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: WHITE LAKE, SD **COOP ID: 399232**

Climate Division: SD 9 **NWS Call Sign:** **Elevation: 1,630 Feet** **Lat: 43˚44N** **Lon: 98˚43W**

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	27.2	7.1	17.2	67	1998	2	30.8	1990	-32	1970	19	1.8	1978	1484	0	.0	.0	1.6	17.4	30.6	10.6
Feb	33.7	14.0	23.9	73+	2000	21	35.5	1999	-32	1994	9	9.1+	1979	1152	0	.0	.0	5.1	11.8	26.9	6.1
Mar	45.3	24.2	34.8	86	1978	30	42.3	2000	-24	1962	1	26.7	1996	938	0	.0	.0	13.1	4.9	25.0	1.3
Apr	59.9	35.5	47.7	97	1992	30	55.0	1981	3	1975	3	40.6	1995	522	4	.0	.3	24.6	.5	12.4	.0
May	71.7	47.3	59.5	99	1967	25	66.2	1987	16	1980	8	54.8	1979	214	43	.0	.4	30.6	.0	1.5	.0
Jun	81.2	56.6	68.9	110	1988	24	76.8	1988	32	1998	3	62.9	1982	47	164	.6	5.4	30.0	.0	@	.0
Jul	87.2	61.8	74.5	110	1976	9	79.1	1975	37	1971	30	66.1	1992	13	307	2.1	12.9	31.0	.0	.0	.0
Aug	85.7	59.8	72.8	111	1988	15	77.7	1983	36	1950	20	66.6	1992	20	260	1.6	11.7	31.0	.0	.0	.0
Sep	76.5	49.4	63.0	105+	1979	9	69.7	1998	22	1951	28	58.5	1993	135	74	.3	4.6	29.7	.0	1.1	.0
Oct	62.3	37.2	49.8	97	1963	5	53.7	2000	8	1991	30	45.8	1976	473	0	.0	.2	27.0	.3	9.7	.0
Nov	42.3	23.0	32.7	81	1999	8	44.1	1999	-18	1959	14	20.0	1985	971	0	.0	.0	10.2	6.2	25.1	1.1
Dec	30.5	11.4	21.0	72	1998	1	30.1	1997	-32	1983	23	2.9	1983	1367	0	.0	.0	2.3	15.0	30.6	7.1
Ann	58.6	35.6	47.2	111	Aug 1988	15	79.1	Jul 1975	-32+	Feb 1994	9	1.8	Jan 1978	7336	852	4.6	35.5	236.2	56.1	162.9	26.2

\+ 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	.28	.10	1.17	1952	14	1.33	1979	.00+	1997
Feb	.59	.31	1.75	1997	4	1.79	2000	.00+	1996
Mar	1.43	1.26	2.45	1987	17	5.05	1987	.00+	1997
Apr	2.49	2.11	2.15	1968	3	4.97	1986	.20	1980
May	3.60	3.44	3.46	1954	31	8.11	1982	.78	1992
Jun	3.19	2.85	3.20	1967	19	7.88	1984	.81	1978
Jul	2.88	2.58	2.90	1998	3	7.49	1992	.31	1975
Aug	2.21	1.74	3.66	1961	27	6.93	1992	.15	1973
Sep	2.09	1.47	4.10	1996	19	8.40	1996	.10	1990
Oct	1.59	1.40	1.85	1997	12	5.23	1998	.00+	1992
Nov	.90	.86	1.72	1957	1	2.53	1971	.00+	1997
Dec	.34	.18	.97	1949	11	1.15	1987	.00+	1998
Ann	21.59	22.35	4.10	Sep 1996	19	8.40	Sep 1996	.00+	Dec 1998

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	1.5	1.0	.2	.0
Feb	2.4	1.7	.3	.2
Mar	3.6	3.3	1.4	.2
Apr	5.7	5.5	2.0	.4
May	6.5	6.5	2.6	1.1
Jun	6.3	5.8	2.3	.8
Jul	5.5	5.4	2.1	.7
Aug	3.9	3.8	1.6	.6
Sep	3.7	3.4	1.3	.4
Oct	3.2	3.2	1.2	.4
Nov	2.5	2.3	.6	.2
Dec	1.8	1.4	.2	.0
Ann	46.6	43.3	15.8	5.0

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	.00	.00	.02	.07	.14	.23	.34	.49	.77	1.04
Feb	.00	.00	.00	.11	.23	.37	.53	.74	1.02	1.52	1.99
Mar	.00	.00	.38	.63	.87	1.14	1.44	1.82	2.30	3.10	3.88
Apr	.53	.76	1.13	1.46	1.79	2.15	2.55	3.02	3.65	4.66	5.61
May	.95	1.29	1.81	2.27	2.72	3.20	3.72	4.34	5.15	6.43	7.63
Jun	1.02	1.32	1.77	2.15	2.52	2.90	3.32	3.81	4.44	5.42	6.33
Jul	.61	.87	1.30	1.68	2.07	2.48	2.94	3.50	4.23	5.41	6.51
Aug	.21	.37	.67	.98	1.31	1.69	2.13	2.69	3.45	4.72	5.97
Sep	.09	.19	.42	.69	1.01	1.40	1.88	2.50	3.38	4.90	6.44
Oct	.00	.15	.43	.68	.94	1.23	1.57	1.98	2.55	3.48	4.38
Nov	.00	.00	.29	.45	.60	.76	.93	1.14	1.41	1.85	2.27
Dec	.00	.00	.00	.05	.15	.23	.33	.45	.60	.85	1.09
Ann	13.50	14.99	16.93	18.44	19.80	21.13	22.51	24.06	25.96	28.76	31.21

