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: MORRIS WC EXP STN, MN **COOP ID: 215638**

Climate Division: MN 4 **NWS Call Sign:** **Elevation: 1,140 Feet** **Lat: 45˚36N** **Lon: 95˚53W**

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	18.2	-1.5	8.4	60	1981	25	22.9	1990	-40	1888	21	-4.9	1982	1757	0	.0	.0	.1	25.8	31.0	17.1
Feb	24.9	5.9	15.4	60	1902	25	30.2	1987	-41	1936	16	-.1	1979	1390	0	.0	.0	.7	18.9	27.8	11.2
Mar	36.6	19.5	28.1	83	1910	23	38.3	2000	-30	1948	11	18.3	1975	1145	0	.0	.0	4.0	10.6	27.6	3.5
Apr	54.4	33.7	44.1	98	1980	22	51.9	1987	-2	1936	7	36.2	1975	631	2	.0	.1	18.6	1.0	15.0	@
May	69.1	46.7	57.9	106	1934	31	66.8	1977	18+	1946	11	51.4	1979	266	46	.0	.7	29.7	.0	2.2	.0
Jun	77.3	56.5	66.9	104+	1988	25	74.9	1988	27	1929	1	61.4	1982	66	122	.1	2.2	30.0	.0	.0	.0
Jul	81.5	60.6	71.1	109	1940	18	75.9	1988	37	1927	12	64.2	1992	20	207	.1	4.0	31.0	.0	.0	.0
Aug	80.0	57.9	69.0	104	1947	10	74.3	1983	31	1931	30	64.6	1992	39	162	.2	2.9	31.0	.0	.0	.0
Sep	70.8	47.1	59.0	106	1931	10	65.7	1998	20+	1974	22	53.2	1993	211	29	.0	1.1	29.1	.0	2.1	.0
Oct	57.5	34.6	46.1	93	1947	5	51.6	1973	1	1895	29	41.2	1976	588	0	.0	.0	22.8	.4	13.9	.0
Nov	37.6	20.3	29.0	78	1999	9	39.1	1999	-27	1891	28	19.7	1985	1081	0	.0	.0	5.6	11.1	27.2	1.9
Dec	23.6	5.5	14.6	69	1939	6	24.9	1997	-34	1887	29	-.7	1983	1564	0	.0	.0	.4	23.0	30.9	11.9
Ann	52.6	32.2	42.5	109	Jul 1940	18	75.9	Jul 1988	-41	Feb 1936	16	-4.9	Jan 1982	8758	568	.4	11.0	203.0	90.8	177.7	45.6

\+ 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: 1886-2001

(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	.85	.76	1.21	1926	31	2.69	1975	.02	1974
Feb	.69	.57	1.15+	1977	24	1.63	1971	.15	1983
Mar	1.52	1.43	1.93	1940	28	3.77	1995	.30	1996
Apr	2.01	1.83	6.90	1954	26	6.18	1986	.15	1980
May	2.84	2.53	3.64	1959	31	6.74	1985	.39	1976
Jun	3.97	3.83	5.20	1914	26	7.62	1971	.49	1988
Jul	3.95	4.04	4.84	1929	8	7.91	1993	1.21	1990
Aug	3.30	2.99	4.34	1935	18	6.34	1984	1.15	1979
Sep	2.16	2.15	3.00	1897	12	4.56	1988	.22	1979
Oct	2.30	1.60	3.60	1984	15	9.21	1984	.08+	1978
Nov	1.22	1.12	1.92	1930	20	3.41	2000	.07+	1999
Dec	.58	.51	1.00+	1951	3	1.74	1972	.01	1986
Ann	25.39	25.15	6.90	Apr 1954	26	9.21	Oct 1984	.01	Dec 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.6	2.9	.1	.0
Feb	7.1	2.3	.1	@
Mar	8.4	4.2	.7	.2
Apr	9.4	4.7	1.1	.3
May	10.6	6.4	1.8	.5
Jun	11.0	7.0	2.7	.9
Jul	10.9	6.0	2.5	1.3
Aug	10.3	5.5	2.1	1.0
Sep	8.7	4.5	1.3	.5
Oct	8.1	4.1	1.3	.6
Nov	7.2	3.2	.7	.1
Dec	7.4	2.2	.0	.0
Ann	108.7	53.0	14.4	5.4

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	.11	.18	.30	.42	.54	.68	.84	1.04	1.30	1.74	2.16
Feb	.15	.21	.32	.41	.50	.60	.71	.84	1.02	1.30	1.56
Mar	.41	.56	.78	.97	1.16	1.36	1.58	1.84	2.18	2.71	3.20
Apr	.38	.56	.85	1.13	1.40	1.70	2.04	2.44	2.99	3.86	4.68
May	.89	1.16	1.56	1.91	2.24	2.58	2.96	3.40	3.97	4.86	5.69
Jun	1.08	1.46	2.03	2.53	3.02	3.54	4.11	4.78	5.66	7.04	8.32
Jul	1.31	1.68	2.23	2.70	3.15	3.61	4.12	4.72	5.48	6.67	7.76
Aug	1.17	1.49	1.94	2.32	2.68	3.05	3.45	3.92	4.52	5.45	6.31
Sep	.44	.63	.95	1.24	1.53	1.84	2.20	2.62	3.19	4.09	4.94
Oct	.10	.22	.48	.79	1.14	1.56	2.08	2.76	3.72	5.36	7.02
Nov	.11	.19	.36	.53	.71	.92	1.17	1.49	1.93	2.65	3.37
Dec	.08	.13	.21	.29	.38	.47	.58	.71	.89	1.19	1.47
Ann	15.52	17.33	19.70	21.53	23.20	24.82	26.53	28.43	30.78	34.23	37.26

