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: MINNEAPOLIS INTL AP, MN **COOP ID: 215435**

Climate Division: MN 6 **NWS Call Sign: MSP** **Elevation: 834 Feet** **Lat: 44˚53N** **Lon: 93˚14W**

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	21.9	4.3	13.1	59	1944	25	26.3	1990	-34+	1970	19	.3	1977	1616	0	.0	.0	.1	23.6	30.8	12.9
Feb	28.4	11.8	20.1	64	1896	26	31.9	1998	-33	1899	9	8.6	1989	1273	0	.0	.0	.9	16.7	26.8	6.9
Mar	40.6	23.5	32.1	83+	1986	29	41.1	2000	-32	1962	1	22.6	1975	1034	0	.0	.0	6.5	7.1	24.1	1.7
Apr	57.0	36.2	46.6	95	1980	21	53.5	1987	2	1962	13	39.4	1975	560	4	.0	.1	21.3	.4	10.1	.0
May	70.1	48.5	59.3	106	1934	31	66.9	1977	18	1967	3	53.4	1997	222	41	.0	.7	30.5	.0	.7	.0
Jun	79.0	57.8	68.4	104	1934	27	74.4	1988	33	1945	3	63.7	1982	44	146	.1	2.7	30.0	.0	.0	.0
Jul	83.3	63.0	73.2	108	1936	14	78.1	1988	43	1972	4	65.8	1992	7	259	.3	5.6	31.0	.0	.0	.0
Aug	80.4	60.8	70.6	103+	1947	4	76.8	1983	39	1967	19	65.9	1992	20	190	@	3.0	31.0	.0	.0	.0
Sep	71.1	50.8	61.0	104	1931	10	67.3	1978	26+	1974	22	55.0	1993	178	56	.0	.9	29.6	.0	.5	.0
Oct	58.4	38.9	48.7	90+	1997	3	54.1	1973	10	1925	30	44.0	1988	516	3	.0	@	24.5	.1	7.3	.0
Nov	40.1	24.8	32.5	77+	1999	8	41.8	1999	-17	1964	30	24.5	1991	978	0	.0	.0	6.4	8.0	23.7	.9
Dec	26.4	10.9	18.7	68	1998	1	26.9	1997	-29	1983	19	3.7	1983	1428	0	.0	.0	.4	20.4	30.2	7.5
Ann	54.7	35.9	45.4	108	Jul 1936	14	78.1	Jul 1988	-34+	Jan 1970	19	.3	Jan 1977	7876	699	.4	13.0	212.2	76.3	154.2	29.9

\+ 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: 1891-2001

(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	1.04	.89	1.21	1967	24	2.82	1975	.10	1990
Feb	.79	.78	1.90	1930	24	2.14	1981	.13	1987
Mar	1.86	1.52	1.62	1965	1	4.56	1998	.32	1994
Apr	2.31	1.95	2.22	1975	27	5.88	1986	.16	1987
May	3.24	3.00	3.59	1942	29	6.56	1999	1.13	1976
Jun	4.34	3.78	2.91	1984	7	9.82	1990	.22	1988
Jul	4.04	3.13	9.15	1987	23	17.90	1987	.58	1975
Aug	4.05	3.74	7.28	1977	30	9.31	1977	1.39	1976
Sep	2.69	2.21	4.96	1903	12	6.90	1986	.58	1974
Oct	2.11	1.90	2.75	1934	19	5.68	1971	.19	1978
Nov	1.94	1.50	2.52	1940	11	5.29	1991	.16	1976
Dec	1.00	.90	1.50	1891	14	4.27	1982	.24	1980
Ann	29.41	30.37	9.15	Jul 1987	23	17.90	Jul 1987	.10	Jan 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.9	3.6	.3	@
Feb	7.5	2.7	.3	@
Mar	10.2	5.1	.8	.1
Apr	11.3	5.5	1.4	.3
May	10.9	7.2	2.2	.5
Jun	11.1	7.5	3.0	1.2
Jul	10.4	6.2	2.4	1.0
Aug	10.4	6.5	2.6	1.0
Sep	9.8	5.6	1.7	.6
Oct	8.4	4.4	1.3	.4
Nov	9.1	4.5	1.1	.3
Dec	9.7	3.0	.2	.1
Ann	118.7	61.8	17.3	5.5

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	.20	.29	.44	.58	.73	.88	1.06	1.27	1.55	2.01	2.44
Feb	.18	.25	.36	.47	.57	.68	.81	.95	1.15	1.46	1.75
Mar	.51	.68	.95	1.19	1.42	1.66	1.92	2.24	2.64	3.29	3.89
Apr	.46	.67	1.01	1.32	1.64	1.97	2.35	2.81	3.42	4.39	5.31
May	1.23	1.53	1.96	2.32	2.66	3.01	3.39	3.83	4.38	5.24	6.02
Jun	1.10	1.50	2.14	2.69	3.25	3.83	4.48	5.25	6.25	7.84	9.33
Jul	.75	1.11	1.70	2.25	2.81	3.41	4.10	4.93	6.03	7.80	9.49
Aug	1.54	1.92	2.46	2.91	3.33	3.77	4.24	4.79	5.48	6.55	7.53
Sep	.80	1.05	1.44	1.77	2.09	2.42	2.79	3.23	3.79	4.66	5.48
Oct	.29	.46	.77	1.06	1.37	1.71	2.10	2.58	3.23	4.29	5.32
Nov	.24	.40	.67	.94	1.23	1.54	1.91	2.37	2.99	4.00	4.98
Dec	.19	.28	.43	.56	.70	.84	1.01	1.21	1.48	1.91	2.31
Ann	19.70	21.53	23.91	25.73	27.35	28.93	30.57	32.40	34.62	37.87	40.69

