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: TRACY, MN **COOP ID: 218323**

Climate Division: MN 7 **NWS Call Sign:** **Elevation: 1,403 Feet** **Lat: 44˚14N** **Lon: 95˚38W**

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	21.5	2.9	12.2	65	1981	25	26.7	1990	-32	1972	15	-.2	1982	1637	0	.0	.0	.4	23.1	30.9	14.3
Feb	27.6	10.0	18.8	64	2000	23	32.1	1987	-30+	1996	2	3.7	1979	1294	0	.0	.0	1.6	16.8	27.2	8.5
Mar	38.6	21.8	30.2	83	1968	30	39.4	2000	-20	1962	1	21.0	1975	1080	0	.0	.0	6.2	9.3	26.0	2.3
Apr	54.6	34.4	44.5	94	1962	25	52.6	1987	3	1975	3	36.4	1975	618	3	.0	.1	19.3	1.3	13.0	.0
May	69.3	47.3	58.3	98	1998	19	66.1	1977	18	1967	3	52.1	1997	258	49	.0	.6	29.4	.0	1.1	.0
Jun	78.8	57.2	68.0	104	1988	22	74.5	1988	35+	1969	13	62.8	1982	48	138	.2	3.1	30.0	.0	.0	.0
Jul	82.7	61.5	72.1	107	1955	31	77.1	1983	40	1967	4	64.2	1992	16	237	.2	5.7	31.0	.0	.0	.0
Aug	80.3	58.9	69.6	104+	1988	1	76.1	1983	36	1950	20	64.8	1992	35	178	.1	3.6	31.0	.0	.0	.0
Sep	71.6	48.7	60.2	100+	1976	7	66.5	1998	22	1974	22	54.7	1993	184	39	@	1.1	29.4	.0	1.1	.0
Oct	58.7	36.6	47.7	93	1953	2	53.4	1973	10	1967	28	42.9	1976	539	0	.0	@	24.2	.3	10.2	.0
Nov	39.3	22.6	31.0	79	1999	14	42.6	1999	-16	1964	30	21.5	1985	1021	0	.0	.0	6.9	9.4	25.4	1.1
Dec	25.9	8.8	17.4	66	1998	3	26.0	1997	-30	1983	19	.2	1983	1477	0	.0	.0	.8	20.4	30.6	9.4
Ann	54.1	34.2	44.2	107	Jul 1955	31	77.1	Jul 1983	-32	Jan 1972	15	-.2	Jan 1982	8207	644	.5	14.2	210.2	80.6	165.5	35.6

\+ 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: 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	.65	.62	1.11	2001	30	2.33	1996	.00	1974
Feb	.54	.53	1.32	1954	20	1.48	1971	.01	1976
Mar	1.93	1.68	1.50+	1987	23	5.19	1977	.13	1994
Apr	2.71	2.51	3.21	2001	22	6.44	1986	.25	1996
May	3.37	3.42	2.52	2000	18	7.20	2000	.20	1981
Jun	4.00	3.70	4.30	1996	17	8.82	1993	1.13	1973
Jul	3.23	3.41	2.87	1979	21	6.02	1978	.57	1988
Aug	3.09	2.81	3.93	1994	10	6.37	1985	.73	1989
Sep	2.76	2.62	2.65+	1995	30	7.79	1986	.58+	2000
Oct	1.98	2.07	3.80	1979	31	5.16	1979	.05+	1989
Nov	1.67	1.41	2.38	1975	20	4.65	1975	.06	1984
Dec	.65	.72	2.20	1959	28	1.52	1987	.00	1986
Ann	26.58	26.77	4.30	Jun 1996	17	8.82	Jun 1993	.00+	Dec 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	2.3	.2	.0
Feb	4.2	1.6	.2	.0
Mar	6.7	4.5	1.3	.4
Apr	9.4	6.1	1.6	.6
May	10.1	6.4	2.3	.9
Jun	10.1	6.6	2.7	1.0
Jul	9.2	6.1	2.2	.7
Aug	8.6	5.5	2.1	.7
Sep	8.2	5.1	1.8	.7
Oct	5.8	3.9	1.4	.5
Nov	5.2	3.6	1.1	.3
Dec	4.1	2.1	.4	.0
Ann	86.1	53.8	17.3	5.8

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	.02	.07	.16	.26	.36	.48	.62	.80	1.04	1.45	1.85
Feb	.04	.07	.14	.22	.30	.39	.51	.65	.85	1.19	1.52
Mar	.35	.52	.80	1.06	1.33	1.62	1.96	2.36	2.89	3.76	4.58
Apr	.64	.90	1.29	1.65	2.00	2.37	2.79	3.28	3.93	4.96	5.93
May	.59	.89	1.38	1.84	2.31	2.82	3.40	4.11	5.05	6.56	8.01
Jun	1.37	1.75	2.30	2.77	3.22	3.68	4.18	4.76	5.51	6.67	7.74
Jul	.89	1.20	1.66	2.07	2.47	2.88	3.34	3.89	4.60	5.71	6.75
Aug	.98	1.27	1.71	2.08	2.44	2.81	3.21	3.69	4.30	5.26	6.14
Sep	.68	.94	1.34	1.70	2.06	2.43	2.84	3.34	3.99	5.01	5.97
Oct	.13	.25	.50	.77	1.07	1.43	1.85	2.40	3.16	4.44	5.72
Nov	.11	.22	.43	.65	.91	1.21	1.56	2.02	2.65	3.72	4.78
Dec	.05	.11	.22	.31	.41	.52	.65	.80	1.00	1.34	1.66
Ann	16.53	18.37	20.79	22.66	24.34	25.99	27.72	29.64	32.01	35.49	38.54

