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: ARBORETUM UNIV WIS, WI **COOP ID: 470273**

Climate Division: WI 8 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 43˚03N** **Lon: 89˚24W**

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	27.3	5.0	16.2	55	1981	25	28.7	1990	-33	1979	11	2.2	1977	1514	0	.0	.0	.6	20.5	30.8	11.8
Feb	33.0	9.6	21.3	66	2000	26	32.2	1998	-38	1996	3	9.8	1979	1223	0	.0	.0	1.9	14.3	27.4	7.8
Mar	44.5	21.6	33.1	82	1986	30	41.2	2000	-12	1982	6	24.8	1975	990	0	.0	.0	8.8	4.7	26.6	1.7
Apr	57.7	33.2	45.5	95	1980	23	51.8	1977	4	1982	7	39.5	1975	587	1	.0	@	21.7	.3	14.7	.0
May	70.3	44.2	57.3	93	1991	30	63.5	1977	22	1989	7	50.9	1997	273	32	.0	.4	30.6	.0	3.2	.0
Jun	79.7	53.4	66.6	104	1988	21	71.3	1971	29	1977	9	60.9	1982	59	104	.1	3.1	30.0	.0	.1	.0
Jul	83.6	57.9	70.8	101	1988	16	75.4	1983	36	1972	5	65.9	1992	11	189	.1	5.4	31.0	.0	.0	.0
Aug	81.5	55.7	68.6	108	1988	2	75.8	1995	32	1979	16	63.9	1992	44	157	.2	3.4	31.0	.0	@	.0
Sep	73.9	47.0	60.5	99	1978	9	65.5	1978	20	1974	23	55.1	1993	166	29	.0	1.0	29.9	.0	1.7	.0
Oct	61.9	35.6	48.8	93	1976	2	57.5	1971	7	1988	31	41.7	1988	508	4	.0	@	26.9	.0	12.5	.0
Nov	45.5	24.7	35.1	77	1999	9	42.7	1999	-14	1976	29	27.3	1976	897	0	.0	.0	10.6	3.4	23.0	.5
Dec	32.3	11.9	22.1	65	1998	4	31.1	1998	-28	1983	25	10.6	1983	1329	0	.0	.0	1.8	15.3	30.0	6.5
Ann	57.6	33.3	45.5	108	Aug 1988	2	75.8	Aug 1995	-38	Feb 1996	3	2.2	Jan 1977	7601	516	.4	13.3	224.8	58.5	170.0	28.3

\+ 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: 1971-2001

(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	1.34	1.23	1.29	1974	27	3.00	1999	.32	1983
Feb	1.24	1.21	1.34	2001	9	2.83	2000	.00	1995
Mar	2.38	2.10	2.85	1998	31	5.48	1998	.15	1996
Apr	3.86	3.50	2.81	1999	23	8.11	1973	1.37	1985
May	3.84	3.78	3.74	2000	2	10.90	2000	.62	1992
Jun	4.60	3.88	4.11	1996	17	12.07	1996	1.01	1992
Jul	4.36	3.91	4.43	1977	18	10.45	1993	1.24	1976
Aug	4.10	3.52	6.00	2001	2	8.29	1972	1.49	1996
Sep	3.74	3.65	3.50	1994	24	9.44	1980	.08	1979
Oct	2.63	2.31	2.27	1991	25	6.27	1984	.69	2000
Nov	2.67	2.47	2.71	1971	2	6.68	1992	.16	1976
Dec	1.79	1.72	1.88	1971	15	4.75	1987	.34	1975
Ann	36.55	36.49	6.00	Aug 2001	2	12.07	Jun 1996	.00	Feb 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.9	4.2	.6	@
Feb	6.5	3.6	.6	.1
Mar	8.6	5.2	1.3	.4
Apr	11.0	7.2	2.6	.8
May	11.0	7.3	2.6	.9
Jun	9.9	7.0	2.7	1.3
Jul	9.6	6.3	2.9	1.2
Aug	9.9	6.6	3.4	1.0
Sep	9.4	5.9	2.2	.9
Oct	8.9	5.7	1.8	.6
Nov	9.1	5.8	1.5	.6
Dec	8.4	4.6	.9	.3
Ann	110.2	69.4	23.1	8.1

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	.34	.47	.67	.84	1.01	1.19	1.39	1.62	1.93	2.42	2.87
Feb	.07	.19	.39	.57	.76	.98	1.23	1.53	1.95	2.63	3.29
Mar	.30	.49	.83	1.16	1.51	1.90	2.35	2.90	3.66	4.89	6.09
Apr	1.47	1.83	2.34	2.77	3.18	3.59	4.04	4.56	5.22	6.24	7.17
May	1.01	1.37	1.92	2.41	2.90	3.40	3.96	4.63	5.50	6.87	8.15
Jun	.99	1.41	2.09	2.70	3.31	3.96	4.70	5.58	6.75	8.60	10.36
Jul	1.45	1.86	2.47	2.98	3.48	3.99	4.54	5.20	6.03	7.33	8.53
Aug	1.56	1.94	2.49	2.94	3.37	3.81	4.29	4.84	5.55	6.63	7.61
Sep	.47	.77	1.29	1.82	2.37	2.98	3.69	4.56	5.75	7.71	9.60
Oct	.63	.88	1.26	1.60	1.94	2.30	2.71	3.19	3.82	4.81	5.75
Nov	.63	.88	1.27	1.62	1.97	2.34	2.75	3.24	3.89	4.91	5.87
Dec	.31	.46	.73	.97	1.22	1.50	1.81	2.19	2.69	3.51	4.29
Ann	27.46	29.25	31.53	33.25	34.77	36.23	37.73	39.37	41.36	44.23	46.69

