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: CENTER 4 SE, ND **COOP ID: 321456**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,990 Feet** **Lat: 47˚04N** **Lon: 101˚12W**

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	22.4	-1.4	10.5	60	1981	23	26.6	1992	-42	1950	18	-6.0	1982	1692	0	.0	.0	.2	21.8	30.8	16.6
Feb	28.2	5.8	17.0	68	1958	25	29.8	1984	-39	1994	10	.2	1979	1344	0	.0	.0	1.5	16.3	27.9	9.9
Mar	39.4	16.0	27.7	80	1967	29	37.9	1986	-30	1952	4	15.5	1996	1157	0	.0	.0	7.3	9.2	29.4	3.3
Apr	54.6	27.5	41.1	94	1980	21	50.1	1987	-11	1954	3	32.0	1979	718	0	.0	.1	20.2	1.2	20.0	.3
May	67.9	40.1	54.0	96	1980	21	61.0	1977	10	1967	3	47.6	1979	357	15	.0	.4	29.5	.0	5.6	.0
Jun	76.5	49.5	63.0	105	1988	20	73.7	1988	26+	1985	2	58.0	1985	138	79	.1	2.3	30.0	.0	.3	.0
Jul	82.4	54.1	68.3	105	1960	20	73.5	1989	35+	1972	4	61.8	1993	55	155	.6	6.1	31.0	.0	.0	.0
Aug	82.1	51.8	67.0	106+	1983	8	74.7	1991	31	1958	31	58.7	1977	100	159	.4	6.9	31.0	.0	@	.0
Sep	71.0	41.2	56.1	104	1978	5	63.2	1990	11	1974	30	51.5	1974	287	20	.1	1.4	29.0	.0	4.1	.0
Oct	58.2	30.3	44.3	96	1963	4	47.2	1986	-3	1991	31	39.5	1976	643	0	.0	.1	23.3	.6	16.7	.0
Nov	38.7	15.5	27.1	79	1999	8	36.8	1999	-25	1964	30	15.1	1985	1136	0	.0	.0	6.1	10.0	28.4	3.0
Dec	26.7	4.0	15.4	65	1979	4	26.9	1991	-40	1967	31	.5	1983	1539	0	.0	.0	1.1	19.5	30.8	10.9
Ann	54.0	27.9	41.0	106+	Aug 1983	8	74.7	Aug 1991	-42	Jan 1950	18	-6.0	Jan 1982	9166	428	1.2	17.3	210.2	78.6	194.0	44.0

\+ 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

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: CENTER 4 SE, ND **COOP ID: 321456**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,990 Feet** **Lat: 47°04N** **Lon: 101°12W**

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	.23	1.05	1996	18	1.64	1982	.00+	1989
Feb	.45	.34	.92	1981	27	1.82	1998	.00+	1988
Mar	.71	.54	1.20	1953	21	2.14	1982	.00	1985
Apr	1.63	1.33	1.70	1999	1	4.88	1975	.00+	1987
May	2.30	2.03	2.31	1960	25	5.69	1999	.05	1984
Jun	3.00	2.88	2.40	2000	13	6.51	1976	.40	1974
Jul	2.70	2.21	5.82	1969	18	9.14	1993	.89	1985
Aug	1.85	1.45	3.00	1999	12	5.61	1980	.23	1997
Sep	1.85	1.41	3.86	1994	16	6.94	1977	.04	1993
Oct	1.55	.90	2.15	1982	8	8.04	1982	.02	1993
Nov	.62	.45	1.50	1982	10	1.83	2000	.00+	1986
Dec	.42	.47	.68	1967	17	1.39	1977	.00+	1997
Ann	17.48	17.29	5.82	Jul 1969	18	9.14	Jul 1993	.00+	Dec 1997

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.7	1.6	@	@
Feb	4.3	1.6	.2	.0
Mar	5.4	2.2	.3	@
Apr	7.1	4.2	1.2	.2
May	9.1	5.3	1.5	.4
Jun	10.8	6.6	1.9	.5
Jul	8.5	5.5	1.6	.6
Aug	7.9	4.4	1.3	.2
Sep	7.3	3.9	1.0	.4
Oct	5.7	3.3	1.0	.4
Nov	4.6	2.1	.3	@
Dec	5.1	1.5	@	.0
Ann	80.5	42.2	10.3	2.7

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	.00	.00	.05	.10	.17	.25	.35	.48	.67	1.00	1.32
Feb	.00	.00	.09	.16	.24	.33	.43	.56	.74	1.03	1.32
Mar	.02	.08	.18	.28	.40	.53	.68	.88	1.14	1.60	2.04
Apr	.00	.14	.42	.67	.95	1.25	1.60	2.03	2.62	3.60	4.56
May	.39	.60	.93	1.25	1.57	1.92	2.32	2.80	3.45	4.49	5.49
Jun	.88	1.17	1.59	1.96	2.32	2.70	3.11	3.60	4.23	5.22	6.14
Jul	.79	1.04	1.43	1.76	2.09	2.43	2.80	3.24	3.82	4.71	5.54
Aug	.32	.49	.76	1.01	1.27	1.55	1.87	2.26	2.77	3.61	4.41
Sep	.19	.33	.59	.84	1.12	1.43	1.80	2.26	2.88	3.91	4.92
Oct	.06	.13	.29	.49	.73	1.02	1.38	1.85	2.52	3.69	4.87
Nov	.00	.03	.11	.20	.30	.42	.57	.76	1.02	1.47	1.92
Dec	.00	.00	.05	.14	.22	.31	.42	.54	.71	.98	1.27
Ann	10.11	11.43	13.17	14.54	15.78	17.00	18.29	19.73	21.51	24.15	26.49

