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: NAPOLEON, ND **COOP ID: 326255**

Climate Division: ND 9 **NWS Call Sign:** **Elevation: 1,980 Feet** **Lat: 46˚30N** **Lon: 99˚46W**

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	18.0	-1.5	8.3	57+	1981	25	22.3	1990	-46	1916	12	-7.2	1982	1762	0	.0	.0	.1	24.7	31.0	16.8
Feb	24.9	5.2	15.1	62	1958	25	27.5	1998	-47	1936	15	-1.0	1979	1398	0	.0	.0	1.0	18.1	28.0	11.2
Mar	36.5	17.5	27.0	87	1910	23	36.0	1973	-34	1948	10	17.3	1996	1178	0	.0	.0	5.4	10.6	29.1	4.4
Apr	53.0	30.7	41.9	94	1980	22	50.1	1977	-11+	1975	3	31.6	1975	696	1	.0	.1	18.6	1.9	19.2	.3
May	67.0	42.6	54.8	107	1934	30	62.9	1977	8	1907	3	48.1	1979	336	19	.0	.4	28.9	@	4.1	.0
Jun	75.8	52.0	63.9	108	1933	18	73.6	1988	26	1910	1	57.6	1985	122	88	.1	2.0	29.9	.0	.1	.0
Jul	82.3	56.6	69.5	118	1936	6	74.1	1989	30+	1922	7	61.3	1992	41	179	.5	5.8	31.0	.0	.0	.0
Aug	81.4	54.9	68.2	110	1936	1	74.6	1983	25	1908	22	61.3	1977	68	165	.5	5.6	31.0	.0	.0	.0
Sep	70.2	43.8	57.0	107	1931	7	63.1	1998	10	1907	29	51.6	1993	263	24	.2	1.3	29.0	.0	2.7	.0
Oct	56.8	31.7	44.3	95+	1938	3	48.2	1973	-8+	1925	29	38.5	1976	644	0	.0	.1	22.2	.9	16.3	@
Nov	36.6	16.8	26.7	75+	1975	6	39.1	1999	-27	1964	30	15.3	1985	1149	0	.0	.0	5.5	12.3	28.3	2.7
Dec	22.9	4.0	13.5	65	1939	6	24.2	1997	-48	1916	20	-2.9	1983	1599	0	.0	.0	.5	22.3	31.0	12.0
Ann	52.1	29.5	40.9	118	Jul 1936	6	74.6	Aug 1983	-48	Dec 1916	20	-7.2	Jan 1982	9256	476	1.3	15.3	203.1	90.8	189.8	47.4

\+ 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: 1901-2001

(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	.58	.47	.75	1923	13	1.44	1996	.03	1974
Feb	.51	.41	.75+	1937	8	1.46	1987	.06	1973
Mar	.98	.84	1.22	1953	14	2.07	1990	.12	1971
Apr	1.64	1.28	4.20	1932	23	5.01	1986	.03	1988
May	2.48	2.35	2.25+	1932	26	5.99	1999	.44	1997
Jun	3.20	3.10	3.81	1991	20	6.42	1991	.45	1974
Jul	2.88	2.27	4.10	1977	5	9.17	1993	.52	1988
Aug	2.19	2.03	3.62	1980	21	6.91	1980	.31	1971
Sep	1.77	1.26	3.20	1973	2	8.08	1973	.12	1974
Oct	1.55	1.23	2.25	1982	9	5.97	1982	.02	1989
Nov	.80	.58	1.31	1977	8	3.07	1977	.00	1990
Dec	.44	.43	.85	1901	6	.94	1995	.00	1986
Ann	19.02	18.81	4.20	Apr 1932	23	9.17	Jul 1993	.00+	Nov 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.1	2.1	.1	.0
Feb	6.2	1.7	.0	.0
Mar	6.6	3.1	.4	@
Apr	7.5	4.0	.9	.3
May	8.7	5.6	1.6	.4
Jun	9.9	6.4	2.2	.6
Jul	8.3	5.6	2.0	.5
Aug	6.9	4.1	1.5	.5
Sep	6.7	3.4	1.0	.4
Oct	5.9	3.6	1.0	.4
Nov	6.2	2.6	.3	@
Dec	6.2	1.5	.0	.0
Ann	86.2	43.7	11.0	3.1

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	.12	.17	.26	.33	.41	.50	.59	.71	.86	1.11	1.34
Feb	.09	.13	.20	.27	.35	.43	.52	.62	.77	1.01	1.23
Mar	.18	.26	.41	.54	.68	.82	.99	1.19	1.46	1.89	2.31
Apr	.11	.22	.42	.65	.90	1.19	1.54	1.99	2.60	3.65	4.68
May	.71	.94	1.30	1.61	1.91	2.22	2.57	2.98	3.51	4.35	5.13
Jun	.81	1.11	1.57	1.98	2.39	2.82	3.30	3.87	4.61	5.78	6.88
Jul	.61	.88	1.30	1.68	2.07	2.48	2.94	3.50	4.23	5.40	6.51
Aug	.42	.61	.94	1.23	1.53	1.86	2.23	2.67	3.26	4.21	5.11
Sep	.19	.32	.56	.81	1.08	1.37	1.72	2.16	2.75	3.73	4.69
Oct	.08	.16	.34	.55	.79	1.07	1.42	1.87	2.50	3.59	4.67
Nov	.02	.07	.18	.29	.42	.57	.74	.97	1.29	1.82	2.35
Dec	.06	.12	.19	.25	.32	.38	.46	.54	.66	.85	1.02
Ann	11.28	12.67	14.52	15.95	17.25	18.53	19.87	21.38	23.23	25.97	28.39

