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: SPEARFISH, SD **COOP ID: 397882**

Climate Division: SD 4 **NWS Call Sign:** **Elevation: 3,640 Feet** **Lat: 44˚31N** **Lon: 103˚52W**

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	35.7	13.4	24.6	68+	1981	24	36.2	1986	-32	1950	4	9.6	1979	1255	0	.0	.0	5.5	11.7	28.4	7.6
Feb	39.8	17.3	28.6	75	1982	22	37.5	1999	-25+	1996	2	16.4	1989	1020	0	.0	.0	7.7	8.4	24.5	4.0
Mar	46.6	23.6	35.1	80+	1978	31	44.0	1986	-18+	1967	7	25.4	1996	927	0	.0	.0	12.9	5.6	24.9	1.2
Apr	57.0	33.2	45.1	91	1980	22	51.6	1981	1	1968	4	38.9	1975	597	0	.0	@	20.2	1.0	14.3	.0
May	67.3	43.2	55.3	96+	2001	14	61.5	1977	14	1954	3	50.3	1996	316	13	.0	.3	28.7	.0	2.4	.0
Jun	77.6	52.3	65.0	101	1979	14	75.5	1988	25	1951	3	59.6	1998	106	104	.1	2.7	29.9	.0	.0	.0
Jul	84.9	58.5	71.7	106	1954	9	75.5	1980	35	1950	13	64.1	1992	24	232	1.0	9.0	31.0	.0	.0	.0
Aug	84.1	56.7	70.4	104+	2001	8	76.9	1983	32	1985	24	65.6	1992	39	208	.2	7.8	31.0	.0	@	.0
Sep	73.1	46.4	59.8	105	1978	7	67.2	1998	20	1972	26	53.5	1986	208	51	.1	2.4	28.7	.0	1.3	.0
Oct	59.5	35.7	47.6	91+	1975	7	51.4	2000	-2	1991	29	42.8	1991	539	0	.0	.1	24.2	.7	10.1	.1
Nov	44.2	23.9	34.1	78	1999	8	46.6	1999	-23	1959	16	19.0	1985	929	0	.0	.0	11.3	6.2	24.0	1.3
Dec	38.0	16.4	27.2	70+	1997	14	35.6	1991	-31	1983	28	8.3	1983	1173	0	.0	.0	6.9	9.3	28.0	4.9
Ann	59.0	35.1	47.0	106	Jul 1954	9	76.9	Aug 1983	-32	Jan 1950	4	8.3	Dec 1983	7133	608	1.4	22.3	238.0	42.9	157.9	19.1

\+ 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	.58	.44	.77	1949	31	1.69	1996	.00	1989
Feb	.69	.60	1.12	1948	24	1.75	1986	.00+	1999
Mar	1.40	1.01	3.80	1950	27	4.40	1973	.26	1999
Apr	2.46	2.40	2.15	1967	30	5.95	1986	.05	1988
May	3.57	2.89	3.51	1982	20	14.11	1982	.62	1998
Jun	3.82	2.92	6.46	1976	15	14.01	1976	.70	1987
Jul	2.20	2.27	2.25	1957	14	4.20	1981	.40	1971
Aug	1.68	1.25	2.35	1970	7	5.11	1972	.22	1990
Sep	1.47	1.36	2.29	1966	13	4.52	1986	.17	1978
Oct	2.08	1.51	2.37	1994	7	6.31	1998	.12	1999
Nov	.98	.83	2.84	2000	1	3.84	2000	.06	1986
Dec	.73	.71	1.45+	1983	5	1.88	1980	.03+	1991
Ann	21.66	20.51	6.46	Jun 1976	15	14.11	May 1982	.00+	Feb 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.6	2.0	.1	.0
Feb	5.9	2.1	.2	.0
Mar	8.5	3.9	.5	.2
Apr	10.0	5.4	1.2	.6
May	12.0	7.2	2.1	.7
Jun	11.8	7.1	2.2	.9
Jul	9.6	5.4	1.2	.4
Aug	7.7	4.1	1.0	.2
Sep	6.4	3.6	.9	.3
Oct	6.9	3.8	1.2	.4
Nov	6.3	2.5	.4	.1
Dec	6.6	2.2	.2	@
Ann	98.3	49.3	11.2	3.8

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	.07	.15	.24	.33	.43	.55	.71	.92	1.27	1.61
Feb	.00	.10	.24	.35	.46	.58	.71	.86	1.08	1.42	1.74
Mar	.27	.40	.60	.79	.98	1.19	1.42	1.70	2.07	2.67	3.24
Apr	.44	.66	1.02	1.36	1.70	2.07	2.49	3.00	3.68	4.77	5.81
May	.82	1.16	1.68	2.15	2.61	3.11	3.66	4.33	5.20	6.58	7.88
Jun	.81	1.16	1.72	2.23	2.74	3.29	3.90	4.64	5.61	7.17	8.64
Jul	.61	.82	1.14	1.41	1.68	1.96	2.27	2.64	3.12	3.87	4.57
Aug	.27	.41	.65	.88	1.12	1.38	1.68	2.05	2.54	3.33	4.09
Sep	.19	.31	.52	.72	.94	1.18	1.45	1.79	2.25	3.00	3.72
Oct	.25	.41	.71	1.00	1.30	1.65	2.05	2.54	3.22	4.33	5.40
Nov	.17	.25	.40	.53	.67	.82	.99	1.19	1.47	1.92	2.34
Dec	.08	.13	.23	.33	.44	.56	.71	.89	1.13	1.54	1.94
Ann	13.79	15.24	17.14	18.61	19.93	21.21	22.56	24.05	25.88	28.58	30.93

