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: CAVALIER 7 NW, ND **COOP ID: 321435**

Climate Division: ND 3 **NWS Call Sign:** **Elevation: 890 Feet** **Lat: 48˚52N** **Lon: 97˚42W**

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	12.2	-7.3	2.5	48+	1973	25	14.9	1990	-39	1996	20	-11.4	1982	1940	0	.0	.0	.0	27.6	31.0	21.4
Feb	19.8	.0	9.9	61	1958	25	23.1	1984	-40+	1996	2	-6.6	1979	1543	0	.0	.0	.2	21.8	28.1	14.6
Mar	31.5	13.5	22.5	76	1963	31	32.5	1973	-31	1962	1	13.0	1996	1317	0	.0	.0	2.0	15.0	29.9	5.7
Apr	51.0	28.5	39.8	97	1952	27	49.4	1977	-10+	1979	6	28.9	1979	760	2	.0	.1	16.6	2.7	20.3	.5
May	67.6	41.2	54.4	98	1964	21	66.3	1977	9	1967	3	46.5	1979	357	28	.0	.8	28.6	@	5.4	.0
Jun	74.9	51.3	63.1	99	1961	17	71.3	1988	29	1964	1	56.4	1985	136	80	.0	1.7	29.9	.0	.1	.0
Jul	78.7	55.5	67.1	101	1989	26	72.4	1989	35	1983	5	60.2	1992	58	121	@	2.0	31.0	.0	.0	.0
Aug	78.2	52.6	65.4	103+	1989	2	71.9	1983	30	1982	27	59.7	1977	98	111	.2	2.6	31.0	.0	@	.0
Sep	67.4	42.6	55.0	103	1978	6	60.4	1976	19+	1961	28	50.6	1985	311	10	.1	.5	28.6	.0	2.8	.0
Oct	53.5	31.2	42.4	93	1992	2	48.4	1973	-2	1991	31	36.5	1991	703	0	.0	.1	19.2	1.1	16.3	@
Nov	32.7	15.4	24.1	75	1999	1	35.7	1981	-33+	1985	30	11.9	1996	1229	0	.0	.0	3.3	15.1	28.7	4.0
Dec	17.8	-.1	8.9	60	1969	1	24.0	1997	-37	1967	31	-4.8	2000	1743	0	.0	.0	.1	25.3	31.0	15.5
Ann	48.8	27.0	37.9	103+	Aug 1989	2	72.4	Jul 1989	-40+	Feb 1996	2	-11.4	Jan 1982	10195	352	.3	7.8	190.5	108.6	193.6	61.7

\+ 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	.39	.33	.52	1950	24	1.02	1977	.00	1973
Feb	.41	.25	.87	1998	26	1.49+	1998	.00	1993
Mar	.66	.54	1.13	1950	27	1.67	1971	.06	1978
Apr	1.10	.80	1.92	1953	24	3.25	1979	.00+	1988
May	2.19	2.06	2.67	1968	15	5.46	1974	.52	1984
Jun	3.17	3.05	2.90	1964	12	6.01	2000	.65	1978
Jul	3.31	2.95	3.34	1976	20	8.46	1993	.44	1989
Aug	2.63	2.03	2.58	1956	31	7.41	1980	.47	1971
Sep	1.78	1.57	4.21	1957	2	5.41	1977	.27	1976
Oct	1.54	1.22	3.16	1949	10	4.67	1997	.10	1990
Nov	.68	.50	2.56	1986	8	2.86	2000	.00	1999
Dec	.39	.40	.90	1956	16	1.01	1996	.02	1981
Ann	18.25	18.72	4.21	Sep 1957	2	8.46	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.5	1.2	.0	.0
Feb	4.3	1.1	.1	.0
Mar	5.3	2.2	.1	.0
Apr	5.6	2.9	.6	.1
May	8.8	5.0	1.5	.4
Jun	10.9	6.6	2.1	.6
Jul	10.9	6.3	2.1	.8
Aug	8.6	4.7	1.5	.8
Sep	8.2	4.0	1.1	.2
Oct	7.0	3.2	1.0	.2
Nov	4.8	2.1	.2	.1
Dec	5.0	1.2	@	.0
Ann	84.9	40.5	10.3	3.2

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	.04	.08	.15	.20	.26	.32	.39	.48	.59	.77	.94
Feb	.01	.04	.09	.15	.21	.29	.38	.49	.66	.93	1.20
Mar	.09	.15	.24	.33	.43	.54	.66	.81	1.02	1.35	1.67
Apr	.00	.00	.20	.38	.58	.79	1.05	1.37	1.81	2.54	3.27
May	.61	.82	1.13	1.41	1.68	1.96	2.27	2.64	3.11	3.86	4.56
Jun	.99	1.29	1.74	2.12	2.50	2.88	3.30	3.80	4.44	5.43	6.35
Jul	.93	1.24	1.72	2.13	2.54	2.96	3.43	3.98	4.70	5.83	6.88
Aug	.62	.87	1.25	1.60	1.94	2.30	2.70	3.18	3.82	4.82	5.76
Sep	.33	.48	.75	.99	1.23	1.50	1.80	2.17	2.65	3.44	4.18
Oct	.09	.17	.36	.57	.81	1.08	1.42	1.86	2.47	3.51	4.55
Nov	.03	.09	.19	.29	.40	.52	.66	.84	1.08	1.49	1.88
Dec	.04	.07	.12	.18	.24	.30	.38	.47	.60	.81	1.01
Ann	12.60	13.68	15.07	16.13	17.07	17.99	18.94	19.99	21.26	23.12	24.73

