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: CANTON 4 WNW, SD **COOP ID: 391392**

Climate Division: SD 9 **NWS Call Sign:** **Elevation: 1,345 Feet** **Lat: 43˚19N** **Lon: 96˚39W**

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	25.9	5.2	15.6	66	1981	24	29.2	1990	-35	1970	19	.5	1979	1534	0	.0	.0	.8	19.8	31.0	11.8
Feb	32.9	12.7	22.8	70	1958	23	34.5	1998	-36	1962	28	6.1	1979	1182	0	.0	.0	3.7	13.6	27.0	6.0
Mar	45.4	23.8	34.6	87	1968	30	42.7	2000	-23	1948	11	25.5	1984	941	0	.0	.0	11.7	4.7	24.4	1.6
Apr	60.9	35.3	48.1	97	1962	25	55.8	1981	5	1982	6	41.7	1983	512	5	.0	.4	24.3	.5	12.0	.0
May	73.2	47.7	60.5	103	1967	25	66.9	1987	17	1967	3	54.8	1997	197	56	.0	1.2	30.8	.0	1.5	.0
Jun	82.2	57.1	69.7	105	1988	21	76.4	1988	25	1956	1	64.6	1982	28	167	.4	5.3	30.0	.0	.0	.0
Jul	85.4	61.4	73.4	107	1989	9	78.2	1974	39	1971	30	65.3	1992	13	272	.6	8.4	31.0	.0	.0	.0
Aug	82.9	59.1	71.0	107	1955	26	76.0	1983	32	1950	20	65.3	1992	22	207	.1	4.8	31.0	.0	.0	.0
Sep	75.6	49.3	62.5	104	1976	6	68.0	1998	21	1984	26	57.6	1993	135	58	@	2.0	29.8	.0	1.3	.0
Oct	63.2	37.1	50.2	95	1963	5	55.4	1973	11+	1993	31	44.4	1976	461	1	.0	.1	27.4	.1	10.2	.0
Nov	42.6	23.2	32.9	82	1999	8	43.8	1999	-22	1959	14	22.3	1985	963	0	.0	.0	9.5	6.5	24.5	1.2
Dec	29.4	10.3	19.9	65+	1998	3	27.8	1979	-30+	1985	18	2.1	1983	1401	0	.0	.0	1.4	17.5	30.6	7.5
Ann	58.3	35.2	46.8	107+	Jul 1989	9	78.2	Jul 1974	-36	Feb 1962	28	.5	Jan 1979	7389	766	1.1	22.2	231.4	62.7	162.5	28.1

\+ 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	.37	.28	.86	2001	30	1.35	1997	.00	1981
Feb	.40	.30	2.14	1951	28	1.34	1992	.00	1986
Mar	1.53	1.38	2.05	1979	22	3.46	1979	.02	1994
Apr	2.45	2.29	2.45	2001	22	6.00	1984	.41	1981
May	3.06	2.95	2.17	1965	15	8.84	1993	.85	1989
Jun	3.68	3.14	4.13	1983	20	10.44	1983	.76	1976
Jul	3.18	2.80	4.32	1971	10	7.85	1992	.75	1988
Aug	3.19	3.24	3.56	1960	5	7.09	1975	.00	1972
Sep	2.14	2.00	2.63	1949	4	6.13	1986	.00	1972
Oct	1.83	1.74	1.72	1982	19	6.04	1982	.10	1999
Nov	1.24	.93	2.98	1975	20	4.57	1975	.01	1980
Dec	.46	.32	1.13	1953	3	1.87	1982	.02	1986
Ann	23.53	23.51	4.32	Jul 1971	10	10.44	Jun 1983	.00+	Feb 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.7	1.2	@	.0
Feb	3.5	1.4	.1	.0
Mar	5.7	3.3	1.0	.3
Apr	9.1	5.6	1.6	.4
May	10.6	6.8	2.1	.5
Jun	8.9	5.7	2.9	1.1
Jul	8.2	5.4	2.2	.8
Aug	8.3	5.2	2.0	.9
Sep	6.9	4.0	1.3	.5
Oct	6.3	3.6	1.0	.5
Nov	5.1	2.9	.7	.3
Dec	3.8	1.4	.2	.0
Ann	80.1	46.5	15.1	5.3

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	.01	.03	.08	.13	.19	.26	.34	.45	.60	.85	1.10
Feb	.01	.04	.09	.15	.21	.28	.37	.49	.64	.91	1.17
Mar	.16	.28	.49	.70	.93	1.19	1.49	1.87	2.39	3.24	4.08
Apr	.56	.79	1.15	1.47	1.79	2.13	2.52	2.97	3.58	4.53	5.44
May	1.05	1.34	1.76	2.12	2.46	2.81	3.19	3.64	4.21	5.10	5.91
Jun	.99	1.34	1.87	2.34	2.80	3.27	3.81	4.44	5.26	6.54	7.75
Jul	.80	1.10	1.56	1.97	2.38	2.81	3.28	3.85	4.59	5.76	6.86
Aug	.59	1.03	1.57	2.00	2.42	2.86	3.34	3.91	4.65	5.80	6.88
Sep	.18	.42	.77	1.08	1.40	1.75	2.16	2.64	3.30	4.35	5.37
Oct	.12	.24	.47	.72	1.00	1.32	1.71	2.21	2.91	4.08	5.25
Nov	.07	.14	.29	.45	.64	.87	1.14	1.49	1.99	2.83	3.66
Dec	.02	.05	.10	.16	.23	.32	.42	.55	.74	1.06	1.37
Ann	14.26	15.94	18.16	19.88	21.44	22.97	24.57	26.36	28.56	31.81	34.67

