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: SIOUX FALLS AP, SD **COOP ID: 397667**

Climate Division: SD 9 **NWS Call Sign: FSD** **Elevation: 1,422 Feet** **Lat: 43˚35N** **Lon: 96˚45W**

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	2.9	14.0	66	1981	24	27.3	1990	-36	1970	19	1.1	1979	1566	0	.0	.0	.7	21.2	30.9	12.3
Feb	31.6	10.1	20.8	70+	1982	22	31.9	1987	-31	1962	28	6.8	1979	1236	0	.0	.0	2.9	14.8	27.4	6.5
Mar	43.8	21.3	32.6	87	1968	30	39.4	2000	-23	1948	11	23.1	1984	989	0	.0	.0	9.6	6.5	25.0	1.5
Apr	58.8	32.5	45.7	94	1962	25	52.7	1977	5+	1982	6	39.9	1983	568	5	.0	.2	22.7	.7	12.7	.0
May	71.0	44.6	57.8	100	1967	25	65.6	1977	17	1967	4	51.5	1997	242	35	.0	.5	30.4	.0	1.7	.0
Jun	80.6	54.5	67.5	110	1988	21	75.3	1988	33+	1969	13	61.6	1982	58	149	.2	3.9	30.0	.0	.0	.0
Jul	85.6	60.3	73.0	108	1989	9	78.5	1974	38+	1971	30	64.6	1992	10	274	1.2	9.0	31.0	.0	.0	.0
Aug	83.2	58.4	70.8	108	1973	26	77.2	1983	34	1950	20	65.2	1985	20	216	.5	6.2	31.0	.0	.0	.0
Sep	74.2	47.6	60.9	104	1976	6	66.3	1978	22	1974	30	56.1	1993	176	64	.1	1.8	29.7	.0	1.3	.0
Oct	61.1	34.8	48.0	94	1963	5	52.4	1973	9	1972	19	43.1	1987	519	4	.0	.0	25.6	.2	10.9	.0
Nov	41.9	20.7	31.3	81	1999	8	42.1	1999	-17+	1964	30	19.6	1985	995	0	.0	.0	8.8	7.6	25.7	1.3
Dec	28.8	7.8	18.3	63+	1998	3	26.4	1979	-28	1990	23	.9	1983	1433	0	.0	.0	1.4	18.5	30.7	8.0
Ann	57.2	33.0	45.1	110	Jun 1988	21	78.5	Jul 1974	-36	Jan 1970	19	.9	Dec 1983	7812	747	2.0	21.6	223.8	69.5	166.3	29.6

\+ 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	.51	.42	1.59	1960	1	1.54	1988	.08	1990
Feb	.51	.37	1.62	1952	19	1.76	1992	.05+	1986
Mar	1.81	1.59	2.39	1995	25	4.08	1998	.20	1994
Apr	2.65	2.35	3.72	2001	22	5.83	1995	.28	1987
May	3.39	3.03	3.55	1972	1	8.26	1993	.61	1981
Jun	3.49	2.85	4.26	1957	16	8.43	1984	.91	1988
Jul	2.93	2.68	3.35	1992	1	8.41	1992	.49	1988
Aug	3.01	2.72	4.59	1975	1	9.09	1975	.71	1971
Sep	2.58	1.99	4.02	1966	11	9.26	1986	.47	1990
Oct	1.93	1.70	4.54	1973	9	6.28	1998	.02	1988
Nov	1.36	1.36	1.92	2001	23	2.95	1983	.02	1980
Dec	.52	.37	1.41	1955	3	1.99	1982	.00	1986
Ann	24.69	26.11	4.59	Aug 1975	1	9.26	Sep 1986	.00	Dec 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.0	1.5	.1	@
Feb	6.9	1.6	.2	.0
Mar	9.0	4.4	.9	.3
Apr	10.6	5.8	1.6	.5
May	11.2	6.6	2.3	.8
Jun	10.3	6.4	2.4	.7
Jul	10.1	5.4	2.0	.6
Aug	9.4	5.5	1.9	.7
Sep	8.0	4.6	1.6	.8
Oct	6.8	3.3	1.3	.4
Nov	7.9	2.9	.8	.2
Dec	6.1	1.6	.1	.0
Ann	103.3	49.6	15.2	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	.08	.12	.19	.26	.34	.42	.51	.62	.78	1.03	1.26
Feb	.07	.11	.18	.25	.32	.41	.50	.62	.78	1.04	1.29
Mar	.32	.48	.74	.99	1.24	1.52	1.83	2.20	2.71	3.52	4.29
Apr	.61	.86	1.24	1.59	1.94	2.30	2.72	3.21	3.85	4.88	5.85
May	.83	1.15	1.65	2.09	2.52	2.98	3.49	4.11	4.91	6.17	7.36
Jun	.96	1.29	1.80	2.24	2.67	3.11	3.61	4.20	4.97	6.17	7.29
Jul	.70	.98	1.41	1.79	2.17	2.57	3.02	3.55	4.25	5.36	6.40
Aug	.68	.96	1.40	1.80	2.19	2.61	3.09	3.65	4.39	5.57	6.69
Sep	.44	.67	1.05	1.40	1.76	2.16	2.61	3.15	3.88	5.06	6.18
Oct	.10	.20	.43	.68	.98	1.33	1.76	2.32	3.11	4.45	5.80
Nov	.07	.15	.31	.49	.70	.95	1.25	1.64	2.19	3.13	4.07
Dec	.03	.08	.16	.24	.32	.41	.51	.64	.81	1.09	1.36
Ann	14.52	16.35	18.77	20.65	22.36	24.04	25.80	27.78	30.23	33.84	37.02

