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: COLUMBIA 8 N, SD **COOP ID: 391873**

Climate Division: SD 3 **NWS Call Sign:** **Elevation: 1,300 Feet** **Lat: 45˚44N** **Lon: 98˚18W**

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	19.1	-2.7	8.2	60	1981	24	23.4	1990	-37	1951	29	-4.3	1982	1762	0	.0	.0	.2	24.2	31.0	17.0
Feb	26.0	5.0	15.5	68	1958	25	29.1	1987	-45	1994	9	-1.8	1979	1385	0	.0	.0	1.6	17.0	28.1	10.4
Mar	37.8	18.0	27.9	83	1963	31	36.7	2000	-28+	1995	8	18.9	1996	1149	0	.0	.0	5.9	9.0	28.3	3.3
Apr	55.1	32.2	43.7	95	1962	25	52.9	1987	-9	1975	3	34.9	1975	644	3	.0	.1	20.6	.8	15.8	.1
May	68.5	45.3	56.9	101	1959	1	64.9	1977	10	1956	18	50.5	1979	278	28	.0	.2	30.1	.0	2.5	.0
Jun	77.4	54.5	66.0	105	1988	21	74.6	1988	33+	1969	20	60.6	1993	78	105	@	1.9	30.0	.0	.0	.0
Jul	83.5	58.8	71.2	108	1966	10	75.9	1974	38	1971	30	63.4	1992	26	217	.6	6.6	31.0	.0	.0	.0
Aug	81.9	55.9	68.9	108	1965	13	74.6	1983	34	1968	14	64.1	1977	43	164	.4	5.4	31.0	.0	.0	.0
Sep	71.6	44.7	58.2	99	1984	19	64.0	1978	15	1965	26	52.9	1984	231	25	.0	1.5	29.5	.0	2.3	.0
Oct	58.0	32.2	45.1	92	1976	1	49.6	1973	5	1984	29	40.6	1976	616	0	.0	.1	24.3	.3	14.4	.0
Nov	37.0	17.4	27.2	75+	1999	8	39.6	1999	-26	1985	26	13.7	1985	1134	0	.0	.0	6.1	10.6	27.8	2.2
Dec	23.9	3.7	13.8	65	1962	16	26.7	1999	-38	1967	31	-2.1	1983	1587	0	.0	.0	.9	20.9	30.9	11.2
Ann	53.3	30.4	41.9	108+	Jul 1966	10	75.9	Jul 1974	-45	Feb 1994	9	-4.3	Jan 1982	8933	542	1.0	15.8	211.2	82.8	181.1	44.2

+ 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: 1949-2001

(3) Derived from 1971-2000 serially complete daily data

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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	.56	.53	.80	1960	1	1.66	1982	.01+	1978
Feb	.45	.41	1.70	1958	27	1.25	1979	.07+	1985
Mar	1.42	1.09	3.68	2000	8	4.70	2000	.07	1971
Apr	1.80	1.45	2.45	1953	30	9.60	1986	.10	1988
May	2.78	2.55	2.76	1995	9	5.99	1972	.45	1976
Jun	3.19	3.04	2.99	1953	15	7.04	1978	.17	1974
Jul	2.95	2.90	3.52	2000	2	7.39	2000	.25	1976
Aug	2.31	2.55	2.41	1957	9	4.71	1980	.52	1997
Sep	1.99	1.33	5.32	1999	3	8.27	1999	.00+	1978
Oct	1.72	1.26	2.85	1998	17	7.00	1998	.09	1992
Nov	.76	.60	1.06	2000	1	2.74	2000	.00+	1999
Dec	.37	.28	.60	1949	11	1.20	1972	.00+	1986
Ann	20.30	20.03	5.32	Sep 1999	3	9.60	Apr 1986	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	1.9	.1	.0
Feb	5.0	1.6	@	.0
Mar	6.5	3.1	.8	.1
Apr	7.1	3.7	1.2	.4
May	9.3	5.6	1.7	.5
Jun	9.3	5.8	2.1	.8
Jul	9.2	5.4	1.9	.8
Aug	7.8	4.6	1.7	.4
Sep	6.2	3.5	1.1	.3
Oct	5.5	3.1	1.1	.5
Nov	5.6	2.2	.2	.1
Dec	4.8	1.4	@	.0
Ann	82.0	41.9	11.9	3.9

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	.03	.07	.13	.21	.30	.40	.52	.68	.90	1.28	1.65
Feb	.07	.11	.18	.24	.30	.37	.45	.55	.68	.89	1.09
Mar	.18	.29	.49	.69	.90	1.13	1.40	1.73	2.18	2.91	3.63
Apr	.19	.32	.57	.82	1.09	1.40	1.75	2.20	2.80	3.81	4.79
May	.84	1.10	1.49	1.83	2.16	2.51	2.89	3.33	3.91	4.80	5.64
Jun	.66	.95	1.42	1.85	2.27	2.73	3.25	3.87	4.69	6.01	7.25
Jul	.60	.87	1.31	1.70	2.10	2.52	3.00	3.58	4.35	5.57	6.73
Aug	.73	.95	1.28	1.56	1.82	2.10	2.40	2.76	3.22	3.93	4.60
Sep	.00	.17	.50	.81	1.14	1.51	1.95	2.47	3.21	4.42	5.61
Oct	.09	.18	.38	.61	.87	1.19	1.57	2.07	2.77	3.98	5.18
Nov	.00	.02	.10	.20	.32	.47	.66	.91	1.26	1.87	2.49
Dec	.00	.02	.08	.13	.20	.27	.35	.46	.61	.86	1.10
Ann	13.42	14.71	16.39	17.68	18.83	19.95	21.11	22.41	23.99	26.30	28.32

