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: HILLAND 2 NW, SD **COOP ID: 393857**

Climate Division: SD 5 **NWS Call Sign:** **Elevation: 2,530 Feet** **Lat: 44˚19N** **Lon: 101˚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	28.1	6.8	17.5	70	1974	16	30.2	1992	-30	1949	21	1.9	1979	1475	0	.0	.0	2.9	14.8	30.5	9.5
Feb	34.2	12.6	23.4	72	1951	10	36.4	1999	-30	1996	2	8.1	1979	1164	0	.0	.0	6.2	10.8	27.1	5.4
Mar	43.1	21.0	32.1	83	1993	27	40.0	1992	-26	1998	11	23.5	1996	1020	0	.0	.0	12.5	5.8	26.6	1.6
Apr	56.4	31.6	44.0	94	1989	22	50.7	1981	4	1997	8	38.6	1995	629	0	.0	.1	22.4	.8	15.6	.1
May	68.3	43.7	56.0	100	1969	27	62.6	1977	18	1950	1	51.1	1996	296	17	.0	.9	29.9	.0	3.3	.0
Jun	78.5	53.2	65.9	109	1988	24	75.6	1988	25	1976	17	60.8	1982	86	110	.8	4.3	29.9	.0	.1	.0
Jul	86.8	59.1	73.0	110	1952	24	78.8	1974	39	1959	1	64.0	1992	19	266	3.1	13.4	31.0	.0	.0	.0
Aug	86.6	56.5	71.6	111	1988	15	78.1	1983	38	1992	30	65.4	1992	35	238	2.1	12.9	31.0	.0	.0	.0
Sep	75.7	45.6	60.7	105+	1976	6	68.6	1998	21	1951	28	55.9	1993	185	54	.7	4.7	29.5	.0	1.8	.0
Oct	61.6	33.7	47.7	96	1963	4	51.8	1997	-4	1991	30	45.5	1987	539	0	.0	.3	25.2	.4	11.3	.1
Nov	42.2	19.9	31.1	84	1999	8	43.3	1999	-19	1959	14	17.3	1985	1019	0	.0	.0	10.8	6.8	26.8	1.5
Dec	31.5	10.2	20.9	71	1998	2	32.4	1999	-32	1989	22	2.6	1983	1370	0	.0	.0	3.7	12.7	30.0	5.6
Ann	57.8	32.8	45.3	111	Aug 1988	15	78.8	Jul 1974	-32	Dec 1989	22	1.9	Jan 1979	7837	685	6.7	36.6	235.0	52.1	173.1	23.8

\+ 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	.26	.24	.75	1949	3	.87	1971	.00+	1994
Feb	.33	.23	.60	1998	26	1.00	1971	.00+	1999
Mar	.81	.65	2.24	1973	14	3.64	1973	.05	1997
Apr	1.94	1.80	2.56	2000	19	5.28	2000	.35	1987
May	2.96	2.67	4.00	1993	6	7.53	1972	.53	1994
Jun	2.69	2.53	3.30	1999	6	6.29	1999	.64	1989
Jul	1.66	1.50	5.67	1969	20	4.84	1997	.08	1971
Aug	1.56	1.68	2.80	1953	2	2.79	1980	.00	1995
Sep	.97	.50	1.80+	1971	5	4.14	1971	.11	2000
Oct	1.19	.88	2.01	1951	4	4.22	1998	.00	1992
Nov	.56	.41	1.00	1996	17	1.34	1998	.00	1999
Dec	.38	.40	.95	1965	11	1.20	1975	.00	1991
Ann	15.31	14.75	5.67	Jul 1969	20	7.53	May 1972	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.7	.8	@	.0
Feb	3.9	1.5	.2	.0
Mar	5.8	2.6	.4	.1
Apr	7.1	4.3	1.3	.3
May	8.7	5.7	1.9	.6
Jun	10.0	5.7	1.7	.3
Jul	7.6	3.8	1.0	.3
Aug	7.3	3.9	.9	.1
Sep	5.1	2.5	.7	.2
Oct	5.6	2.6	1.0	.3
Nov	4.1	2.1	.2	@
Dec	4.8	1.2	@	.0
Ann	74.7	36.7	9.3	2.2

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	.07	.13	.18	.23	.28	.34	.42	.54	.66
Feb	.00	.03	.08	.14	.19	.25	.32	.41	.53	.73	.92
Mar	.09	.15	.26	.37	.49	.63	.79	.98	1.25	1.70	2.13
Apr	.42	.60	.89	1.14	1.40	1.67	1.98	2.35	2.84	3.61	4.35
May	.82	1.10	1.52	1.90	2.26	2.64	3.06	3.56	4.21	5.23	6.19
Jun	.89	1.15	1.52	1.84	2.14	2.46	2.80	3.21	3.73	4.53	5.27
Jul	.27	.42	.66	.89	1.12	1.38	1.67	2.02	2.50	3.27	4.00
Aug	.43	.66	.91	1.10	1.28	1.47	1.66	1.89	2.18	2.62	3.03
Sep	.05	.10	.22	.35	.50	.68	.89	1.17	1.56	2.23	2.90
Oct	.09	.22	.41	.58	.77	.96	1.19	1.47	1.85	2.46	3.04
Nov	.09	.17	.26	.34	.42	.49	.58	.68	.82	1.03	1.22
Dec	.01	.05	.10	.16	.22	.29	.37	.47	.61	.85	1.08
Ann	10.20	11.17	12.41	13.37	14.22	15.05	15.92	16.88	18.05	19.76	21.25

