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: HIGHMORE 1 W, SD **COOP ID: 393832**

Climate Division: SD 6 **NWS Call Sign:** **Elevation: 1,890 Feet** **Lat: 44˚31N** **Lon: 99˚27W**

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	24.9	4.2	14.6	64+	1987	12	28.4	1990	-45	1912	12	-1.6	1978	1564	0	.0	.0	1.0	19.3	30.7	12.5
Feb	31.6	11.3	21.5	69+	1958	25	33.0	1999	-41	1917	2	6.1	1979	1219	0	.0	.0	3.8	13.3	27.3	7.0
Mar	43.0	21.1	32.1	86+	1946	31	41.5	2000	-26	1917	4	23.4	1996	1022	0	.0	.0	11.3	6.4	26.8	2.0
Apr	58.4	32.3	45.4	98	1980	21	52.3	1987	-4	1936	3	38.0	1995	592	1	.0	.3	23.6	.8	15.4	@
May	70.4	44.1	57.3	108	1934	30	63.8	1987	16+	1945	8	52.0	1979	272	31	.0	.8	30.4	.0	2.9	.0
Jun	79.9	53.5	66.7	112	1931	28	75.9	1988	23	1919	10	61.7	1993	71	121	.6	5.5	30.0	.0	.0	.0
Jul	86.6	58.9	72.8	113+	1936	16	78.1	1974	35	1912	15	63.7	1992	23	264	3.3	13.3	31.0	.0	.0	.0
Aug	85.8	57.5	71.7	113	1965	13	79.2	1983	31	1911	28	65.8	1992	33	240	2.3	11.8	31.0	.0	.0	.0
Sep	75.7	47.1	61.4	108+	1983	2	69.4	1998	10	1926	25	56.7	1985	170	61	.5	4.3	29.6	.0	1.7	.0
Oct	61.3	35.2	48.3	97	1963	4	52.0	1973	-11	1925	29	43.7	1976	520	0	.0	.4	26.4	.3	11.3	@
Nov	40.4	20.9	30.7	81+	1999	8	42.3	1999	-23	1940	14	18.0	1985	1031	0	.0	.0	8.8	7.7	26.4	1.5
Dec	28.4	8.8	18.6	68	1939	6	29.3	1979	-36	1983	24	-.5	1983	1439	0	.0	.0	1.8	16.8	30.8	8.5
Ann	57.2	32.9	45.1	113+	Aug 1965	13	79.2	Aug 1983	-45	Jan 1912	12	-1.6	Jan 1978	7956	718	6.7	36.4	228.7	64.6	173.3	31.5

\+ 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: 1896-2001

(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	.40	.22	2.46	1939	9	1.55	1997	.00	1989
Feb	.54	.35	1.20+	1991	18	2.55	1987	.00	1985
Mar	1.38	1.07	2.70	1987	17	4.30	1977	.05	1994
Apr	2.59	2.44	3.15	1989	28	9.08	1995	.35	1992
May	3.07	2.49	2.57	1907	25	8.35	1991	.30	1992
Jun	3.16	2.71	4.75	1984	21	7.40	1984	.73	1989
Jul	3.25	2.57	5.90	1981	2	8.50	1981	.48	1976
Aug	2.26	1.92	3.30	1953	2	5.47	1981	.22	1976
Sep	1.66	1.46	2.75	1996	19	7.15	1996	.00+	1998
Oct	1.79	1.18	2.25	1980	16	5.46	1998	.10	1987
Nov	.75	.69	2.10	1993	13	2.64	1993	.00	1999
Dec	.38	.33	.72	1931	30	1.41	1972	.00+	1995
Ann	21.23	21.26	5.90	Jul 1981	2	9.08	Apr 1995	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.9	1.5	.1	.0
Feb	3.9	1.6	.2	.1
Mar	5.0	3.5	.7	.3
Apr	7.0	6.1	1.6	.6
May	7.9	6.9	2.0	.7
Jun	8.0	6.9	2.0	.7
Jul	7.0	6.2	2.1	.8
Aug	5.3	4.7	1.4	.5
Sep	4.3	3.6	.9	.4
Oct	4.4	3.9	1.2	.5
Nov	4.2	2.9	.3	@
Dec	4.0	1.4	.1	.0
Ann	64.9	49.2	12.6	4.6

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	.05	.10	.16	.22	.30	.38	.49	.64	.89	1.13
Feb	.03	.08	.17	.25	.33	.42	.53	.66	.84	1.14	1.43
Mar	.12	.21	.40	.59	.80	1.04	1.32	1.68	2.17	3.00	3.81
Apr	.39	.61	.99	1.34	1.72	2.12	2.59	3.17	3.94	5.19	6.40
May	.60	.87	1.32	1.74	2.16	2.61	3.12	3.74	4.56	5.88	7.13
Jun	.85	1.15	1.61	2.01	2.40	2.82	3.27	3.82	4.52	5.63	6.67
Jul	.61	.90	1.37	1.81	2.26	2.75	3.30	3.96	4.85	6.27	7.62
Aug	.39	.59	.92	1.23	1.54	1.89	2.28	2.76	3.39	4.42	5.40
Sep	.00	.12	.39	.65	.93	1.24	1.61	2.06	2.69	3.73	4.75
Oct	.13	.25	.48	.72	1.00	1.31	1.69	2.17	2.84	3.96	5.07
Nov	.06	.13	.26	.37	.48	.61	.75	.93	1.17	1.56	1.93
Dec	.00	.00	.08	.15	.22	.30	.38	.49	.63	.85	1.06
Ann	13.66	15.07	16.91	18.33	19.60	20.84	22.14	23.58	25.34	27.93	30.19

