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: WRIGHT 4 NW, MN **COOP ID: 219173**

Climate Division: MN 6 **NWS Call Sign:** **Elevation: 1,295 Feet** **Lat: 46˚43N** **Lon: 93˚04W**

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	17.7	-2.5	7.6	54	1973	25	19.9	1990	-52	1972	15	-4.4	1982	1781	0	.0	.0	.1	27.4	31.0	17.6
Feb	25.3	4.2	14.8	62	1976	24	28.5	1998	-45+	1996	2	3.3	1989	1407	0	.0	.0	.4	18.9	27.7	11.8
Mar	36.1	16.7	26.4	74	1987	7	35.5	2000	-43	1962	1	18.7	1996	1196	0	.0	.0	3.9	9.7	28.5	5.0
Apr	52.1	29.2	40.7	93	1980	21	47.9	1987	-12	1970	1	33.5	1975	731	0	.0	@	18.6	.8	21.0	.3
May	66.2	40.4	53.3	94	1986	29	59.9	1977	15	1967	3	47.2	1979	374	11	.0	.1	29.6	.0	7.3	.0
Jun	73.3	48.6	61.0	95	1980	24	65.5	1995	26	1964	1	55.7	1982	154	32	.0	.4	30.0	.0	.7	.0
Jul	77.6	54.1	65.9	100	1988	27	69.8	1988	33+	1988	1	59.8	1992	67	92	@	1.5	31.0	.0	.0	.0
Aug	75.5	52.9	64.2	100	1976	18	69.4	1983	28	1970	31	58.9	1977	102	76	@	.7	31.0	.0	.2	.0
Sep	66.0	44.6	55.3	97	1976	7	60.4	1998	16	1965	26	49.8	1993	297	6	.0	.1	29.1	.0	3.8	.0
Oct	54.0	34.6	44.3	86	1963	5	49.3	1973	1	1976	27	37.3	1976	641	0	.0	.0	21.1	.6	14.2	.0
Nov	35.2	20.5	27.9	72+	1978	3	37.0	1999	-28+	1976	28	20.3	1995	1115	0	.0	.0	3.7	12.3	26.7	2.1
Dec	21.7	4.9	13.3	60	1962	1	22.7	1997	-47	1983	19	-.1	1983	1603	0	.0	.0	.2	25.1	30.8	12.9
Ann	50.1	29.0	39.6	100+	Jul 1988	27	69.8	Jul 1988	-52	Jan 1972	15	-4.4	Jan 1982	9468	217	.0	2.8	198.7	94.8	191.9	49.7

\+ 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: 1961-2001

(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	.95	.84	1.14	1996	18	2.71	1975	.17	1981
Feb	.67	.54	.83	1971	26	1.99	1971	.11	1987
Mar	1.41	1.29	1.75	1977	12	3.42	1979	.45	1996
Apr	2.08	1.89	2.18	2001	23	4.73	1981	.26	1988
May	3.27	3.27	2.98	1977	29	8.59	1991	.89	1976
Jun	4.36	4.23	3.06	1986	10	7.75	1994	.92	1995
Jul	4.23	4.07	3.45	1972	22	8.02	1972	1.32	1989
Aug	4.12	3.79	3.80	1989	31	8.82	1999	.96	1976
Sep	3.36	3.33	2.68	1986	1	8.94	1986	.51	1976
Oct	2.50	1.79	2.79	1970	9	5.99	1971	.48	1993
Nov	1.68	1.51	2.00	1974	1	3.99	1996	.24	1976
Dec	.83	.81	1.30	1984	16	1.61	1984	.15	1979
Ann	29.46	29.13	3.80	Aug 1989	31	8.94	Sep 1986	.11	Feb 1987

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.5	3.0	.3	.1
Feb	6.4	2.4	.1	.0
Mar	7.7	4.2	.6	.1
Apr	8.7	5.1	1.3	.3
May	10.5	6.6	2.0	.7
Jun	12.5	8.0	3.0	1.0
Jul	11.0	7.9	2.8	1.3
Aug	10.6	6.9	2.4	1.0
Sep	11.3	6.8	2.0	.7
Oct	10.2	5.4	1.3	.5
Nov	8.2	4.4	.8	.2
Dec	8.1	3.1	.2	@
Ann	113.7	63.8	16.8	5.9

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	.23	.32	.46	.59	.71	.84	.98	1.15	1.38	1.74	2.07
Feb	.11	.17	.27	.36	.46	.56	.67	.82	1.00	1.31	1.60
Mar	.46	.59	.79	.95	1.12	1.28	1.47	1.68	1.96	2.39	2.78
Apr	.53	.73	1.03	1.30	1.56	1.84	2.15	2.52	3.00	3.75	4.46
May	1.16	1.47	1.91	2.29	2.65	3.02	3.42	3.88	4.48	5.40	6.25
Jun	1.53	1.94	2.54	3.04	3.52	4.02	4.56	5.18	5.98	7.23	8.36
Jul	1.61	2.00	2.57	3.04	3.48	3.94	4.43	5.00	5.73	6.85	7.87
Aug	1.31	1.70	2.28	2.77	3.25	3.75	4.29	4.93	5.75	7.03	8.22
Sep	.92	1.24	1.72	2.15	2.56	3.00	3.48	4.05	4.79	5.96	7.05
Oct	.46	.68	1.05	1.39	1.74	2.11	2.53	3.05	3.73	4.83	5.87
Nov	.31	.46	.71	.94	1.17	1.42	1.70	2.05	2.51	3.24	3.94
Dec	.22	.29	.41	.52	.63	.74	.86	1.00	1.19	1.49	1.77
Ann	20.20	21.97	24.25	25.99	27.55	29.05	30.61	32.34	34.45	37.52	40.18