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	3.1	2.5	3	2
Feb	6.1	5.0	3	2
Mar	5.2	5.5	2	1
Apr	1.7	.0	#	0
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.7	.0	#	0
Nov	4.9	4.0	1	#
Dec	3.9	3.5	3	1
Ann	25.6	20.5	N/A	N/A

Extremes (2)

Month	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year
Jan	8.0	1976	1	10.0	1979	20	1988	22	14	1988
Feb	15.0	1971	19	19.0	1971	26	1978	22	21	1978
Mar	8.0	1989	2	16.0	1985	25	1978	8	13	1978
Apr	10.0	1995	10	18.0	1995	18	1995	12	3	1995
May	#	1979	9	#	1979	#	1999	2	#	1999
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	#	1984	25	#+	1984	0	0	0	0	0
Oct	9.0	1995	23	9.0+	1995	9	1995	24	1	1995
Nov	6.0	1972	2	23.0	1985	22	1985	30	9	1985
Dec	8.0	1987	23	9.0	1985	31	1985	13	24	1985
Ann	15.0	Feb 1971	19	23.0	Nov 1985	31	Dec 1985	13	24	Dec 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.5	1.4	.5	.2	.0
Feb	2.0	1.9	.8	.2	.1
Mar	1.8	1.7	.8	.3	.0
Apr	.7	.6	.2	.1	@
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.3	.3	.2	.1	.0
Nov	1.5	1.4	.8	.4	.0
Dec	1.6	1.5	.7	.1	.0
Ann	9.4	8.8	4.0	1.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	11.1	7.8	4.1	.4
Feb	9.3	6.8	4.2	2.0
Mar	5.5	3.7	2.1	1.0
Apr	.4	.1	@	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.3	.2	.2	.0
Nov	3.7	2.6	1.6	.7
Dec	12.2	8.5	5.6	2.8
Ann	42.5	29.7	17.8	6.9

+ 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	5/25	5/20	5/17	5/14	5/11	5/08	5/05	5/02	4/27
32	5/22	5/16	5/12	5/08	5/05	5/02	4/29	4/24	4/19
28	5/10	5/05	5/02	4/29	4/26	4/23	4/20	4/17	4/12
24	4/29	4/24	4/20	4/17	4/14	4/11	4/07	4/04	3/29
20	4/19	4/14	4/10	4/07	4/04	4/01	3/28	3/25	3/19
16	4/15	4/09	4/04	3/31	3/28	3/24	3/20	3/15	3/09

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	9/13	9/16	9/18	9/19	9/21	9/23	9/24	9/26	9/29
32	9/17	9/21	9/24	9/26	9/29	10/01	10/04	10/06	10/11
28	9/20	9/26	9/30	10/04	10/07	10/10	10/14	10/18	10/24
24	10/04	10/09	10/12	10/15	10/18	10/21	10/24	10/27	11/01
20	10/12	10/18	10/22	10/25	10/28	10/31	11/03	11/07	11/13
16	10/21	10/27	11/01	11/06	11/10	11/14	11/18	11/23	11/30

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	149	143	139	135	132	129	125	121	115
32	167	160	155	150	146	141	137	131	124
28	185	178	172	168	163	159	154	149	141
24	210	202	196	191	186	182	177	171	163
20	230	222	216	211	207	202	197	191	183
16	256	246	239	232	226	220	214	207	197

***** 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	1484	1152	938	522	214	47	13	20	135	473	971	1367	7336
60	1329	1012	783	383	119	14	1	4	61	322	821	1212	6061
57	1236	935	690	306	77	5	0	1	32	238	731	1119	5370
55	1175	884	629	259	55	2	0	0	19	189	673	1057	4942
50	1026	752	484	158	20	0	0	0	4	91	534	908	3977
32	534	351	105	6	0	0	0	0	0	1	155	424	1576

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	74	122	190	477	852	1107	1316	1263	929	552	175	81	7138
55	1	11	1	40	194	419	603	550	258	27	3	0	2107
57	0	7	0	27	154	362	541	489	211	14	0	0	1805
60	0	0	0	14	103	281	450	399	150	5	0	0	1402
65	0	0	0	4	43	164	307	260	74	0	0	0	852
70	0	0	0	0	13	81	183	147	29	0	0	0	453

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	16	81	280	613	878	1084	1039	711	352	58	3	0	16	97	377	990	1868	2952	3991	4702	5054	5112	5115
45	0	2	36	172	463	728	929	884	563	222	21	0	0	2	38	210	673	1401	2330	3214	3777	3999	4020	4020
50	0	0	14	96	320	580	774	729	422	123	9	0	0	0	14	110	430	1010	1784	2513	2935	3058	3067	3067
55	0	0	1	46	196	431	619	574	288	56	0	0	0	0	1	47	243	674	1293	1867	2155	2211	2211	2211
60	0	0	0	21	103	290	465	421	176	19	0	0	0	0	0	21	124	414	879	1300	1476	1495	1495	1495
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	2	20	70	195	388	566	711	677	453	231	44	6	2	22	92	287	675	1241	1952	2629	3082	3313	3357	3363

(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