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: GREGORY, SD **COOP ID: 393452**

Climate Division: SD 8 **NWS Call Sign:** **Elevation: 2,160 Feet** **Lat: 43˚14N** **Lon: 99˚26W**

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	29.2	5.9	17.6	71	1974	16	30.0	1990	-29	1966	29	2.9	1978	1472	0	.0	.0	4.5	14.9	30.4	9.4
Feb	35.2	11.2	23.2	76	1995	21	34.0	1999	-28+	1994	9	8.8	1978	1170	0	.0	.0	7.8	10.5	27.1	5.3
Mar	45.8	21.2	33.5	91+	1946	31	40.6	2000	-25	1960	4	25.5	1996	977	0	.0	.0	15.4	4.2	25.6	1.6
Apr	58.0	33.0	45.5	98	1980	21	53.0	1981	-4	1936	3	38.5	1983	585	1	.0	.3	23.9	.6	13.7	.0
May	69.8	44.7	57.3	103+	1934	30	63.6	1977	18	1967	2	52.7	1983	261	21	.0	.9	30.4	.0	2.5	.0
Jun	80.1	54.7	67.4	107	1936	25	74.7	1988	32	1969	14	62.4	1985	59	130	.5	6.0	30.0	.0	.0	.0
Jul	86.5	60.2	73.4	114	1936	16	78.8	1974	38	1971	30	66.3	1992	12	272	2.7	14.1	31.0	.0	.0	.0
Aug	84.7	58.0	71.4	113+	1936	24	76.7	1983	33	1935	30	64.5	1985	30	227	1.8	12.7	31.0	.0	.0	.0
Sep	75.7	48.1	61.9	105	1931	9	68.4	1998	20+	1985	24	56.8	1985	157	63	.4	5.3	29.8	.0	1.5	.0
Oct	62.5	34.4	48.5	97+	1963	4	52.6	1973	7	1991	30	44.9	1985	513	0	.0	.5	27.7	.3	11.0	.0
Nov	43.0	20.4	31.7	85	1999	8	44.1	1999	-24	1959	14	16.7	1985	999	0	.0	.0	12.7	5.1	25.4	1.3
Dec	32.1	10.0	21.1	79	1939	11	30.5	1999	-36	1983	21	-.6	1983	1363	0	.0	.0	5.6	11.9	30.3	7.0
Ann	58.6	33.5	46.0	114	Jul 1936	16	78.8	Jul 1974	-36	Dec 1983	21	-.6	Dec 1983	7598	714	5.4	39.8	249.8	47.5	167.5	24.6

\+ 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: 1926-2001

(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	.52	.28	2.10	1988	20	2.10	1988	.00+	1998
Feb	.61	.38	1.90	1977	23	2.94	1987	.00+	1998
Mar	1.88	1.69	2.00	1987	17	6.65	1987	.15	1994
Apr	2.89	2.60	2.76	1938	27	6.80	1995	.72	1980
May	3.93	3.78	2.85	1999	5	7.72	1982	.70	1992
Jun	3.75	3.24	4.20	1944	11	7.43	1998	1.25	1976
Jul	3.37	3.13	4.20	1957	1	8.65	1981	.54	2000
Aug	2.41	2.11	3.30	1988	3	6.11	1987	.35	1974
Sep	2.58	2.06	3.50	1996	19	8.45	1986	.15	1975
Oct	2.29	1.63	5.20	1998	3	9.76	1998	.00	1992
Nov	1.12	1.16	1.95+	1972	2	2.63	1983	.11	1976
Dec	.60	.40	1.60	1981	1	2.25	1981	.00+	1998
Ann	25.95	26.98	5.20	Oct 1998	3	9.76	Oct 1998	.00+	Dec 1998

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.4	1.6	.2	@
Feb	3.1	2.1	.3	.1
Mar	5.8	4.1	1.3	.5
Apr	8.5	6.8	2.1	.6
May	9.1	7.5	2.9	1.2
Jun	8.7	6.8	2.8	1.1
Jul	8.0	6.7	2.3	.9
Aug	7.0	5.3	1.6	.6
Sep	6.0	4.4	1.7	.8
Oct	4.9	3.9	1.6	.7
Nov	4.9	3.4	.7	.2
Dec	3.6	2.3	.2	@
Ann	73.0	54.9	17.7	6.7

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	.00	.00	.05	.15	.25	.36	.49	.65	.88	1.24	1.61
Feb	.00	.00	.09	.19	.31	.43	.58	.76	1.02	1.44	1.85
Mar	.17	.31	.56	.82	1.11	1.43	1.82	2.30	2.96	4.06	5.14
Apr	.90	1.18	1.58	1.93	2.27	2.62	3.01	3.46	4.04	4.95	5.80
May	1.00	1.37	1.94	2.44	2.94	3.47	4.05	4.74	5.65	7.08	8.42
Jun	1.60	1.94	2.41	2.80	3.17	3.53	3.93	4.38	4.96	5.83	6.62
Jul	1.02	1.34	1.82	2.23	2.63	3.05	3.51	4.04	4.74	5.82	6.83
Aug	.46	.68	1.03	1.36	1.69	2.05	2.45	2.94	3.58	4.62	5.61
Sep	.15	.30	.61	.96	1.36	1.82	2.39	3.12	4.14	5.88	7.62
Oct	.09	.27	.60	.93	1.29	1.71	2.19	2.81	3.65	5.06	6.44
Nov	.16	.26	.42	.57	.73	.91	1.11	1.36	1.70	2.24	2.77
Dec	.00	.00	.05	.17	.28	.41	.57	.76	1.02	1.45	1.89
Ann	15.55	17.43	19.91	21.84	23.59	25.31	27.10	29.12	31.60	35.26	38.49

