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: ROSEAU 1 E, MN **COOP ID: 217087**

Climate Division: MN 1 **NWS Call Sign:** **Elevation: 1,047 Feet** **Lat: 48˚51N** **Lon: 95˚46W**

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	9.4	-10.7	-.7	45	1993	31	11.6	1990	-48	1996	20	-14.5	1982	2037	0	.0	.0	.0	29.4	31.0	21.5
Feb	17.9	-3.4	7.3	55	1958	25	21.7	1998	-52	1996	2	-5.1	1989	1617	0	.0	.0	@	23.2	28.1	16.6
Mar	30.8	10.6	20.7	74	1963	31	34.3	2000	-38	1962	1	10.4	1996	1374	0	.0	.0	1.9	13.6	29.4	7.4
Apr	50.0	28.0	39.0	92	1952	27	47.5	1987	-18	1975	1	29.0	1996	781	0	.0	.1	16.9	1.8	21.9	.4
May	65.6	42.0	53.8	94+	1969	28	64.4	1977	11	1981	10	46.0	1979	376	28	.0	.2	29.2	.1	7.1	.0
Jun	73.1	51.9	62.5	98	1970	8	69.5	1988	21	1964	1	54.2	1982	136	61	.0	.6	30.0	.0	.5	.0
Jul	77.0	55.8	66.4	94+	1980	10	70.3	1989	33	1981	26	60.6	1992	60	104	.0	.8	31.0	.0	.0	.0
Aug	76.1	53.5	64.8	97+	1989	2	69.6	1983	28+	1982	28	58.2	1977	111	106	.0	1.1	31.0	.0	.5	.0
Sep	64.9	43.1	54.0	94+	1983	3	59.8	1998	13	1965	26	49.1	1975	337	6	.0	.2	28.7	.0	3.5	.0
Oct	51.4	31.6	41.5	88	1970	5	47.6	1973	1	1976	23	34.9	1979	729	0	.0	.0	18.5	1.2	17.4	.0
Nov	30.2	15.4	22.8	72	1975	5	34.0	1999	-35	1985	29	11.3	1985	1267	0	.0	.0	2.3	16.6	28.5	4.1
Dec	15.3	-1.4	7.0	50	1962	1	20.3	1997	-44	1967	31	-6.6	1983	1803	0	.0	.0	.0	27.8	30.9	16.6
Ann	46.8	26.4	36.6	98	Jun 1970	8	70.3	Jul 1989	-52	Feb 1996	2	-14.5	Jan 1982	10628	305	.0	3.0	189.5	113.7	198.8	66.6

\+ 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	.68	.55	1.10	1989	7	2.88	1989	.00	1984
Feb	.50	.47	.94	1983	27	1.26	1983	.00+	1997
Mar	.58	.59	1.04	1970	3	1.23	1995	.00+	1999
Apr	1.15	.84	2.60	1997	5	3.06	1991	.00	1980
May	2.24	2.15	2.52	1970	29	4.91	1999	.24	1980
Jun	3.71	3.23	3.07	1970	16	7.12	1998	1.56	1974
Jul	3.33	3.14	2.82	1996	18	7.24	1996	1.08	1985
Aug	3.09	2.19	4.75	1985	4	10.97	1974	.69	1971
Sep	2.57	2.43	5.07	1957	2	6.95	1991	.31	1998
Oct	1.49	1.40	1.80	1997	9	4.42	1998	.07	1976
Nov	.80	.63	1.34	2000	1	2.72	1994	.00+	1998
Dec	.62	.54	1.00	1997	4	1.46	1995	.00	1998
Ann	20.76	20.73	5.07	Sep 1957	2	10.97	Aug 1974	.00+	Mar 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.2	2.4	.1	@
Feb	2.5	1.3	.1	.0
Mar	5.2	2.0	.1	.0
Apr	4.7	2.8	.6	.2
May	9.1	5.5	1.1	.2
Jun	11.2	7.3	2.3	.7
Jul	10.1	6.5	2.0	.6
Aug	9.1	5.6	1.7	.9
Sep	9.7	5.1	1.6	.6
Oct	6.6	3.6	1.0	.2
Nov	5.9	2.8	.3	.1
Dec	5.4	2.2	.1	@
Ann	85.7	47.1	11.0	3.5

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	.06	.14	.25	.35	.45	.56	.69	.84	1.04	1.37	1.69
Feb	.00	.09	.19	.27	.35	.43	.52	.62	.76	.98	1.19
Mar	.00	.00	.17	.28	.39	.49	.61	.74	.92	1.19	1.46
Apr	.03	.11	.26	.43	.61	.82	1.08	1.41	1.86	2.63	3.39
May	.58	.79	1.12	1.41	1.69	1.98	2.31	2.71	3.22	4.02	4.78
Jun	1.34	1.69	2.19	2.61	3.02	3.43	3.88	4.40	5.07	6.10	7.04
Jul	1.22	1.53	1.98	2.36	2.71	3.08	3.48	3.95	4.54	5.46	6.29
Aug	.64	.92	1.37	1.78	2.20	2.65	3.15	3.76	4.56	5.84	7.05
Sep	.35	.56	.92	1.28	1.66	2.07	2.55	3.14	3.94	5.25	6.51
Oct	.13	.24	.43	.64	.87	1.12	1.43	1.81	2.34	3.22	4.09
Nov	.00	.05	.17	.30	.43	.58	.76	.99	1.30	1.82	2.34
Dec	.09	.17	.28	.37	.45	.54	.65	.77	.92	1.17	1.41
Ann	15.19	16.28	17.67	18.72	19.65	20.55	21.47	22.49	23.72	25.50	27.04