\+ 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	2.5	1.0	1	#
Feb	5.0	4.7	1	#
Mar	6.1	4.2	1	#
Apr	3.8	1.8	#	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	1.4	.0	#	0
Nov	5.2	5.6	#	#
Dec	6.0	6.4	1	#
Ann	30.0	23.7	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	5.5	1996	25	9.9	1971	8	1971	31	4	1971
Feb	6.3	1971	18	10.6	1971	10	1971	8	7	1971
Mar	8.0	1998	30	22.0	1998	10	1999	11	3	1976
Apr	10.0	2000	20	13.0	1994	6	1992	11	#+	2000
May	#	1975	7	#	1975	0	0	0	0	0
Jun	.3	1998	3	.3	1998	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	.0	0	0	.0	0	0	0	0	0	0
Oct	7.0	1971	28	10.0	1971	7	1971	28	1	1971
Nov	5.0	1998	10	14.0	1998	7	1998	10	2	1996
Dec	6.0	1989	5	12.0	1989	9	1996	25	6	1996
Ann	10.0	Apr 2000	20	22.0	Mar 1998	10+	Mar 1999	11	7	Feb 1971

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.1	1.3	.3	.1	.0
Feb	1.7	1.3	.4	.2	.0
Mar	1.9	1.5	.8	.3	.0
Apr	.9	.9	.7	.2	.1
May	.0	.0	.0	.0	.0
Jun	.1	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.6	.6	.2	.1	.0
Nov	1.9	1.4	.7	.1	.0
Dec	2.3	1.6	.5	.1	.0
Ann	11.5	8.6	3.6	1.1	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	-9.9	-9.9	-9.9	-9.9
Apr	-9.9	-9.9	-9.9	-9.9
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	.5	.4	.2	.0
Nov	-9.9	-9.9	-9.9	-9.9
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

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

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	9/07	9/10	9/13	9/15	9/17	9/19	9/21	9/24	9/27
32	9/11	9/16	9/20	9/23	9/26	9/29	10/02	10/05	10/10
28	9/17	9/24	9/29	10/03	10/06	10/10	10/14	10/19	10/25
24	9/26	10/02	10/07	10/10	10/14	10/17	10/21	10/25	10/31
20	10/14	10/19	10/22	10/26	10/28	10/31	11/04	11/07	11/12
16	10/16	10/22	10/27	10/30	11/03	11/07	11/10	11/15	11/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	137	130	126	122	118	114	110	106	99
32	160	152	146	141	137	132	127	121	113
28	188	177	170	163	157	151	144	136	125
24	200	192	186	181	176	172	167	161	153
20	223	216	211	207	203	199	194	190	183
16	246	236	230	224	218	213	207	200	191

***** 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	1475	1164	1020	629	296	86	19	35	185	539	1019	1370	7837
60	1320	1024	865	481	178	32	4	11	94	385	869	1215	6478
57	1227	948	772	395	121	15	0	4	55	294	779	1122	5732
55	1166	897	711	340	90	8	0	2	36	237	719	1060	5266
50	1017	765	565	217	36	1	0	0	9	115	579	916	4220
32	526	364	153	9	0	0	0	0	0	1	175	434	1662

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	75	124	156	370	743	1015	1270	1226	859	485	146	87	6556
55	1	13	1	11	120	333	557	515	205	8	0	0	1764
57	0	8	0	6	89	280	495	455	164	3	0	0	1500
60	0	0	0	2	53	207	405	370	113	1	0	0	1151
65	0	0	0	0	17	110	266	238	54	0	0	0	685
70	0	0	0	0	4	46	152	137	20	0	0	0	359

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	21	65	215	513	806	1051	1008	651	299	52	5	4	25	90	305	818	1624	2675	3683	4334	4633	4685	4690
45	1	3	29	124	367	656	896	853	504	185	21	0	1	4	33	157	524	1180	2076	2929	3433	3618	3639	3639
50	0	0	6	63	234	507	741	699	365	99	6	0	0	0	6	69	303	810	1551	2250	2615	2714	2720	2720
55	0	0	1	29	130	365	586	544	247	44	0	0	0	0	1	30	160	525	1111	1655	1902	1946	1946	1946
60	0	0	0	8	59	230	431	393	142	15	0	0	0	0	0	8	67	297	728	1121	1263	1278	1278	1278
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	5	26	63	160	325	507	667	641	413	212	51	10	5	31	94	254	579	1086	1753	2394	2807	3019	3070	3080

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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