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: STEPHAN 2 NW, SD **COOP ID: 397992**

Climate Division: SD 6 **NWS Call Sign:** **Elevation: 1,805 Feet** **Lat: 44˚16N** **Lon: 99˚30W**

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	25.0	.6	12.8	65+	1987	12	26.7	1990	-36	1982	10	-2.3	1978	1619	0	.0	.0	1.2	19.1	30.8	13.5
Feb	30.6	6.9	18.8	72	2000	23	30.5	1999	-40	1994	9	4.4	1979	1295	0	.0	.0	3.9	12.9	27.7	7.5
Mar	42.7	18.3	30.5	85	1988	27	38.8	2000	-25	1960	4	22.2	1996	1070	0	.0	.0	11.5	5.6	27.9	2.3
Apr	57.5	30.7	44.1	99	1980	21	50.5	1977	-1	1975	1	37.0	1995	628	1	.0	.2	23.9	.6	16.5	.1
May	69.8	43.2	56.5	103	1969	27	63.4	1977	13	1967	2	49.5	1983	287	24	.0	.7	30.5	.0	3.4	.0
Jun	79.7	53.0	66.4	110	1988	24	75.3	1988	29	1964	2	59.9	1982	78	118	.5	5.1	30.0	.0	@	.0
Jul	86.6	58.2	72.4	111	1976	9	78.0	1974	32	1964	29	64.6	1992	21	250	2.6	13.5	31.0	.0	.0	.0
Aug	85.0	56.1	70.6	112	1965	13	77.1	1983	31+	1986	28	62.6	1985	45	216	2.1	12.5	31.0	.0	.1	.0
Sep	75.2	45.6	60.4	107	1983	2	68.1	1998	17	1974	30	54.8	1984	193	55	.5	4.2	29.7	.0	2.5	.0
Oct	60.9	32.1	46.5	95	1997	2	51.1	1973	2	1991	30	41.9	1976	574	0	.0	.2	26.6	.3	13.4	.0
Nov	40.9	17.0	29.0	82+	1999	9	40.8	1999	-22	1959	14	15.7	1985	1082	0	.0	.0	9.5	7.2	27.7	1.7
Dec	28.2	4.9	16.6	70+	1998	2	26.9	1999	-32+	1990	30	-2.0	1983	1502	0	.0	.0	2.1	16.0	30.9	8.8
Ann	56.8	30.6	43.7	112	Aug 1965	13	78.0	Jul 1974	-40	Feb 1994	9	-2.3	Jan 1978	8394	664	5.7	36.4	230.9	61.7	180.9	33.9

\+ 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	.31	1.16	1997	4	1.78	1997	.00+	1981
Feb	.50	.36	1.58	1991	18	2.01	1987	.00+	1983
Mar	1.31	1.04	2.00	1982	30	3.93	1982	.10	1972
Apr	1.98	1.82	2.07	1964	28	5.44	1986	.09	1992
May	2.95	2.55	2.82	1962	15	7.62	1999	.27	1992
Jun	2.95	2.77	2.90	1978	30	5.75	1998	.82	1996
Jul	2.62	2.33	4.52	1968	26	6.17	1993	.39	1976
Aug	2.07	2.24	3.40	1971	30	5.47	1990	.22	1972
Sep	1.77	1.61	3.10	1996	19	7.06	1996	.00+	1980
Oct	1.75	1.24	2.25	1996	29	7.07	1998	.14	1978
Nov	.65	.56	1.29	1993	13	1.97	1993	.00+	1990
Dec	.41	.32	.65+	1994	14	2.06	1996	.00+	1995
Ann	19.37	18.67	4.52	Jul 1968	26	7.62	May 1999	.00+	Dec 1995

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	2.7	1.4	.1	@
Feb	3.2	1.6	.2	.1
Mar	4.2	2.7	.7	.3
Apr	6.4	4.6	1.3	.3
May	8.8	6.1	1.9	.6
Jun	7.9	6.1	2.2	.7
Jul	7.5	5.4	1.6	.6
Aug	6.1	4.4	1.4	.4
Sep	4.3	3.3	1.2	.5
Oct	4.5	3.3	1.0	.4
Nov	3.5	1.8	.4	.1
Dec	2.9	1.3	.1	.0
Ann	62.0	42.0	12.1	4.0

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	.03	.08	.15	.23	.33	.48	.68	1.05	1.43
Feb	.00	.02	.08	.15	.24	.33	.45	.60	.82	1.18	1.55
Mar	.11	.20	.37	.55	.75	.98	1.26	1.60	2.07	2.86	3.64
Apr	.27	.43	.71	.99	1.28	1.60	1.97	2.42	3.04	4.04	5.02
May	.51	.76	1.19	1.60	2.01	2.46	2.97	3.59	4.42	5.77	7.05
Jun	.88	1.16	1.58	1.95	2.30	2.66	3.07	3.54	4.16	5.12	6.01
Jul	.58	.82	1.20	1.55	1.90	2.27	2.68	3.18	3.83	4.88	5.86
Aug	.27	.44	.73	1.02	1.32	1.66	2.05	2.53	3.17	4.23	5.26
Sep	.00	.10	.36	.63	.93	1.27	1.67	2.18	2.89	4.08	5.26
Oct	.16	.28	.51	.75	1.02	1.32	1.68	2.13	2.74	3.78	4.79
Nov	.00	.00	.11	.21	.32	.45	.61	.80	1.07	1.52	1.97
Dec	.00	.03	.10	.16	.23	.31	.40	.51	.66	.91	1.16
Ann	11.48	12.90	14.78	16.24	17.56	18.86	20.23	21.76	23.64	26.43	28.89

