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, SD **COOP ID: 395620**

Climate Division: SD 8 **NWS Call Sign:** **Elevation: 2,587 Feet** **Lat: 43˚18N** **Lon: 100˚40W**

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	31.8	8.8	20.3	75	1974	17	32.5	1990	-28+	1988	6	5.3	1978	1385	0	.0	.0	3.8	14.9	30.2	9.1
Feb	37.1	13.9	25.5	74+	1995	22	35.6	1999	-30	1994	9	10.4	1978	1105	0	.0	.0	7.3	10.8	27.1	5.7
Mar	45.4	22.4	33.9	85	1978	31	40.3	1986	-27	1998	11	23.7	1996	965	0	.0	.0	12.8	6.5	26.4	1.8
Apr	57.0	33.3	45.2	95	1980	22	52.1	1981	6	1997	8	38.3	1995	595	0	.0	.1	21.0	.9	14.9	.0
May	68.7	44.6	56.7	98	1969	28	63.0	1985	18+	1976	6	51.1	1995	279	21	.0	.5	29.4	.0	3.0	.0
Jun	79.3	54.5	66.9	107	1988	25	75.6	1988	27	1969	2	61.7	1982	71	129	.4	3.8	29.9	.0	@	.0
Jul	86.8	60.0	73.4	110	1966	11	80.4	1974	35	1971	30	65.3	1992	15	276	1.9	11.9	31.0	.0	.0	.0
Aug	85.4	58.1	71.8	108	1980	7	76.4	1973	36	1976	28	65.4	1992	22	231	1.1	10.5	31.0	.0	.0	.0
Sep	75.9	47.1	61.5	104	1983	3	68.5	1998	18	1974	30	56.4	1993	163	59	.4	4.3	29.3	@	2.3	.0
Oct	62.4	34.7	48.6	95+	1967	4	53.3	1973	1	1991	30	45.3	1976	509	0	.0	.4	25.1	.4	12.2	.0
Nov	44.5	21.9	33.2	85	1999	9	44.2	1999	-16+	1976	30	19.0	1985	954	0	.0	.0	10.8	6.8	26.4	1.4
Dec	35.3	12.2	23.8	71	1998	2	32.0	1999	-32	1983	23	5.9	1983	1278	0	.0	.0	5.0	12.2	30.3	6.2
Ann	59.1	34.3	46.7	110	Jul 1966	11	80.4	Jul 1974	-32	Dec 1983	23	5.3	Jan 1978	7341	716	3.8	31.5	236.4	52.5	172.8	24.2

\+ 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: 1966-2001

(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	.33	.28	.73	1985	16	1.05	1985	.00	1989
Feb	.46	.41	.97	2000	26	1.46	1977	.02	1979
Mar	1.16	.84	1.22+	1986	18	5.13	1977	.03	1978
Apr	2.12	1.95	3.34	1971	20	5.74	1971	.43	1981
May	3.58	3.04	3.43	1991	16	8.26	1977	.34	1992
Jun	3.21	3.26	2.85	1979	16	6.11	1979	.75	1973
Jul	2.97	2.91	2.29	1990	8	6.89	1972	.51	1996
Aug	1.90	1.61	1.93	1994	10	4.80	1994	.54	1984
Sep	1.59	1.06	2.83	1989	21	4.95	1989	.23	1991
Oct	1.58	1.35	2.09	1995	6	4.50	1995	.08	1999
Nov	.70	.48	1.23	2001	24	2.06	1985	.00	1974
Dec	.47	.37	.65	1976	6	1.40	1976	.00	1991
Ann	20.07	19.57	3.43	May 1991	16	8.26	May 1977	.00+	Dec 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.7	1.1	.1	.0
Feb	4.6	1.4	.1	.0
Mar	6.9	3.0	.5	.1
Apr	9.3	5.3	1.1	.4
May	11.2	7.0	2.0	.7
Jun	10.5	5.9	2.5	.7
Jul	9.8	6.3	1.8	.8
Aug	7.5	4.4	1.1	.4
Sep	7.0	3.6	1.0	.2
Oct	6.1	3.6	.9	.3
Nov	5.0	2.3	.2	@
Dec	4.5	1.5	.1	.0
Ann	87.1	45.4	11.4	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	.02	.05	.10	.15	.20	.26	.33	.41	.52	.70	.88
Feb	.03	.06	.12	.18	.25	.34	.44	.56	.74	1.03	1.33
Mar	.12	.20	.36	.52	.70	.90	1.13	1.42	1.81	2.47	3.12
Apr	.45	.65	.96	1.24	1.52	1.83	2.17	2.58	3.12	3.99	4.81
May	.62	.94	1.46	1.95	2.45	3.00	3.62	4.37	5.37	6.99	8.54
Jun	.94	1.24	1.70	2.10	2.48	2.89	3.33	3.85	4.53	5.59	6.58
Jul	.80	1.08	1.51	1.89	2.26	2.65	3.08	3.59	4.25	5.29	6.26
Aug	.62	.81	1.07	1.30	1.51	1.74	1.98	2.27	2.64	3.22	3.75
Sep	.21	.34	.56	.78	1.02	1.28	1.58	1.95	2.45	3.27	4.06
Oct	.14	.25	.46	.68	.92	1.19	1.52	1.92	2.48	3.42	4.34
Nov	.07	.15	.27	.37	.47	.58	.71	.86	1.07	1.39	1.70
Dec	.02	.06	.13	.20	.27	.36	.46	.58	.75	1.03	1.31
Ann	12.83	14.18	15.94	17.29	18.51	19.70	20.94	22.32	24.01	26.50	28.67

