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: POWERS LAKE 1 N, ND **COOP ID: 327281**

Climate Division: ND 3 **NWS Call Sign:** **Elevation: 2,205 Feet** **Lat: 48˚34N** **Lon: 102˚39W**

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	16.0	-5.5	5.3	48	1981	24	19.6	1990	-44	1996	19	-11.6	1982	1854	0	.0	.0	.0	25.5	31.0	19.3
Feb	23.4	3.2	13.3	60	1992	28	25.6	1984	-44	1962	27	-2.6	1994	1448	0	.0	.0	.5	19.0	28.2	12.6
Mar	34.9	14.9	24.9	75+	1986	29	35.9	1986	-40	1962	1	13.2	1996	1244	0	.0	.0	4.0	12.3	30.1	5.9
Apr	52.3	27.9	40.1	94+	1980	22	51.0	1987	-24	1975	2	29.7	1979	749	1	.0	.1	17.3	2.3	21.6	.4
May	66.6	39.7	53.2	102	1980	23	61.0	1977	13+	1967	3	45.8	1979	384	16	@	.7	28.5	.1	7.0	.0
Jun	74.2	49.1	61.7	103	1988	20	72.7	1988	26	1969	12	55.9	1985	164	64	.2	1.7	29.9	.0	.4	.0
Jul	79.6	53.4	66.5	106	1960	20	71.9	1989	28	1967	3	59.5	1993	80	127	.3	4.0	31.0	.0	.0	.0
Aug	79.4	51.6	65.5	103	1983	7	73.0	1983	29	1964	12	58.8	1977	110	126	.2	4.2	31.0	.0	.2	.0
Sep	67.5	40.5	54.0	101	1978	4	60.5	1990	15	1974	30	48.2	1972	347	17	.1	1.1	27.7	.0	5.1	.0
Oct	54.5	28.6	41.6	92	1953	1	45.5	1977	-9	1991	30	36.9	1991	727	0	.0	.1	20.2	1.5	21.2	.1
Nov	34.3	14.1	24.2	76	1999	8	34.5	1981	-30+	1985	30	12.1	1985	1224	0	.0	.0	4.3	13.4	29.1	4.5
Dec	21.4	.2	10.8	54+	1969	2	22.8	1997	-48	1983	23	-5.9	1983	1681	0	.0	.0	.1	23.4	31.0	14.7
Ann	50.3	26.5	38.4	106	Jul 1960	20	73.0	Aug 1983	-48	Dec 1983	23	-11.6	Jan 1982	10012	351	.8	11.9	194.5	97.5	204.9	57.5

\+ 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	.38	.33	.54	1976	1	1.17	1989	.00	1973
Feb	.37	.29	.81	1998	25	1.53	1998	.00	1971
Mar	.72	.57	1.40	1975	26	2.56	1975	.15+	1984
Apr	1.27	1.17	1.52	1980	7	4.21	1975	.12	1987
May	2.12	1.80	2.50	1972	26	6.16	1999	.06	1980
Jun	2.74	2.58	2.85	1969	27	6.15	1993	.53	1979
Jul	2.90	2.88	3.75	1948	13	8.74	1993	.66	1985
Aug	1.94	1.83	3.70	1993	22	5.15	1993	.04	1979
Sep	1.71	1.53	2.69	1975	19	4.44	1977	.14	1997
Oct	1.07	.66	1.50	1982	28	4.02	1982	.00	1976
Nov	.55	.51	1.08	2000	2	1.83	2000	.00+	1982
Dec	.33	.35	.60	1948	4	.69	1996	.00	1987
Ann	16.10	15.04	3.75	Jul 1948	13	8.74	Jul 1993	.00+	Dec 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.9	1.7	.1	.0
Feb	4.1	1.2	@	.0
Mar	5.4	2.6	.2	@
Apr	6.3	3.3	.7	.1
May	8.4	5.4	.9	.3
Jun	9.9	6.5	1.5	.6
Jul	8.7	5.9	1.8	.8
Aug	7.0	4.2	1.0	.4
Sep	6.9	4.2	.8	.3
Oct	5.5	3.0	.6	.1
Nov	4.4	1.8	.1	@
Dec	4.1	1.3	.0	.0
Ann	74.6	41.1	7.7	2.6

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	.06	.11	.18	.23	.28	.33	.39	.46	.55	.70	.83
Feb	.02	.05	.11	.16	.22	.29	.36	.46	.58	.80	1.00
Mar	.11	.17	.27	.37	.48	.59	.72	.88	1.10	1.44	1.78
Apr	.17	.27	.45	.63	.82	1.02	1.26	1.55	1.95	2.59	3.22
May	.27	.44	.74	1.04	1.35	1.70	2.10	2.59	3.27	4.37	5.43
Jun	.67	.93	1.32	1.68	2.03	2.40	2.82	3.31	3.96	4.99	5.95
Jul	.73	1.00	1.42	1.80	2.17	2.56	2.99	3.51	4.18	5.25	6.25
Aug	.21	.35	.62	.89	1.18	1.51	1.89	2.37	3.01	4.09	5.14
Sep	.34	.50	.75	.98	1.21	1.46	1.74	2.08	2.53	3.26	3.94
Oct	.03	.10	.25	.40	.57	.77	1.00	1.30	1.72	2.41	3.11
Nov	.00	.04	.14	.22	.31	.42	.54	.69	.89	1.23	1.57
Dec	.04	.08	.13	.18	.23	.28	.33	.40	.49	.64	.78
Ann	10.03	11.14	12.60	13.73	14.75	15.75	16.79	17.95	19.38	21.48	23.32

