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: ARDMORE 2 N, SD **COOP ID: 390236**

Climate Division: SD 5 **NWS Call Sign:** **Elevation: 3,550 Feet** **Lat: 43˚03N** **Lon: 103˚39W**

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	35.3	6.9	21.1	72	1953	12	31.7	1990	-37	1963	19	4.5	1979	1362	0	.0	.0	4.3	11.8	30.8	9.8
Feb	41.1	12.6	26.9	74+	1992	29	36.9	1999	-36+	1996	3	11.2	1993	1069	0	.0	.0	8.1	7.4	27.8	5.2
Mar	50.7	21.1	35.9	83	1972	10	43.8	1986	-29	1989	5	29.2	1996	902	0	.0	.0	17.0	3.2	28.3	1.2
Apr	61.0	30.2	45.6	93	1992	30	51.4	1981	-9	1968	4	39.4	1997	582	0	.0	.2	23.7	.5	18.5	@
May	70.8	40.8	55.8	100	1969	27	61.0	1994	16	1954	3	50.2	1983	299	12	.0	.7	29.9	.0	4.4	.0
Jun	82.0	49.9	66.0	110	1954	23	72.8	1988	24	1969	14	60.0	1998	82	109	.6	6.7	29.9	.0	.2	.0
Jul	89.2	56.0	72.6	114	1954	12	77.7	1974	36+	1972	4	66.0	1992	16	252	3.2	15.2	31.0	.0	.0	.0
Aug	88.5	53.9	71.2	107+	1980	6	77.2	1983	32+	1993	31	66.2	1992	19	211	1.3	15.0	31.0	.0	@	.0
Sep	78.4	42.7	60.6	105	1960	4	66.5	1998	16	1983	21	55.4	1993	176	43	.2	5.0	29.3	.0	4.5	.0
Oct	65.1	30.6	47.9	95	1953	1	51.2	1974	-14	1991	31	45.1	1984	532	0	.0	.3	26.8	.3	19.0	.1
Nov	47.4	18.1	32.8	83	1999	7	43.0	1999	-33	1959	14	18.5	1985	967	0	.0	.0	12.8	4.8	28.6	1.9
Dec	37.3	7.9	22.6	70+	1998	1	31.2	1999	-43	1989	22	6.2	1983	1315	0	.0	.0	5.2	10.3	30.9	7.4
Ann	62.2	30.9	46.6	114	Jul 1954	12	77.7	Jul 1974	-43	Dec 1989	22	4.5	Jan 1979	7321	627	5.3	43.1	249.0	38.3	193.0	25.6

\+ 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	.40	.41	1.10	1949	4	.97	1992	.00	1989
Feb	.55	.40	.88	1964	25	1.53	1998	.03	1996
Mar	1.04	.88	1.66	1973	14	3.49	1973	.12	1978
Apr	1.91	1.62	5.06	2000	19	6.32	2000	.50	1998
May	2.87	2.30	3.54	1971	23	6.29	1991	.35	1974
Jun	2.80	2.61	2.13	1986	10	6.05	1999	.47	2000
Jul	2.29	1.98	2.38	1973	20	8.20	1997	.00	1975
Aug	1.59	1.52	2.27	1968	9	4.23	1998	.09	1995
Sep	1.38	1.31	1.74	1973	2	4.07	1989	.07	1992
Oct	1.32	1.19	1.90	1994	6	4.73	1998	.10	1999
Nov	.61	.53	1.09	1977	8	1.83	1998	.03	1997
Dec	.45	.33	1.15	1975	31	1.50	1987	.02	1979
Ann	17.21	16.94	5.06	Apr 2000	19	8.20	Jul 1997	.00+	Jan 1989

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.9	1.1	.1	.0
Feb	4.1	1.8	.2	.0
Mar	5.7	3.0	.4	.2
Apr	7.4	4.7	1.0	.2
May	8.9	6.1	1.9	.5
Jun	7.8	5.8	1.9	.6
Jul	6.8	5.0	1.7	.4
Aug	5.9	3.8	1.0	.2
Sep	4.5	3.5	.9	.2
Oct	4.7	3.1	.9	.2
Nov	3.4	2.0	.2	@
Dec	3.8	1.3	.1	@
Ann	66.9	41.2	10.3	2.5

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	.11	.18	.24	.29	.35	.42	.49	.59	.75	.90
Feb	.07	.11	.19	.27	.35	.44	.54	.67	.84	1.13	1.40
Mar	.16	.24	.39	.54	.69	.85	1.04	1.27	1.58	2.09	2.58
Apr	.39	.57	.85	1.10	1.36	1.64	1.95	2.33	2.83	3.62	4.38
May	.84	1.12	1.53	1.88	2.22	2.58	2.98	3.44	4.05	4.99	5.87
Jun	.67	.93	1.34	1.70	2.07	2.45	2.88	3.39	4.06	5.12	6.12
Jul	.39	.70	1.09	1.41	1.72	2.04	2.39	2.81	3.36	4.22	5.02
Aug	.28	.42	.65	.87	1.09	1.33	1.60	1.93	2.38	3.09	3.77
Sep	.09	.17	.35	.53	.75	.99	1.29	1.68	2.21	3.11	4.01
Oct	.18	.29	.48	.66	.85	1.06	1.31	1.61	2.02	2.68	3.33
Nov	.05	.10	.18	.26	.36	.46	.59	.74	.96	1.32	1.68
Dec	.04	.07	.13	.19	.26	.34	.43	.55	.71	.98	1.24
Ann	11.53	12.61	14.00	15.06	16.01	16.94	17.90	18.96	20.26	22.16	23.81

