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: WATERTOWN, WI **COOP ID: 478919**

Climate Division: WI 8 **NWS Call Sign:** **Elevation: 825 Feet** **Lat: 43˚11N** **Lon: 88˚44W**

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	25.3	7.1	16.2	60	1944	26	28.2	1990	-31+	1994	19	2.1	1977	1514	0	.0	.0	.4	21.2	30.3	9.8
Feb	30.2	12.0	21.1	64+	2000	26	34.3	1998	-33	1929	20	11.1	1979	1229	0	.0	.0	1.3	14.6	26.6	5.5
Mar	41.8	23.6	32.7	81	1986	30	41.7	2000	-23	1962	1	24.6	1975	1003	0	.0	.0	8.0	5.3	24.1	.8
Apr	55.7	35.0	45.4	91	1980	22	51.4	1977	4	1948	12	38.5	1975	591	1	.0	@	21.4	.3	10.1	.0
May	68.9	46.3	57.6	97	1934	31	65.2	1977	23	1966	9	51.4	1997	273	44	.0	.5	30.4	.0	1.0	.0
Jun	78.8	56.1	67.5	101+	1988	22	71.8	1991	31	1945	4	61.5	1982	48	122	.1	3.2	30.0	.0	.0	.0
Jul	82.5	61.1	71.8	103	1934	24	75.9	1999	41+	1965	6	67.1	1992	9	221	.1	5.1	31.0	.0	.0	.0
Aug	80.2	58.9	69.6	103	1937	16	76.3	1995	37	1958	25	65.2	1992	34	176	.1	2.9	31.0	.0	.0	.0
Sep	72.4	50.2	61.3	100+	1939	15	66.0	1978	26+	1983	23	56.2	1993	151	39	.0	.7	30.0	.0	.5	.0
Oct	60.3	39.0	49.7	92	1943	29	58.0	1971	7	1925	30	43.7	1988	479	3	.0	.0	26.3	.0	7.2	.0
Nov	44.0	27.4	35.7	76	1944	1	42.9	1999	-7	1947	30	27.3	1976	880	0	.0	.0	9.7	4.2	20.3	.2
Dec	30.7	14.3	22.5	66	2001	6	30.6	1998	-27	1983	24	9.4	1983	1318	0	.0	.0	1.3	15.3	28.8	4.6
Ann	55.9	35.9	45.9	103+	Aug 1937	16	76.3	Aug 1995	-33	Feb 1929	20	2.1	Jan 1977	7529	606	.3	12.4	220.8	60.9	148.9	20.9

\+ 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: 1924-2001

(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	1.31	1.25	1.58	1939	5	2.97	1979	.27	1984
Feb	1.23	1.06	1.47	1938	12	3.33	1981	.01	1987
Mar	2.14	1.97	2.36	1998	31	5.03	1976	.25	1978
Apr	3.13	2.92	2.83	1982	3	6.98	1993	1.17	1994
May	3.17	2.83	3.51	2000	18	9.32	2000	.74	1981
Jun	4.31	4.28	3.54	1938	30	9.35	1994	1.20	1992
Jul	4.43	3.85	6.65	1982	11	10.47	1982	.72	1973
Aug	4.49	3.94	3.44	1968	20	9.19	1995	1.74	1984
Sep	3.66	3.12	4.09	1991	12	8.98	1986	.60	1979
Oct	2.58	2.12	2.75	1995	6	6.31	1984	.51	1994
Nov	2.37	2.20	1.86	1926	26	5.14	1985	.19	1976
Dec	1.67	1.53	1.86	1942	27	3.87	1987	.29	1989
Ann	34.49	34.73	6.65	Jul 1982	11	10.47	Jul 1982	.01	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.0	4.3	.5	.1
Feb	7.3	3.5	.5	.1
Mar	9.0	5.0	1.2	.4
Apr	11.2	7.0	1.8	.6
May	10.5	6.7	2.2	.5
Jun	9.8	6.5	2.5	1.4
Jul	10.8	6.8	3.1	1.0
Aug	10.2	7.5	3.5	1.3
Sep	9.4	6.2	2.2	.9
Oct	8.8	5.2	1.8	.4
Nov	9.7	5.3	1.5	.4
Dec	9.4	4.3	.8	.1
Ann	115.1	68.3	21.6	7.2

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	.37	.50	.68	.85	1.01	1.17	1.36	1.57	1.86	2.30	2.71
Feb	.09	.17	.33	.50	.69	.91	1.16	1.49	1.94	2.70	3.45
Mar	.35	.53	.84	1.14	1.44	1.77	2.15	2.61	3.23	4.23	5.19
Apr	1.24	1.53	1.94	2.28	2.60	2.93	3.28	3.68	4.20	4.99	5.71
May	.91	1.21	1.67	2.06	2.44	2.84	3.29	3.81	4.49	5.55	6.54
Jun	1.21	1.62	2.23	2.77	3.30	3.85	4.46	5.18	6.12	7.59	8.95
Jul	1.42	1.84	2.46	2.99	3.50	4.03	4.62	5.30	6.17	7.54	8.80
Aug	1.92	2.33	2.89	3.36	3.79	4.23	4.70	5.25	5.93	6.97	7.92
Sep	.67	.99	1.53	2.02	2.53	3.08	3.70	4.46	5.46	7.08	8.62
Oct	.54	.78	1.15	1.50	1.84	2.21	2.63	3.13	3.79	4.85	5.85
Nov	.62	.84	1.19	1.49	1.79	2.10	2.45	2.87	3.41	4.26	5.05
Dec	.33	.48	.72	.95	1.18	1.42	1.70	2.03	2.47	3.18	3.85
Ann	27.76	29.12	30.83	32.11	33.22	34.29	35.38	36.57	38.00	40.03	41.77

