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: HOT SPRINGS, SD **COOP ID: 394007**

Climate Division: SD 4 **NWS Call Sign:** **Elevation: 3,559 Feet** **Lat: 43˚26N** **Lon: 103˚28W**

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	37.8	10.7	24.3	69	1981	23	33.5	1981	-41	1909	11	9.2	1979	1263	0	.0	.0	6.9	8.7	29.9	7.3
Feb	43.6	15.0	29.3	72+	1982	21	38.7	1999	-34	1996	2	16.5	1978	999	0	.0	.0	10.8	5.5	26.8	4.0
Mar	52.0	22.0	37.0	86	1910	22	43.8	1986	-22	1913	21	29.7	1975	869	0	.0	.0	18.8	2.7	27.2	1.1
Apr	61.4	30.9	46.2	93	1910	28	52.8	1981	-11	1936	2	40.2	1983	566	0	.0	.1	24.2	.4	15.9	@
May	70.8	41.2	56.0	102	1934	29	61.1	1977	13	1954	3	50.9	1983	291	12	.0	.4	30.3	.0	3.8	.0
Jun	80.9	50.1	65.5	108+	1936	24	73.2	1988	26+	1951	3	59.4	1998	89	104	.5	5.9	29.9	.0	.1	.0
Jul	87.6	55.8	71.7	112+	1939	10	75.5	1974	36	1915	3	64.3	1992	15	222	3.1	14.3	31.0	.0	.0	.0
Aug	86.6	53.6	70.1	111	1937	14	76.4	1983	28	1910	26	65.0	1974	32	191	1.2	14.0	31.0	.0	.0	.0
Sep	77.6	42.8	60.2	103+	1960	4	67.4	1998	13	1926	26	55.4	1974	191	47	.2	5.3	29.5	.0	3.1	.0
Oct	64.8	32.0	48.4	94	1935	8	51.3	1973	-18	1925	28	45.4	1971	516	0	.0	.2	28.1	.3	13.8	.1
Nov	47.1	20.6	33.9	80	1999	8	44.9	1999	-21	1959	14	19.1	1985	935	0	.0	.0	14.4	3.9	26.3	1.1
Dec	39.0	12.5	25.8	72	1941	3	34.1	1999	-37	1989	22	8.2	1983	1218	0	.0	.0	7.3	7.2	29.6	4.5
Ann	62.4	32.3	47.4	112+	Jul 1939	10	76.4	Aug 1983	-41	Jan 1909	11	8.2	Dec 1983	6984	576	5.0	40.2	262.2	28.7	176.5	18.1

\+ 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: 1908-2001

(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	.36	.31	1.10	1921	24	.79	1998	.00	1989
Feb	.45	.44	.64	1992	23	1.29	1987	.03	1996
Mar	.92	.91	1.45	1933	4	2.20	1998	.13	1988
Apr	1.95	1.61	4.31	2000	19	6.30	2000	.07	1987
May	3.03	2.21	3.33	1971	23	6.45	1982	.55	1985
Jun	2.81	2.51	3.50	1947	21	6.31	1999	.71	1996
Jul	2.57	2.29	2.87	1997	29	8.05	1997	.60	1994
Aug	1.77	1.36	3.25	1922	3	4.99	1996	.28	1975
Sep	1.33	.98	2.10	1938	5	3.41	1989	.09	1992
Oct	1.26	1.17	1.61	1962	6	4.66	1998	.00	1999
Nov	.53	.46	1.50	1922	4	1.54	1998	.00	1997
Dec	.35	.27	1.20	1909	11	.98	1994	.00	1979
Ann	17.33	17.36	4.31	Apr 2000	19	8.05	Jul 1997	.00+	Oct 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	1.5	@	.0
Feb	4.4	1.6	.1	.0
Mar	5.7	2.6	.5	.0
Apr	7.8	4.5	1.3	.3
May	10.3	6.1	1.8	.7
Jun	9.6	5.6	2.3	.6
Jul	8.7	5.4	1.8	.5
Aug	6.6	3.8	.9	.3
Sep	5.5	3.3	.8	.2
Oct	5.4	3.0	.9	.1
Nov	4.1	1.7	.2	.0
Dec	4.1	1.2	.1	.0
Ann	76.7	40.3	10.7	2.7

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	.02	.06	.12	.17	.23	.29	.36	.44	.56	.75	.93
Feb	.06	.09	.15	.22	.28	.36	.45	.55	.70	.94	1.17
Mar	.22	.30	.43	.55	.67	.80	.94	1.11	1.33	1.68	2.01
Apr	.31	.48	.76	1.03	1.31	1.61	1.96	2.39	2.95	3.87	4.75
May	.73	1.02	1.46	1.86	2.25	2.66	3.12	3.67	4.39	5.54	6.61
Jun	.74	1.01	1.42	1.77	2.13	2.49	2.90	3.39	4.02	5.02	5.96
Jul	.78	1.02	1.39	1.70	2.01	2.33	2.67	3.09	3.62	4.44	5.21
Aug	.34	.50	.76	1.00	1.24	1.50	1.80	2.16	2.64	3.40	4.13
Sep	.14	.24	.42	.61	.80	1.03	1.29	1.62	2.07	2.81	3.54
Oct	.17	.33	.54	.72	.90	1.09	1.30	1.55	1.89	2.42	2.92
Nov	.05	.11	.20	.28	.35	.44	.54	.65	.81	1.06	1.30
Dec	.01	.04	.09	.14	.20	.26	.34	.43	.57	.79	1.00
Ann	11.35	12.48	13.94	15.06	16.06	17.04	18.06	19.19	20.57	22.60	24.37

