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: RICHLAND CENTER, WI **COOP ID: 477158**

Climate Division: WI 7 **NWS Call Sign:** **Elevation: 723 Feet** **Lat: 43˚19N** **Lon: 90˚23W**

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	26.3	4.5	15.4	56+	1981	25	26.6	1990	-46	1951	30	2.2	1977	1537	0	.0	.0	.6	21.0	30.7	11.6
Feb	32.4	9.8	21.1	63+	2000	27	33.6	1998	-40	1951	2	9.7	1979	1229	0	.0	.0	2.0	13.8	27.1	6.9
Mar	43.8	21.8	32.8	84	1986	30	40.8	1973	-30	1962	1	25.0	1975	998	0	.0	.0	9.4	4.6	25.1	1.4
Apr	57.6	33.5	45.6	93	1980	23	51.7	1977	0	1982	6	40.3	1975	585	1	.0	@	22.4	.2	13.8	@
May	70.1	44.0	57.1	93	1949	5	65.2	1977	21	1966	10	50.9	1997	278	31	.0	.6	30.5	.0	2.9	.0
Jun	79.2	53.6	66.4	103	1988	21	71.5	1971	33	1993	1	60.5	1982	59	101	.1	2.9	30.0	.0	.0	.0
Jul	83.5	58.3	70.9	102	1988	16	74.8	1977	38	1972	6	65.5	1992	16	198	.1	6.3	31.0	.0	.0	.0
Aug	80.7	56.2	68.5	102+	1988	18	74.9	1995	33	1986	28	63.0	1992	50	156	.1	3.1	31.0	.0	.0	.0
Sep	72.5	46.8	59.7	99	1955	9	64.2	1998	23	1949	29	54.3	1993	184	23	.0	.8	29.9	.0	1.4	.0
Oct	60.8	35.0	47.9	91+	1976	2	56.2	1971	12	1952	29	41.5	1988	532	2	.0	@	27.1	.1	11.8	.0
Nov	44.2	23.3	33.8	77	1964	3	41.9	1999	-13	1977	26	26.2	1976	937	0	.0	.0	10.7	4.1	23.8	.7
Dec	31.0	11.0	21.0	64	1998	6	28.5	1998	-31	1950	27	7.9	1983	1363	0	.0	.0	1.3	15.6	29.9	6.6
Ann	56.8	33.2	45.0	103	Jun 1988	21	74.9	Aug 1995	-46	Jan 1951	30	2.2	Jan 1977	7768	512	.3	13.7	225.9	59.4	166.5	27.2

\+ 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

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	1.18	1.08	1.03	1988	20	2.71	1996	.08	1981
Feb	1.12	.96	1.47	1966	8	3.59	1971	.02	1996
Mar	2.19	1.86	3.29	1998	31	6.16	1998	.00	1996
Apr	3.96	3.30	3.00	1999	3	11.82	1999	.95	1997
May	3.86	3.80	3.68	2000	18	7.96	2000	.60	1981
Jun	4.34	3.71	4.71	1967	28	10.85	1998	.63	1988
Jul	4.79	3.37	4.92	1978	1	12.81	1978	1.22	1990
Aug	4.37	4.42	5.43	2001	2	9.40	1972	.79	1976
Sep	3.71	3.64	3.38	1961	30	10.25	1992	.27	1979
Oct	2.25	2.19	2.86	1959	24	5.51	1984	.41	1975
Nov	2.51	2.22	3.08	1982	12	6.10	1982	.13	1976
Dec	1.32	1.25	1.14+	1971	15	2.68	1982	.22	1996
Ann	35.60	36.15	5.43	Aug 2001	2	12.81	Jul 1978	.00	Mar 1996

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.0	4.0	.3	@
Feb	7.2	3.3	.6	.1
Mar	8.3	4.9	1.3	.4
Apr	11.7	7.7	2.5	1.0
May	11.0	7.1	2.7	.8
Jun	10.7	7.0	2.9	1.2
Jul	10.4	6.6	3.2	1.7
Aug	10.8	7.0	3.0	1.4
Sep	10.4	6.4	2.3	1.0
Oct	9.6	5.1	1.7	.4
Nov	9.9	5.3	1.6	.3
Dec	9.2	3.8	.7	.1
Ann	118.2	68.2	22.8	8.4

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	.24	.35	.52	.68	.84	1.01	1.21	1.44	1.75	2.25	2.72
Feb	.06	.13	.26	.42	.59	.79	1.04	1.35	1.79	2.55	3.30
Mar	.23	.50	.86	1.18	1.50	1.85	2.24	2.71	3.33	4.33	5.29
Apr	1.26	1.63	2.19	2.66	3.12	3.60	4.12	4.73	5.52	6.74	7.88
May	1.31	1.67	2.21	2.66	3.09	3.54	4.03	4.60	5.33	6.46	7.51
Jun	.94	1.34	1.98	2.56	3.14	3.75	4.44	5.28	6.37	8.12	9.77
Jul	1.11	1.56	2.26	2.89	3.51	4.17	4.92	5.80	6.96	8.81	10.55
Aug	1.26	1.68	2.31	2.85	3.38	3.93	4.54	5.26	6.19	7.65	9.00
Sep	.59	.91	1.44	1.96	2.49	3.06	3.73	4.53	5.62	7.37	9.06
Oct	.64	.86	1.18	1.46	1.74	2.02	2.34	2.71	3.19	3.95	4.65
Nov	.48	.70	1.07	1.41	1.76	2.13	2.55	3.06	3.74	4.82	5.85
Dec	.30	.43	.62	.79	.96	1.15	1.35	1.60	1.92	2.43	2.91
Ann	25.62	27.56	30.05	31.93	33.60	35.21	36.88	38.72	40.94	44.17	46.95

