SASKATOON SRC

CLIMATOLOGICAL REFERENCE STATION

ANNUAL SUMMARY, 1990

by

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ERRATA

Note: The values of total global and diffuse radiation have been changed from the 1990 Monthly Weather Summaries sent out earlier. This was because of a problem with calibration and application of the conversion equation.

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Enquiries concerning the Climatological Reference Station data and its measurement programs are welcome. For further information, please contact:

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ABSTRACT

Data concerning temperature, precipitation, soil temperature, evaporation, windspeed, bright sunshine and solar radiation at the Saskatoon Climatological Reference Station (52°09'N, 106°36'W, 497 m MSL) are presented for the year 1990 and compared with the long term historic and standard period (1961-90) records.

1990 had an above normal mean annual temperature and below normal total annual precipitation. Including 1990, nine out of the 11 years since 1980 have had higher than normal mean annual temperatures. 1990 is the seventh year in this period with below normal total annual precipitation.

Seven months during 1990 had above normal mean temperatures, while nine months recorded below normal total precipitation. The maximum temperature recorded was in August when 35.0°C was attained and the minimum temperature was recorded in December at -39.0°C.

The greatest 24 hour precipitation (23.0 mm rainfall) fell in July. The greatest 24 hour snowfall came in November with an accumulation of 11.4 cm.

The total net evaporation was near the 1961-1990 normal and 55.1 mm below last year's total. The number of days with frost was two days greater than normal but two days less than last year. The peak wind speed of 100 km/h was recorded in June. The mean wind speed for the year was close to normal.

A below normal amount of bright sunshine was recorded for 1990. This is reflected in the lower than normal total global radiation and above normal diffuse radiation.

Saskatoon had its share of severe weather in 1990. A tornado struck on June 27, but fortunately (but not for the farmers) it went south of the city. The Saskatoon area and much of Saskatchewan had 2 blizzards in December.

1990 was a relatively good year for crop growth in the Saskatoon area. The June and July rains seemed to come when they were needed to help in germination and growth. Late summer and fall weather provided suitable harvest conditions generally.

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HISTORY AND STATION LOCATION

The first meteorological observations appear to have been taken at or near Saskatoon by the Royal Northwest Mounted Police in 1889. At first only temperatures were recorded. A number of changes were made in the coordinates and as a result there is some disagreement in the early records as to the exact location of the weather observing point. The bulk of the evidence, however, indicates that the location was 52°15'N and 106°20'W, elevation 480 m above sea level. This would place it at Clark's Crossing, on the South Saskatchewan River, approximately 16 km north and east of the centre of the present City of Saskatoon. At that time there was a settlement at Clark's Crossing and also about 10 or 15 families on either side of the river at Saskatoon.

Little is known about the early observers. However, the records show that a Major T.H. Keenan took the observations from March, 1892 until March, 1895. Mr. George Will was the observer from January, 1897 until April, 1897. It is thought that Thomas H. Copeland was involved in the observational program from 1895 to May 1, 1901, at which time it was taken over by Mr. Eby, senior. Continuous observations were taken by the Eby's at a site on 8th Street until October 31, 1942, when the station was closed. Mr. Eby continued the program until his death in 1921. His daughter, Miss E.S. Eby, recorded the observations until April, 1931 and was replaced by her brother, J.M. Eby, who continued the program until the station was closed. 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 long time observer at this site was Mr. Sidney Cox. The Saskatchewan Research Council took over the program in the fall of 1963 at our newly established Climatological Reference Station.

The location of the Saskatchewan Research Council's Climatological Reference Station is latitude 52°09'N and longitude 106°36'W and the elevation is 497 m above mean sea level*. The long time observer (16 years) at this present site was Mr. Joe Calvert, who retired from the program in August, 1983.

Then Mr. Ray Begrand succeeded Mr. Calvert until September, 1988 when Ms. Virginia Wittrock became the primary observer. The observers for 1990 were Virginia Wittrock, Ray Begrand, Rod Bouvier, Rolf Jahren, Bob MacPherson, Julio Matamala, Brett Smith, and Dave Bedard.

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*From various sources including the Physical Environment of Saskatoon, Canada (E.A. Christiansen ed. 1970) and 1974 Annual Meteorological Summary, Saskatoon, Saskatchewan, (Environment Canada, Atmospheric Environment Service).

FOOTNOTES TO CLIMATIC TABLES 1 TO 13

1 The values are calculated using the monthly summaries, January to December, 1990 (Tables 2 to 13).

2 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 period January 1, 1961 to December 31, 1990 for data analysis. Items in this column conform to this standard, except where noted.

3 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 in this column are drawn from the following data sets:

Saskatoon SRC	1963 to 1990
Saskatoon U. of S.	1916 to 1963
Saskatoon	1892 to 1915

Station locations, exposures and measurement procedures were subject to change during this time period. Data presented in this column are unadjusted and users are cautioned accordingly.

4 The mean annual temperature is defined as the average of the daily mean temperatures for one year. In the monthly summaries (Tables 2 to 13) the daily mean temperature reported is the average of the daily mean temperatures for one month under consideration. In turn, the daily mean temperature for a particular day is defined as the arithmetic mean of the daily maximum temperature and the daily minimum temperature for the date.

5 The mean maximum temperature tabulated is the mean of the daily maximum temperatures for one year in the case of Table 1 and for particular months in the cases of Tables 2 to 13. For details concerning measurement procedures, the reader is referred to the Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978.

6 The mean minimum temperature as tabulated is defined as the mean of the daily minimum temperatures averaged over the appropriate time periods. Refer to note 5 above concerning measurement procedures.

7 The word "extreme" refers to the highest or lowest value of a particular element recorded during the period in question. The highest temperature recorded at Saskatoon SRC during 1990 was 35.0°C,while the highest value ever recorded was 41.0°C (June, 1988).

8 A day with frost is recorded on each occasion when the daily minimum temperature is equal to or less than 0°C.

9 A heating degree-day (HDD) is an index of 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 mean 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.

10 In order for plant growth to proceed, 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 mean temperature and the 5.0°C base temperature defines the number of growing degree-days (GDD). 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.

11 Total precipitation is the sum of the daily rainfall and daily snowfall amounts recorded. 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 Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978. The notation T in this column refers to a trace of precipitation (less than 0.2 mm water equivalent).

12 Note that prior to 1960, measurement of snowfall was accomplished using snow rulers set vertically in the ground to obtain the thickness of the newly deposited layer. In obtaining precipitation values a standard water equivalent of one inch of

snow yielding one-tenth inch of water was assumed. Since these measurements were inaccurate due to snow drifting, compaction and varying water equivalent, the Nipher snow gauge which actually catches snow has been employed at a number of stations (including Saskatoon SRC) in more recent years.

13 A precipitation day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water (0.01 inch in English units). If both rain and snow occur on the same day, a snow day, a rain day and a precipitation day are all recorded. If only one form of precipitation occurs on a specified date, a precipitation day, a rain day or a snow day are recorded appropriately. Beginning in 1974, observations at Saskatoon SRC refer to the calendar day. Previous to 1974, 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. An asterisk (*) appearing in the normal column denotes the occurrence of measurable precipitation on one or more occasions but the 30-year mean when calculated amounts to less than a trace.

14 Evaporation measurements are carried out in the period May 1 to October 31 (weather permitting) only, using the International Hydrological Decade class A pan. The data reported is the sum of the daily net evaporation. Particulars of the measurement procedure are contained in the Atmospheric Environment Service publication "Evaporation", May, 1978. The data base available for comparison is the Saskatoon SRC record for the period 1964 to 1990. The notation M refers to missing data.

15 The mean wind speed value reported is the mean of the hourly wind speeds for the period in question. Average hourly wind speeds are obtained from recording instruments. The anemometer employed is a propeller-type aerofoil at a height of 10 m.

16 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 again with published data for Saskatoon Airport.

17 Total bright sunshine is the sum of the daily bright sunshine values in hours and tenths of hours as recorded by a Campbell-Stokes sunshine recorder. Atmospheric Environment Service publication, "Bright Sunshine, 1951-1980", Volume 7 supplies information on measurement procedures.

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

19 Total global solar radiation is the sum of the daily values of short wave solar radiation recorded during the period in question. Measurements are carried out on a horizontal surface at the ground and integrated over the whole celestial dome,

summing the diffuse and direct components of the solar beam. The measuring instrument is a temperature-compensated Eppley pyranometer. 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 normal based on sixteen years of data (1975-1990). Diffuse solar radiation is also recorded (Table 26). The instrument used is an Eppley pyranometer with a shade ring.

20 The year/day entry appearing in Tables 2 to 13 refers to the year and day on which an extreme event occurred. Reference to the month appears in the table heading. For example, referring to Table 2, the warmest day in January, 1990 was the 7th with a high temperature of 4.0°C, while the warmest January day on record was January 30, 1931 with a high temperature of 10.0°C.

21 Due to missing observations, faulty instrument calibration, lost records, etc., only partial data are available especially during the period 1892 to 1915. The number of years of useful record is therefore cited.

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

Table 1. Annual Climatic Summary, Saskatoon SRC, 1990.

