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: MISSION 14 S, SD **COOP ID: 395638**

Climate Division: SD 8 **NWS Call Sign:** **Elevation: 2,810 Feet** **Lat: 43˚07N** **Lon: 100˚37W**

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	31.5	8.1	19.8	71	1987	13	32.2	1990	-28	1966	29	3.5	1979	1402	0	.0	.0	3.8	14.2	30.3	8.6
Feb	36.8	13.1	25.0	75	1995	22	35.3	1999	-30	1996	2	10.2	1978	1122	0	.0	.0	7.2	10.2	26.8	4.8
Mar	46.3	20.8	33.6	84+	1988	28	40.5	1986	-26	1960	4	24.9	1996	975	0	.0	.0	13.9	5.6	26.5	1.6
Apr	58.1	31.2	44.7	95	1989	23	51.2	1981	5	1957	12	38.5	1995	610	0	.0	.2	21.8	.8	15.9	.0
May	69.8	43.0	56.4	98+	1989	24	62.6	1985	19+	1980	8	50.7	1995	285	17	.0	.5	29.6	.0	2.7	.0
Jun	80.4	53.0	66.7	109	1988	25	75.6	1988	31	1969	14	61.4	1998	76	128	.4	4.3	29.9	.0	.0	.0
Jul	87.6	59.0	73.3	110+	1990	3	79.4	1974	39	1971	30	64.7	1992	16	273	1.5	12.3	31.0	.0	.0	.0
Aug	86.4	56.4	71.4	107	1965	13	78.2	1983	37	1964	12	64.9	1992	27	226	1.1	10.8	31.0	.0	.0	.0
Sep	76.9	46.2	61.6	104	1952	4	69.3	1998	20	1974	30	55.7	1993	166	62	.3	4.5	29.4	@	1.7	.0
Oct	63.2	34.1	48.7	95+	1997	2	51.5	1973	0	1991	31	44.6	1976	508	0	.0	.3	25.5	.4	11.1	@
Nov	44.3	20.9	32.6	85	1999	9	45.4	1999	-21	1959	14	17.8	1985	972	0	.0	.0	11.2	6.7	25.7	1.4
Dec	34.5	11.3	22.9	72	1998	2	32.6	1999	-31	1990	22	4.2	1983	1306	0	.0	.0	5.0	12.1	30.3	5.8
Ann	59.7	33.1	46.4	110+	Jul 1990	3	79.4	Jul 1974	-31	Dec 1990	22	3.5	Jan 1979	7465	706	3.3	32.9	239.3	50.0	171.0	22.2

\+ 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: 1951-2001

(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	.39	.26	1.21	1985	16	1.35	1985	.00	1989
Feb	.60	.46	1.92	2000	26	2.22	2000	.05	1983
Mar	1.33	1.11	2.50	1977	11	7.82	1977	.11	1997
Apr	2.14	1.97	2.50	1970	12	4.77	1971	.51	1980
May	3.61	3.54	3.07	1999	10	7.77	1977	.47	1992
Jun	3.16	3.18	3.60	1980	16	8.22	1980	.53	1976
Jul	3.26	2.91	3.37	2000	4	8.03	1998	1.02	1996
Aug	2.13	1.97	3.95	1959	20	5.11	1980	.60	1997
Sep	1.63	1.21	2.40	1963	1	5.04	1996	.31	1972
Oct	1.51	1.08	2.49	1953	21	5.23	1995	.14	1999
Nov	.79	.74	.98	2001	24	2.27	1985	.04	1976
Dec	.46	.38	1.09	1987	27	1.94	1987	.00+	1991
Ann	21.01	20.91	3.95	Aug 1959	20	8.22	Jun 1980	.00+	Dec 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.5	1.0	.1	@
Feb	3.8	1.7	.1	@
Mar	5.8	3.1	.7	.2
Apr	8.2	5.1	1.4	.2
May	9.6	6.9	2.3	.8
Jun	9.8	6.6	2.1	.7
Jul	9.3	6.1	1.9	.8
Aug	7.4	4.6	1.3	.5
Sep	6.5	3.9	1.1	.2
Oct	5.4	3.4	.9	.3
Nov	4.1	2.5	.4	.0
Dec	3.6	1.6	.1	@
Ann	77.0	46.5	12.4	3.7

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	.01	.04	.09	.14	.21	.28	.36	.47	.62	.88	1.13
Feb	.05	.09	.17	.25	.34	.45	.57	.73	.94	1.31	1.66
Mar	.14	.24	.42	.61	.81	1.03	1.29	1.62	2.07	2.81	3.53
Apr	.44	.64	.95	1.24	1.53	1.83	2.18	2.60	3.15	4.03	4.87
May	.89	1.23	1.75	2.22	2.68	3.17	3.72	4.37	5.22	6.57	7.83
Jun	.73	1.03	1.49	1.90	2.32	2.75	3.25	3.83	4.60	5.83	6.98
Jul	1.01	1.32	1.78	2.18	2.56	2.95	3.39	3.90	4.55	5.58	6.53
Aug	.69	.90	1.19	1.45	1.69	1.94	2.22	2.54	2.96	3.60	4.20
Sep	.23	.37	.60	.83	1.06	1.32	1.62	1.99	2.49	3.30	4.08
Oct	.15	.26	.46	.67	.90	1.16	1.47	1.85	2.37	3.24	4.09
Nov	.10	.17	.28	.39	.50	.63	.78	.97	1.22	1.62	2.02
Dec	.00	.05	.13	.20	.27	.36	.45	.57	.73	.99	1.24
Ann	13.45	14.85	16.68	18.09	19.36	20.60	21.88	23.32	25.08	27.66	29.91

