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: MILLER, SD **COOP ID: 395561**

Climate Division: SD 7 **NWS Call Sign:** **Elevation: 1,590 Feet** **Lat: 44˚31N** **Lon: 98˚59W**

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	25.2	3.9	14.6	65	1987	12	28.9	1990	-32	1966	29	.7	1978	1564	0	.0	.0	1.2	19.4	30.6	11.7
Feb	31.0	10.0	20.5	70	1958	25	32.3	1998	-37	1994	9	4.1	1979	1246	0	.0	.0	4.0	13.5	27.3	6.9
Mar	41.6	20.2	30.9	81+	1963	31	39.3	2000	-19	1962	1	23.1	1996	1057	0	.0	.0	10.8	5.9	26.2	1.8
Apr	56.2	32.2	44.2	98	1980	21	51.0	1987	0	1975	3	38.0	1975	625	1	.0	.2	23.0	.6	14.3	@
May	68.4	45.5	57.0	99	1959	1	63.8	1977	18	1967	3	51.6	1979	279	29	.0	.5	30.4	.0	1.7	.0
Jun	78.2	55.3	66.8	109	1988	24	75.0	1988	34	1969	2	61.3	1993	66	120	.4	4.0	30.0	.0	.0	.0
Jul	85.1	60.6	72.9	109	1966	10	78.6	1974	40	1971	30	63.7	1992	23	267	1.8	11.7	31.0	.0	.0	.0
Aug	83.7	57.8	70.8	112	1965	13	76.8	1983	37	1950	20	64.7	1992	33	212	1.3	9.8	31.0	.0	.0	.0
Sep	74.1	47.5	60.8	105	1983	2	66.7	1998	20	1951	28	55.0	1993	176	50	.3	3.5	29.6	.0	1.0	.0
Oct	60.7	34.9	47.8	95	1963	4	52.9	1973	6	1991	31	44.0	1976	534	0	.0	.2	26.6	.3	9.7	.0
Nov	40.8	20.6	30.7	80	1999	8	43.1	1999	-15+	1985	24	17.8	1985	1029	0	.0	.0	8.9	7.3	25.4	1.3
Dec	29.0	8.6	18.8	68+	1998	2	29.8	1997	-32	1990	30	1.7	1983	1432	0	.0	.0	2.1	16.6	30.6	7.6
Ann	56.2	33.1	44.7	112	Aug 1965	13	78.6	Jul 1974	-37	Feb 1994	9	.7	Jan 1978	8064	679	3.8	29.9	228.6	63.6	166.8	29.3

\+ 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	.41	.22	1.22	1997	4	1.65	1997	.00+	2000
Feb	.55	.46	.81	2001	7	1.37	1977	.00	1983
Mar	1.29	.81	2.05	1977	12	5.45	1977	.02	1971
Apr	2.11	2.13	2.50	1991	11	6.37	1986	.22	1996
May	3.14	2.57	3.80	1998	11	6.67	1995	.21	1992
Jun	2.90	2.43	2.80	1967	18	6.18	1990	.65	1989
Jul	2.60	2.27	2.18	1997	20	5.92	1997	.00	1976
Aug	2.01	1.83	3.11	1960	25	4.21	1998	.18	1976
Sep	1.80	1.48	3.00	1989	20	6.46	1996	.00	1979
Oct	1.77	1.23	2.50	1998	16	8.56	1998	.05	1978
Nov	.74	.57	1.22	1952	17	1.96	1983	.00+	1999
Dec	.44	.32	1.42	1996	15	2.10	1996	.00+	1986
Ann	19.76	19.82	3.80	May 1998	11	8.56	Oct 1998	.00+	Jan 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.9	1.2	.1	@
Feb	3.7	1.7	.1	.0
Mar	5.8	3.4	.8	.2
Apr	7.3	5.1	1.4	.2
May	9.8	6.1	2.0	.7
Jun	8.8	6.1	1.9	.6
Jul	8.3	5.4	1.8	.6
Aug	6.9	4.5	1.3	.4
Sep	5.4	3.3	1.3	.4
Oct	5.5	3.2	1.2	.5
Nov	4.4	2.4	.3	@
Dec	3.6	1.3	.1	.1
Ann	73.4	43.7	12.3	3.7

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	.02	.08	.14	.21	.29	.39	.50	.67	.95	1.22
Feb	.05	.11	.20	.28	.36	.45	.56	.68	.85	1.12	1.38
Mar	.11	.20	.37	.55	.75	.97	1.24	1.57	2.04	2.81	3.57
Apr	.38	.57	.88	1.17	1.46	1.78	2.14	2.58	3.16	4.09	4.98
May	.47	.73	1.18	1.62	2.07	2.57	3.14	3.84	4.78	6.31	7.78
Jun	.63	.90	1.33	1.71	2.10	2.51	2.97	3.52	4.25	5.41	6.50
Jul	.46	.82	1.26	1.61	1.96	2.31	2.71	3.18	3.79	4.74	5.63
Aug	.46	.64	.94	1.20	1.47	1.75	2.06	2.44	2.94	3.72	4.47
Sep	.02	.11	.31	.54	.83	1.17	1.60	2.16	2.95	4.32	5.70
Oct	.14	.26	.49	.73	1.00	1.31	1.68	2.15	2.80	3.88	4.95
Nov	.00	.07	.20	.31	.44	.57	.73	.92	1.18	1.62	2.04
Dec	.00	.02	.07	.14	.21	.30	.40	.54	.73	1.05	1.38
Ann	11.62	13.09	15.02	16.53	17.90	19.25	20.66	22.25	24.21	27.10	29.66

