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: MC INTOSH 6 SE, SD **COOP ID: 395381**

Climate Division: SD 2 **NWS Call Sign:** **Elevation: 2,175 Feet** **Lat: 45˚50N** **Lon: 101˚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	23.9	3.5	13.7	68	1981	23	27.8	1992	-37	1977	9	-.1	1978	1590	0	.0	.0	1.2	20.4	30.7	12.9
Feb	31.2	10.9	21.1	71	1992	29	32.0	1998	-35	1994	9	4.2	1979	1231	0	.0	.0	3.1	14.6	27.4	7.0
Mar	42.0	20.5	31.3	80+	1986	28	40.4	1986	-27	1948	10	21.4	1996	1046	0	.0	.0	9.0	8.0	27.7	2.3
Apr	57.6	32.4	45.0	96	1992	30	53.5	1987	-1+	1997	8	36.2	1975	602	3	.0	.2	21.3	1.1	15.9	.1
May	70.5	44.2	57.4	98	1969	27	64.5	1977	14	1967	3	51.7	1996	262	25	.0	.7	29.9	.0	2.7	.0
Jun	79.5	53.1	66.3	106+	1988	27	77.7	1988	31+	1998	3	61.1	1993	84	123	.2	3.5	30.0	.0	@	.0
Jul	86.5	58.2	72.4	109	1973	11	76.7	1989	40	1954	1	64.1	1992	22	248	1.3	10.4	31.0	.0	.0	.0
Aug	85.5	56.6	71.1	106	1949	7	75.4	1983	36	1950	19	65.0	1992	29	217	.9	9.8	31.0	.0	.0	.0
Sep	74.1	45.9	60.0	104	1959	8	67.1	1998	18	1965	26	54.4	1999	202	52	.2	2.8	29.4	.0	1.9	.0
Oct	60.2	34.4	47.3	94+	1997	2	50.4	1973	-8	1991	30	44.0	1976	549	0	.0	.2	24.4	.4	12.7	.1
Nov	39.9	19.8	29.9	80	1999	7	40.2	1999	-19+	1985	29	16.1	1985	1055	0	.0	.0	7.4	9.6	27.2	2.0
Dec	28.1	8.1	18.1	69	1965	4	29.1	1999	-34+	1990	30	.0	1983	1454	0	.0	.0	1.8	17.8	30.6	9.0
Ann	56.6	32.3	44.5	109	Jul 1973	11	77.7	Jun 1988	-37	Jan 1977	9	-.1	Jan 1978	8126	668	2.6	27.6	219.5	71.9	176.8	33.4

\+ 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: 1948-2001

(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	.22	.87	1997	4	1.53	1997	.03	1991
Feb	.45	.31	1.02	1951	28	1.45	1998	.02	1984
Mar	.82	.62	1.75	1973	14	2.20	1973	.06	1999
Apr	1.68	1.37	2.07	1989	28	4.43	1974	.08	1987
May	2.58	2.22	3.03	1953	29	6.23	1982	.21	1997
Jun	3.00	2.50	3.56	1964	9	5.81	1993	1.00	1974
Jul	2.27	2.23	2.59	1973	23	6.57	1993	.03	1988
Aug	1.69	1.38	2.83	1992	4	4.63	1983	.25	1973
Sep	1.30	.77	2.92	1986	1	5.13+	1986	.11	1974
Oct	1.41	.97	2.05	1972	5	4.80	1994	.00	1993
Nov	.51	.51	.89	2000	1	1.49	1996	.00+	1999
Dec	.37	.27	.55	1964	3	1.96	1972	.00+	1986
Ann	16.44	16.72	3.56	Jun 1964	9	6.57	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.3	1.3	@	.0
Feb	4.5	1.5	.2	.0
Mar	5.3	2.0	.3	.1
Apr	7.2	4.2	.7	.2
May	8.5	5.7	1.7	.5
Jun	9.6	6.4	1.8	.6
Jul	7.9	4.9	1.2	.4
Aug	6.7	3.9	.9	.4
Sep	5.3	3.0	.6	.3
Oct	5.1	3.2	.9	.3
Nov	4.7	1.8	.1	.0
Dec	4.7	1.3	@	.0
Ann	73.8	39.2	8.4	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	.03	.05	.10	.15	.20	.27	.34	.43	.56	.78	.99
Feb	.04	.07	.13	.20	.26	.34	.43	.55	.71	.98	1.24
Mar	.09	.15	.27	.38	.50	.64	.80	1.00	1.27	1.72	2.16
Apr	.15	.26	.49	.72	.98	1.27	1.61	2.05	2.64	3.64	4.62
May	.34	.55	.92	1.28	1.65	2.07	2.56	3.15	3.96	5.28	6.55
Jun	.96	1.25	1.67	2.03	2.37	2.73	3.13	3.59	4.18	5.10	5.95
Jul	.41	.62	.95	1.26	1.57	1.91	2.30	2.77	3.40	4.40	5.36
Aug	.31	.46	.71	.94	1.17	1.43	1.71	2.06	2.52	3.27	3.98
Sep	.10	.19	.36	.54	.74	.97	1.24	1.59	2.06	2.87	3.66
Oct	.02	.10	.27	.46	.69	.96	1.28	1.70	2.30	3.31	4.33
Nov	.00	.05	.14	.23	.31	.40	.51	.63	.81	1.10	1.37
Dec	.00	.00	.08	.15	.21	.28	.37	.47	.61	.83	1.06
Ann	11.36	12.33	13.59	14.54	15.40	16.22	17.08	18.02	19.18	20.85	22.31

