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: NEW ULM 2 SE, MN **COOP ID: 215887**

Climate Division: MN 8 **NWS Call Sign:** **Elevation: 860 Feet** **Lat: 44˚18N** **Lon: 94˚27W**

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	23.5	4.6	14.1	65	1981	24	30.3	1990	-37+	1984	18	1.9	1977	1580	0	.0	.0	.3	22.7	30.9	13.2
Feb	30.3	12.1	21.2	63+	1981	20	37.2	1987	-33	1996	2	7.8	1979	1227	0	.0	.0	1.7	15.5	27.0	7.4
Mar	42.5	24.3	33.4	87	1968	30	42.9	1987	-28	1962	1	24.4	1975	979	0	.0	.0	8.1	6.4	24.2	1.8
Apr	59.2	36.2	47.7	95	1980	21	57.7	1987	6	1982	6	40.6	1975	529	10	.0	.1	22.6	.4	11.5	.0
May	72.5	48.1	60.3	95+	1969	27	68.8	1988	19	1967	3	54.2	1997	215	69	.0	.8	30.6	.0	1.2	.0
Jun	80.9	57.5	69.2	103+	1988	28	76.8	1988	35	1993	1	62.5	1993	45	171	.2	3.6	30.0	.0	.0	.0
Jul	84.0	61.9	73.0	105	1988	31	78.5	1983	43+	1972	5	63.1	1992	23	270	.3	6.6	31.0	.0	.0	.0
Aug	81.4	59.5	70.5	100	1988	1	77.3	1983	37	1950	20	62.9	1992	33	201	@	3.8	31.0	.0	.0	.0
Sep	73.7	50.5	62.1	99+	1976	7	67.9	1978	23	1974	22	55.1	1993	143	55	.0	1.1	29.8	.0	1.1	.0
Oct	61.5	38.9	50.2	92	1963	5	56.2	1973	12	1972	19	45.4	1976	460	2	.0	.0	26.0	.1	8.6	.0
Nov	41.3	24.9	33.1	83	1950	1	42.5	1999	-17	1977	26	22.7	1991	957	0	.0	.0	8.0	7.6	23.3	1.0
Dec	27.4	10.8	19.1	67	1998	1	27.8	1986	-36	1983	19	1.2	1983	1422	0	.0	.0	.7	20.0	30.5	8.1
Ann	56.5	35.8	46.2	105	Jul 1988	31	78.5	Jul 1983	-37+	Jan 1984	18	1.2	Dec 1983	7613	778	.5	16.0	219.8	72.7	158.3	31.5

\+ 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: 1948-2001

(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	.74	.65	.95	1949	4	2.18	1996	.01	1990
Feb	.68	.55	1.42	1971	27	2.74	1971	.05+	1996
Mar	2.04	1.76	1.75	1949	31	5.18	1998	.22	1994
Apr	2.59	2.46	2.37	1967	2	6.67	1986	.37	1996
May	3.43	3.21	2.90	1977	5	8.49	2000	.69	1976
Jun	4.51	4.49	5.22	1953	8	7.46	1975	.90	1982
Jul	3.98	3.65	3.82	1968	27	9.11	1990	.34	1975
Aug	4.04	3.51	4.70	1948	10	10.38	1979	1.42	1971
Sep	2.77	2.31	3.37	1994	12	6.78+	1991	.29	2000
Oct	2.13	1.63	2.79	1966	15	5.57	1977	.21	1978
Nov	1.87	1.57	1.97	2001	24	4.88	1975	.08	1976
Dec	.76	.75	1.41	1982	28	2.63	1982	.05	1986
Ann	29.54	29.96	5.22	Jun 1953	8	10.38	Aug 1979	.01	Jan 1990

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.5	2.5	.1	.0
Feb	6.0	2.1	.1	@
Mar	9.0	4.5	1.1	.5
Apr	10.1	5.9	1.7	.6
May	11.6	6.8	2.3	.6
Jun	11.2	7.4	3.0	1.3
Jul	10.0	5.7	2.7	1.3
Aug	9.9	6.3	2.7	1.0
Sep	8.7	5.2	1.8	.6
Oct	7.1	4.0	1.5	.6
Nov	7.3	4.1	1.2	.4
Dec	7.3	2.5	.2	@
Ann	105.7	57.0	18.4	6.9

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	.06	.11	.21	.31	.42	.55	.71	.90	1.16	1.61	2.05
Feb	.07	.11	.21	.30	.40	.52	.66	.83	1.06	1.45	1.83
Mar	.39	.58	.88	1.15	1.43	1.73	2.07	2.48	3.03	3.90	4.74
Apr	.55	.79	1.17	1.51	1.86	2.23	2.64	3.14	3.80	4.85	5.84
May	1.03	1.35	1.84	2.26	2.67	3.10	3.57	4.12	4.83	5.95	6.98
Jun	1.74	2.15	2.75	3.25	3.72	4.20	4.72	5.32	6.08	7.26	8.33
Jul	.82	1.18	1.76	2.30	2.84	3.41	4.06	4.84	5.88	7.53	9.10
Aug	1.55	1.92	2.46	2.91	3.33	3.76	4.23	4.77	5.46	6.52	7.49
Sep	.59	.84	1.25	1.61	1.99	2.38	2.83	3.36	4.07	5.20	6.26
Oct	.19	.34	.63	.93	1.25	1.62	2.05	2.60	3.35	4.61	5.84
Nov	.21	.35	.61	.87	1.15	1.46	1.83	2.29	2.91	3.93	4.93
Dec	.11	.17	.28	.38	.49	.62	.76	.93	1.16	1.54	1.91
Ann	18.72	20.72	23.34	25.35	27.17	28.95	30.80	32.86	35.39	39.11	42.36

