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: MADELINE ISLAND, WI **COOP ID: 474953**

Climate Division: WI 2 **NWS Call Sign:** **Elevation: 660 Feet** **Lat: 46˚47N** **Lon: 90˚46W**

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	21.0	3.4	12.2	52	1981	25	21.6	1990	-35	1982	10	.3	1977	1638	0	.0	.0	.1	26.0	31.0	12.5
Feb	26.5	6.1	16.3	56	1994	19	30.8	1998	-35	1979	17	2.7	1979	1364	0	.0	.0	.4	18.8	27.9	10.0
Mar	35.4	15.7	25.6	65+	2000	8	35.0	2000	-31	1962	1	17.9	1984	1223	0	.0	.0	2.7	10.5	29.0	3.1
Apr	48.1	27.8	38.0	87+	1987	20	46.2	1987	0	1972	8	32.6	1975	813	0	.0	.0	13.4	1.3	21.1	@
May	61.2	37.7	49.5	92	1986	29	56.6	1988	18	1979	1	42.3	1979	492	10	.0	.1	27.7	.0	7.1	.0
Jun	70.6	47.2	58.9	97	1995	19	65.6+	1988	28	1976	1	52.7	1982	213	29	.0	.6	29.8	.0	.4	.0
Jul	76.6	54.5	65.6	102	1988	28	72.4	1988	35+	1979	4	59.6	1992	82	100	.1	1.1	31.0	.0	.0	.0
Aug	75.4	54.2	64.8	97	1961	14	70.0	1998	33	1976	29	59.8	1977	92	86	.0	.7	31.0	.0	.0	.0
Sep	66.7	46.2	56.5	93	1948	12	62.3	1998	26+	1976	24	51.0	1974	271	15	.0	.1	29.5	.0	.8	.0
Oct	54.6	36.1	45.4	87	1992	3	50.9	1971	17+	1996	31	39.7	1976	610	0	.0	.0	21.9	@	9.6	.0
Nov	38.2	24.7	31.5	72+	1999	9	39.5	1999	-5	1976	30	24.9	1995	1007	0	.0	.0	4.1	7.9	24.3	.3
Dec	26.1	12.3	19.2	58	1998	4	28.4	1997	-23	1976	30	7.8	1983	1419	0	.0	.0	.2	21.8	30.5	5.7
Ann	50.0	30.5	40.3	102	Jul 1988	28	72.4	Jul 1988	-35+	Jan 1982	10	.3	Jan 1977	9224	240	.1	2.6	191.8	86.3	181.7	31.6

\+ 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

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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	1.64	1.45	1.42	1997	5	4.01	1975	.00+	1990
Feb	1.14	.99	2.00	1971	5	3.40	1971	.08	1993
Mar	2.05	1.79	3.00	1967	21	4.99	1977	.08	1999
Apr	2.40	2.38	3.00	1984	30	7.00	1991	.15	1988
May	3.29	2.82	4.73	1964	23	8.80	1985	1.04	1975
Jun	4.16	3.46	6.00	1967	19	9.05	1985	.77	1995
Jul	3.98	3.51	4.40	1987	17	10.44	1987	1.15	1989
Aug	3.98	3.52	4.10	1972	16	10.06	1972	1.57	1996
Sep	3.58	3.01	4.00	1955	17	9.56	1990	.92	1976
Oct	2.74	2.78	2.40	1973	9	5.71	1982	.68	1976
Nov	2.66	2.44	2.60	1991	2	8.35	1991	.33	1990
Dec	1.56	1.78	2.00	1965	12	2.84	1996	.26	1994
Ann	33.18	31.92	6.00	Jun 1967	19	10.44	Jul 1987	.00+	Jan 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	12.2	5.5	.8	.2
Feb	8.3	3.6	.5	.1
Mar	9.2	4.6	1.1	.4
Apr	8.8	5.8	1.4	.4
May	9.9	7.0	2.2	.7
Jun	11.9	8.1	3.0	1.1
Jul	11.5	7.6	3.1	1.2
Aug	10.8	7.0	2.7	1.1
Sep	11.7	7.4	2.3	.8
Oct	10.6	6.3	1.7	.5
Nov	10.2	6.3	1.9	.5
Dec	10.9	5.0	.6	.1
Ann	126.0	74.2	21.3	7.1

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	.00	.39	.74	.99	1.23	1.47	1.75	2.05	2.45	3.09	3.69
Feb	.25	.35	.52	.67	.82	.98	1.16	1.38	1.67	2.12	2.55
Mar	.38	.56	.86	1.14	1.42	1.73	2.08	2.50	3.06	3.96	4.82
Apr	.42	.64	.99	1.31	1.65	2.01	2.43	2.93	3.59	4.67	5.70
May	1.15	1.46	1.91	2.29	2.66	3.03	3.44	3.91	4.52	5.45	6.31
Jun	1.40	1.79	2.37	2.86	3.33	3.81	4.34	4.95	5.75	6.97	8.11
Jul	1.09	1.47	2.04	2.54	3.04	3.55	4.12	4.80	5.67	7.05	8.34
Aug	1.31	1.69	2.24	2.71	3.17	3.63	4.15	4.75	5.52	6.72	7.82
Sep	1.04	1.38	1.89	2.34	2.77	3.22	3.71	4.30	5.05	6.24	7.34
Oct	.83	1.09	1.48	1.81	2.14	2.48	2.85	3.29	3.86	4.74	5.56
Nov	.52	.76	1.15	1.51	1.88	2.27	2.71	3.24	3.95	5.08	6.16
Dec	.46	.61	.83	1.03	1.21	1.41	1.62	1.87	2.20	2.71	3.18
Ann	23.23	25.15	27.60	29.48	31.14	32.75	34.42	36.27	38.51	41.76	44.58

