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: TYNDALL, SD **COOP ID: 398472**

Climate Division: SD 9 **NWS Call Sign:** **Elevation: 1,420 Feet** **Lat: 42˚59N** **Lon: 97˚52W**

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	27.7	8.0	17.9	70	1981	24	30.1	1990	-30+	1970	19	2.8	1978	1461	0	.0	.0	2.1	17.0	30.7	9.4
Feb	34.5	14.3	24.4	74+	1981	17	34.1	1987	-29	1988	11	8.6	1979	1136	0	.0	.0	5.5	11.6	26.7	5.0
Mar	45.7	24.9	35.3	88	1968	30	42.2	2000	-19	1960	4	26.8	1984	921	0	.0	.0	13.1	4.8	23.3	1.0
Apr	59.6	36.9	48.3	96	1980	21	57.1	1981	6	1975	3	41.7	1983	508	5	.0	.4	24.3	.5	10.1	.0
May	71.2	49.4	60.3	105	1967	25	66.9	1977	20	1967	3	54.7	1995	196	51	.0	.8	30.4	.0	.8	.0
Jun	81.6	58.8	70.2	108	1988	21	77.8	1988	34	1956	1	64.8	1982	31	187	.5	6.2	30.0	.0	.0	.0
Jul	86.7	63.8	75.3	109+	1995	13	79.8	1974	42	1971	30	67.1	1992	7	326	1.9	12.2	31.0	.0	.0	.0
Aug	84.4	61.7	73.1	108	1988	15	78.4	1983	38	1950	20	67.8	1992	14	262	.7	9.8	31.0	.0	.0	.0
Sep	76.0	51.2	63.6	103+	1976	6	70.1	1998	24	1984	26	57.2	1993	125	83	.1	4.0	29.7	.0	.8	.0
Oct	62.8	38.1	50.5	94+	1997	3	54.7	1974	12	1991	30	46.3	1976	452	1	.0	.2	26.9	.2	8.1	.0
Nov	43.5	24.8	34.2	82	1999	9	45.3	1999	-19	1959	14	22.8	1985	925	0	.0	.0	10.5	5.9	23.7	.8
Dec	31.0	12.6	21.8	68	1998	3	29.8	1999	-31	1989	22	3.5	1983	1339	0	.0	.0	2.7	14.7	30.3	5.9
Ann	58.7	37.0	47.9	109+	Jul 1995	13	79.8	Jul 1974	-31	Dec 1989	22	2.8	Jan 1978	7115	915	3.2	33.6	237.2	54.7	154.5	22.1

\+ 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	.46	.41	1.96	1949	3	1.24	1979	.05+	1987
Feb	.71	.46	1.38	1971	19	1.97	1971	.01	1985
Mar	1.68	1.20	2.22	1987	17	6.27	1987	.15	1994
Apr	2.54	2.29	2.22+	1986	14	6.22	1984	.46	1987
May	3.61	3.32	2.79	1959	28	10.27	1982	.81	1994
Jun	3.12	2.55	2.95	1984	12	9.02	1984	.83	1995
Jul	3.53	2.88	3.43	1962	13	9.50	1993	.92	2000
Aug	2.68	2.18	3.95	1960	28	7.00	2000	.31	1983
Sep	2.28	1.78	3.51	1999	4	7.71	1973	.10	1998
Oct	1.64	1.58	1.94	1968	16	4.48	1998	.15	1999
Nov	1.31	1.29	1.74	1979	21	4.24	1983	.01	1980
Dec	.60	.48	1.05	1953	3	2.20	1982	.00	1986
Ann	24.16	24.49	3.95	Aug 1960	28	10.27	May 1982	.00	Dec 1986

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	1.6	.1	.0
Feb	4.8	2.0	.2	.1
Mar	6.9	3.9	.9	.3
Apr	9.2	5.7	1.5	.4
May	10.0	6.7	2.6	.9
Jun	8.8	6.1	2.2	.6
Jul	8.8	5.9	2.2	1.0
Aug	7.6	4.7	1.7	.8
Sep	7.1	4.5	1.2	.5
Oct	6.1	3.6	1.3	.3
Nov	5.4	2.9	.8	.2
Dec	4.5	1.8	.2	.0
Ann	83.8	49.4	14.9	5.1

