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: WAUKESHA, WI **COOP ID: 478937**

Climate Division: WI 9 **NWS Call Sign:** **Elevation: 830 Feet** **Lat: 43˚01N** **Lon: 88˚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	27.5	11.4	19.5	58+	1997	5	30.3	1990	-27+	1994	18	6.6	1977	1413	0	.0	.0	.5	20.6	29.9	7.1
Feb	32.8	16.5	24.7	66	1999	12	36.4	1998	-28	1996	3	14.8	1979	1130	0	.0	.0	1.8	14.2	26.2	3.3
Mar	43.9	26.6	35.3	82	1986	30	42.4	1973	-14	1962	1	28.7	1984	922	0	.0	.0	8.5	5.1	23.6	.2
Apr	57.0	37.5	47.3	91	1980	22	53.8	1977	7	1982	7	42.4	1975	534	2	.0	@	20.4	.3	9.4	.0
May	70.1	48.5	59.3	93	1975	19	67.9	1977	26+	1978	1	53.6	1983	230	53	.0	.6	30.4	.0	.7	.0
Jun	80.0	58.1	69.1	100+	1995	21	75.0	1995	35	1980	11	63.6	1982	45	165	.2	3.3	30.0	.0	.0	.0
Jul	84.2	63.4	73.8	109	1995	14	78.3	1983	43	1950	14	68.3	1992	7	278	.2	5.6	31.0	.0	.0	.0
Aug	81.5	61.8	71.7	101	1948	24	78.1	1995	39	1950	20	66.9	1997	20	226	.1	3.1	31.0	.0	.0	.0
Sep	73.4	53.0	63.2	101+	1953	2	68.2	1971	28	1949	29	60.0	1993	107	54	.0	.9	29.9	.0	.2	.0
Oct	61.0	41.8	51.4	88+	1971	1	59.4	1971	17+	1987	21	43.9	1987	428	6	.0	.0	26.6	.0	4.8	.0
Nov	45.4	29.8	37.6	77	1950	1	44.7	1999	-9	1950	24	28.9	1995	823	0	.0	.0	10.3	3.7	18.8	.1
Dec	32.6	17.8	25.2	68	2001	6	33.6	1994	-23	1983	24	14.2	1983	1234	0	.0	.0	1.6	14.5	28.1	3.5
Ann	57.5	38.9	48.2	109	Jul 1995	14	78.3	Jul 1983	-28	Feb 1996	3	6.6	Jan 1977	6893	784	.5	13.5	222.0	58.4	141.7	14.2

\+ 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

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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	1.48	1.29	1.45	1982	4	4.27	1999	.23	1981
Feb	1.31	1.15	1.60	1997	21	3.20	1997	.00	1987
Mar	2.28	2.02	2.10	1976	4	5.54	1976	.46	1980
Apr	3.53	3.42	3.37	1973	21	7.88	1973	1.12	1989
May	3.02	3.12	2.21	1970	12	8.05	2000	.88	1988
Jun	3.78	3.53	3.93	1997	21	7.83	1996	.53	1995
Jul	3.83	3.57	5.09	1952	18	7.54	2000	1.40	1998
Aug	4.77	4.35	3.52	1995	20	10.83	1995	1.10	1973
Sep	3.52	3.36	3.70	1961	13	8.40	1972	.00	1979
Oct	2.62	2.39	2.06	1991	5	5.79	1985	.54	1975
Nov	2.63	2.41	2.42	1982	1	5.99	1985	.53	1976
Dec	1.87	1.73	1.65	1982	2	4.21	1971	.34	1976
Ann	34.64	34.76	5.09	Jul 1952	18	10.83	Aug 1995	.00+	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.4	4.6	.7	.2
Feb	8.0	3.7	.7	.1
Mar	9.9	5.4	1.3	.1
Apr	12.2	7.0	2.4	.6
May	11.1	6.5	1.9	.7
Jun	10.2	6.2	2.6	1.0
Jul	10.0	6.4	2.6	1.1
Aug	10.1	7.5	3.2	1.4
Sep	8.9	5.8	2.2	.9
Oct	9.2	5.1	1.7	.5
Nov	10.4	5.7	1.7	.4
Dec	10.2	4.8	1.0	.2
Ann	120.6	68.7	22.0	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	.32	.46	.67	.87	1.07	1.27	1.51	1.79	2.16	2.75	3.31
Feb	.17	.33	.55	.74	.93	1.13	1.35	1.62	1.97	2.54	3.07
Mar	.49	.70	1.03	1.34	1.64	1.97	2.33	2.77	3.35	4.27	5.15
Apr	1.24	1.57	2.06	2.46	2.85	3.25	3.69	4.20	4.85	5.85	6.77
May	.96	1.24	1.67	2.03	2.38	2.74	3.14	3.61	4.21	5.15	6.01
Jun	1.09	1.45	1.99	2.46	2.92	3.39	3.92	4.54	5.35	6.61	7.79
Jul	1.57	1.92	2.42	2.82	3.21	3.59	4.01	4.49	5.10	6.03	6.87
Aug	1.61	2.06	2.72	3.28	3.82	4.37	4.98	5.69	6.60	8.01	9.31
Sep	.46	.90	1.50	2.00	2.50	3.03	3.63	4.34	5.28	6.77	8.18
Oct	.62	.86	1.24	1.59	1.93	2.29	2.69	3.17	3.80	4.80	5.74
Nov	.67	.92	1.30	1.64	1.97	2.32	2.71	3.18	3.78	4.73	5.62
Dec	.44	.61	.88	1.13	1.37	1.63	1.92	2.26	2.71	3.43	4.11
Ann	28.15	29.47	31.13	32.36	33.44	34.47	35.52	36.66	38.04	40.00	41.66