\+ 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: 1901-2001
(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	9.4	7.3	10	9
Feb	7.4	6.6	12	9
Mar	8.8	6.9	6	4
Apr	3.5	1.2	1	#
May	.6	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	#	0
Aug	.0	.0	0	0
Sep	.2	.0	#	0
Oct	1.1	.2	#	0
Nov	7.7	4.5	2	1
Dec	6.7	7.2	6	3
Ann	45.4	33.9	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	10.5	1996	18	25.0	1999	38	1982	31	31	1978
Feb	7.0	1982	1	19.0	1987	46	1978	28	42	1978
Mar	13.7	1982	20	27.8	1984	49	1978	10	35	1978
Apr	15.0	1997	6	17.0	1986	17	1986	15	5	1997
May	7.5	1991	4	9.0	1991	#+	1990	1	#+	1990
Jun	.0	0	0	.0	0	0	0	0	0	0
Jul	.0	0	0	.0	0	#	1982	9	#	1982
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	6.0	1984	24	6.0	1984	6	1984	24	#	1984
Oct	5.0	1991	30	8.0	1991	4	1982	7	#+	1997
Nov	11.0	1993	25	23.5	1996	20	1993	27	7	1977
Dec	6.0	1973	14	14.2	1988	29	1977	31	25	1977
Ann	15.0	Apr 1997	6	27.8	Mar 1984	49	Mar 1978	10	42	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.0	3.0	1.3	.3	@
Feb	4.9	2.7	1.0	.2	.0
Mar	4.3	2.8	1.2	.3	@
Apr	1.3	.9	.4	.3	.1
May	.1	.1	.1	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	@	@	@	.0
Oct	.7	.5	.1	@	.0
Nov	3.9	2.5	1.1	.4	.1
Dec	5.9	2.9	.8	.2	.0
Ann	27.2	15.4	6.0	1.7	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	26.4	24.1	22.2	12.6
Feb	24.8	21.4	20.0	13.2
Mar	14.3	12.1	8.9	3.3
Apr	2.5	1.4	.9	.4
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	@	.0
Oct	.8	.2	.0	.0
Nov	11.2	8.9	5.4	1.9
Dec	21.8	17.1	12.1	5.2
Ann	101.9	85.3	69.5	36.6

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

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	8/31	9/04	9/08	9/11	9/13	9/16	9/19	9/22	9/27
32	9/11	9/15	9/18	9/21	9/23	9/25	9/28	10/01	10/05
28	9/18	9/21	9/24	9/27	9/29	10/01	10/04	10/06	10/10
24	9/22	9/27	10/01	10/05	10/08	10/11	10/14	10/18	10/24
20	10/05	10/11	10/15	10/18	10/21	10/24	10/28	11/01	11/06
16	10/10	10/16	10/21	10/24	10/28	11/01	11/05	11/09	11/15

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	136	129	123	118	114	109	105	99	91
32	150	143	138	134	130	126	122	117	111
28	167	160	155	151	147	143	138	133	127
24	186	179	174	169	165	161	157	151	144
20	214	206	200	195	191	186	181	175	167
16	226	219	214	209	205	201	196	191	184

***** 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	1762	1398	1178	696	336	122	41	68	263	644	1149	1599	9256
60	1607	1258	1023	552	215	55	11	25	152	489	999	1444	7830
57	1514	1174	930	469	157	29	4	13	99	398	909	1351	7047
55	1452	1118	868	417	123	18	1	7	71	338	849	1289	6551
50	1297	981	720	296	60	4	0	1	24	203	702	1134	5422
32	773	530	268	42	0	0	0	0	0	8	258	617	2496

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	34	56	113	337	706	957	1161	1119	751	387	100	41	5762
55	0	0	0	22	116	285	449	413	131	4	0	0	1420
57	0	0	0	14	87	236	390	357	100	1	0	0	1185
60	0	0	0	7	53	171	305	276	63	0	0	0	875
65	0	0	0	1	19	88	179	165	24	0	0	0	476
70	0	0	0	0	4	34	90	84	7	0	0	0	219

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	17	157	481	735	931	880	525	202	23	0	0	1	18	175	656	1391	2322	3202	3727	3929	3952	3952
45	0	0	4	83	339	585	776	725	385	112	9	0	0	0	4	87	426	1011	1787	2512	2897	3009	3018	3018
50	0	0	0	43	217	438	621	570	254	53	1	0	0	0	0	43	260	698	1319	1889	2143	2196	2197	2197
55	0	0	0	18	123	296	468	417	150	19	0	0	0	0	0	18	141	437	905	1322	1472	1491	1491	1491
60	0	0	0	7	57	172	316	278	75	5	0	0	0	0	0	7	64	236	552	830	905	910	910	910
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	17	113	297	453	601	563	328	146	24	0	0	1	18	131	428	881	1482	2045	2373	2519	2543	2543

(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