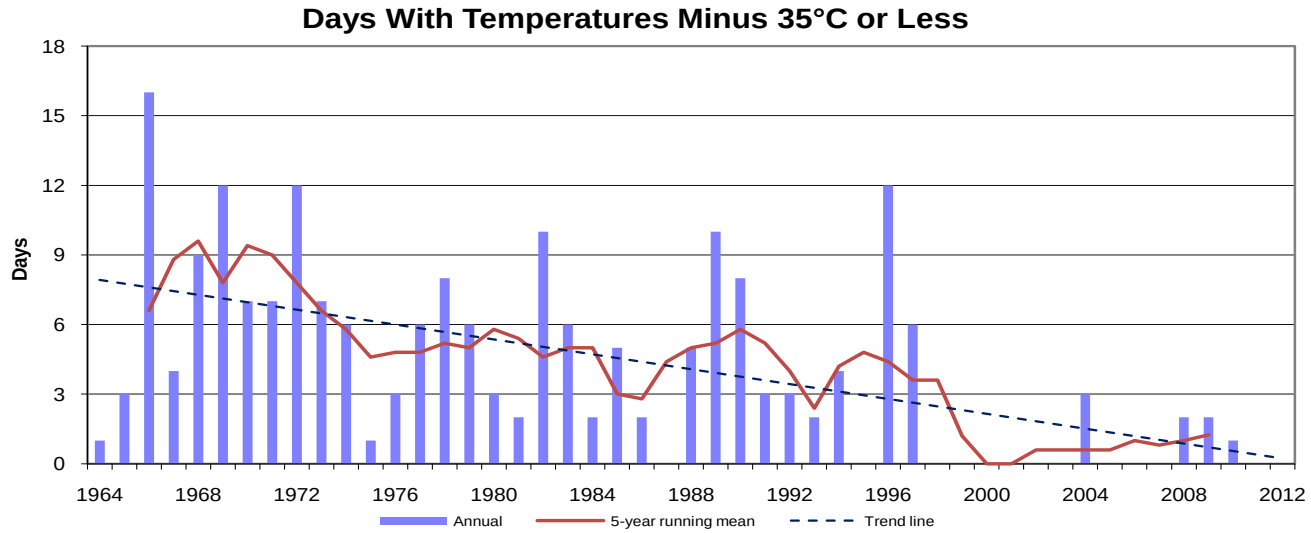


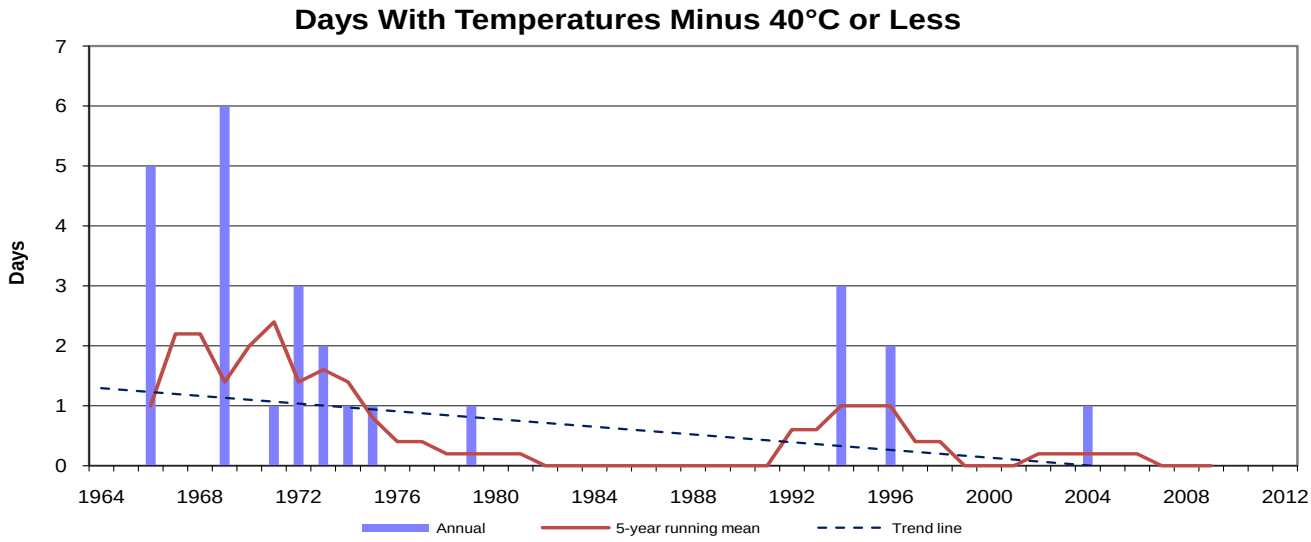




ANNUAL DAYS WITH TEMPERATURES LESS THAN A SET POINT

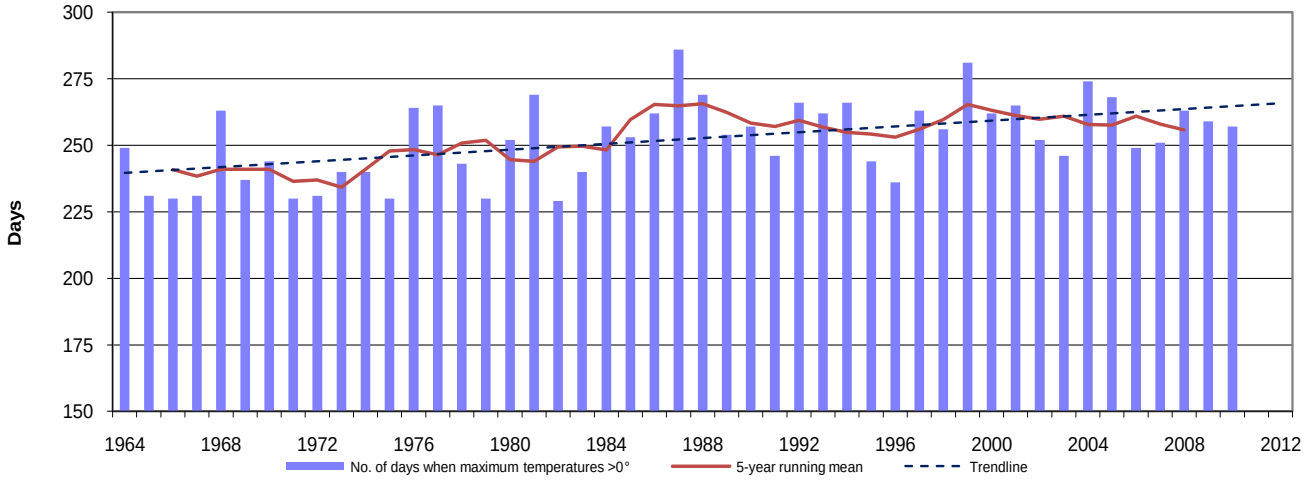




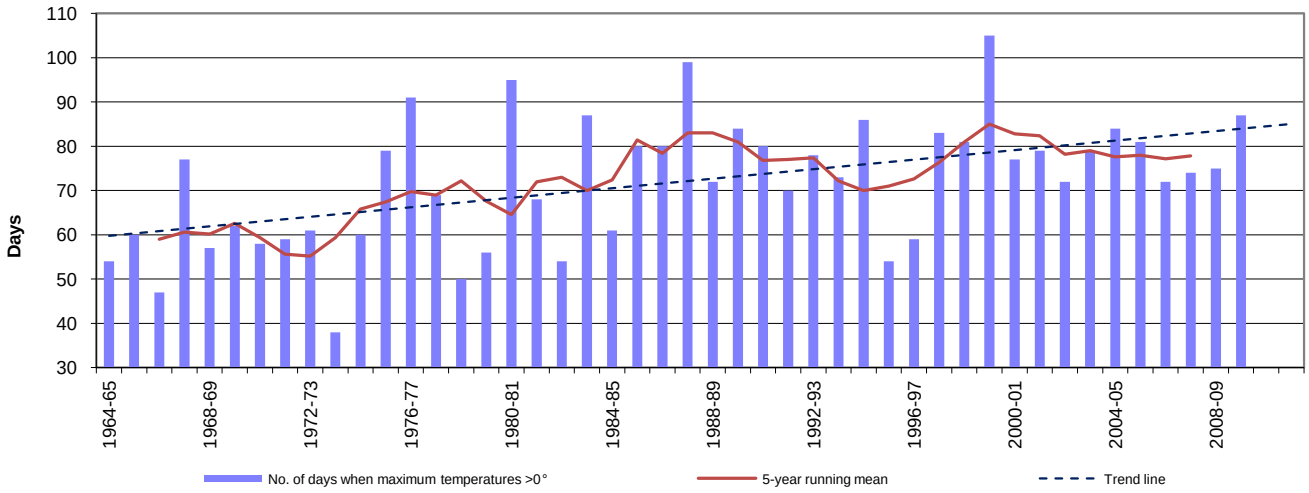


ANNUAL DAYS WITH TEMPERATURES GREATER THAN 0°C (THAW DAYS)

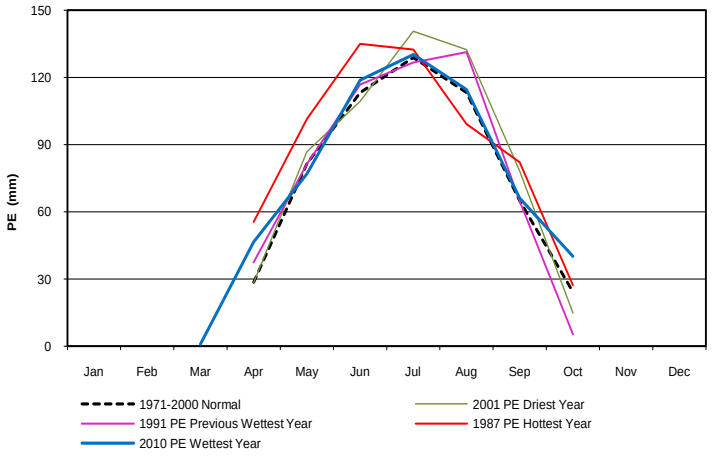
January1st to December 31st



October to March (Cold Season)



POTENTIAL EVAPOTRANSPIRATION (PE) using the Thornthwaite Method[1]



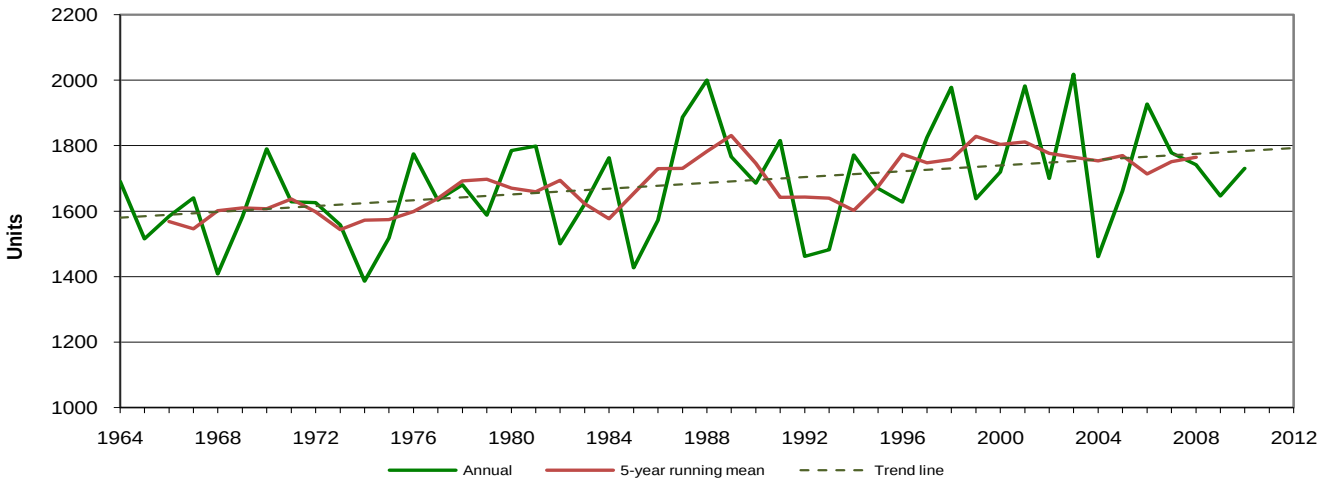
MONTH	PE (mm) 2010	PE (mm) 1991 Previous Wettest Year	PE (mm) 2001 Driest Year	PE (mm) 1987 Hottest Year	PE (mm) 1971-2000 Normal
Jan					
Feb					
Mar	0.89				
Apr	46.5	37.5	28.6	55.5	28.6
May	77.0	81.3	86.8	101.4	81.5
June	118.8	116.8	109.3	135.0	113.2
July	130.2	126.7	140.6	132.5	128.9
Aug	114.6	131.3	132.4	99.2	113.3
Sept	66.1	64.8	78.1	82.1	64.9
Oct	40.1	5.4	14.8	27.3	24.3
Nov					
Dec					
Total	594.3	563.7	590.4	632.9	554.6

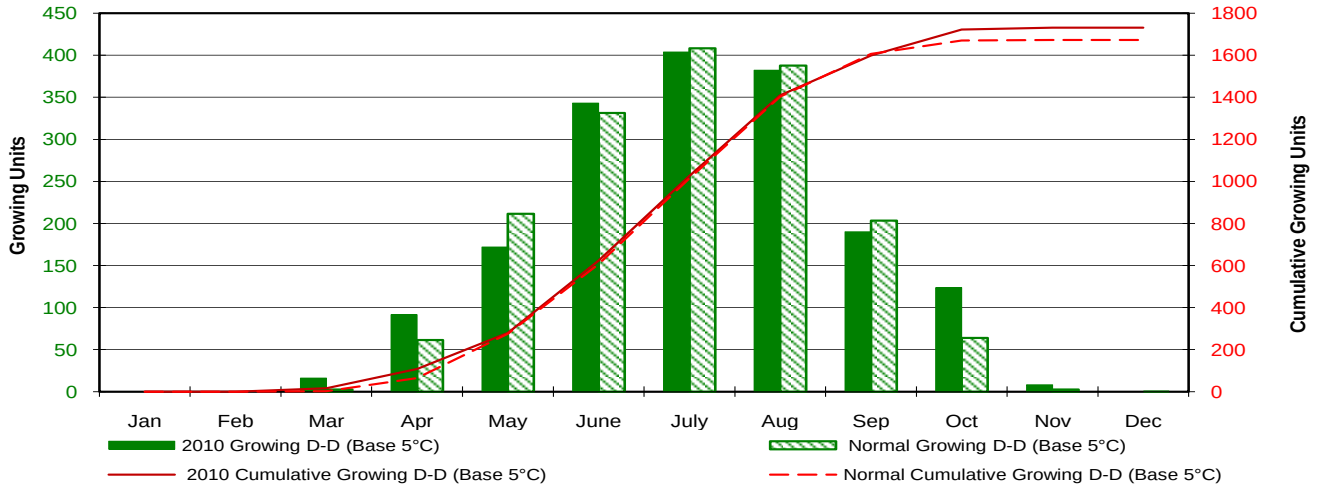
[1]*Thornthwaite and Mather 1955*

DEGREE-DAYS

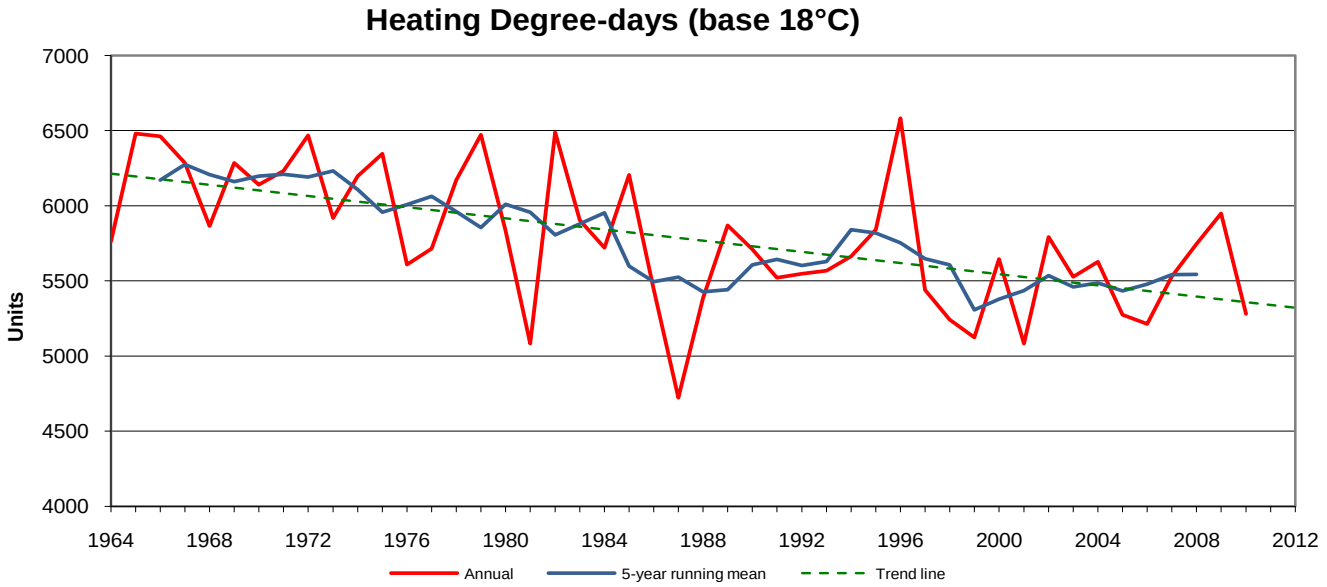
MONTH	GROWING DEGREE-DAYS Base 5°C			HEATING DEGREE-DAYS Base 18°C			COOLING DEGREE-DAYS Base 18°C			EXTREME COOLING DEGREE-DAYS Base 24°C		
	2010	2010 Cumulative	Normal Cumulative	2010	2010 Cumulative	Normal Cumulative	2010	2010 Cumulative	Normal Cumulative	2010	2010 Cumulative	Normal Cumulative
January	0.0	0.0	0.0	930.4	930.4	1076.9	0.0	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	874.9	1805.3	1963.1	0.0	0.0	0.0	0.0	0.0	0.0
March	16.0	16.0	2.4	555.7	2361.0	2695.5	0.0	0.0	0.0	0.0	0.0	0.0
April	91.4	107.4	63.7	328.9	2689.9	3116.2	0.0	0.0	0.3	0.0	0.0	0.0
May	172.1	279.5	275.3	249.7	2939.6	3320.6	13.3	13.3	7.7	0.0	0.0	0.2
June	343.2	622.7	606.8	67.0	3006.6	3403.4	20.2	33.5	30.0	0.0	0.0	1.3
July	403.9	1026.6	1015.2	23.6	3030.2	3438.7	24.5	58.0	70.7	0.0	0.0	2.8
August	382.3	1408.9	1403.0	51.0	3081.2	3496.4	30.3	88.3	113.2	0.0	0.0	5.2
September	190.2	1599.1	1606.5	202.3	3283.5	3695.3	1.6	89.9	119.0	0.0	0.0	5.3
October	123.6	1722.7	1670.2	322.8	3606.3	4105.5	0.0	89.9	119.1	0.0	0.0	5.3
November	8.1	1730.8	1672.8	707.6	4313.9	4821.3	0.0	89.9	119.1	0.0	0.0	5.3
December	0.0	1730.8	1672.9	966.1	5280.0	5809.0	0.0	89.9	119.1	0.0	0.0	5.3

Growing Degree-days (base 5°C)





