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: REDIG 11 NE BUFFALO, SD **COOP ID: 397062**

Climate Division: SD 1 **NWS Call Sign:** **Elevation: 3,070 Feet** **Lat: 45˚23N** **Lon: 103˚22W**

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	28.1	5.9	17.0	70	1981	23	31.6	1992	-38	1949	21	2.3	1979	1487	0	.0	.0	1.7	16.5	30.6	10.8
Feb	34.5	11.8	23.2	72	1992	29	33.9	1999	-36	1989	3	7.4	1979	1172	0	.0	.0	5.0	11.4	27.7	6.2
Mar	43.7	19.6	31.7	78	1967	29	40.0	1986	-29	1998	11	22.6	1975	1034	0	.0	.0	11.2	6.2	28.6	2.6
Apr	56.5	30.3	43.4	92	1980	21	51.0	1987	-10	1997	8	36.5	1997	649	0	.0	@	21.5	1.2	18.3	@
May	67.6	40.9	54.3	97	1964	20	60.0	1977	12	1954	3	48.6	1996	344	10	.0	.2	29.3	.0	4.4	.0
Jun	77.1	50.1	63.6	104	1988	20	74.3	1988	28+	1964	3	58.2	1998	121	79	.3	2.4	29.9	.0	.1	.0
Jul	85.0	55.5	70.3	110	1981	7	74.0	1983	33	1950	13	62.8	1992	32	195	1.2	9.1	31.0	.0	.0	.0
Aug	84.9	53.7	69.3	106+	1975	7	76.4	1983	31	1950	20	63.6	1974	54	187	.8	9.7	31.0	.0	.0	.0
Sep	74.0	43.2	58.6	104	1948	15	65.2	1998	16	1995	22	52.7	1993	232	40	.3	2.8	29.0	.0	3.3	.0
Oct	60.3	32.2	46.3	94	1953	1	49.3	1973	-11+	1991	31	42.1	1972	583	0	.0	.2	24.6	.5	14.9	.1
Nov	42.0	19.0	30.5	82	1999	7	41.7	1999	-22	1985	27	14.6	1985	1036	0	.0	.0	9.4	7.7	27.6	2.2
Dec	31.7	9.1	20.4	68	1965	4	31.5	1999	-38+	1990	30	1.8	1983	1382	0	.0	.0	3.0	14.2	30.7	7.8
Ann	57.1	30.9	44.1	110	Jul 1981	7	76.4	Aug 1983	-38+	Dec 1990	30	1.8	Dec 1983	8126	511	2.6	24.4	226.6	57.7	186.2	29.7

\+ 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	.32	.32	.63	1997	4	1.27	1997	.00+	1995
Feb	.40	.27	.80	1979	22	1.56	1978	.02	1984
Mar	.77	.50	2.04	1977	29	3.99	1977	.02+	1997
Apr	1.54	1.20	1.74	1971	19	4.12	1984	.10	1985
May	2.93	2.61	2.46	1962	18	7.65	1996	.36	1980
Jun	3.04	2.33	3.90	1998	18	9.08	1976	.91	1983
Jul	2.10	1.84	2.85	1989	14	6.38	1993	.26	1971
Aug	1.44	1.14	2.77	1978	26	4.65	1998	.23	1994
Sep	.99	.70	1.62	1996	18	4.10	1986	.00	1975
Oct	1.34	.85	2.20	1971	2	5.29	1982	.00	1987
Nov	.50	.37	1.83	2000	1	2.23	2000	.00	1990
Dec	.32	.24	.56	1972	23	1.05	1996	.00+	1991
Ann	15.69	15.35	3.90	Jun 1998	18	9.08	Jun 1976	.00+	Jan 1995

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.2	1.3	@	.0
Feb	4.7	1.7	.1	.0
Mar	5.6	2.1	.3	.1
Apr	6.6	3.7	.9	.3
May	7.9	6.0	2.1	.6
Jun	8.4	6.2	2.0	.5
Jul	7.2	5.0	1.2	.3
Aug	5.8	3.4	.8	.2
Sep	4.0	2.5	.7	.1
Oct	4.7	3.0	.8	.3
Nov	4.6	1.9	.1	@
Dec	4.1	1.1	@	.0
Ann	67.8	37.9	9.0	2.4

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	.00	.08	.14	.20	.26	.33	.41	.53	.70	.87
Feb	.02	.04	.09	.14	.20	.27	.36	.47	.64	.91	1.19
Mar	.04	.08	.17	.27	.39	.53	.70	.92	1.23	1.76	2.29
Apr	.17	.29	.51	.72	.95	1.21	1.51	1.89	2.39	3.23	4.05
May	.61	.87	1.30	1.69	2.09	2.51	2.99	3.56	4.32	5.53	6.68
Jun	.85	1.14	1.58	1.96	2.33	2.72	3.15	3.66	4.32	5.35	6.32
Jul	.37	.55	.86	1.14	1.44	1.75	2.12	2.56	3.14	4.09	5.00
Aug	.22	.34	.55	.75	.96	1.18	1.44	1.76	2.18	2.87	3.53
Sep	.03	.10	.24	.38	.54	.72	.94	1.22	1.60	2.24	2.88
Oct	.04	.13	.32	.51	.72	.97	1.26	1.64	2.16	3.03	3.89
Nov	.02	.06	.13	.20	.28	.37	.48	.61	.80	1.11	1.42
Dec	.00	.02	.07	.12	.17	.23	.30	.39	.51	.72	.92
Ann	8.86	10.06	11.67	12.93	14.08	15.22	16.41	17.76	19.42	21.90	24.08

