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: MT RUSHMORE NATL MEM, SD **COOP ID: 395870**

Climate Division: SD 4 **NWS Call Sign:** **Elevation: 5,250 Feet** **Lat: 43˚53N** **Lon: 103˚27W**

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	32.7	16.1	24.4	68	1981	23	34.8	1986	-38	1963	19	11.2	1979	1259	0	.0	.0	3.9	11.0	27.2	5.3
Feb	35.9	18.8	27.4	68	1982	21	36.4	1992	-29	1989	3	12.4	1989	1054	0	.0	.0	6.6	7.8	23.8	3.2
Mar	41.7	23.4	32.6	78	1968	30	39.6	1986	-12	1965	18	25.4	1996	1005	0	.0	.0	11.4	5.6	24.1	.9
Apr	49.8	30.9	40.4	85	1989	22	49.3	1987	1	1975	1	34.2	1983	740	0	.0	.0	17.4	1.8	16.0	.0
May	60.6	40.8	50.7	93	1969	27	58.8	1985	14	1967	1	45.4	1995	449	6	.0	@	26.6	.0	3.9	.0
Jun	71.5	50.9	61.2	99+	1970	29	71.8	1988	27	1981	16	54.3	1998	176	62	.0	1.4	29.6	.0	.3	.0
Jul	78.8	58.1	68.5	100+	1985	11	73.1	1974	35	1986	6	59.9	1992	58	165	.2	5.0	31.0	.0	.0	.0
Aug	77.5	57.7	67.6	99	1973	20	74.4	1983	33	1968	18	62.3	1977	63	143	.0	3.1	30.9	.0	.0	.0
Sep	67.2	48.5	57.9	97	1978	6	65.0	1979	19+	1985	29	50.4	1986	259	44	.0	.9	28.2	.1	2.0	.0
Oct	55.3	37.3	46.3	84+	1976	10	50.5	1974	1	1991	30	41.9	1971	580	0	.0	.0	23.0	.9	10.3	.0
Nov	40.6	25.0	32.8	75	1975	5	46.9	1999	-12	1985	27	18.5	1985	965	0	.0	.0	9.6	6.6	22.1	.9
Dec	34.3	18.3	26.3	67	1997	14	34.1	1979	-31	1983	21	11.5	1983	1201	0	.0	.0	5.6	10.6	26.8	3.4
Ann	53.8	35.5	44.7	100+	Jul 1985	11	74.4	Aug 1983	-38	Jan 1963	19	11.2	Jan 1979	7809	420	.2	10.4	223.8	44.4	156.5	13.7

\+ 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: 1962-2001

(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	.25	.60	1971	30	1.40	1999	.02	1990
Feb	.55	.37	.63	1997	3	1.43	1987	.00	1985
Mar	1.17	.88	1.74	1963	16	3.79	1973	.16	1981
Apr	2.21	2.20	2.30	2000	19	5.95	1971	.00	1987
May	3.95	3.02	3.38	1995	8	10.25	1995	.75	1985
Jun	3.74	3.00	6.30	1972	10	10.09	1999	.78	1987
Jul	3.16	2.83	2.52	1977	24	8.37	1979	.64	1983
Aug	2.04	1.87	2.26	1996	29	5.92	1996	.44	2000
Sep	1.55	1.12	2.10	1963	1	5.97	1986	.14	1975
Oct	1.58	.99	1.83	1980	15	5.46	1994	.11	1976
Nov	.64	.42	1.11	2000	1	2.10	1973	.00	1987
Dec	.46	.40	.58	1996	21	1.50	1996	.00+	1991
Ann	21.43	20.67	6.30	Jun 1972	10	10.25	May 1995	.00+	Dec 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.2	1.3	.1	.0
Feb	4.4	2.2	.1	.0
Mar	6.3	3.6	.5	.1
Apr	7.5	5.0	1.4	.4
May	11.2	7.2	2.6	.9
Jun	12.1	7.7	2.6	.7
Jul	11.2	6.9	2.1	.7
Aug	8.6	5.1	1.0	.3
Sep	6.4	3.6	1.1	.2
Oct	5.7	3.7	1.0	.3
Nov	4.3	2.1	.3	@
Dec	4.0	1.7	.1	.0
Ann	85.9	50.1	12.9	3.6

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	.02	.04	.09	.14	.20	.27	.35	.46	.61	.86	1.12
Feb	.04	.10	.18	.27	.35	.44	.55	.68	.85	1.14	1.41
Mar	.17	.26	.43	.59	.76	.95	1.16	1.43	1.78	2.36	2.92
Apr	.27	.54	.91	1.23	1.55	1.88	2.26	2.72	3.32	4.29	5.20
May	.84	1.20	1.78	2.30	2.83	3.40	4.03	4.80	5.80	7.41	8.93
Jun	.87	1.21	1.76	2.25	2.74	3.26	3.84	4.53	5.44	6.88	8.24
Jul	.97	1.27	1.71	2.10	2.47	2.86	3.28	3.78	4.42	5.43	6.36
Aug	.64	.83	1.12	1.36	1.60	1.85	2.12	2.44	2.85	3.48	4.07
Sep	.15	.26	.47	.69	.92	1.19	1.50	1.89	2.43	3.32	4.19
Oct	.16	.28	.49	.71	.95	1.22	1.53	1.92	2.46	3.34	4.21
Nov	.03	.09	.19	.28	.38	.49	.62	.79	1.01	1.37	1.72
Dec	.00	.07	.16	.24	.31	.38	.47	.57	.71	.93	1.14
Ann	12.89	14.43	16.46	18.04	19.47	20.88	22.35	23.99	26.02	29.01	31.64