DEGREE-DAYS



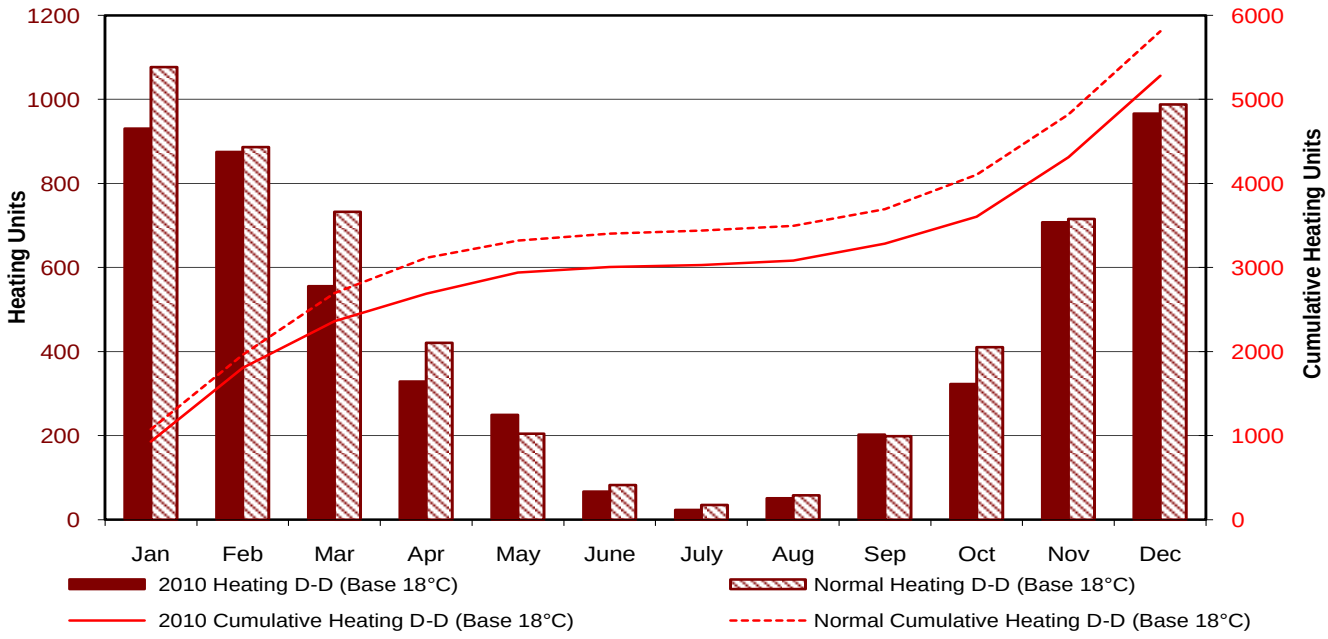
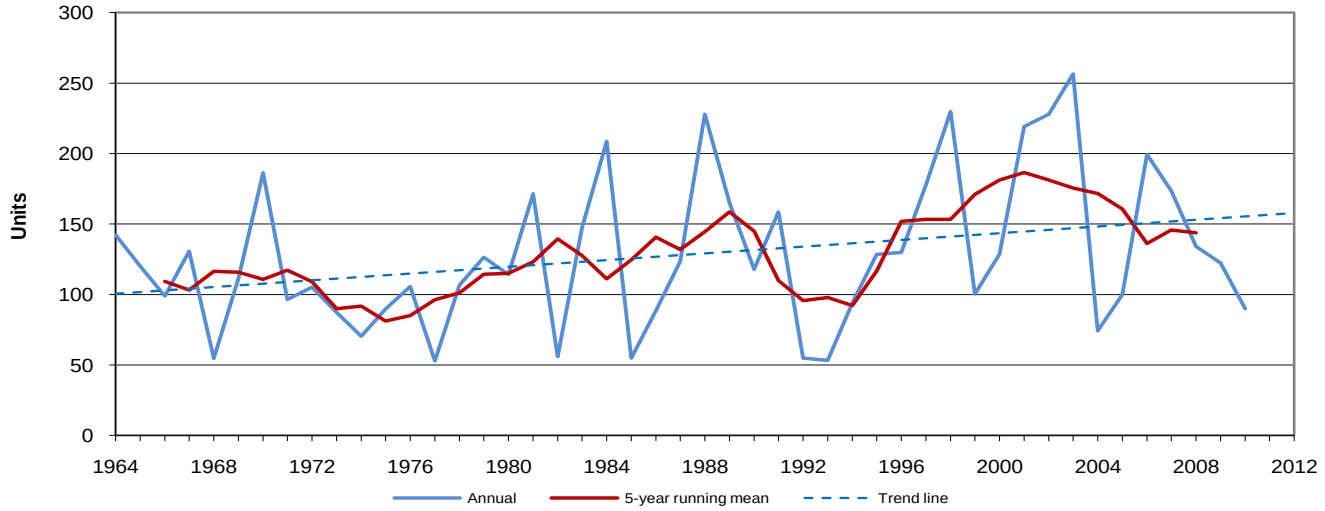
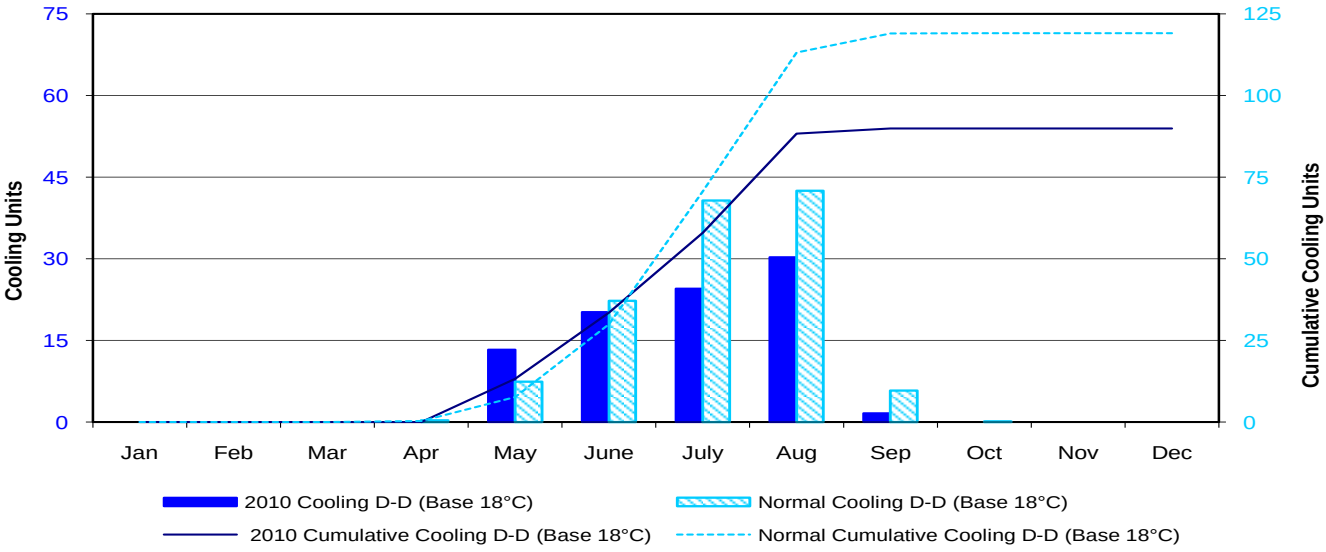


photo credit: CR Beaulieu April 2010

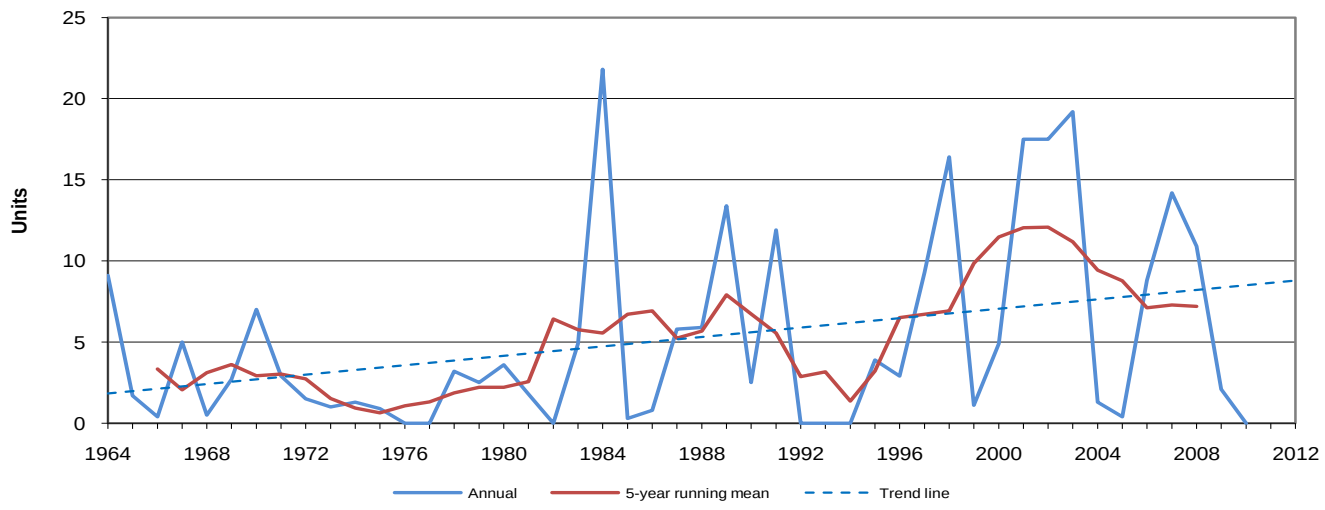
DEGREE-DAYS

Cooling Degree-days (base 18°C)

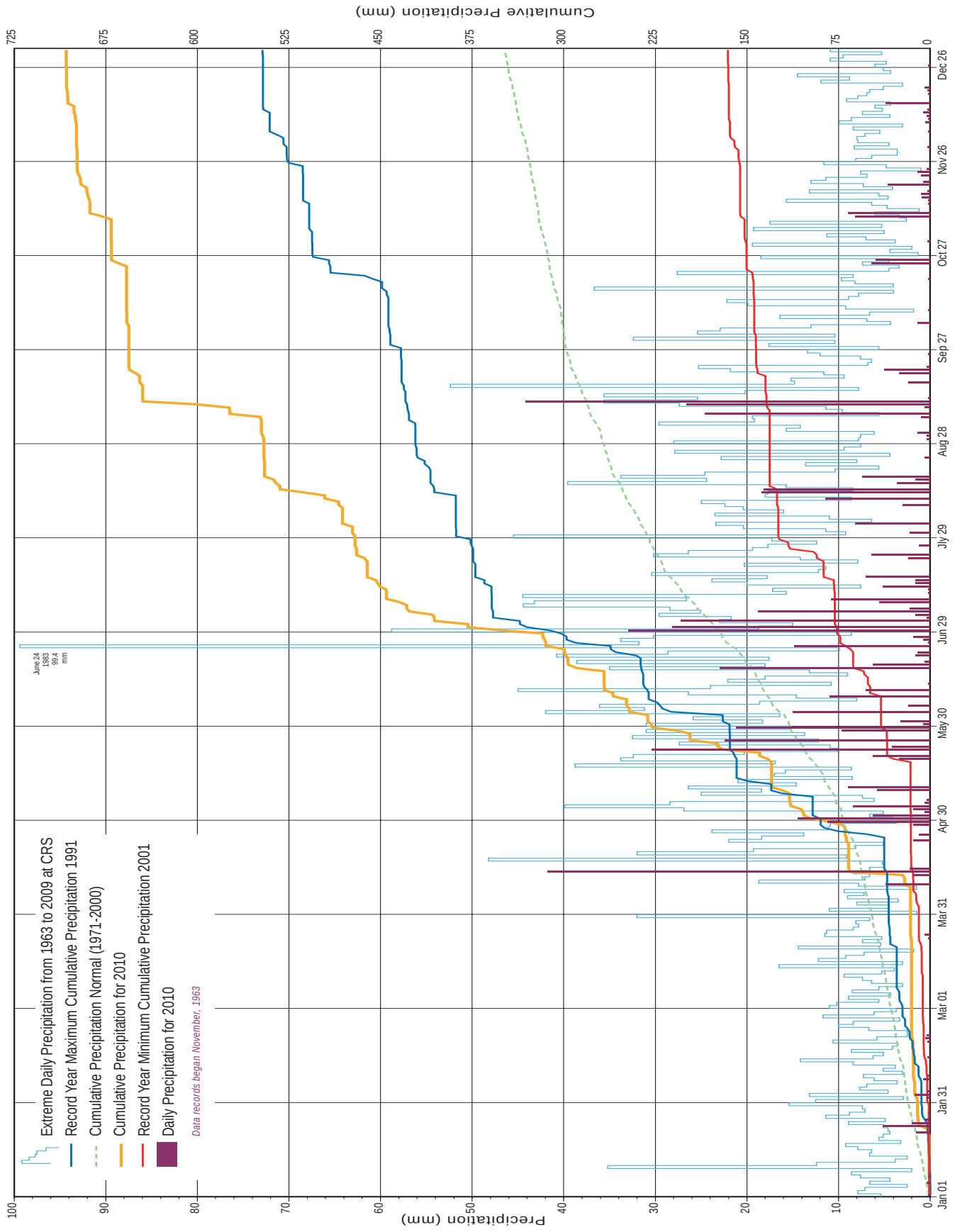




Extreme Cooling Degree-days (base 24°C)



DAILY PRECIPITATION



PRECIPITATION RANKINGS

RANKING BY DRY SPELLS/DAYS

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

MONTHLY RANKING BY DRIEST MONTH

AMOUNT (mm)		AMOUNT % OF NORMAL	
Mar	0.8	Mar	4.9
Feb	4.9	Feb	36.8
Dec	8.5	Dec	46.4
Jan	10.4	Jan	57.1
Oct	14.3	Oct	87.2
Nov	28.2	July	163.1
Aug	74.6	Nov	190.5
Apr	81.1	Aug	206.1
July	94.6	June	247.4
Sept	108.6	May	302.9
May	134.2	Apr	343.6
June	147.2	Sept	369.4

photo credit: CR Beaulieu Jan 2010

PRECIPITATION

2010 PRECIPITATION RECORDS

TYPE	DATE	NEW RECORD	OLD RECORD/year
Greatest Daily Precipitation (mm)	January 23	5.2	5.1/1976
	April 13	41.8	8.4/2003
	April 29	11.2	3.7/1990
	April 30	14.4	4.1/1979
	May 22	30.4	10.1/1986
	May 25	22.4	12.2/1967&1977
	May 29	21.2	15.2/1982
	June 30	28.2	18.7/1991
	July 2	27.2	23.0/1990
	August 10	11.4	8.6/1980
	August 12	18.4	17.7/1991
	August 13	18.2	9.2/2008
	September 6	24.6	5.6/1978
	September 10	44.2	35.6/2005
	October 25	5.9	4.5/1984
	November 9	9.0	6.0/1995
	December 14	4.9	4.3/1964
Greatest Daily Ppt during the month	April 13	41.8	24.6 April 19, 1985
Least Daily Ppt during the Month (excluding 0 amount)	March 24	0.6	0.6 March 17&24, 2008
Greatest Monthly Precipitation (mm)	April	81.1	55.9/1985
Least Monthly Precipitation (mm)	March	0.8	2.4/2008
Wettest Season (mm)	Spring(MAM)	216.1	164.1/1977
	Summer(JJA)	316.4	269.4/2005
Wettest Year (mm)	2010	707.4	546.9/1991
Least number of Days with any Daily Precipitation	March	2	3/ 1990, 1994, 1996
Most number of Days with Daily Precipitation >5 mm	May	9	9/1977
Most number of Days with Daily Precipitation >10 mm	April	3	3/1991
	June	6	5/1966, 1970, 2005
	August	3	3/1967, 1968, 1982, 1988, 2009
Most number of Days with Daily Precipitation >25 mm	April	1	0
	September	2	2/2005
Most number of Days with Seasonal Precipitation	Summer (JJA)	45	43/1978

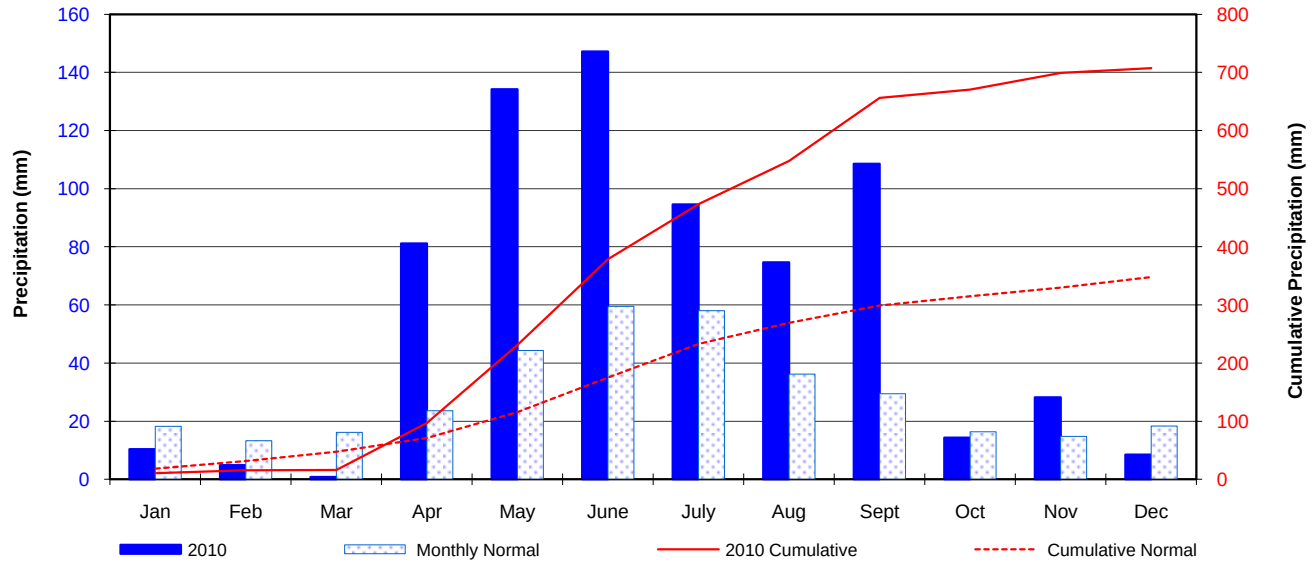
EXTREME PRECIPITATION EVENTS (mm)*

PERIOD	DATE	AMOUNT (mm)
*0.5 hour	June 30	26.6
*0.5 hour	June 29	24.4
*1 hour	June 29	29.4
*1 hour	June 30	27.6
*2 hours	June 29	31.6
*2 hours	June 30	28.2
*6 hours	June 29	33.0
*6 hours	May 22	28.4
*12 hours	September 10	41.0
*12 hours	April 13	33.4
*Daily	September 10	44.2
*Daily	April 13	41.8
*24 hours	June 29 - 30	61.2
*24 hours	September 9 - 10	48.4
Longest wet spell	April 28 to May 6	9 days / 45.4 mm
Longest wet spell	July 11 to July 16	6 days / 15.8 mm
Longest dry spell	February 19 to March 22	29 days
Longest dry spell	March 25 to April 7	15 days

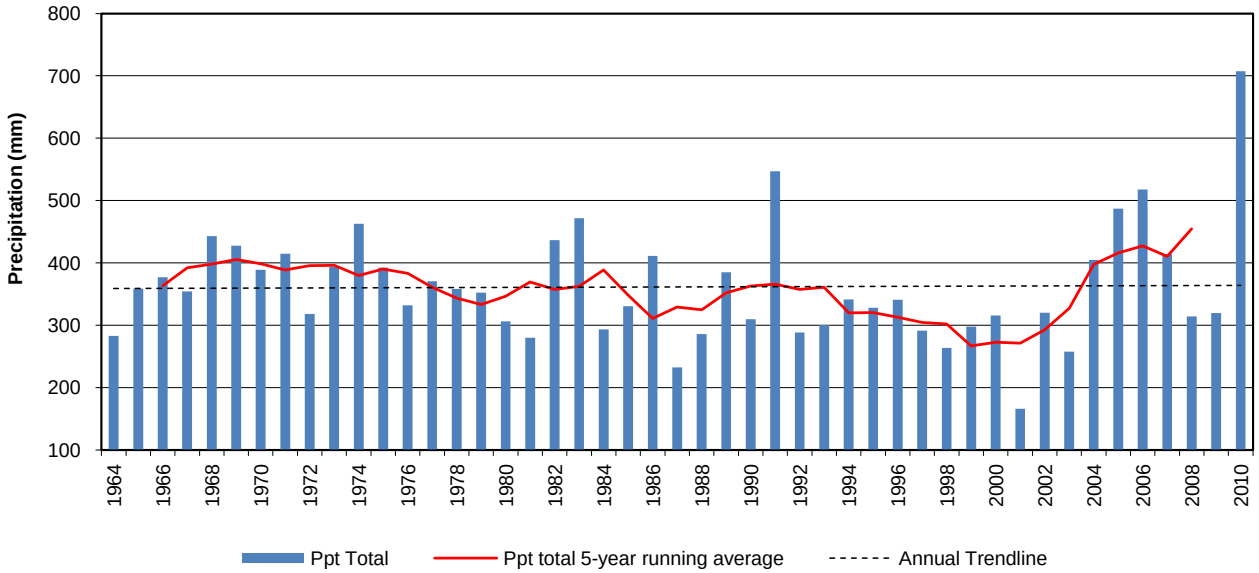
**recorded by tipping bucket April 12th to October 15th*

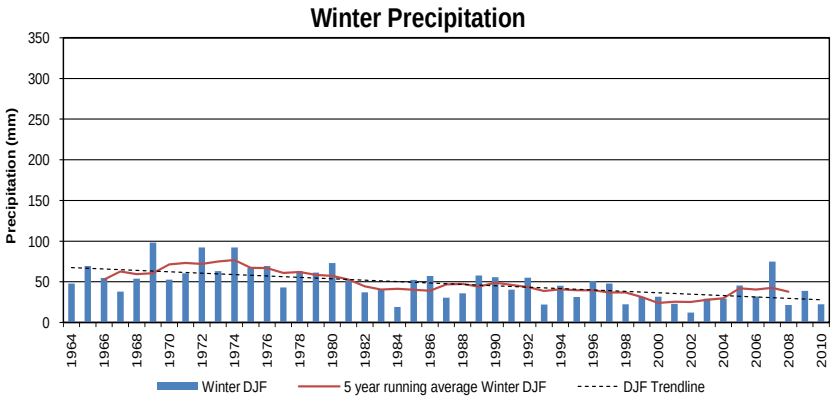
PRECIPITATION

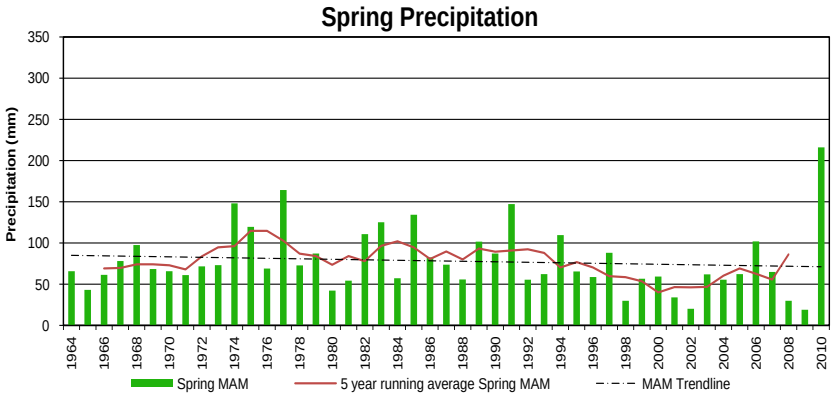
MONTH	MONTHLY PRECIPITATION (mm)				EXTREME VALUES (mm)					
	2010	NORMAL	CUMULATIVE 2010	% OF CUMULATIVE NORMAL	CRS Maximum	CRS Minimum	SASKATOON CITY Maximum			
January	10.4	18.2	10.4	57.1	48.6/1969	2.6/2001	66.1/1911SE	SE	Saskatoon Eby	1901-1942
February	4.9	13.3	15.3	48.6	40.2/1979	2.5/1984	43.7/1924SE	US	University of Saskatchewan	1915-1964
March	0.8	16.2	16.1	33.8	57.1/1967	2.4/1992, 1994, 2008	59.0/1927SE	SWT	S'toon Water Treatment Plant	1974-
April	81.1	23.6	97.2	136.3	55.9/1985	2.4/1988, 89	86.1/1955US			
May	134.2	44.3	231.4	200.2	145.3/1977	0.2/2002	178.0/1977SWT	S	Saskatoon	1941-1942
June	147.2	59.5	378.6	216.2	171.0/2005	13.0/1985	186.8/1942S	NRC	National Res. Council	1952-1966
July	94.6	58.0	473.2	203.0	125.9/1971	13.0/1984	162.9/1928SE			
August	74.6	36.2	547.8	203.4	105.2/2007	7.0/2001	178.9/1954NRC	SRC	Sask. Research Council	1963-
September	108.6	29.4	656.4	219.8	128.4/2006	0.8/1995	128.4/2006SRC			
October	14.3	16.4	670.7	212.9	69.8/1969	0.0/2000	69.8/1969SRC	SA	S'toon Diefenbaker Intl. Airport	1942-
November	28.2	14.8	698.9	211.9	48.2/1973	0.4/2009	57.3/1940SE			
December	8.5	18.3	707.4	203.2	43.0/1977	1.2/1997	59.2/1956SA			
Total	707.4	348.2								