\+ 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	6.4	4.8	6	3	10.0	1999	21	20.0	1989	20	1982	31	14+	1997	3.3	2.9	.6	.2	@	26.5	18.1	9.8	4.4
Feb	4.5	3.0	5	4	11.0	1998	25	14.0	1974	24	1982	14	15	1982	3.0	2.6	.4	.1	@	18.3	13.8	7.9	2.9
Mar	7.8	6.0	4	3	14.0	1975	26	27.0	1975	25	1997	18	13	1997	3.3	2.9	1.1	.3	.1	14.3	10.0	7.2	3.6
Apr	3.6	1.0	1	#	10.0	1980	7	19.0	1979	28	1975	10	13	1975	1.5	1.3	.6	.3	@	3.6	2.5	1.7	.7
May	.8	.0	#	0	6.0	2000	12	8.0+	2000	7	1984	1	1	1984	.3	.3	.1	@	.0	.4	.2	.1	.0
Jun	.0	.0	#	0	1.0	1998	1	1.0	1998	1	1998	1	#	1998	@	@	.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	.4	.0	#	0	4.0	1984	24	4.0+	1984	4	1984	24	#+	2000	.2	.2	@	.0	.0	.1	@	.0	.0
Oct	2.9	1.0	#	#	8.0	1975	15	15.0	1985	13	1985	8	2	1985	1.0	.9	.4	.2	.0	2.2	1.2	.5	.1
Nov	5.8	4.8	2	1	8.5	2000	2	18.3	2000	13	1978	28	7	2000	3.1	2.7	.8	.3	.0	11.5	5.8	3.2	.5
Dec	4.6	4.5	3	2	5.0	1975	31	11.0	1977	18	1996	30	13	1996	3.3	2.5	.5	@	.0	20.2	13.0	4.3	.5
Ann	36.8	25.1	N/A	N/A	14.0	Mar 1975	26	27.0	Mar 1975	28	Apr 1975	10	15	Feb 1982	19.0	16.3	4.5	1.4	.1	97.1	64.6	34.7	12.7

+ 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	6/26	6/18	6/13	6/08	6/04	5/31	5/26	5/21	5/13
32	6/05	6/01	5/28	5/25	5/22	5/19	5/16	5/13	5/08
28	5/23	5/18	5/15	5/12	5/09	5/06	5/04	4/30	4/25
24	5/16	5/11	5/08	5/05	5/02	4/29	4/26	4/22	4/17
20	5/08	5/02	4/28	4/25	4/22	4/19	4/16	4/12	4/06
16	4/24	4/19	4/16	4/13	4/11	4/09	4/06	4/03	3/29

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	8/16	8/22	8/26	8/29	9/01	9/05	9/08	9/12	9/18
32	8/25	8/30	9/03	9/07	9/10	9/13	9/16	9/20	9/26
28	9/07	9/12	9/16	9/19	9/22	9/25	9/28	10/01	10/06
24	9/11	9/17	9/22	9/25	9/29	10/03	10/06	10/11	10/17
20	9/26	10/01	10/05	10/08	10/11	10/14	10/17	10/21	10/26
16	10/04	10/10	10/14	10/18	10/21	10/24	10/28	11/01	11/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	114	105	99	94	89	83	78	72	63
32	129	122	118	114	110	106	102	98	91
28	156	149	143	139	135	131	126	121	114
24	172	165	159	154	150	145	140	135	127
20	192	185	180	175	171	167	163	158	151
16	210	204	199	196	192	189	185	181	175

***** 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	1854	1448	1244	749	384	164	80	110	347	727	1224	1681	10012
60	1699	1308	1089	605	257	85	27	49	225	572	1074	1526	8516
57	1606	1224	996	522	195	50	13	27	164	479	984	1433	7693
55	1544	1168	935	469	158	34	8	18	128	418	924	1371	7175
50	1389	1032	791	345	85	11	0	4	59	272	774	1216	5978
32	862	577	334	66	2	0	0	0	0	16	314	691	2862

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	31	53	114	308	657	890	1069	1039	660	312	79	33	5245
55	0	0	1	21	101	233	364	343	98	2	0	0	1163
57	0	0	0	15	75	190	307	291	74	1	0	0	953
60	0	0	0	7	45	135	229	220	45	0	0	0	681
65	0	0	0	1	16	64	127	126	17	0	0	0	351
70	0	0	0	0	4	22	54	58	5	0	0	0	143

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	13	136	426	655	827	793	431	147	11	0	0	0	13	149	575	1230	2057	2850	3281	3428	3439	3439
45	0	0	2	71	294	507	672	638	299	74	4	0	0	0	2	73	367	874	1546	2184	2483	2557	2561	2561
50	0	0	0	32	175	360	517	483	182	28	0	0	0	0	0	32	207	567	1084	1567	1749	1777	1777	1777
55	0	0	0	12	93	227	363	339	102	5	0	0	0	0	0	12	105	332	695	1034	1136	1141	1141	1141
60	0	0	0	3	41	124	220	201	46	1	0	0	0	0	0	3	44	168	388	589	635	636	636	636
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	12	108	276	401	517	498	279	125	15	0	0	1	13	121	397	798	1315	1813	2092	2217	2232	2232

(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