\+ 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: 1949-2001
(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	7.7	6.5	9	6
Feb	6.3	5.9	9	4
Mar	8.4	6.5	5	2
Apr	2.2	1.0	#	#
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.7	.0	#	0
Nov	8.0	6.2	2	1
Dec	5.5	4.3	6	3
Ann	38.8	30.4	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	8.0	1997	4	17.1	1982	49	1997	30	45	1997
Feb	6.0	1991	19	13.7	1979	49	1997	13	46	1997
Mar	14.5	1982	20	28.0	1975	44	1997	8	32	1997
Apr	9.0	1995	12	10.0	1986	26	1975	1	4	1975
May	#	1996	10	#+	1996	#+	1996	10	#+	1996
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	#	1995	22	#+	1995	#	1995	22	#	1995
Oct	3.5	1995	31	4.2	1995	3	1995	31	#+	1999
Nov	10.0	1977	21	31.0	1993	27	1993	30	8+	2000
Dec	8.0	2000	1	15.8	2000	31+	2000	31	28	1985
Ann	14.5	Mar 1982	20	31.0	Nov 1993	49+	Feb 1997	13	46	Feb 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.1	2.7	.9	.3	.0
Feb	5.0	2.7	.7	.1	.0
Mar	4.7	2.7	1.0	.3	.1
Apr	1.3	.8	.2	.1	.0
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	.6	.3	.1	.0	.0
Nov	4.7	2.5	1.0	.3	@
Dec	5.4	2.1	.4	.1	.0
Ann	27.8	13.8	4.3	1.2	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	24.6	19.6	15.2	6.5
Feb	21.3	16.8	12.0	8.8
Mar	13.9	10.5	7.9	4.9
Apr	1.6	.8	.6	.2
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	.3	@	.0	.0
Nov	10.3	6.0	3.6	1.6
Dec	19.5	14.4	8.6	4.5
Ann	91.5	68.1	47.9	26.5

+ 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	5/29	5/24	5/21	5/19	5/16	5/14	5/11	5/08	5/04
32	5/22	5/17	5/14	5/11	5/08	5/05	5/02	4/28	4/23
28	5/14	5/09	5/05	5/02	4/29	4/26	4/23	4/20	4/15
24	5/04	4/29	4/25	4/22	4/19	4/16	4/13	4/09	4/04
20	4/19	4/14	4/11	4/08	4/06	4/03	4/01	3/28	3/24
16	4/11	4/07	4/03	3/31	3/29	3/26	3/23	3/20	3/15

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	9/07	9/11	9/13	9/15	9/17	9/19	9/21	9/23	9/27
32	9/12	9/16	9/19	9/21	9/23	9/25	9/27	9/30	10/04
28	9/22	9/26	9/29	10/02	10/05	10/07	10/10	10/13	10/18
24	9/27	10/02	10/05	10/08	10/11	10/14	10/17	10/20	10/25
20	10/07	10/12	10/16	10/20	10/23	10/26	10/30	11/03	11/08
16	10/15	10/21	10/25	10/29	11/02	11/05	11/09	11/13	11/19

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	142	135	131	127	123	120	116	111	105
32	159	151	146	142	138	133	129	124	117
28	173	168	164	161	158	154	151	147	142
24	193	187	182	178	174	170	166	161	155
20	222	215	209	204	199	195	190	184	176
16	240	232	227	222	217	213	208	202	194

***** 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	1762	1385	1149	644	278	78	26	43	231	616	1134	1587	8933
60	1607	1245	994	502	170	26	7	12	125	461	984	1432	7565
57	1514	1161	901	421	119	12	1	4	76	370	894	1339	6812
55	1452	1105	839	370	91	6	0	2	52	310	834	1277	6338
50	1297	975	690	255	40	0	0	0	14	179	690	1122	5262
32	772	528	241	28	0	0	0	0	0	6	252	612	2439

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	33	67	115	376	773	1017	1214	1144	784	413	108	47	6091
55	0	0	0	28	150	333	501	433	146	4	0	0	1595
57	0	0	0	19	116	279	440	373	110	2	0	0	1339
60	0	0	0	10	75	203	353	288	69	0	0	0	998
65	0	0	0	3	28	105	217	164	25	0	0	0	542
70	0	0	0	0	8	40	116	77	6	0	0	0	247

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	0	25	197	548	797	990	930	579	242	24	0	0	0	25	222	770	1567	2557	3487	4066	4308	4332	4332
45	0	0	6	113	400	647	835	775	433	139	9	0	0	0	6	119	519	1166	2001	2776	3209	3348	3357	3357
50	0	0	0	56	266	497	680	620	299	65	0	0	0	0	0	56	322	819	1499	2119	2418	2483	2483	2483
55	0	0	0	26	151	352	526	465	186	21	0	0	0	0	0	26	177	529	1055	1520	1706	1727	1727	1727
60	0	0	0	10	72	216	372	315	99	6	0	0	0	0	0	10	82	298	670	985	1084	1090	1090	1090
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	22	137	335	508	649	602	369	167	21	0	0	1	23	160	495	1003	1652	2254	2623	2790	2811	2811

(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