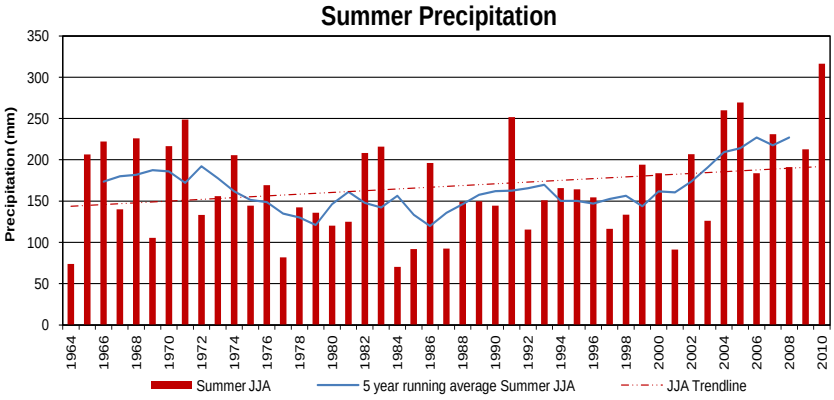


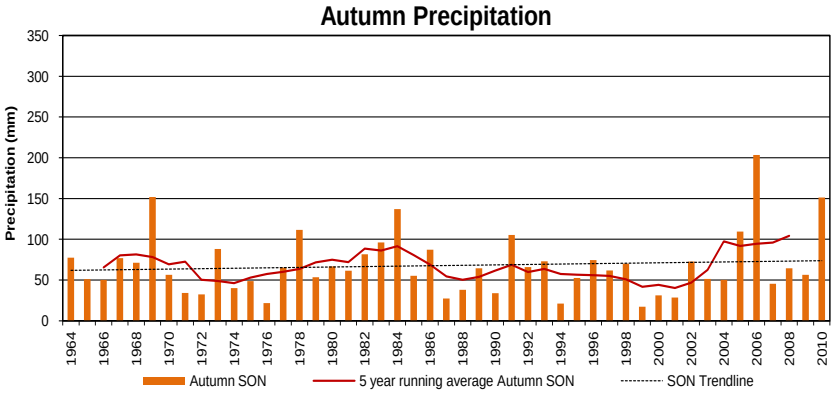
Annual Precipitation




Winter Precipitation
Precipitation (mm)
Winter DJF
5 year running average Winter DJF
DJF Trendline


Spring Precipitation
Precipitation (mm)
Spring MAM
5 year running average Spring MAM
MAM Trendline

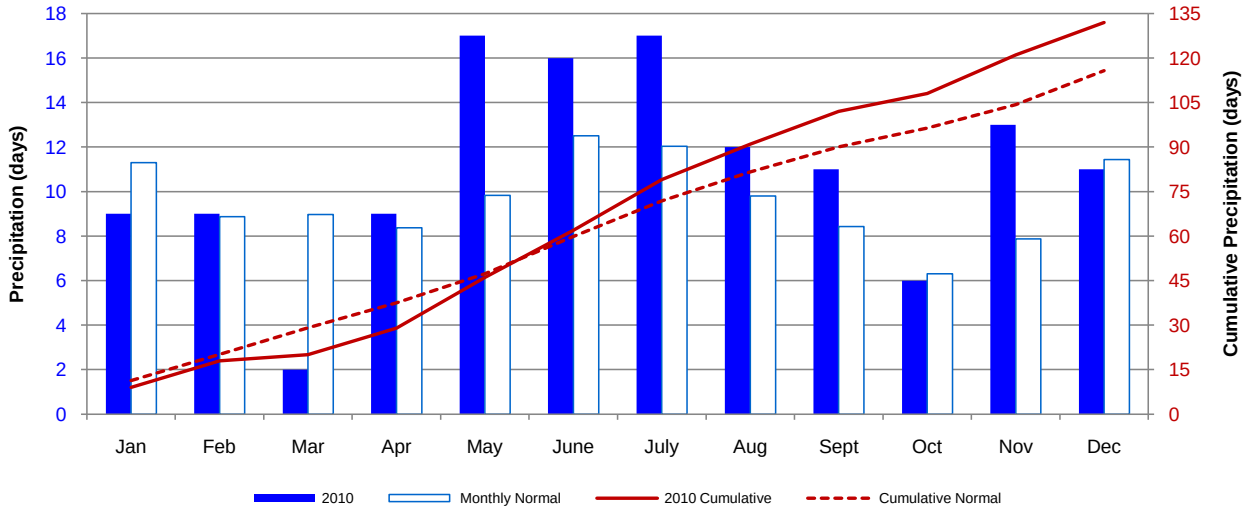

Summer Precipitation
Precipitation (mm)
Summer JJA
5 year running average Summer JJA
JJA Trendline


Autumn Precipitation
Precipitation (mm)
Autumn SON
5 year running average Autumn SON
SON Trendline

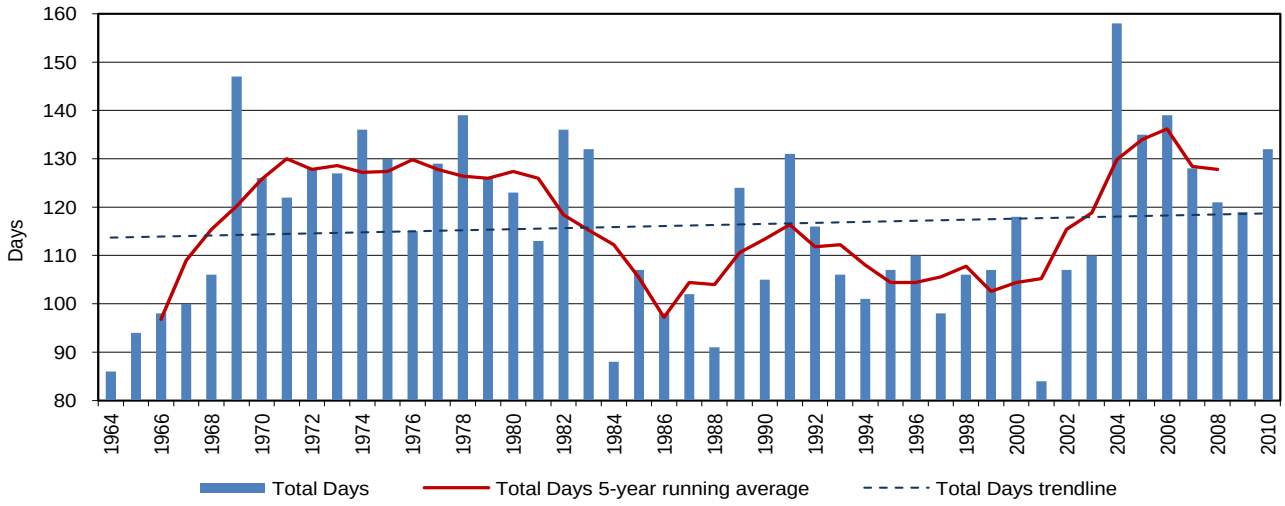
PRECIPITATION

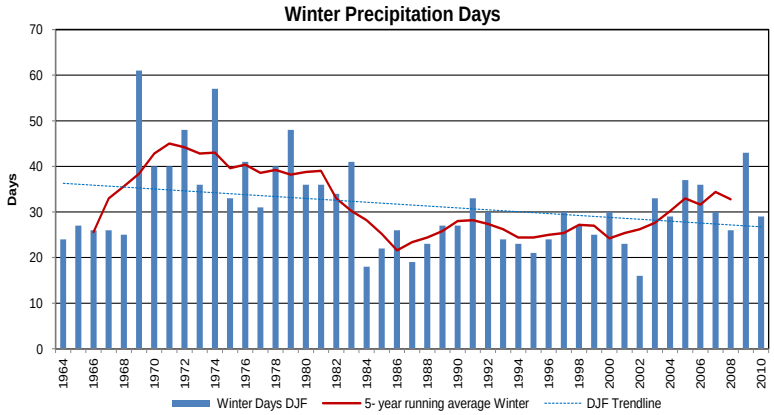
MONTH	MONTHLY PRECIPITATION DAYS			
	2010	NORMAL	CUMULATIVE 2010	% OF CUMULATIVE NORMAL
January	9	11.3	9	79.6
February	9	8.9	18	89.3
March	2	9.0	20	68.6
April	9	8.4	29	77.3
May	17	9.8	46	97.2
June	16	12.5	62	103.6
July	17	12.0	79	109.9
August	12	9.8	91	111.4
September	11	8.4	102	113.2
October	6	6.3	108	112.0
November	13	7.9	121	116.0
December	11	11.4	132	114.1
Total	132	115.7		

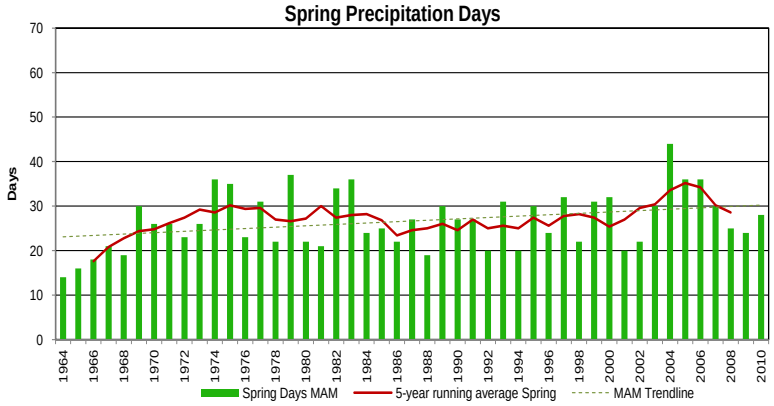
Monthly Precipitation Days

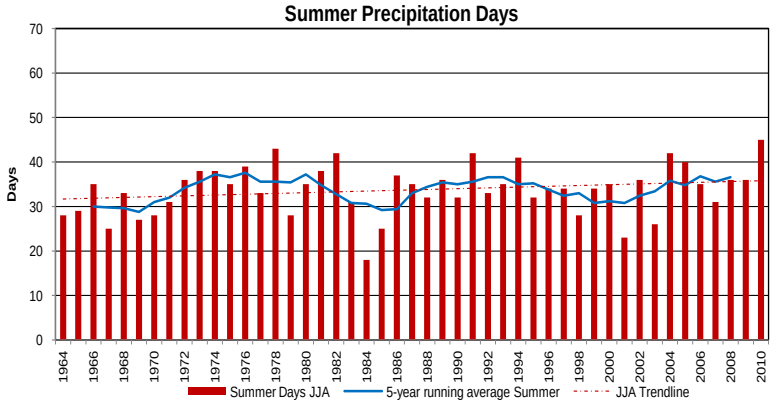


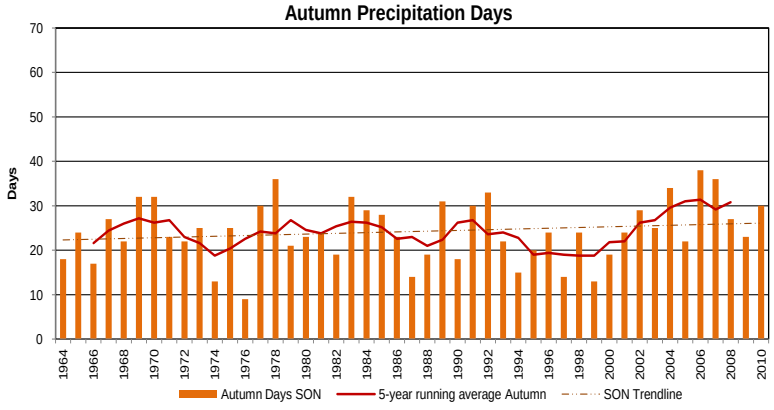
Annual Precipitation Days




Winter Precipitation Days
Days
Winter Days DJF
5- year running average Winter
DJF Trendline


Spring Precipitation Days
Days
Spring Days MAM
5-year running average Spring
MAM Trendline


Summer Precipitation Days
Days
Summer Days JJA
5-year running average Summer
JJA Trendline


Autumn Precipitation Days
Days
Autumn Days SON
5-year running average Autumn
SON Trendline

PRECIPITATION RANKINGS

ANNUAL RANKING BY DRIEST YEAR (mm)

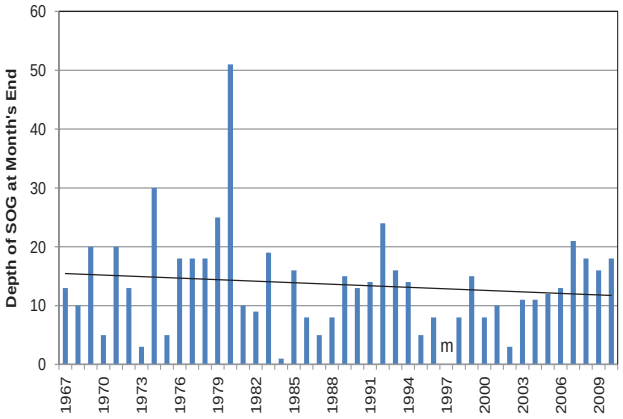
ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	165.8	2002	12.1	2009	19	1984	70.2	1999	17.2
1987	232.4	1984	19.2	2002	20.3	1964	73.9	1994	21
2003	257.7	2008	21.6	2008	29.8	1977	81.9	1976	21.8
1998	263.3	1993	22	1998	29.8	2001	91.2	1987	27.4
1981	279.8	1998	22.4	2001	34.0	1985	91.8	2001	28.5
1964	282.7	2010	22.5	1980	42.2	1987	92.6	2000	31.2
1988	285.7	2001	23.1	1965	43.2	1969	105.5	1972	32.3
1992	288.1	2003	29.2	1981	54.3	1992	115.6	1990	33.9
1997	291.4	2004	29.3	2004	55.4	1997	116.4	1971	34.2
1984	293.1	1987	30.6	1992	55.5	1980	120.3	1988	38.1
1999	297.7	1999	31.3	1988	55.6	1981	124.9	1974	40
1993	300.0	1995	31.3	1999	56.5	2003	126.2	2007	45.3
1980	305.9	2000	31.7	1984	57.2	1972	133.3	1975	48.8
1990	309.8	2006	32	1996	58.8	1998	133.4	2004	50
2008	313.8	1988	35.9	2000	59.2	1979	135.9	1966	50.2
2000	315.4	1982	37	1971	61.1	1967	139.9	1965	50.9
1972	317.9	1967	37.9	1966	61.2	1978	142.5	2003	51.2
2009	319.3	2009	38.8	2003	61.8	1975	144.5	1995	52.6
2002	320.0	1991	40.3	2005	62.1	1990	144.5	1979	53.4
1995	327.7	1983	41.1	1993	62.2	1988	148.9	1985	55.2
1985	330.6	1977	43.1	2007	64.7	1989	149.9	1970	56.4
1976	331.8	1994	45.1	1995	65.4	1993	151.0	2009	56.5
1996	340.6	2005	45.4	1970	65.7	1996	154.4	1981	61.4
1994	341.4	1964	47.9	1964	65.8	1973	156.1	1997	61.6
1979	352.0	1997	48	1969	68.5	1995	164.4	2008	64.4
1967	354.3	1996	51	1976	69.1	1994	165.6	1989	64.5
1978	358.1	1981	52.2	1972	71.6	1976	169.4	1977	65.4
1965	358.8	1985	52.3	1978	72.8	2000	183.8	1992	65.9
1977	370.5	1970	52.7	1973	73.1	2006	183.8	1980	66.6
1966	376.9	1968	53.8	1987	73.6	2008	191.2	1998	70
1989	384.8	1966	54.7	1967	78	1999	194.2	1968	71.3
1970	388.8	1992	55	1986	82.5	1986	196.2	2002	72.8
1975	392.3	1990	55.6	1990	87.2	1974	205.5	1993	73.1
1973	393.3	1986	57.2	1979	87.3	1965	206.6	1996	74.4
2004	404.5	1989	57.9	1997	88.2	2002	206.8	1967	76.8
1986	411.3	1971	60.4	1968	97.6	1982	208.4	1964	77.4
2007	413.9	1979	61.3	1989	101.7	2009	212.8	1982	81.5
1971	414.6	1978	63	2006	101.8	1983	215.8	1986	87.2
1969	427.4	1973	63.2	1994	109.4	1970	216.5	1973	88.2
1982	436.2	1975	67.3	1982	110.8	1966	222	1983	96.2
1968	443.1	1965	69.3	1975	119.6	1968	225.9	1991	105.4
1974	462.7	1976	69.5	1983	125.2	2007	231	2005	109.4
1983	471.6	1980	73	1985	134.3	1971	248.8	1978	111.4
2005	486.8	2007	74.7	1991	147.3	1991	251.6	2010	115.1
2006	517.5	1974	92.2	1974	148.0	2004	260	1984	137
1991	546.9	1972	92.2	1977	164.1	2005	269.4	1969	151.8
2010	707.4	1969	98.1	2010	216.1	2010	316.4	2006	203.4

ANNUAL RANKING BY DAYS WITH PRECIPITATION

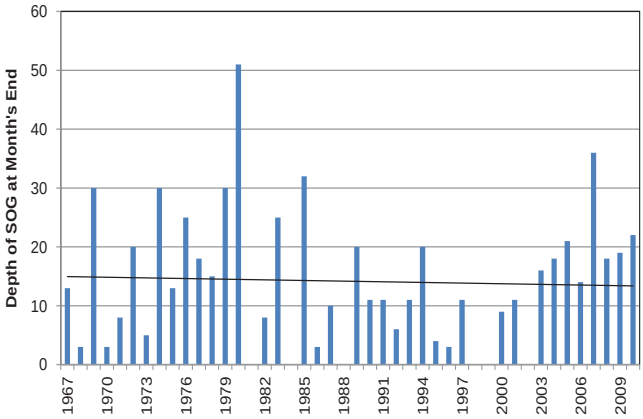
ANNUAL		WINTER (DJF)		SPRING (MAM)		SUMMER (JJA)		AUTUMN (SON)	
2001	84	2002	16	1964	14	1984	18	1976	9
1964	86	1984	18	1965	16	2001	23	1974	13
1984	88	1987	19	1966	18	1967	25	1999	13
1988	91	1995	21	1968	19	1985	25	1987	14
1965	94	1985	22	1988	19	2003	26	1997	14
1966	98	1988	23	1992	20	1969	27	1994	15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

SNOW-ON-THE-GROUND (SOG)

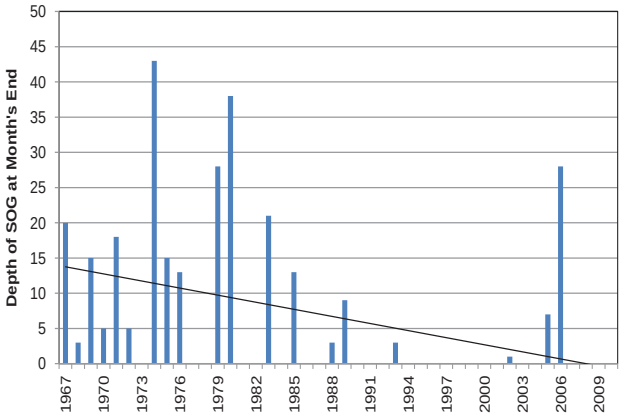
January



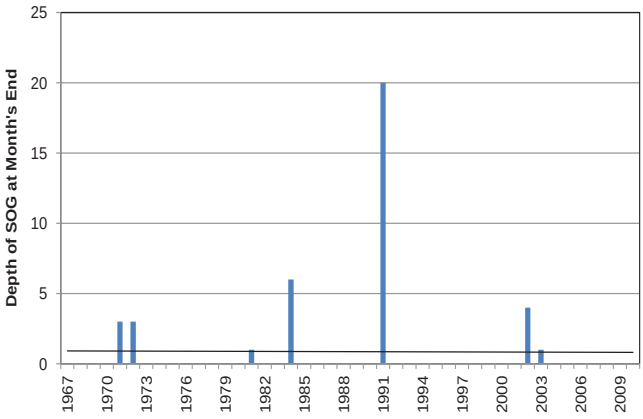
February



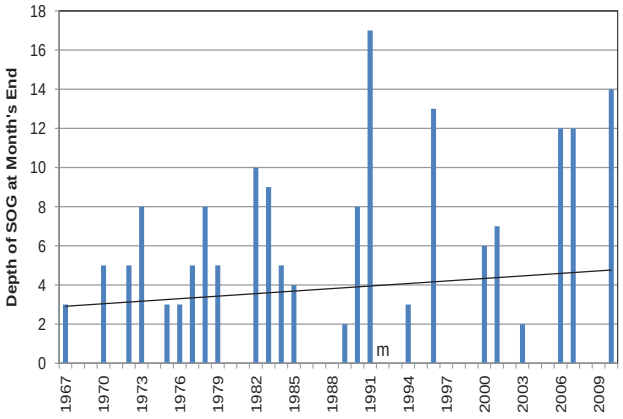
March



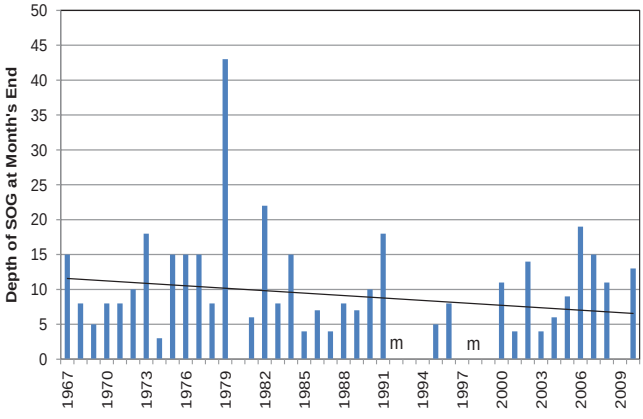
October



November



December



RADIATION

Sunrise/Sunset Tables for Saskatoon, 2010 & 2011[1]