	1990[1] Values	1989 Values	Normals[2] (1961-90) and Extremes[3] (1892-1990)
Mean Annual Temperature[4] (°C)	2.5	2.3	2.0
Mean Maximum Temperature[5] (°C)	8.7	8.3	7.8
Mean Minimum Temperature[6] (°C)	-3.5	-3.7	-3.8
Extreme Maximum Temperature[7] (°C)	35.0 (Aug)	37.0 (July)	41.0 (June)
Extreme Minimum Temperature[7] (°C)	-39.0 (Dec)	-40.0 (Dec)	-50.0 (Feb)
Days with Frost[8]	200	202	198
Heating Degree-Days[9] (18°C base)	5679.0	5789.5	5684
Growing Degree-Days[10] (5°C base)	1658.5	1729.5	1660
Total Precipitation[11] (mm)	310.3	384.8	361.4
Total Rainfall[11] (mm)	215.0	294.8	250.7
Total Snowfall[12] (cm)	95.3	92.5	109.7
Greatest 24-hr Precipitation (mm)	23.0 (July)	30.0 (June)	99.4 (June)
Greatest 24-hr Rainfall (mm)	23.0 (July)	30.0 (June)	99.4 (June)
Greatest 24-hr Snowfall (cm)	11.4 (Nov)	13.0 (Jan)	36.7 (Oct)
Precipitation Days[13]	96	93	114.0
Rainfall Days[13]	55	59	62
Snowfall Days[13]	46	42	56
Total Evaporation[14] (mm)	986.3 (May-Sept)	1041.4 (May-Oct)	988.3 (May-Sept)
Mean Wind Speed[15] (km/hr)	16	17	16.3
Peak Wind Gust[16] (km/hr)	100 (June)	89 (June)	151 (Aug)[a]
Total Bright Sunshine[17] (hr)	2302.4	2380.7	2399.3
Total Global Radiation[19] (MJ m^{-2})	4191.3	4219.9	4322.0
Total Diffuse Radiation[19] (MJ m^{-2})	1749.4	1653.6	1729.5

[a]information from Saskatoon Airport records

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
JANUARY, 1990

Table 2.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-12.0	-13.6	-17.6	
Monthly Mean Maximum Temperature[5] (°C)	-6.9	-8.1	-12.4	
Monthly Mean Minimum Temperature[6] (°C)	-17.0	-19.6	-22.7	
Extreme Maximum Temperature[7] (°C)	4.0	4.0	7.0	10.0
Year/Day(s) [20]	1990/7	1989/26 & 27	1986/11	1931/30
Years of Record[21]1	1	1	27	92
Extreme Minimum Temperature[7] (°C)	-36.0	-37.5	-43.9	-48.9
Year/Day(s)[20]	1990/30	1989/9	1966/22 & 1969/29	1893/31
Years of Record[21]	1	1	27	92
Days with Frost[8]	31	31	31	
Heating Degree-Days[9] (18°C base)	921.0	959.5	1043.0	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	18.7	32.3	20.8	
Total Rainfall[11] (mm)	1.1	4.6	0.4	
Total Snowfall[12] (cm)	17.6	27.7	20.0	
Greatest 24-hour Precipitation (mm)	5.8	15.4	15.4	30.5
Year/Day(s)[20]	1990/16	1989/30	1989/30	1893/23
Years of Record[21]	1	1	27	92
Greatest 24-hour Rainfall (mm)	1.1	2.4	2.4	2.4
Year/Day(s)[20]	1990/7	1989/30	1989/30	1989/30
Years of Record [21]	1	1	27	92
Greatest 24-hour Snowfall (cm)	5.8	13.0	13.0	30.5
Year/Day(s)[20]	1990/16	1989/30	1989/30	1893/23
Years of Record [21]	1	1	27	92
Precipitation Days[13]	11	7	11	
Rainfall Days[13]	1	2	0	
Snowfall Days[13]	10	6	11	
Total Net Evaporation[14] (mm)	-	-	May-Sept	
Mean Wind Speed[15] (km/hr)	17.0	27.2[a]	15.7	
Peak Gust Speed[16] (km/hr)	98.5	74.0	111.0	
Total Bright Sunshine[17] (hr)	83.7	100.3	104.9	
Percent Possible Bright Sunshine[18]	33	39	41	
Total Global Radiation[19] (MJ m^{-2})	111.3	124.2	129.9	
Total Diffuse Radiation[19] (MJ m^{-2})	75.2	66.3	71.4	
Mean Soil Temperature[22] (°C) (10,50 cm)	-5.7, -1.8	-8.1, -3.3	-8.3, -3.9	
Mean Soil Temperature[22] (°C) (150,300 cm)	2.3, 4.8	2.1, 4.8	1.8, 4.4	

[a]7 days missing data

SUMMARY:

January 1990 was, for the most part, a warm month with mean temperatures 7.1°C above the 1951-1980 mean value. Only 4 other years had higher means during the 1942 to 1989 period. The mean maximum was 7.3°C above the normal and the mean minimum was 6.9°C above. Six days recorded highs above freezing, while 8 days had lows that were below -25°C. The extreme maximum temperature, recorded on the 7th, was 4.0°C. This was also the day that 1.1 mm of rain was recorded. Rainfall was more than ten times the normal monthly amount. The extreme minimum was -36.0°C recorded on the 30th. Only 921.0 heating degree-days, well below the normal of 1149.0 were recorded. The total amount of precipitation was 82.7% of normal. The mean wind speed was slightly above the mean of 16.8 km/hr. The peak gust of 98.5 km/hr was recorded on the 10th while the 11th had continuing high winds with a peak gust of 91.0 km/hr. The amount of bright sunshine recorded was only 33% of the amount of bright sunshine that could be recorded in the month of January. The mean soil temperatures were all above the mean values. The 10 cm depth was 3°C above normal, the 50 cm depth was 2°C above, while the 150 cm and 300 cm depths were 0.2 and 0.3°C above normal.

January 1990 was a great month for those who enjoy winter outdoor activities. The temperatures were just perfect for skating, skiing, tobogganning, etc.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
Table 3. FEBRUARY, 1990

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-13.6	-16.8	-13.8	
Monthly Mean Maximum Temperature[5] (°C)	-7.6	-11.7	-9.0	
Monthly Mean Minimum Temperature[6] (°C)	-19.6	-21.9	-18.3	
Extreme Maximum Temperature[7] (°C)	4.0	1.0	7.5	12.8
Year/Day(s) [20]	1990/22	1989/24	1988/26	1931/19
Years of Record[21]1	1	1	27	94
Extreme Minimum Temperature[7] (°C)	-38.0	-37.5	-41.1	-50.0
Year/Day(s)[20]	1990/1	1989/1	1972/6	1893/1
Years of Record[21]	1	1	27	94
Days with Frost[8]	28	28	28	
Heating Degree-Days[9] (18°C base)	882.0	971.0	878.0	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0[c]	
Total Precipitation[11] (mm)	7.9	7.4	14.5	
Total Rainfall[11] (mm)	0.0	0.0	0.2	
Total Snowfall[12] (cm)	7.9	7.4	14.3	
Greatest 24-hour Precipitation (mm)	2.4	3.0	14.2	20.3
Year/Day(s)[20]	1990/16	1989/26	1979/13	1918/7
Years of Record[21]	1	1	27	93
Greatest 24-hour Rainfall (mm)	0.0	0.0	1.8	8.1
Year/Day(s)[20]	--	--	1968/26	1953/3
Years of Record [21]	1	1	27	94
Greatest 24-hour Snowfall (cm)	2.4	3.0	14.2	20.3
Year/Day(s)[20]	1990/16	1989/26	1979/13	1918/7
Years of Record [21]	1	1	27	93
Precipitation Days[13]	6	2	10	
Rainfall Days[13]	0	0	*	
Snowfall Days[13]	6	2	9	
Total Net Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	21[a]	26.8[a]	15.8	
Peak Gust Speed[16] (km/hr)	74	65.9	106	
Total Bright Sunshine[17] (hr)	153.3	176.2	133.2	
Percent Possible Bright Sunshine[18]	55.9	64.3	48.6	
Total Global Radiation[19] (MJ m^{-2})	225.2	209.3[b]	210.1	
Total Diffuse Radiation[19] (MJ m^{-2})	101.8	90.5	105.3	
Mean Soil Temperature[22] (°C) (10,50 cm)	-8.4, -4.0	-7.2, -3.1	-7.3, -4.1	
Mean Soil Temperature[22] (°C) (150,300 cm)	1.1, 3.5	1.2, 3.6	0.8, 3.2	

[a]1 day missing data; [b]3 days missing data

SUMMARY:

February 1990 had a mean temperature that was 0.2°C above the newly calculated normals and 5.1°C warmer than the 1989 value. The mean maximum temperature was -7.6°C and the mean minimum temperature was -19.6°C. The extreme maximum temperature of 4.0°C occurred on the 22nd which was well below the extreme of 12.8°C. The extreme minimum temperature of -38.0°C occurred on the first day of the month.

This value did not come close to the extreme minimum of -50°C. The above normal temperatures resulted in 882.0 heating degree-days with no growing degree-days recorded. The total amount of precipitation (7.9 mm) all came in the form of snow. The greatest 24-hour precipitation was 2.4 mm of snow which fell on the 16th. The 12th of February recorded the peak wind speed of 74 km/hr. The overall monthly mean wind speed was 21 km/hr. The total bright sunshine was 115% of the normal recorded value and 55.9% of the possible amount of bright sunshine. The 10 cm soil temperature level was the only level that had below normal temperatures, all the other levels recorded above normal temperature values.

Do you remember February 1979 when 40.1 cm of snow fell? That is 507% more than what we received this year.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
MARCH, 1990

Table 4.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-2.2	-10.1	-7.1	
Monthly Mean Maximum Temperature[5] (°C)	2.2	-5.2	-2.2	
Monthly Mean Minimum Temperature[6] (°C)	-6.5	-15.0	-12.1	
Extreme Maximum Temperature[7] (°C)	14.0	8.0	15.0	22.8
Year/Day(s) [20]	1990/29 & 30	1989/31	1973/24 & 1981/16	1910/23
Years of Record[21]	1	1	27	94
Extreme Minimum Temperature[7] (°C)	-18.5	-30.5	-38.9	-43.3
Year/Day(s)[20]	1990/22	1989/2	1972/2	1897/14
Years of Record[21]	1	1	27	94
Days with Frost[8]	25	31	30	
Heating Degree-Days[9] (18°C base)	611.5	872.5	727.8	
Growing Degree-Days[10] (5°C base)	5.5	0.0	1.5	
Total Precipitation[11] (mm)	9.4	9.8	19.9	
Total Rainfall[11] (mm)	1.0	3.4	1.5	
Total Snowfall[12] (cm)	8.4	6.4	18.8	
Greatest 24-hour Precipitation (mm)	8.0	4.0	32.0	32.0
Year/Day(s)[20]	1990/20	1989/11	1967/30	1967/30
Years of Record[21]	1	1	27	89
Greatest 24-hour Rainfall (mm)	1.0	2.8	5.6	7.4
Year/Day(s)[20]	1990/12	1989/10	1968/3	1938/28
Years of Record [21]	1	1	27	94
Greatest 24-hour Snowfall (cm)	8.0	4.0	32.0	32.0
Year/Day(s)[20]	1990/20	1989/11	1967/30	1967/30
Years of Record [21]	1	1	27	89
Precipitation Days[13]	2	7	9	
Rainfall Days[13]	1	2	1	
Snowfall Days[13]	1	5	8	
Total Net Evaporation[14] (mm)	--	--	(May-Sept)	
Mean Wind Speed[15] (km/hr)	19.0	24.6	16.6	
Peak Gust Speed[16] (km/hr)	83.0	75.0	87.0	
Total Bright Sunshine[17] (hr)	184.7	185.5	176.9	
Percent Possible Bright Sunshine[18]	50.5	51	48.3	
Total Global Radiation[19] (MJ m^{-2})	349.0	379.0	362.4	
Total Diffuse Radiation[19] (MJ m^{-2})	144.3	154.5	173.9	
Mean Soil Temperature[22] (°C) (10,50 cm)	-0.2, -0.3	-5.9, -2.8	-3.1, -1.8	
Mean Soil Temperature[22] (°C) (150,300 cm)	0.6, 2.7	0.6, 2.7	0.4, 2.4	