\+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: CENTER 4 SE, ND **COOP ID: 321456**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,990 Feet** **Lat: 47˚04N** **Lon: 101˚12W**

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	4.3	2.5	6	6	10.0	1996	18	13.0	1971	28	1982	31	15	1982	3.3	2.3	.4	.2	@	25.2	21.8	17.4	7.3
Feb	4.6	3.5	6	4	9.0	1996	26	13.0	1979	33	1982	10	24	1982	2.7	2.0	.3	.1	.0	19.2	15.0	9.9	4.8
Mar	5.7	4.5	2	1	8.0	1972	26	19.6	1975	26	1979	3	14	1979	2.2	1.6	.7	.3	.0	10.7	7.8	5.0	1.9
Apr	1.5	.0	1	0	11.0	1975	8	12.0	1975	22	1975	8	9	1975	.6	.5	.3	.1	@	2.6	1.9	1.4	.7
May	#	.0	0	0	#	1979	10	#+	1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.1	.0	#	0	2.0	1972	25	2.0	1972	2	1972	25	#+	1995	@	@	.0	.0	.0	@	.0	.0	.0
Oct	1.6	.0	#	0	16.0	1991	29	16.0	1991	16	1991	30	2	1991	.4	.3	.2	.1	@	.7	.3	.2	.1
Nov	4.9	4.3	1	#	10.0	1998	9	18.3	1998	20	1993	26	6	1996	2.3	1.7	.5	.2	@	8.2	4.1	2.3	.7
Dec	4.8	5.3	3	3	5.0	1972	29	13.0	1977	18	1977	11	14	1977	3.6	2.5	.3	@	.0	18.2	11.3	6.2	.2
Ann	27.5	20.1	N/A	N/A	16.0	Oct 1991	29	19.6	Mar 1975	33	Feb 1982	10	24	Feb 1982	15.1	10.9	2.7	1.0	@	84.8	62.2	42.4	15.7

+ 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: CENTER 4 SE, ND **COOP ID: 321456**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,990 Feet** **Lat: 47˚04N** **Lon: 101˚12W**

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	6/16	6/10	6/05	6/01	5/29	5/25	5/21	5/17	5/11
32	6/04	5/30	5/26	5/23	5/20	5/17	5/13	5/10	5/04
28	5/23	5/18	5/15	5/12	5/09	5/07	5/04	4/30	4/26
24	5/14	5/09	5/05	5/02	4/29	4/26	4/22	4/19	4/13
20	5/04	4/29	4/25	4/22	4/19	4/15	4/12	4/08	4/03
16	4/23	4/18	4/14	4/11	4/08	4/05	4/02	3/29	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	8/20	8/27	8/31	9/04	9/08	9/11	9/15	9/20	9/26
32	9/04	9/08	9/11	9/14	9/17	9/19	9/22	9/25	9/30
28	9/15	9/20	9/24	9/27	9/29	10/02	10/05	10/09	10/14
24	9/25	9/30	10/03	10/06	10/09	10/12	10/15	10/18	10/23
20	9/30	10/05	10/10	10/13	10/17	10/20	10/23	10/28	11/02
16	10/09	10/15	10/19	10/22	10/26	10/29	11/01	11/05	11/11

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	128	119	112	106	101	96	90	84	74
32	139	132	127	123	119	115	111	106	99
28	166	158	152	147	142	138	133	127	119
24	185	177	172	167	163	159	154	148	141
20	200	193	188	184	180	176	172	167	160
16	222	215	209	204	200	195	191	185	177

***** 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

Complete documentation available from:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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: CENTER 4 SE, ND **COOP ID: 321456**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,990 Feet** **Lat: 47˚04N** **Lon: 101˚12W**

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	1692	1344	1157	718	357	138	55	100	287	643	1136	1539	9166
60	1537	1204	1002	574	232	66	16	44	170	488	986	1384	7703
57	1444	1120	909	491	170	37	7	25	113	395	896	1291	6898
55	1382	1064	848	437	135	24	3	17	81	334	836	1229	6390
50	1237	935	703	314	67	6	0	4	26	193	694	1074	5253
32	734	489	259	49	1	0	0	0	0	6	257	568	2363

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	65	69	124	321	681	930	1124	1083	723	386	110	52	5668
55	0	0	1	19	103	264	413	386	114	1	0	0	1301
57	0	0	0	13	76	217	356	333	86	0	0	0	1081
60	0	0	0	6	45	156	272	259	54	0	0	0	792
65	0	0	0	0	15	79	155	159	20	0	0	0	428
70	0	0	0	0	3	29	74	85	6	0	0	0	197

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	1	20	158	469	714	897	861	510	203	21	0	0	1	21	179	648	1362	2259	3120	3630	3833	3854	3854
45	0	0	5	85	327	564	742	706	369	114	6	0	0	0	5	90	417	981	1723	2429	2798	2912	2918	2918
50	0	0	0	41	206	415	587	551	240	51	0	0	0	0	0	41	247	662	1249	1800	2040	2091	2091	2091
55	0	0	0	13	107	275	433	398	136	15	0	0	0	0	0	13	120	395	828	1226	1362	1377	1377	1377
60	0	0	0	5	47	154	285	257	68	3	0	0	0	0	0	5	52	206	491	748	816	819	819	819
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	23	128	304	445	572	549	330	156	23	0	0	1	24	152	456	901	1473	2022	2352	2508	2531	2531

(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