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: WHEATON, MN **COOP ID: 218907**

Climate Division: MN 4 **NWS Call Sign:** **Elevation: 1,018 Feet** **Lat: 45˚48N** **Lon: 96˚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	20.8	.9	10.9	61	1981	24	26.2	1990	-33+	1977	9	-3.9	1982	1678	0	.0	.0	.3	23.5	30.9	15.6
Feb	28.0	8.5	18.3	66	1991	2	31.5	1987	-33+	1996	3	3.2	1979	1309	0	.0	.0	1.4	16.5	27.4	8.8
Mar	39.7	21.0	30.4	84	1963	31	39.7	2000	-22	1962	1	21.6	1975	1075	0	.0	.0	6.4	7.8	26.8	2.7
Apr	57.9	34.2	46.1	98+	1980	22	54.9	1987	2	1975	1	37.1	1975	574	5	.0	.3	22.1	.4	14.1	.0
May	72.3	47.1	59.7	99+	1959	2	67.5	1977	21+	1967	3	53.4	1979	215	50	.0	.7	30.5	.0	1.9	.0
Jun	80.2	56.7	68.5	106	1988	25	75.9	1988	34	1951	5	62.8	1982	47	150	.1	3.7	30.0	.0	.0	.0
Jul	84.9	61.0	73.0	105+	1966	11	77.6	1988	39	1972	3	65.2	1992	14	262	.7	7.8	31.0	.0	.0	.0
Aug	83.5	59.1	71.3	104+	1976	20	76.7	1983	37	1965	28	66.4	1977	23	219	.7	6.2	31.0	.0	.0	.0
Sep	74.2	49.0	61.6	103	1959	8	67.7	1978	22	1965	26	56.8	1993	151	49	.1	1.9	29.8	.0	.9	.0
Oct	60.9	37.0	49.0	96	1963	5	55.0	1973	10	1972	19	45.3	1976	498	0	.0	.1	25.5	.2	10.1	.0
Nov	39.6	21.6	30.6	81	1950	1	41.7	1999	-17	1951	24	20.1	1985	1033	0	.0	.0	7.4	9.1	26.1	1.5
Dec	25.6	7.3	16.5	59	1998	1	26.8	1997	-30+	1983	23	1.1	1983	1506	0	.0	.0	.9	20.8	30.8	10.0
Ann	55.6	33.6	44.7	106	Jun 1988	25	77.6	Jul 1988	-33+	Feb 1996	3	-3.9	Jan 1982	8123	735	1.6	20.7	216.3	78.3	169.0	38.6

\+ 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

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1933-2001

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

Issue Date: February 2004

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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	.92	.84	2.05	1997	4	3.14	1997	.00	1974
Feb	.55	.50	.93	1953	10	1.37	1998	.08	1999
Mar	1.50	1.42	2.10	1982	19	4.10	1995	.19	1971
Apr	1.95	1.63	2.02	2001	7	6.01	1986	.11	1980
May	2.54	1.68	2.35	1956	28	5.96	1972	.43	1976
Jun	3.77	3.04	5.55	1959	27	8.72	1984	.79	1987
Jul	3.11	3.09	4.90	1950	8	7.13	1993	1.05	1976
Aug	2.53	2.35	3.95	1982	31	5.05	1982	.52	1972
Sep	2.10	2.04	2.79	1995	30	5.92	1995	.04	1979
Oct	1.87	1.07	2.06	1979	31	6.57	1984	.06	1978
Nov	1.16	.84	1.74	1977	9	3.67	2000	.00	1999
Dec	.54	.46	1.25	1959	28	1.50	1977	.00+	1986
Ann	22.54	23.00	5.55	Jun 1959	27	8.72	Jun 1984	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.1	2.9	.3	.1
Feb	3.9	2.1	.1	.0
Mar	5.4	3.5	.9	.2
Apr	6.4	4.3	1.4	.4
May	8.4	5.8	1.7	.4
Jun	8.7	6.4	2.5	.9
Jul	8.3	5.4	2.3	.7
Aug	7.2	5.0	1.6	.6
Sep	6.0	4.0	1.5	.5
Oct	6.2	3.5	1.2	.5
Nov	4.9	2.9	.6	.1
Dec	4.4	1.8	.2	.0
Ann	74.9	47.6	14.3	4.4

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	.05	.14	.28	.42	.56	.72	.90	1.13	1.44	1.95	2.44
Feb	.12	.17	.25	.32	.40	.47	.56	.67	.81	1.04	1.25
Mar	.34	.48	.70	.90	1.09	1.31	1.54	1.83	2.20	2.79	3.35
Apr	.22	.37	.64	.92	1.21	1.53	1.91	2.38	3.02	4.08	5.11
May	.60	.84	1.21	1.54	1.87	2.22	2.61	3.08	3.69	4.67	5.58
Jun	.92	1.28	1.83	2.31	2.80	3.31	3.88	4.56	5.44	6.85	8.17
Jul	1.14	1.43	1.85	2.20	2.54	2.88	3.25	3.68	4.23	5.08	5.86
Aug	.74	.98	1.34	1.66	1.96	2.28	2.63	3.04	3.58	4.41	5.19
Sep	.22	.38	.67	.96	1.28	1.63	2.04	2.56	3.26	4.43	5.57
Oct	.09	.19	.41	.66	.94	1.29	1.71	2.25	3.01	4.32	5.64
Nov	.02	.08	.23	.38	.57	.79	1.05	1.40	1.88	2.72	3.55
Dec	.00	.04	.13	.21	.30	.40	.53	.67	.88	1.22	1.56
Ann	13.63	15.25	17.38	19.04	20.53	22.00	23.54	25.27	27.39	30.52	33.27

