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: WAGNER, SD **COOP ID: 398767**

Climate Division: SD 9 **NWS Call Sign:** **Elevation: 1,430 Feet** **Lat: 43˚05N** **Lon: 98˚18W**

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	30.7	9.5	20.1	70	1981	24	33.0	1990	-30	1966	29	4.9	1978	1392	0	.0	.0	2.8	15.9	30.2	8.3
Feb	37.1	15.7	26.4	74+	1992	29	37.0	1999	-28	1962	28	11.9	1978	1081	0	.0	.0	6.5	10.8	26.0	4.5
Mar	48.5	25.3	36.9	88+	1978	30	43.3	2000	-21	1960	4	29.4	1996	870	0	.0	.0	14.6	4.0	23.5	.8
Apr	62.6	36.6	49.6	100	1962	25	58.4	1981	5	1975	3	42.2	1995	471	8	.0	.6	25.4	.5	9.9	.0
May	74.3	48.6	61.5	104	1967	25	67.8	1987	20	1961	1	55.3	1995	172	62	.0	1.1	30.7	.0	.8	.0
Jun	84.4	57.9	71.2	108	1988	21	78.3	1988	32	1956	1	66.1	1982	25	209	.8	8.8	30.0	.0	.0	.0
Jul	89.7	63.2	76.5	111	1954	13	82.1	1974	41	1971	30	68.3	1992	7	362	3.5	16.3	31.0	.0	.0	.0
Aug	87.7	61.4	74.6	110	1965	13	81.1	1983	35	1950	20	68.6	1992	12	308	1.7	13.0	31.0	.0	.0	.0
Sep	78.4	51.4	64.9	106	1959	6	71.3	1998	25+	1974	30	60.3	1993	98	96	.4	5.1	29.9	.0	.6	.0
Oct	64.7	39.0	51.9	97	1958	15	55.5	1974	10	1991	30	47.1	1976	410	1	.0	.2	27.6	.2	6.9	.0
Nov	45.1	24.7	34.9	82	1964	2	46.3	1999	-17	1959	14	22.6	1985	904	0	.0	.0	11.5	5.2	23.1	.7
Dec	33.3	13.7	23.5	71	1998	2	31.7	1979	-29	1989	22	4.8	1983	1287	0	.0	.0	3.6	13.4	30.2	5.1
Ann	61.4	37.3	49.3	111	Jul 1954	13	82.1	Jul 1974	-30	Jan 1966	29	4.8	Dec 1983	6729	1046	6.4	45.1	244.6	50.0	151.2	19.4

\+ 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

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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	.58	.51	1.16	1988	19	2.11	1988	.00	1981
Feb	.81	.74	1.01	2000	23	2.08	1971	.00	1985
Mar	1.79	1.17	2.78	1987	17	8.00	1987	.28	1978
Apr	2.78	2.39	2.81	2001	22	7.02	1986	.39	1987
May	4.03	3.34	3.43	1985	11	13.40	1982	1.41	1998
Jun	3.32	3.20	3.03	1961	14	6.71	1975	.87	1995
Jul	3.13	2.68	3.09	1962	13	8.41	1993	1.06	1982
Aug	2.73	2.34	3.41	1961	18	6.99	1975	.38	1972
Sep	2.59	2.27	3.43	1987	16	6.48	1973	.25	1980
Oct	1.96	1.75	2.48	1961	10	5.01	1982	.11	1999
Nov	1.27	1.04	1.55	1979	21	3.09	1983	.00	1980
Dec	.65	.62	1.09	1955	3	2.16	1982	.00	1986
Ann	25.64+	26.82+	3.43+	Sep 1987	16	13.40	May 1982	.00+	Dec 1986

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.2	1.8	.2	@
Feb	4.7	2.4	.4	.1
Mar	6.0	4.0	1.1	.2
Apr	8.0	5.4	1.9	.5
May	9.6	7.4	3.0	.9
Jun	8.6	6.3	2.2	.9
Jul	8.0	5.9	2.2	.7
Aug	6.5	4.5	1.7	.9
Sep	5.8	4.1	1.5	.8
Oct	5.0	3.6	1.3	.5
Nov	4.8	3.0	.7	.2
Dec	4.3	2.2	.1	.0
Ann	75.5	50.6	16.3	5.7

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	.02	.07	.16	.24	.33	.44	.56	.72	.93	1.29	1.63
Feb	.04	.11	.23	.35	.48	.62	.79	1.00	1.29	1.76	2.22
Mar	.23	.37	.63	.88	1.14	1.43	1.77	2.19	2.76	3.69	4.59
Apr	.57	.83	1.23	1.61	1.98	2.38	2.83	3.38	4.09	5.24	6.33
May	1.29	1.68	2.24	2.72	3.19	3.67	4.20	4.82	5.61	6.85	8.00
Jun	1.17	1.49	1.94	2.32	2.69	3.06	3.47	3.94	4.55	5.49	6.35
Jul	.93	1.23	1.68	2.06	2.43	2.82	3.25	3.75	4.41	5.42	6.37
Aug	.54	.79	1.19	1.56	1.93	2.33	2.78	3.32	4.04	5.19	6.28
Sep	.44	.66	1.04	1.39	1.76	2.16	2.61	3.16	3.90	5.09	6.23
Oct	.25	.40	.68	.95	1.24	1.56	1.93	2.39	3.01	4.04	5.03
Nov	.06	.17	.37	.55	.75	.98	1.24	1.57	2.01	2.75	3.47
Dec	.06	.14	.25	.34	.44	.54	.66	.80	.99	1.30	1.59
Ann	16.96	18.59	20.71	22.34	23.79	25.21	26.68	28.32	30.32	33.24	35.79