\+ 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	6.3	5.0	4	3	12.0	1974	21	15.0	1974	18+	1993	14	13	1993	3.2	2.9	.8	.2	@	18.3	12.7	8.6	2.6
Feb	6.3	5.0	2	1	8.0	1993	10	22.0	1993	12	1986	13	9	1978	3.0	2.8	.9	.2	.0	11.3	7.2	4.8	.9
Mar	7.1	7.0	1	1	12.0	1975	27	18.0	1977	11	1978	3	6	1978	3.2	3.0	.9	.5	@	6.6	4.0	2.1	.2
Apr	4.4	4.5	#	#	10.0	2000	19	12.0	2000	12	1975	3	2	1997	2.0	1.8	.7	.2	@	1.8	.7	.3	.0
May	.7	.0	#	0	4.0	1979	10	7.0	1979	1	1984	3	#+	1991	.3	.2	.1	.0	.0	.1	.0	.0	.0
Jun	#	.0	#	0	#	1995	9	#	1995	#+	1995	9	#+	1995	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	#	0	.0	0	0	.0	0	#	1997	19	#	1997	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	#	0	.0	0	0	.0	0	#	1981	22	#	1981	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.7	.0	#	0	4.0	1984	27	6.0	1984	2	1985	28	#+	2000	.2	.2	.1	.0	.0	.1	.0	.0	.0
Oct	3.0	2.0	#	#	8.0	1984	18	13.0	1995	8	1995	31	1	1995	.9	.9	.4	.3	.0	1.1	.8	.5	.0
Nov	5.5	5.0	1	1	7.0	1983	21	24.0	1985	21	1985	30	10	1985	2.6	2.5	.9	.3	.0	7.6	4.6	2.7	.9
Dec	7.3	7.0	3	2	15.0	1975	31	17.0	1994	23	1985	13	20	1985	3.4	3.1	.9	.3	@	15.1	9.9	6.3	.8
Ann	41.3	35.5	N/A	N/A	15.0	Dec 1975	31	24.0	Nov 1985	23	Dec 1985	13	20	Dec 1985	18.8	17.4	5.7	2.0	@	62.0	39.9	25.3	5.4

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

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	8/26	9/01	9/04	9/07	9/10	9/13	9/17	9/20	9/25
32	9/08	9/11	9/13	9/15	9/17	9/19	9/21	9/23	9/26
28	9/11	9/15	9/18	9/21	9/24	9/26	9/29	10/02	10/07
24	9/21	9/26	9/29	10/02	10/05	10/08	10/11	10/14	10/19
20	9/28	10/03	10/07	10/10	10/14	10/17	10/20	10/24	10/29
16	10/08	10/14	10/17	10/21	10/24	10/27	10/30	11/03	11/08

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	121	113	107	102	98	93	88	83	75
32	139	133	129	126	122	119	115	111	105
28	160	154	149	145	142	138	134	129	123
24	180	174	169	165	161	158	154	149	142
20	203	195	189	184	179	175	170	164	156
16	225	217	211	206	201	196	191	185	176

***** 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	1362	1069	902	582	299	82	16	19	176	532	967	1315	7321
60	1207	929	747	434	175	29	3	3	84	377	817	1160	5965
57	1114	845	654	348	117	13	0	1	47	286	727	1067	5219
55	1052	795	592	293	85	7	0	0	29	227	670	1005	4755
50	902	664	441	172	31	1	0	0	6	106	531	852	3706
32	415	269	67	2	0	0	0	0	0	1	151	365	1270

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	76	124	189	410	736	1018	1259	1215	856	493	174	74	6624
55	0	6	0	11	108	335	546	502	195	6	3	0	1712
57	0	0	0	6	78	281	484	441	153	2	0	0	1445
60	0	0	0	2	44	207	393	350	101	0	0	0	1097
65	0	0	0	0	12	109	252	211	43	0	0	0	627
70	0	0	0	0	2	45	137	102	13	0	0	0	299

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	14	71	216	493	780	1011	963	612	267	46	3	0	14	85	301	794	1574	2585	3548	4160	4427	4473	4476
45	0	2	26	115	343	630	856	808	468	149	13	0	0	2	28	143	486	1116	1972	2780	3248	3397	3410	3410
50	0	0	5	54	213	482	701	653	326	67	0	0	0	0	5	59	272	754	1455	2108	2434	2501	2501	2501
55	0	0	0	18	109	335	546	498	205	20	0	0	0	0	0	18	127	462	1008	1506	1711	1731	1731	1731
60	0	0	0	4	44	203	394	349	111	3	0	0	0	0	0	4	48	251	645	994	1105	1108	1108	1108
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	9	35	100	198	331	493	629	603	420	244	69	16	9	44	144	342	673	1166	1795	2398	2818	3062	3131	3147

(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