SUMMARY:

March, 1990 had a monthly mean temperature that was 4.9°C above the 1961-1990 normal. The mean maximum and minimum temperatures were 4.4°C and 5.6°C above the normal. The extreme maximum temperature occurred on the 29th and 30th with temperatures of 14.0°C. The extreme minimum temperature recorded on the 22nd was -18.5°C. This minimum temperature was well above the all time low recorded in 1897 when a temperature of -43.3°C occurred. There were only 25 days with frost this month. This is a new record in the 27 year history of the Climate Reference Station. March 1990 had below normal precipitation. Only 9.4 mm precipitation fell, well below the normal of 19.9 mm. The majority of the 9.4 mm fell as snow on the 20th of the month. Saskatoon has received only 65% of the normal precipitation in 1990. The mean wind speed was 2.4 km/hr higher than the normal with a peak wind speed of 83 km/hr occurring on the 9th. Hours of bright sunshine was 104% of normal. The 10 and 50 cm soil temperature levels had temperatures that were 2.9 and 1.5°C respectively above normal. The 150 and 300 cm soil temperatures were 0.2 and 0.3°C higher than the mean value.
March 1990 was an extremely mild month. It makes one think that spring may have sprung (too bad for the ski bunnies). We did not even come close to the record high temperature however - this occurred in 1910 when a temperature of 22.8°C was reached.

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
Table 5. APRIL, 1990

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	3.9	4.7	3.5	
Monthly Mean Maximum Temperature[5] (°C)	9.9	11.8	9.9	
Monthly Mean Minimum Temperature[6] (°C)	-2.2	-2.4	-2.0	
Extreme Maximum Temperature[7] (°C)	26.5	28.0	30.6	33.0
Year/Day(s) [20]	1990/20	1989/21	1977/26	1952/28
Years of Record[21]	1	1	27	93
Extreme Minimum Temperature[7] (°C)	-9.0	-10.5	-27.8	-28.3
Year/Day(s)[20]	1990/10	1989/16 & 17	1979/1	1893/1954
Years of Record[21]	1	1	27	93
Days with Frost[8]	20	25	20	
Heating Degree-Days[9] (18°C base)	424.5	377.0	388.0	
Growing Degree-Days[10] (5°C base)	60.0	37.0	60.2	
Total Precipitation[11] (mm)	38.2	3.0	20.2	
Total Rainfall[11] (mm)	21.4	1.0	10.4	
Total Snowfall[12] (cm)	16.8	2.5	9.2	
Greatest 24-hour Precipitation (mm)	18.4	2.5	24.6	30.2
Year/Day(s)[20]	1990/24	1989/7	1985/19	1955/19
Years of Record[21]	1	1	27	93
Greatest 24-hour Rainfall (mm)	18.4	0.5	24.6	26.7
Year/Day(s)[20]	1990/24	1989/13	1985/19	1926/23
Years of Record [21]	1	1	27	93
Greatest 24-hour Snowfall (cm)	10.9	2.5	18.5	20.3
Year/Day(s)[20]	1990/28	1989/7	1983/10	1942/5
Years of Record [21]	1	1	27	93
Precipitation Days[13]	5	4	7	
Rainfall Days[13]	2	3	4	
Snowfall Days[13]	3	1	4	
Total Net Evaporation[14] (mm)	--	--	(May-Sept)	
Mean Wind Speed[15] (km/hr)	16.5	27.2	17.6	
Peak Gust Speed[16] (km/hr)	67	85	93	
Total Bright Sunshine[17] (hr)	199.2	277.4	231.3	
Percent Possible Bright Sunshine[18]	48	67	56	
Total Global Radiation[19] (MJ m^{-2})	450.0	519.2	492.2	
Total Diffuse Radiation[19] (MJ m^{-2})	206.0	158.0	178.5	
Mean Soil Temperature[22] (°C) (10,50 cm)	4.5, 4.2	3.5, 3.4	3.1, 2.5	
Mean Soil Temperature[22] (°C) (150,300 cm)	2.3, 2.6	1.5, 2.4	1.2, 2.2	

SUMMARY:

April, 1990 oscillated between summar and winter weather conditions - a typical spring month for this location. The extreme maximum temperature of 26.5°C was recorded on the 20th and the extreme minimum temperature was recorded on the 10th with a temperature of -9.0°C, a range of 35.5°C. These do not exceed the extremes of -28.3°C that was recorded in 1893 and again in 1954 and 33.0°C recorded in 1952. There were 20 days with frost. Saskatoon received 35.2 mm more precipitation than was recorded in 1989. This precipitation came as both rain (21.4mm) and snow (16.8mm). The majority of the snow came at the end of the month (27th to 29th) when 14.9 cm fell. The mean wind speed of 16.5 km/h was below the normal and the peak gust of 67 km/hr did not come close to the extreme 1961-1990 peak gust of 93 km/hr. Saskatoon received only 199.2 hours of sunshine - only 48% of the possible amount. The global radiation was lower than the value recorded last year while the diffuse radiation was higher. All four levels of soil temperature recorded higher values than last year's values as well as the normal.

This month clearly illustrated that almost any type of weather can happen in Saskatchewan in a short period of time. On the 20th the temperature was a balmy 26.5°C, four days later it rained 18.4 mm and three days after that brought a three day snow storm.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
May, 1990

Table 6.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	10.9	11.5	11.5	
Monthly Mean Maximum Temperature[5] (°C)	17.6	18.1	18.5	
Monthly Mean Minimum Temperature[6] (°C)	4.2	4.8	4.5	
Extreme Maximum Temperature[7] (°C)	27.5	27.5	35.0	37.2
Year/Day(s) [20]	1990/6&29	1989/7&10	1988/30	1936/27
Years of Record[21]	1	1	27	93
Extreme Minimum Temperature[7] (°C)	-4.0	-6.5	-10.0	-12.8
Year/Day(s)[20]	1990/1,11&13	1989/5	1967/2	1907/6
Years of Record[21]	1	1	27	93
Days with Frost[8]	5	3	6	
Heating Degree-Days[9] (18°C base)	227.0	198.0	193.1	
Growing Degree-Days[10] (5°C base)	186.5	188.5	209.9	
Total Precipitation[11] (mm)	39.6	88.4	43.9	
Total Rainfall[11] (mm)	38.9	88.4	41.5	
Total Snowfall[12] (cm)	0.7	0.0	2.4	
Greatest 24-hour Precipitation (mm)	15.8	21.0	39.9	51.3
Year/Day(s)[20]	1990/15	1989/12	1985/4	1909/30
Years of Record[21]	1	1	27	93
Greatest 24-hour Rainfall (mm)	15.8	21.0	39.9	51.3
Year/Day(s)[20]	1990/15	1989/12	1985/4	1909/30
Years of Record [21]	1	1	27	93
Greatest 24-hour Snowfall (cm)	0.6	0	26.2	26.2
Year/Day(s)[20]	1990/7	--	1983/10	1983/10
Years of Record[21]	1	1	27	93
Precipitation Days[13]	12	19	9	
Rainfall Days[13]	11	19	9	
Snowfall Days[13]	1	0	1	
Total Net Evaporation[14] (mm)	169.5[a]	190.8	205.6	
Mean Wind Speed[15] (km/hr)	16.6	29.6	17.6	
Peak Gust Speed[16] (km/hr)	88	87	98	
Total Bright Sunshine[17] (hr)	250.8	272.7	284.6	
Percent Possible Bright Sunshine[18]	52	56		
Total Global Radiation[19] (MJ m^{-2})	543.2	555.4	586.3	
Total Diffuse Radiation[19] (MJ m^{-2})	201.0[b]	194.7	222.2	
Mean Soil Temperature[22] (°C) (10,50 cm)	9.7,8.7	10.7,10.1	10.5,8.9	
Mean Soil Temperature[22] (°C) (150,300 cm)	5.0,3.5	5.3,3.5	4.4,3.1	

[a] 3 days missing data; [b] 5 days missing data

SUMMARY:

This month had many below normal temperatures - 18 days had below normal temperatures. Saskatoon even received snow (0.7 cm) on the 7th and 8th. The mean monthly temperature was 0.6° C below normal, the mean maximum was 0.9° C below normal and the mean minimum temperature was 0.3° C below normal. The extreme maximum temperature of 27.5° C was the same as last year's but did not even approach the 1951-1990 extreme of 35° C in 1988. On May 6th, when the temperature maximum was recorded, Saskatoon had a dust storm with visibility less than 1 kilometre (at times). The extreme minimum temperature was -4.0° C. The cool month was reflected in the number of growing degree days (186.5) and heating degree days (227.0). Precipitation was 9.8% below normal. The majority of the precipitation came in the form of rainfall (38.9 mm). The greatest 24-hour precipitation came in the form of rainfall (38.9 mm). The greatest 24-hour precipitation came in the middle of the month when 15.8 mm of rain fell. The total amount of evaporation was 169.5 mm. The peak gust of 88 km/hr occurred on the 24th. The mean wind speed was 16.6 km/hr. The 10 and 50 cm soil temperatures were below normal while the 150 and 300 cm soil temperatures were above normal.

Saskatoon received 0.6 cm of snow this month, but do you remember May 10, 1983 when 26.2 cm of snow fell? Or do you remember when Saskatoon received 20.4 cm of snow in the last four days of May, 1982?