\+ 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
(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	6.9	4.2	3	3
Feb	8.2	6.9	2	1
Mar	4.9	2.4	1	#
Apr	2.7	.0	#	0
May	.0	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	1.4	.0	#	0
Nov	5.4	2.6	#	#
Dec	5.4	5.5	1	#
Ann	34.9	21.6	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	13.0	1975	8	21.3	1975	19	1982	23	9	1982
Feb	11.0	1991	17	15.5	1991	14	1978	13	10	1979
Mar	10.0	1975	24	28.8	1975	17	1975	28	5	1975
Apr	9.0	1997	7	20.0	1995	9	1975	2	2	1975
May	.5	1979	10	.5	1979	0	0	0	0	0
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	#	1999	30	#	1999	#	1999	30	#	1999
Oct	8.0	1999	1	8.0	1999	4	1972	30	#+	1976
Nov	8.0	1993	24	28.0	1985	5	1980	13	1	1978
Dec	11.0	1996	15	12.6	1985	6	1981	31	4	1981
Ann	13.0	Jan 1975	8	28.8	Mar 1975	19	Jan 1982	23	10	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.2	2.2	.4	.1	@
Feb	3.2	2.2	1.1	.3	@
Mar	2.5	1.9	.8	.3	@
Apr	.9	.7	.4	.3	.0
May	@	.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	.5	.5	.2	@	.0
Nov	2.6	2.1	.7	.3	.0
Dec	3.0	2.0	.6	.2	@
Ann	15.9	11.6	4.2	1.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	19.8	14.9	6.4	.8
Feb	16.8	13.0	9.3	2.9
Mar	5.6	3.1	2.0	.5
Apr	.4	.3	.3	.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	.4	.1	.0	.0
Nov	5.4	1.3	.3	.0
Dec	11.7	5.4	.8	.0
Ann	60.1	38.1	19.1	4.2

+ 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	5/26	5/22	5/19	5/16	5/14	5/11	5/09	5/05	5/01
32	5/17	5/13	5/09	5/07	5/04	5/02	4/29	4/26	4/21
28	5/10	5/05	5/02	4/29	4/26	4/23	4/21	4/17	4/13
24	5/01	4/25	4/21	4/18	4/15	4/12	4/09	4/05	3/31
20	4/14	4/10	4/07	4/05	4/03	4/01	3/30	3/27	3/24
16	4/10	4/05	4/01	3/29	3/26	3/23	3/20	3/16	3/11

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	148	142	138	134	130	127	123	118	112
32	167	161	157	153	150	147	143	139	134
28	184	178	173	169	166	162	158	154	148
24	208	201	195	191	186	182	177	172	165
20	224	218	214	211	208	205	201	197	192
16	250	241	235	230	225	220	215	209	201

***** 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	1564	1246	1057	625	279	66	23	33	176	534	1029	1432	8064
60	1409	1106	902	480	170	21	7	9	87	380	879	1277	6727
57	1316	1022	809	398	119	9	0	3	50	292	789	1184	5991
55	1254	973	747	346	91	4	0	1	32	237	729	1122	5536
50	1104	843	599	230	41	0	0	0	8	123	590	972	4510
32	602	420	171	16	0	0	0	0	0	2	188	482	1881

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	61	98	137	383	773	1043	1267	1202	863	492	149	73	6541
55	0	7	0	22	151	357	554	490	205	13	0	0	1799
57	0	0	0	14	117	302	492	430	164	6	0	0	1525
60	0	0	0	7	75	224	405	343	111	2	0	0	1167
65	0	0	0	1	29	120	267	212	50	0	0	0	679
70	0	0	0	0	8	50	157	113	16	0	0	0	344

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	14	59	246	587	850	1061	1012	674	323	48	2	0	14	73	319	906	1756	2817	3829	4503	4826	4874	4876
45	0	0	22	151	438	700	906	857	530	202	19	0	0	0	22	173	611	1311	2217	3074	3604	3806	3825	3825
50	0	0	5	81	295	551	751	702	388	110	6	0	0	0	5	86	381	932	1683	2385	2773	2883	2889	2889
55	0	0	0	45	176	402	596	547	262	47	0	0	0	0	0	45	221	623	1219	1766	2028	2075	2075	2075
60	0	0	0	18	89	266	442	397	160	15	0	0	0	0	0	18	107	373	815	1212	1372	1387	1387	1387
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	14	54	174	362	542	696	657	425	212	38	1	0	14	68	242	604	1146	1842	2499	2924	3136	3174	3175

(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