\+ 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

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	9.9	9.5	6	6
Feb	6.7	5.8	6	5
Mar	8.0	7.2	2	2
Apr	2.3	1.4	#	#
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.4	.0	#	0
Nov	7.2	6.9	1	1
Dec	7.9	7.9	4	3
Ann	42.4	38.7	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	11.0	1988	19	26.7	1975	23	1982	26	11	1982
Feb	12.0	1971	27	19.8	1971	23	1982	6	18	1979
Mar	11.5	1985	3	23.9	1975	19	1979	4	10	1979
Apr	6.0	1974	4	9.0	1994	6	1974	4	1	1994
May	1.3	1992	25	1.3	1992	#	1992	25	#	1992
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	#	1995	21	#	1995
Oct	3.5	1999	1	3.5	1999	4	1999	1	#+	2000
Nov	12.0	1983	28	28.1	1991	17	1983	29	5	1991
Dec	10.5	1982	28	18.7	1973	18	1996	23	13	1983
Ann	12.0+	Nov 1983	28	28.1	Nov 1991	23+	Feb 1982	6	18	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.1	3.6	1.0	.4	.1
Feb	4.9	2.4	.6	.1	@
Mar	4.6	2.6	1.0	.5	.1
Apr	1.6	.9	.2	.1	.0
May	@	@	.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	.3	.2	@	.0	.0
Nov	3.8	2.2	1.0	.4	.1
Dec	6.0	3.0	.7	.3	@
Ann	28.3	14.9	4.5	1.8	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	25.8	23.4	18.0	3.5
Feb	19.4	15.9	12.4	5.7
Mar	10.0	7.1	5.0	1.4
Apr	1.4	.4	.1	.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	@	.0	.0
Nov	6.8	4.0	2.1	.5
Dec	19.0	13.5	7.6	2.3
Ann	82.5	64.3	45.2	13.4

+ 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	5/28	5/22	5/18	5/14	5/11	5/07	5/04	4/30	4/24
32	5/18	5/12	5/08	5/05	5/02	4/28	4/25	4/21	4/15
28	5/07	5/01	4/27	4/24	4/21	4/17	4/14	4/10	4/04
24	4/17	4/13	4/10	4/08	4/06	4/04	4/02	3/30	3/27
20	4/13	4/09	4/05	4/03	3/31	3/29	3/26	3/23	3/18
16	4/07	4/02	3/29	3/26	3/23	3/20	3/17	3/14	3/09

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	9/15	9/18	9/20	9/22	9/25	9/27	9/30	10/03
32	9/15	9/19	9/23	9/25	9/28	10/01	10/04	10/07	10/11
28	9/26	10/01	10/04	10/07	10/10	10/13	10/16	10/19	10/24
24	10/05	10/11	10/16	10/19	10/23	10/27	10/30	11/04	11/10
20	10/16	10/22	10/26	10/29	11/01	11/05	11/08	11/12	11/17
16	10/27	11/01	11/04	11/07	11/10	11/12	11/15	11/18	11/23

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	156	149	143	138	134	130	125	119	112
32	170	163	158	153	149	144	140	135	127
28	194	186	181	176	172	168	163	157	150
24	220	213	208	203	199	195	190	185	178
20	238	230	224	219	214	210	205	199	191
16	250	244	239	235	231	227	222	218	211

***** 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	1580	1227	979	529	215	45	23	33	143	460	957	1422	7613
60	1425	1087	825	396	128	14	7	9	64	315	807	1267	6344
57	1332	1003	735	323	88	5	0	2	34	239	718	1174	5653
55	1270	947	676	279	66	2	0	0	20	193	661	1112	5226
50	1115	815	535	184	28	0	0	0	4	102	523	958	4264
32	606	381	155	15	0	0	0	0	0	2	149	462	1770

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	49	78	199	486	876	1116	1269	1191	902	567	182	63	6978
55	0	0	7	60	229	428	556	479	232	44	4	0	2039
57	0	0	3	44	189	371	494	418	186	28	1	0	1734
60	0	0	1	27	136	290	408	332	126	12	0	0	1332
65	0	0	0	10	69	171	270	201	55	2	0	0	778
70	0	0	0	2	27	86	159	105	17	0	0	0	396

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	3	56	261	629	881	1022	948	659	334	51	2	0	3	59	320	949	1830	2852	3800	4459	4793	4844	4846
45	0	0	21	160	478	731	867	793	510	214	21	1	0	0	21	181	659	1390	2257	3050	3560	3774	3795	3796
50	0	0	7	87	334	581	712	638	369	123	7	0	0	0	7	94	428	1009	1721	2359	2728	2851	2858	2858
55	0	0	1	42	211	434	557	483	240	56	1	0	0	0	1	43	254	688	1245	1728	1968	2024	2025	2025
60	0	0	0	13	111	288	403	332	137	22	0	0	0	0	0	13	124	412	815	1147	1284	1306	1306	1306
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	38	167	392	573	688	628	410	208	31	0	0	1	39	206	598	1171	1859	2487	2897	3105	3136	3136

(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