U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Service

Climatography of the United States No. 20 1971-2000

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: ROCHESTER MUNICIPAL AP, MN **COOP ID: 217004**

Climate Division: MN 9 **NWS Call Sign: RST** **Elevation: 1,304 Feet** **Lat: 43˚54N** **Lon: 92˚30W**

Temperature (˚F)

	Mean (1)			Extremes										Degree Days (1) Base Temp 65		Mean Number of Days (3)					
Month	Daily Max	Daily Min	Mean	Highest Daily(2)	Year	Day	Highest Month(1) Mean	Year	Lowest Daily(2)	Year	Day	Lowest Month(1) Mean	Year	Heating	Cooling	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	19.9	3.7	11.8	55	1981	24	25.5	1990	-40	1951	30	-2.7	1977	1650	0	.0	.0	.1	24.9	30.8	13.2
Feb	26.2	10.6	18.4	63	1981	17	29.5	1998	-35	1996	2	5.5	1979	1305	0	.0	.0	.6	18.1	27.1	7.8
Mar	38.7	22.6	30.6	79	1986	29	39.3	2000	-31	1962	1	20.0	1975	1066	0	.0	.0	5.8	8.5	25.4	2.3
Apr	54.8	34.6	44.7	91+	1980	22	51.9	1977	5	1982	6	38.5	1975	609	1	.0	.1	19.9	.7	12.2	.0
May	67.7	46.1	56.9	92+	1980	28	63.2+	1998	21	1967	3	51.3	1997	281	30	.0	.3	30.1	.0	1.5	.0
Jun	76.6	55.6	66.1	101	1985	8	71.8	1991	35+	1990	4	61.1	1982	65	99	@	1.7	30.0	.0	.0	.0
Jul	80.1	60.1	70.1	102+	1988	31	73.4	1983	42	1967	5	63.7	1992	23	181	.1	3.1	31.0	.0	.0	.0
Aug	77.5	58.0	67.7	100+	1948	24	73.2	1983	35	1950	20	62.8	1992	50	135	.0	1.5	31.0	.0	.0	.0
Sep	69.2	48.7	58.9	97	1955	9	64.4	1998	23	1967	29	53.3	1993	208	26	.0	.4	29.4	.0	1.1	.0
Oct	56.9	37.1	47.0	93	1997	3	52.6	1973	11	1988	30	40.8	1976	558	1	.0	@	23.8	.2	10.4	.0
Nov	38.7	23.7	31.2	75	1999	8	40.1	1999	-20	1977	26	22.7	1985	1014	0	.0	.0	6.3	8.7	24.3	1.2
Dec	24.5	10.1	17.3	62+	1998	1	25.8	1982	-33	1983	19	2.6	1983	1479	0	.0	.0	.4	22.2	30.4	8.5
Ann	52.6	34.2	43.4	102+	Jul 1988	31	73.4	Jul 1983	-40	Jan 1951	30	-2.7	Jan 1977	8308	473	.1	7.1	208.4	83.3	163.2	33.0

\+ Also occurred on an earlier date(s)

@ Denotes mean number of days greater than 0 but less than .05

Complete documentation available from: www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1948-2001

(3) Derived from 1971-2000 serially complete daily data

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Precipitation (inches)

Precipitation Totals

Month	Means/ Medians(1) Mean	Means/ Medians(1) Median	Extremes Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year
Jan	.94	.77	1.42	1967	24	2.07	1999	.11	1984
Feb	.75	.59	1.09	1951	25	2.21	1971	.11	1982
Mar	1.88	1.90	1.81	1993	31	3.58	1990	.32	1994
Apr	3.01	2.68	3.81	1990	23	6.47+	1999	.94	2000
May	3.53	3.39	4.02	2000	17	8.41	1982	1.60	1992
Jun	4.00	3.58	4.80	2000	1	12.51	2000	.94	1985
Jul	4.61	3.54	7.47	1981	11	12.33	1978	1.02	1975
Aug	4.33	4.55	2.93	1994	10	9.52	1979	1.50	1992
Sep	3.12	2.37	5.98	1978	12	10.50	1986	.38	1975
Oct	2.20	1.98	2.81	1966	14	4.95	1979	.40	1988
Nov	2.01	1.73	2.30	1991	1	5.90	1991	.11	1976
Dec	1.02	.99	1.00	1991	12	2.83	1982	.28	1998
Ann	31.40	30.05	7.47	Jul 1981	11	12.51	Jun 2000	.11+	Jan 1984