\+ 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)

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	21.6	22.7	15	14	14.1	1997	5	40.0	1976	35	1997	6	31	1997	9.8	6.7	2.3	.9	.2	-9.9	-9.9	-9.9	-9.9
Feb	12.0	11.4	18	17	12.0	1971	5	20.8	1972	40	1971	15	33	1971	5.5	3.8	1.2	.6	.1	-9.9	-9.9	-9.9	-9.9
Mar	12.0	12.9	12	11	13.0	1976	5	30.3	1976	42	1972	10	30	1972	5.4	3.2	1.2	.5	.2	24.1	23.9	22.8	15.8
Apr	3.3	1.2	2	1	6.4	1994	29	12.2+	1996	27	1972	9	12	1972	1.7	1.1	.4	.2	.0	4.8	4.1	3.1	1.1
May	.2	.0	#	0	2.4	1997	12	2.4	1997	5	1984	1	#+	1997	.1	.1	.0	.0	.0	.1	.1	@	.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	.2	#	#	0	2.0	1979	23	2.0+	1982	1	1993	31	#+	2000	.4	.2	.0	.0	.0	.1	.0	.0	.0
Nov	7.3	6.8	1	1	13.0	1991	30	23.5	1975	20	1975	28	8	1991	4.0	2.7	.8	.4	.1	5.7	2.3	.9	.5
Dec	13.4	15.2	7	4	12.0	1983	15	20.8	1974	36	1985	15	34	1985	8.3	4.7	1.5	.6	.1	-9.9	-9.9	-9.9	-9.9
Ann	70.0	70.2	N/A	N/A	14.1	Jan 1997	5	40.0	Jan 1976	42	Mar 1972	10	34	Dec 1985	35.2	22.5	7.4	3.2	.7	-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	6/23	6/18	6/14	6/11	6/08	6/05	6/02	5/29	5/24
32	6/12	6/07	6/03	5/31	5/27	5/24	5/21	5/17	5/12
28	5/26	5/20	5/16	5/12	5/09	5/05	5/02	4/28	4/22
24	5/12	5/07	5/03	4/30	4/27	4/24	4/21	4/18	4/13
20	5/01	4/25	4/20	4/17	4/13	4/10	4/06	4/02	3/27
16	4/18	4/13	4/09	4/06	4/03	3/31	3/28	3/25	3/19

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	9/09	9/14	9/17	9/20	9/22	9/25	9/28	10/01	10/05
32	9/19	9/24	9/27	9/29	10/02	10/04	10/07	10/10	10/14
28	9/28	10/03	10/07	10/11	10/14	10/17	10/21	10/25	10/30
24	10/16	10/21	10/24	10/27	10/30	11/01	11/04	11/08	11/12
20	10/29	11/02	11/05	11/08	11/11	11/13	11/16	11/19	11/24
16	11/03	11/08	11/12	11/15	11/18	11/21	11/25	11/28	12/04

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	127	120	114	110	106	101	97	91	84
32	147	140	135	130	127	123	118	113	106
28	182	173	167	162	157	153	148	142	133
24	206	199	194	189	185	181	176	171	164
20	235	226	220	215	211	206	201	195	187
16	253	245	238	233	228	223	218	212	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	1638	1364	1223	813	492	213	82	92	271	610	1007	1419	9224
60	1483	1224	1068	663	355	116	26	31	157	457	857	1264	7701
57	1390	1140	975	575	282	73	11	13	104	369	767	1171	6870
55	1328	1084	913	517	238	51	6	8	75	313	707	1109	6349
50	1173	944	758	379	147	17	0	0	27	190	557	954	5146
32	634	477	262	51	7	0	0	0	0	5	130	438	2004

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	19	37	62	228	547	806	1040	1018	734	418	113	41	5063
55	0	0	0	5	65	167	334	312	119	13	0	0	1015
57	0	0	0	3	47	130	277	256	87	7	0	0	807
60	0	0	0	1	27	82	198	180	51	3	0	0	542
65	0	0	0	0	10	29	100	86	15	0	0	0	240
70	0	0	0	0	1	8	35	27	3	0	0	0	74

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	7	78	322	582	812	788	519	212	29	0	0	0	7	85	407	989	1801	2589	3108	3320	3349	3349
45	0	0	0	34	192	432	657	633	371	108	10	0	0	0	0	34	226	658	1315	1948	2319	2427	2437	2437
50	0	0	0	11	101	287	502	478	235	42	1	0	0	0	0	11	112	399	901	1379	1614	1656	1657	1657
55	0	0	0	2	47	165	348	323	127	14	0	0	0	0	0	2	49	214	562	885	1012	1026	1026	1026
60	0	0	0	0	17	79	205	185	54	2	0	0	0	0	0	0	17	96	301	486	540	542	542	542
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	0	4	62	199	345	510	488	292	111	13	0	0	0	4	66	265	610	1120	1608	1900	2011	2024	2024

(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

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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