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 LAUGHLIN, SD **COOP ID: 395406**

Climate Division: SD 2 **NWS Call Sign:** **Elevation: 2,000 Feet** **Lat: 45˚49N** **Lon: 100˚49W**

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	21.8	-1.0	10.4	66	1981	23	23.8	1987	-37	1966	29	-4.8	1982	1695	0	.0	.0	.7	20.8	30.9	14.1
Feb	28.8	6.2	17.5	71+	1992	29	30.8	1998	-37	1988	11	1.6	1979	1330	0	.0	.0	2.9	14.7	27.9	7.9
Mar	39.8	17.3	28.6	82	1967	29	37.0	1986	-25	1948	10	18.8	1996	1130	0	.0	.0	8.7	7.5	28.8	2.7
Apr	56.0	30.2	43.1	98	1980	21	49.8	1987	-4+	1975	3	35.7	1975	657	0	.0	.2	21.6	1.0	17.8	.1
May	68.9	43.1	56.0	100	1969	27	63.9	1977	15	1967	3	51.2	1996	301	22	.0	.9	30.1	.0	3.1	.0
Jun	77.4	52.8	65.1	104+	1988	27	76.2	1988	27+	1969	20	59.9	1993	97	100	.1	3.1	30.0	.0	.1	.0
Jul	84.1	58.2	71.2	110	1919	3	76.1	1974	37	1967	3	63.6	1992	27	218	1.0	8.3	31.0	.0	.0	.0
Aug	83.0	56.0	69.5	108	1959	18	75.5	1983	34+	1964	12	63.7	1977	46	186	.6	8.2	31.0	.0	.0	.0
Sep	72.3	44.7	58.5	104+	1959	8	64.4	1998	16	1965	26	53.6	1984	229	34	.2	2.1	29.6	@	2.4	.0
Oct	58.7	31.7	45.2	94	1963	4	48.0	1994	-6	1991	30	41.5	1976	613	0	.0	.1	24.8	.4	14.3	.1
Nov	39.0	16.8	27.9	77+	1999	8	39.9	1999	-25	1985	24	15.0	1985	1113	0	.0	.0	7.5	9.4	28.3	2.1
Dec	25.2	3.4	14.3	70	1965	4	27.6	1997	-35+	1990	30	-5.3	1983	1573	0	.0	.0	1.4	18.2	30.8	9.8
Ann	54.6	30.0	42.3	110	Jul 1919	3	76.2	Jun 1988	-37+	Feb 1988	11	-5.3	Dec 1983	8811	560	1.9	22.9	219.3	72.0	184.4	36.8

\+ 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: 1919-2001

(3) Derived from 1971-2000 serially complete daily data

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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	.41	.35	1.09	1997	4	1.34	1997	.00	1996
Feb	.49	.42	1.00	1958	27	2.14	1987	.05+	1989
Mar	1.18	.80	2.87	1977	29	3.93	1977	.04	1998
Apr	1.83	1.51	2.57	1989	28	4.62	1986	.06	1987
May	2.57	2.01	2.43	1986	8	6.39	1982	.57	1984
Jun	3.00	3.01	4.75	1988	30	6.50	1988	.52	1974
Jul	2.15	1.93	3.63	1981	12	5.49	1981	.16	1988
Aug	1.91	1.52	3.20	1978	15	6.32	1978	.08	1976
Sep	1.23	1.04	1.77	1977	23	4.36	1996	.12	1972
Oct	1.53	.97	2.69	1971	2	4.92	1998	.00	1988
Nov	.64	.57	1.56	1956	2	2.25	2000	.00+	1999
Dec	.46	.39	1.00	1998	29	1.33	1993	.00	1979
Ann	17.40	16.57	4.75	Jun 1988	30	6.50	Jun 1988	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.1	1.5	@	@
Feb	4.0	1.3	.1	.0
Mar	4.5	2.4	.6	.2
Apr	5.4	3.9	1.1	.3
May	7.4	5.2	1.6	.7
Jun	7.8	5.8	1.9	.7
Jul	6.5	4.4	1.4	.5
Aug	5.5	3.7	1.1	.5
Sep	3.7	2.5	.8	.1
Oct	3.8	2.6	.9	.5
Nov	2.9	1.7	.3	.1
Dec	3.5	1.7	.2	@
Ann	58.1	36.7	10.0	3.6

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	.03	.08	.14	.20	.28	.38	.50	.67	.97	1.27
Feb	.07	.11	.18	.25	.32	.40	.49	.60	.75	.99	1.23
Mar	.08	.15	.30	.46	.64	.85	1.10	1.43	1.88	2.65	3.41
Apr	.13	.25	.48	.73	1.01	1.34	1.72	2.22	2.90	4.05	5.19
May	.48	.71	1.09	1.44	1.79	2.18	2.61	3.13	3.83	4.94	6.00
Jun	.86	1.15	1.58	1.95	2.31	2.69	3.11	3.61	4.25	5.25	6.18
Jul	.43	.62	.94	1.23	1.52	1.84	2.19	2.62	3.19	4.10	4.96
Aug	.25	.40	.67	.94	1.22	1.53	1.89	2.33	2.94	3.93	4.88
Sep	.13	.22	.39	.56	.75	.96	1.20	1.51	1.92	2.61	3.29
Oct	.03	.11	.29	.50	.74	1.03	1.38	1.84	2.49	3.59	4.70
Nov	.00	.00	.11	.22	.33	.45	.61	.80	1.06	1.50	1.94
Dec	.02	.05	.12	.18	.26	.34	.44	.57	.74	1.04	1.32
Ann	11.84	12.90	14.27	15.31	16.24	17.15	18.08	19.12	20.39	22.23	23.84