\+ 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: 1961-2001
(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	14.6	10.7	13	11	14.0	1972	12	32.2	1975	34	1996	31	28	1997	8.2	4.1	1.4	.7	.1	30.5	29.5	26.5	18.6
Feb	7.7	5.8	15	14	9.0	1996	27	20.0	1971	34	1996	4	29+	1996	5.6	2.7	.7	.2	.0	27.7	27.1	26.4	20.0
Mar	10.2	10.0	11	9	12.0	1985	4	21.0	1975	37	1997	14	31	1997	5.3	3.0	1.2	.4	@	22.3	19.9	17.4	11.7
Apr	4.2	2.8	2	#	9.4	1998	1	15.6	1983	26	1971	2	13	1975	2.0	1.3	.5	.2	.0	5.5	4.1	3.1	1.9
May	.3	.0	#	0	3.2	1971	19	3.2	1971	2	1971	19	#+	1979	.2	.1	@	.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	0	0	0	0	0	0	.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	#	0	.1	1974	21	.1	1974	#	1995	21	#	1995	@	.0	.0	.0	.0	.0	.0	.0	.0
Oct	1.4	.0	#	0	6.1	1990	17	10.9	1995	5	1995	23	#+	1997	1.0	.5	.2	.1	.0	.5	.1	@	.0
Nov	11.9	8.0	2	1	19.2	1991	1	36.6	1991	19	1991	2	10	1991	5.3	2.9	1.4	.6	.1	11.8	6.8	3.7	1.3
Dec	9.9	11.5	6	4	8.7	1988	14	19.2	1983	24	1983	21	18	1983	7.6	3.7	1.0	.3	.0	26.7	20.6	16.2	7.7
Ann	60.2	48.8	N/A	N/A	19.2	Nov 1991	1	36.6	Nov 1991	37	Mar 1997	14	31	Mar 1997	35.2	18.3	6.4	2.5	.2	125.0	108.1	93.3	61.2

+ 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	7/03	6/27	6/22	6/19	6/15	6/11	6/08	6/03	5/28
32	6/16	6/11	6/07	6/04	5/31	5/28	5/25	5/21	5/15
28	5/29	5/24	5/21	5/18	5/15	5/12	5/09	5/05	4/30
24	5/14	5/10	5/06	5/04	5/01	4/29	4/26	4/23	4/19
20	5/04	4/28	4/24	4/21	4/18	4/15	4/12	4/08	4/02
16	4/18	4/14	4/12	4/09	4/07	4/05	4/03	3/31	3/28

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	8/13	8/19	8/24	8/28	8/31	9/04	9/08	9/12	9/18
32	8/26	8/31	9/04	9/07	9/10	9/13	9/16	9/20	9/25
28	9/14	9/18	9/21	9/23	9/25	9/28	9/30	10/03	10/06
24	9/20	9/25	9/29	10/02	10/05	10/08	10/11	10/15	10/20
20	10/04	10/09	10/13	10/17	10/20	10/23	10/27	10/31	11/06
16	10/17	10/22	10/26	10/29	11/01	11/04	11/07	11/11	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	104	95	88	82	76	71	65	58	48
32	122	115	109	105	101	96	92	86	79
28	153	146	141	137	133	129	125	120	114
24	175	169	164	160	156	152	148	144	137
20	213	203	196	190	184	179	173	166	156
16	228	221	216	211	207	203	198	193	186

***** 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	1781	1407	1196	731	374	154	67	102	297	641	1115	1603	9468
60	1626	1267	1041	583	245	69	16	36	170	488	965	1448	7954
57	1533	1183	948	496	181	35	6	16	109	398	875	1355	7135
55	1471	1127	886	439	144	21	1	9	77	341	815	1293	6624
50	1316	987	732	308	71	4	0	0	24	215	666	1138	5461
32	772	515	264	34	0	0	0	0	0	11	215	605	2416

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	32	91	293	660	868	1048	997	699	393	90	26	5211
55	0	0	0	8	90	199	336	293	85	10	0	0	1021
57	0	0	0	5	65	153	279	238	58	5	0	0	803
60	0	0	0	2	36	97	196	166	29	1	0	0	527
65	0	0	0	0	11	32	92	76	6	0	0	0	217
70	0	0	0	0	2	7	27	23	0	0	0	0	59

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	1	15	128	435	651	824	767	475	191	16	0	0	1	16	144	579	1230	2054	2821	3296	3487	3503	3503
45	0	0	2	63	293	501	669	612	333	103	7	0	0	0	2	65	358	859	1528	2140	2473	2576	2583	2583
50	0	0	0	31	174	353	514	457	208	47	0	0	0	0	0	31	205	558	1072	1529	1737	1784	1784	1784
55	0	0	0	10	89	218	360	307	111	14	0	0	0	0	0	10	99	317	677	984	1095	1109	1109	1109
60	0	0	0	0	41	109	219	174	52	0	0	0	0	0	0	0	41	150	369	543	595	595	595	595
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	12	105	291	413	528	488	283	116	11	0	0	0	12	117	408	821	1349	1837	2120	2236	2247	2247

(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:
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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