\+ 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: 1924-2001
(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	12.7	10.9	5	3
Feb	7.6	7.7	4	3
Mar	5.5	4.5	1	#
Apr	1.8	.1	#	#
May	.2	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.1	.0	#	0
Nov	2.9	1.1	#	#
Dec	8.6	7.8	2	1
Ann	39.4	32.1	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	13.0	1999	3	50.4	1979	36	1979	25	25	1979
Feb	8.0	1994	13	22.6	1974	30	1979	1	26	1979
Mar	11.0	1971	19	18.2	1971	15	1979	1	8	1979
Apr	7.0	1973	10	11.7	1973	9	1997	13	1	1997
May	3.0	1994	1	3.0	1994	3	1994	1	#+	1994
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	#	1984	26	#	1984	0	0	0	0	0
Oct	2.0	1997	27	2.0	1997	1	1992	20	#+	1992
Nov	8.0	1995	28	12.0	1995	9	1977	29	2	1977
Dec	7.5	1984	27	21.8	1977	16+	2000	31	9	1977
Ann	13.0	Jan 1999	3	50.4	Jan 1979	36	Jan 1979	25	26	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.0	3.9	1.3	.6	.1
Feb	5.2	2.8	.7	.3	.0
Mar	3.4	1.8	.4	.2	@
Apr	.9	.5	.3	.1	.0
May	.1	.1	@	.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	.1	.1	.0	.0	.0
Nov	2.1	1.0	.2	@	.0
Dec	6.1	3.1	1.0	.1	.0
Ann	24.9	13.3	3.9	1.3	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	19.9	14.1	9.9	4.1
Feb	17.8	12.9	8.6	3.6
Mar	7.4	3.8	2.2	.7
Apr	1.1	.6	.2	.0
May	.1	@	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	@	.0	.0	.0
Nov	2.3	.8	.3	.0
Dec	13.8	7.2	3.8	.9
Ann	62.4	39.4	25.0	9.3

+ 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	6/01	5/26	5/21	5/17	5/13	5/09	5/05	5/01	4/24
32	5/14	5/09	5/05	5/02	4/29	4/26	4/23	4/19	4/14
28	5/01	4/27	4/23	4/20	4/18	4/15	4/12	4/08	4/04
24	4/18	4/15	4/12	4/10	4/08	4/05	4/03	4/01	3/28
20	4/12	4/07	4/04	4/01	3/29	3/26	3/23	3/19	3/14
16	4/05	3/31	3/27	3/23	3/20	3/17	3/13	3/09	3/04

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	9/17	9/21	9/24	9/26	9/28	9/30	10/02	10/05	10/08
32	9/25	9/29	10/01	10/04	10/06	10/08	10/11	10/13	10/17
28	10/03	10/08	10/13	10/16	10/20	10/23	10/27	10/31	11/06
24	10/16	10/21	10/25	10/29	11/01	11/04	11/07	11/11	11/17
20	10/24	10/30	11/03	11/07	11/10	11/13	11/17	11/21	11/26
16	11/04	11/10	11/15	11/18	11/22	11/25	11/29	12/03	12/09

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	160	152	146	141	137	133	128	122	114
32	179	172	167	163	159	155	151	146	140
28	209	200	194	189	184	180	174	168	160
24	226	220	215	211	207	203	198	194	187
20	251	242	236	231	225	220	215	209	200
16	272	263	257	251	246	241	235	228	219

***** 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	1514	1229	1003	591	273	48	9	34	151	479	880	1318	7529
60	1359	1089	848	445	171	13	0	8	67	336	730	1163	6229
57	1266	1005	755	362	122	5	0	2	35	259	640	1070	5521
55	1204	949	693	311	95	3	0	0	21	213	581	1008	5078
50	1049	809	546	195	44	0	0	0	4	119	440	856	4062
32	534	360	137	7	0	0	0	0	0	2	83	373	1496

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	43	55	158	408	794	1064	1235	1164	878	550	193	78	6620
55	0	0	0	21	176	377	522	452	209	48	1	0	1806
57	0	0	0	13	141	320	460	392	163	32	0	0	1521
60	0	0	0	6	97	238	367	305	105	15	0	0	1133
65	0	0	0	1	44	122	221	176	39	3	0	0	606
70	0	0	0	0	16	45	103	84	9	0	0	0	257

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	62	241	582	851	1006	939	661	337	79	6	0	3	65	306	888	1739	2745	3684	4345	4682	4761	4767
45	0	0	33	140	432	701	851	784	511	217	35	1	0	0	33	173	605	1306	2157	2941	3452	3669	3704	3705
50	0	0	11	76	293	551	696	629	369	119	15	0	0	0	11	87	380	931	1627	2256	2625	2744	2759	2759
55	0	0	3	37	176	403	541	475	241	59	3	0	0	0	3	40	216	619	1160	1635	1876	1935	1938	1938
60	0	0	0	16	95	266	386	321	135	23	0	0	0	0	0	16	111	377	763	1084	1219	1242	1242	1242
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	2	38	148	353	549	680	619	408	193	40	2	0	2	40	188	541	1090	1770	2389	2797	2990	3030	3032

(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