

# Climatography of the United States No. 20

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801  
www.ncdc.noaa.gov

Station: MANDERSON 3 NE, SD

1971-2000

COOP ID: 395154

Climate Division: SD 5

NWS Call Sign:

Elevation: 3,095 Feet Lat: 43° 16N

Lon: 102° 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	34.8	11.0	22.9	66+	1998	3	33.8	1990	-28	1968	6	5.0	1979	1305	0	.0	.0	3.7	12.6	30.2	7.5
Feb	40.6	16.2	28.4	70+	1999	26	39.1	1999	-31	1996	2	15.6	1989	1025	0	.0	.0	9.2	7.5	26.5	4.2
Mar	48.3	25.0	36.7	82	1995	12	44.0	1986	-18	1998	11	27.7	1996	879	0	.0	.0	15.6	4.1	26.7	1.1
Apr	58.3	33.5	45.9	93	1992	29	53.0	1981	5	1992	1	40.3	1997	573	0	.0	.1	22.6	.6	14.7	.1
May	68.0	44.4	56.2	95	1992	20	61.1	1987	23+	1990	2	51.1	1995	285	12	.0	.9	29.7	.0	2.8	.0
Jun	78.7	53.8	66.3	105	1989	20	73.8	1988	33+	1995	10	60.5	1998	73	110	.7	5.7	29.9	.0	.0	.0
Jul	86.8	59.4	73.1	110	1990	2	77.0	1989	38	1995	1	66.3	1992	11	263	3.3	14.6	31.0	.0	.0	.0
Aug	87.0	58.1	72.6	104+	2001	8	78.6	1983	37	1992	30	67.0	1992	17	251	1.3	13.4	31.0	.0	.0	.0
Sep	77.2	47.2	62.2	102	2001	5	68.5	1998	19	1993	14	56.4	1993	151	68	.3	5.1	29.3	.0	2.4	.0
Oct	64.0	35.3	49.7	93+	1992	3	53.3	1973	-8	1991	31	46.9	1976	476	0	.0	.3	26.4	.3	20.4	.1
Nov	46.4	21.9	34.2	83+	1999	9	45.5	1999	-19	1991	2	19.6	1985	926	0	.0	.0	13.4	5.2	27.1	1.6
Dec	37.6	13.6	25.6	69+	1998	2	34.5	1999	-37	1989	22	9.0	1983	1221	0	.0	.0	5.4	10.4	29.9	4.9
Ann	60.6	35.0	47.8	110	Jul 1990	2	78.6	Aug 1983	-37	Dec 1989	22	5.0	Jan 1979	6942	704	5.6	40.1	247.2	40.7	180.7	19.5

+ 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/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(1) From the 1971-2000 Monthly Normals

(2) Derived from station's available digital record: 1949-2001

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

056-A

# 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: MANDERSON 3 NE, SD**

**COOP ID: 395154**

**Climate Division: SD 5**

**NWS Call Sign:**

**Elevation: 3,095 Feet Lat: 43°16N**

**Lon: 102°26W**

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.39	.36	.73	1971	30	.92	2000	.05	1987	4.5	1.1	.1	.0	.08	.12	.17	.23	.28	.33	.40	.47	.57	.73	.88
Feb	.46	.36	.60+	1993	11	1.21	1987	.02	1996	4.6	1.4	.1	.0	.07	.11	.18	.24	.31	.38	.46	.56	.69	.91	1.12
Mar	1.32	1.00	1.78	2000	8	5.02	1977	.15	1978	7.1	3.1	.6	.2	.20	.31	.50	.68	.87	1.08	1.32	1.61	2.01	2.65	3.27
Apr	2.20	2.25	2.00	2000	20	5.81	2000	.07	1998	9.1	5.1	1.5	.3	.31	.49	.80	1.11	1.43	1.78	2.19	2.69	3.37	4.47	5.53
May	3.16	2.65	2.54	1996	27	6.45	1982	.61	1974	10.6	6.7	2.0	.5	1.09	1.39	1.83	2.19	2.54	2.90	3.30	3.75	4.34	5.25	6.08
Jun	3.18	2.85	3.08	1963	15	8.30	1993	.83	1971	10.0	6.2	1.8	.6	.65	.94	1.40	1.83	2.26	2.72	3.24	3.87	4.70	6.02	7.28
Jul	2.58	2.47	2.80	1955	23	6.74	1981	.20	1975	7.8	4.7	1.4	.5	.58	.82	1.20	1.54	1.88	2.24	2.64	3.13	3.76	4.77	5.73
Aug	1.87	1.60	3.36	1975	1	4.51	1997	.23	2000	6.1	3.4	1.0	.4	.47	.65	.92	1.16	1.40	1.65	1.93	2.26	2.69	3.38	4.02
Sep	1.51	1.13	3.73	1955	20	4.53	1973	.01	1979	5.9	3.2	.9	.3	.08	.17	.35	.55	.78	1.05	1.39	1.82	2.42	3.44	4.46
Oct	1.52	1.25	3.60	1998	5	7.29	1998	.00	1992	5.5	3.3	1.1	.3	.11	.28	.52	.74	.97	1.23	1.52	1.87	2.35	3.13	3.88
Nov	.70	.63	1.18	1977	8	1.90	2000	.01	1989	4.9	2.0	.2	.1	.10	.16	.26	.36	.46	.57	.70	.85	1.06	1.40	1.73
Dec	.41	.36	.75	1955	2	1.01+	1993	.00	1991	5.5	1.3	.0	.0	.01	.04	.10	.16	.22	.30	.38	.50	.65	.91	1.17
Ann	19.30	18.41	3.73	Sep 1955	20	8.30	Jun 1993	.00+	Oct 1992	81.6	41.5	10.7	3.2	12.57	13.82	15.46	16.71	17.83	18.93	20.07	21.34	22.89	25.16	27.14

