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: ST CLOUD MUNICIPAL AP, MN **COOP ID: 217294**

Climate Division: MN 5 **NWS Call Sign: STC** **Elevation: 1,009 Feet** **Lat: 45˚33N** **Lon: 94˚03W**

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	18.7	-1.2	8.8	56	1981	24	21.5	1990	-43	1977	9	-3.6	1982	1742	0	.0	.0	@	25.8	31.0	16.9
Feb	25.7	6.4	16.1	57	1981	20	29.6	1998	-40	1996	2	4.1	1989	1381	0	.0	.0	.6	18.2	27.5	10.7
Mar	37.7	19.1	28.4	79	1968	30	37.6	1973	-32	1962	1	19.1	1975	1135	0	.0	.0	5.1	8.4	27.2	3.6
Apr	54.9	32.2	43.6	96	1980	21	50.5	1977	-3	1975	4	36.5	1975	637	2	.0	@	19.9	.7	15.9	@
May	69.0	44.1	56.6	97+	2001	15	64.0	1977	19+	1967	4	50.9	1979	285	26	.0	.5	30.1	.0	3.4	.0
Jun	77.3	52.9	65.1	102	1988	24	70.8	1988	32	1993	1	59.3	1982	79	90	.1	1.8	30.0	.0	@	.0
Jul	81.7	57.9	69.8	102+	1988	31	74.4	1988	40+	1972	7	62.9	1992	19	172	.2	3.9	31.0	.0	.0	.0
Aug	78.9	55.5	67.2	100	1950	16	73.2	1983	33	1974	31	63.0	1992	49	121	.0	2.4	31.0	.0	.0	.0
Sep	69.0	45.7	57.4	98	1978	7	62.9	1998	18	1974	22	51.3	1993	253	31	.0	.5	29.3	.0	2.5	.0
Oct	56.3	34.3	45.3	90+	1992	2	51.5	1973	5	1976	27	40.2	1976	604	1	.0	@	23.1	.2	13.9	.0
Nov	37.2	20.4	28.8	75	1999	8	37.4	1999	-20	1964	30	20.6	1985	1077	0	.0	.0	5.3	9.9	26.7	2.1
Dec	23.2	5.5	14.4	61+	1998	3	24.0	1997	-41	1983	19	-.9	1983	1554	0	.0	.0	.3	23.5	30.7	11.1
Ann	52.5	31.1	41.8	102+	Jul 1988	31	74.4	Jul 1988	-43	Jan 1977	9	-3.6	Jan 1982	8815	443	.3	9.1	205.7	86.7	178.8	44.4

\+ 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	.76	.64	.75	1997	4	2.39	1975	.06	1990
Feb	.59	.59	1.81	1951	28	1.67	1979	.07	1999
Mar	1.50	1.40	1.13	1977	11	3.09	1990	.31	1971
Apr	2.13	1.72	3.52	2001	22	5.55	1986	.05	1987
May	2.97	2.96	3.22	1979	9	5.64	1993	.93	1976
Jun	4.51	4.13	3.46	1983	26	10.52	1990	.05	1988
Jul	3.34	2.95	2.29	1972	22	7.53	1986	.21	1975
Aug	3.93	3.88	4.57	1956	3	7.31	1995	.60	1976
Sep	2.93	2.27	3.62	1985	8	9.48	1985	.93	2000
Oct	2.24	1.75	3.21	1950	1	6.16	1971	.14	1978
Nov	1.54	1.34	2.02	1977	9	3.83	1996	.14	1976
Dec	.69	.59	.69+	1984	16	1.81	1984	.10	1999
Ann	27.13	26.64	4.57	Aug 1956	3	10.52	Jun 1990	.05+	Jun 1988

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	8.8	2.6	.1	.0
Feb	6.9	1.8	.2	.0
Mar	8.3	4.2	.8	.1
Apr	9.4	4.8	1.5	.2
May	11.1	6.7	1.9	.4
Jun	11.4	7.7	2.7	1.2
Jul	10.6	6.4	2.4	.8
Aug	10.0	6.4	2.6	1.1
Sep	9.3	5.7	1.9	.6
Oct	8.5	4.5	1.3	.6
Nov	8.3	3.9	.9	.2
Dec	7.9	2.2	.1	.0
Ann	110.5	56.9	16.4	5.2

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	.15	.22	.33	.43	.53	.64	.77	.92	1.12	1.44	1.74
Feb	.09	.14	.22	.30	.39	.48	.59	.73	.91	1.20	1.48
Mar	.44	.58	.80	.98	1.16	1.35	1.55	1.80	2.11	2.60	3.05
Apr	.30	.48	.78	1.08	1.39	1.73	2.12	2.61	3.26	4.32	5.34
May	1.21	1.48	1.86	2.18	2.48	2.78	3.11	3.48	3.96	4.69	5.35
Jun	.91	1.32	1.98	2.59	3.20	3.86	4.60	5.49	6.68	8.57	10.36
Jul	.91	1.23	1.71	2.13	2.54	2.98	3.46	4.03	4.77	5.93	7.01
Aug	1.37	1.74	2.28	2.74	3.17	3.62	4.11	4.68	5.41	6.54	7.57
Sep	.73	1.00	1.43	1.81	2.19	2.58	3.02	3.55	4.24	5.32	6.34
Oct	.31	.49	.81	1.12	1.45	1.81	2.22	2.74	3.43	4.55	5.64
Nov	.16	.28	.49	.71	.94	1.20	1.50	1.88	2.40	3.26	4.11
Dec	.15	.21	.31	.40	.50	.60	.71	.84	1.02	1.31	1.57
Ann	17.77	19.53	21.81	23.57	25.14	26.67	28.26	30.03	32.20	35.37	38.13