2010	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	7:08	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	19:43	5:34	20:34	4:51	21:19	4:51	21:30	5:29	20:55	6:20	19:51	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	7:45	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	6:29	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	16:55
7	9:13	17:13	8:36	18:06	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	7:36	18:59	6:25	19:53	5:23	20:44	4:47	21:24	4:56	21:27	5:39	20:44	6:30	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	5:41	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	19:03	6:20	19:56	5:20	20:47	4:46	21:26	4:58	21:25	5:42	20:40	6:33	19:33	7:23	18:23	8:18	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	9:10	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	8:23	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	8:21	18:21	7:20	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	8:19	18:22	7:18	19:13	6:07	20:07	5:10	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	8:17	18:24	7:16	19:15	6:05	20:08	5:09	20:58	4:45	21:30	5:06	21:18	5:54	20:26	6:44	19:17	7:35	18:08	8:31	17:12	9:11	16:55
18	9:05	17:29	8:15	18:26	7:13	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	8:13	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	18:01	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	19:24	5:54	20:17	5:02	21:05	4:46	21:31	5:13	21:12	6:02	20:16	6:53	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	21:07	4:46	21:31	5:15	21:11	6:03	20:14	6:54	19:02	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	6:58	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	21:11	4:47	21:31	5:19	21:06	6:08	20:07	6:59	18:55	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	6:12	20:03	7:03	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	18:48	7:57	17:43	8:50	16:59	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	8:52	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	17:04

2011	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	7:53	18:46	6:42	19:40	5:37	20:32	4:52	21:17	4:50	21:30	5:28	20:57	6:18	19:54	7:07	18:44	8:02	17:38	8:53	16:58
2	9:15	17:06	8:45	17:56	7:50	18:48	6:39	19:42	5:35	20:33	4:51	21:19	4:51	21:30	5:29	20:55	6:19	19:52	7:09	18:42	8:03	17:36	8:54	16:58
3	9:15	17:07	8:44	17:58	7:48	18:50	6:37	19:44	5:33	20:35	4:50	21:20	4:52	21:30	5:31	20:54	6:21	19:50	7:11	18:40	8:05	17:34	8:55	16:57
4	9:15	17:09	8:42	17:59	7:46	18:51	6:35	19:46	5:31	20:37	4:50	21:21	4:52	21:29	5:32	20:52	6:23	19:47	7:12	18:37	8:07	17:33	8:57	16:56
5	9:14	17:10	8:40	18:01	7:44	18:53	6:32	19:47	5:29	20:38	4:49	21:22	4:53	21:29	5:34	20:50	6:24	19:45	7:14	18:35	8:09	17:31	8:58	16:56
6	9:14	17:11	8:39	18:03	7:42	18:55	6:30	19:49	5:27	20:40	4:48	21:23	4:54	21:28	5:35	20:48	6:26	19:43	7:16	18:33	8:11	17:29	8:59	16:56
7	9:14	17:12	8:37	18:05	7:39	18:57	6:28	19:51	5:26	20:42	4:48	21:23	4:55	21:27	5:37	20:47	6:28	19:41	7:17	18:31	8:12	17:27	9:01	16:55
8	9:13	17:14	8:35	18:07	7:37	18:59	6:26	19:52	5:24	20:43	4:47	21:24	4:56	21:27	5:39	20:45	6:29	19:38	7:19	18:28	8:14	17:26	9:02	16:55
9	9:13	17:15	8:33	18:09	7:35	19:00	6:23	19:54	5:22	20:45	4:47	21:25	4:57	21:26	5:40	20:43	6:31	19:36	7:21	18:26	8:16	17:24	9:03	16:55
10	9:12	17:16	8:31	18:11	7:32	19:02	6:21	19:56	5:20	20:47	4:47	21:26	4:58	21:25	5:42	20:41	6:32	19:34	7:22	18:24	8:18	17:23	9:04	16:54
11	9:11	17:18	8:30	18:13	7:30	19:04	6:19	19:58	5:19	20:48	4:46	21:27	4:59	21:24	5:43	20:39	6:34	19:31	7:24	18:22	8:20	17:21	9:05	16:54
12	9:11	17:19	8:28	18:14	7:28	19:06	6:17	19:59	5:17	20:50	4:46	21:27	5:00	21:23	5:45	20:37	6:36	19:29	7:26	18:19	8:21	17:19	9:06	16:54
13	9:10	17:21	8:26	18:16	7:26	19:07	6:14	20:01	5:15	20:51	4:46	21:28	5:01	21:23	5:47	20:35	6:37	19:27	7:28	18:17	8:23	17:18	9:07	16:54
14	9:09	17:22	8:24	18:18	7:23	19:09	6:12	20:03	5:14	20:53	4:45	21:28	5:02	21:22	5:48	20:33	6:39	19:24	7:29	18:15	8:25	17:17	9:08	16:54
15	9:08	17:24	8:22	18:20	7:21	19:11	6:10	20:04	5:12	20:54	4:45	21:29	5:04	21:21	5:50	20:31	6:41	19:22	7:31	18:13	8:27	17:15	9:09	16:54
16	9:07	17:26	8:20	18:22	7:19	19:13	6:08	20:06	5:11	20:56	4:45	21:29	5:05	21:20	5:52	20:29	6:42	19:20	7:33	18:11	8:28	17:14	9:10	16:55
17	9:06	17:27	8:18	18:24	7:16	19:14	6:05	20:08	5:09	20:58	4:45	21:30	5:06	21:18	5:53	20:27	6:44	19:17	7:35	18:08	8:30	17:12	9:10	16:55
18	9:05	17:29	8:16	18:26	7:14	19:16	6:03	20:10	5:08	20:59	4:45	21:30	5:07	21:17	5:55	20:25	6:46	19:15	7:36	18:06	8:32	17:11	9:11	16:55
19	9:04	17:31	8:14	18:28	7:12	19:18	6:01	20:11	5:07	21:00	4:45	21:31	5:09	21:16	5:56	20:23	6:47	19:12	7:38	18:04	8:34	17:10	9:12	16:55
20	9:03	17:32	8:12	18:29	7:09	19:20	5:59	20:13	5:05	21:02	4:45	21:31	5:10	21:15	5:58	20:21	6:49	19:10	7:40	18:02	8:35	17:09	9:12	16:56
21	9:02	17:34	8:10	18:31	7:07	19:21	5:57	20:15	5:04	21:03	4:46	21:31	5:11	21:14	6:00	20:19	6:50	19:08	7:42	18:00	8:37	17:07	9:13	16:56
22	9:01	17:36	8:08	18:33	7:05	19:23	5:55	20:16	5:03	21:05	4:46	21:31	5:13	21:12	6:01	20:16	6:52	19:05	7:44	17:58	8:39	17:06	9:13	16:57
23	9:00	17:38	8:06	18:35	7:02	19:25	5:53	20:18	5:01	21:06	4:46	21:31	5:14	21:11	6:03	20:14	6:54	19:03	7:45	17:56	8:40	17:05	9:14	16:57
24	8:58	17:39	8:03	18:37	7:00	19:27	5:51	20:20	5:00	21:08	4:46	21:31	5:16	21:10	6:05	20:12	6:55	19:01	7:47	17:54	8:42	17:04	9:14	16:58
25	8:57	17:41	8:01	18:39	6:58	19:28	5:49	20:22	4:59	21:09	4:47	21:31	5:17	21:08	6:06	20:10	6:57	18:58	7:49	17:52	8:44	17:03	9:15	16:59
26	8:56	17:43	7:59	18:40	6:55	19:30	5:47	20:23	4:58	21:10	4:47	21:31	5:19	21:07	6:08	20:08	6:59	18:56	7:51	17:50	8:45	17:02	9:15	16:59
27	8:54	17:45	7:57	18:42	6:53	19:32	5:45	20:25	4:57	21:11	4:48	21:31	5:20	21:05	6:10	20:06	7:00	18:54	7:52	17:48	8:47	17:01	9:15	17:00
28	8:53	17:46	7:55	18:44	6:51	19:34	5:43	20:27	4:56	21:13	4:48	21:31	5:21	21:04	6:11	20:03	7:02	18:51	7:54	17:46	8:48	17:00	9:15	17:01
29	8:52	17:48			6:48	19:35	5:41	20:28	4:55	21:14	4:49	21:31	5:23	21:02	6:13	20:01	7:04	18:49	7:56	17:44	8:50	17:00	9:15	17:02
30	8:50	17:50			6:46	19:37	5:39	20:30	4:54	21:15	4:49	21:31	5:24	21:00	6:14	19:59	7:05	18:47	7:58	17:42	8:51	16:59	9:15	17:03
31	8:49	17:52			6:44	19:39			4:53	21:16			5:26	20:59	6:16	19:57			8:00	17:40			9:15	17:04

[1]National Research Council, Canada, Hertzberg Institute of Astrophysics

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

RADIATION

MONTH	BRIGHT SUNSHINE (hrs)				BRIGHT SUNSHINE DAYS		
	2010	NORMAL	% OF NORMAL	% OF POSSIBLE	NO. OF DAYS	NORMAL	NO. OF DAYS WITH MORE THAN 1 HOUR
January	*107.2	103.3	103.8	41.3	*25	23.8	*25
February	*121.8	132.3	92.1	43.7	*26	24.2	*26
March	*170.1	175.2	97.1	46.0	*31	27.1	*31
April	215.5	225.2	95.7	51.5	26	27.3	22
May	221.9	267.1	83.1	45.5	26	29.5	25
June	265.7	277.2	95.9	53.1	28	28.5	28
July	326.7	305.7	106.9	65.1	30	30.3	30
August	261.1	280.8	93.0	57.7	30	30.1	26
September	191.2	186.0	102.8	50.4	27	27.0	23
October	231.3	157.9	146.5	70.3	28	27.0	28
November	81.5	98.0	83.2	30.9	21	22.2	13
December	78.8	85.4	92.3	32.5	18	22.8	14
Total	2272.8	2294.1	99.1	50.7	316	319.8	291

*Estimated based Global and Diffuse Radiation (see *Glossary of Terms*)

Daily Global and Diffuse Radiation

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	3.5	2.6	3.6	3.6	12.0	2.4	13.7	3.6	4.8	4.6	28.7	3.6	22.7	8.9	22.2	7.0	18.2	4.2	13.8	2.0	5.1	3.5	3.4	2.6
2	2.5	1.3	3.2	2.8	13.8	3.2	17.2	3.6	12.0	10.5	27.1	5.8	16.0	7.1	17.6	10.6	19.6	3.3	12.6	1.9	7.0	1.2	1.9	1.9
3	4.4	1.2	4.9	2.4	12.9	2.3	14.0	7.0	20.9	5.3	8.5	7.0	26.5	6.0	19.3	6.7	16.8	4.2	12.3	1.9	7.0	1.1	1.4	1.4
4	2.2	2.2	4.0	4.0	9.4	4.9	12.7	6.8	3.5	3.3	13.8	7.0	28.0	3.5	23.1	8.1	18.6	3.9	9.8	3.8	7.0	1.3	1.9	1.9
5	2.7	2.6	4.4	4.1	10.8	4.9	16.8	3.4	16.3	11.5	21.5	5.7	3.9	3.7	15.4	8.9	11.0	5.8	8.4	3.7	5.3	2.1	4.9	2.3
6	4.2	1.3	3.0	2.9	12.0	2.5	19.7	4.1	11.9	9.7	27.1	4.1	25.7	6.0	23.4	5.9	3.0	2.8	11.7	2.8	5.9	1.4	5.7	1.2
7	5.1	1.2	8.4	1.9	13.3	2.5	18.2	3.7	25.6	6.5	14.2	11.1	26.6	7.2	22.2	7.5	7.9	6.7	11.9	1.7	6.0	1.5	5.0	1.8
8	4.6	2.1	8.0	3.1	5.3	5.1	13.9	7.3	21.4	7.4	8.2	6.3	20.6	8.9	21.4	6.2	13.9	5.1	10.4	2.7	1.0	1.0	1.2	1.2
9	2.4	2.3	10.7	2.5	8.0	5.9	4.2	5.5	13.4	9.7	18.7	12.0	24.3	6.7	24.1	2.8	1.8	2.0	11.4	1.8	3.0	3.0	2.2	2.1
10	3.7	1.3	4.8	4.1	4.0	3.7	12.3	10.9	9.3	7.2	6.0	5.3	19.6	11.8	4.9	4.6	4.1	4.7	10.7	2.3	2.4	2.3	2.0	2.0
11	3.4	2.6	4.5	3.8	10.9	4.1	11.7	9.4	22.6	6.7	10.3	8.9	25.4	5.0	21.4	6.9	14.7	5.8	4.9	3.9	3.0	3.0	1.9	1.9
12	3.4	2.3	3.5	3.0	12.5	5.5	9.0	7.8	24.8	4.7	29.2	4.1	17.3	10.3	11.5	9.5	17.5	3.1	9.7	3.0	2.0	2.0	2.4	2.2
13	4.2	2.3	5.9	2.1	11.2	5.7	0.7	0.7	25.5	5.9	28.8	3.2	14.1	10.7	7.3	8.8	9.6	8.0	9.9	2.2	2.6	2.4	2.0	2.0
14	3.1	2.6	5.9	1.7	14.5	1.9	3.9	3.3	25.8	5.2	29.8	2.8	22.6	7.8	20.0	8.5	7.4	6.8	9.2	3.6	1.5	1.5	1.7	1.7
15	3.5	2.5	10.5	2.4	13.5	4.9	21.1	4.5	23.8	5.4	18.0	9.5	21.8	7.5	17.9	6.0	7.4	6.8	7.5	2.7	1.7	1.8	2.8	1.9
16	3.6	1.6	10.0	2.8	14.3	3.5	21.5	4.8	24.6	5.6	13.4	9.0	23.2	5.8	20.4	6.6	9.3	5.0	10.0	1.7	2.6	2.6	1.6	1.6
17	6.8	1.3	9.0	3.9	13.4	3.9	22.2	2.4	24.3	8.0	2.3	2.2	24.3	7.5	9.8	9.5	17.0	2.1	9.3	1.9	2.3	2.3	2.7	2.3
18	3.8	3.0	4.6	4.5	7.7	6.3	21.7	4.1	26.6	4.0	22.7	10.1	26.1	4.5	21.2	5.8	15.2	3.8	8.7	4.0	1.3	1.3	2.1	2.0
19	4.4	1.3	4.9	4.3	9.9	7.1	22.2	3.5	21.6	7.3	18.5	9.2	21.0	8.4	17.8	6.6	6.5	5.0	8.6	2.2	7.2	1.4	1.7	1.7
20	2.2	2.2	7.6	5.0	13.1	4.9	22.0	4.2	12.8	8.0	28.4	4.5	15.6	10.4	13.9	9.0	2.0	2.0	9.1	1.9	3.2	2.9	2.5	2.4
21	2.1	2.0	9.6	4.1	10.7	6.6	21.7	4.7	28.2	4.2	24.7	8.2	18.1	8.0	16.2	8.1	6.8	5.0	9.0	1.5	4.7	2.0	4.2	1.2
22	1.0	1.0	6.2	6.0	6.3	5.1	22.2	4.2	9.7	7.0	23.8	7.2	20.7	6.9	9.2	6.9	10.1	4.9	6.1	4.4	2.8	2.1	4.9	1.2
23	1.9	1.9	10.7	2.5	6.4	5.6	6.1	5.5	4.9	4.5	27.5	5.6	21.5	7.4	6.1	5.8	6.7	6.0	8.0	2.3	3.4	1.4	2.6	2.3
24	2.8	2.8	7.1	6.6	14.1	8.1	22.0	5.9	26.0	7.0	15.3	7.1	26.2	5.9	18.5	5.0	14.2	2.4	1.7	1.7	2.9	2.2	1.7	1.7
25	2.5	2.5	10.3	1.9	7.0	6.5	10.8	9.4	5.1	4.6	20.3	9.3	26.2	5.7	21.0	2.6	13.4	3.7	1.6	1.6	3.2	2.9	3.1	2.2
26	6.9	1.5	10.0	3.0	3.3	3.1	9.7	8.8	19.2	10.1	23.1	5.4	23.5	9.0	20.8	2.5	10.9	3.5	2.4	2.3	4.6	2.4	3.3	1.6
27	6.0	1.3	10.1	5.9	13.3	7.5	22.9	4.9	21.4	11.6	23.7	6.8	19.5	7.6	20.4	3.5	13.7	2.7	6.3	4.1	1.8	1.7	3.4	1.2
28	6.0	3.0	8.1	6.4	13.3	7.9	7.9	6.6	2.5	2.4	24.5	8.3	24.4	6.6	21.0	2.5	11.3	2.5	7.1	3.3	2.0	2.0	3.7	1.4
29	6.5	1.6			12.9	6.2	5.6	4.9	2.4	2.3	19.5	8.4	22.1	4.4	6.0	5.2	13.9	1.9	3.9	3.2	1.8	1.8	2.9	1.8
30	5.2	3.7			15.1	4.4	4.1	3.8	13.1	10.0	23.9	8.0	20.8	6.0	7.6	6.8	12.8	2.7	7.1	2.2	2.6	2.6	2.3	2.2
31	6.9	2.8			10.8	8.0			12.5	10.5			24.4	5.5	16.3	5.8			7.2	1.4			3.4	1.4
TOTAL	121.5	63.9	193.5	101.3	335.7	154.2	431.7	159.3	516.5	210.7	601.5	205.7	672.7	220.7	517.9	200.2	335.3	126.4	260.3	79.7	106.9	60.7	86.5	56.3
1971-2000 Normal	129.9	71.4	210.1	105.3	362.4	173.9	492.2	178.5	586.3	222.2	638.7	228.1	633.5	216.5	529.0	185.6	351.8	127.6	239.1	92.6	123.7	73.6	95.2	54.3

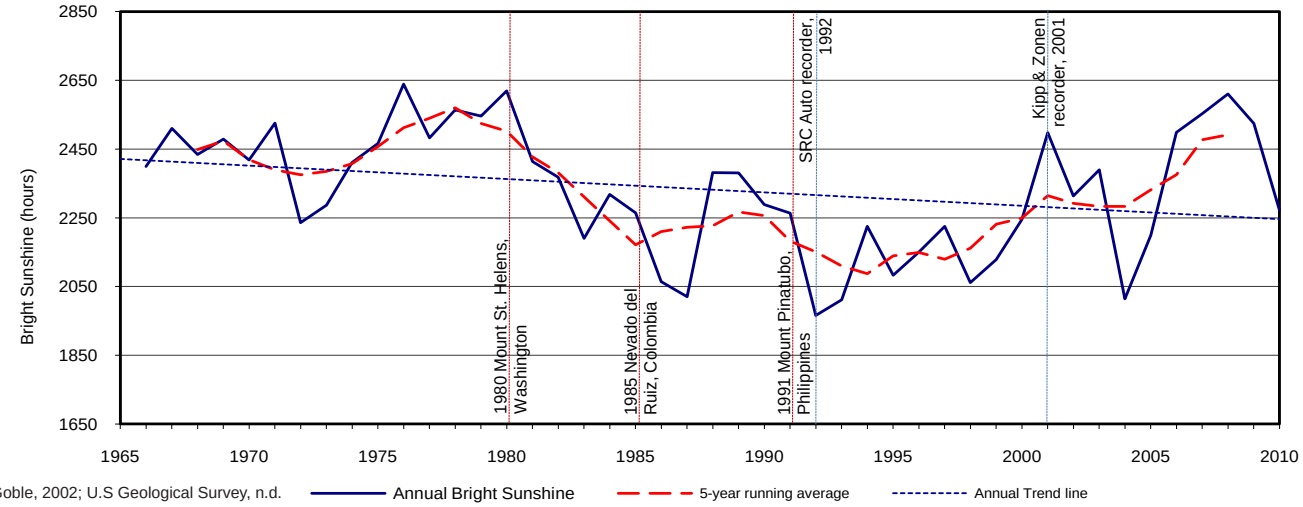
COMMENTS: G= Global Radiation D= Diffuse Radiation Units = MJ/m^2

September 9 & 10 Diffuse ring maladjusted.