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	.06	.09	.16	.22	.29	.37	.46	.57	.72	.96	1.20
Feb	.05	.09	.18	.27	.38	.51	.66	.86	1.13	1.59	2.05
Mar	.20	.33	.57	.80	1.05	1.33	1.65	2.05	2.60	3.50	4.37
Apr	.60	.84	1.21	1.54	1.87	2.22	2.61	3.08	3.69	4.66	5.57
May	.90	1.24	1.77	2.23	2.69	3.18	3.72	4.37	5.21	6.55	7.80
Jun	.93	1.22	1.67	2.05	2.43	2.82	3.24	3.75	4.40	5.42	6.37
Jul	.80	1.13	1.64	2.11	2.57	3.07	3.62	4.28	5.15	6.54	7.85
Aug	.61	.86	1.25	1.61	1.96	2.33	2.75	3.25	3.90	4.95	5.93
Sep	.27	.45	.77	1.08	1.42	1.80	2.24	2.78	3.52	4.74	5.92
Oct	.21	.34	.58	.80	1.05	1.31	1.62	2.01	2.53	3.38	4.20
Nov	.07	.14	.29	.46	.66	.90	1.19	1.57	2.10	3.02	3.93
Dec	.06	.13	.23	.32	.41	.50	.61	.74	.91	1.18	1.44
Ann	14.80	16.50	18.75	20.49	22.07	23.61	25.22	27.03	29.25	32.51	35.39

\+ 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	4.2	3	3
Feb	5.3	3.9	3	1
Mar	5.2	3.6	1	#
Apr	2.6	.3	#	0
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.7	.0	#	0
Nov	6.2	3.7	1	#
Dec	7.7	6.2	2	1
Ann	33.9	21.9	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	19.0	1988	19	21.5	1988	22	1988	19	9	1988
Feb	11.0	1997	4	16.0	1978	19	1978	17	13	1979
Mar	10.8	1983	26	21.1	1983	14	1977	4	4	1984
Apr	15.0	1986	14	15.0	1986	15	1986	14	1	1986
May	.0	0	0	.0	0	#	1984	1	#	1984
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	.1	1984	25	.1	1984	0	0	0	0	0
Oct	5.5	1982	19	5.5	1982	2+	1982	19	#+	1982
Nov	14.0	1975	20	27.3	1983	20	1983	28	6	1979
Dec	9.0	1982	27	21.1	1982	19	1982	31	13	1983
Ann	19.0	Jan 1988	19	27.3	Nov 1983	22	Jan 1988	19	13+	Dec 1983

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.6	2.3	.6	.2	@
Feb	3.4	1.9	.6	.2	@
Mar	2.9	2.0	.4	.1	.1
Apr	1.0	.8	.3	.1	@
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
Oct	.4	.2	@	@	.0
Nov	2.2	1.6	.7	.3	.1
Dec	3.3	2.2	.8	.3	.0
Ann	16.8	11.0	3.4	1.2	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	21.9	15.2	9.3	2.2
Feb	14.4	8.6	6.1	2.7
Mar	6.7	3.4	2.5	.6
Apr	.5	.2	.1	.1
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	.0	.0	.0
Nov	4.8	2.8	2.0	1.2
Dec	16.6	9.2	6.2	3.0
Ann	65.1	39.4	26.2	9.8

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	161	154	149	145	141	137	133	129	122
32	174	168	164	160	157	154	150	146	140
28	194	187	182	178	174	170	166	161	154
24	215	209	205	201	197	193	189	185	178
20	232	226	221	217	213	210	206	201	195
16	261	253	247	241	236	231	226	220	211

***** 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	1461	1136	921	508	196	31	7	14	125	452	925	1339	7115
60	1306	996	766	370	106	7	0	2	55	303	775	1184	5870
57	1213	912	674	294	67	2	0	1	29	222	687	1091	5192
55	1151	863	612	248	48	1	0	0	17	174	631	1029	4774
50	1002	732	468	151	16	0	0	0	4	82	493	878	3826
32	510	326	96	5	0	0	0	0	0	1	134	395	1467

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	71	114	198	492	878	1146	1342	1271	949	573	199	79	7312
55	0	7	1	45	213	457	629	558	276	33	6	0	2225
57	0	0	0	31	171	398	567	497	228	18	2	0	1912
60	0	0	0	17	116	314	474	406	164	7	0	0	1498
65	0	0	0	5	51	187	326	262	83	1	0	0	915
70	0	0	0	0	17	93	193	143	34	0	0	0	480

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	2	24	94	305	649	922	1102	1041	729	371	72	3	2	26	120	425	1074	1996	3098	4139	4868	5239	5311	5314
45	0	2	47	195	495	772	947	886	584	246	27	0	0	2	49	244	739	1511	2458	3344	3928	4174	4201	4201
50	0	0	17	111	350	622	792	731	438	140	11	0	0	0	17	128	478	1100	1892	2623	3061	3201	3212	3212
55	0	0	5	60	225	472	637	576	304	64	1	0	0	0	5	65	290	762	1399	1975	2279	2343	2344	2344
60	0	0	1	28	121	327	482	421	189	22	0	0	0	0	1	29	150	477	959	1380	1569	1591	1591	1591
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	2	22	72	202	399	602	735	691	463	240	52	2	2	24	96	298	697	1299	2034	2725	3188	3428	3480	3482

(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