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: OELRICHS, SD **COOP ID: 396212**

Climate Division: SD 5 **NWS Call Sign:** **Elevation: 3,340 Feet** **Lat: 43˚11N** **Lon: 103˚14W**

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	33.5	9.1	21.3	69	1989	30	33.3	1990	-28+	1963	19	5.4	1979	1355	0	.0	.0	3.9	11.8	30.1	7.5
Feb	39.7	13.8	26.8	74	1954	8	37.1	1999	-34	1996	3	13.5	1989	1071	0	.0	.0	8.3	7.5	26.8	4.1
Mar	49.3	21.3	35.3	81+	1972	10	41.5	1986	-24+	1989	5	27.9	1996	920	0	.0	.0	16.8	3.7	26.2	1.2
Apr	60.2	31.4	45.8	93	1962	20	53.1	1981	-2	1968	4	40.5	1983	576	0	.0	.1	23.8	.5	16.0	@
May	70.6	42.2	56.4	102+	1969	27	62.2	1985	16	1950	1	50.6	1995	282	15	.0	.4	30.1	.0	3.1	.0
Jun	81.7	51.2	66.5	108+	1988	24	74.7	1988	27	1969	2	60.8	1998	78	121	.8	6.2	29.9	.0	.1	.0
Jul	90.0	57.6	73.8	114	1973	6	79.0	1974	36	1971	30	66.5	1992	11	285	4.1	16.7	31.0	.0	.0	.0
Aug	89.1	55.7	72.4	109	1975	7	78.2	1983	36+	1988	28	66.8	1992	17	247	2.4	16.4	31.0	.0	.0	.0
Sep	78.4	44.2	61.3	107	1948	3	69.8	1998	16	1984	29	56.4	1993	172	61	.5	6.1	29.4	.0	2.2	.0
Oct	64.7	32.7	48.7	95	1975	6	51.9	1973	-11	1991	30	45.2	1976	507	0	.0	.4	26.9	.4	13.1	.1
Nov	45.8	19.6	32.7	83+	1999	9	44.8	1999	-21	1959	14	16.7	1985	968	0	.0	.0	12.6	5.3	26.0	1.3
Dec	36.1	10.9	23.5	71	1999	1	33.3	1999	-37	1989	22	5.0	1983	1287	0	.0	.0	5.1	10.0	30.0	5.3
Ann	61.6	32.5	47.0	114	Jul 1973	6	79.0	Jul 1974	-37	Dec 1989	22	5.0	Dec 1983	7244	729	7.8	46.3	248.8	39.2	173.6	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/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	.42	.43	.70	1997	4	.96	1997	.00+	1989
Feb	.49	.46	.92	1992	23	1.49	1987	.00	1996
Mar	.98	.88	1.30	1963	16	2.31	1987	.08	1978
Apr	1.96	1.86	2.51	2000	19	4.64	2000	.00	1987
May	3.12	2.85	4.36	1971	23	8.52	1991	.75	1974
Jun	2.80	2.51	3.20	1986	9	7.01	1986	.87	1973
Jul	2.14	1.93	2.25	1988	18	5.11	1997	.45	1975
Aug	1.67	1.37	4.10	1974	22	5.19	1974	.16	1971
Sep	1.30	1.15	2.15	1955	19	3.12	1989	.15+	1980
Oct	1.30	1.09	1.57	1982	9	4.04	1994	.19	1999
Nov	.65	.58	.93	1983	8	1.81	1983	.00	1997
Dec	.42	.35	.85	1973	18	1.17	1994	.03	1979
Ann	17.25	16.80	4.36	May 1971	23	8.52	May 1991	.00+	Nov 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.1	1.4	.1	.0
Feb	4.2	1.7	.1	.0
Mar	5.6	2.9	.5	.1
Apr	7.7	4.6	1.3	.4
May	9.6	6.5	2.0	.4
Jun	8.8	6.0	1.9	.6
Jul	7.7	4.8	1.2	.5
Aug	6.2	3.8	.9	.3
Sep	5.2	3.4	.8	.2
Oct	5.3	3.2	.9	.2
Nov	4.2	2.0	.2	.0
Dec	4.3	1.3	.1	.0
Ann	72.9	41.6	10.0	2.7

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	.00	.09	.18	.24	.30	.37	.44	.52	.62	.79	.95
Feb	.05	.11	.19	.26	.33	.41	.50	.61	.75	.99	1.21
Mar	.16	.24	.39	.52	.66	.81	.99	1.20	1.49	1.95	2.39
Apr	.21	.44	.77	1.05	1.34	1.64	1.99	2.41	2.97	3.87	4.73
May	.89	1.19	1.64	2.02	2.40	2.80	3.24	3.75	4.42	5.47	6.44
Jun	.68	.95	1.35	1.72	2.08	2.46	2.88	3.38	4.05	5.09	6.07
Jul	.54	.74	1.06	1.33	1.60	1.89	2.21	2.58	3.08	3.86	4.59
Aug	.24	.37	.61	.84	1.09	1.35	1.66	2.03	2.54	3.37	4.16
Sep	.14	.23	.41	.59	.79	1.01	1.26	1.58	2.02	2.74	3.44
Oct	.22	.33	.52	.70	.88	1.08	1.31	1.59	1.96	2.56	3.14
Nov	.08	.16	.27	.36	.46	.56	.67	.80	.97	1.25	1.52
Dec	.04	.07	.13	.19	.25	.32	.40	.51	.65	.89	1.12
Ann	12.08	13.07	14.34	15.31	16.18	17.01	17.87	18.83	19.99	21.67	23.13

