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: ACADEMY 2 NE, SD **COOP ID: 390043**

Climate Division: SD 8 **NWS Call Sign:** **Elevation: 1,680 Feet** **Lat: 43˚29N** **Lon: 99˚04W**

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	28.3	6.3	17.3	72	1931	29	30.7	1990	-37	1912	12	1.8	1978	1480	0	.0	.0	3.0	15.9	30.6	10.1
Feb	34.4	12.2	23.3	78	1930	18	34.1	1999	-36	1905	2	7.6	1979	1167	0	.0	.0	6.5	11.2	27.0	5.3
Mar	45.0	21.7	33.4	92	1943	30	41.3	1986	-23	1962	1	25.5	1996	981	0	.0	.0	13.7	4.9	26.0	1.3
Apr	57.9	33.1	45.5	98	1980	21	52.2	1981	-4	1924	1	39.1	1983	586	1	.0	.4	23.6	.5	13.7	@
May	69.6	45.5	57.6	108	1934	30	63.3	1987	18+	1967	2	53.2	1995	252	21	@	1.0	30.1	.0	1.6	.0
Jun	79.6	55.2	67.4	111	1936	25	75.3	1988	32	1946	2	62.2	1982	62	134	.6	5.2	30.0	.0	.0	.0
Jul	86.2	60.7	73.5	116	1940	24	78.9	1974	38	1945	2	65.5	1992	15	278	2.8	13.7	31.0	.0	.0	.0
Aug	84.7	58.1	71.4	115	1934	4	77.1	1983	32	1935	30	63.8	1985	31	229	2.0	12.0	31.0	.0	.0	.0
Sep	75.7	47.6	61.7	110	1929	2	68.4	1998	17	1899	28	55.9	1993	161	61	.5	5.2	29.8	.0	1.4	.0
Oct	62.0	35.1	48.6	100	1947	5	51.8	1973	-8	1925	29	44.8	1976	511	0	.0	.6	26.7	.3	10.5	.0
Nov	42.5	21.5	32.0	87	1999	9	44.0	1999	-20	1959	14	17.8	1985	991	0	.0	.0	11.0	5.8	25.2	1.2
Dec	31.7	10.4	21.1	74+	1998	3	30.0	1999	-31	1917	29	2.3	1983	1362	0	.0	.0	4.0	13.2	30.7	6.4
Ann	58.1	34.0	46.1	116	Jul 1940	24	78.9	Jul 1974	-37	Jan 1912	12	1.8	Jan 1978	7599	724	5.9	38.1	240.4	51.8	166.7	24.3

\+ 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: 1898-2001

(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	.49	.31	1.60	2001	30	1.77	1988	.03	1989
Feb	.63	.46	2.22	1977	23	2.91	1977	.00+	1985
Mar	1.52	1.19	2.00	1906	2	5.01	1987	.11	1994
Apr	2.68	2.74	2.50	1911	30	5.88	1984	.95	1980
May	3.78	3.18	3.00	1942	5	9.55	1982	.61	1992
Jun	3.34	2.90	3.65	1974	9	6.95	1999	.72	1988
Jul	2.97	2.94	5.55	1950	8	6.41	1992	.82	1980
Aug	2.17	1.98	3.11	1921	1	5.38	1985	.49	1983
Sep	2.24	1.85	3.58	1998	14	7.45	1996	.27	2000
Oct	1.82	1.41	2.75	1980	16	5.56	1982	.05	1992
Nov	.99	1.04	1.62	1972	2	2.13	2000	.02	1976
Dec	.41	.37	1.25	1949	11	1.11	1989	.00	1979
Ann	23.04	22.43	5.55	Jul 1950	8	9.55	May 1982	.00+	Feb 1985

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	1.5	.2	.0
Feb	4.4	1.5	.2	@
Mar	6.4	3.8	.9	.3
Apr	8.9	6.2	1.8	.5
May	9.9	7.0	2.5	1.1
Jun	9.1	5.7	2.4	.8
Jul	8.5	5.5	2.0	.8
Aug	6.5	3.9	1.4	.6
Sep	6.4	4.0	1.4	.5
Oct	5.9	3.6	1.2	.5
Nov	5.2	2.6	.5	.2
Dec	4.4	1.6	@	.0
Ann	80.1	46.9	14.5	5.3