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.6	2.9	.3	@
Feb	7.8	2.1	.3	.0
Mar	10.7	5.1	1.1	.2
Apr	11.7	6.8	1.9	.5
May	11.6	7.1	2.2	.8
Jun	11.4	6.7	2.9	.8
Jul	10.7	6.9	3.0	1.3
Aug	10.1	6.8	3.1	1.0
Sep	9.8	5.4	1.9	.8
Oct	8.6	4.8	1.6	.3
Nov	9.6	4.2	1.3	.4
Dec	9.3	3.1	.3	@
Ann	120.9	61.9	19.9	6.1

Precipitation Probabilities (1)

Probability that the monthly/annual precipitation will be equal to or less than the indicated amount

Monthly/Annual Precipitation vs Probability Levels
These values were determined from the incomplete gamma distribution

Month	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.20	.29	.43	.55	.68	.81	.96	1.14	1.38	1.76	2.11
Feb	.12	.19	.30	.40	.51	.62	.75	.91	1.13	1.47	1.81
Mar	.47	.65	.92	1.16	1.40	1.66	1.94	2.27	2.71	3.40	4.05
Apr	1.03	1.32	1.73	2.08	2.42	2.76	3.14	3.58	4.14	5.01	5.82
May	1.47	1.79	2.24	2.61	2.96	3.32	3.70	4.14	4.70	5.55	6.32
Jun	.90	1.28	1.86	2.39	2.92	3.48	4.10	4.86	5.84	7.41	8.89
Jul	1.09	1.52	2.20	2.80	3.40	4.03	4.74	5.59	6.70	8.45	10.11
Aug	1.52	1.93	2.52	3.02	3.50	3.99	4.53	5.15	5.95	7.18	8.32
Sep	.37	.61	1.05	1.48	1.95	2.46	3.07	3.81	4.83	6.50	8.13
Oct	.57	.78	1.09	1.38	1.65	1.94	2.27	2.65	3.16	3.95	4.69
Nov	.23	.39	.67	.95	1.25	1.58	1.97	2.46	3.12	4.20	5.26
Dec	.27	.36	.51	.64	.77	.90	1.05	1.23	1.46	1.82	2.16
Ann	20.86	22.85	25.42	27.40	29.16	30.88	32.67	34.65	37.07	40.61	43.69

+ Also occurred on an earlier date(s)
# Denotes amounts of a trace
@ Denotes mean number of days greater than 0 but less than .05
****** Statistics not computed because less than six years out of thirty had measurable precipitation

(1) From the 1971-2000 Monthly Normals
(2) Derived from station's available digital record: 1948-2001
(3) Derived from 1971-2000 serially complete daily data

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Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	10.5	9.6	6	6
Feb	7.8	7.2	7	6
Mar	8.9	9.5	3	3
Apr	4.3	2.6	#	1
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	1.0	.0	#	0
Nov	7.1	5.4	1	0
Dec	11.5	9.8	4	2
Ann	51.1	44.1	N/A	N/A

Extremes (2)