\+ 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: 1933-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	9.2	8.3	6	7
Feb	6.2	5.5	5	4
Mar	8.2	4.8	2	#
Apr	2.5	.5	#	0
May	#	.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	4.9	1.6	1	0
Dec	5.7	6.0	2	1
Ann	37.0	26.7	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	24.0	1997	4	24.0	1997	22+	1982	26	13	1982
Feb	7.0	1990	16	13.2	1979	31	1979	22	24	1979
Mar	14.0	1982	19	21.1	1975	18	1979	1	12	1979
Apr	9.0	1994	29	10.0+	1995	8	1975	2	2	1975
May	#	1997	13	#	1997	#	1997	13	#	1997
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	.0	0	0	.0	0	0	0	0	0	0
Oct	3.0	1995	24	4.5	1995	3	1995	24	#	1995
Nov	10.0	1977	9	22.5	1977	13	1977	27	6	1977
Dec	8.0	2000	28	12.5	1972	12	1983	26	10	1977
Ann	24.0	Jan 1997	4	24.0	Jan 1997	31	Feb 1979	22	24	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.4	3.5	1.4	.5	.1
Feb	3.2	2.6	.9	.2	.0
Mar	2.7	2.3	1.0	.6	.2
Apr	.8	.7	.4	.2	.0
May	.0	.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	.2	.2	@	.0	.0
Nov	2.3	2.0	.8	.3	@
Dec	4.0	2.9	.6	.2	.0
Ann	17.6	14.2	5.1	2.0	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	10.3	8.8	5.8	2.3
Apr	1.1	.7	.5	.0
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	.1	.1	.0	.0
Nov	4.5	2.5	2.1	.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-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	5/22	5/19	5/16	5/14	5/12	5/10	5/08	5/05	5/02
32	5/18	5/14	5/11	5/08	5/05	5/03	4/30	4/27	4/22
28	5/09	5/03	4/29	4/26	4/23	4/20	4/16	4/12	4/07
24	4/23	4/19	4/16	4/13	4/10	4/08	4/05	4/02	3/28
20	4/16	4/11	4/08	4/06	4/03	4/01	3/29	3/26	3/22
16	4/07	4/03	3/31	3/28	3/26	3/23	3/21	3/17	3/13

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	9/12	9/16	9/19	9/21	9/23	9/25	9/27	9/30	10/04
32	9/19	9/23	9/26	9/28	9/30	10/02	10/05	10/07	10/11
28	9/26	10/02	10/06	10/09	10/12	10/15	10/18	10/22	10/28
24	10/07	10/12	10/16	10/19	10/22	10/25	10/28	11/01	11/06
20	10/15	10/20	10/23	10/26	10/29	11/01	11/04	11/07	11/12
16	10/22	10/27	10/31	11/03	11/06	11/09	11/12	11/16	11/21

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	144	140	137	133	130	127	123	117
32	167	160	155	151	147	143	139	134	127
28	198	189	182	177	171	166	160	154	144
24	215	208	203	198	194	190	186	181	174
20	226	220	215	212	208	205	201	196	190
16	243	237	232	229	225	221	217	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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1678	1309	1075	574	215	47	14	23	151	498	1033	1506	8123
60	1523	1169	920	436	123	13	1	4	68	347	883	1351	6838
57	1430	1085	827	359	81	5	0	1	36	263	793	1258	6138
55	1368	1029	766	311	60	2	0	0	21	213	733	1196	5699
50	1213	896	622	208	23	0	0	0	4	111	592	1042	4711
32	691	452	202	19	0	0	0	0	0	2	183	541	2090

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	35	67	151	440	858	1094	1270	1219	888	528	141	58	6749
55	0	0	2	42	205	406	557	506	219	26	0	0	1963
57	0	0	0	30	165	349	495	445	173	14	0	0	1671
60	0	0	0	17	113	267	404	355	115	4	0	0	1275
65	0	0	0	5	50	150	262	219	49	0	0	0	735
70	0	0	0	0	17	69	144	114	14	0	0	0	358

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	35	231	611	849	1017	970	649	304	37	0	0	2	37	268	879	1728	2745	3715	4364	4668	4705	4705
45	0	0	8	135	460	699	862	815	500	185	16	0	0	0	8	143	603	1302	2164	2979	3479	3664	3680	3680
50	0	0	0	73	320	550	707	660	358	101	2	0	0	0	0	73	393	943	1650	2310	2668	2769	2771	2771
55	0	0	0	33	196	402	552	505	233	46	1	0	0	0	0	33	229	631	1183	1688	1921	1967	1968	1968
60	0	0	0	14	102	265	399	352	133	14	0	0	0	0	0	14	116	381	780	1132	1265	1279	1279	1279
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	27	156	380	550	677	635	408	196	30	0	0	1	28	184	564	1114	1791	2426	2834	3030	3060	3060

(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