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: RAPID CITY 4 NW, SD **COOP ID: 396947**

Climate Division: SD 5 **NWS Call Sign:** **Elevation: 3,450 Feet** **Lat: 44˚07N** **Lon: 103˚17W**

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	34.3	10.3	22.3	73	1987	12	33.3	1992	-25	1979	14	5.7	1979	1325	0	.0	.0	7.3	10.9	29.5	7.4
Feb	38.1	14.3	26.2	78	1988	27	37.0	1999	-28	1996	2	13.1	1978	1086	0	.0	.0	9.2	7.9	26.3	4.1
Mar	45.4	21.3	33.4	81	1986	30	41.6	1986	-19	1996	9	24.3	1996	980	0	.0	.0	15.4	4.6	26.3	1.3
Apr	54.6	31.0	42.8	90	1980	21	49.8	1987	0	1975	2	36.3	1983	667	0	.0	@	22.2	1.0	15.3	@
May	64.8	42.1	53.5	99	1969	27	59.0	1985	19	1954	3	48.1	1996	367	8	.0	.2	29.4	.0	3.0	.0
Jun	75.0	51.7	63.4	105	1974	26	73.4	1988	32+	1998	3	57.0	1982	126	76	.3	3.1	29.8	.0	@	.0
Jul	82.7	57.6	70.2	107+	1981	7	74.4	1989	40	1959	1	62.3	1992	33	192	1.4	10.1	31.0	.0	.0	.0
Aug	82.4	55.1	68.8	104	1974	19	74.0	1983	38+	1992	31	63.6	1977	46	162	.4	9.2	31.0	.0	.0	.0
Sep	72.8	44.6	58.7	103+	1960	4	67.0	1998	21	1972	26	52.9	1986	232	42	.1	3.2	29.2	.0	1.9	.0
Oct	60.8	33.8	47.3	92+	1975	6	51.1	1996	-3	1991	30	43.1	1976	549	0	.0	.1	26.2	.4	10.1	@
Nov	44.3	21.2	32.8	83	1999	8	45.0	1999	-17	1985	23	15.3	1985	967	0	.0	.0	12.8	5.5	24.7	1.1
Dec	37.0	12.7	24.9	74	1979	18	34.4	1999	-29	1989	22	6.5	1983	1245	0	.0	.0	7.9	8.7	29.7	4.6
Ann	57.7	33.0	45.4	107+	Jul 1981	7	74.4	Jul 1989	-29	Dec 1989	22	5.7	Jan 1979	7623	480	2.2	25.9	251.4	39.0	166.8	18.5

\+ 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: 1949-2001

(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	.29	.16	.70	1993	9	1.39	1993	.00+	1991
Feb	.36	.31	.71	1953	9	1.21	1987	.00+	1985
Mar	.90	.80	1.80	1963	16	2.37	1973	.00	1984
Apr	1.97	1.47	2.08	2000	19	4.76	2000	.04	1987
May	3.46	2.83	2.71	1965	14	7.85	1996	1.19	1979
Jun	3.04	2.27	4.00	1999	3	9.24	1999	.70	1983
Jul	2.71	2.20	2.64	1981	25	6.31	1995	.28	1988
Aug	2.09	2.01	2.68	1986	12	4.99	1982	.34	1995
Sep	1.23	.87	3.07	1998	14	4.09	1986	.06	1975
Oct	1.57	1.46	2.70	1997	9	5.29	1998	.11	1999
Nov	.53	.41	1.15	2000	1	1.65	1985	.04	1990
Dec	.30	.25	.60	1960	4	.89	1975	.00	1998
Ann	18.45	17.53	4.00	Jun 1999	3	9.24	Jun 1999	.00+	Dec 1998

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.1	.7	.1	.0
Feb	4.1	1.4	@	.0
Mar	5.9	2.8	.3	.1
Apr	8.0	4.3	1.2	.3
May	11.0	6.9	2.3	.7
Jun	10.9	6.3	1.6	.5
Jul	10.0	5.7	1.5	.4
Aug	7.9	4.4	1.2	.4
Sep	5.5	2.7	.6	.1
Oct	5.7	3.1	1.0	.3
Nov	4.0	1.7	.1	@
Dec	3.7	.8	.0	.0
Ann	80.8	40.8	9.9	2.8

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	.01	.05	.09	.14	.20	.26	.35	.47	.68	.88
Feb	.00	.04	.10	.16	.22	.28	.36	.44	.56	.76	.95
Mar	.03	.10	.22	.35	.49	.66	.85	1.10	1.44	2.02	2.59
Apr	.16	.29	.55	.82	1.12	1.47	1.88	2.39	3.11	4.30	5.48
May	1.16	1.49	1.97	2.37	2.77	3.17	3.61	4.13	4.79	5.81	6.76
Jun	.55	.81	1.26	1.67	2.10	2.56	3.08	3.71	4.55	5.91	7.20
Jul	.74	1.00	1.39	1.73	2.07	2.42	2.81	3.27	3.86	4.80	5.68
Aug	.52	.72	1.02	1.29	1.56	1.84	2.16	2.53	3.01	3.78	4.50
Sep	.09	.17	.32	.49	.68	.90	1.16	1.49	1.96	2.73	3.50
Oct	.19	.31	.53	.75	.98	1.24	1.54	1.91	2.42	3.26	4.07
Nov	.05	.09	.16	.24	.32	.41	.52	.65	.83	1.14	1.43
Dec	.01	.04	.08	.12	.17	.22	.29	.37	.47	.65	.83
Ann	11.60	12.86	14.51	15.79	16.94	18.06	19.23	20.54	22.14	24.50	26.57