\+ 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
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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	12.5	13.5	6	5	14.0	1982	4	27.4	1982	30	1979	19	21	1979	7.3	4.0	1.4	.4	.2	20.0	14.9	9.6	2.9
Feb	9.0	9.0	5	4	8.0	1974	5	30.6	1994	18	1994	13	12	1979	4.5	2.7	1.0	.3	.0	17.5	12.2	7.6	2.2
Mar	7.0	6.3	1	1	11.0	1971	18	19.7	1972	14	1971	19	5	1971	3.7	2.1	.8	.3	@	6.1	3.5	2.0	.2
Apr	3.1	1.5	#	#	14.0	1973	9	18.0	1973	14	1973	9	2	1973	1.2	.8	.3	.2	@	.8	.5	.3	.1
May	#	.0	0	0	#	1971	2	#	1971	0	0	0	0	0	.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	.1	.0	#	0	1.7	1992	20	1.7	1992	2	1992	20	#+	1997	.1	.1	.0	.0	.0	.1	.0	.0	.0
Nov	3.2	2.0	#	#	10.0	1995	28	15.1	1995	10	1995	29	3	1995	1.9	1.2	.2	.1	@	2.8	1.1	.6	.1
Dec	8.1	7.2	2	2	9.3	1984	26	23.1	1978	20	2000	31	10	2000	6.3	3.7	.9	.3	.0	15.1	7.0	3.0	.1
Ann	43.0	39.5	N/A	N/A	14.0+	Jan 1982	4	30.6	Feb 1994	30	Jan 1979	19	21	Jan 1979	25.0	14.6	4.6	1.6	.2	62.4	39.2	23.1	5.6

+ 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	5/28	5/23	5/19	5/16	5/13	5/10	5/07	5/04	4/29
32	5/11	5/06	5/03	4/30	4/27	4/25	4/22	4/18	4/14
28	4/28	4/23	4/20	4/17	4/14	4/12	4/09	4/05	4/01
24	4/17	4/13	4/11	4/08	4/06	4/04	4/02	3/30	3/26
20	4/11	4/06	4/02	3/30	3/27	3/24	3/20	3/17	3/11
16	4/03	3/29	3/25	3/21	3/18	3/15	3/12	3/08	3/02

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	9/20	9/24	9/27	9/29	10/02	10/04	10/07	10/09	10/14
32	9/26	10/01	10/06	10/09	10/13	10/16	10/19	10/24	10/29
28	10/09	10/15	10/19	10/23	10/26	10/29	11/02	11/06	11/12
24	10/21	10/25	10/28	10/31	11/03	11/05	11/08	11/11	11/16
20	10/30	11/05	11/09	11/13	11/16	11/19	11/23	11/27	12/03
16	11/09	11/14	11/18	11/22	11/25	11/28	12/01	12/05	12/11

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	152	148	144	141	137	134	130	124
32	192	183	177	172	168	163	158	152	144
28	215	208	202	198	194	190	185	180	173
24	226	221	217	213	210	207	203	199	193
20	260	251	244	239	234	228	223	216	207
16	276	268	261	256	251	246	241	234	226

***** 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	1413	1130	922	534	230	45	7	20	107	428	823	1234	6893
60	1258	990	767	390	135	13	0	4	39	292	673	1079	5640
57	1165	906	674	310	91	6	0	0	18	221	585	986	4962
55	1103	850	613	260	68	3	0	0	9	180	526	924	4536
50	948	710	467	154	27	0	0	0	1	97	389	773	3566
32	437	271	89	3	0	0	0	0	0	2	63	303	1168

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	47	65	189	461	846	1111	1295	1229	937	603	230	93	7106
55	0	0	1	28	201	423	582	516	256	68	3	0	2078
57	0	0	0	17	162	366	520	454	205	48	2	0	1774
60	0	0	0	8	113	284	427	365	137	25	0	0	1359
65	0	0	0	2	53	165	278	226	54	6	0	0	784
70	0	0	0	0	20	79	148	119	14	0	0	0	380

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	7	68	242	578	848	1025	962	684	360	89	7	0	7	75	317	895	1743	2768	3730	4414	4774	4863	4870
45	0	1	31	142	428	698	870	807	535	225	40	3	0	1	32	174	602	1300	2170	2977	3512	3737	3777	3780
50	0	0	13	77	286	548	715	652	391	127	15	0	0	0	13	90	376	924	1639	2291	2682	2809	2824	2824
55	0	0	6	40	173	399	560	497	256	63	3	0	0	0	6	46	219	618	1178	1675	1931	1994	1997	1997
60	0	0	1	17	90	265	405	343	149	24	0	0	0	0	1	18	108	373	778	1121	1270	1294	1294	1294
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	2	44	142	342	547	689	638	419	194	42	2	0	2	46	188	530	1077	1766	2404	2823	3017	3059	3061

(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