\+ 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: 1962-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	5.5	4.4	2	1
Feb	6.9	5.0	2	1
Mar	8.4	7.3	2	1
Apr	11.5	11.0	1	1
May	1.2	.0	#	0
Jun	.1	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	#	0
Sep	.7	.0	#	0
Oct	3.6	2.0	#	#
Nov	8.6	5.8	1	1
Dec	5.8	4.0	2	1
Ann	52.3	39.5	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	9.0	1999	6	19.0	1996	19	1993	13	8	1993
Feb	9.0	1995	14	20.5	1987	16	1978	21	6	1993
Mar	12.0	1971	17	24.0	1998	16	1998	30	7	1971
Apr	30.0	2000	19	35.0	2000	30	2000	19	7	1997
May	8.0	1978	7	8.0	1978	8	1978	7	1	1984
Jun	3.0	1995	9	3.0	1995	3+	1999	12	#+	1999
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	#	1995	12	#	1995
Sep	5.0	1996	25	5.0	1996	5	1996	25	#+	2000
Oct	13.0	1996	26	19.0	1996	13	1996	26	2	1998
Nov	9.0	1985	9	30.0	1985	16+	1985	13	9	1985
Dec	8.5	1980	1	26.0	1996	20	1996	25	9	1985
Ann	30.0	Apr 2000	19	35.0	Apr 2000	30	Apr 2000	19	9+	Dec 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.6	2.7	.4	.1	.0
Feb	3.5	3.2	1.1	.3	.0
Mar	3.8	3.4	1.4	.6	.1
Apr	2.9	2.7	1.4	.8	.1
May	.4	.4	.2	.1	.0
Jun	@	@	@	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.4	.3	.1	@	.0
Oct	1.4	1.3	.5	.2	@
Nov	2.7	2.2	1.1	.5	.0
Dec	3.1	2.5	.8	.2	.0
Ann	21.8	18.7	7.0	2.8	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	11.0	5.4	1.9	.0
Feb	10.0	4.9	2.0	.4
Mar	8.1	4.6	2.5	.6
Apr	5.2	3.5	2.3	.8
May	.7	.5	.2	.0
Jun	@	@	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.3	.1	@	.0
Oct	1.5	.7	.4	.0
Nov	7.5	4.7	2.8	.9
Dec	9.5	5.8	3.5	.6
Ann	53.8	30.2	15.6	3.3

+ 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	6/18	6/12	6/07	6/03	5/30	5/27	5/23	5/18	5/11
32	6/06	5/30	5/26	5/22	5/18	5/14	5/10	5/05	4/29
28	5/23	5/17	5/12	5/08	5/04	5/01	4/27	4/22	4/15
24	5/10	5/04	4/29	4/25	4/22	4/18	4/14	4/10	4/03
20	5/01	4/25	4/20	4/16	4/12	4/08	4/04	3/30	3/24
16	4/22	4/15	4/09	4/05	3/31	3/27	3/22	3/17	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	9/09	9/13	9/15	9/18	9/20	9/22	9/24	9/27	9/30
32	9/13	9/17	9/19	9/22	9/24	9/26	9/28	9/30	10/04
28	9/19	9/25	9/29	10/03	10/06	10/10	10/13	10/18	10/24
24	9/27	10/03	10/08	10/12	10/16	10/19	10/23	10/28	11/03
20	10/06	10/13	10/18	10/23	10/27	10/31	11/04	11/09	11/16
16	10/16	10/23	10/29	11/02	11/06	11/10	11/15	11/20	11/27

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	135	127	121	116	112	107	102	97	89
32	149	142	137	132	128	124	119	114	107
28	180	171	165	159	154	149	143	137	128
24	205	195	188	182	176	171	165	158	148
20	226	216	209	203	197	191	185	177	167
16	248	238	231	225	219	213	207	200	190

***** 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	1259	1054	1005	740	449	176	58	63	259	580	965	1201	7809
60	1104	914	850	591	310	94	19	22	159	426	815	1046	6350
57	1011	830	757	505	237	57	9	9	111	336	725	953	5540
55	949	774	695	448	194	39	4	5	84	277	670	891	5030
50	805	642	540	316	107	13	0	1	35	150	531	740	3880
32	336	231	111	32	2	0	0	0	0	3	153	278	1146

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	100	100	130	283	582	876	1130	1103	775	445	178	100	5802
55	0	0	0	8	61	225	422	395	170	7	5	0	1293
57	0	0	0	5	42	183	364	338	137	4	0	0	1073
60	0	0	0	1	22	129	281	257	95	1	0	0	786
65	0	0	0	0	6	62	165	143	44	0	0	0	420
70	0	0	0	0	1	23	83	64	17	0	0	0	188

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	21	31	67	167	399	683	917	895	588	287	75	27	21	52	119	286	685	1368	2285	3180	3768	4055	4130	4157
45	4	7	32	92	268	535	762	740	447	179	36	7	4	11	43	135	403	938	1700	2440	2887	3066	3102	3109
50	0	2	12	48	157	391	607	585	317	97	13	0	0	2	14	62	219	610	1217	1802	2119	2216	2229	2229
55	0	0	0	18	78	258	456	432	205	48	3	0	0	0	0	18	96	354	810	1242	1447	1495	1498	1498
60	0	0	0	5	32	148	311	287	118	13	0	0	0	0	0	5	37	185	496	783	901	914	914	914
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	8	17	44	101	225	413	596	582	353	166	44	11	8	25	69	170	395	808	1404	1986	2339	2505	2549	2560

(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