Month	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year
Jan	15.4	1982	22	24.4	1979	29	1982	25	16	1979
Feb	9.3	1983	2	16.1	1981	21+	1979	14	19	1979
Mar	9.0	1985	3	25.2	1985	16+	1975	15	11	1975
Apr	13.0	1988	26	16.4	1983	11	1988	27	1+	1988
May	.2	1973	2	.2+	1989	#+	1989	6	#	1996
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	#	1995	21	#+	1995	0	0	0	0	0
Oct	5.0	1979	22	5.4	1979	4	1979	23	#	1995
Nov	7.8	1991	23	22.5	1985	11+	1983	30	4	1991
Dec	8.1	2000	28	35.3	2000	19+	2000	31	12	1985
Ann	15.4	Jan 1982	22	35.3	Dec 2000	29	Jan 1982	25	19	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.5	3.1	1.1	.5	@
Feb	7.9	2.5	.6	.2	.0
Mar	7.2	3.0	.8	.3	.0
Apr	2.7	1.1	.5	.2	@
May	.1	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	1.0	.2	.1	@	.0
Nov	6.4	2.4	.7	.2	.0
Dec	9.5	3.3	1.1	.3	.0
Ann	44.3	15.6	4.9	1.7	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.3	22.2	17.8	7.6
Feb	23.8	20.0	16.1	8.7
Mar	16.3	12.0	9.3	3.7
Apr	2.6	1.1	.4	.1
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.3	@	.0	.0
Nov	7.1	4.0	1.7	.1
Dec	24.6	15.7	9.2	2.7
Ann	103.0	75.0	54.5	22.9

+ Also occurred on an earlier date(s) #Denotes trace amounts

@ Denotes mean number of days greater than 0 but less than .05

-9/-9.9 represents missing values
Annual statistics for Mean/Median snow depths are not appropriate

(1) Derived from Snow Climatology and 1971-2000 daily data

(2) Derived from 1971-2000 daily data

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Freeze Data

Spring Freeze Dates (Month/Day)

Temp (F)	Probability of later date in spring (thru Jul 31) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	6/02	5/27	5/22	5/19	5/15	5/12	5/08	5/04	4/28
32	5/16	5/11	5/08	5/06	5/03	4/30	4/28	4/25	4/20
28	5/04	4/29	4/25	4/21	4/18	4/14	4/11	4/07	4/01
24	4/21	4/17	4/13	4/11	4/08	4/05	4/03	3/30	3/26
20	4/16	4/11	4/08	4/05	4/02	3/30	3/27	3/24	3/19
16	4/11	4/05	4/02	3/29	3/27	3/24	3/20	3/17	3/11

Fall Freeze Dates (Month/Day)

Temp (F)	Probability of earlier date in fall (beginning Aug 1) than indicated(*)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	9/13	9/16	9/18	9/20	9/22	9/24	9/26	9/28	10/02
32	9/19	9/24	9/27	9/30	10/02	10/05	10/08	10/11	10/15
28	9/25	9/30	10/04	10/07	10/10	10/13	10/17	10/20	10/26
24	10/08	10/13	10/17	10/21	10/24	10/27	10/31	11/04	11/09
20	10/16	10/22	10/25	10/28	10/31	11/03	11/07	11/10	11/15
16	10/27	11/01	11/04	11/07	11/10	11/13	11/16	11/20	11/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	149	142	137	133	129	125	121	116	109
32	167	162	158	155	152	149	146	142	137
28	200	191	185	180	175	170	165	159	150
24	220	212	207	202	198	194	189	184	177
20	233	226	220	216	212	208	203	198	191
16	251	243	237	233	228	224	219	213	206

***** Probability of observing a temperature as cold, or colder, later in the spring or earlier in the fall than the indicated date.

0/00 Indicates that the probability of occurrence of threshold temperature is less than the indicated probability.

Derived from 1971-2000 serially complete daily data

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Degree Days to Selected Base Temperatures (˚F)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1650	1305	1066	609	281	65	23	50	208	558	1014	1479	8308
60	1495	1165	911	465	173	20	5	13	108	409	864	1324	6952
57	1402	1081	818	382	122	8	0	4	65	326	774	1231	6213
55	1340	1025	756	330	93	4	0	2	44	275	714	1169	5752
50	1185	885	609	215	42	0	0	0	12	165	570	1014	4697
32	658	428	184	13	0	0	0	0	0	6	163	506	1958