November 15 = Within Instrment tolerance

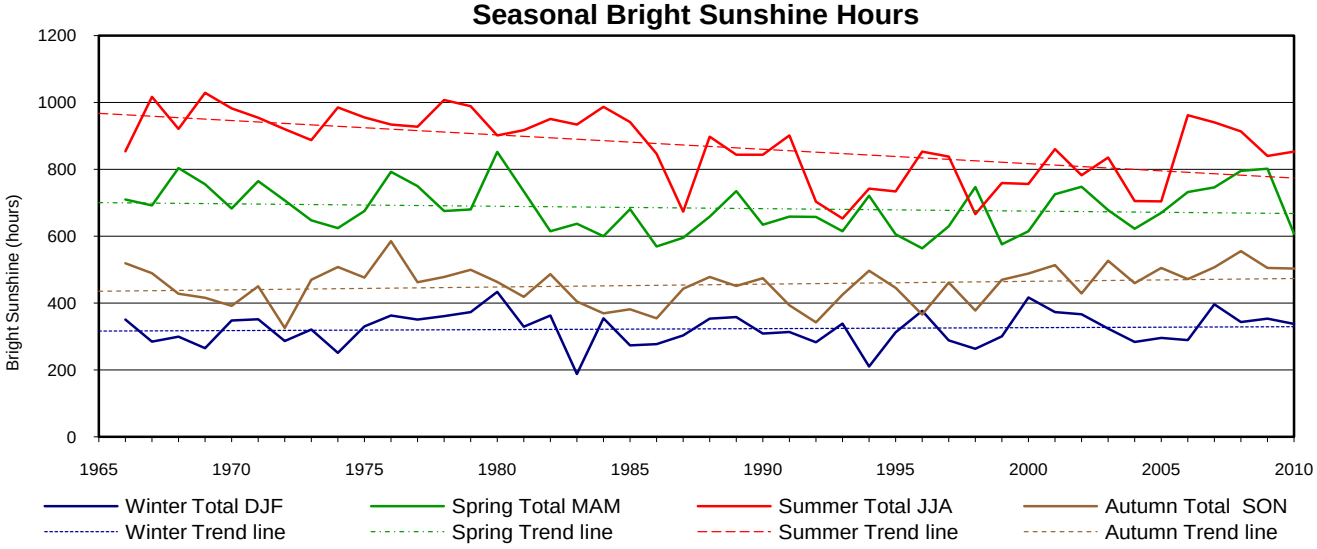
RADIATION

Annual Bright Sunshine Hours

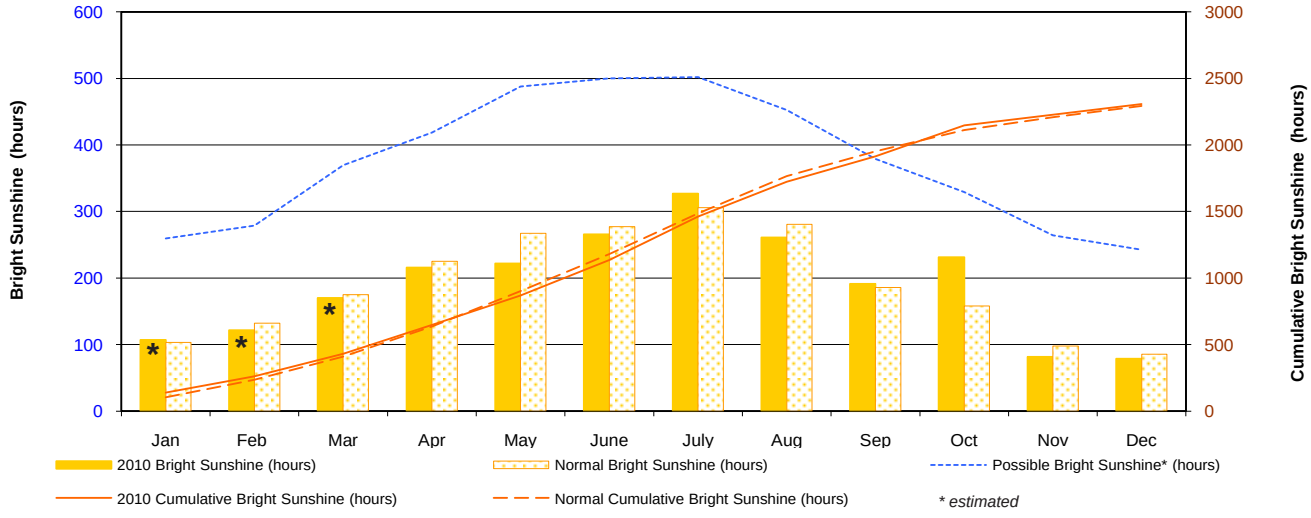


Goble, 2002; U.S Geological Survey, n.d. — Annual Bright Sunshine — 5-year running average — Annual Trend line

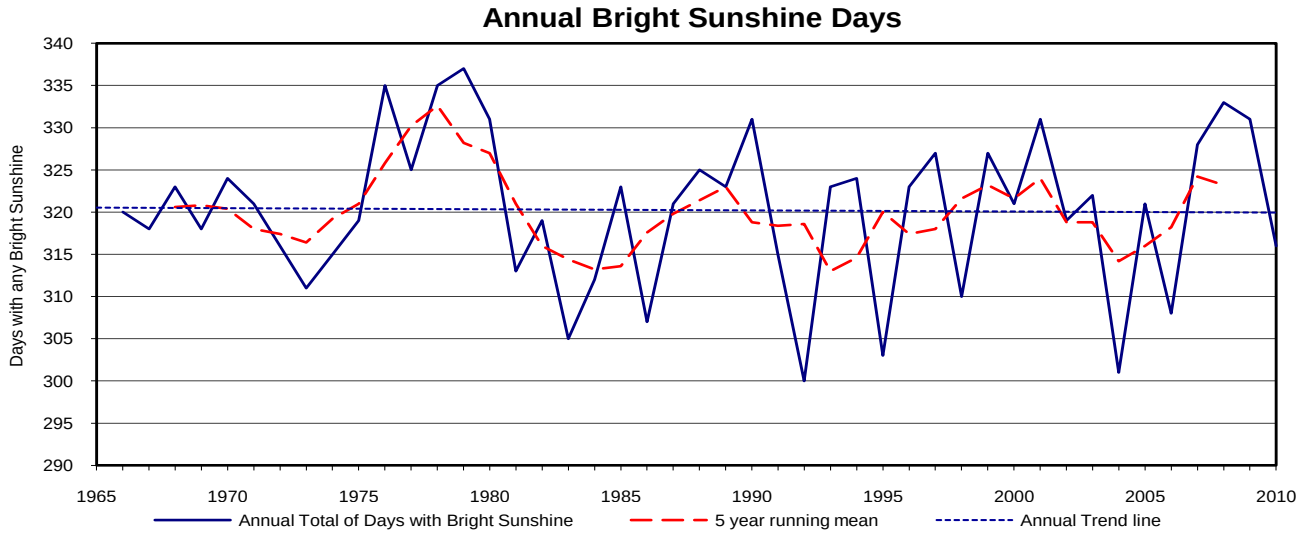
Seasonal Bright Sunshine Hours

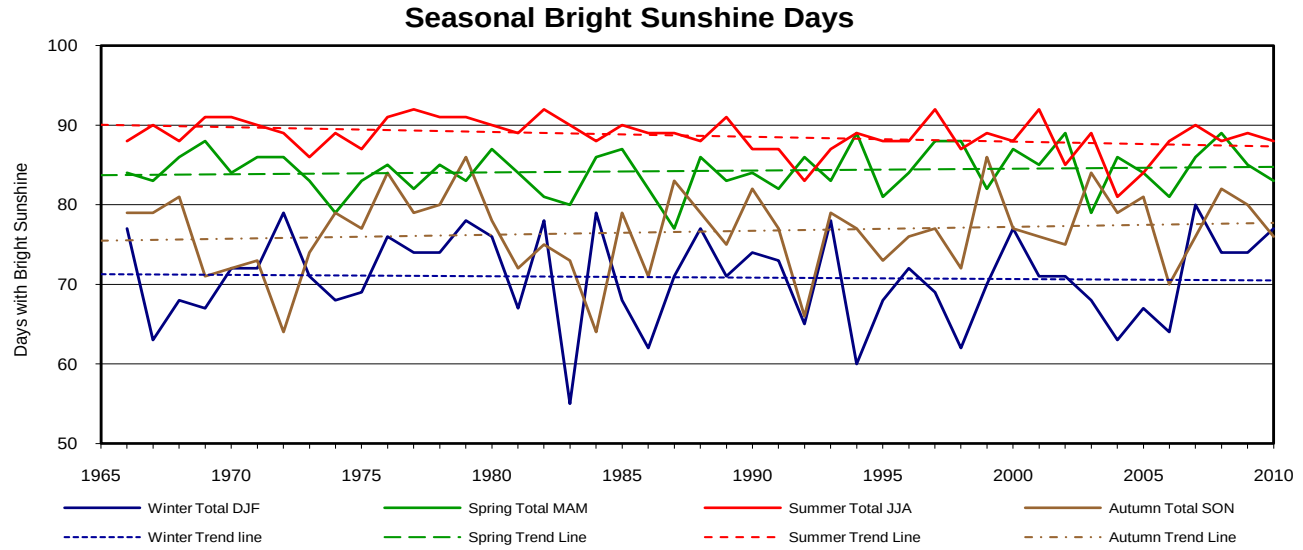


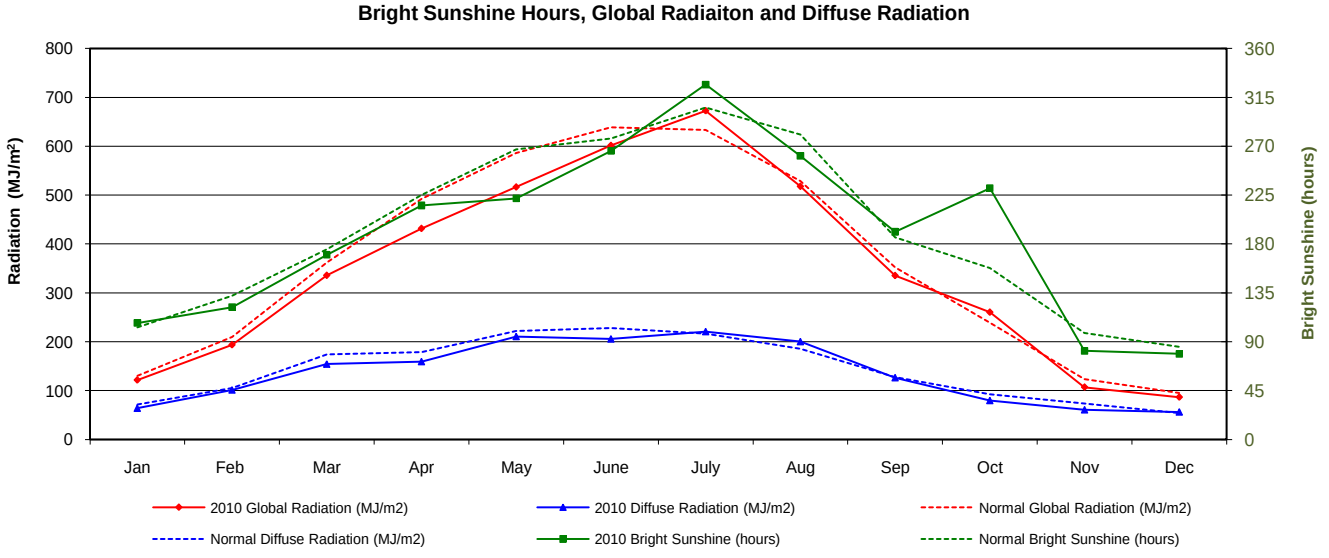
Monthly Bright Sunshine Hours



RADIATION


Annual Bright Sunshine Days
Days with any Bright Sunshine
340
335
330
325
320
315
310
305
300
295
290
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Annual Total of Days with Bright Sunshine
5 year running mean
Annual Trend line


Seasonal Bright Sunshine Days
Days with Bright Sunshine
100
90
80
70
60
50
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Winter Total DJF
Spring Total MAM
Summer Total JJA
Autumn Total SON
Winter Trend line
Spring Trend Line
Summer Trend Line
Autumn Trend Line


Bright Sunshine Hours, Global Radiaiton and Diffuse Radiation
Radiation (MJ/m²)
800
700
600
500
400
300
200
100
0
Bright Sunshine (hours)
360
315
270
225
180
135
90
45
0
Jan
Feb
Mar
Apr
May
June
July
Aug
Sep
Oct
Nov
Dec
2010 Global Radiation (MJ/m2)
2010 Diffuse Radiation (MJ/m2)
Normal Global Radiation (MJ/m2)
Normal Diffuse Radiation (MJ/m2)
2010 Bright Sunshine (hours)
Normal Bright Sunshine (hours)

RADIATION

Bright Sunshine Rankings

% OF ACTUAL TO POSSIBLE BRIGHT SUNSHINE

% Annual		% Winter (DJF)		% Spring (MAM)		% Summer (JJA)		% Autumn (SON)	
1976	58.8	1980	55.0	1980	66.7	1969	70.7	1976	60.3
1980	58.3	2000	52.8	1968	63.0	1967	69.8	2008	57.3
2008	58.1	2007	50.9	2009	62.8	1978	69.2	1966	53.3
1978	57.2	1979	47.9	2008	62.2	1979	67.9	2001	52.9
2007	57.0	2001	47.8	1976	62.1	1984	67.9	1974	52.2
1979	56.8	1996	47.7	1971	60.1	1974	67.7	2007	52.1
1971	56.3	2002	47.1	1969	59.2	1970	67.5	2009	52.1
2009	56.3	1982	46.6	1977	58.8	2006	66.1	2005	52.1
1967	56.0	1978	46.4	2002	58.6	1975	65.6	2010	51.8
2006	55.7	1976	46.0	1998	58.6	1971	65.6	1979	51.3
2001	55.7	1989	45.8	2007	58.6	1982	65.4	1994	51.1
1977	55.4	2009	45.3	1989	57.6	1985	64.8	2000	50.3
1969	55.3	1971	45.2	1981	57.6	2007	64.7	1967	50.2
1975	55.0	1966	45.1	2006	57.4	1976	64.2	1982	50.0
1968	54.2	1977	45.0	2001	56.9	1983	64.2	1988	49.3
1970	53.9	1984	44.9	1994	56.6	1977	63.8	1978	49.1
1981	53.8	1988	44.8	1966	55.7	1968	63.3	2003	49.1
1974	53.8	1970	44.6	1972	55.4	1972	63.3	1975	48.9
1966	53.5	2008	43.5	1967	54.4	1981	63.1	1990	48.7
1989	53.1	1993	43.4	1970	53.6	2008	62.9	2006	48.5
1988	53.0	2010	43.3	1979	53.4	1980	62.0	1973	48.3
1982	52.8	1975	42.4	1985	53.4	1991	61.9	1980	47.7
2003	52.1	1981	42.2	2003	53.3	1988	61.8	1977	47.6
2002	51.6	2003	41.6	1975	53.1	1973	61.1	1997	47.5
1984	51.6	1973	41.2	1978	53.0	2001	59.2	2004	47.4
1990	51.0	1991	40.2	2005	52.4	2010	58.7	1989	46.5
1973	51.0	1995	40.2	1991	51.7	1996	58.7	1971	46.2
2010	50.7	1990	39.7	1988	51.6	1966	58.7	1995	45.8
1985	50.5	1987	38.9	1992	51.5	1986	58.2	1987	45.5
1991	50.5	1999	38.5	1973	50.8	1989	58.1	1999	44.2
2000	50.0	1968	38.0	1983	50.1	1990	58.0	2002	44.1
1972	49.8	2005	37.9	1990	49.8	2009	57.8	1968	44.0
1997	49.6	2006	37.1	1997	49.3	1997	57.7	1993	43.8
1994	49.6	1997	37.0	1974	49.0	2003	57.4	1981	43.1
2005	49.1	1967	36.5	2004	48.7	2002	53.8	1969	42.9
1983	48.9	1972	36.3	1982	48.3	1999	52.2	1983	41.5
1996	47.9	2004	35.9	1993	48.2	2000	52.1	1991	40.4
1999	46.5	1992	35.9	2000	48.1	1994	51.0	1970	40.2
1995	46.5	1986	35.6	2010	47.6	1995	50.5	1985	39.3
1986	46.0	1985	35.1	1995	47.6	2004	48.5	1998	38.9
1998	46.0	1969	34.0	1984	47.0	2005	48.5	1984	38.1
1987	45.1	1998	33.7	1987	46.8	1992	48.4	1996	37.7
1993	44.9	1974	32.2	1999	45.2	1987	46.3	1986	36.4
2004	44.8	1994	26.9	1986	44.7	1998	45.8	1992	35.3
1992	43.8	1983	24.2	1996	44.1	1993	44.9	1972	33.6

DAYS WITH BRIGHT SUNSHINE

Annual		Winter (DJF)		Spring (MAM)		Summer (JJA)		Autumn (SON)	
1979	337	2007	80	1994	89	1977	92	1979	86
1976	335	1972	79	2002	89	1982	92	1999	86
1978	335	1984	79	2008	89	1997	92	1976	84
2008	333	1979	78	1969	88	2001	92	2003	84
1980	331	1982	78	1997	88	1969	91	1987	83
1990	331	1993	78	1998	88	1970	91	1990	82
2001	331	1966	77	1980	87	1976	91	2008	82
2009	331	1988	77	1985	87	1978	91	1968	81
2007	328	2000	77	2000	87	1979	91	2005	81
1997	327	1976	76	1968	86	1989	91	1978	80
1999	327	1980	76	1971	86	1967	90	2009	80
1977	325	1977	74	1972	86	1971	90	1966	79
1988	325	1978	74	1984	86	1980	90	1967	79
1970	324	1990	74	1988	86	1983	90	1974	79
1994	324	2008	74	1992	86	1985	90	1977	79
1968	323	2009	74	2004	86	2007	90	1985	79
1985	323	1991	73	2007	86	1972	89	1988	79
1989	323	1970	72	1976	85	1974	89	1993	79
1993	323	1971	72	1978	85	1981	89	2004	79
1996	323	1996	72	2001	85	1986	89	1980	78
2003	322	1973	71	2009	85	1987	89	1975	77
1971	321	1987	71	1966	84	1994	89	1991	77
1987	321	1989	71	1970	84	1999	89	1994	77
2000	321	2001	71	1981	84	2003	89	1997	77
2005	321	2002	71	1990	84	2009	89	2000	77
1966	320	1999	70	1996	84	1966	88	1996	76
1975	319	1975	69	2005	84	1968	88	2001	76
1982	319	1997	69	1967	83	1984	88	2007	76
2002	319	1968	68	1973	83	1988	88	2010	76
1967	318	1974	68	1975	83	1995	88	1982	75
1969	318	1985	68	1979	83	1996	88	1989	75
1972	316	1995	68	1989	83	2000	88	2002	75
2010	316	2003	68	1993	83	2006	88	1973	74
1974	315	1969	67	2010	83	2008	88	1971	73
1991	315	1981	67	1977	82	2010	88	1983	73
1981	313	2005	67	1986	82	1975	87	1995	73
1984	312	1992	65	1991	82	1990	87	1970	72
1973	311	2006	64	1999	82	1991	87	1981	72
1998	310	1967	63	1982	81	1993	87	1998	72
2006	308	2004	63	1995	81	1998	87	1969	71
1986	307	1986	62	2006	81	1973	86	1986	71
1983	305	1998	62	1983	80	2002	85	2006	70
1995	303	1994	60	1974	79	2005	84	1992	66
2004	301	1983	55	2003	79	1992	83	1972	64
1992	300	2010	44	1987	77	2004	81	1984	64

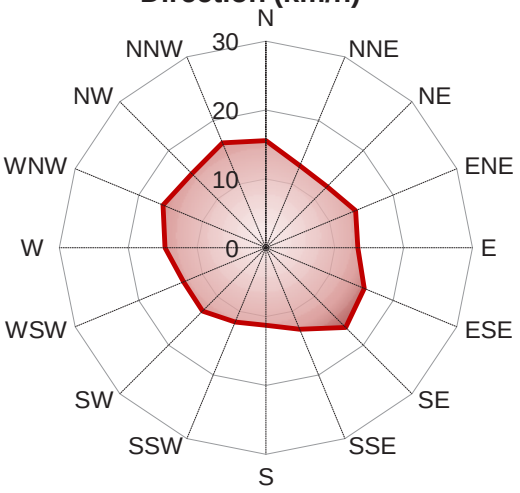
Note: January, February & March values are estimated

WIND

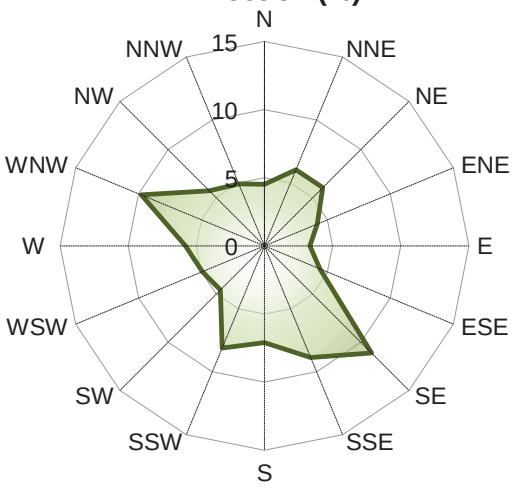
MONTH	AVERAGE WIND SPEED (km/h)			HIGHEST INSTANTANEOUS WIND SPEED (km/h)							
	2010 Average	Normal*	2010 Peak Speed Average	2010 for CRS (Speed / direction / date)			Since 1953 (Saskatoon Diefenbaker Int'l. Airport) (Speed / direction / day / year)				
January	13.7	16	42.8	56.0	NNW	24	111	W	11	1986
February	10.5	16	37.7	43.8	SE	27	106	N	22	1988
March	14.6	17	45.3	70.4	W	17	93	W	18	1959
April	17.9	18	47.9	91.2	W	09	108	W	06	1959
May	17.9	18	46.6	70.2	NNW	23	132	SW	17	1965
June	14.4	17	45.3	71.6	ESE	29	117	S	01	1986
July	12.2	16	45.1	80.4	WSW	16	113	E	05	1955
August	12.4	16	45.0	65.8	NNE	12	151	W	14	1967
September	14.4	17	41.2	54.3	NW	17	148	W	22	1967
October	14.0	17	44.8	62.3	N	26	138	NW	16	1967
November	12.6	16	39.6	51.6	N	16	100	W	17	1967
December	14.3	16	41.0	60.3	SE	14	121	W	12	1955

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

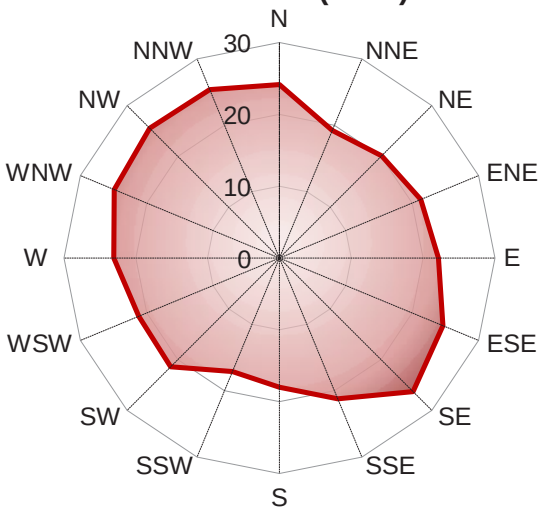
Annual Wind Speed Average by Direction (km/h)



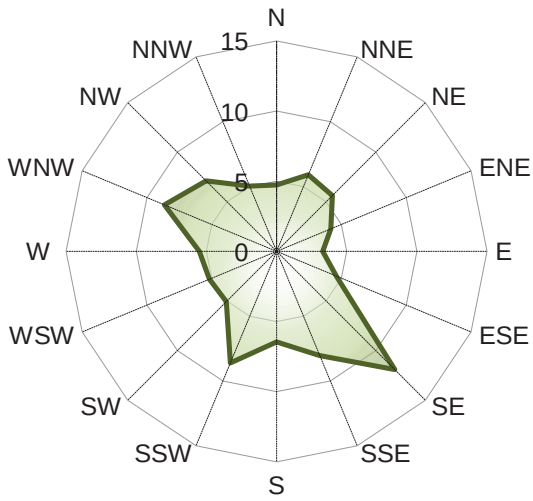
Annual Wind Frequency by Direction (%)



Annual Peak Speed Average by Direction (km/h)