\+ 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	11.6	8.5	5	3	12.0	1996	27	31.5	1979	23+	1979	24	17	1971	6.1	4.0	1.2	.4	@	23.6	16.1	11.6	5.1
Feb	8.4	7.5	5	3	7.0	1971	5	27.1	1994	22	1971	9	17	1979	4.7	3.0	1.0	.3	.0	19.9	14.2	10.8	4.2
Mar	5.9	5.8	2	1	10.0	1998	9	17.5	1971	12+	1998	10	6	1975	2.6	2.0	.7	.2	@	9.6	5.7	3.3	.4
Apr	2.1	.9	#	#	12.0	1973	9	15.3	1973	12	1973	9	1	1973	1.1	.9	.2	.1	@	1.0	.2	.2	@
May	#	.0	0	0	#	1976	3	#	1976	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	2.5	1997	27	2.5	1997	#+	1997	26	#+	1997	@	@	.0	.0	.0	.0	.0	.0	.0
Nov	5.2	3.4	#	#	9.0	1985	9	24.5	1985	10	1977	29	2	1985	2.2	1.9	.6	.2	.0	3.8	1.6	.8	.1
Dec	8.7	7.5	3	2	8.0	1985	1	22.8	1985	21	1985	26	16	1985	5.1	3.3	.9	.3	.0	16.1	8.2	4.5	2.3
Ann	42.0	33.6	N/A	N/A	12.0+	Jan 1996	27	31.5	Jan 1979	23+	Jan 1979	24	17+	Feb 1979	21.8	15.1	4.6	1.5	@	74.0	46.0	31.2	12.1

+ 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	6/10	6/04	5/31	5/28	5/25	5/22	5/19	5/15	5/09
32	5/22	5/18	5/15	5/13	5/10	5/08	5/05	5/02	4/28
28	5/14	5/09	5/05	5/02	4/29	4/26	4/23	4/19	4/14
24	4/25	4/21	4/18	4/15	4/13	4/11	4/08	4/05	4/01
20	4/17	4/13	4/10	4/08	4/06	4/03	4/01	3/29	3/25
16	4/13	4/08	4/04	3/31	3/28	3/25	3/22	3/18	3/13

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	9/07	9/12	9/15	9/18	9/20	9/23	9/25	9/29	10/03
32	9/15	9/20	9/23	9/26	9/28	10/01	10/03	10/07	10/11
28	9/25	9/29	10/02	10/05	10/08	10/10	10/13	10/16	10/21
24	10/05	10/11	10/14	10/18	10/21	10/23	10/27	10/30	11/05
20	10/17	10/21	10/25	10/28	10/31	11/03	11/06	11/09	11/14
16	10/22	10/29	11/02	11/06	11/10	11/14	11/18	11/22	11/29

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	137	130	125	121	118	114	110	105	98
32	156	151	147	143	140	137	134	130	125
28	180	173	169	165	161	157	153	148	142
24	210	203	198	194	190	186	181	176	169
20	227	221	216	211	208	204	199	194	188
16	253	244	237	231	226	221	215	208	199

***** 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	1537	1229	998	585	278	59	16	50	184	532	937	1363	7768
60	1382	1089	843	439	171	17	1	14	86	386	787	1208	6423
57	1289	1005	750	356	120	7	0	5	47	305	697	1115	5696
55	1227	949	688	303	92	3	0	2	30	256	638	1053	5241
50	1072	809	541	188	40	0	0	0	6	153	494	898	4201
32	551	364	134	6	0	0	0	0	0	6	111	403	1575

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	37	59	159	412	776	1032	1206	1130	829	499	164	63	6366
55	0	0	0	19	155	345	493	419	169	36	1	0	1637
57	0	0	0	11	121	289	431	360	126	23	0	0	1361
60	0	0	0	5	79	209	339	276	75	11	0	0	994
65	0	0	0	1	31	101	198	156	23	2	0	0	512
70	0	0	0	0	10	33	93	73	4	0	0	0	213

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	1	61	236	552	814	979	907	624	294	60	4	0	1	62	298	850	1664	2643	3550	4174	4468	4528	4532
45	0	0	27	134	403	664	824	752	476	183	24	0	0	0	27	161	564	1228	2052	2804	3280	3463	3487	3487
50	0	0	9	67	263	514	669	597	331	96	6	0	0	0	9	76	339	853	1522	2119	2450	2546	2552	2552
55	0	0	4	32	150	366	514	442	207	44	1	0	0	0	4	36	186	552	1066	1508	1715	1759	1760	1760
60	0	0	0	15	74	230	361	292	115	13	0	0	0	0	0	15	89	319	680	972	1087	1100	1100	1100
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	42	164	354	527	648	589	395	199	41	2	0	1	43	207	561	1088	1736	2325	2720	2919	2960	2962

(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