\+ 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)

Extremes (2)

Mean Number of Days (1)

Snow Fall >= Thresholds

Snow Depth >= Thresholds

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	3.6	2.0	2	1	12.0	1993	9	15.4	1971	16	1993	9	16	1993	3.7	1.5	.4	.1	@	10.1	3.5	1.0	.1
Feb	4.5	4.1	1	#	8.0	1991	18	13.5	1971	12	1971	8	6	1993	3.3	1.7	.4	@	.0	6.3	2.8	.7	.2
Mar	7.4	4.2	1	#	18.0	1973	14	27.0	1977	18	1977	30	3	1999	3.5	2.2	1.0	.4	@	4.0	2.2	1.1	.2
Apr	5.1	4.1	#	#	10.5	2000	20	20.0	2000	17	2000	20	2+	2000	2.5	1.5	.7	.5	@	1.4	.8	.4	.0
May	.5	.0	#	0	5.5	1991	3	5.5	1991	2	1996	10	#+	1996	.2	.2	@	@	.0	.1	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	#	.0	0	0	#	1993	13	#	1993	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	1.3	.0	#	0	6.0	1971	28	8.0	1995	6	1971	29	1	1998	.7	.4	.1	.1	.0	.6	.3	.2	.0
Nov	4.2	3.2	1	#	9.0	1977	19	11.4	1977	13	1985	10	5	1985	2.5	1.5	.6	.1	.0	4.8	2.3	.9	.1
Dec	4.1	4.0	1	#	6.0	1975	31	14.5	1975	9	1989	22	3	1989	2.8	1.3	.3	.1	.0	7.8	2.4	.2	.0
Ann	30.7	21.6	N/A	N/A	18.0	Mar 1973	14	27.0	Mar 1977	18	Mar 1977	30	16	Jan 1993	19.2	10.3	3.5	1.3	@	35.1	14.3	4.5	.6

+ 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	6/09	6/03	5/30	5/26	5/23	5/20	5/16	5/12	5/06
32	5/24	5/19	5/16	5/13	5/10	5/08	5/05	5/01	4/27
28	5/13	5/08	5/04	5/01	4/28	4/25	4/22	4/18	4/13
24	5/03	4/28	4/24	4/21	4/19	4/16	4/13	4/09	4/05
20	4/22	4/16	4/12	4/09	4/05	4/02	3/30	3/26	3/20
16	4/17	4/10	4/04	3/31	3/27	3/23	3/18	3/13	3/06

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	9/09	9/13	9/16	9/19	9/21	9/23	9/26	9/29	10/03
32	9/12	9/17	9/22	9/25	9/28	10/02	10/05	10/09	10/15
28	9/19	9/25	9/30	10/04	10/07	10/11	10/15	10/19	10/25
24	10/01	10/06	10/10	10/14	10/17	10/20	10/24	10/28	11/02
20	10/12	10/17	10/20	10/23	10/26	10/29	10/31	11/04	11/09
16	10/21	10/27	10/31	11/04	11/07	11/11	11/14	11/19	11/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	144	136	130	125	120	115	110	105	96
32	164	156	150	145	140	136	131	125	117
28	186	178	171	166	161	156	151	145	137
24	204	196	190	185	181	176	171	165	157
20	224	217	211	207	203	199	194	189	181
16	249	241	235	230	225	220	214	208	200

***** 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	1325	1086	980	667	367	126	33	46	232	549	967	1245	7623
60	1170	946	825	519	235	56	9	14	134	395	817	1090	6210
57	1077	863	732	433	169	29	3	5	89	305	732	997	5434
55	1018	815	670	377	131	18	1	3	64	248	677	936	4958
50	875	683	523	249	61	4	0	0	23	128	537	791	3874
32	406	288	117	15	0	0	0	0	0	3	167	325	1321

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	104	125	160	337	664	941	1181	1139	800	477	190	103	6221
55	3	8	0	10	83	269	469	429	174	9	10	0	1464
57	0	1	0	5	58	220	409	369	139	4	5	0	1210
60	0	0	0	2	31	157	323	285	95	1	0	0	894
65	0	0	0	0	8	76	192	162	42	0	0	0	480
70	0	0	0	0	1	28	98	75	15	0	0	0	217

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	20	36	83	216	488	758	988	954	630	316	79	22	20	56	139	355	843	1601	2589	3543	4173	4489	4568	4590
45	3	9	39	127	341	609	833	799	486	197	33	3	3	12	51	178	519	1128	1961	2760	3246	3443	3476	3479
50	1	1	12	66	213	459	678	644	347	104	11	0	1	2	14	80	293	752	1430	2074	2421	2525	2536	2536
55	0	0	2	29	114	315	523	490	225	47	1	0	0	0	2	31	145	460	983	1473	1698	1745	1746	1746
60	0	0	0	8	49	191	370	338	127	14	0	0	0	0	0	8	57	248	618	956	1083	1097	1097	1097
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	25	41	81	164	301	467	634	611	397	224	67	30	25	66	147	311	612	1079	1713	2324	2721	2945	3012	3042

(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