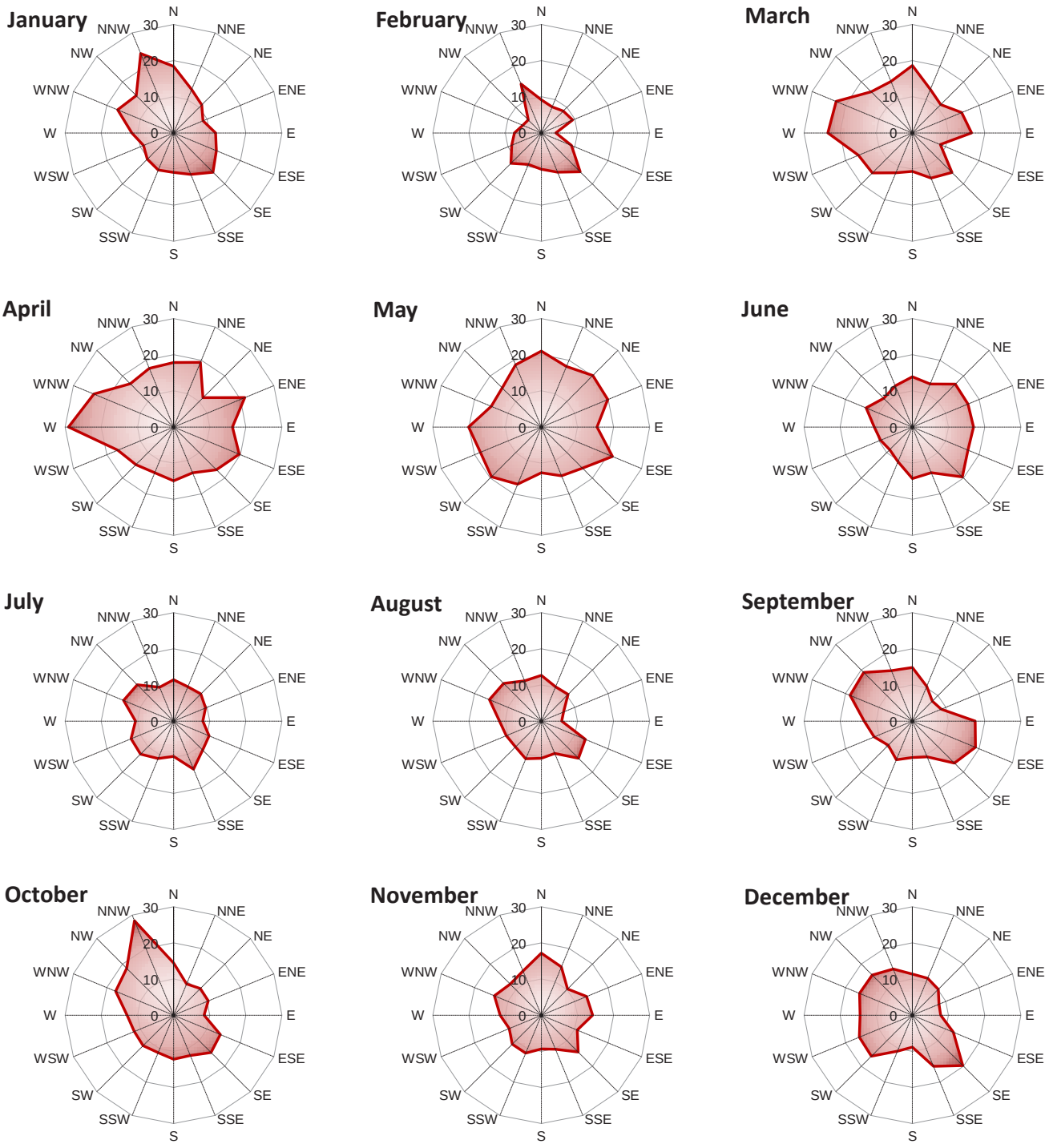


Annual Peak Wind Frequency by Direction (%)



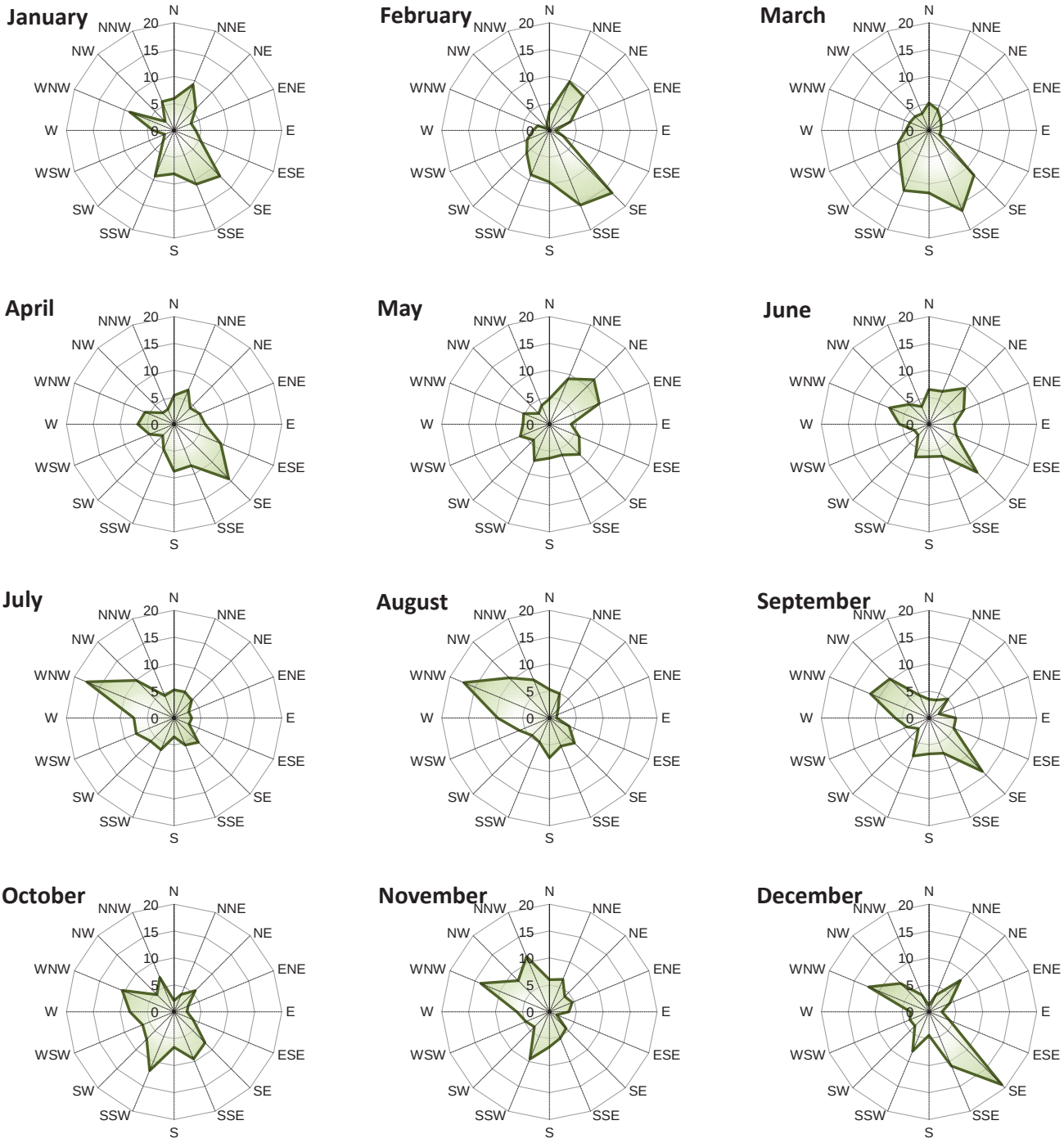
WIND

Average Wind Speed by Direction (km/h)



WIND

Average Wind Frequency by Direction (%)



WIND

EXTREME DAILY WINDS (km/h)

DATE	WIND SPEED/ DIRECTION	BEAUFORT WIND SCALE DESIGNATION*
January 24	56.0 NNW	Near Gale
March 17	70.4 W	Gale
March 18	63.0 W	Gale
March 29	57.2 SW	Near Gale
March 30	61.0 WSW	Near Gale
March 31	60.8 WNW	Near Gale
April 8	70.3 SSW	Gale
April 9	91.2 W	Storm
April 10	63.7 WNW	Gale
April 23	54.1 WSW	Near Gale
April 28	57.2 SE	Near Gale
April 30	65.3 N	Gale
May 1	59.3 NNW	Near Gale
May 3	62.5 ESE	Near Gale
May 4	67.1 NE	Gale
May 20	70.1 SW	Gale
May 21	56.2 SSW	Near Gale
May 22	66.5 NNE	Gale
May 23	70.2 W	Gale
May 25	58.1 N	Near Gale
June 5	52.9 WNW	Near Gale
June 14	53.1 SSW	Near Gale
June 17	56.0 NE	Near Gale
June 24	54.8 SW	Near Gale
June 26	57.6 W	Near Gale
June 28	52.1 SE	Near Gale
June 29	71.6 ESE	Gale
June 30	71.5 ENE	Gale
July 8	58.5 NW	Near Gale
July 9	55.2 W	Near Gale
July 12	53.8 SSE	Near Gale
July 13	54.8 WSW	Near Gale
July 15	56.7 NNW	Near Gale
July 16	80.4 WSW	Strong Gale
August 8	64.3 NNW	Gale
August 12	65.8 NNE	Gale
August 13	52.3 NNE	Near Gale
August 14	55.4 N	Near Gale
August 23	55.2 NW	Near Gale
August 27	56.0 WNW	Near Gale
September 16	52.5 WNW	Near Gale
September 17	54.3 NW	Near Gale
October 5	60.0 WNW	Near Gale
October 15	56.0 NW	Near Gale
October 26	62.3 N	Near Gale
October 27	61.0 NNW	Near Gale
November 16	51.6 N	Near Gale
December 12	51.6 SE	Near Gale
December 14	60.3 SE	Near Gale

*Near Gale >=51 but < 63 *Gale >=63 but <76
*Strong Gale >=76 but <88 *Storm >=88 but <102

WINDCHILL CALCULATION CHART [1]

T°C / km/h Speed	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

-28	Increasing risk of frostbite for most people within 30 minutes of exposure
-36	High risk for most people in 5 to 10 minutes of exposure
-48	High risk for most people in 2 to 5 minutes of exposure
-55	High risk for most people in 2 minutes of exposure or less

1: Environment Canada, 2004b

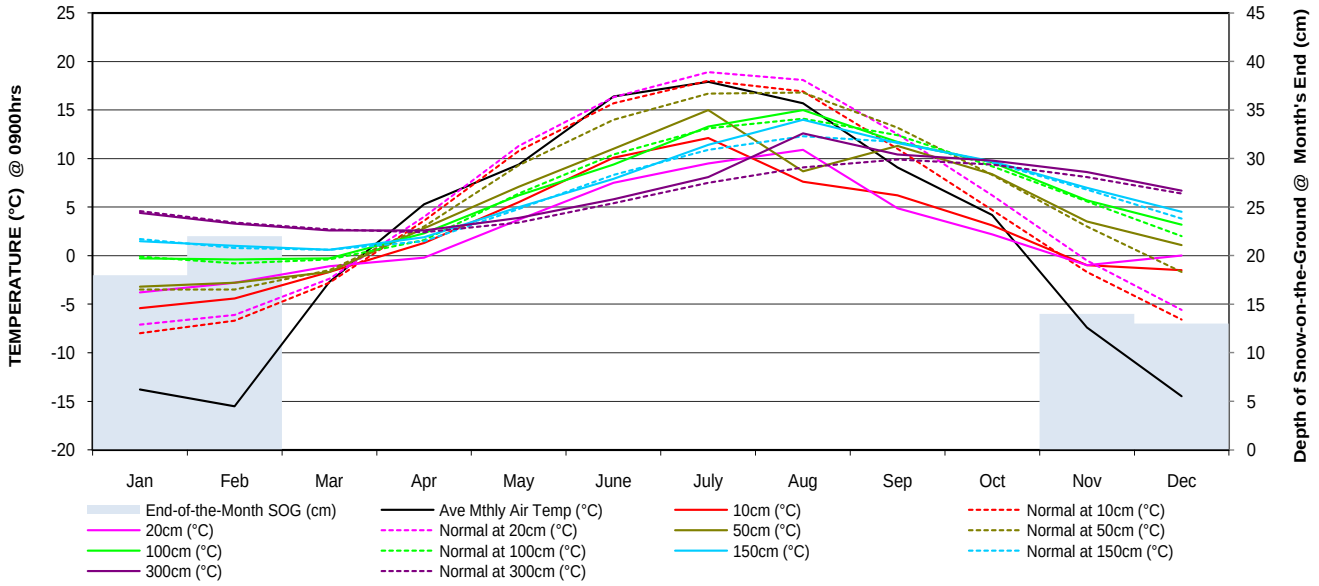
MAXIMUM DAILY WIND CHILL VALUE < 0°C

DATE	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
1	-51	-31	-16	-7	-4					-2	-4	-27
2	-31	-20	-24	-7	-4						-1	-18
3	-32	-29	-21	-6	-4						-3	-15
4	-30	-28	-17	-6	-8						-8	-23
5	-33	-20	-14	-7	-7						-3	-26
6	-43	-21	-10	-9	-5						-4	-28
7	-47	-36	-13	-3	-6						-4	-28
8	-38	-37	-7	-1	-3						-6	-29
9	-31	-37	-6	-11	-3						-7	-25
10	-24	-34	-6	-12	-2						-10	-30
11	-17	-19	-9	-11	-2						-12	-33
12	-12	-31	-8	-8	-1					-3	-11	-36
13	-15	-31	-6	-6						-2	-11	-26
14	-23	-32	-9	-3						-2	-6	-19
15	-16	-31	-12	-3						-1	-5	-19
16	-15	-19	-10	-4		-4				-5	-16	-23
17	-24	-22	-6	-2		-7				-7	-22	-27
18	-16	-16	-13	-1		-6				-6	-27	-26
19	-20	-18	-15			-3				-1	-33	-24
20	-22	-23	-12							-5	-29	-29
21	-14	-25	-8							-2	-25	-29
22	-12	-22	-11			-2				-5	-32	-28
23	-14	-31	-14							-3	-36	-29
24	-25	-23	-23	-5						-3	-33	-19
25	-32	-19	-24	-10	-3					-7	-38	-20
26	-34	-24	-11	-4	-1					-11	-19	-16
27	-38	-21	-9	-7	-1					-16	-23	-20
28	-42	-20	-6		-1					-18	-14	-26
29	-37		-2		-1					-10	-17	-32
30	-25		-2	-3						-14	-27	-35
31	-41		-4							-7		-34

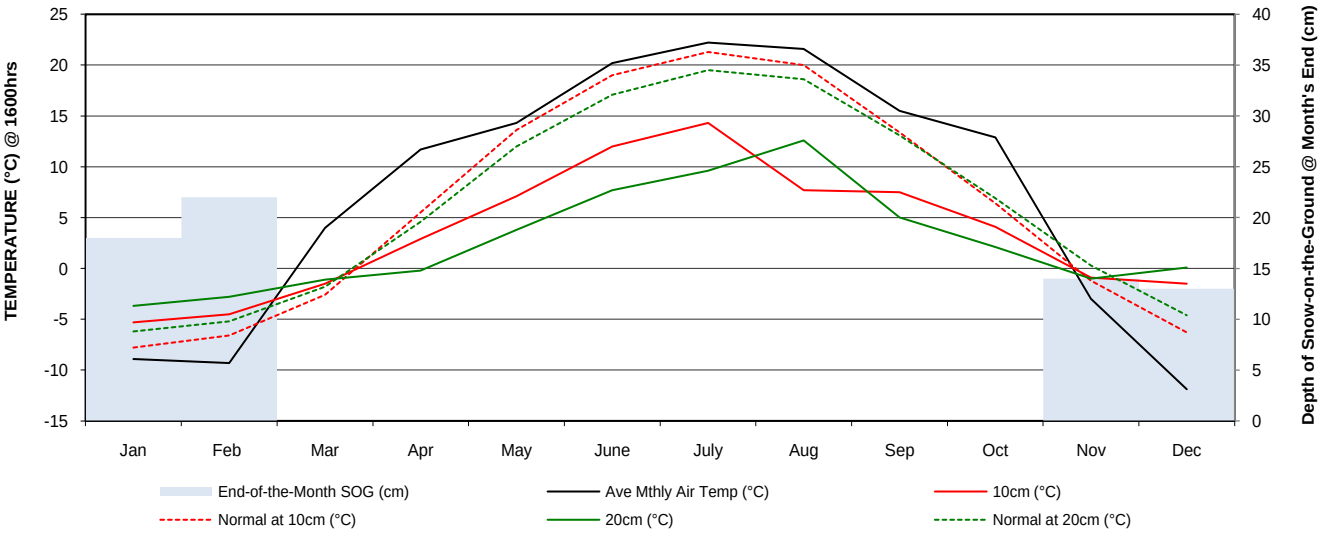
SOIL TEMPERATURES

MONTH	Mean Air Temp @ 0900h (°C)	SOIL TEMPERATURES (C°) @ 0900hrs												Mean Air Temp @ 1600h (°C)	SOIL TEMPERATURES @ 1600hrs			
		10cm		20cm		50cm		100cm		150cm		300cm			10cm		20cm	
		2010	NORM	2010	NORM	2010	NORM	2010	NORM	2010	NORM	2010	NORM		2010	NORM	2010	NORM
January	-13.8	-5.4	-8.0	-3.8	-7.1	-3.2	-3.5	-0.3	-0.1	1.5	1.7	4.4	4.6	-8.9	-5.3	-7.8	-3.7	-6.2
February	-15.5	-4.4	-6.7	-2.8	-6.1	-2.8	-3.5	-0.4	-0.8	1.0	0.8	3.3	3.4	-9.3	-4.5	-6.6	-2.8	-5.2
March	-2.7	-1.7	-2.8	-1.1	-2.4	-1.7	-1.5	-0.3	-0.4	0.6	0.6	2.6	2.7	4.0	-1.5	-2.6	-1.1	-1.8
April	5.3	1.3	3.6	-0.2	4.0	2.8	3.0	2.3	1.6	1.9	1.5	2.6	2.4	11.7	2.9	5.5	-0.2	4.6
May	9.4	5.5	10.8	3.7	11.3	7.1	9.3	6.2	6.4	5.0	4.8	3.9	3.4	14.3	7.1	13.6	3.8	12.0
June	16.4	10.1	15.7	7.5	16.3	11.0	14.0	9.4	10.4	7.9	8.3	5.8	5.4	20.2	12.0	19.0	7.7	17.1
July	17.9	12.1	18.0	9.5	18.9	15.0	16.7	13.3	13.1	11.4	10.9	8.1	7.5	22.2	14.3	21.3	9.6	19.5
August	15.7	7.6	16.9	10.9	18.1	8.7	16.8	15.0	14.1	14.0	12.3	12.6	9.1	21.6	7.7	20.0	12.6	18.6
September	9.1	6.2	11.0	4.9	12.5	11.3	13.2	11.7	12.4	11.6	11.7	10.4	9.9	15.5	7.5	13.4	5.0	13.1
October	4.2	3.1	4.7	2.2	6.2	8.4	8.3	9.6	9.2	9.7	9.6	9.8	9.4	12.9	4.1	6.4	2.1	6.9
November	-7.4	-1.0	-1.7	-1.0	-0.5	3.5	3.0	5.7	5.6	7.0	6.8	8.6	8.1	-3.0	-0.9	-1.2	-1.0	0.3
December	-14.5	-1.5	-6.6	0.0	-5.6	1.1	-1.7	3.2	2.0	4.5	3.8	6.7	6.4	-11.9	-1.5	-6.3	0.1	-4.6

Average Monthly Soil Temperatures @ 0900 hrs



Average Monthly Soil Temperatures @ 1600 hrs



Saskatchewan Research Council

Annual Weather Summary

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

CRS estab. 1963

		2010 VALUE	2009 VALUE	NORMAL (1971-2000) OR EXTREME (1892-2004) [1 4]
TEMPERATURE	Average annual maximum (°C)	8.9	7.8	8.3
	Extreme annual maximum (°C/date)	33.6 August 26	34.6 Sept 19	41.0 June 1988
	Average annual minimum (°C)	-1.5	-3.8	-3.4
	Extreme annual minimum (°C/date)	-35.2 January 1	-37.4 Jan 04	-50.0 Feb. 1893
	Annual **average** (°C)	3.7	2.0	2.5
	No.of Frost-free days (Temperature > 0°C)	191	160	197.1
	% of Frost-free days for the year	52.3%	43.8%	54.0%
DEGREE-DAYS	Annual growing (5°C base)	1730.9	1646.3	1672.9
	Annual frost-free growing (5°C base)	1409.4	1409.3	1345.3
	Annual heating (18°C base)	5279.9	5948.4	5809.0
	Annual cooling (18°C base)	89.9	122.3	119.1
PRECIPITATION	Annual total (mm)	707.4	319.3	348.2
	Greatest Daily (mm/date)	44.2 September 10	40.8 June 21	99.4 June 24, 1983
	Greatest Monthly (mm/date)	147.2 June	98.8 August	160.1/June 1991
	Measurable precipitation days (≥ 0.2mm)	132	119	115.7
	% of Precipitation days for the year	36.2%	32.6%	31.7%
WIND	Average Annual wind speed (km/h)	14.1	14.2	16.6[2]
	Peak gust (speed/direction/date)	91.2[W]April 9	75.0[SSE]Sept 29	151.0 [W]Aug 14, 1967[2]
	Prevailing direction	SE 11.1%[5]		
	Prevailing direction for Peak Winds	SE 11.9%[5]		
RADIATION	Total annual bright sunshine (hours)	2272.8[6]	2524.5	2294.1
	% possible bright sunshine	50.7[6]	56.3	51.2
	% normal bright sunshine	99.1%[6]	110.0%	
	Bright Sunshine days	316[6]	331.0	319.9
	% of normal Bright Sunshine days	98.8%[6]	103.5%	
	Total annual global radiation(MJ/m²)	4180.0	4451.0	4391.9[3]
	Total annual diffuse radiation (MJ/m²)	1639.1	1700.5	1729.6[3]

For Your Information

1. 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 (2.5km E of CRS) and/or the Saskatoon Diefenbaker International Airport (DIA) station (10 km WNW of CRS).
2. Wind normals are from the Saskatoon DIA station.
3. Global and Diffuse radiation normals are from 1961-1990 period.
4. Extreme values for temperature and precipitation are from the Saskatoon area weather stations extending back to 1882. The earlier records from 1882 to 1901 have several large gaps.
5. Data for the wind roses have been compiled using Mistaya's "Windographer™"
6. The bright sunshine recorder was in for calibration during January, February and March therefore, the values for those months have been estimated using the Global/Diffuse values.*(see Glossary of Terms; Bright Sunshine* for Methodology)

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

	January 2010	2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-7.6	-11.0	-9.8	
	Extreme monthly maximum (°C/date)	5.9/12	5.3/18	7.0/1986/11&1993/30	11.0/1980/23$_{SWT}$
	Average monthly **minimum** (°C)	-16.3	-21.4	-19.7	
	Extreme monthly minimum (°C/date)	-35.2/01	-37.4/04	-43.9/1966/22&1969/29	-48.9/1893/31$_{SM}$
	Monthly **average** (°C)	-12.0	-16.2	-14.7	
	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)	930.4	1061.5	1015.1	
	Yearly total-to-date heating	930.4	1061.5	1015.1	
	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)	10.4	17.6	15.5	66.1/1911$_{SE}$
	Yearly total-to-date (mm)	10.4	17.6	15.5	
	Greatest daily (mm/date)	5.2/23	3.2/13	35.2/2007/15	36.0/2007/10$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	9	17	10.2	
WIND	Average monthly speed (km/h)	13.7	14.3	15.0$_{SA}$	
	Peak gust (speed/direction/date)	56.0^{NNW}24	66.1^{WNW}24		111^{W}1986/11$_{SA}$
RADIATION	Monthly bright sunshine (hours)	*107.2	120.7	101.0	
	% possible bright sunshine	na	46.5	39.9	
	% normal bright sunshine	na	103.3		
	Bright Sunshine days	*25.1	27	23.4	
	Monthly global radiation(MJ/m^2)	121.5	130.4	129.9	
	Monthly diffuse radiation (MJ/m^2)	63.9	64.6	71.4	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	-5.7	-2.8		
	10 cm/20 cm	-5.4/-3.8	-6.0/-4.3	-8.0/-7.1	
	50 cm/100cm	-3.2/-0.3	-3.6/0.0	-3.5/-0.1	
	150 cm/300cm	1.5/4.4	1.9/4.6	1.7/4.6	

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

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon DIA

**Estimate only; Bright sunshine recorder calibrated during January - March*

For Your Information

January mean temperatures were a month ahead of themselves this year. Monthly mean values of -16.3°C and -7.6°C are expected in February not January. Out of 31 days, 22 were above the daily normal; 9 of those by more than 10°C. From the 9th to the 25th all mean temperatures were above normal. The 'January' or 'Bonspiel Thaw' usually lasts no more than a week not 17 days. Snowfall was not a problem until the 23rd when Saskatoon experienced a mini blizzard causing unwary motorists to visit the roadside ditches. The "Strong" continuous wind (40 to 56 km/h) during the month occurred at this time. By month's end, an average of 18cm of snow-on-the-ground was measured at the station; a disbelieving small amount to those who had to shovel waist high drifts from the doors, driveways and sidewalks.