\+ 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	5.7	2.0	5	#
Feb	7.5	6.2	1	#
Mar	6.6	4.8	1	#
Apr	3.7	2.0	#	0
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	0	0
Oct	1.1	.0	#	0
Nov	3.4	3.0	#	0
Dec	5.5	4.0	1	#
Ann	33.7	22.0	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	18.0	1997	4	22.0	1975	36	1986	1	36	1986
Feb	15.0	1997	5	19.0	1989	12	1992	18	4	1980
Mar	14.0	1985	2	27.0	1989	24	1985	6	18	1985
Apr	12.0	1982	7	24.0	1995	4	1996	14	#+	1996
May	2.0	1979	10	2.0	1979	2	1979	10	#	1979
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	2.0	1985	28	2.0	1985	0	0	0	0	0
Oct	5.0	1990	17	9.0	1995	3	1976	18	#+	1997
Nov	10.0	1985	29	11.7	2000	9	1998	10	1+	1998
Dec	11.0	1988	26	15.8	1988	12	1977	31	5	1977
Ann	18.0	Jan 1997	4	27.0	Mar 1989	36	Jan 1986	1	36	Jan 1986

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.0	1.7	.7	.2	.1
Feb	1.9	1.7	1.1	.5	.2
Mar	2.1	2.0	1.0	.5	.2
Apr	1.1	1.0	.6	.3	.1
May	@	@	.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
Oct	.3	.3	.2	.1	.0
Nov	1.4	1.2	.6	.2	@
Dec	2.2	1.6	.8	.3	.1
Ann	11.0	9.5	5.0	2.1	.7

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9
Apr	.0	.0	.0	.0
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.1	.1	.0	.0
Nov	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

+ 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	6/13	6/07	6/02	5/28	5/24	5/20	5/16	5/11	5/04
32	5/24	5/20	5/16	5/13	5/11	5/08	5/05	5/02	4/27
28	5/17	5/13	5/09	5/06	5/03	5/01	4/28	4/24	4/19
24	5/07	5/02	4/29	4/26	4/23	4/21	4/18	4/14	4/10
20	5/02	4/26	4/22	4/18	4/15	4/11	4/07	4/03	3/28
16	4/14	4/10	4/06	4/04	4/01	3/29	3/27	3/23	3/19

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	143	132	125	119	113	107	101	94	83
32	157	149	142	137	132	127	121	115	106
28	171	164	160	156	152	148	144	139	133
24	191	184	179	174	170	166	161	156	149
20	212	204	197	192	187	182	177	171	162
16	230	223	218	213	209	205	201	196	189

***** 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	1619	1295	1070	628	287	78	21	45	193	574	1082	1502	8394
60	1464	1155	915	482	174	28	6	15	103	421	932	1347	7042
57	1371	1071	822	398	121	13	0	6	63	331	842	1254	6292
55	1309	1015	760	345	91	7	0	3	43	275	782	1192	5822
50	1156	888	609	227	39	1	0	0	13	153	639	1037	4762
32	646	453	173	13	0	0	0	0	0	4	213	531	2033

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	50	82	125	376	760	1030	1253	1194	852	453	121	53	6349
55	0	0	0	18	138	347	540	485	205	11	0	0	1744
57	0	0	0	11	106	293	478	426	165	5	0	0	1484
60	0	0	0	5	66	218	390	342	114	2	0	0	1137
65	0	0	0	1	24	118	250	216	55	0	0	0	664
70	0	0	0	0	6	50	140	121	21	0	0	0	338

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	7	55	230	555	824	1042	998	659	297	35	1	0	7	62	292	847	1671	2713	3711	4370	4667	4702	4703
45	0	1	18	131	406	674	887	843	515	185	12	0	0	1	19	150	556	1230	2117	2960	3475	3660	3672	3672
50	0	0	4	71	269	524	732	688	373	93	1	0	0	0	4	75	344	868	1600	2288	2661	2754	2755	2755
55	0	0	0	36	154	377	577	533	248	38	0	0	0	0	0	36	190	567	1144	1677	1925	1963	1963	1963
60	0	0	0	10	73	239	422	382	147	11	0	0	0	0	0	10	83	322	744	1126	1273	1284	1284	1284
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	17	55	183	362	528	665	639	424	219	43	4	1	18	73	256	618	1146	1811	2450	2874	3093	3136	3140

(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