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	4	18	120	402	783	1039	1198	1124	821	482	124	13	6128
55	0	0	2	27	144	353	485	411	181	35	2	0	1640
57	0	0	1	19	111	297	423	350	143	23	1	0	1368
60	0	0	0	11	71	218	332	263	95	12	0	0	1002
65	0	0	0	1	30	99	181	135	26	1	0	0	473
70	0	0	0	0	7	43	82	53	13	1	0	0	199

Growing Degree Units (2)

Base	Growing Degree Units (Monthly)												Growing Degree Units (Accumulated Monthly)											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
40	0	2	39	214	546	807	958	885	592	270	42	2	0	2	41	255	801	1608	2566	3451	4043	4313	4355	4357
45	0	0	16	121	395	657	803	730	444	162	18	1	0	0	16	137	532	1189	1992	2722	3166	3328	3346	3347
50	0	0	6	61	256	507	648	575	305	85	4	0	0	0	6	67	323	830	1478	2053	2358	2443	2447	2447
55	0	0	1	30	149	361	493	420	187	39	1	0	0	0	1	31	180	541	1034	1454	1641	1680	1681	1681
60	0	0	0	10	77	224	339	273	101	10	0	0	0	0	0	10	87	311	650	923	1024	1034	1034	1034
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	24	129	325	515	637	575	359	153	24	0	0	0	24	153	478	993	1630	2205	2564	2717	2741	2741

(1) Derived from the 1971-2000 Monthly Normals
(2) Derived from 1971-2000 serially complete daily data
Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Notes

a. The monthly means are simple arithmetic averages computed by summing the monthly values for the period 1971-2000 and dividing by thirty. Prior to averaging, the data are adjusted if necessary to compensate for data quality issues, station moves or changes in station reporting practices. Missing months are replaced by estimates based on neighboring stations.

b. The median is defined as the middle value in an ordered set of values. The median is being provided for the snow and precipitation elements because the mean can be a misleading value for precipitation normals.

c. Only observed validated values were used to select the extreme daily values.

d. Extreme monthly temperature/precipitation means were selected from the monthly normals data.
Monthly snow extremes were calculated from daily values quality controlled to be consistent with the Snow Climatology.

e. Degree Days were derived using the same techniques as the 1971-2000 normals.
Compete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

f. Mean "number of days statistics" for temperature and precipitation were calculated from a serially complete daily data set .
Documentation of the serially complete data set is available from the link below:

g. Snowfall and snow depth statistics were derived from the Snow Climatology.
Documentation for the Snow Climatology project is available from the link under references.

Data Sources for Tables

Several different data sources were used to create the Clim20 climate summaries. In some cases the daily extremes appear inconsistent with the monthly extremes and or the mean number of days statistics. For example, a high daily extreme value may not be reflected in the highest monthly value or the mean number of days threshold that is less than and equal to the extreme value. Some of these difference are caused by different periods of record. Daily extremes are derived from the station's entire period of record while the serial data and normals data were are for the 1971-2000 period. Therefore extremes observed before 1971 would not be included in the 1971-2000 normals or the 1971-2000 serial daily data set. Inconsistencies can also occur when monthly values are adjusted to reflect the current observing conditions or were replaced during the 1971-2000 Monthly Normals processing and are not reconciled with the Summary of the Day data.

a. Temperature/ Precipitation Tables
   1. 1971-2000 Monthly Normals
   2. Cooperative Summary of the Day
   3. National Weather Service station records
   4. 1971-2000 serially complete daily data

b. Degree Day Table
   1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals
   2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data

c. Snow Tables
   1. Snow Climatology
   2. Cooperative Summary of the Day

d. Freeze Data Table
   1971-2000 serially complete daily data

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normals.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normals/usnormalsprods.html
Snow Climatology Project Description, www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html
Eischeid, J. K., P. Pasteris, H. F. Diaz, M. Plantico, and N. Lott, 2000: Creating a serially complete, national daily time series of temperature and precipitation for the Western United States. J. Appl. Meteorol., 39, 1580-1591,
www1.ncdc.noaa.gov/pub/data/special/ serialcomplete_jam_0900.pdf