\+ 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: 1926-2001
(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	8.9	7.0	#	#
Feb	6.3	5.0	1	#
Mar	8.7	6.0	1	0
Apr	3.2	.0	#	0
May	.0	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.4	.0	0	0
Oct	1.4	.0	#	0
Nov	8.6	6.0	#	0
Dec	8.8	8.0	#	0
Ann	46.3	32.0	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	17.0	1988	20	24.0	1982	2+	2000	29	#+	2000
Feb	13.0	1971	19	15.0	1971	8	1984	18	2	1989
Mar	15.0	1979	19	29.0	1983	8	1998	7	8	1998
Apr	12.0	1988	26	18.0	1988	2	2000	16	#+	2000
May	.0	0	0	.0	0	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	12.0	1985	28	12.0	1985	0	0	0	0	0
Oct	17.0	1995	23	17.0+	1995	4	1976	18	1	1998
Nov	19.5	1972	2	38.0	1985	3	1998	10	#+	1999
Dec	15.0	1981	1	23.0	1985	1+	1999	22	#+	1999
Ann	19.5	Nov 1972	2	38.0	Nov 1985	8+	Mar 1998	7	8	Mar 1998

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.7	2.6	.7	.3	.1
Feb	2.0	2.0	.6	.2	.1
Mar	2.3	2.2	1.1	.5	.2
Apr	.9	.8	.5	.2	@
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	@	@	@	@	@
Oct	.4	.4	.3	.1	@
Nov	2.1	2.1	1.0	.4	.1
Dec	2.3	2.3	1.0	.3	.1
Ann	12.7	12.4	5.2	2.0	.6

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9
Apr	-9.9	-9.9	-9.9	-9.9
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	-9.9	-9.9	-9.9	-9.9
Nov	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

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

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	9/10	9/13	9/15	9/16	9/18	9/20	9/22	9/24	9/26
32	9/16	9/20	9/23	9/25	9/28	9/30	10/03	10/06	10/10
28	9/22	9/28	10/02	10/05	10/08	10/11	10/14	10/18	10/23
24	9/29	10/05	10/09	10/12	10/15	10/19	10/22	10/26	11/01
20	10/07	10/12	10/16	10/19	10/22	10/26	10/29	11/02	11/07
16	10/18	10/24	10/29	11/02	11/05	11/09	11/13	11/17	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	143	136	132	127	124	120	116	111	104
32	161	155	150	146	142	138	134	129	122
28	182	175	170	165	161	157	152	147	139
24	203	196	190	185	181	177	172	166	159
20	218	210	205	200	196	192	187	182	175
16	246	237	231	226	220	215	210	203	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	1472	1170	977	585	261	59	12	30	157	513	999	1363	7598
60	1317	1030	822	441	149	18	1	8	75	360	849	1208	6278
57	1224	946	729	359	98	7	0	3	42	273	759	1115	5555
55	1162	897	667	307	72	3	0	1	26	219	703	1053	5110
50	1011	767	517	195	27	0	0	0	6	110	564	907	4104
32	516	355	115	9	0	0	0	0	0	2	177	427	1601

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	68	109	161	414	783	1061	1283	1220	896	512	168	87	6762
55	0	7	0	23	141	374	570	508	232	16	4	0	1875
57	0	0	0	15	106	318	508	448	188	8	0	0	1591
60	0	0	0	7	64	239	415	360	131	2	0	0	1218
65	0	0	0	1	21	130	272	227	63	0	0	0	714
70	0	0	0	0	4	56	151	124	24	0	0	0	359

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	6	28	93	277	590	866	1074	1028	707	361	75	9	6	34	127	404	994	1860	2934	3962	4669	5030	5105	5114
45	1	7	46	174	438	716	919	873	562	235	33	1	1	8	54	228	666	1382	2301	3174	3736	3971	4004	4005
50	0	0	14	95	297	566	764	718	419	134	12	0	0	0	14	109	406	972	1736	2454	2873	3007	3019	3019
55	0	0	1	49	179	419	609	564	285	64	2	0	0	0	1	50	229	648	1257	1821	2106	2170	2172	2172
60	0	0	0	23	89	280	455	411	179	25	0	0	0	0	0	23	112	392	847	1258	1437	1462	1462	1462
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	9	34	89	207	379	558	690	664	457	257	68	17	9	43	132	339	718	1276	1966	2630	3087	3344	3412	3429

(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