\+ 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	5.7	3.8	3	2
Feb	7.2	7.0	3	1
Mar	5.6	4.9	1	#
Apr	3.3	.0	#	#
May	#	.0	0	0
Jun	.0	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.9	.0	#	0
Nov	6.8	3.3	1	#
Dec	8.1	5.8	2	2
Ann	37.6	24.8	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	9.0	1973	21	15.5+	1979	26	1988	19	11	1988
Feb	9.0	1997	3	23.0	1993	24	1978	16	15	1978
Mar	9.0	1971	18	19.5	1983	11	1989	6	3	1984
Apr	9.0	1982	7	22.5	1995	11	1995	11	1	1995
May	#	1989	5	#	1989	0	0	0	0	0
Jun	.0	0	0	.0	0	#	1996	19	#	1996
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	#	1985	30	#+	1985	#+	1985	30	#+	1985
Oct	6.0	1982	19	8.0	1995	6	1995	23	#+	1997
Nov	9.0	1975	20	24.5	1985	18	1979	22	5+	2000
Dec	9.0	1989	10	19.5	1982	18	1983	22	14	1983
Ann	9.0+	Feb 1997	3	24.5	Nov 1985	26	Jan 1988	19	15	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.3	2.7	.8	.2	.0
Feb	3.2	2.7	.9	.4	.0
Mar	2.3	2.2	.7	.4	.0
Apr	1.0	1.0	.5	.3	.0
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	.3	.2	.1	.1	.0
Nov	2.2	2.0	1.1	.4	.0
Dec	3.3	2.9	1.2	.4	.0
Ann	15.6	13.7	5.3	2.2	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	13.1	7.0	4.7	.5
Feb	8.9	6.0	4.2	1.9
Mar	4.6	2.7	1.5	@
Apr	.6	.4	.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	.2	.1	@	.0
Nov	4.8	3.7	2.7	.8
Dec	13.0	7.2	4.2	1.4
Ann	45.2	27.1	17.6	4.6

+ 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	5/19	5/15	5/12	5/09	5/07	5/04	5/02	4/29	4/25
32	5/14	5/09	5/05	5/02	4/29	4/26	4/23	4/20	4/15
28	5/02	4/28	4/25	4/22	4/20	4/17	4/14	4/11	4/07
24	4/25	4/20	4/17	4/14	4/11	4/08	4/05	4/01	3/28
20	4/12	4/07	4/04	4/01	3/29	3/26	3/23	3/19	3/15
16	4/07	4/02	3/28	3/25	3/22	3/18	3/15	3/10	3/05

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	9/14	9/17	9/20	9/22	9/25	9/27	9/29	10/02	10/06
32	9/21	9/26	9/30	10/03	10/06	10/08	10/12	10/15	10/20
28	9/28	10/04	10/08	10/11	10/14	10/17	10/20	10/24	10/29
24	10/12	10/17	10/20	10/23	10/26	10/28	10/31	11/04	11/08
20	10/19	10/24	10/27	10/30	11/02	11/05	11/08	11/11	11/16
16	10/28	11/03	11/08	11/11	11/15	11/18	11/22	11/27	12/03

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	158	152	148	144	140	136	132	128	122
32	176	170	166	162	159	155	151	147	141
28	196	190	185	181	177	173	169	164	157
24	217	210	205	201	197	193	189	184	177
20	239	232	227	222	218	213	209	203	196
16	263	255	248	243	238	233	227	221	212

***** 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	1392	1081	870	471	172	25	7	12	98	410	904	1287	6729
60	1237	941	715	337	90	5	0	2	38	263	754	1132	5514
57	1144	864	623	266	55	1	0	0	17	187	668	1039	4864
55	1084	812	563	224	38	0	0	0	9	143	612	977	4462
50	941	681	420	134	12	0	0	0	1	65	475	833	3562
32	461	293	76	4	0	0	0	0	0	1	127	363	1325

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	92	136	229	531	913	1174	1378	1320	988	615	214	99	7689
55	2	11	3	61	238	484	665	607	307	44	9	0	2431
57	0	7	1	43	193	425	603	545	255	27	4	0	2103
60	0	0	0	25	134	339	510	453	185	10	0	0	1656
65	0	0	0	8	62	209	362	308	96	1	0	0	1046
70	0	0	0	1	21	109	225	182	40	0	0	0	578

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	4	26	105	329	683	952	1151	1091	762	398	78	4	4	30	135	464	1147	2099	3250	4341	5103	5501	5579	5583
45	0	6	53	216	528	802	996	936	613	272	35	1	0	6	59	275	803	1605	2601	3537	4150	4422	4457	4458
50	0	1	22	124	379	652	841	781	469	160	10	0	0	1	23	147	526	1178	2019	2800	3269	3429	3439	3439
55	0	0	7	67	245	503	686	626	332	78	2	0	0	0	7	74	319	822	1508	2134	2466	2544	2546	2546
60	0	0	0	29	137	358	531	474	214	31	0	0	0	0	0	29	166	524	1055	1529	1743	1774	1774	1774
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	3	29	85	221	426	618	760	724	483	253	57	6	3	32	117	338	764	1382	2142	2866	3349	3602	3659	3665

(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