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: ONIDA 4 NW, SD **COOP ID: 396292**

Climate Division: SD 6 **NWS Call Sign:** **Elevation: 1,850 Feet** **Lat: 44˚44N** **Lon: 100˚09W**

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	24.5	3.9	14.2	62+	1987	12	28.3	1990	-34	1966	29	-.5	1978	1576	0	.0	.0	1.0	19.6	30.6	11.7
Feb	31.3	10.5	20.9	71	1958	25	32.4	1998	-38	1994	9	4.9	1979	1235	0	.0	.0	4.2	13.2	27.5	6.1
Mar	42.6	20.9	31.8	83	1988	27	38.0	1973	-24+	1998	11	22.2	1996	1031	0	.0	.0	10.8	6.3	26.6	2.0
Apr	58.3	32.3	45.3	98	1980	21	52.6	1987	-1	1975	1	38.4	1995	592	2	.0	.2	23.6	.8	14.3	.1
May	70.4	44.3	57.4	103	1969	27	65.0	1977	19+	1980	8	51.4	1996	263	27	.0	.8	30.4	.0	2.1	.0
Jun	80.2	53.6	66.9	110	1988	24	76.2	1988	32	1969	2	60.5	1992	76	132	.6	5.4	30.0	.0	.0	.0
Jul	87.6	58.8	73.2	110	1989	5	79.5	1974	38	1971	30	62.5	1992	28	281	3.4	13.6	31.0	.0	.0	.0
Aug	85.8	57.0	71.4	110	1959	18	77.8	1983	33	1964	12	65.8	1992	24	223	1.7	12.2	31.0	.0	.0	.0
Sep	76.0	46.3	61.2	108	1976	6	67.8	1998	18	1974	30	57.2	1999	167	51	.5	4.5	29.7	.0	1.5	.0
Oct	61.2	34.5	47.9	94	1993	6	52.4	1973	-1	1991	30	43.3	1991	532	0	.0	.3	26.2	.3	10.4	@
Nov	40.1	20.2	30.2	81	1999	8	41.7	1999	-18	1959	14	16.3	1985	1046	0	.0	.0	9.0	7.4	26.4	1.3
Dec	27.8	8.1	18.0	69	1998	1	28.5	1997	-32	1990	30	1.1	1983	1459	0	.0	.0	1.6	16.9	30.9	7.5
Ann	57.2	32.5	44.9	110+	Jul 1989	5	79.5	Jul 1974	-38	Feb 1994	9	-.5	Jan 1978	8029	716	6.2	37.0	228.5	64.5	170.3	28.7

\+ 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	.59	.53	.92	1997	3	1.77	1997	.05+	1984
Feb	.64	.57	.90	1955	20	2.05	1987	.00	1983
Mar	1.38	1.23	1.50	1977	29	3.74	1977	.00	1971
Apr	1.93	1.79	3.20	1964	27	5.47	1986	.15	1980
May	2.85	2.63	2.00	1949	31	5.51	1982	.47	1980
Jun	3.11	2.81	3.40	1969	25	6.33	1984	.57	1974
Jul	2.69	2.26	4.23	1981	2	7.40	1981	.60	1976
Aug	2.14	1.93	6.21	1953	2	5.05	1999	.70+	1976
Sep	1.54	1.00	5.08	1999	2	7.64	1999	.00	1972
Oct	1.58	1.34	3.10	1951	4	4.50	1982	.10	1978
Nov	.82	.76	1.40	1956	2	2.30	1985	.01	1999
Dec	.57	.60	1.00	1972	29	1.58	1996	.00	1986
Ann	19.84	19.77	6.21	Aug 1953	2	7.64	Sep 1999	.00+	Dec 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.4	2.0	.2	.0
Feb	4.7	2.4	.2	.0
Mar	6.6	4.0	.8	.1
Apr	7.5	4.5	1.3	.2
May	9.5	6.0	2.2	.5
Jun	9.7	6.2	2.1	.6
Jul	8.7	5.1	1.7	.5
Aug	6.9	4.1	1.5	.4
Sep	5.4	3.0	.8	.3
Oct	5.5	3.5	1.0	.3
Nov	5.2	2.9	.3	@
Dec	5.1	2.1	.1	@
Ann	80.2	45.8	12.2	2.9

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	.07	.11	.20	.28	.37	.46	.58	.72	.91	1.23	1.54
Feb	.04	.10	.20	.29	.39	.50	.63	.79	1.01	1.36	1.71
Mar	.18	.36	.59	.79	.98	1.19	1.42	1.70	2.07	2.65	3.20
Apr	.29	.46	.74	1.00	1.28	1.58	1.93	2.35	2.92	3.85	4.74
May	.86	1.13	1.53	1.88	2.22	2.57	2.96	3.42	4.01	4.93	5.79
Jun	.87	1.17	1.61	2.00	2.38	2.78	3.22	3.74	4.42	5.48	6.46
Jul	.69	.94	1.33	1.68	2.02	2.37	2.77	3.24	3.86	4.84	5.75
Aug	.73	.93	1.23	1.48	1.72	1.96	2.23	2.55	2.95	3.57	4.15
Sep	.05	.16	.37	.59	.83	1.11	1.45	1.88	2.47	3.47	4.46
Oct	.17	.29	.51	.73	.96	1.23	1.54	1.93	2.46	3.34	4.19
Nov	.07	.13	.24	.35	.48	.62	.79	1.00	1.29	1.78	2.25
Dec	.04	.10	.20	.28	.36	.46	.57	.70	.88	1.16	1.44
Ann	12.92	14.21	15.89	17.18	18.34	19.47	20.65	21.95	23.55	25.90	27.94