\+ 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: 1908-2001
(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	5.4	4.8	2	1
Feb	4.7	3.3	1	1
Mar	6.4	5.4	1	#
Apr	3.6	2.0	#	#
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	1.5	.0	#	#
Nov	3.8	2.5	1	#
Dec	4.9	3.7	2	1
Ann	30.4	21.7	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	7.0	1974	21	11.6	1979	21	1976	2	7	1993
Feb	7.0	1973	13	14.5	1993	10	1971	3	5	1993
Mar	12.0	1975	27	20.0	1975	12	1975	28	3	1998
Apr	10.0	2000	19	18.0	1984	12	1974	11	1+	2000
May	1.0	1979	10	1.0	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	2.0	2000	23	2.0	2000	2	2000	23	#+	2000
Oct	8.0	1993	8	10.5	1972	8	1995	31	1	1995
Nov	6.0	1975	25	13.8	1986	12	1985	30	6	1985
Dec	12.0	1975	31	19.5	1975	14	1983	29	7	1983
Ann	12.0+	Dec 1975	31	20.0	Mar 1975	21	Jan 1976	2	7+	Jan 1993

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.4	2.2	.5	.1	.0
Feb	2.8	2.1	.5	.2	.0
Mar	2.8	2.3	.9	.3	.1
Apr	1.2	1.1	.5	.1	@
May	@	@	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.0	.0	.0
Oct	.4	.4	.2	.1	.0
Nov	2.1	1.6	.6	.3	.0
Dec	3.0	2.3	.8	.3	@
Ann	15.8	12.1	4.0	1.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	12.5	4.9	1.8	.3
Feb	8.0	4.3	2.2	.0
Mar	4.1	1.2	.4	.2
Apr	1.4	.7	.2	@
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.0	.0	.0
Oct	.5	.2	.2	.0
Nov	4.1	1.5	.8	.0
Dec	10.1	5.6	2.5	.3
Ann	40.8	18.4	8.1	.8

+ 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	6/03	5/30	5/26	5/23	5/19	5/14	5/08
32	5/29	5/25	5/21	5/18	5/16	5/13	5/10	5/07	5/02
28	5/15	5/10	5/07	5/04	5/02	4/29	4/26	4/23	4/19
24	5/05	5/01	4/28	4/25	4/23	4/20	4/18	4/15	4/10
20	4/26	4/21	4/17	4/14	4/11	4/08	4/05	4/01	3/26
16	4/16	4/10	4/05	4/01	3/28	3/24	3/20	3/15	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	9/02	9/06	9/08	9/11	9/13	9/16	9/18	9/21	9/25
32	9/07	9/12	9/15	9/17	9/20	9/22	9/25	9/28	10/02
28	9/15	9/20	9/24	9/27	10/01	10/04	10/07	10/11	10/16
24	9/21	9/28	10/02	10/06	10/09	10/13	10/17	10/21	10/27
20	10/06	10/12	10/16	10/19	10/22	10/25	10/29	11/02	11/07
16	10/19	10/24	10/27	10/30	11/02	11/05	11/08	11/12	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	131	124	118	114	109	105	100	95	87
32	145	138	134	130	126	123	119	114	108
28	171	164	159	155	151	147	143	138	131
24	188	182	177	173	169	165	161	156	149
20	212	205	201	197	194	190	186	182	176
16	239	232	227	223	219	215	210	205	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	1263	999	869	566	291	89	15	32	191	516	935	1218	6984
60	1108	859	714	419	168	34	2	8	99	361	785	1063	5620
57	1015	775	621	335	110	16	0	3	59	271	695	970	4870
55	954	725	559	282	79	9	0	1	38	214	639	908	4408
50	807	594	412	167	28	1	0	0	10	97	499	757	3372
32	339	215	55	3	0	0	0	0	0	1	132	291	1036

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	98	140	209	427	744	1005	1230	1182	846	508	187	97	6673
55	1	6	0	16	110	324	517	470	194	8	4	0	1650
57	0	0	0	9	79	271	455	410	154	3	0	0	1381
60	0	0	0	3	44	199	364	322	104	1	0	0	1037
65	0	0	0	0	12	104	222	191	47	0	0	0	576
70	0	0	0	0	2	42	111	93	16	0	0	0	264

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	10	32	95	243	522	791	1018	978	650	327	68	19	10	42	137	380	902	1693	2711	3689	4339	4666	4734	4753
45	1	7	45	142	370	642	863	823	505	201	25	2	1	8	53	195	565	1207	2070	2893	3398	3599	3624	3626
50	0	1	11	70	234	492	708	668	366	104	3	0	0	1	12	82	316	808	1516	2184	2550	2654	2657	2657
55	0	0	0	28	126	345	553	513	241	37	0	0	0	0	0	28	154	499	1052	1565	1806	1843	1843	1843
60	0	0	0	8	54	212	398	362	136	9	0	0	0	0	0	8	62	274	672	1034	1170	1179	1179	1179
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	21	48	112	200	340	498	641	615	435	266	71	22	21	69	181	381	721	1219	1860	2475	2910	3176	3247	3269

(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