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	.03	.06	.12	.19	.27	.35	.46	.59	.78	1.10	1.41
Feb	.00	.00	.09	.19	.29	.42	.58	.78	1.05	1.52	2.00
Mar	.15	.26	.47	.68	.91	1.17	1.47	1.85	2.37	3.24	4.08
Apr	.83	1.09	1.46	1.79	2.10	2.43	2.79	3.21	3.75	4.60	5.38
May	.90	1.25	1.80	2.29	2.78	3.30	3.88	4.58	5.48	6.92	8.27
Jun	1.05	1.37	1.84	2.24	2.63	3.03	3.47	3.99	4.66	5.70	6.66
Jul	.84	1.12	1.55	1.92	2.28	2.66	3.08	3.57	4.21	5.21	6.14
Aug	.45	.65	.97	1.26	1.55	1.86	2.22	2.64	3.20	4.10	4.95
Sep	.22	.38	.69	1.00	1.34	1.72	2.17	2.74	3.51	4.80	6.05
Oct	.14	.26	.50	.75	1.03	1.35	1.73	2.21	2.88	3.99	5.09
Nov	.08	.15	.28	.42	.57	.74	.95	1.21	1.57	2.17	2.75
Dec	.03	.07	.14	.20	.26	.33	.41	.51	.64	.85	1.06
Ann	13.66	15.35	17.58	19.32	20.90	22.45	24.08	25.90	28.14	31.47	34.39

\+ 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: 1898-2001
(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	6.7	5.3	4	2	9.0	1982	22	21.6	1988	35	1984	1	17	1988	4.2	2.1	.7	.3	.0	17.3	9.9	6.0	3.1
Feb	6.6	4.7	3	1	10.5	1997	4	20.0	1993	19	1993	27	12	1988	3.8	2.1	.6	.3	.1	11.4	7.2	5.2	2.7
Mar	8.6	7.1	1	1	10.0	1984	17	24.7	1975	14	1977	4	5	1998	3.7	2.7	1.3	.5	@	8.4	4.9	3.0	.7
Apr	4.7	1.3	#	#	9.5	1994	29	38.0	1995	19	1995	12	4	1995	1.8	1.2	.7	.3	.0	1.9	1.1	.6	.2
May	.0	.0	0	0	1.0	1989	1	1.0	1989	0	0	0	0	0	@	@	.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	7.0	1985	28	7.5	1985	2	1985	28	#+	1995	.1	.1	@	@	.0	@	.0	.0	.0
Oct	1.7	.0	#	0	11.5	1995	24	13.6	1995	10	1995	24	1	1995	.6	.5	.2	.1	@	.7	.1	.1	@
Nov	7.8	5.3	1	1	11.0	1972	2	26.5	1985	18	2000	17	9	2000	3.7	2.3	1.1	.4	.1	7.0	4.2	2.7	1.6
Dec	6.5	5.3	3	1	9.0	1987	24	18.0	1987	40	1983	29	29	1983	3.8	2.4	.7	.3	.0	13.4	7.1	4.3	2.0
Ann	42.9	29.0	N/A	N/A	11.5	Oct 1995	24	38.0	Apr 1995	40	Dec 1983	29	29	Dec 1983	21.7	13.4	5.3	2.2	.2	60.1	34.5	21.9	10.3

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

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	153	144	138	133	129	124	119	113	104
32	169	161	156	151	147	143	138	133	125
28	188	181	176	171	167	163	159	153	146
24	210	202	197	192	187	183	178	173	165
20	227	220	215	211	207	203	199	194	188
16	255	246	240	234	229	224	219	213	204

***** 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	1480	1167	981	586	252	62	15	31	161	511	991	1362	7599
60	1325	1027	826	442	141	20	2	9	77	358	841	1207	6275
57	1232	943	733	360	91	8	0	3	43	270	751	1114	5548
55	1171	895	671	309	65	4	0	1	27	215	695	1052	5105
50	1022	764	525	196	23	0	0	0	6	106	555	904	4101
32	530	354	125	10	0	0	0	0	0	2	171	422	1614

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	73	111	167	414	792	1062	1285	1221	890	514	171	83	6783
55	0	8	0	23	144	376	572	509	227	14	4	0	1877
57	0	0	0	14	107	320	510	449	184	7	0	0	1591
60	0	0	0	6	65	242	419	362	128	2	0	0	1224
65	0	0	0	1	21	134	278	229	61	0	0	0	724
70	0	0	0	0	4	60	159	127	23	0	0	0	373

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	4	23	83	270	594	863	1071	1021	696	347	64	4	4	27	110	380	974	1837	2908	3929	4625	4972	5036	5040
45	1	5	43	168	446	713	916	866	550	223	28	0	1	6	49	217	663	1376	2292	3158	3708	3931	3959	3959
50	0	0	12	94	301	563	761	711	407	128	12	0	0	0	12	106	407	970	1731	2442	2849	2977	2989	2989
55	0	0	4	47	180	416	606	556	281	60	0	0	0	0	4	51	231	647	1253	1809	2090	2150	2150	2150
60	0	0	0	20	91	275	451	404	175	21	0	0	0	0	0	20	111	386	837	1241	1416	1437	1437	1437
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	6	28	79	191	369	553	694	660	446	239	58	13	6	34	113	304	673	1226	1920	2580	3026	3265	3323	3336

(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