+ 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	10.1	8.6	8	6
Feb	7.2	5.3	8	8
Mar	8.5	8.6	4	4
Apr	2.9	1.7	#	1
May	.2	.0	#	0
Jun	.0	.0	#	0
Jul	.0	.0	#	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.6	.0	#	0
Nov	9.1	7.4	1	1
Dec	8.6	8.4	4	3
Ann	47.2	40.0	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	9.0	1976	10	29.9	1975	25	1996	29	16+	1984
Feb	8.2	1971	26	21.6	1971	25+	1979	22	21	1979
Mar	9.0	1985	4	22.8	1985	26	1979	5	17	1979
Apr	6.5	1994	28	9.4	1991	12+	1975	2	4	1975
May	3.2	1971	19	3.2	1971	#	1976	2	#	1996
Jun	.0	0	0	.0	0	#+	1993	27	#	1993
Jul	.0	0	0	.0	0	#	1991	10	#	1991
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	.2	1995	21	.2	1995	0	0	0	0	0
Oct	4.9	1995	23	6.0	1995	1+	1995	24	#	1995
Nov	10.9	1975	20	25.0	1983	14+	1983	29	5	1991
Dec	7.0	1988	26	17.8	1978	18	1985	4	14	1983
Ann	10.9	Nov 1975	20	29.9	Jan 1975	26	Mar 1979	5	21	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	8.5	3.4	1.0	.3	.0
Feb	6.8	2.6	.6	.1	.0
Mar	5.1	2.8	1.1	.3	.0
Apr	2.4	1.0	.3	.1	.0
May	.2	.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	.8	.1	.1	.0	.0
Nov	5.7	2.5	1.0	.5	@
Dec	8.3	3.0	.6	.2	.0
Ann	37.8	15.4	4.7	1.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.1	26.2	21.1	10.2
Feb	25.2	24.0	20.2	10.6
Mar	17.4	14.2	11.5	6.1
Apr	2.1	1.0	.8	.2
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	.0
Nov	7.6	4.5	3.2	.6
Dec	24.2	16.3	11.2	2.4
Ann	104.7	86.2	68.0	30.1

+ 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	6/11	6/06	6/02	5/30	5/27	5/24	5/21	5/17	5/12
32	5/28	5/23	5/20	5/17	5/14	5/12	5/09	5/06	5/01
28	5/13	5/09	5/06	5/04	5/02	4/29	4/27	4/24	4/20
24	5/02	4/27	4/23	4/20	4/17	4/14	4/11	4/08	4/03
20	4/15	4/12	4/09	4/07	4/05	4/03	4/01	3/29	3/26
16	4/12	4/07	4/04	3/31	3/29	3/26	3/22	3/19	3/14

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	9/07	9/10	9/13	9/15	9/17	9/18	9/21	9/23	9/26
32	9/12	9/16	9/18	9/21	9/23	9/25	9/27	9/30	10/03
28	9/17	9/22	9/25	9/28	10/01	10/04	10/07	10/10	10/15
24	9/25	10/01	10/05	10/08	10/11	10/15	10/18	10/22	10/28
20	10/08	10/14	10/18	10/21	10/24	10/27	10/31	11/03	11/09
16	10/15	10/21	10/25	10/29	11/01	11/04	11/08	11/12	11/18

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	131	124	120	116	112	108	104	99	93
32	150	143	138	134	131	127	123	118	112
28	172	165	160	156	152	148	144	139	132
24	199	191	186	181	176	172	167	162	154
20	222	215	210	206	201	197	193	188	181
16	241	232	227	222	217	212	207	201	193

***** 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	1742	1381	1135	637	285	79	19	49	253	604	1077	1554	8815
60	1591	1232	979	498	183	27	6	15	132	458	936	1415	7472
57	1498	1148	886	415	130	12	0	5	81	369	846	1322	6712
55	1436	1092	824	362	101	6	0	2	55	313	786	1260	6237
50	1281	952	674	243	46	1	0	0	16	191	637	1105	5146
32	741	489	228	20	0	0	0	0	0	7	196	579	2260

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	2	15	90	369	766	997	1176	1096	769	429	86	6	5801
55	0	0	0	20	135	314	463	384	145	22	0	0	1483
57	0	0	0	13	102	260	401	325	112	14	0	0	1227
60	0	0	0	7	66	186	311	240	72	7	0	0	889
65	0	0	0	2	26	90	172	121	31	1	0	0	443
70	0	0	0	0	7	29	71	44	10	0	0	0	161

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	22	183	528	767	938	857	537	225	22	0	0	1	23	206	734	1501	2439	3296	3833	4058	4080	4080
45	0	0	6	101	380	617	783	702	394	128	7	0	0	0	6	107	487	1104	1887	2589	2983	3111	3118	3118
50	0	0	2	51	249	467	628	547	259	59	1	0	0	0	2	53	302	769	1397	1944	2203	2262	2263	2263
55	0	0	0	19	140	325	473	394	151	24	0	0	0	0	0	19	159	484	957	1351	1502	1526	1526	1526
60	0	0	0	4	71	194	320	250	76	5	0	0	0	0	0	4	75	269	589	839	915	920	920	920
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	16	132	332	488	614	555	332	146	17	0	0	0	16	148	480	968	1582	2137	2469	2615	2632	2632

(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