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR

Table 7. June, 1990

Element	1990 Value	1989 Value	Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	17.0	16.9	15.9	
Monthly Mean Maximum Temperature[5] (°C)	24.0	23.5	22.6	
Monthly Mean Minimum Temperature[6] (°C)	9.9	10.3	9.2	
Extreme Maximum Temperature[7] (°C)	32.0	34.0	41.0	41.0
Year/Day(s) [20]	1990/26th	1989/30th	1988/5th	1988/5th
Years of Record[21]	1	1	27	94
Extreme Minimum Temperature[7] (°C)	2.0	3.5	-3.3	-3.9
Year/Day(s)[20]	1990/3rd	1989/13th	1967/6	1903/9 & 1917/2
Years of Record[21]	1	1	27	94
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	67.0	63.5	77.9	
Growing Degree-Days[10] (5°C base)	353.5	351.5	338.8	
Total Precipitation[11] (mm)	59.6	63.5	63.6	
Total Rainfall[11] (mm)	59.6	63.5	63.6	
Total Snowfall[12] (cm)	0	0	0	
Greatest 24-hour Precipitation (mm)	21.2	30.0	99.4	99.4
Year/Day(s)[20]	1990/1	1989/25	1983/24	1983/24
Years of Record[21]	1	1	27	94
Greatest 24-hour Rainfall (mm)	21.2	30.0	99.4	99.4
Year/Day(s)[20]	1990/1	1989/25	1983/24	1983/24
Years of Record [21]	1	1	27	94
Greatest 24-hour Snowfall (cm)	0	0	0	1.8
Year/Day(s)[20]	--	--	--	1938/29
Years of Record [21]	--	--	27	94
Precipitation Days[13]	13	7	12	
Rainfall Days[13]	13	7	12	
Snowfall Days[13]	0	0	0	
Total Net Evaporation[14] (mm)	219.7	214.2[a]	225.1	
Mean Wind Speed[15] (km/hr)	15.5	27.9	17.0	
Peak Gust Speed[16] (km/hr)	99.8	89	117	
Total Bright Sunshine[17] (hr)	309.0	262.6	299.3	
Percent Possible Bright Sunshine[18]	62	53	60	
Total Global Radiation[19] (MJ m^{-2})	611.9[b]	609.3	638.7	
Total Diffuse Radiation[19] (MJ m^{-2})	232.4	226.9	228.1	
Mean Soil Temperature[22] (°C) (10,50 cm)	15.7,14.0	15.4,14.3	15.7,14.0	
Mean Soil Temperature[22] (°C) (150,300 cm)	8.2,5.3	8.4,5.4	8.3,5.3	

[a] 3 days missing data [b] 1 day missing data

SUMMARY:

June 1990 had all kinds of summer weather conditions. The conditions ranged from calm, sunny days (perfect beach days) to days with tornados (June 27th) to days with a peak wind speed of 99.8 km/hr (June 4th). The maximum temperature for June was 32° C with the mean maximum being 24.0° C. The extreme maximum temperature ever recorded in June happened only two years ago in 1988 when a temperature of 41.0° C was attained. The minimum temperature was
2.0° C with the mean minimum at 9.9° C. There were 353.5 growing degree days, 14.7 higher than the 1961-1990 normals. The Climate Reference Station recorded a total of 59.6 mm of precipitation this month, 6.3% below normal. For 1990 the total precipitation is 7.6% below normal. The greatest 24-hour rainfall occurred on the first when 21.2 mm of precipitation fell. This value does not even come close to the extreme value of 99.4 mm that fell on the 24th in 1983. There were 13 precipitation days this month. June had 309.0 hours of bright sunshine measured with the 15th recording the greatest amount (15.9 hours). The total evaporation of 219.7 mm was less than the 1961-1990 mean of 225.1 mm. The 10, 50, 300 cm levels of soil temperatures were all normal while the 150 cm was 0.1° C below normal.

June 1990 had a variety of weather conditions but what seemed to predominate were showers and wind at 5:00 p.m. for all those people who ride their bikes to work.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
Table 8. July, 1990

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	17.5	20.0	18.4	
Monthly Mean Maximum Temperature[5] (°C)	23.4	27.3	25.1	
Monthly Mean Minimum Temperature[6] (°C)	11.5	12.8	11.6	
Extreme Maximum Temperature[7] (°C)	31.5	37.0	38.5	40.0
Year/Day(s) [20]	1990/31st	1989/21st	1984/27	1919/17;1941/19
Years of Record[21]	1	1	27	94
Extreme Minimum Temperature[7] (°C)	6.5	8.0	1.7	-0.6
Year/Day(s)[20]	1990/20th	1989/13th	1967/2	1918/25
Years of Record[21]	1	1	27	94
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	55.5	12.0	28.7	
Growing Degree-Days[10] (5°C base)	379.5	463.5	409.8	
Total Precipitation[11] (mm)	78.0	27.8	55.8	
Total Rainfall[11] (mm)	78.0	27.8	55.8	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	23.0	11.5	45.5	79.2
Year/Day(s)[20]	1990/2	1989/10th	1968/29	1946/3
Years of Record[21]	1	1	27	94
Greatest 24-hour Rainfall (mm)	23.0	11.5	45.5	79.2
Year/Day(s)[20]	1990/2	1989/10th	1968/29	1946/3
Years of Record [21]	1	1	27	94
Greatest 24-hour Snowfall (cm)	0.0	0.0	0.0	0.0
Year/Day(s)[20]	--	--	--	--
Years of Record [21]	1	1	27	--
Precipitation Days[13]	12	5	12	
Rainfall Days[13]	12	5	12	
Snowfall Days[13]	0	0	0	
Total Net Evaporation[14] (mm)	207.6	261.6	232.8	
Mean Wind Speed[15] (km/hr)	14.0	24.3	15.5	
Peak Gust Speed[16] (km/hr)	88.5	79	103.0	
Total Bright Sunshine[17] (hr)	293.4	328.8	333.1	
Percent Possible Bright Sunshine[18]	58.6	65.6	66.5	
Total Global Radiation[19] (MJ m^{-2})	613.9	550.7*	633.5	
Total Diffuse Radiation[19] (MJ m^{-2})	226.7	194.7*	216.5	
Mean Soil Temperature[22] (°C) (10,50 cm)	17.5,16.7	19.4,18.0	18.1,16.8	
Mean Soil Temperature[22] (°C) (150,300 cm)	10.8,7.3	11.3,7.4	11.0,7.5	

* 4 days missing data

SUMMARY:

July 1990 was a wet, cool and cloudy month. The mean monthly temperature was 17.5°C, 0.9°C below the 1961-1990 normal. The mean maximum temperature was 3.9°C below the value recorded in 1989 and the mean minimum temperature was 1.3°C less than last year's. The highest temperature that was attained was 31.5°C on the very last day. The lowest temperature was 6.5°C recorded on the twentieth. There were 18 out of 31 days that had below normal temperatures. The coolness of the month was reflected in the high number of heating degree days (55.5) compared to a normal of 28.7 and the low number of growing degree days (379.5) compared to a normal of 409.8. July received 78.0 mm of rainfall. This is 39.8% above the 1961-1990 normal. The total precipitation for 1990 is 251.4 mm, 3% above normal. The greatest 24-hour precipitation was 23.0 mm received in an 11 hour time period on July 2nd. On the 27th Saskatoon received 17.7 mm of precipitation in a four hour time period. The total evaporation was 207.6 mm, 54 mm less than last year. The mean wind speed was 14.0 km/hr with the peak gust occurring on the 3rd when a speed of 88.5 km/hr was reached. There was 293.4 hours of bright sunshine. The mean soil temperatures for all four levels were below normal.

Yes, Saskatoon received a lot of rain during the month of July, but do you remember July 29, 1968 when 45.5 mm of rain fell in a 24-hour time period or July 3, 1946 when 79.2 mm of precipitation fell?

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
Table 9. AUGUST, 1990

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	17.8	18.5	17.2	
Monthly Mean Maximum Temperature[5] (°C)	24.8	25.1	24.3	
Monthly Mean Minimum Temperature[6] (°C)	10.8	11.8	10.1	
Extreme Maximum Temperature[7] (°C)	35.0	35.0	37.0	37.8
Year/Day(s) [20]	1990/6	1989/1	1984/10	1893/6, 1949/6
Years of Record[21]	1	1	27	93
Extreme Minimum Temperature[7] (°C)	5.5	6.0	-2.8	-2.8
Year/Day(s)[20]	1990/27	1989/20	1976/28	1976/28
Years of Record[21]	1	1	27	93
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	46.5	45.5	63.3	
Growing Degree-Days[10] (5°C base)	394.5	412.0	378.3	
Total Precipitation[11] (mm)	7.1	58.6	35.2	
Total Rainfall[11] (mm)	7.1	58.6	35.2	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	3.1	27.9	27.9	73.7
Year/Day(s)[20]	1990/16	1989/25	1989/25	1945/3
Years of Record[21]	1	1	27	93
Greatest 24-hour Rainfall (mm)	3.1	27.9	27.9	73.7
Year/Day(s)[20]	1990/16	1989/25	1989/25	1945/3
Years of Record [21]	1	1	27	93
Greatest 24-hour Snowfall (cm)	0.0	0.0	0.0	0.0
Year/Day(s)[20]	--	--	--	--
Years of Record [21]	1	1	27	
Precipitation Days[13]	6	9	9	
Rainfall Days[13]	6	9	9	
Snowfall Days[13]	0	0	0	
Total Net Evaporation[14] (mm)	217.1	218.0	206.6	
Mean Wind Speed[15] (km/hr)	14.8[a]	24.1	15.5	
Peak Gust Speed[16] (km/hr)	68	70	105	
Total Bright Sunshine[17] (hr)	241.2	252.9	294.8	
Percent Possible Bright Sunshine[18]	53	56	65	
Total Global Radiation[19] (MJ m^{-2})	429.1[b]	493.3	529.0	
Total Diffuse Radiation[19] (MJ m^{-2})	195.1[b]	232.0	185.6	
Mean Soil Temperature[22] (°C) (10,50 cm)	17.3,17.1	17.6,18.0	16.7,16.8	
Mean Soil Temperature[22] (°C) (150,300 cm)	12.3,8.8	12.8,9.2	12.4,9.3	

[a] 2 days missing data [b] 3 days missing data

SUMMARY:

August 1990 had near normal temperatures and below normal rainfall. The mean monthly temperature was 0.6°C above the 1961-1990 normal while the mean maximum temperature was 0.5°C above normal. The mean minimum temperature was 0.7°C above normal. The extreme maximum temperature occurred on the 6th at 35.0°C. The extreme minimum temperature was 5.5°C. This did not come close to breaking the record of -2.8°C set in 1976. This station received only 7.1 mm of precipitation, well below the normal of 35.2 mm and only 12% of what was received last year. There is now an annual accummulated precipitation amount of 258.5. The total evaporation for August was 217.1 mm. The mean wind speed was 14.8 km/hr and the peak wind speed was 68 km/hr. The total bright sunshine was 53.6 hours less than normal. The global radiation recorded only 429.1 MJ m^{-2} and diffuse radiation recorded 195.1 MJ m^{-2}.