\+ 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	6.0	4.5	9	8
Feb	5.0	4.5	10	11
Mar	5.4	4.4	8	6
Apr	2.5	1.0	2	#
May	.4	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	2.3	.0	#	#
Nov	7.0	7.3	3	2
Dec	6.2	6.0	6	4
Ann	34.9	27.7	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	5.0	1997	1	23.0	1989	26	1997	31	23	1997
Feb	6.0	1977	25	19.0	1987	28	1987	28	26	1997
Mar	7.0	1996	30	16.0	1975	34	1997	16	30	1997
Apr	8.0	1990	28	12.0	1999	21	1996	5	13	1997
May	5.0	1991	4	7.0	1991	3	1991	4	#+	1996
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	2.0	1972	26	2.0	1972	2	1972	26	#+	1984
Oct	7.0	1985	8	13.0	1991	7	1985	10	1	1991
Nov	11.0	1986	8	16.5	1985	15	1996	30	10	1996
Dec	6.5	1978	29	16.5	1996	23	1996	31	16	1996
Ann	11.0	Nov 1986	8	23.0	Jan 1989	34	Mar 1997	16	30	Mar 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.0	2.8	.5	@	.0
Feb	3.9	2.2	.5	.1	.0
Mar	3.8	2.3	.6	.1	.0
Apr	1.7	1.0	.3	.1	.0
May	.2	.2	@	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	@	@	.0	.0	.0
Oct	.8	.7	.4	.2	.0
Nov	3.8	2.4	.9	.3	.1
Dec	4.7	2.8	.7	.1	.0
Ann	23.9	14.4	3.9	.9	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	29.6	25.4	19.0	9.9
Feb	26.2	21.2	17.7	12.5
Mar	20.4	15.1	11.3	8.2
Apr	3.3	2.0	1.5	.5
May	.3	.1	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	@	.0	.0	.0
Oct	1.6	.8	.3	.0
Nov	16.2	9.8	6.6	1.2
Dec	25.0	20.4	15.9	4.4
Ann	122.6	94.8	72.3	36.7

+ 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	6/08	6/03	5/30	5/27	5/24	5/21	5/17	5/13	5/08
32	5/30	5/25	5/22	5/19	5/16	5/14	5/11	5/07	5/03
28	5/18	5/13	5/10	5/07	5/05	5/02	4/29	4/26	4/21
24	5/05	4/30	4/26	4/23	4/20	4/17	4/14	4/10	4/05
20	4/24	4/20	4/16	4/13	4/11	4/08	4/05	4/02	3/28
16	4/17	4/13	4/10	4/07	4/05	4/02	3/31	3/28	3/24

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	8/28	9/02	9/05	9/08	9/11	9/14	9/16	9/20	9/24
32	9/11	9/15	9/18	9/21	9/23	9/25	9/28	10/01	10/05
28	9/18	9/23	9/27	9/30	10/03	10/06	10/09	10/13	10/18
24	9/27	10/02	10/06	10/10	10/13	10/16	10/19	10/23	10/29
20	10/09	10/14	10/18	10/21	10/24	10/27	10/30	11/03	11/08
16	10/15	10/21	10/25	10/28	11/01	11/04	11/07	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	129	122	117	113	109	106	101	97	90
32	148	141	137	133	129	125	121	116	109
28	171	164	159	155	151	147	142	137	130
24	197	189	184	179	175	171	166	161	153
20	217	210	204	200	196	191	187	181	174
16	231	224	218	213	209	205	200	194	187

***** 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	1940	1543	1317	760	357	136	58	98	311	703	1229	1743	10195
60	1785	1403	1162	617	241	65	15	39	186	548	1079	1588	8728
57	1692	1319	1069	534	183	37	6	19	124	456	989	1495	7923
55	1630	1263	1007	482	150	24	1	12	89	395	929	1433	7415
50	1475	1123	856	359	82	7	0	2	30	254	781	1278	6247
32	931	646	375	74	2	0	0	0	0	17	322	747	3114

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	14	27	81	306	697	934	1087	1036	689	336	83	27	5317
55	0	0	0	23	131	268	375	335	88	2	0	0	1222
57	0	0	0	16	103	220	318	280	63	0	0	0	1000
60	0	0	0	9	67	159	233	207	35	0	0	0	710
65	0	0	0	2	28	80	121	111	10	0	0	0	352
70	0	0	0	0	10	29	46	46	2	0	0	0	133

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	0	5	134	471	704	849	799	466	165	12	0	0	0	5	139	610	1314	2163	2962	3428	3593	3605	3605
45	0	0	0	65	332	554	694	644	324	89	5	0	0	0	0	65	397	951	1645	2289	2613	2702	2707	2707
50	0	0	0	33	216	406	539	489	205	39	0	0	0	0	0	33	249	655	1194	1683	1888	1927	1927	1927
55	0	0	0	14	125	266	384	338	109	10	0	0	0	0	0	14	139	405	789	1127	1236	1246	1246	1246
60	0	0	0	5	59	149	237	199	50	2	0	0	0	0	0	5	64	213	450	649	699	701	701	701
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	3	98	301	431	538	502	283	113	13	0	0	0	3	101	402	833	1371	1873	2156	2269	2282	2282

(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