\+ 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)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	10.4	8.4	11	9	12.0	1989	7	34.0	1989	31	1996	31	27	1996	4.8	3.0	1.2	.3	.1	-9.9	-9.9	-9.9	-9.9
Feb	5.8	5.3	12	10	4.5	1983	27	11.6	1992	31	1996	5	28	1996	3.8	2.3	.6	.0	.0	-9.9	-9.9	-9.9	-9.9
Mar	3.5	3.0	5	3	5.0	1990	16	10.5	1976	27	1996	3	21	1996	2.2	1.4	.4	.1	.0	-9.9	-9.9	-9.9	-9.9
Apr	3.4	2.0	#	0	9.0	1990	9	12.0	1996	20	1996	3	7	1996	1.0	.7	.5	.2	.0	.9	.6	.2	.0
May	.0	.0	#	0	.5	1990	1	.5	1990	#	1991	2	#	1991	@	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	#	0	.0	0	0	.0	0	1	1972	6	#	1972	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	#	.0	#	0	#	2000	27	#+	2000	#	2000	27	#	2000	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.7	.0	#	0	6.5	1972	30	6.5	1972	3	1991	25	1	1991	.4	.2	.1	@	.0	.6	.2	.0	.0
Nov	6.0	4.5	1	#	7.0	1995	2	21.1	1995	14	1995	30	9	1995	3.3	1.8	.6	.1	.0	12.7	7.2	5.0	1.6
Dec	8.8	6.4	6	6	10.0	1995	13	22.8	1995	33	1995	17	26	1995	4.7	2.8	.9	.3	.1	-9.9	-9.9	-9.9	-9.9
Ann	38.6	29.6	N/A	N/A	12.0	Jan 1989	7	34.0	Jan 1989	33	Dec 1995	17	28	Feb 1996	20.2	12.2	4.3	1.0	.2	-9.9	-9.9	-9.9	-9.9

+ 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	7/08	6/29	6/22	6/16	6/11	6/06	5/31	5/25	5/16
32	6/09	6/04	5/31	5/28	5/25	5/22	5/19	5/15	5/09
28	5/30	5/24	5/20	5/16	5/13	5/10	5/06	5/02	4/26
24	5/18	5/12	5/08	5/04	5/01	4/27	4/24	4/19	4/13
20	5/07	5/01	4/26	4/23	4/19	4/15	4/12	4/07	4/01
16	4/23	4/18	4/15	4/12	4/09	4/06	4/03	3/31	3/26

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	8/12	8/19	8/24	8/28	9/01	9/04	9/09	9/13	9/20
32	8/24	8/31	9/05	9/09	9/13	9/17	9/22	9/27	10/04
28	9/08	9/14	9/18	9/21	9/24	9/27	10/01	10/05	10/10
24	9/20	9/24	9/28	10/01	10/04	10/07	10/10	10/13	10/18
20	9/25	10/02	10/07	10/11	10/15	10/19	10/23	10/28	11/03
16	10/12	10/18	10/23	10/26	10/30	11/02	11/06	11/10	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	119	106	96	88	81	73	65	55	42
32	140	130	123	116	111	105	99	91	81
28	157	149	143	138	134	129	124	118	110
24	178	170	164	160	155	151	146	140	133
20	202	194	188	183	178	173	168	162	154
16	228	219	213	208	203	198	192	186	178

***** 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	2037	1617	1374	781	376	136	60	111	337	729	1267	1803	10628
60	1882	1477	1219	634	258	62	14	47	207	574	1117	1648	9139
57	1789	1393	1126	548	199	34	5	24	141	484	1027	1555	8325
55	1727	1337	1064	493	164	21	1	15	104	425	967	1493	7811
50	1572	1197	912	364	92	6	0	3	40	289	817	1338	6630
32	1017	716	426	66	2	0	0	0	0	30	343	803	3403

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	3	22	76	275	678	915	1066	1017	659	324	66	24	5125
55	0	0	0	12	126	246	354	319	74	6	0	0	1137
57	0	0	0	8	99	199	297	267	51	3	0	0	924
60	0	0	0	3	65	137	213	196	26	0	0	0	640
65	0	0	0	0	28	61	104	106	6	0	0	0	305
70	0	0	0	0	10	18	34	44	1	0	0	0	107

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	0	5	117	440	660	806	760	441	152	10	0	0	0	5	122	562	1222	2028	2788	3229	3381	3391	3391
45	0	0	0	60	302	510	651	605	304	80	1	0	0	0	0	60	362	872	1523	2128	2432	2512	2513	2513
50	0	0	0	25	186	367	496	451	185	36	0	0	0	0	0	25	211	578	1074	1525	1710	1746	1746	1746
55	0	0	0	11	106	230	343	308	95	11	0	0	0	0	0	11	117	347	690	998	1093	1104	1104	1104
60	0	0	0	1	50	121	198	173	41	2	0	0	0	0	0	1	51	172	370	543	584	586	586	586
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	4	96	295	414	514	484	272	99	8	0	0	0	4	100	395	809	1323	1807	2079	2178	2186	2186

(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

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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