August, 1990 was what the farming community appreciates during harvest season - hot, dry weather.

SASKATOON

SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
SEPTEMBER, 1990

Table 10.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	13.6	12.2	11.3	
Monthly Mean Maximum Temperature[5] (°C)	21.5	18.5	17.7	
Monthly Mean Minimum Temperature[6] (°C)	5.7	5.8	4.8	
Extreme Maximum Temperature[7] (°C)	31.0	27.0	35.6	35.6
Year/Day(s) [20]	1990/2	1989/16	1978/4	1978/4
Years of Record[21]1	1	1	27	91
Extreme Minimum Temperature[7] (°C)	-1.5	-3.0	-7.8	-11.1
Year/Day(s)[20]	1990/22	1989/22	1978/30	1908/28
Years of Record[21]	1	1	27	91
Days with Frost[8]	4	4	4	
Heating Degree-Days[9] (18°C base)	142.0	179.5	199.6	
Growing Degree-Days[10] (5°C base)	254.0	213.5	196.2	
Total Precipitation[11] (mm)	6.3	26.4	32.8	
Total Rainfall[11] (mm)	6.3	26.0	31.1	
Total Snowfall[12] (cm)	0.0	0.0	1.8	
Greatest 24-hour Precipitation (mm)	4.3	14.2	29.6	44.2
Year/Day(s)[20]	1990/8	1989/2	1980/3	1931/12
Years of Record[21]	1	1	27	91
Greatest 24-hour Rainfall (mm)	4.3	14.2	29.6	44.2
Year/Day(s)[20]	1990/8	1989/2	1980/3	1931/12
Years of Record [21]	1	1	27	91
Greatest 24-hour Snowfall (cm)	0.0	0.0	17.6	17.6
Year/Day(s)[20]	--	--	1982/28	1982/28
Years of Record [21]	1	1	27	91
Precipitation Days[13]	5	6	9	
Rainfall Days[13]	5	6	9	
Snowfall Days[13]	0	0	0	
Total Net Evaporation[14] (mm)	172.4	121.4	125.8	
Mean Wind Speed[15] (km/hr)	13.4[a]	26.5	16.7	
Peak Gust Speed[16] (km/hr)	79	70	89	
Total Bright Sunshine[17] (hr)	241.2	200.6[c]	188.9	
Percent Possible Bright Sunshine[18]	64	53	50	
Total Global Radiation[19] (MJ m^{-2})	421.0	352.1[b]	351.8	
Total Diffuse Radiation[19] (MJ m^{-2})	120.8	125.3[b]	127.6	
Mean Soil Temperature[22] (°C) (10,50 cm)	12.9, 14.8	11.0, 13.5[a]	11.2, 13.3	
Mean Soil Temperature[22] (°C) (150,300 cm)	11.9, 9.6	11.8,10.0[a]	11.9, 9.9	

[a] Information from Saskatoon Airport.
[b] Total diffuse radiation and total global radiation are low due to incomplete data.
[c] Including 2 day estimations from data logger.

SUMMARY:

September, 1990 was an extremely dry month with only 6.3 mm of precipitation being received (only 19.2% of normal). The majority of this precipitation occured on the 8th when 4.3 mm of rain fell. There were also above average temperatures recorded as compared to the 1961-1990 normals. The extreme maximum of 31.0°C was recorded on the second and the extreme minimum of -1.5°C recorded on the 22nd. A maximum of 30.0°C was recorded on the 23rd a day after the minimum. The warm month was reflected in the high number of growing degree days (254.0) and the low number of heating degree days (142.0). A total of 172.4 mm was evaporated - well above the normal of 125.8 mm. The amount of bright sunshine was also high at 28% above normal. The global radiation was also above normal with 421.0 MJ m-2 and the diffuse radiation was below normal with a recording of 125.3 MJ m-2.

September 1990 was an extremely dry, warm and sunny month. This was very different to 1980 when 29.6 mm of rainfall was recorded or 1982 when Saskatoon received 17.6 cm of snow. Talk about an early ski season.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
Table 11. OCTOBER, 1990

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	3.3	5.4	4.8	
Monthly Mean Maximum Temperature[5] (°C)	10.2	11.6	10.9	
Monthly Mean Minimum Temperature[6] (°C)	-3.7	-0.9	-1.3	
Extreme Maximum Temperature[7] (°C)	20.0	20.0	28.5	32.2
Year/Day(s) [20]	1990/25 & 28	1989/8 & 23	1984/8	1943/5
Years of Record[21]	1	1	27	91
Extreme Minimum Temperature[7] (°C)	-13.0	-7.0	-19.5	-25.6
Year/Day(s)[20]	1990/17	1989/29	1984/30 & 31	1919/26
Years of Record[21]	1	1	27	91
Days with Frost[8]	26	20	19	
Heating Degree-Days[9] (18°C base)	463.5	394.5	405.2	
Growing Degree-Days[10] (5°C base)	25.0	63.5	62.2	
Total Precipitation[11] (mm)	4.9	15.4	18.0	
Total Rainfall[11] (mm)	1.6	2.2	7.9	
Total Snowfall[12] (cm)	3.3	13.2	9.6	
Greatest 24-hour Precipitation (mm)	1.5	7.2	36.7	36.7
Year/Day(s)[20]	1990/4	1989/14	1984/16	1984/16
Years of Record[21]	1	1	27	91
Greatest 24-hour Rainfall (mm)	0.5	1.8	23.1	34.0
Year/Day(s)[20]	1990/9 & 26	1989/13	1969/2	1914/5
Years of Record [21]	1	1	27	91
Greatest 24-hour Snowfall (cm)	1.5	7.2	36.7	36.7
Year/Day(s)[20]	1990/4	1989/14	1984/16	1984/16
Years of Record [21]	1	1	27	91
Precipitation Days[13]	7	7	6	
Rainfall Days[13]	4	3	4	
Snowfall Days[13]	3	4	3	
Total Net Evaporation[14] (mm)	--	35.4[b]	--	
Mean Wind Speed[15] (km/hr)	16.1[a]	26.7[c]	17.1	
Peak Gust Speed[16] (km/hr)	78	76	96	
Total Bright Sunshine[17] (hr)	133.9	167.2	166.4	
Percent Possible Bright Sunshine[18]	41	51	51	
Total Global Radiation[19] (MJ m^{-2})	223.2	326.5	239.1	
Total Diffuse Radiation[19] (MJ m^{-2})	110.8	92.4	92.6	
Mean Soil Temperature[22] (°C) (10,50 cm)	3.6, 8.3	4.9, 9.0	4.5, 8.1	
Mean Soil Temperature[22] (°C) (150,300 cm)	10.0, 9.4	9.9, 9.3	9.7, 9.5	

[a]calculated with 24 days of data [b]evaporation program was discontinued after Oct. 12 1989 [c]calculated with 29 days of data

SUMMARY:

October, 1990 was a cool, very dry month. Twenty-one days had below normal temperatures. This was reflected in the below normal mean temperature of 3.3°C. The mean minimum temperature was 2.4°C below normal. The extreme minimum occurred on the 17th when a temperature of -13.0°C was recorded. The extreme maximum temperature (20°C) was the same as last year's. The cool month was also reflected in the high number of heating degree days (463.5) and the low number of growing degree days (25.0). October was also a very cloudy month. There were only 133.9 hours of sunshine recorded, 32.5 hours below the normal. This lack of sunshine is reflected in the global radiation and the diffuse radiation. This month was an extremely dry month - the third month in a row that has recorded a below normal precipitation amount. Saskatoon is now over 50% below normal for the year to date. Only 4.9 mm of precipitation were recorded, 3.3 cm of which came in the form of snowfall. The greatest 24-hour precipitation amount was recorded on the 4th of the month when 1.5 cm of snow fell. Due to the coolness of the month, the evaporation program ended for the season on the 11th. The mean wind speed was near normal with the peak gust occurring on the 10th.