\+ 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

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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	6.2	5.6	5	4
Feb	7.3	7.4	5	3
Mar	9.2	8.3	2	2
Apr	4.2	.5	#	#
May	#	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	1.6	.0	#	0
Nov	7.4	5.0	1	1
Dec	5.8	5.5	4	2
Ann	41.7	32.3	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	8.3	1982	22	15.6	1982	27	1997	17	25	1997
Feb	8.5	1991	18	22.0	1987	25	1997	8	21	1997
Mar	10.0	1982	19	31.5	1975	25	1975	29	12	1997
Apr	11.0	1995	11	27.2	1995	20	1975	1	4	1997
May	#	2000	12	#+	2000	#+	1997	16	#+	1997
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	#	1991	18	#	1991	0	0	0	0	0
Oct	8.0	1999	1	9.0	1995	5+	1999	1	1	1991
Nov	8.0	1977	8	24.5	1985	21	1985	30	7	1985
Dec	11.5	1996	14	12.0	1972	30	1996	25	22	1985
Ann	11.5	Dec 1996	14	31.5	Mar 1975	30	Dec 1996	25	25	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.7	2.5	.5	.2	.0
Feb	3.9	2.8	.8	.1	.0
Mar	3.9	2.8	1.2	.7	.1
Apr	1.2	1.1	.6	.3	@
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.5	.4	.3	.1	.0
Nov	3.6	2.5	1.0	.4	.0
Dec	4.6	2.6	.8	.2	@
Ann	22.4	14.7	5.2	2.0	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	19.6	15.2	9.5	3.3
Feb	14.6	8.3	5.6	2.7
Mar	9.4	5.5	3.1	.9
Apr	1.4	1.0	.5	.3
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.4	.3	.1	.0
Nov	8.8	5.3	3.1	.7
Dec	15.6	11.3	7.1	2.3
Ann	69.8	46.9	29.0	10.2

+ 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	5/31	5/26	5/22	5/19	5/16	5/13	5/09	5/06	4/30
32	5/20	5/15	5/12	5/09	5/07	5/04	5/02	4/29	4/24
28	5/13	5/08	5/05	5/02	4/29	4/26	4/23	4/20	4/15
24	5/02	4/27	4/23	4/19	4/16	4/13	4/10	4/06	3/31
20	4/21	4/16	4/12	4/09	4/06	4/04	3/31	3/28	3/23
16	4/11	4/05	4/02	3/30	3/27	3/24	3/21	3/17	3/12

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	9/17	9/19	9/21	9/23	9/27
32	9/13	9/17	9/21	9/23	9/26	9/29	10/01	10/05	10/09
28	9/22	9/27	9/30	10/03	10/06	10/09	10/12	10/15	10/20
24	9/27	10/02	10/06	10/10	10/13	10/16	10/19	10/23	10/28
20	10/02	10/09	10/14	10/18	10/22	10/26	10/30	11/04	11/11
16	10/17	10/24	10/28	11/01	11/04	11/08	11/12	11/16	11/23

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	142	135	131	127	123	119	115	111	105
32	159	153	149	145	141	138	134	130	124
28	178	172	167	163	159	155	151	147	140
24	199	192	187	183	179	175	170	165	158
20	221	213	207	202	198	193	189	183	175
16	247	239	232	227	222	217	212	205	197

***** 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	1576	1235	1031	592	263	76	28	24	167	532	1046	1459	8029
60	1421	1095	876	450	155	27	9	5	81	378	896	1304	6697
57	1328	1014	783	369	105	13	3	1	45	290	806	1211	5968
55	1266	964	721	318	78	7	0	0	28	234	746	1149	5511
50	1114	833	572	208	32	0	0	0	6	122	608	997	4492
32	609	414	153	13	0	0	0	0	0	3	202	502	1896

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	57	103	146	413	787	1046	1277	1222	874	494	146	66	6631
55	0	9	0	28	153	364	564	509	212	13	0	0	1852
57	0	3	0	19	118	309	505	448	169	6	0	0	1577
60	0	0	0	9	75	234	418	358	114	2	0	0	1210
65	0	0	0	2	27	132	281	223	51	0	0	0	716
70	0	0	0	0	7	62	172	118	17	0	0	0	376

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	10	58	249	582	845	1069	1027	683	324	42	0	0	10	68	317	899	1744	2813	3840	4523	4847	4889	4889
45	0	0	19	148	432	695	914	872	534	200	14	0	0	0	19	167	599	1294	2208	3080	3614	3814	3828	3828
50	0	0	4	83	294	545	759	717	395	108	5	0	0	0	4	87	381	926	1685	2402	2797	2905	2910	2910
55	0	0	0	40	172	397	604	562	264	50	0	0	0	0	0	40	212	609	1213	1775	2039	2089	2089	2089
60	0	0	0	17	89	258	451	409	164	12	0	0	0	0	0	17	106	364	815	1224	1388	1400	1400	1400
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	13	53	179	361	535	687	663	437	219	35	1	0	13	66	245	606	1141	1828	2491	2928	3147	3182	3183

(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