\+ 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

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	5.2	4.0	4	4
Feb	4.0	3.0	4	2
Mar	4.6	2.0	2	1
Apr	1.8	.0	#	#
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.5	.0	#	0
Nov	4.6	2.2	1	#
Dec	5.6	4.5	3	2
Ann	26.3	15.7	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	1979	26	19.0	1982	22	1979	29	12	1997
Feb	9.0	1984	18	15.0	1997	22	1979	25	20	1979
Mar	10.0	1993	21	13.0	1983	25	1979	5	15	1979
Apr	9.0	1994	28	14.0	1994	9	1994	28	1	1994
May	#	1989	5	#	1989	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Oct	5.0	1991	31	5.0	1991	5	1991	31	#+	1999
Nov	13.0	1983	28	19.0	1983	18	1983	30	4+	2000
Dec	12.0	1982	28	19.0	1982	18	1983	20	16	1983
Ann	13.0	Nov 1983	28	19.0+	Nov 1983	25	Mar 1979	5	20	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.0	2.3	.6	.1	.0
Feb	2.0	1.5	.5	.2	.0
Mar	1.8	1.5	.6	.3	@
Apr	.6	.6	.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	.2	.2	.1	@	.0
Nov	2.1	1.5	.5	.3	.1
Dec	3.0	2.2	.7	.2	@
Ann	12.7	9.8	3.2	1.2	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.2	14.9	10.2	3.6
Feb	15.1	9.8	6.4	3.7
Mar	7.1	4.8	2.9	1.1
Apr	.7	.2	@	.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	.1	@	.0
Nov	6.2	3.7	2.1	.6
Dec	16.4	9.6	7.0	2.9
Ann	65.9	43.1	28.6	11.9

+ 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	5/30	5/24	5/20	5/17	5/13	5/10	5/07	5/03	4/27
32	5/15	5/11	5/08	5/05	5/03	4/30	4/27	4/24	4/20
28	5/08	5/04	4/30	4/28	4/25	4/23	4/20	4/17	4/12
24	4/28	4/23	4/19	4/16	4/13	4/10	4/07	4/03	3/29
20	4/22	4/15	4/11	4/07	4/04	3/31	3/28	3/23	3/17
16	4/09	4/04	3/31	3/27	3/24	3/21	3/18	3/14	3/08

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	9/08	9/12	9/15	9/17	9/19	9/21	9/23	9/26	9/29
32	9/16	9/20	9/22	9/25	9/27	9/29	10/02	10/04	10/08
28	9/21	9/25	9/29	10/02	10/04	10/07	10/10	10/14	10/18
24	9/30	10/05	10/09	10/13	10/16	10/19	10/23	10/27	11/01
20	10/14	10/19	10/22	10/25	10/27	10/30	11/01	11/05	11/09
16	10/17	10/23	10/27	10/31	11/04	11/08	11/12	11/16	11/22

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	152	144	138	133	128	123	118	112	104
32	165	159	154	150	147	143	139	135	128
28	177	172	168	165	162	158	155	151	146
24	207	200	194	190	185	181	176	171	163
20	227	220	214	210	206	201	197	192	184
16	251	241	235	229	224	219	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)

Heating Degree Days (1)

Base Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1534	1182	941	512	197	28	13	22	135	461	963	1401	7389
60	1379	1042	786	374	109	5	0	4	59	314	813	1246	6131
57	1286	958	694	298	71	2	0	1	30	236	723	1153	5452
55	1224	907	634	252	51	0	0	0	18	189	666	1091	5032
50	1072	777	491	154	19	0	0	0	3	97	528	937	4078
32	569	361	119	6	0	0	0	0	0	2	150	441	1648

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	58	103	201	489	881	1129	1282	1208	913	565	177	63	7069
55	0	5	3	45	219	439	569	495	241	39	3	0	2058
57	0	0	1	31	177	381	507	434	193	24	1	0	1749
60	0	0	0	17	123	294	414	344	132	9	0	0	1333
65	0	0	0	5	56	167	272	207	58	1	0	0	766
70	0	0	0	0	19	75	152	104	18	0	0	0	368

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	9	74	284	644	898	1043	969	683	349	54	2	0	9	83	367	1011	1909	2952	3921	4604	4953	5007	5009
45	0	3	33	174	490	748	888	814	535	222	22	0	0	3	36	210	700	1448	2336	3150	3685	3907	3929	3929
50	0	0	9	101	344	598	733	659	391	126	7	0	0	0	9	110	454	1052	1785	2444	2835	2961	2968	2968
55	0	0	3	49	217	450	578	505	263	58	1	0	0	0	3	52	269	719	1297	1802	2065	2123	2124	2124
60	0	0	0	23	117	306	425	351	149	23	0	0	0	0	0	23	140	446	871	1222	1371	1394	1394	1394
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	14	61	194	403	587	698	643	441	233	40	0	0	14	75	269	672	1259	1957	2600	3041	3274	3314	3314

(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