\+ 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: 1971-2001
(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	5.4	-99.9	4	3	10.8	1995	20	16.3	1985	13+	1999	9	8+	1999	3.2	2.1	1.0	.3	.1	-9.9	-9.9	-9.9	-9.9
Feb	2.0	-99.9	3	2	10.0	1993	22	10.0	1993	19	1994	13	12	1994	2.1	1.5	.7	.2	.1	-9.9	-9.9	-9.9	-9.9
Mar	3.2	.0	#	#	7.0	1998	9	14.3	1998	11	1994	1	3	1998	1.2	.8	.4	.2	.0	-9.9	-9.9	-9.9	-9.9
Apr	1.5	.0	#	0	8.3	1982	6	11.9	1982	4	1993	1	#+	2000	.4	.3	.1	.1	.0	.1	.0	.0	.0
May	.0	.0	#	0	.0	0	0	.0	0	2	1994	1	#	1994	.0	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	#	.0	#	0	#	1981	25	#	1981	3	1997	27	#+	1997	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	2.0	.0	#	0	7.5	1995	28	10.9	1986	8	1995	29	2	1995	.5	.4	.2	.1	.0	-9.9	-9.9	-9.9	-9.9
Dec	5.1	-99.9	2	1	12.0	1987	15	25.5	1987	18	2000	29	8+	2000	2.0	1.6	.4	.4	.1	-9.9	-9.9	-9.9	-9.9
Ann	19.2	-9.9	N/A	N/A	12.0	Dec 1987	15	25.5	Dec 1987	19	Feb 1994	13	12	Feb 1994	9.4	6.7	2.8	1.3	.3	-9.9	-9.9	-9.9	-9.9

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	6/18	6/12	6/07	6/04	5/31	5/28	5/24	5/20	5/14
32	6/08	5/31	5/26	5/22	5/18	5/14	5/09	5/04	4/27
28	5/18	5/13	5/09	5/06	5/03	5/01	4/27	4/24	4/19
24	5/04	4/29	4/26	4/23	4/20	4/17	4/14	4/11	4/06
20	4/23	4/18	4/16	4/13	4/11	4/08	4/06	4/03	3/30
16	4/14	4/10	4/07	4/04	4/02	3/30	3/28	3/25	3/20

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	8/31	9/06	9/09	9/13	9/16	9/19	9/22	9/26	10/01
32	9/09	9/15	9/19	9/22	9/25	9/28	10/02	10/06	10/11
28	9/23	9/27	9/30	10/03	10/05	10/07	10/10	10/13	10/17
24	9/29	10/05	10/10	10/13	10/17	10/20	10/24	10/28	11/03
20	10/10	10/16	10/20	10/24	10/27	10/30	11/03	11/07	11/13
16	10/20	10/25	10/30	11/02	11/06	11/09	11/13	11/17	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	131	123	117	112	107	102	97	91	82
32	160	149	142	136	130	124	117	110	100
28	175	168	162	158	154	150	145	140	133
24	203	195	189	184	179	174	169	163	155
20	219	212	207	203	199	195	191	186	179
16	237	231	226	221	217	214	209	204	198

***** 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	1514	1223	990	587	273	59	11	44	166	508	897	1329	7601
60	1359	1083	835	441	166	17	0	12	75	365	747	1174	6274
57	1266	999	742	358	116	7	0	4	40	288	657	1081	5558
55	1204	943	680	306	88	4	0	1	25	241	598	1019	5109
50	1049	803	533	190	38	0	0	0	5	144	455	864	4081
32	533	358	129	7	0	0	0	0	0	5	88	370	1490

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	41	59	163	411	783	1036	1201	1136	852	524	181	64	6451
55	0	0	0	20	157	349	488	424	187	47	1	0	1673
57	0	0	0	12	123	292	426	365	143	31	0	0	1392
60	0	0	0	5	81	213	333	279	87	16	0	0	1014
65	0	0	0	1	32	104	189	157	29	4	0	0	516
70	0	0	0	0	10	35	80	72	5	0	0	0	202

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	56	225	546	804	963	895	623	304	67	6	0	3	59	284	830	1634	2597	3492	4115	4419	4486	4492
45	0	0	24	134	397	654	808	740	474	184	31	1	0	0	24	158	555	1209	2017	2757	3231	3415	3446	3447
50	0	0	10	72	259	506	653	586	332	98	12	0	0	0	10	82	341	847	1500	2086	2418	2516	2528	2528
55	0	0	3	34	154	359	498	431	207	48	1	0	0	0	3	37	191	550	1048	1479	1686	1734	1735	1735
60	0	0	0	15	79	227	345	282	111	17	0	0	0	0	0	15	94	321	666	948	1059	1076	1076	1076
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	43	152	347	520	639	590	401	207	47	3	0	1	44	196	543	1063	1702	2292	2693	2900	2947	2950

(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