+ 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: 1949-2001

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

Complete documentation available from:  
[www.ncdc.noaa.gov/oa/climate/normals/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html)

# 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](http://www.ncdc.noaa.gov)

**Station: MANDERSON 3 NE, SD**

**COOP ID: 395154**

**Climate Division: SD 5**

**NWS Call Sign:**

**Elevation: 3,095 Feet**

**Lat: 43°16N**

**Lon: 102°26W**

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										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	6.9	7.4	2	1	11.0	1971	30	14.8	1971	15	1979	30	11	1979	3.8	1.9	.5	.2	.1	12.8	6.9	4.7	.9
Feb	6.1	5.0	1	#	7.2	1991	18	15.5	1993	16	1979	8	9	1979	2.8	2.0	.6	.2	.0	5.2	2.2	1.2	.7
Mar	10.8	4.8	1	#	11.0	1977	12	55.6	1977	17	1977	12	5	1977	3.6	2.5	1.0	.6	.1	4.6	2.7	1.4	.3
Apr	3.5	3.5	#	#	6.0	1994	27	10.9	1980	8	1977	1	1	1977	1.6	1.0	.4	.1	.0	1.2	.5	.4	.0
May	.4	.0	#	0	4.5	1979	9	7.0	1979	3	1979	10	#+	1994	.1	.1	@	.0	.0	.1	@	.0	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	#	1993	7	#	1993	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	#	0	.0	0	0	.0	0	#+	1994	16	#+	1994	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	#	0	.0	0	0	.0	0	#	1994	31	#	1994	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	#	.0	#	0	#	2000	23	#	2000	#	2000	23	#	2000	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	3.5	3.0	#	#	12.0	1991	29	13.0	1991	8	1997	25	1	1971	1.1	.8	.5	.2	.1	1.0	.7	.4	.0
Nov	6.1	6.2	1	1	7.0	1977	8	11.4	1977	14	1991	4	6	1991	2.9	1.8	.8	.2	.0	5.4	3.4	1.4	.0
Dec	7.0	6.7	2	1	7.0	1978	1	15.1	1978	16	1978	9	9	1978	3.8	2.1	.6	.1	.0	11.6	5.8	1.2	.0
Ann	44.3	36.6	N/A	N/A	12.0	Oct 1991	29	55.6	Mar 1977	17	Mar 1977	12	11	Jan 1979	19.7	12.2	4.4	1.6	.3	41.9	22.2	10.7	1.9

+ 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

Complete documentation available from:

[www.ncdc.noaa.gov/oa/climate/normals/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html)