\+ 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: 1896-2001
(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	6.9	4.0	4	2
Feb	6.4	5.7	4	1
Mar	8.0	6.0	2	#
Apr	2.8	1.0	#	#
May	.1	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	1.4	.0	#	0
Nov	5.6	3.5	1	#
Dec	6.1	7.0	2	1
Ann	37.3	27.2	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	10.0	1975	7	24.5	1975	30	1997	15	24	1997
Feb	14.0	1991	18	16.5	1991	30	1978	20	21	1978
Mar	12.0	1985	3	38.5	1975	32	1975	31	12	1989
Apr	22.0	1995	18	22.0+	1995	32	1975	2	4	1975
May	2.0	1979	10	2.0	1979	#	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	#	1995	21	#+	1995	#	1995	21	#	1995
Oct	6.5	1999	1	12.0	1976	3	1979	31	#+	1997
Nov	7.0	1981	30	22.0	2000	15	2000	14	8	2000
Dec	10.0	1996	14	14.0	1983	27	1996	31	17	1996
Ann	22.0	Apr 1995	18	38.5	Mar 1975	32+	Apr 1975	2	24	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.3	2.6	.8	.1	@
Feb	3.0	2.6	.8	.2	@
Mar	2.9	2.7	1.1	.7	.1
Apr	1.3	1.2	.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	.0	.0
Oct	.4	.4	.3	.1	.0
Nov	2.6	2.3	.9	.2	.0
Dec	3.1	2.7	.8	.3	@
Ann	16.6	14.5	5.3	1.9	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	16.8	11.0	8.1	4.0
Feb	11.5	7.3	4.4	2.4
Mar	6.2	4.3	2.8	.9
Apr	.9	.4	.3	.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	.1	.0	.0
Nov	6.6	3.9	1.6	.6
Dec	12.9	8.1	5.1	1.1
Ann	55.2	35.1	22.3	9.2

+ 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	6/14	6/07	6/01	5/27	5/23	5/18	5/14	5/08	4/30
32	5/24	5/20	5/16	5/13	5/10	5/08	5/05	5/01	4/26
28	5/15	5/10	5/07	5/03	4/30	4/28	4/24	4/21	4/16
24	5/04	4/29	4/26	4/24	4/21	4/19	4/16	4/13	4/09
20	4/27	4/22	4/18	4/15	4/12	4/09	4/06	4/02	3/28
16	4/17	4/13	4/09	4/06	4/04	4/01	3/29	3/26	3/21

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	9/03	9/07	9/11	9/14	9/16	9/19	9/22	9/25	9/30
32	9/13	9/17	9/20	9/22	9/24	9/26	9/29	10/01	10/05
28	9/22	9/27	9/30	10/03	10/06	10/09	10/12	10/16	10/21
24	9/23	9/29	10/04	10/08	10/12	10/15	10/19	10/24	10/30
20	10/09	10/14	10/18	10/21	10/24	10/27	10/30	11/03	11/08
16	10/16	10/21	10/25	10/28	10/31	11/03	11/06	11/09	11/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	145	135	128	122	116	110	104	97	87
32	156	149	144	140	136	132	128	123	116
28	181	173	167	162	158	154	149	143	135
24	196	188	182	177	173	168	163	158	150
20	217	209	203	199	194	189	184	179	171
16	228	222	217	213	209	206	202	197	190

***** 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	1564	1219	1022	592	272	71	23	33	170	520	1031	1439	7956
60	1409	1079	867	448	165	24	7	11	85	368	881	1284	6628
57	1316	1000	774	366	114	11	0	3	50	281	791	1191	5897
55	1254	948	712	315	87	5	0	1	32	228	731	1129	5442
50	1103	817	567	202	37	0	0	0	8	120	592	981	4427
32	603	402	158	11	0	0	0	0	0	2	188	490	1854

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	62	108	159	410	783	1041	1264	1230	881	506	147	75	6666
55	0	9	1	24	156	356	551	518	223	19	0	0	1857
57	0	5	0	16	122	301	489	458	181	10	0	0	1582
60	0	0	0	7	79	225	403	373	126	3	0	0	1216
65	0	0	0	1	31	121	264	240	61	0	0	0	718
70	0	0	0	0	9	52	154	138	23	0	0	0	376

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	11	60	239	567	831	1051	1017	675	319	43	0	0	11	71	310	877	1708	2759	3776	4451	4770	4813	4813
45	0	1	24	145	418	681	896	862	531	198	17	0	0	1	25	170	588	1269	2165	3027	3558	3756	3773	3773
50	0	0	5	81	280	531	741	707	386	108	6	0	0	0	5	86	366	897	1638	2345	2731	2839	2845	2845
55	0	0	0	43	166	385	586	552	265	47	1	0	0	0	0	43	209	594	1180	1732	1997	2044	2045	2045
60	0	0	0	15	86	244	432	400	160	14	0	0	0	0	0	15	101	345	777	1177	1337	1351	1351	1351
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	11	54	178	361	531	678	652	433	220	36	1	1	12	66	244	605	1136	1814	2466	2899	3119	3155	3156

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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