+ 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: 1951-2001
(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	5.4	4.3	3	2	12.0	1992	8	17.0	1982	22	1988	2	16	1988	2.9	2.5	.4	.3	@	15.4	8.8	5.2	2.8
Feb	5.8	5.5	3	2	8.0	1971	19	15.0	1993	16	1978	20	11	1988	3.2	2.9	.5	.3	.0	12.8	7.9	6.2	1.3
Mar	8.9	5.5	2	1	12.0	1977	11	54.0	1977	20	1977	12	8	1977	3.2	3.2	1.1	.5	.1	8.1	5.5	3.4	.7
Apr	5.1	2.0	#	#	20.0	1995	18	40.0	1995	18	1995	18	4	1995	1.7	1.7	.5	.3	@	2.5	1.5	.9	.4
May	.1	.0	#	0	2.0	1979	10	2.0	1979	#	1979	10	#	1979	@	@	.0	.0	.0	.0	.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	.3	.0	#	0	4.0	1985	29	6.0	1985	6	1985	29	#+	1985	.1	.1	@	.0	.0	.1	@	@	.0
Oct	1.6	1.0	#	#	7.0	1995	24	13.0	1995	10	1995	24	1	1995	.9	.8	.2	.1	.0	.9	.2	.1	@
Nov	6.5	5.1	1	1	9.0	1985	10	33.0	1985	17	1985	16	10	1985	2.6	2.4	.9	.3	.0	7.5	4.2	2.1	.8
Dec	5.2	5.0	2	1	12.0	1987	27	25.0	1987	23	1987	31	14	1985	2.9	2.8	.4	.2	@	12.1	6.5	2.9	1.4
Ann	38.9	28.4	N/A	N/A	20.0	Apr 1995	18	54.0	Mar 1977	23	Dec 1987	31	16	Jan 1988	17.5	16.4	4.0	2.0	.1	59.4	34.6	20.8	7.4

+ 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	5/29	5/26	5/22	5/19	5/15	5/11	5/05
32	5/19	5/15	5/13	5/10	5/08	5/06	5/04	5/01	4/27
28	5/13	5/08	5/05	5/02	4/30	4/28	4/25	4/22	4/17
24	5/05	4/30	4/27	4/24	4/21	4/18	4/15	4/11	4/06
20	4/25	4/20	4/16	4/12	4/09	4/06	4/02	3/29	3/24
16	4/15	4/10	4/06	4/03	3/31	3/28	3/24	3/21	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	9/08	9/12	9/15	9/17	9/20	9/22	9/25	9/27	10/01
32	9/14	9/18	9/22	9/24	9/27	9/29	10/02	10/05	10/10
28	9/22	9/27	10/01	10/04	10/07	10/10	10/14	10/17	10/23
24	10/01	10/06	10/10	10/13	10/16	10/19	10/22	10/26	10/31
20	10/10	10/15	10/19	10/22	10/25	10/28	10/31	11/04	11/09
16	10/18	10/24	10/28	11/01	11/05	11/08	11/12	11/16	11/23

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	134	129	124	120	115	111	105	98
32	158	152	148	144	141	138	134	130	124
28	176	170	166	163	159	156	153	148	143
24	198	191	186	182	178	174	170	165	158
20	220	212	207	202	198	194	189	184	176
16	242	234	228	223	218	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	1402	1122	975	610	285	76	16	27	166	508	972	1306	7465
60	1247	982	820	463	167	28	2	6	82	354	822	1151	6124
57	1154	898	727	378	111	13	0	2	47	265	735	1058	5388
55	1092	848	665	324	82	7	0	1	29	209	681	996	4934
50	944	718	518	205	31	1	0	0	7	97	541	849	3911
32	457	314	116	8	0	0	0	0	0	1	169	375	1440

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	79	116	165	388	756	1042	1280	1222	886	517	186	92	6729
55	0	7	0	14	124	359	567	510	226	11	9	0	1827
57	0	0	0	8	92	305	505	449	183	5	3	0	1550
60	0	0	0	3	55	230	415	361	128	1	0	0	1193
65	0	0	0	0	17	128	273	226	62	0	0	0	706
70	0	0	0	0	4	58	155	120	24	0	0	0	361

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	7	25	84	227	525	810	1025	987	663	324	69	15	7	32	116	343	868	1678	2703	3690	4353	4677	4746	4761
45	0	4	39	136	379	662	870	832	518	206	31	1	0	4	43	179	558	1220	2090	2922	3440	3646	3677	3678
50	0	0	12	77	246	513	715	677	380	115	11	0	0	0	12	89	335	848	1563	2240	2620	2735	2746	2746
55	0	0	3	34	138	365	560	523	255	52	1	0	0	0	3	37	175	540	1100	1623	1878	1930	1931	1931
60	0	0	0	9	64	230	407	371	153	17	0	0	0	0	0	9	73	303	710	1081	1234	1251	1251	1251
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	10	30	82	175	328	510	661	634	418	229	63	16	10	40	122	297	625	1135	1796	2430	2848	3077	3140	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:
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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