\+ 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	11.1	9.7	3	2
Feb	11.3	11.3	2	2
Mar	14.8	8.5	1	1
Apr	8.6	9.0	1	#
May	.8	.0	#	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	#	0
Oct	4.0	.5	#	#
Nov	9.0	8.6	1	1
Dec	7.9	9.2	2	2
Ann	67.5	56.8	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	11.0	1971	31	22.3	1971	12+	1993	14	9	1993
Feb	10.0	1991	18	21.0	1991	12	1971	8	5	1982
Mar	26.0	1977	30	50.2	1977	38	1977	31	6	1973
Apr	15.0	1974	12	21.4	1974	30	1977	2	5	1977
May	8.0	1978	8	8.0	1978	6	1978	8	#+	1996
Jun	.0	0	0	.0	0	#	1972	18	#	1972
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	1.0	1973	15	1.0	1973	1	2000	25	#+	2000
Oct	8.1	1996	27	23.2	1971	9	1981	21	1	1996
Nov	10.0	1978	10	23.0	1978	14	1978	12	4	1978
Dec	12.0	1983	5	16.8	1983	12	1993	23	6	1992
Ann	26.0	Mar 1977	30	50.2	Mar 1977	38	Mar 1977	31	9	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	7.3	3.7	.9	.2	.1
Feb	5.3	3.2	.9	.3	@
Mar	5.9	3.5	1.1	.4	.2
Apr	2.8	1.9	.8	.3	.1
May	.3	.2	.1	.1	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.0	.0	.0
Oct	1.4	1.0	.4	.3	.0
Nov	4.3	2.2	.7	.3	.1
Dec	5.9	3.3	.8	.2	@
Ann	33.3	19.1	5.7	2.1	.5

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	18.4	9.7	5.3	.6
Feb	11.6	7.0	4.4	.3
Mar	8.4	3.9	2.0	.8
Apr	3.0	1.6	1.1	.4
May	.3	.1	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	1.6	.8	.4	.0
Nov	8.9	4.5	1.8	.2
Dec	15.1	8.4	3.6	.5
Ann	67.3	36.0	18.6	2.8

+ 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	6/06	5/31	5/27	5/24	5/20	5/17	5/14	5/09	5/04
32	5/21	5/17	5/13	5/11	5/08	5/05	5/03	4/29	4/25
28	5/07	5/03	4/30	4/27	4/25	4/22	4/20	4/17	4/12
24	5/01	4/26	4/23	4/19	4/16	4/13	4/10	4/07	4/02
20	4/22	4/17	4/12	4/09	4/06	4/02	3/30	3/25	3/20
16	4/16	4/10	4/05	4/01	3/28	3/25	3/21	3/16	3/10

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	9/05	9/10	9/14	9/17	9/20	9/22	9/25	9/29	10/04
32	9/11	9/17	9/21	9/25	9/29	10/02	10/06	10/11	10/17
28	9/24	9/30	10/05	10/09	10/12	10/16	10/20	10/24	10/31
24	10/04	10/10	10/15	10/19	10/22	10/26	10/30	11/04	11/10
20	10/13	10/19	10/23	10/27	10/30	11/03	11/07	11/11	11/17
16	10/18	10/25	10/30	11/03	11/07	11/11	11/16	11/21	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	148	139	132	127	122	116	111	104	95
32	166	158	152	148	143	138	134	128	120
28	194	185	180	174	170	165	160	154	146
24	214	205	199	193	188	183	178	172	163
20	232	223	217	212	207	202	197	191	183
16	248	239	233	228	223	218	213	207	198

***** 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	1255	1020	927	597	316	106	24	39	208	539	929	1173	7133
60	1100	880	772	451	191	45	7	13	115	386	779	1018	5757
57	1009	800	679	366	132	23	1	5	73	297	692	925	5002
55	952	749	617	313	98	14	0	2	51	243	637	865	4541
50	808	617	471	195	39	3	0	0	17	127	498	722	3497
32	359	238	91	7	0	0	0	0	0	2	137	282	1116

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	127	141	188	400	720	988	1230	1192	833	487	199	132	6637
55	8	9	0	16	105	313	517	481	194	14	9	2	1668
57	2	4	0	9	77	262	457	421	156	6	3	0	1397
60	0	0	0	3	43	193	369	336	108	2	0	0	1054
65	0	0	0	0	13	104	232	208	51	0	0	0	608
70	0	0	0	0	2	44	127	111	19	0	0	0	303

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	32	80	205	467	745	982	944	609	290	71	25	21	53	133	338	805	1550	2532	3476	4085	4375	4446	4471
45	3	7	37	117	325	596	827	789	466	181	33	6	3	10	47	164	489	1085	1912	2701	3167	3348	3381	3387
50	1	0	12	58	206	449	672	634	329	95	11	0	1	1	13	71	277	726	1398	2032	2361	2456	2467	2467
55	0	0	0	23	112	306	518	479	210	41	2	0	0	0	0	23	135	441	959	1438	1648	1689	1691	1691
60	0	0	0	7	48	182	365	329	121	10	0	0	0	0	0	7	55	237	602	931	1052	1062	1062	1062
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	16	27	61	137	278	456	635	606	373	188	57	23	16	43	104	241	519	975	1610	2216	2589	2777	2834	2857

(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