+ 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: 1919-2001
(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	4.2	3.1	3	1
Feb	2.4	1.5	1	1
Mar	6.6	4.5	2	#
Apr	2.3	.0	1	0
May	.1	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	.5	.0	#	0
Nov	3.9	1.5	1	0
Dec	4.6	2.9	2	#
Ann	24.7	13.5	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	6.0	1993	12	15.0	1993	16	1994	19	13	1994
Feb	14.0	1995	27	14.0	1995	17	1987	28	5	1982
Mar	20.0	1982	19	23.0	1985	24	1982	19	9	1987
Apr	9.0	1979	12	12.0	1979	18	1975	2	5	1975
May	2.5	1979	10	2.5	1979	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	2.0	1984	24	3.0	1984	3	1984	25	#	1984
Oct	6.0	1991	28	6.0	1991	6	1991	30	1	1991
Nov	10.0	1986	8	24.0	1993	24	1993	26	6	1986
Dec	10.0	1988	26	16.0	1993	18	1985	3	13	1985
Ann	20.0	Mar 1982	19	24.0	Nov 1993	24+	Nov 1993	26	13+	Jan 1994

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.2	1.1	.5	.1	.0
Feb	1.1	.9	.5	.2	.1
Mar	1.3	1.2	.8	.5	.2
Apr	.5	.4	.3	.2	.0
May	@	@	.0	.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	.0
Oct	.1	.1	.1	@	.0
Nov	.7	.7	.3	.1	.1
Dec	1.6	1.2	.4	.2	@
Ann	6.6	5.7	2.9	1.3	.4

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	.8	.5	.3	.1
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.0	.0
Oct	.3	.3	.2	.0
Nov	2.6	1.6	1.1	.2
Dec	9.2	5.9	4.1	2.3
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	6/07	6/02	5/29	5/26	5/23	5/20	5/16	5/12	5/07
32	6/01	5/26	5/21	5/18	5/15	5/11	5/08	5/03	4/27
28	5/16	5/12	5/09	5/06	5/03	5/01	4/28	4/25	4/21
24	5/07	5/02	4/28	4/25	4/22	4/19	4/16	4/12	4/07
20	4/26	4/21	4/17	4/14	4/11	4/08	4/05	4/01	3/27
16	4/16	4/11	4/08	4/05	4/03	3/31	3/29	3/26	3/21

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	135	128	123	118	114	110	106	101	94
32	150	143	138	134	130	126	121	116	109
28	170	163	158	154	151	147	143	138	131
24	191	184	178	174	169	165	161	155	148
20	212	204	198	193	188	184	179	173	165
16	227	220	215	211	208	204	200	195	189

***** 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	1695	1330	1130	657	301	97	27	46	229	613	1113	1573	8811
60	1540	1190	975	512	185	38	7	15	127	458	963	1418	7428
57	1447	1106	882	428	130	19	1	6	80	367	873	1325	6664
55	1385	1054	820	374	99	11	0	3	56	307	813	1263	6185
50	1231	924	672	254	44	2	0	0	17	174	670	1113	5101
32	713	489	228	22	0	0	0	0	0	4	235	612	2303

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	41	83	121	355	744	994	1214	1163	795	414	112	63	6099
55	0	4	0	17	130	315	501	452	161	4	0	0	1584
57	0	0	0	11	99	262	440	393	125	2	0	0	1332
60	0	0	0	5	61	192	353	309	82	0	0	0	1002
65	0	0	0	0	22	100	218	186	34	0	0	0	560
70	0	0	0	0	5	40	118	95	11	0	0	0	269

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	0	7	31	198	530	783	987	945	590	248	24	0	0	7	38	236	766	1549	2536	3481	4071	4319	4343	4343
45	0	1	6	112	383	633	832	790	442	144	11	0	0	1	7	119	502	1135	1967	2757	3199	3343	3354	3354
50	0	0	1	59	247	483	677	635	308	69	0	0	0	0	1	60	307	790	1467	2102	2410	2479	2479	2479
55	0	0	0	24	140	335	524	482	188	23	0	0	0	0	0	24	164	499	1023	1505	1693	1716	1716	1716
60	0	0	0	7	68	204	370	330	101	8	0	0	0	0	0	7	75	279	649	979	1080	1088	1088	1088
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	9	42	158	333	490	640	610	375	180	28	0	0	9	51	209	542	1032	1672	2282	2657	2837	2865	2865

(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