Weather Words for the Weatherwise When Shovelling Snow[1]

- *Do warm-up excercises before beginning*
- *Wear layers of clothing to prevent overheating*
- *If you became tired, lightheaded, dizzy or short of breath; quit*
- *Bend the knees and not the back*
- *Shovel many times during a snow fall*
- *Take a CPR course - just in case you neighbour needs help*

[1] *CBC News Dec. 21, 2007; The Southwest Booster, Dec 11, 2008*

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

February 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-8.1	-9.4	-7.7	
	Extreme monthly maximum (°C/date)	-2.5/28	3.1/04&08	8.3/2005/02	12.8/1931/19$_{SE}$
	Average monthly **minimum** (°C)	-18.3	-19.3	-17.6	
	Extreme monthly minimum (°C/date)	-30.3/08	-32.6/26	-41.1/1972/06	-50.0/1893/01$_{SM}$
	Monthly **average** (°C)	-13.2	-14.4	-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)	874.9	906.4	886.2	
	Yearly total-to-date heating	1805.3	1967.9	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)	4.9	6.2	13.3	43.7/1924$_{SE}$
	Yearly total-to-date (mm)	15.3	23.8	31.5	
	Greatest daily (mm/date)	1.7/02	1.2/24	14.2/1979/13	30.0/1962/03$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	9	8	8.9	
WIND	Average monthly speed (km/h)	10.5	12.5	15.3$_{SA}$	
	Peak gust (speed/direction/date)	43.8^{SE}27	58.4^{NW}01		106^{N}1988/22$_{SA}$
RADIATION	Monthly bright sunshine (hours)	*121.8	146.9	132.3	
	% possible bright sunshine	na	52.6	47.0	
	% normal bright sunshine	na	111.0		
	Bright Sunshine days	*26	24	24.2	
	Monthly global radiation(MJ/m^2)	193.5	208.9	210.1	
	Monthly diffuse radiation (MJ/m^2)	101.3	107.1	105.3	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	-15.5/-4.4	-1.1		
	10 cm/20 cm	-4.4/-2.8	-4.2/-2.7	-6.7/-6.1	
	50 cm/100cm	-2.8/-0.4	-2.8/-0.4	-3.5/-0.8	
	150 cm/300cm	1.0/3.3	1.1/3.5	0.8/3.4	

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
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

**Estimate only; Bright sunshine recorder calibrated during January - March*

For Your Information

This February had 22 days with maximum temperatures warmer than -10°C. Minimum temperatures, except for the last day, were all -10°C or colder including one -30°C on February 8th. Overall, the temperatures were slightly below normal values. The temperatures were not reflected in the heating degree-day values where, instead of being above normal, they were actually slightly below normal by 1.3%. Snow was not a problem as only 4.9 mm was measured over 9 days. Homeowners had to decide whether to shovel or just let the wind blow the miniscule amount off the sidewalks. Winds were very low during the month with 21 days recording daily maximum wind speeds of less than 31 km/h.

Groundhog Day arrived with the settlers, along with their hopes and dreams. As badgers or sacred bears, used as spring prophets in Europe, were scarce in the new land, settlers turned to groundhogs as their spring prognosticators. A sunny, February 2nd is greeted with dismay as it indicates six more weeks of winter weather. How accurate are the furry fortune tellers? Those who 'pooh pooh' the predictions consider them unreliable. While those who believe, credit the remarkable rodents with being right 90-100% of the time.[1]

[1]Phillips, 1993

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

March 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	5.1	-4.1	-0.7	
	Extreme monthly maximum (°C/date)	17.2/28	5.5/04	20.0/1993/23	22.8/1910/23$_{SE}$
	Average monthly **minimum** (°C)	-5.0	-16.0	-10.5	
	Extreme monthly minimum (°C/date)	-15.5/25	-33.4/11	-38.9/1972/02	-43.3/1897/14$_{SM}$
	Monthly **average** (°C)	0.1	-10.1	-5.6	
	No. of Frost-free days (Temp. > 0°C)	5	0	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	16.0	0.0	2.4	
	Yearly total-to-date growing	16.0	0.0	2.4	
	Monthly heating (18°C base)	555.7	869.6	732.4	
	Yearly total-to-date heating	2361.0	2837.5	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)	0.8	3.8	16.2	59.0/1927$_{SE}$
	Yearly total-to-date (mm)	16.1	27.6	47.7	
	Greatest daily (mm/date)	0.6/24	1.3/23	32.0/1967/30	32.0/1967/30$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	2	7	9.0	
WIND	Average monthly speed (km/h)	14.6	16.1	15.8$_{SA}$	
	Peak gust (speed/direction/date)	70.4^{W}17	54.7^{NNW}05		93^{W}1959/18
RADIATION	Monthly bright sunshine (hours)	*170.1	232.3	175.2	
	% possible bright sunshine	na	62.8	47.4	
	% normal bright sunshine	na	132.6		
	Bright Sunshine days	*31	27	27.1	
	Monthly global radiation(MJ/m^2)	335.7	408.2	362.4	
	Monthly diffuse radiation (MJ/m^2)	154.2	165.5	173.9	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	-2.7/5.0	1.3		
	10 cm/20 cm	-1.7/-1.1	-3.5/-2.0	-2.8/-2.4	
	50 cm/100cm	-1.7/-0.3	-2.6/-0.3	-1.5/-0.4	
	150 cm/300cm	0.6/2.6	0.7/2.8	0.6/2.7	

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

**Estimate only; Bright sunshine recorder calibrated during January - March*

For Your Information

Temperature:

Extreme Maximum Daily
March 14 = 8.0ºC; old record = 8.0ºC/1981&99
March 17 = 15.6ºC; old record = 9.0ºC/1991
March 20 = 10.0ºC; old record = 9.5ºC/1986
March 28 = 17.2ºC; old record = 13.1ºC/2000
March 29 = 16.6ºC; old record = 14.0ºC/1990

Highest Minimum Daily
March 17 = 2.2ºC; old record = 0.0ºC/1966, 73, 87
March 30 = 3.0ºC; old record = 2.0ºC/1990

Highest Mean Daily
March 13 = 4.0ºC; old record = 4.0ºC/1994
March 17 = 8.9ºC; old record = 4.5ºC/1973
March 28 = 8.0ºC; old record = 6.3ºC/1986
March 29 = 9.5ºC; old record = 7.8ºC/1990
March 30 = 8.6ºC; old record = 8.0ºC/1990

Monthly Averages
Greatest Maximum = 5.1ºC; old record = 4.0°C/1981, 1986, 2000

For all Marchs
Greatest Highest Minimum = -15.5ºC/25; old record = -18.3ºC/1973-01, 2005-16
Greatest Lowest Mean = -10.8/02; old record = -11.4/1973

Greatest Number of Days when Maximum Temperature is:
<= 0°C: 6; old record = 6/1992 & 94
> 10°C: 7; old record = 6/1991, 2000

Minimum Temperature is:
>0°C: 5; old record = 5/ 1990, 93, 2000
>2°C: 3; old record = 3/1993

Monthly Degree-days
Heating: Lowest; 555.7; old record = 568.7/1993
18 days; old record = 18/1967

Precipitation (mm)
Least Maximum Daily = 0.6; 0.6/2008
Lowest Monthly = 0.8; old record - 2.4/ 2008
Fewest Number of Ppt days = 2; old record = 3/1990, 94, 96

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

April 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	13.0	9.5	10.7	
	Extreme monthly maximum (°C/date)	23.3/22	20.3/13	31.5/2001/28	33.3/1952/28$_{SA\ US}$
	Average monthly **minimum** (°C)	1.0	-3.0	-1.7	
	Extreme monthly minimum (°C/date)	-5.3/06	-10.5/01	-27.8/1979/01	-30.5/1979/01$_{SWT}$
	Monthly **average** (°C)	7.0	3.2	4.5	
	No.of Frost-free days (Temp. > 0°C)	16	7	10.6	
DEGREE-DAYS	Monthly growing (5°C base)	91.4	26.3	61.3	
	Yearly total-to-date growing	107.4	26.3	63.7	
	Monthly heating (18°C base)	328.9	442.7	420.7	
	Yearly total-to-date heating	2689.9	3280.2	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)	81.1	3.4	23.6	86.1/1955$_{US}$
	Yearly total-to-date (mm)	97.2	31.0	71.3	
	Greatest daily (mm/date)	41.8/13	1.4/18	24.6/1985/19	30.2/1955/19$_{US}$
	Measurable precipitation days (≥ 0.2mm)	9	7	8.4	
WIND	Average monthly speed (km/h)	17.9	14.3	17.2$_{SA}$	
	Peak gust (speed/direction/date)	91.2^{W}09	59.7^{NW}18		108^{W}1959/06
RADIATION	Monthly bright sunshine (hours)	215.5	275.7	225.2	
	% possible bright sunshine	51.5	65.8	53.8	
	% normal bright sunshine	95.7	122.4		
	Bright Sunshine days	26	28	27.3	
	Monthly global radiation(MJ/m^2)	431.7	517.1	492.2	
	Monthly diffuse radiation (MJ/m^2)	159.3	193.8	178.5	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	5.3/13.1	10.7		
	10 cm/20 cm	1.3/-0.2	0.6/0.5	3.6/4.0	
	50 cm/100cm	2.8/2.3	0.9/0.9	3.0/1.6	
	150 cm/300cm	1.9/2.6	1.1/2.5	1.5/2.4	

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 Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Records for April 2010

Temperature
Lowest Daily Maximum
April 25 2.8°C; old record 4.2/ 2002

Precipitation
Greatest daily
April 13, 41.8mm; old record 8.4mm/2003
April 29, 11.2; old record 3.7mm/1990
April 30, 14.4; old record 4.1mm/1979

Greatest Monthly
81.1mm; old record 55.9mm/1985
Greatest Daily Extreme
April 13 41.8mm; old record 24.6mm 19/1985

Number of days with
>= 10mm; 3 days; old record 3 days/ 1991

>= 25 mm; 1 days; no previous occurence

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

May 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	16.0	16.9	18.6	
	Extreme monthly maximum (°C/date)	30.0/19	31.3/30	35.0/1988/30	37.2/1936/27 SE
	Average monthly **minimum** (°C)	4.7	2.3	4.7	
	Extreme monthly minimum (°C/date)	-3.0/07	-5.4/07	-10.0/1967/02	-12.8/1907/06 SE
	Monthly **average** (°C)	10.4	9.6	11.6	
	No. of Frost-free days (Temp. > 0°C)	26	20	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	172.1	161.6	211.6	
	Yearly total-to-date growing	279.5	187.9	275.3	
	Monthly heating (18°C base)	249.7	261.5	204.4	
	Yearly total-to-date heating	2939.6	3541.7	3320.6	
	Monthly cooling (18°C base)	13.3	0.9	7.4	
	Yearly total-to-date cooling	13.3	0.9	7.7	
PRECIPITATION	Monthly total (mm)	134.2	11.8	44.3	178.0/1977 SWT
	Yearly total-to-date (mm)	231.4	42.8	115.6	
	Greatest daily (mm/date)	30.4/22	3.0/24	39.9/1985/04	59.0/1999/18 SA
	Measurable precipitation days (≥ 0.2mm)	17	10	9.8	
WIND	Average monthly speed (km/h)	17.9	16.7	16.9 SA	
	Peak gust (speed/direction/date)	70.2 W 23	65.0 WNW 27		132 SW 1965/17 SA
RADIATION	Monthly bright sunshine (hours)	221.9	294.5	267.1	
	% possible bright sunshine	45.5	60.3	54.8	
	% normal bright sunshine	83.1	110.3		
	Bright Sunshine days	26	30	29.5	
	Monthly global radiation(MJ/m²)	516.5	636.0	586.3	
	Monthly diffuse radiation (MJ/m²)	210.7	219.1	222.2	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	9.4/17.5	16.9		
	10 cm/20 cm	5.5/3.7	5.7/4.8	10.8/11.3	
	50 cm/100cm	7.1/6.2	6.3/5.0	9.3/6.4	
	150 cm/300cm	5.0/3.9	4.0/3.3	4.8/3.4	

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 Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

Temperature Records: (since 1963)

Extreme daily maximum
May 18=29.8ºC; old record=29.6ºC/2006
May 19=30.0ºC; old record=30.0ºC/1984

Lowest daily maximum
May 30=9.7ºC; old record=11.7ºC/1988
May 31=10.8°C; old record=11.5°C/1980

Highest daily minimum
May 18=14.7ºC; old record=12.6ºC/2006
May 19=15.6ºC; old record=13.0ºC/1980

Highest daily average
May 18=22.3ºC; old record=21.1ºC/2006
May 19=22.8ºC; old record=19.8ºC/1980

Lowest daily average
May 31=7.8ºC; old record=8.0ºC/1980

Weather Words for the Weatherwise

Canadians will go to extraordinary lengths for a weather report. On May 27, 2008 a Canadian weather station reported a temperature high of -30°C/ low of -80°C and winds NE at 20 km/h for the day. The report was from the planet Mars. Phillips 2009

Precipitation Records: (since 1963)

Daily maximum
May 22 = 30.4mm; old record = 10.1mm/1986
May 25 = 22.4mm: old record = 12.2mm/1967&77
May 29 = 21.2mm; old record = 15.2mm/1982

Monthly maximum
2nd highest 134.2mm; highest = 145.3/1977

Spring maximum
216.1 mm; old reocord 164.1/1977

Days >=5mm
9 days; old record = 9 days/1977

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

	June 2010	2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	21.8	22.7	22.6	
	Extreme monthly maximum (°C/date)	28.1/30	33.2/14	41.0/1988/05	41.5/1988/06$_{S2}$
	Average monthly **minimum** (°C)	11.0	9.4	9.5	
	Extreme monthly minimum (°C/date)	2.5/01	-0.5/05	-3.3/1967/06	-3.9/1917/02$_{US}$
	Monthly **average** (°C)	16.4	16.0	16.0	
	No.of Frost-free days (Temp. > 0°C)	30	29	29.9	
DEGREE-DAYS	Monthly growing (5°C base)	343.2	331.4	331.5	
	Yearly total-to-date growing	622.7	519.3	606.8	
	Monthly heating (18°C base)	67.0	96.4	82.8	
	Yearly total-to-date heating	3006.6	3638.1	3403.4	
	Monthly cooling (18°C base)	20.2	37.8	22.3	
	Yearly total-to-date cooling	33.5	38.7	30.0	
PRECIPITATION	Monthly total (mm)	147.2	52.0	59.5	186.8/1942$_{S}$
	Yearly total-to-date (mm)	378.6	94.8	175.1	
	Greatest daily (mm/date)	33.0/29	40.8/21	99.4/1983/24	99.4/1983/24$_{SRC}$
	Measurable precipitation days (≥ 0.2mm)	16	11	12.5	
WIND	Average monthly speed (km/h)	14.4	14.9	16.6$_{SA}$	
	Peak gust (speed/direction/date)	71.6^{ESE}29	65.1^{N}28		117^{S}1986/01$_{SA}$
RADIATION	Monthly bright sunshine (hours)	265.7	283.4	277.2	
	% possible bright sunshine	53.1	56.7	55.4	
	% normal bright sunshine	95.9	102.2		
	Bright Sunshine days	28	30	28.5	
	Monthly global radiation(MJ/m^2)	601.5	638.4	638.7	
	Monthly diffuse radiation (MJ/m^2)	205.7	230.1	228.1	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	16.4/23.7	24.1		
	10 cm/20 cm	10.1/7.5	11.3/10.0	15.7/16.3	
	50 cm/100cm	11.0/9.4	11.2/8.8	14.0/10.4	
	150 cm/300cm	7.9/5.8	7.0/5.0	8.3/5.4	

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 Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The unusual rainy weather continued for the third month causing headaches for just about everyone. If Noah was alive today, he would be busy repairing his ark. Even with the extraordinary amounts, only one daily precipitation record was set. On June 30th the old record of 18.7 mm, set in 1991, was surpassed with the new record of 28.2mm. This June placed third behind 2005 (171.0mm) and 1991 (160.1mm) for total monthly precipitation. It replaced the old record of 5 days (1966, 1970 and 2005) with 6 for the most days with 10mm or more precipitation. With the deluge experienced in the last three months, the precipitation to date is 9% above the normal we usually receive for the whole year. The total for the first 6 months of this year is more than we recorded in 1991 (our wettest year) for the same period. The thunder storm of June 29th/30th which dumped 61.2 mm, was accompanied by damaging Gale force winds of over 70km/h and pea to walnut sized hailstones.[1]

[1] Godwin, July 2010 pers. comm.

Weather Word for the Weatherwise
Hailstone Size Categories[2]

6 mm	0.25"	Pea
12 mm	0.5"	Mothball, Hazelnut
19mm	0.75"	Cherry, Grape
25 mm	1"	Quarter
32 mm	1.25"	Loonie
38 mm	1.5"	Walnut
45 mm	1.75"	Golf Ball
50 mm	2"	Hen's Egg
64 mm	2.5"	Tennis Ball
70 mm	2.75"	Baseball
76 mm	3"	Teacup
101 mm	4"	Grapefruit
114 mm	4.5"	Softball

[2] Heidorn, Hailstone Sizes

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

July 2010		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	24.0	22.8	24.8	
	Extreme monthly maximum (°C/date)	29.0/29	31.4/18	39.3/ 2001/05	40.0/1919/17&1941/19&1946/30 SEUSSA
	Average monthly **minimum** (°C)	12.0	10.8	11.5	
	Extreme monthly minimum (°C/date)	9.1/11	4.8/12	1.7/1967/02&1978/09	-0.6/1918/25 SE
	Monthly **average** (°C)	18.0	16.8	18.2	
	No. of Frost-free days (Temp. > 0°C)	31	31	31	
DEGREE-DAYS	Monthly growing (5°C base)	403.9	365.5	408.4	
	Yearly total-to-date growing	1026.6	884.8	1015.2	
	Monthly heating (18°C base)	23.6	59.2	35.3	
	Yearly total-to-date heating	3030.2	3697.3	3438.7	
	Monthly cooling (18°C base)	24.5	21.7	40.7	
	Yearly total-to-date cooling	58.0	60.4	70.7	
PRECIPITATION	Monthly total (mm)	94.6	62.0	58.0	162.9/1928 SE
	Yearly total-to-date (mm)	473.2	156.8	233.1	
	Greatest daily (mm/date)	27.2/02	13.8/07	45.5/1968/29	79.2/1946/03 US
	Measurable precipitation days (≥ 0.2mm)	17	13	12.0	
WIND	Average monthly speed (km/h)	12.2	13.7	14.8 SA	
	Peak gust (speed/direction/date)	80.4 NNW 16	58.9 WNW 20		113 E 1955/05 SA
RADIATION	Monthly bright sunshine (hours)	326.7	288.4	305.7	
	% possible bright sunshine	65.1	57.5	60.9	
	% normal bright sunshine	106.9	94.3		
	Bright Sunshine days	30	30	30.3	
	Monthly global radiation(MJ/m²)	672.7	612.5	633.5	
	Monthly diffuse radiation (MJ/m²)	220.7	222.7	216.5	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	17.9/23.9	23.8		
	10 cm/20 cm	12.1/9.5	12.6/11.5	18.0/18.9	
	50 cm/100cm	15.0/13.3	13.7/11.5	16.7/13.1	
	150 cm/300cm	11.4/8.1	9.7/7.0	10.9/7.5	

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 Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

For all the precipitation received during July, only one daily record was broken. On July 2nd, 27.2mm replaced the 1990 record of 23.0mm. The monthly total of 94.6 mm (36.6mm more than normal) was only the fifth greatest total since 1964. However, new records are being set for accumulation. The four-month accumulation (April to July) of 457.1mm broke the 1991 total by 102.7mm and also has broken the 1991 April to August record total of 387.7mm. We are only 73.7mm shy of the greatest annual total of 546.9mm with still five months to go. Meanwhile, July temperatures hovered around normal with no real hot days or cool nights recorded. Winds, generally from the west-northwest, were only *Strong (40-50km/h)* to *Strong Gales (76-87 km/h)* preceding the start of the frequent thunder and lightning storms.