+ 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	8.4	7.0	7	7
Feb	4.9	4.8	7	4
Mar	9.4	8.5	4	2
Apr	3.9	2.0	#	#
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	#	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.8	#	#	#
Nov	8.2	7.0	2	1
Dec	7.6	6.5	5	3
Ann	43.2	35.8	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	12.0	1982	23	26.5	1979	30+	1997	20	28	1997
Feb	8.0	1984	19	10.5	1971	30	1979	9	24	1979
Mar	14.0	1984	4	29.5	1983	24	1984	10	13	1984
Apr	8.0	1984	30	15.5	1983	14	1975	3	3	1975
May	#	1990	1	#+	1990	2	1994	1	#+	2000
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	#	1978	7	#	1978
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	#	1995	22	#+	1995	#+	1995	22	#+	1995
Oct	6.0	1982	20	7.5	1976	4	1976	24	#+	1999
Nov	14.0	1983	28	23.5	1983	17	1983	28	7	1991
Dec	12.0	1982	28	22.5	1987	26	1996	31	20	1983
Ann	14.0+	Mar 1984	4	29.5	Mar 1983	30+	Jan 1997	20	28	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.6	3.0	1.3	.4	.1
Feb	3.0	2.2	.5	.1	.0
Mar	3.2	2.8	1.5	.7	.1
Apr	1.2	1.1	.6	.3	.0
May	.0	.0	.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	.1	@	.0
Nov	2.7	2.2	1.3	.5	.1
Dec	3.5	2.8	.9	.4	.1
Ann	17.5	14.3	6.2	2.4	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	23.4	19.5	15.5	7.0
Feb	20.0	14.8	11.0	5.8
Mar	13.4	9.2	6.2	2.6
Apr	2.5	1.3	.6	.2
May	@	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.4	.2	.0	.0
Nov	9.3	6.0	3.4	1.1
Dec	20.9	14.8	9.2	4.2
Ann	89.9	65.8	45.9	20.9

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

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	9/13	9/17	9/20	9/22	9/24	9/26	9/29	10/01	10/05
32	9/17	9/23	9/27	9/30	10/03	10/06	10/10	10/14	10/19
28	9/24	9/29	10/03	10/07	10/10	10/13	10/16	10/20	10/25
24	10/03	10/09	10/13	10/17	10/20	10/24	10/28	11/01	11/07
20	10/16	10/22	10/26	10/29	11/01	11/04	11/07	11/11	11/16
16	10/22	10/28	11/01	11/04	11/07	11/10	11/14	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	153	147	143	139	135	132	128	124	117
32	174	168	163	159	155	152	148	143	136
28	189	182	177	173	169	165	161	156	149
24	215	208	203	198	194	190	186	181	173
20	235	228	222	218	213	209	204	198	191
16	249	241	235	230	226	221	216	211	203

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1637	1294	1080	618	258	48	16	35	184	539	1021	1477	8207
60	1482	1154	925	476	160	14	4	9	91	387	871	1322	6895
57	1389	1070	832	395	113	5	0	2	53	301	781	1229	6170
55	1327	1014	770	345	88	3	0	1	34	249	721	1167	5719
50	1172	881	624	233	41	0	0	0	8	138	580	1012	4689
32	653	438	193	20	0	0	0	0	0	4	176	504	1988

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	39	68	136	395	815	1081	1243	1165	845	488	145	50	6470
55	0	0	0	30	189	393	530	453	189	21	0	0	1805
57	0	0	0	20	153	336	468	393	148	10	0	0	1528
60	0	0	0	11	106	254	379	306	96	3	0	0	1155
65	0	0	0	3	49	138	237	178	39	0	0	0	644
70	0	0	0	0	18	59	126	85	11	0	0	0	299

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	4	40	212	579	852	1002	925	616	283	46	2	0	4	44	256	835	1687	2689	3614	4230	4513	4559	4561
45	0	1	15	121	432	702	847	770	470	174	19	0	0	1	16	137	569	1271	2118	2888	3358	3532	3551	3551
50	0	0	2	69	296	552	692	615	333	95	8	0	0	0	2	71	367	919	1611	2226	2559	2654	2662	2662
55	0	0	0	34	186	404	537	461	211	42	0	0	0	0	0	34	220	624	1161	1622	1833	1875	1875	1875
60	0	0	0	13	99	269	382	312	117	15	0	0	0	0	0	13	112	381	763	1075	1192	1207	1207	1207
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	26	131	344	546	670	607	376	173	30	0	0	2	28	159	503	1049	1719	2326	2702	2875	2905	2905

(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