# Climatography of the United States

## No. 20 1971-2000

**Station: MANDERSON 3 NE, SD**

**COOP ID: 395154**

**Climate Division: SD 5**

**NWS Call Sign:**

**Elevation: 3,095 Feet**

**Lat: 43° 16N**

**Lon: 102° 26W**

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	6/11	6/05	5/31	5/27	5/24	5/20	5/16	5/12	5/05
32	5/25	5/21	5/18	5/15	5/13	5/10	5/08	5/05	5/01
28	5/14	5/10	5/07	5/05	5/03	5/01	4/28	4/25	4/22
24	4/29	4/26	4/23	4/20	4/18	4/16	4/14	4/11	4/07
20	4/24	4/19	4/16	4/13	4/10	4/07	4/05	4/01	3/27
16	4/17	4/11	4/07	4/03	3/31	3/28	3/24	3/20	3/15
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	9/08	9/11	9/14	9/16	9/19	9/21	9/23	9/26	9/29
32	9/11	9/16	9/19	9/22	9/25	9/28	10/01	10/04	10/09
28	9/16	9/22	9/25	9/28	10/01	10/04	10/08	10/11	10/16
24	9/21	9/27	10/02	10/05	10/09	10/12	10/16	10/20	10/26
20	9/27	10/03	10/08	10/12	10/16	10/20	10/24	10/29	11/04
16	10/04	10/11	10/17	10/21	10/25	10/30	11/03	11/08	11/16
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	133	127	122	117	113	108	102	94
32	156	149	143	139	135	130	126	121	113
28	169	163	158	155	151	147	143	139	133
24	194	186	181	177	173	169	164	159	152
20	211	203	198	193	188	184	179	173	165
16	233	224	218	213	207	202	197	191	182

\* 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

Complete documentation available from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

**Climatography  
of the United States  
No. 20  
1971-2000**

**Station: MANDERSON 3 NE, SD**

**COOP ID: 395154**

**Climate Division: SD 5      NWS Call Sign:      Elevation: 3,095 Feet    Lat: 43°16N      Lon: 102°26W**

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	1305	1025	879	573	285	73	11	17	151	476	926	1221	6942
60	1150	885	724	427	163	24	1	4	71	323	776	1066	5614
57	1057	804	631	343	107	10	0	1	39	235	692	973	4892
55	996	754	569	291	77	5	0	0	24	181	636	912	4445
50	852	623	424	176	27	0	0	0	5	79	498	767	3451
32	380	242	66	5	0	0	0	0	0	1	143	305	1142

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	98	141	210	422	750	1028	1275	1257	907	548	207	107	6950
55	1	9	0	18	114	343	562	544	240	15	10	1	1857
57	0	3	0	10	82	288	500	483	195	7	6	0	1574
60	0	0	0	4	45	212	408	392	138	2	0	0	1201
65	0	0	0	0	12	110	263	251	68	0	0	0	704
70	0	0	0	0	2	44	142	135	26	0	0	0	349

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	3	34	89	235	519	805	1036	1003	651	251	60	11	3	37	126	361	880	1685	2721	3724	4375	4626	4686	4697
45	0	7	39	138	374	655	881	848	510	148	22	3	0	7	46	184	558	1213	2094	2942	3452	3600	3622	3625
50	0	0	13	73	242	506	726	693	370	73	6	0	0	0	13	86	328	834	1560	2253	2623	2696	2702	2702
55	0	0	3	32	142	362	571	538	250	31	0	0	0	0	3	35	177	539	1110	1648	1898	1929	1929	1929
60	0	0	0	11	67	226	416	385	148	8	0	0	0	0	0	11	78	304	720	1105	1253	1261	1261	1261
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	4	40	88	171	323	504	658	638	421	239	70	16	4	44	132	303	626	1130	1788	2426	2847	3086	3156	3172

(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](http://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.  
Complete documentation for the 1971-2000 Normals is available on the internet from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/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 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.

- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>a. Temperature/ Precipitation Tables<ol style="list-style-type: none"><li>1. 1971-2000 Monthly Normals</li><li>2. Cooperative Summary of the Day</li><li>3. National Weather Service station records</li><li>4. 1971-2000 serially complete daily data</li></ol></li><li>b. Degree Day Table<ol style="list-style-type: none"><li>1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals</li><li>2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data</li></ol></li></ol> | <ol style="list-style-type: none"><li>c. Snow Tables<ol style="list-style-type: none"><li>1. Snow Climatology</li><li>2. Cooperative Summary of the Day</li></ol></li><li>d. Freeze Data Table<br/>1971-2000 serially complete daily data</li></ol> |
|---|---|

## References

U.S. Climate Normals 1971-2000, [www.ncdc.noaa.gov/normal.html](http://www.ncdc.noaa.gov/normal.html)  
U.S. Climate Normals 1971-2000-Products Clim20, [www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html)  
Snow Climatology Project Description, [www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html](http://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](http://www1.ncdc.noaa.gov/pub/data/special/serialcomplete_jam_0900.pdf)