\+ 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: 1886-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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Snow (inches)

Snow Totals

Means/Medians (1)

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	11.2	9.5	9	9	9.0	1975	11	33.7	1975	31	1997	28	26	1997	10.9	3.9	1.0	.3	.0	29.6	27.4	24.2	12.5
Feb	7.9	7.9	11	11	9.0	1986	20	18.1	1986	31	1986	20	28	1997	7.3	2.8	.8	.1	.0	26.3	24.3	22.7	15.6
Mar	9.4	8.0	8	5	19.0	1985	4	26.8	1985	36	1997	5	29	1997	6.1	2.9	.9	.5	.1	18.5	14.9	13.1	9.0
Apr	3.0	2.3	#	#	9.5	1994	29	9.5	1994	14	1975	9	5	1975	2.0	1.0	.3	.2	.0	2.5	1.2	.9	.3
May	.0	.0	#	0	.1	1990	2	.1	1990	#+	1997	14	#+	1997	@	.0	.0	.0	.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	#	1985	24	#+	1985	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.8	.2	#	#	5.2	1995	24	6.5	1995	4	1995	24	#+	2000	.7	.3	.1	@	.0	.4	.1	.0	.0
Nov	7.6	7.0	2	1	11.5	1971	26	20.9	1977	13	1996	30	6	1977	5.5	2.4	.8	.3	@	10.4	5.2	2.9	.8
Dec	7.4	6.1	5	4	9.6	1985	1	20.5	1985	19+	1996	24	15	1985	8.4	2.6	.6	.1	.0	22.4	19.2	14.0	4.1
Ann	47.3	41.0	N/A	N/A	19.0	Mar 1985	4	33.7	Jan 1975	36	Mar 1997	5	29	Mar 1997	40.9	15.9	4.5	1.5	.1	110.1	92.3	77.8	42.3

+ 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	5/23	5/20	5/17	5/14	5/12	5/09	5/06	5/01
32	5/19	5/14	5/11	5/08	5/05	5/03	4/30	4/26	4/21
28	5/09	5/03	4/29	4/25	4/22	4/18	4/15	4/11	4/05
24	4/26	4/21	4/17	4/14	4/11	4/08	4/05	4/01	3/27
20	4/16	4/11	4/08	4/05	4/02	3/31	3/28	3/24	3/20
16	4/11	4/06	4/02	3/30	3/27	3/24	3/21	3/17	3/12

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	9/05	9/09	9/12	9/14	9/17	9/19	9/22	9/24	9/28
32	9/13	9/18	9/21	9/24	9/27	9/29	10/02	10/06	10/10
28	9/19	9/25	9/29	10/03	10/06	10/10	10/13	10/18	10/24
24	9/30	10/06	10/11	10/14	10/18	10/21	10/25	10/29	11/05
20	10/09	10/15	10/19	10/23	10/26	10/30	11/02	11/07	11/13
16	10/25	10/29	11/01	11/04	11/07	11/09	11/12	11/15	11/20

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	144	137	132	128	125	121	117	112	105
32	164	157	152	148	144	140	135	130	123
28	194	185	178	172	167	161	156	149	140
24	213	204	199	194	189	185	180	174	166
20	226	219	214	210	206	202	198	193	186
16	247	239	233	229	224	219	215	209	201

***** 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	1757	1390	1145	631	266	66	20	39	211	588	1081	1564	8758
60	1602	1250	990	487	167	22	5	10	111	434	931	1409	7418
57	1509	1166	897	406	119	9	0	3	67	345	841	1316	6678
55	1447	1110	835	355	92	5	0	1	45	289	781	1254	6214
50	1292	972	689	241	43	1	0	0	12	169	635	1099	5153
32	759	519	243	22	0	0	0	0	0	5	206	583	2337

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	24	53	121	384	803	1047	1210	1146	808	441	115	42	6194
55	0	0	0	26	182	361	497	434	163	12	0	0	1675
57	0	0	0	18	147	306	435	374	125	6	0	0	1411
60	0	0	0	9	101	228	347	288	79	2	0	0	1054
65	0	0	0	2	46	122	207	162	29	0	0	0	568
70	0	0	0	0	17	50	104	74	7	0	0	0	252

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	0	19	184	549	797	946	882	558	228	27	0	0	0	19	203	752	1549	2495	3377	3935	4163	4190	4190
45	0	0	4	102	402	647	791	727	415	128	11	0	0	0	4	106	508	1155	1946	2673	3088	3216	3227	3227
50	0	0	0	52	274	497	636	572	282	67	1	0	0	0	0	52	326	823	1459	2031	2313	2380	2381	2381
55	0	0	0	21	163	352	481	418	170	26	0	0	0	0	0	21	184	536	1017	1435	1605	1631	1631	1631
60	0	0	0	10	84	219	330	269	88	7	0	0	0	0	0	10	94	313	643	912	1000	1007	1007	1007
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	15	122	332	501	625	569	343	149	18	0	0	0	15	137	469	970	1595	2164	2507	2656	2674	2674

(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