October 1990 was a fairly cool month - but in 1984 the extreme minimum was -19.5°C and was -25.6°C in 1919.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
NOVEMBER, 1990

Table 12.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-7.5	-5.6	-6.1	
Monthly Mean Maximum Temperature[5] (°C)	-2.5	-0.8	-1.5	
Monthly Mean Minimum Temperature[6] (°C)	-12.5	-10.3	-10.5	
Extreme Maximum Temperature[7] (°C)	12.0	9.5	19.4	21.7
Year/Day(s) [20]	1990/13	1989/19	1975/4	1903/3
Years of Record[21]	1	1	28	92
Extreme Minimum Temperature[7] (°C)	-28.0	-23.0	-33.5	-39.4
Year/Day(s)[20]	1990/25	1989/16	1985/24	1893/30
Years of Record[21]	1	1	28	92
Days with Frost[8]	30	29	29	
Heating Degree-Days[9] (18°C base)	722.0	703.0	692	
Growing Degree-Days[10] (5°C base)	0.0	0.0	2.8	
Total Precipitation[11] (mm)	22.7	22.7	14.9	
Total Rainfall[11] (mm)	0.0	5.0	2.2	
Total Snowfall[12] (cm)	22.7	17.7	13.2	
Greatest 24-hour Precipitation (mm)	11.4	5.8	19.3	27.9
Year/Day(s)[20]	1990/20	1989/2	1978/4	1938/1
Years of Record[21]	1	1	28	92
Greatest 24-hour Rainfall (mm)	0.0	5.0	14.5	14.5
Year/Day(s)[20]	1990/--	1989/3	1978/4	1978/4
Years of Record [21]	1	1	28	92
Greatest 24-hour Snowfall (cm)	11.4	5.8	17.5	27.9
Year/Day(s)[20]	1990/20	1989/2	1982/6	1938/1
Years of Record [21]	1	1	28	92
Precipitation Days[13]	6	13	8	
Rainfall Days[13]	0	1	1	
Snowfall Days[13]	6	12	7	
Total Net Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	16.7	15.8	15.3	
Peak Gust Speed[16] (km/hr)	71.5	83.0	100.0	
Total Bright Sunshine[17] (hr)	99.3	84.1	101.8	
Percent Possible Bright Sunshine[18]	38	32	39	
Total Global Radiation[19] (MJ m^{-2})	113.2	108.4	123.7	
Total Diffuse Radiation[19] (MJ m^{-2})	79.4	67.9	73.6	
Mean Soil Temperature[22] (°C) (10,50 cm)	-2.0,3.3	-0.8,3.9	-1.7,2.6	
Mean Soil Temperature[22] (°C) (150,300 cm)	7.2,5.2	7.3,8.2	6.8,8.1	

SUMMARY:

November 1990 oscillated between very cold to mild and between being a fairly dry month to one with above normal precipitation. The mean monthly temperature was -7.5°C with the mean maximum being -2.5 °C and the mean minimum being -12.5°C. These are all below the 1961-1990 normals. The extreme maximum temperature occurred on the 13th with the extreme minimum being recorded 12 days later. Eighteen days had below normal mean temperatures. The coolness was reflected in the heating degree days which was 3% and 4% higher than the 1989 value and the mean. The total precipitation was 7.8 mm above normal. November was windier than normal with a mean wind speed 9% above normal. The peak gust of 71.5 km/hr occurred on the 29th. The total bright sunshine of 99.3 hrs was near normal. In November it is normal to receive only 39% of the total possible sunshine. The low amount of sunshine was reflected in the total global radiation of 113.2 MJ m^{-2}. The total diffuse radiation was higher than normal at 80.5 MJ m^{-2}. The 10 cm soil temperature was below normal by 0.3°C, while all the other levels were above normal.

November 1990 was a fairly cool and wet month. However it was not as cool as 1985 when an extreme minimum of -33.5°C was recorded nor as wet as 1978 when 19.3 mm of precipitation fell in one day.

SASKATOON
SASKATCHEWAN RESEARCH COUNCIL
CLIMATE REFERENCE STATION
LOCATION: 52°09'N 106° 36' W 497 m MSL
MONTHLY WEATHER SUMMARY FOR
DECEMBER, 1990

Table 13.

Element	1990 Value	1989 Value	Mean or Extreme Value 1961 - 1990[2]	Extreme All Years[3]
Monthly Mean Temperature[4] (°C)	-18.2	-15.4	-14.8	
Monthly Mean Maximum Temperature[5] (°C)	-12.7	-10.0	-9.8	
Monthly Mean Minimum Temperature[6] (°C)	-23.7	-20.8	-19.3	
Extreme Maximum Temperature[7] (°C)	5.5	4.5	9.5	13.3
Year/Day(s) [20]	1990/8	1989/23,24,26	1987/7	1939/5
Years of Record[21]	1	1	28	92
Extreme Minimum Temperature[7] (°C)	-39.0	-40.0	-42.2	-43.9
Year/Day(s)[20]	1990/21	1989/20	1973/31	1892/22
Years of Record[21]	1	1	28	92
Days with Frost[8]	31	31	31	
Heating Degree-Days[9] (18°C base)	1,117.0	1,013.5	987.7	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	17.9	29.0	20.6	
Total Rainfall[11] (mm)	0.0	11.4	0.9	
Total Snowfall[12] (cm)	17.9	17.6	20.5	
Greatest 24-hour Precipitation (mm)	3.4	8.0	14.5	20.6
Year/Day(s)[20]	1990/11	1989/3	1973/23	1936/24
Years of Record[21]	1	1	28	91
Greatest 24-hour Rainfall (mm)	0.0	8.0	8.0	8.0
Year/Day(s)[20]	--	1989/3	1989/3	1989/3
Years of Record [21]	1	1	28	92
Greatest 24-hour Snowfall (cm)	3.4	6.8	14.5	20.6
Year/Day(s)[20]	1990/11	1989/8	1973/23	1936/24
Years of Record [21]	1	1	28	91
Precipitation Days[13]	12	7	13	
Rainfall Days[13]	0	2	1	
Snowfall Days[13]	12	6	12	
Total Net Evaporation[14] (mm)	--	--	--	
Mean Wind Speed[15] (km/hr)	16	15	15.7	
Peak Gust Speed[16] (km/hr)	77	68	97.0	
Total Bright Sunshine[17] (hr)	98.8	72.4	84.2	
Percent Possible Bright Sunshine[18]	41	30	35	
Total Global Radiation[19] (MJ m^{-2})	100.3	82.0	95.2	
Total Diffuse Radiation[19] (MJ m^{-2})	55.5	55.7	54.3	
Mean Soil Temperature[22] (°C) (10,50 cm)	-7.9,-1.2	-6,-1.0	-6.6,-1.7	
Mean Soil Temperature[22] (°C) (150,300 cm)	4.4,6.5	4.4,6.5	3.9,6.3	

SUMMARY:

December 1990 recorded two official blizzards (18th and 27th), extremely cold temperatures and below normal precipitation. December had 18 days with below normal mean temperatures with the monthly mean temperature being -18.2°C. The mean minimum was -23.7°C, 4.4°C below the 1961-1990 normal. The coldest temperature recorded was -39.0°C on the 21st of the month. There were 6 days in the month that did get to 0°C and higher with the highest temperature occurring on the 4th when a temperature of 6.5°C was attained. This resulted in a monthly temperature range of 45.5°C. The coolness of the month was reflected in the high number of heating degree days (1117). There was only 17.9 cm of snowfall recorded. The good thing about the precipitation was that there was no rainfall this month. There were a near normal 12 days of recorded precipitation. The mean wind speed was only 0.3 km/hr above normal. The peak wind speed of 77 km/hr occurred on the 27th - the same day that the second blizzard occurred. December had 14.5 hours more sunshine than normal. There were only 5 days that were completely overcast. The 10 cm soil temperature was 1.3°C below normal while the other three depths were above normal.

Did you know that a blizzard is defined by Environment Canada as having temperatures below -12°C, winds greater than 40 km/hr, visibilities less than 1 km with blowing snow, and all lasting for 6 hours or more?

Table 14. Soil Temperature and Snow Cover at Saskatoon, SRC, January, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-6.0	5.0	31	1	7
10	-5.7	4.5	31	5	12
20	-4.4	5.0	31	10	9
50	-1.8	1.0	31	15	10
100	0.4	0.5	5	20	18
150	2.3	1.0	0	25	13
300	4.8	1.5	0	31	13

*at 0900 h

Table 15. Soil Temperature and Snow Cover at Saskatoon, SRC, February, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-8.8	5.5	28	1	14
10	-8.4	5.0	28	5	13
20	-7.3	4.5	28	10	12
50	-4.0	2.0	28	15	12
100	-0.8	1.5	28	20	12
150	1.1	1.5	0	25	11
300	3.5	1.0	0	28	11

*at 0900 h

Table 16. Soil Temperature and Snow Cover at Saskatoon, SRC, March, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-1.5	5.5	31	1	10
10	-0.2	6.5	11	5	10
20	0.3	7.0	7	10	0
50	-0.3	4.0	13	15	0
100	-0.4	1.5	19	20	0
150	0.6	0.5	0	25	3
300	2.7	0.5	0	31	0

*at 0900 h

Table 17. Soil Temperature and Snow Cover at Saskatoon, SRC, March, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	3.6	9.5	1	1	0
10	4.5	8.5	0	5	0
20	6.1	8.0	0	10	0
50	4.2	7.0	0	15	0
100	2.4	4.5	0	20	0
150	2.3	3.0	0	25	0
300	2.6	0.5	0	30	0

*at 0900 h

Table 18. Soil Temperature and Snow Cover at Saskatoon, SRC, May, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	9.0	13.0	0	1	0
10	9.7	12.0	0	5	0
20	11.1	11.0	0	10	0
50	8.7	7.5	0	15	0
100	6.0	4.5	0	20	0
150	5.0	2.5	0	25	0
300	3.5	1.5	0	31	0

*at 0900 h

Table 19. Soil Temperature and Snow Cover at Saskatoon, SRC, June, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	15.2	9.5	0	1	0
10	15.7	8.5	0	5	0
20	17.1	8.5	0	10	0
50	14.0	4.5	0	15	0
100	10.1	3.5	0	20	0
150	8.2	3.5	0	25	0
300	5.3	1.5	0	30	0

*at 0900 h

Table 20. Soil Temperature and Snow Cover at Saskatoon, SRC, July, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	17.3	6.0	0	1	0
10	17.5	5.5	0	5	0
20	19.3	6.0	0	10	0
50	16.7	3.0	0	15	0
100	12.8	1.5	0	20	0
150	10.8	1.5	0	25	0
300	7.3	1.5	0	31	0

*at 0900 h

Table 21. Soil Temperature and Snow Cover at Saskatoon, SRC, August, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	17.2	7.5	0	1	0
10	17.3	7.0	0	5	0
20	19.2	6.0	0	10	0
50	17.1	2.5	0	15	0
100	13.7	0.5	0	20	0
150	12.3	1.0	0	25	0
300	8.8	1.5	0	31	0

*at 0900 h

Table 22. Soil Temperature and Snow Cover at Saskatoon, SRC, September, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	12.7	9.5	0	1	0
10	12.9	9.0	0	5	0
20	15.2	7.5	0	10	0
50	14.8	4.0	0	15	0
100	12.8	1.5	0	20	0
150	11.9	0.5	0	25	0
300	9.6	0.5	0	30	0