\+ 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: 1891-2001
(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	12.4	12.1	7	7	17.2	1982	22	33.1	1999	38	1982	23	16	1984	9.7	4.1	1.3	.4	.1	27.1	24.5	21.9	7.9
Feb	8.0	8.3	7	6	6.2	1983	2	17.3	1989	24+	1979	22	21	1979	7.1	3.0	.8	.1	.0	23.5	21.1	18.9	8.4
Mar	10.4	10.4	3	3	14.7	1985	31	36.8	1985	22+	1979	11	12+	1979	6.3	3.1	1.1	.4	.1	14.3	10.7	7.9	3.5
Apr	3.1	1.8	#	1	13.6	1983	14	21.8	1983	10+	1985	1	3	1975	2.2	.9	.3	.1	@	1.7	.9	.5	.1
May	.1	.0	#	0	1.2	1976	2	1.2	1976	2	1984	1	#	2000	.1	.0	.0	.0	.0	@	.0	.0	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1984	.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	0	.4	1985	24	.4	1985	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.6	.0	0	0	8.2	1991	31	8.2	1991	#+	1993	30	0	0	.6	.1	@	@	.0	.0	.0	.0	.0
Nov	9.8	7.2	1	1	18.5	1991	1	46.9	1991	23+	1991	5	10	1991	5.8	2.8	.9	.4	.1	7.6	4.8	3.0	.7
Dec	9.3	7.5	4	2	12.0	1982	28	21.0	1983	21+	1991	6	15	1983	8.4	2.9	.7	.2	@	21.1	14.2	9.7	4.3
Ann	53.7	47.3	N/A	N/A	18.5	Nov 1991	1	46.9	Nov 1991	38	Jan 1982	23	21	Feb 1979	40.2	16.9	5.1	1.6	.3	95.3	76.2	61.9	24.9

+ 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	5/24	5/19	5/15	5/12	5/10	5/07	5/04	4/30	4/25
32	5/12	5/08	5/05	5/02	4/30	4/27	4/25	4/21	4/17
28	4/28	4/24	4/21	4/18	4/16	4/13	4/10	4/07	4/03
24	4/17	4/13	4/11	4/08	4/06	4/04	4/02	3/30	3/27
20	4/10	4/06	4/03	3/31	3/29	3/27	3/24	3/21	3/17
16	4/02	3/29	3/25	3/23	3/20	3/17	3/14	3/11	3/07

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	9/16	9/19	9/22	9/24	9/26	9/28	10/01	10/03	10/07
32	9/20	9/25	9/29	10/02	10/05	10/08	10/11	10/14	10/20
28	10/01	10/06	10/10	10/14	10/17	10/20	10/23	10/27	11/02
24	10/14	10/20	10/24	10/27	10/31	11/03	11/06	11/10	11/16
20	10/25	10/30	11/02	11/05	11/08	11/11	11/13	11/17	11/21
16	10/27	11/02	11/06	11/10	11/14	11/17	11/21	11/25	12/01

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	158	151	147	143	139	135	131	127	120
32	175	169	165	161	157	154	150	146	140
28	206	198	193	188	184	179	174	169	161
24	227	220	215	211	207	203	198	193	186
20	243	236	231	227	223	219	215	211	204
16	261	253	247	243	238	233	228	223	215

***** 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	1616	1273	1034	560	222	44	7	20	178	516	978	1428	7876
60	1454	1118	867	413	131	13	3	4	80	359	827	1281	6550
57	1361	1034	774	334	88	4	0	1	46	277	737	1188	5844
55	1299	978	713	285	65	2	0	0	29	228	677	1126	5402
50	1144	839	568	179	25	0	0	0	7	125	534	971	4392
32	616	392	160	9	0	0	0	0	0	3	141	467	1788

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	4	25	133	443	844	1090	1275	1195	868	517	130	13	6537
55	0	0	2	33	182	402	562	482	214	40	1	0	1918
57	0	0	1	23	143	345	500	420	171	26	1	0	1630
60	0	0	0	14	95	263	408	329	117	13	0	0	1239
65	0	0	0	4	41	146	259	190	56	3	0	0	699
70	0	0	0	1	14	62	131	85	22	0	0	0	315

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	43	246	606	858	1038	954	639	295	45	2	0	2	45	291	897	1755	2793	3747	4386	4681	4726	4728
45	0	1	19	145	453	708	883	799	491	180	18	0	0	1	20	165	618	1326	2209	3008	3499	3679	3697	3697
50	0	0	6	74	309	558	728	644	350	96	6	0	0	0	6	80	389	947	1675	2319	2669	2765	2771	2771
55	0	0	1	34	188	409	573	489	223	42	1	0	0	0	1	35	223	632	1205	1694	1917	1959	1960	1960
60	0	0	0	13	100	268	418	338	120	10	0	0	0	0	0	13	113	381	799	1137	1257	1267	1267	1267
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	27	145	358	557	703	635	381	161	22	0	0	1	28	173	531	1088	1791	2426	2807	2968	2990	2990

(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