\+ 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: 1966-2001
(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	5.5	4.1	2	1	10.0	1993	9	17.3	1996	12	1993	15	8	1988	3.5	2.1	.5	.2	@	13.9	6.8	4.7	1.2
Feb	4.9	3.5	2	1	9.5	1996	27	14.5	1993	14	1993	27	7	1993	3.2	2.0	.5	.3	.0	11.8	6.1	3.4	.3
Mar	7.9	6.0	1	1	23.0	1977	12	53.0	1977	13	1986	21	5	1987	3.4	2.4	1.0	.4	.1	7.6	4.3	2.6	.7
Apr	4.3	2.0	1	#	15.0	1984	3	25.3	1995	15	1995	12	6	1995	1.9	1.3	.5	.3	.1	2.7	1.4	1.0	.3
May	.1	.0	#	0	2.0	1979	10	2.0	1979	2	1979	10	#	1979	.1	@	.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	.1	.0	#	0	2.0	1985	29	3.0	1985	3	1985	29	#+	1985	.1	.1	.0	.0	.0	.1	@	.0	.0
Oct	1.2	.0	#	#	8.0	1975	24	8.0	1975	5	1972	31	1	1995	.6	.5	.2	@	.0	.9	.4	@	.0
Nov	6.3	4.6	1	1	6.0	1972	2	25.0	1985	16	1985	30	9	1985	3.0	2.3	.8	.2	.0	7.8	4.2	2.2	.8
Dec	6.1	4.0	2	1	8.0	2000	11	23.4	1996	18	1985	1	11	1985	3.4	2.2	.8	.1	.0	13.8	7.6	5.3	1.7
Ann	36.4	24.2	N/A	N/A	23.0	Mar 1977	12	53.0	Mar 1977	18	Dec 1985	1	11	Dec 1985	19.2	12.9	4.3	1.5	.2	58.6	30.8	19.2	5.0

+ 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	6/16	6/08	6/02	5/28	5/24	5/19	5/15	5/09	5/01
32	5/27	5/22	5/18	5/15	5/12	5/09	5/06	5/02	4/27
28	5/17	5/12	5/08	5/05	5/02	4/29	4/26	4/22	4/17
24	5/06	5/01	4/28	4/26	4/23	4/20	4/18	4/15	4/10
20	5/01	4/26	4/22	4/19	4/16	4/12	4/09	4/05	3/31
16	4/17	4/11	4/07	4/04	4/01	3/29	3/25	3/22	3/16

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	9/09	9/12	9/14	9/16	9/18	9/20	9/23	9/26
32	9/12	9/16	9/20	9/22	9/25	9/27	9/30	10/03	10/07
28	9/18	9/24	9/28	10/01	10/05	10/08	10/11	10/15	10/21
24	9/27	10/03	10/07	10/11	10/14	10/18	10/21	10/26	11/01
20	10/08	10/13	10/16	10/19	10/22	10/25	10/28	10/31	11/05
16	10/19	10/24	10/28	11/01	11/04	11/07	11/11	11/15	11/20

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	141	132	125	120	115	109	104	97	88
32	158	150	144	140	135	131	126	121	113
28	177	169	164	159	155	151	146	141	133
24	194	187	182	178	174	170	165	160	153
20	208	202	197	192	189	185	181	176	169
16	242	233	227	221	216	211	206	200	191

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1385	1105	965	595	279	71	15	22	163	509	954	1278	7341
60	1230	965	810	449	164	25	2	5	79	356	804	1123	6012
57	1137	884	717	365	110	11	0	2	44	266	714	1030	5280
55	1076	834	655	312	81	6	0	1	28	211	661	968	4833
50	930	703	509	195	32	0	0	0	6	99	522	819	3815
32	447	305	116	7	0	0	0	0	0	1	152	347	1375

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	85	124	174	403	765	1048	1283	1232	886	515	188	92	6795
55	1	9	0	17	133	363	570	520	223	11	7	0	1854
57	0	3	0	10	100	309	508	459	180	5	0	0	1574
60	0	0	0	4	61	232	418	369	125	1	0	0	1210
65	0	0	0	0	21	129	276	231	59	0	0	0	716
70	0	0	0	0	5	58	157	123	22	0	0	0	365

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	25	75	224	517	805	1025	980	638	302	64	9	6	31	106	330	847	1652	2677	3657	4295	4597	4661	4670
45	0	2	36	132	372	655	870	825	495	190	28	0	0	2	38	170	542	1197	2067	2892	3387	3577	3605	3605
50	0	0	11	73	242	505	715	670	357	104	8	0	0	0	11	84	326	831	1546	2216	2573	2677	2685	2685
55	0	0	3	32	139	362	560	517	235	48	1	0	0	0	3	35	174	536	1096	1613	1848	1896	1897	1897
60	0	0	0	10	67	233	410	367	140	12	0	0	0	0	0	10	77	310	720	1087	1227	1239	1239	1239
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	11	30	71	158	318	507	660	630	409	220	61	18	11	41	112	270	588	1095	1755	2385	2794	3014	3075	3093

(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