*at 0900 h

Table 23. Soil Temperature and Snow Cover at Saskatoon, SRC, October, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	3.3	12.0	5	1	0
10	3.6	11.5	1	5	0
20	6.1	9.0	0	10	0
50	8.3	6.0	0	15	0
100	9.3	4.0	0	20	0
150	10.0	3.0	0	25	0
300	9.4	1.0	0	31	0

*at 0900 h

Table 24. Soil Temperature and Snow Cover at Saskatoon, SRC, November, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-2.3	9.5	24	1	0
10	-2.0	9.0	24	5	6
20	0.2	8.0	14	10	3
50	3.3	5.5	0	15	0
100	5.7	4.0	0	20	0
150	7.2	2.5	0	25	8
300	8.2	1.5	0	30	8

*at 0900 h

Table 25. Soil Temperature and Snow Cover at Saskatoon, SRC, December, 1990*

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-8.5	14.0	31	1	8
10	-7.9	13.5	31	5	8
20	-5.6	13.0	31	10	5
50	-1.2	7.0	13	15	10
100	2.3	3.5	3	20	10
150	4.4	2.5	0	25	14
300	6.5	2.0	0	31	10

*at 0900 h

Table 26. Diffuse Solar Radiation (MJm^{-2}) at Saskatoon, SRC, 1990

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	2.0	2.1	4.1	3.3	6.8	11.0	5.3	8.9	4.5	3.6	0.9	2.0
2	1.6*	2.5	6.5	8.5	12.1	10.0	10.1	8.8	2.5	5.0	3.4	2.2
3	2.6	3.7	3.0	4.4	8.0	7.6	7.0	5.6	7.6	4.6	2.9*	1.8
4	2.5	4.0	2.8	5.7	8.4	8.2	8.5	7.3	3.5	5.3	5.4	1.4
5	2.3	2.6	2.7	2.6	3.2	6.1	12.4	M	2.3	3.5*	6.8	1.4
6	1.9	2.2	4.4	8.5	11.1	6.8	3.1*	M	7.4	4.3	6.9	2.3
7	1.6	3.9	6.4	7.1	9.6	11.2	8.4	M	3.1	4.5	2.1*	2.1
8	1.8*	4.5	4.7	8.2	8.9	5.6	5.0	15.2	4.3	2.4	4.1	2.4
9	2.8	2.4	2.3	8.4	8.9	4.8	6.6	5.4	5.4	4.1	5.7	2.3
10	2.2	5.0	6.1	9.0	M	9.2	7.6	7.1	2.4	4.4	2.9*	1.5*
11	1.1	3.1*	5.1	3.0	M	5.7	5.8	9.9	3.3	2.7*	2.5	1.0*
12	2.8	2.7	1.4*	6.5	M	10.7	3.2	6.3	6.6	4.6	M	1.2
13	2.2	2.7	4.4*	7.7	M	9.6	6.1	8.0	5.1	3.3	2.3*	1.3
14	1.7	3.0	6.4	7.5	M	6.5	5.2	7.0	2.8	5.2	2.5	1.8
15	1.6	2.6	6.4	9.0	3.9	4.4	5.3	7.1	1.8	3.1	1.3	2.2
16	1.9	6.3	2.2	3.7	8.0	9.0	8.3	4.3	5.3	2.2	3.1	2.1
17	2.6	5.0	6.4	2.8	6.3	8.3	8.1	8.4	4.9	2.2	2.5	2.1
18	3.4	3.8	2.1	7.3	9.5	8.1	6.9	8.1	1.8	4.6	1.9	1.6*
19	1.7	2.9	3.0	5.4	6.9	10.4	11.6	7.7	5.0	1.9	2.8	2.4
20	1.8	3.5	4.9*	4.2	6.8	8.3	10.6	7.9	5.7	3.7	0.9*	1.5
21	2.8	5.4	10.6	8.0	6.3	8.2	10.1	9.3	5.1	4.3	2.4	1.7
22	2.5*	5.0	3.8	7.1	6.6	7.1	10.4	5.0	2.9	3.6	2.3	1.6
23	2.2	6.3	M	8.0	10.0	11.0	4.6	4.2	1.8	1.2	2.4*	1.9
24	1.3	5.3	8.4	7.7	6.9	5.5	7.2	6.0	2.8	4.5	1.5	M
25	2.7*	3.0	2.5	3.7	6.1	4.2	9.4	6.9	2.4	3.8	1.9*	1.2
26	2.7	2.6	4.0	7.7	7.8	7.6	9.0	3.7	2.8	2.3	1.4	1.8*
27	4.1	2.7	4.9	10.8	7.0	8.6	7.1	5.5	3.6	2.8	2.1	2.3
28	4.0	3.0	6.6	9.7	5.5	7.1	7.5	7.5	4.7	3.0	1.3	2.1
29	3.6*		7.0	13.5	7.5	6.2	9.4	2.7	6.0	2.8	2.2	1.4
30	4.0		5.8	7.4	8.5	5.4	3.4	6.7	3.4	4.0	1.0	1.4
31	3.2		5.7		10.4		3.5	4.6		3.3		2.5
Total	75.2	101.8	144.3	206.4	201.0	232.4	226.7	195.1	120.8	110.8	79.4	55.5

M means missing data
* instrumentation problem possible

Table 27. Global Solar Radiation (MJm^{-2}) at Saskatoon, SRC, 1990

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	3.8	7.3	10.3	17.9	22.8	15.1	26.1	13.0	17.2	12.2	0.9	4.4
2	1.6	6.7	7.2	13.8	17.4	17.0	19.7	13.4	19.5	7.2	3.4	2.8
3	3.1	6.8	12.1	16.8	14.0	25.3	14.5	24.8	16.5	4.6	2.9	5.3
4	2.8	5.5	12.4	14.1	17.2	13.2	8.7	22.9	18.7	8.4	6.0	3.3
5	4.9	7.5	12.2	19.3	24.5	19.0	17.0	M	18.1	3.5	7.3	4.2
6	3.2	7.4	11.3	15.9	14.4	23.3	3.1	M	13.9	8.9	7.9	2.3
7	1.8	5.7	12.1	16.5	14.3	18.2	11.2	M	18.2	9.1	2.1	3.3
8	1.8	5.3	7.0	9.5	10.7	18.8	26.8	19.4	5.0	11.8	4.1	3.1
9	3.5	7.4	12.8	12.5	21.5	26.1	26.0	22.3	17.8	10.0	5.7	2.8
10	2.6	5.1	7.6	14.9	15.6	12.1	15.2	16.9	17.8	4.8	2.9	1.5
11	4.8	3.1	9.4	20.4	25.6	26.7	26.0	16.3	17.3	2.7	2.6	1.0
12	2.8	8.6	1.4	18.8	20.2	18.0	28.0	19.5	12.1	6.1	M	3.7
13	5.2	9.6	4.4	8.7	24.2	11.9	26.3	16.9	7.6	9.4	2.3	6.0
14	1.7	10.0	15.1	16.1	14.6	26.0	22.4	15.4	16.6	6.2	3.1	5.1
15	5.3	9.0	9.0	13.3	3.9	28.6	26.5	20.2	17.6	9.3	5.7	5.3
16	1.9	7.1	14.2	21.4	21.6	22.9	8.8	9.0	12.1	10.5	4.1	3.0
17	4.8	6.9	11.0	22.1	22.6	22.8	14.4	9.5	13.5	10.4	4.0	2.2
18	4.2	8.7	14.8	18.4	11.7	17.4	24.5	10.5	15.7	6.7	4.7	1.6
19	6.3	10.0	13.7	18.3	7.0	13.0	19.2	9.8	11.4	9.3	3.6	2.4
20	6.3	9.5	4.9	19.9	10.0	24.7	18.6	14.9	8.3	6.6	0.9	4.8
21	3.6	5.8	12.7	11.1	6.5	M	19.9	15.7	9.2	4.9	3.7	3.5
22	2.5	8.5	16.8	9.0	19.6	26.0	23.0	18.8	15.0	6.9	4.0	3.7
23	2.5	8.1	M	14.9	21.9	19.3	25.5	19.8	15.6	8.7	2.4	1.9
24	6.0	9.4	14.4	14.3	18.8	25.5	23.8	16.6	13.9	6.9	4.5	M
25	2.7	10.7	17.0	4.0	25.0	26.9	20.8	7.1	15.7	7.7	1.9	4.7
26	4.3	11.6	16.7	8.2	21.9	23.8	19.1	3.7	14.0	4.0	4.9	1.8
27	4.4	11.8	14.8	12.2	23.4	19.0	7.7	17.9	12.9	6.7	4.6	2.2
28	5.0	12.1	13.8	10.8	23.3	20.8	19.7	17.6	9.1	3.7	4.4	3.2
29	3.6		14.5	14.2	22.2	26.7	20.7	20.1	7.2	6.8	3.9	4.6
30	4.1		14.5	22.7	9.1	23.8	25.5	12.4	13.5	5.6	4.7	4.0
31	5.2		10.9		17.7		25.2	4.7		3.6		2.6
Total	111.3	225.2	349.0	450.0	543.2	611.9	613.9	429.1	421.0	223.2	113.2	100.3

M means missing data

Table 28. Some Significant Climatic Events, 1990

FROST FREE SEASON

	Last Spring Frost	First Fall Frost	Length of Season
1990	May 13	September 22	130
1989	May 23	September 10	110
Normal (1961-1990)	May 19	September 15	119

SNOW SEASON

Greatest Depth of Snow on Ground (cm)

	Jan	Feb	Mar	Apr	Oct	Nov	Dec
1990	18	15	10	5	0	9	17
1989	15	22	20	5	0	5	9

	Cessation[1] of Snow Pack	Last Spring Snowfall	First Fall Snow	Onset[2] of Snow Pack
1990	March 8	April 29	Oct. 4	Nov. 1
1989	April 9	April 7	Oct. 14	Nov. 12

WEATHER "SPELLS"[3,4,5,6]

		1990		1989
Longest Cool Spell	16 days	May 7 - May 22	14 days	Dec 9 - Dec 22
Longest Cool Spell	4 days	Jan 29 - Feb 1 Dec 19 - Dec 22 Dec 28 - Dec 31	6 days	Dec 17 - Dec 22
Longest Warm Spell	24 days	Feb 25 - Mar 20	11 days	Jan 12 - Jan 22
Longest Hot Spell	3 days	Aug 5 - Aug 7	5 days	Aug 8 - Aug 22
Longest Dry Spell	16 days	July 28 - Aug 12	14 days	Oct 16 - Oct 29
Longest West Spell	5 days	June 1 - June 5	10 days	May 11 - May 20

Table 28. Continued

[1] First day on the first interval of at least 5 days duration in which snow cover is reduced to less than 1 cm depth.
[2] First day on the first interval of at least 5 days duration in which snow cover equals or exceeds 1 cm depth.
[3] Temperature "spells" are defined as a sequence of days when the daily mean temperature during the year in question is higher (warm spell) or lower (cool spell) than the long-term daily mean for the date in question.
[4] Precipitation "spells" are defined as the sequence of days with precipitation amounts greater than trace (wet spells) or precipitation amounts of trace or less (dry spells).
[5] A cold spell refers to the number of consecutive days with minimum temperatures less than or equal to -30°C.
[6] A hot spell refers to the number of consecutive days with maximum temperatures equal to or greater than 30°C.