+ 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	6.4	6.0	3	1
Feb	6.4	5.2	2	1
Mar	8.0	5.7	1	#
Apr	4.8	4.1	#	#
May	.6	.0	#	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.2	.0	0	0
Oct	2.7	1.0	#	0
Nov	6.7	6.3	1	#
Dec	7.5	6.8	2	1
Ann	43.3	35.1	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	11.0	1993	9	14.3	1982	16	1976	4	10	1984
Feb	8.0	2000	13	21.7	1987	12	1987	28	7	1979
Mar	12.0	1975	27	24.6	1987	18	1998	7	3+	1998
Apr	8.0	2000	19	15.2	1984	10	2000	20	1+	2000
May	6.0	1979	9	11.0	1979	1	1979	10	#	1979
Jun	.0	0	0	.0	0	#+	1982	12	#+	1982
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	3.0	1995	20	3.0	1995	0	0	0	0	0
Oct	12.0	1991	28	13.0	1991	13	1991	29	1	1991
Nov	8.0	1983	8	22.6	1983	8	1983	22	2	1983
Dec	10.0	1993	17	20.0	1994	17	1983	20	10	1983
Ann	12.0+	Oct 1991	28	24.6	Mar 1987	18	Mar 1998	7	10+	Jan 1984

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.9	2.4	.7	.3	@
Feb	3.7	2.4	.7	.3	.0
Mar	3.8	2.9	1.2	.4	.1
Apr	2.2	1.6	.6	.3	.0
May	.2	.2	.1	@	.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	1.0	.8	.4	.2	@
Nov	2.9	2.2	1.0	.4	.0
Dec	3.8	2.5	.7	.5	@
Ann	21.6	15.1	5.4	2.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	16.2	10.7	7.1	1.8
Feb	9.2	5.7	3.9	.3
Mar	5.1	2.3	1.0	.3
Apr	1.1	.4	.3	.1
May	.1	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.5	.4	.1	.0
Nov	5.9	3.2	1.0	.0
Dec	12.9	7.6	4.8	1.4
Ann	51.0	30.3	18.2	3.9

+ 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	6/17	6/09	6/04	5/30	5/26	5/22	5/17	5/12	5/04
32	5/27	5/23	5/19	5/16	5/14	5/11	5/08	5/05	4/30
28	5/13	5/09	5/06	5/04	5/01	4/29	4/27	4/24	4/20
24	5/07	5/03	4/29	4/26	4/24	4/21	4/18	4/14	4/10
20	4/26	4/20	4/17	4/14	4/11	4/08	4/04	4/01	3/27
16	4/18	4/12	4/08	4/05	4/01	3/29	3/26	3/21	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	9/05	9/09	9/11	9/13	9/15	9/17	9/19	9/22	9/25
32	9/09	9/14	9/17	9/20	9/23	9/26	9/29	10/02	10/07
28	9/20	9/24	9/28	9/30	10/03	10/06	10/09	10/12	10/16
24	9/25	10/01	10/05	10/09	10/12	10/15	10/19	10/23	10/28
20	10/09	10/14	10/17	10/20	10/23	10/26	10/29	11/02	11/07
16	10/17	10/22	10/25	10/28	10/31	11/03	11/06	11/10	11/14

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	127	121	116	112	107	102	96	88
32	153	145	140	136	132	127	123	118	110
28	171	165	161	157	154	151	147	143	137
24	195	186	180	175	171	166	161	155	147
20	215	208	203	199	195	191	187	182	175
16	232	225	220	216	212	208	204	199	193

***** 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	1355	1071	920	576	282	78	11	17	172	507	968	1287	7244
60	1200	931	765	429	163	28	1	3	87	353	818	1132	5910
57	1107	847	672	343	107	13	0	1	51	264	728	1039	5172
55	1045	798	610	289	77	7	0	0	33	208	675	977	4719
50	894	667	460	171	27	1	0	0	9	97	535	827	3688
32	408	272	77	3	0	0	0	0	0	1	161	352	1274

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	75	125	179	416	756	1033	1297	1253	880	518	182	88	6802
55	0	7	0	13	120	350	584	541	223	12	7	0	1857
57	0	0	0	7	88	296	522	479	181	5	0	0	1578
60	0	0	0	2	51	221	430	389	126	1	0	0	1220
65	0	0	0	0	15	121	285	247	61	0	0	0	729
70	0	0	0	0	3	53	160	130	23	0	0	0	369

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	30	92	240	527	801	1054	1021	678	324	63	12	3	33	125	365	892	1693	2747	3768	4446	4770	4833	4845
45	0	5	41	143	380	651	899	866	532	199	25	2	0	5	46	189	569	1220	2119	2985	3517	3716	3741	3743
50	0	0	12	68	241	503	744	711	392	105	5	0	0	0	12	80	321	824	1568	2279	2671	2776	2781	2781
55	0	0	0	28	130	357	589	557	267	45	0	0	0	0	0	28	158	515	1104	1661	1928	1973	1973	1973
60	0	0	0	6	60	226	437	404	159	11	0	0	0	0	0	6	66	292	729	1133	1292	1303	1303	1303
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	7	33	97	193	344	503	657	640	442	254	66	16	7	40	137	330	674	1177	1834	2474	2916	3170	3236	3252

(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