\+ 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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Climate Division: SD 9 **NWS Call Sign: FSD** **Elevation: 1,422 Feet** **Lat: 43°35N** **Lon: 96°45W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	6.9	5.4	4	4
Feb	5.9	5.7	4	2
Mar	8.1	6.4	1	2
Apr	3.5	.8	#	1
May	.0	.0	#	0
Jun	#	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	1.1	.0	#	0
Nov	7.6	6.5	1	1
Dec	6.2	5.5	3	2
Ann	39.3	30.3	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	10.4	1988	19	19.0	1979	18+	1982	25	12	1997
Feb	8.9	1984	18	16.5	1997	18+	1997	17	13+	1997
Mar	11.7	1993	21	21.4	1998	14	1983	27	6	1984
Apr	10.5	1994	28	18.4	1983	9	1995	12	1+	1995
May	.1	1976	2	.1	1976	#+	1994	1	#	2000
Jun	#	1998	3	#	1998	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	.9	1985	28	.9	1985	0	0	0	0	0
Oct	8.8	1991	31	10.0	1991	2	1995	31	#	1999
Nov	12.6	1998	10	19.7	1985	13+	1983	29	5+	2000
Dec	9.2	1996	14	17.6	1982	18	1982	29	11	1985
Ann	12.6	Nov 1998	10	21.4	Mar 1998	18+	Feb 1997	17	13+	Feb 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.5	2.0	.7	.2	@
Feb	6.1	1.7	.4	.1	.0
Mar	5.1	2.2	.9	.4	@
Apr	1.9	1.0	.4	.2	@
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	.7	.3	.1	@	.0
Nov	4.9	2.1	1.0	.3	@
Dec	5.7	1.8	.5	.2	.0
Ann	30.9	11.1	4.0	1.4	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	23.1	16.7	11.1	2.7
Feb	17.8	12.1	8.5	2.9
Mar	9.8	6.5	4.4	1.1
Apr	1.5	.9	.4	.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	.2	.0	.0	.0
Nov	7.2	4.2	3.2	.5
Dec	17.4	11.7	6.3	2.3
Ann	77.0	52.1	33.9	9.5

+ 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	5/30	5/25	5/21	5/18	5/15	5/12	5/09	5/05	4/30
32	5/19	5/13	5/10	5/06	5/03	4/30	4/27	4/23	4/18
28	5/09	5/04	5/01	4/28	4/26	4/23	4/20	4/17	4/12
24	4/25	4/20	4/17	4/14	4/11	4/08	4/05	4/01	3/27
20	4/15	4/11	4/07	4/04	4/01	3/30	3/27	3/23	3/19
16	4/08	4/03	3/30	3/27	3/24	3/21	3/18	3/14	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	9/10	9/14	9/16	9/19	9/21	9/23	9/25	9/28	10/01
32	9/15	9/20	9/23	9/26	9/28	10/01	10/03	10/07	10/11
28	9/22	9/27	10/01	10/04	10/06	10/09	10/12	10/16	10/20
24	10/02	10/07	10/11	10/15	10/18	10/21	10/24	10/28	11/02
20	10/14	10/20	10/23	10/26	10/29	11/01	11/04	11/08	11/13
16	10/22	10/28	11/01	11/04	11/08	11/11	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	150	143	137	133	128	124	119	114	106
32	169	161	156	151	147	143	138	133	126
28	181	175	170	167	163	160	156	152	146
24	209	202	197	193	189	185	181	176	169
20	231	224	219	214	210	206	202	197	190
16	249	242	237	232	228	223	219	213	206

***** 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	1566	1236	989	568	242	58	10	20	176	519	995	1433	7812
60	1425	1097	851	439	157	20	5	10	82	377	860	1294	6617
57	1332	1013	758	357	108	9	0	3	46	291	770	1201	5888
55	1270	957	696	307	82	4	0	1	29	240	710	1139	5435
50	1116	827	547	195	35	0	0	0	6	131	569	984	4410
32	602	393	135	9	0	0	0	0	0	3	169	477	1788

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	9	40	163	446	829	1092	1291	1219	880	515	130	17	6631
55	0	0	3	38	173	405	578	507	230	40	1	0	1975
57	0	0	2	28	135	348	517	445	186	28	0	0	1689
60	0	0	0	16	88	266	424	354	131	15	0	0	1294
65	0	0	0	5	35	149	274	216	64	4	0	0	747
70	0	0	0	1	11	67	149	107	27	1	0	0	363

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	6	64	248	593	861	1051	976	649	300	44	1	0	6	70	318	911	1772	2823	3799	4448	4748	4792	4793
45	0	0	26	146	442	711	896	821	502	185	17	0	0	0	26	172	614	1325	2221	3042	3544	3729	3746	3746
50	0	0	8	80	300	562	741	666	363	99	5	0	0	0	8	88	388	950	1691	2357	2720	2819	2824	2824
55	0	0	1	41	179	414	586	512	236	44	0	0	0	0	1	42	221	635	1221	1733	1969	2013	2013	2013
60	0	0	0	15	93	275	431	358	136	16	0	0	0	0	0	15	108	383	814	1172	1308	1324	1324	1324
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	7	46	165	366	558	702	650	409	193	35	0	0	7	53	218	584	1142	1844	2494	2903	3096	3131	3131

(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