Table 29. Times of Sunrise at Saskatoon, 1990 (local time, in hours and minutes).

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	9.15	8.48	7.54	6.43	5.37	4.52	4.50	5.27	6.17	7.06	8.01	8.52
2	9.15	8.46	7.52	6.40	5.36	4.51	4.50	5.28	6.19	7.08	8.02	8.53
3	9.15	8.45	7.50	6.38	5.34	4.51	4.51	5.30	6.20	7.10	8.04	8.55
4	9.15	8.43	7.47	6.36	5.32	4.50	4.52	5.32	6.22	7.11	8.06	8.56
5	9.15	8.41	7.45	6.33	5.30	4.49	4.53	5.33	6.24	7.13	8.08	8.57
6	9.14	8.40	7.43	6.31	5.28	4.49	4.54	5.35	6.25	7.15	8.10	8.59
7	9.14	8.38	7.41	6.29	5.26	4.48	4.55	5.36	6.27	7.17	8.12	9.00
8	9.14	8.36	7.38	6.27	5.25	4.47	4.56	5.38	6.29	7.18	8.13	9.01
9	9.13	8.34	7.36	6.24	5.23	4.47	4.56	5.40	6.30	7.20	8.15	9.02
10	9.12	8.33	7.34	6.22	5.21	4.47	4.58	5.41	6.32	7.22	8.17	9.03
11	9.12	8.31	7.31	6.20	5.19	4.46	4.59	5.43	6.33	7.23	8.19	9.05
12	9.11	8.29	7.29	6.18	5.18	4.46	5.00	5.44	6.35	7.25	8.20	9.06
13	9.10	8.27	7.27	6.15	5.16	4.46	5.01	5.46	6.37	7.27	8.22	9.07
14	9.10	8.25	7.25	6.13	5.14	4.45	5.02	5.48	6.38	7.29	8.24	9.08
15	9.09	8.23	7.22	6.11	5.13	4.45	5.03	5.49	6.40	7.30	8.26	9.08
16	9.08	8.21	7.20	6.09	5.11	4.45	5.04	5.51	6.42	7.32	8.28	9.09
17	9.07	8.19	7.18	6.07	5.10	4.45	5.06	5.52	5.43	7.34	8.29	9.10
18	9.06	8.17	7.15	6.04	5.08	4.45	5.07	5.54	6.45	7.36	8.31	9.11
19	9.05	8.15	7.13	6.02	5.07	4.45	5.08	5.56	6.47	7.37	8.33	9.12
20	9.04	8.13	7.11	6.00	5.06	4.45	5.09	5.57	6.48	7.39	8.34	9.12
21	9.03	8.11	7.08	5.58	5.04	4.45	5.11	5.59	6.50	7.41	8.36	9.13
22	9.02	8.09	7.06	5.56	5.03	4.46	5.12	6.01	6.51	7.43	8.38	9.13
23	9.01	8.07	7.04	5.54	5.02	4.46	5.14	6.02	6.53	7.44	8.39	9.14
24	8.59	8.05	7.01	5.52	5.00	4.46	5.15	6.04	6.55	7.46	8.41	9.14
25	8.58	8.03	6.59	5.50	4.59	4.47	5.16	6.06	6.56	7.48	8.43	9.15
26	8.57	8.00	6.57	5.47	4.58	4.47	5.18	6.07	6.58	7.50	8.44	9.15
27	8.55	7.58	6.54	5.45	4.57	4.47	5.19	6.09	7.00	7.52	8.46	9.15
28	8.54	7.56	6.52	5.43	4.56	4.48	5.21	6.11	7.01	7.53	8.47	9.15
29	8.53		6.50	5.41	4.55	4.48	5.22	6.12	7.03	7.55	8.49	9.15
30	8.51		6.47	5.39	4.54	4.49	5.24	6.14	7.05	7.57	8.50	9.16
31	8.50		6.45		4.53		5.25	6.15		7.59		9.16

Table 30. Time of Sunset at Saskatoon, 1990 (local time, in hours and minutes).

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	17.04	17.52	18.44	19.39	20.30	21.16	21.31	20.59	19.56	18.46	17.40	16.59
2	17.05	17.54	18.46	19.40	20.32	21.17	21.30	20.57	19.54	18.44	17.39	16.58
3	17.06	17.56	18.48	19.42	20.33	21.19	21.30	20.56	19.52	18.42	17.36	16.57
4	17.07	17.58	18.50	19.44	20.35	21.20	21.30	20.54	19.50	18.39	17.34	16.57
5	17.09	18.00	18.51	19.45	20.37	21.21	21.29	20.52	19.47	18.37	17.32	16.56
6	17.10	18.01	18.53	19.47	20.38	21.22	21.29	20.50	19.45	18.35	17.31	16.56
7	17.11	18.03	18.55	19.49	20.40	21.23	21.28	20.48	19.43	18.33	17.29	16.55
8	17.12	18.05	18.57	19.51	20.42	21.23	21.27	20.47	19.40	18.30	17.27	16.55
9	17.14	18.07	18.59	19.52	20.43	21.24	21.27	20.45	19.38	18.28	17.26	16.55
10	17.15	18.09	19.00	19.54	20.45	21.25	21.26	20.43	19.36	18.26	17.24	16.55
11	17.17	18.11	19.02	19.56	20.47	21.26	21.25	20.41	19.33	18.24	17.22	16.54
12	17.18	18.13	19.04	19.58	20.48	21.27	21.24	20.39	19.31	18.21	17.21	16.54
13	17.20	18.15	19.06	19.59	20.50	21.27	21.24	20.37	19.29	18.19	17.19	16.54
14	17.21	18.16	19.07	20.01	20.51	21.28	21.23	20.35	19.26	18.17	17.18	16.54
15	17.23	18.18	19.09	20.03	20.53	21.28	21.22	20.33	19.24	18.15	17.16	16.54
16	17.24	18.20	19.11	20.04	20.54	21.29	21.21	20.31	19.22	18.12	17.15	16.54
17	17.26	18.22	19.13	20.06	20.56	21.29	21.20	20.29	19.19	18.10	17.13	16.55
18	17.27	18.24	19.14	20.08	20.57	21.30	21.19	20.27	19.17	18.08	17.12	16.55
19	17.29	18.26	19.16	20.10	20.59	21.30	21.17	20.25	19.15	18.06	17.11	16.55
20	17.31	18.28	19.18	20.11	21.00	21.31	21.16	20.23	19.12	18.04	17.10	16.55
21	17.32	18.30	19.20	20.13	21.02	21.31	21.15	20.21	19.10	18.02	17.08	16.56
22	17.34	18.31	19.21	20.15	21.03	21.31	21.14	20.19	19.08	18.00	17.07	16.56
23	17.36	18.33	19.23	20.16	21.05	21.31	21.12	20.16	19.05	17.58	17.06	16.57
24	17.38	18.35	19.25	20.18	21.06	21.31	21.11	20.14	19.03	17.55	17.05	16.57
25	17.39	18.37	19.27	20.20	21.08	21.31	21.10	20.12	19.00	17.53	17.04	16.58
26	17.41	18.39	19.28	20.21	21.09	21.32	21.08	20.10	18.58	17.51	17.03	16.59
27	17.43	18.41	19.30	20.23	21.10	21.31	21.07	20.08	18.56	17.49	17.02	16.59
28	17.45	18.42	19.32	20.25	21.11	21.31	21.05	20.05	18.53	17.47	17.01	17.00
29	17.47		19.33	20.27	21.13	21.31	21.04	20.03	18.51	17.45	17.00	17.01
30	17.48		19.35	20.28	21.14	21.31	21.02	20.01	18.49	17.43	17.00	17.02
31	17.50		19.37		21.15		21.01	19.59		17.42		17.03

Figure 1. Year 1990 Daily Temperature and Cumulative Precipitation

In order to present the maximum length of climatic record for the Saskatoon area, data from several sources have been pooled to produce the historic record shown in this figure. For data sources please refer to Footnotes for Climatic Tables, note 3. The seasons shown are defined on an astronomical basis.

YEAR 1990

DAILY TEMPERATURE AND ACCUMULATIVE PRECIPITATION

SASKATOON SRC (52°09'N, 106°36'W, 497m MSL)

WINTER | SPRING | SUMMER | AUTUMN

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

TEMPERATURE (°C)

ACCUMULATIVE PRECIPITATION (MM)

LEGEND

TEMPERATURE

- EXTREME MAXIMUM TEMPERATURE - PERIOD 1892-1989
- MEAN DAILY MAXIMUM TEMPERATURE - PERIOD 1916-1975
- MEAN DAILY TEMPERATURE FOR THE PERIOD 1892-1970
- MEAN DAILY MINIMUM TEMPERATURE - PERIOD 1916-1975
- EXTREME MINIMUM TEMPERATURE - PERIOD 1892-1989
- DAILY TEMPERATURE FOR CURRENT YEAR

PRECIPITATION

- ALL TIME RECORD MAXIMUM YEARLY TOTAL PRECIPITATION - YEAR 1942
- NORMAL YEARLY TOTAL PRECIPITATION FOR PERIOD 1902 - 1974
- ALL TIME RECORD MINIMUM YEARLY TOTAL PRECIPITATION - YEAR 1961 (U of S Phy.)
- CURRENT TOTAL PRECIPITATION