\+ 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: 1948-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	5.2	4.9	6	5
Feb	5.2	4.0	6	2
Mar	7.5	6.0	4	2
Apr	4.6	3.0	1	#
May	.2	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	1.4	.4	#	#
Nov	6.2	5.5	2	1
Dec	5.0	4.6	4	3
Ann	35.5	28.4	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	5.4	1996	28	23.3	1999	33	1997	30	31	1997
Feb	10.0	1995	26	15.0	1987	41	1997	17	37	1997
Mar	10.5	1977	29	22.3	1996	39	1997	6	29	1997
Apr	8.0	1989	28	15.3	1995	17	1975	6	7	1975
May	4.3	1996	3	4.3	1996	1+	1996	3	#+	1996
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	4.0	1984	23	6.0	1984	2	1984	24	#	1984
Oct	6.0	1992	15	11.0	1992	8	1991	31	1	1992
Nov	10.0	1977	20	17.8	1996	16+	1996	30	7	1996
Dec	9.0	1996	14	17.0	1996	32	1996	31	27	1996
Ann	10.5	Mar 1977	29	23.3	Jan 1999	41	Feb 1997	17	37	Feb 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.5	1.9	.8	.1	.0
Feb	3.6	2.1	.4	.1	@
Mar	3.7	2.2	1.0	.4	.1
Apr	1.7	1.3	.8	.2	.0
May	.1	.1	.1	.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
Oct	.8	.5	.1	.1	.0
Nov	3.5	2.1	.7	.2	@
Dec	3.9	1.7	.4	.2	.0
Ann	20.9	12.0	4.3	1.3	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.9	16.0	13.1	4.4
Feb	14.6	8.9	5.9	2.1
Mar	11.6	7.9	5.4	1.7
Apr	3.7	2.4	1.9	.5
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.0	.0	.0
Oct	.8	.2	@	.0
Nov	9.1	5.5	3.3	1.0
Dec	17.4	13.0	8.9	2.7
Ann	78.3	53.9	38.5	12.4

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

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	9/06	9/10	9/12	9/14	9/16	9/18	9/21	9/23	9/26
32	9/13	9/18	9/21	9/23	9/26	9/29	10/01	10/05	10/09
28	9/20	9/25	9/28	10/01	10/03	10/06	10/08	10/12	10/16
24	9/23	9/29	10/04	10/08	10/11	10/15	10/19	10/23	10/29
20	10/03	10/09	10/14	10/17	10/21	10/24	10/28	11/02	11/08
16	10/16	10/21	10/26	10/29	11/01	11/05	11/08	11/12	11/18

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	140	133	128	123	119	115	111	106	98
32	158	151	146	142	138	135	130	126	119
28	176	170	165	161	157	153	149	145	138
24	197	189	184	179	175	170	165	160	152
20	220	212	206	200	196	191	186	179	171
16	236	229	224	220	216	212	207	202	195

***** 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	1590	1231	1046	602	262	84	22	29	202	549	1055	1454	8126
60	1435	1091	891	461	153	31	5	7	109	395	905	1299	6782
57	1342	1007	798	381	102	15	1	3	68	305	815	1206	6043
55	1280	958	737	331	76	9	0	1	47	247	755	1144	5585
50	1132	827	591	222	30	1	0	0	14	125	615	1002	4559
32	634	407	173	19	0	0	0	0	0	2	204	514	1953

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	67	100	150	410	786	1030	1249	1211	841	476	140	83	6543
55	0	7	0	32	149	348	536	499	198	9	0	0	1778
57	0	0	0	22	114	295	475	439	159	4	0	0	1508
60	0	0	0	11	71	221	387	350	110	1	0	0	1151
65	0	0	0	3	25	123	248	217	52	0	0	0	668
70	0	0	0	0	6	55	139	114	20	0	0	0	334

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	1	6	39	207	539	788	1000	961	600	267	33	0	1	7	46	253	792	1580	2580	3541	4141	4408	4441	4441
45	0	1	9	119	388	638	845	806	457	158	13	0	0	1	10	129	517	1155	2000	2806	3263	3421	3434	3434
50	0	0	3	63	255	488	690	651	319	80	1	0	0	0	3	66	321	809	1499	2150	2469	2549	2550	2550
55	0	0	0	24	146	346	535	496	204	34	0	0	0	0	0	24	170	516	1051	1547	1751	1785	1785	1785
60	0	0	0	10	70	208	382	344	112	10	0	0	0	0	0	10	80	288	670	1014	1126	1136	1136	1136
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	8	41	150	332	497	643	616	379	183	31	0	0	8	49	199	531	1028	1671	2287	2666	2849	2880	2880

(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