The 'umbrella' (a word meaning 'little shade') was in existence in Egypt, Assyria, Greece and China over four thousand years ago. First designed to provide shade from the sun, they were later waxed and lacquered by the Chinese for use in the rain. The first British umbrella shop, opened in 1830, is still located at its same Oxford Street address in London, England.[1]

[1] Bellis, nd a

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

August 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	23.1	23.3	24.6	
	Extreme monthly maximum (°C/date)	33.6/26	30.9/10	39.7/1998/06	39.7/1998/06$_{SRC}$
	Average monthly **minimum** (°C)	11.5	10.6	10.4	
	Extreme monthly minimum (°C/date)	5.9/30	6.2/05	-2.8/1976/28	-2.8/1901/23&1976/28$_{SM\ SRC}$
	Monthly **average** (°C)	17.3	17.0	17.5	
	No.of Frost-free days (Temp. > 0°C)	31	31	30.8	
DEGREE-DAYS	Monthly growing (5°C base)	382.3	371.4	387.8	
	Yearly total-to-date growing	1408.9	1256.2	1403.0	
	Monthly heating (18°C base)	51.0	48.2	57.7	
	Yearly total-to-date heating	3081.2	3745.5	3496.4	
	Monthly cooling (18°C base)	30.3	16.6	42.5	
	Yearly total-to-date cooling	88.3	77.0	113.2	
PRECIPITATION	Monthly total (mm)	74.6	98.8	36.2	178.9/1954$_{NRC}$
	Yearly total-to-date (mm)	547.8	255.6	269.3	
	Greatest daily (mm/date)	18.4/12	39.6/15	48.2/2007/17	84.3/1945/03$_{SA}$
	Measurable precipitation days (≥ 0.2mm)	12	12	9.8	
WIND	Average monthly speed (km/h)	12.4	12.0	14.5$_{SA}$	
	Peak gust (speed/direction/date)	65.8^{NNE}12	56.7^{WNW}11		151^{W}1967/14$_{SA}$
RADIATION	Monthly bright sunshine (hours)	261.1	268.1	280.8	
	% possible bright sunshine	57.7	59.3	62.0	
	% normal bright sunshine	93.0	95.5		
	Bright Sunshine days	30	29	30.1	
	Monthly global radiation(MJ/m^2)	517.9	507.9	529.0	
	Monthly diffuse radiation (MJ/m^2)	200.2	185.4	185.6	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	15.7/21.0	22.5		
	10 cm/20 cm	7.6/10.9	11.5/10.6	16.9/18.1	
	50 cm/100cm	8.7/15.0	13.8/12.4	16.8/14.1	
	150 cm/300cm	14.0/12.6	11.0/8.5	12.3/9.1	

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 Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The excessive rainfall continued during the month of August with 74.6mm recorded; twice the normal amount. The cumulative total for this year is now above the 1991 record year of 546.9mm. With four months still to go, there is now speculation of how great of a record the 2010 total will be. Daily records were set on the 10th, 12th, and 13th. With 12 days experiencing rainfall, the bright sunshine was 7% below normal but one day was devoid of any bright sunshine. Smoke haze from BC forest fires was evident from the 20th to the 22nd. The average maximum temperature was slightly cooler and the average minimum temperature slightly warmer than normal. Temperatures above 30°C occurred twice during the month; on the 19th and 26th. Winds generally form the WNW, were usually below 31km/h. Only two instances of winds above 63 km/h (Gale Force) were recorded; on the 8th and 12th during rain events

Weather Words for the Weatherwise

Before 1800 Clouds were spoken of as 'essences' floating in the sky. It was the Englishman, Luke Howard (1773-1864), who gave them their names derived from Latin. He divided the 'essences' into four types within the three layers of the lower atmosphere: cumulus (heaps), stratus (layers), cirrus (curls) and nimbus (rain).[1]

[1]Bellis, nd b

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

	September 2010	2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	16.6	24.7	18.1	
	Extreme monthly maximum (°C/date)	27.5/04	34.6/19	35.6/1978/04	35.6/1978/04 SRC
	Average monthly **minimum** (°C)	6.0	10.0	4.9	
	Extreme monthly minimum (°C/date)	-2.1/18	1.2/28	-7.8/1974/30	-11.1/1908/28 SE
	Monthly **average** (°C)	11.3	17.3	11.6	
	No. of Frost-free days (Temp. > 0°C)	28	30	25.6	
DEGREE-DAYS	Monthly growing (5°C base)	190.3	370.3	203.5	
	Yearly total-to-date growing	1599.1	1626.5	1606.5	
	Monthly heating (18°C base)	202.3	65.0	198.9	
	Yearly total-to-date heating	3283.5	3810.5	3695.3	
	Monthly cooling (18°C base)	1.6	45.3	5.8	
	Yearly total-to-date cooling	89.9	122.3	119.0	
PRECIPITATION	Monthly total (mm)	108.6	27.4	29.4	128.4/2006 SRC KCS
	Yearly total-to-date (mm)	656.4	283.0	298.7	
	Greatest daily (mm/date)	44.2/10	12.6/30	52.4/2006/15	44.2/1931/12 US
	Measurable precipitation days (≥ 0.2mm)	11	8	8.4	
WIND	Average monthly speed (km/h)	14.4	15.3	15.9 SA	
	Peak gust (speed/direction/date)	54.3 NW 17	75.0 SSE 29		148 W 1967/22 SA
RADIATION	Monthly bright sunshine (hours)	191.2	266.4	186.0	
	% possible bright sunshine	50.4	70.4	49.0	
	% normal bright sunshine	102.8	143.2		
	Bright Sunshine days	27	29	27.0	
	Monthly global radiation(MJ/m²)	335.3	401.6	351.8	
	Monthly diffuse radiation (MJ/m²)	126.4	101.3	127.6	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	9.1/14.7	20.5		
	10 cm/20 cm	6.2/4.9	10.8/10.0	11.0/12.5	
	50 cm/100cm	11.3/11.7	14.0/12.9	13.2/12.4	
	150 cm/300cm	11.6/10.4	11.6/9.5	11.7/9.9	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

September continued to abet the yearly precipitation in reaching an unsurpassable total for future years to aspire to. As of the 30th, the cumulative precipitation is over double the January-to-September normal. The September deluge was over 3½ times the monthly normal. Daily records were set on the 6th when 24.6mm easily flooded the 1978 mark of 5.6mm and on the 10th when 44.2 mm dripped by the 2006 record of 35.6mm. Even with 11 days recording rain, the bright sunshine total for the month was higher than normal. Nine days received at least 90% of the possible daily bright sunshine. Generally, maximum temperatures were cooler while minimum temperatures were warmer than normal. Two highest daily minimum records were set at the end of the month; on the 28th 11.1°C surpassed the 1966 temperature of 10.6°C and on the 29th, 8.3°C tied the 2006 record.

Weather Words for the Weatherwise

A 'Lot of Rain' Synonyms
(In case you have run out)

cataclysm, deluge, douse, downpour, drench, flood, flush, hosing, inundation, niagara, overflow, river, rush, sluice, souse, spate, swamp, torrent, washout

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

October 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	13.9	5.1*	10.8	
	Extreme monthly maximum (°C/date)	24.4/08	16.9/17	28.5/1980/06&1984/08	32.2/1943/05$_{SAUS}$
	Average monthly **minimum** (°C)	1.2	-1.8*	-1.3	
	Extreme monthly minimum (°C/date)	-11.2/28	-8.6/09	-21.5/1991/29,30	-25.6/1919/26$_{SEUS}$
	Monthly **average** (°C)	7.6	1.7*	4.8	
	No.of Frost-free days (Temp. > 0°C)	21	10	11.6	
DEGREE-DAYS	Monthly growing (5°C base)	123.6	7.4	63.7	
	Yearly total-to-date growing	1722.7	1633.9	1670.2	
	Monthly heating (18°C base)	322.8	506.5	410.2	
	Yearly total-to-date heating	3606.3	4317.0	4105.5	
	Monthly cooling (18°C base)	0.0	0.0	0.1	
	Yearly total-to-date cooling	89.9	0.0	119.1	
PRECIPITATION	Monthly total (mm)	14.3	28.7	16.4	69.8/1969$_{SRC}$
	Yearly total-to-date (mm)	670.7	311.7	315.1	
	Greatest daily (mm/date)	6.3/24	10.4/01	36.7/1984/16	41.7/1924/12&1969/03$_{SESA}$
	Measurable precipitation days (≥ 0.2mm)	6	14	6.3	
WIND	Average monthly speed (km/h)	14.0	13.6	16.2$_{SA}$	
	Peak gust (speed/direction/date)	62.3^{N}26	59.9^{NNW}07		138^{NW}1967/16$_{SA}$
RADIATION	Monthly bright sunshine (hours)	231.3	69.9	157.9	
	% possible bright sunshine	70.3	21.3	48.0	
	% normal bright sunshine	146.5	44.3		
	Bright Sunshine days	28	23	27.0	
	Monthly global radiation(MJ/m^2)	260.3	152.6	239.1	
	Monthly diffuse radiation (MJ/m^2)	79.7	109.0	92.6	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	4.2/9.7	6.8		
	10 cm/20 cm	3.1/2.2	1.2/1.7	4.7/6.2	
	50 cm/100cm	8.4/9.6	6.6/8.8	8.3/9.2	
	150 cm/300cm	9.7/9.8	9.5/9.5	9.6/9.4	

Saskatoon Stations
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64
SRC= SK Res. Council 1963-

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

NOTE
Temperature data from Oct. 23-26, 2009 provided by Diefenbaker Int'l A, Saskatoon due to temperature sensor maintenance

For Your Information

Winter: A Dirge

Robbie Burns (1781)

The wintry west extends his blast,
And hail and rain does blaw;
Or the stormy north sends driving forth
The blinding sleet and snaw:
While, tumbling brown, the burn comes down,
And roars frae bank to brae;
And bird and beast in covert rest,
And pass the heartless day.

"The sweeping blast, the sky o'ercast,"
The joyless winter day
Let others fear, to me more dear
Than all the pride of May:
The tempest's howl, it soothes my soul,
My griefs it seems to join;
The leafless trees my fancy please,
Their fate resembles mine!

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

November 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-1.8	6.7	-1.4	
	Extreme monthly maximum (°C/date)	16.1/05	16.8/06	19.4/1975/04	21.7/1903/03 SE
	Average monthly **minimum** (°C)	-9.4	-4.4	-10.3	
	Extreme monthly minimum (°C/date)	-26.4/25	-10.529	-33.5/1985/24	-39.4/1893/30 SM
	Monthly **average** (°C)	-5.6	1.1	-5.9	
	No. of Frost-free days (Temp. > 0°C)	3	2	1.2	
DEGREE-DAYS	Monthly growing (5°C base)	8.1	12.4	2.6	
	Yearly total-to-date growing	1730.8	1646.3	1672.8	
	Monthly heating (18°C base)	707.6	505.8	715.8	
	Yearly total-to-date heating	4313.9	4822.8	4821.3	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	89.9	122.3	119.1	
PRECIPITATION	Monthly total (mm)	28.2	0.4	14.8	57.3/1940 SE
	Yearly total-to-date (mm)	698.9	312.1	329.9	
	Greatest daily (mm/date)	9.0/09	0.4/01	19.3/1978/04	27.9/1938/01 US
	Measurable precipitation days (≥ 0.2mm)	13	1	7.9	
WIND	Average monthly speed (km/h)	12.6	14.0	14.8 SA	
	Peak gust (speed/direction/date)	51.6 N 16	70.4 WSW 06		100 W 1976/17 SA
RADIATION	Monthly bright sunshine (hours)	81.5	169.4	98.0	
	% possible bright sunshine	30.9	64.3	36.7	
	% normal bright sunshine	83.2	172.9	22.2	
	Bright Sunshine days	21	28	123.7	
	Monthly global radiation(MJ/m²)	106.9	136.8	73.6	
	Monthly diffuse radiation (MJ/m²)	60.7	53.7		
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	7.4/3.1	3.5	-1.7/-0.5	
	10 cm/20 cm	-1.0/-1.0	-1.7/-1.5	3.0/5.6	
	50 cm/100cm	3.5/5.7	2.8/5.4	6.8/8.1	
	150 cm/300cm	7.0/8.6	6.7/6.8		

Saskatoon Stations
SM=interrupted readings (NWMP) about 1892-1900
SE= Eby (pioneer) 1901-41
SA= S'toon Airport 1942-
US= Univ. of SK 1915-64

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

This November makes seven months where precipitation has been above normal in 2010. Out of 13 precipitation days, only November 9th produced a record with 9.0mm. The blizzard-like conditions on the 18th contributed 4.6mm to the monthly total of 28.2mm. This amount adds to the prodigious cumulative annual total of 698.9mm - with still a month to go in 2010. The maximum temperature averaged to just below normal value with the unseasonable high temperatures at the beginning of the month being offset by the unseemly low temperatures near month end. High winds were practically nonexistent as there were twenty days when the winds did not reach over 31km/hr. November was also a bit gloomy due to 17 days receiving less than one hour of bright sunshine.

A 1958 blizzard during Winnipeg's rush hour traffic did not faze one motorist when his car was brought to a standstill. He simply got out and went to a nearby restaurant for a cup of coffee. When he came back, the traffic had not moved an inch and others, in the same predicament, decided to follow his example. [1]

[1]Phillips,2009

Saskatchewan Research Council

Monthly Weather Summary

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

CRS estab. 1963

December 2010

		2010 VALUE	2009 VALUE	NORMAL OR EXTREME FOR CRS 1971-2000	EXTREME FOR SASKATOON STATIONS
TEMPERATURE	Average monthly **maximum** (°C)	-9.6	-14.0	-9.0	
	Extreme monthly maximum (°C/date)	0.4/27	-0.6/01	11.2/1997/14	14.4/1939/05$_{SE}$
	Average monthly **minimum** (°C)	-16.6	-22.6	-18.6	
	Extreme monthly minimum (°C/date)	-24.3/31	-33.9/13	-42.2/1973/31	-43.9/1892/22$_{SM}$
	Monthly **average** (°C)	-13.2	-18.3	-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	1730.8	1646.3	1672.9	
	Monthly heating (18°C base)	966.1	1125.6	987.7	
	Yearly total-to-date heating	5280.0	5948.4	5809.0	
	Monthly cooling (18°C base)	0.0	0.0	0.0	
	Yearly total-to-date cooling	89.9	122.3	119.1	
PRECIPITATION	Monthly total (mm)	8.5	7.2	18.3	59.2/1956$_{SA}$
	Yearly total-to-date (mm)	707.4	319.3	348.2	
	Greatest daily (mm/date)	4.9/14	3.1/23	14.5/1973/23	28.4/1936/02$_{SE}$
	Measurable precipitation days (≥ 0.2mm)	11	11	11.4	
WIND	Average monthly speed (km/h)	14.3	11.6	15.1$_{SA}$	
	Peak gust (speed/direction/date)	60.3^{SE}14	42.3^{N}06		121^{W}1955/12$_{SA}$
RADIATION	Monthly bright sunshine (hours)	78.8	108.8	85.4	
	% possible bright sunshine	32.5	44.9	35.2	
	% normal bright sunshine	92.3	127.4		
	Bright Sunshine days	18	26	22.8	
	Monthly global radiation(MJ/m^2)	86.5	100.6	95.2	
	Monthly diffuse radiation (MJ/m^2)	56.3	48.2	54.3	
SOIL	Average temperature (°C) @ 9:00am — Air/grass level	-14.5/2.9	-11.8		
	10 cm/20 cm	-1.5/0.0	-8.5/-6.3	-6.6/-5.6	
	50 cm/100cm	1.1/3.2	-3.3/1.4	-1.7/2.0	
	150 cm/300cm	4.5/6.7	3.6/6.3	3.8/6.4	

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

Normals
Global and diffuse radiation = 1961-1990
Soil Temp. = 1971-2000 calculated by Env. Canada
Wind Normal and Extreme are from Saskatoon Airport

For Your Information

The first decade of the second millennium finished with the December temperatures near normal. The daily temperatures oscillated about their normals with Saskatoonians enjoying 13 days where maximum temperatures were warmer than normal and complaining about 14 days being below their minimum normals. Nine days recorded temperatures less than -20°C but none were less than -30°C. On the 27th, outdoor enthusiasts were treated to temperatures just above 0°C. Precipitation occurred on 11 days producing less than half the normal monthly precipitation. On December 14th, a new daily record of 4.9 mm was set; the old record of 4.3 mm was set in 1964. Unfortunately, the precipitation was in the form of rain and snow turning some sidewalks and roads treacherous for travel. The year ended with an annual total of 707.4 mm of precipitation; more than double the normal value and almost 30% above the former record wet year of 1991.

Winter rain causes problems whether you are on foot or travelling by car. With the sharp rise in the price of road salt, alternatives have been tried such as garlic powder, desugared molasses, sugar beet mash, salted sea water and last year's salt residue blended with ash from coal-burning power plants.[1]

[1]Phillips, 2009

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.

Missing data is roughly estimated by comparing the global and diffuse radiation values. To estimate if a day received any bright sunshine, the global radiation value must be higher than the diffuse radiation value. To estimate the number of hours of bright sunshine, the percentage of global radiation as compare to its normal is used.

For example: February 1-28/2010: [(Global radiation(193.5) x Bright sunshine normal(132.3)] / Global normal(210.1) = 121.8 hours

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 than18°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 various stations that have been/are located within Saskatoon from 1892 to the present. Station locations, exposures and measurement procedures were subject to change during this time period. Data are <u>not adjusted</u> 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. (Environment Canada, 1993, 2002, 2004a)

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

Mathematically: $PET = mT^a$ where PET = Potential of Evaportranspiration; m = % of day length for the month as compared to the year; T = Temperature °C when T is less than or equal to 0; otherwise T = 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 a weighing gauge for the winter season and the tipping bucket during frost-free period.

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

SOIL TEMPERATURE under a short grass surface with normal snow accumulation, is measured according to procedures outlined in the Environment Canada publication "*Soil Temperature*" January 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 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).

Precipitation spells are defined as days when precitation is recorded (wet spell) or not (dry 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 2004b).

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

WIND SPEED

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

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

see also **Beaufort Wind Scale**

REFERENCES AND BIBLIOGRAPHY

Bellis, M., nd a. *Who Invented the Umbrella?* in About.com. Inventors. http://inventors.about.com/0d/uvstartinventions/a/Umbrella.htm. (accessed August 17, 2010).

Bellis, M., nd b. *Luke Howard and the History of Cloud Naming* in About.com. Inventors. http://inventors.about.com/od/britishinventions/a/clouds.htm. (accessed August 17, 2010).

Canadian Broadcasting Corp., 2007. *CBC News in Depth: Forces of nature; Snow.* http://www.cbc.ca/news/background/forcesofnature/snow.html (accessed February 2, 2010).

Christiansen, E.A. (Ed.), 1970. Physical Environment of Saskatoon, Canada. Saskatchewan Research Council, Saskatoon, SK, in cooperation with National Research of Canada, Ottawa, ON.

Environment Canada, Atmospheric Environment Service (AES), 1975. 1974 Annual Meteorological Summary. AES, Saskatoon, SK.

Environment Canada, Atmospheric Environment Service (AES), 1976. Soil Temperature. AES, Downsview, ON

Environment Canada, Atmospheric Environment Service (AES), 1978. Manual of Climatological Observations, 2nd Ed. AES, Downsview, ON

Environment Canada, Atmospheric Environment Service (AES), 1992. AES Guidelines for Co-operative Climatological Autostation. Environment Canada, Downsview, ON.

Environment Canada, Atmospheric Environment Service (AES). 1993. Canadian Climate Normals 1961-1990. Canadian Climate Centre, Downsview ON.

Environment Canada, Meteorological Service of Canada, 2002. *Canadian Daily Climate Data on CD-ROM - Western Canada.* Climate and Water Products Division, Downsview, ON.

Environment Canada, Meteorological Service of Canada, 2004a. *Climate Data Online/Climate Normals and Averages*. http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html (accessed 2004, 2007).

Environment Canada, Meteorological Service of Canada, 2004b. Wind Chill Calculation Chart. http://www.msc.ec.gc.ca/education/windchill/windchill_chart_e.cfm (accessed April, 2009).

Environment Canada, Meteorological Service of Canada, 2005. *Fact Sheet - Summer Severe Weather Warnings*. http://www.on.ec.gc.ca/severe-weather/summerwx_factsheet_e.html (accessed Feb 2008).

Goble, R. J., 2002. *Volcanoes*. In: Introduction to Geology/Physical Geology. http://www.class.unl.edu/geol100/Review2.html (accessed June, 2002)

Godwin, B., 2010. Personal Communication. July, 2010. Saskatchewan Research Council, Saskatoon, SK.

Heidorn, K., 1998. *The Weather Legacy of Admiral Sir Francis Beaufort* In: Weather People and History. http://irishculture.about.com/gi/dynamic/offsite.htm?site=http://www.islandnet.com/%257Esee/weather/history/beaufort.htm (accessed July 30, 2001).

Heidorn, K., 2002. *Hailstone Sizes.* In: Weather Doctor's Weather Eyes. http://www.islandnet.com/~see/weather/eyes/hailsize.htm (accessed July 7, 2010).

Ladd, M.G., 2008. *Ladds of New England: Ancestral line of Merle G. Ladd.* http://www.laddfamily.com (accessed April 29, 2009)

Lutegens, F. K. and E.J. Tarbuck, 1992. *The Atmosphere: An Introduction to Meteorology, 5th Ed.*. Prentice Hall, New Jersey.

National Research Council of Canada, Herzberg Institute of Astrophysics, n.d. *Sunrise - Sunset Tables for Saskatoon* http://www.hia-iha.nrc-cnrc.ca/sunrise_e.html (accessed January 2009, 2010).

Olm, O., 2001. Personal Communication. September 17, 2001. Saskatchewan Research Council, Saskatoon, SK.

Phillips, D.W., 1993. The Day Niagara Falls Ran Dry!: Canadian weather facts and trivia. Key Porter Books Limited, Toronto, Ontario.

Phillips, D.W., 2009. 2010 Canadian Weather Trivia Calendar. Fifth House Ltd., Calgary, AB.

The Southwest Booster, 2008. *Take care of Your Heart when Shoveling Snow this Winter.* http://www.swbooster.com/Living/Health/2008-12-11/article-5821/Take-care-of-your-hea... (accessed February 2, 2010)

Thornthwaite, C.W. and J. R. Mather, 1955. The Water Balance. Publications in Climatology Vol. 8, No.1. Drexel Institute of Technology, Laboratory of Climatology, Centerton, New Jersey.

U.S. Geological Survey. Cascades Volcano Observatory, n.d. *Deadliest Volcanic Eruptions Since 1500 A.D.* http://vulcan.wr.usgs.gov (accessed March 27, 2002)

World Meteorological Organization (WMO). 1988. Technical Regulations: General Meteorological Standards and Recommended Practices, 1988 ed., Suppl. No. 2 (IV. 1996), WMO - No. 49. Geneva, Switzerland.