\+ 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)

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	6.6	6.1	5	3	8.0	1997	4	17.1	1996	37	1986	7	22	1986	3.6	2.7	.8	.2	.0	20.6	17.6	14.1	6.5
Feb	7.8	5.8	6	2	8.0	1979	22	25.0	1986	38	1986	20	30	1978	4.5	3.4	1.0	.2	.0	14.4	11.3	8.9	6.6
Mar	7.3	6.0	3	2	12.0	1977	29	26.0	1975	38	1978	6	16+	1998	3.6	2.8	1.1	.5	.1	11.4	8.8	6.9	4.7
Apr	6.3	3.4	1	1	17.0	1994	26	26.0	1984	26+	1997	12	9	1997	2.1	1.8	.9	.5	.2	3.2	2.3	1.7	1.4
May	1.2	.0	#	0	6.0	1972	1	9.0	1983	8	1984	1	#	2000	.4	.4	.2	.1	.0	.3	.1	.1	.0
Jun	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1996	.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	.2	.0	#	0	3.0	1984	23	6.0	1984	3	1984	24	#	1984	.1	.1	.1	.0	.0	.1	@	.0	.0
Oct	2.3	1.0	#	0	7.0	1991	28	10.0	1991	10+	1991	30	1	1991	1.0	1.0	.3	.1	.0	1.3	.5	.1	.1
Nov	6.8	5.3	2	1	9.0	1986	7	29.0	1985	24	1985	30	9	1985	3.2	2.6	.9	.3	.0	9.2	5.7	4.9	2.4
Dec	5.1	3.0	4	2	9.0	1993	17	14.0	1993	32+	1985	31	27	1985	2.9	2.0	.7	.4	.0	16.3	12.3	8.4	4.7
Ann	43.6	30.6	N/A	N/A	17.0	Apr 1994	26	29.0	Nov 1985	38+	Feb 1986	20	30	Feb 1978	21.4	16.8	6.0	2.3	.3	76.8	58.6	45.1	26.4

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	6/15	6/09	6/05	6/01	5/29	5/25	5/22	5/18	5/12
32	5/30	5/25	5/21	5/18	5/15	5/12	5/09	5/05	4/30
28	5/20	5/15	5/12	5/09	5/06	5/04	5/01	4/27	4/23
24	5/09	5/04	4/30	4/27	4/24	4/21	4/18	4/15	4/09
20	4/28	4/23	4/19	4/16	4/13	4/11	4/07	4/04	3/30
16	4/15	4/10	4/07	4/05	4/02	3/31	3/28	3/25	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	8/29	9/02	9/05	9/08	9/10	9/12	9/15	9/17	9/21
32	9/07	9/11	9/14	9/16	9/19	9/21	9/23	9/26	9/30
28	9/13	9/18	9/22	9/25	9/28	10/01	10/04	10/07	10/12
24	9/18	9/24	9/28	10/02	10/06	10/09	10/13	10/18	10/24
20	9/24	10/01	10/06	10/10	10/14	10/17	10/22	10/26	11/02
16	10/07	10/13	10/18	10/23	10/27	10/31	11/04	11/09	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	124	117	112	108	103	99	95	90	82
32	146	139	134	130	126	122	117	112	105
28	166	158	153	148	144	140	135	130	122
24	190	181	175	169	164	159	153	147	137
20	208	199	193	187	182	177	172	166	157
16	232	223	217	212	207	202	196	190	181

***** 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	1487	1172	1034	649	344	121	32	54	232	583	1036	1382	8126
60	1332	1032	879	501	215	53	9	19	131	428	886	1227	6712
57	1240	958	786	416	152	27	2	9	84	336	796	1134	5940
55	1180	906	725	361	117	17	0	5	59	277	738	1072	5457
50	1035	775	579	238	51	3	0	1	19	146	600	926	4373
32	546	375	161	14	0	0	0	0	0	3	200	442	1741

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	82	127	150	356	690	948	1186	1156	798	443	153	83	6172
55	3	14	1	12	93	275	473	448	168	4	2	0	1493
57	1	10	0	7	67	225	412	389	133	2	0	0	1246
60	0	1	0	2	37	161	326	307	89	0	0	0	923
65	0	0	0	0	10	79	195	187	40	0	0	0	511
70	0	0	0	0	2	28	100	99	14	0	0	0	243

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	9	43	175	451	714	943	915	567	248	39	2	0	9	52	227	678	1392	2335	3250	3817	4065	4104	4106
45	0	2	11	94	308	565	788	760	424	142	13	0	0	2	13	107	415	980	1768	2528	2952	3094	3107	3107
50	0	0	2	45	183	415	633	606	289	69	1	0	0	0	2	47	230	645	1278	1884	2173	2242	2243	2243
55	0	0	0	14	88	273	478	452	178	24	0	0	0	0	0	14	102	375	853	1305	1483	1507	1507	1507
60	0	0	0	3	33	153	326	302	90	7	0	0	0	0	0	3	36	189	515	817	907	914	914	914
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	20	49	142	286	440	595	575	366	194	45	7	1	21	70	212	498	938	1533	2108	2474	2668	2713	2720

(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