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: COLGATE, ND **COOP ID: 321686**

Climate Division: ND 6 **NWS Call Sign:** **Elevation: 1,180 Feet** **Lat: 47˚15N** **Lon: 97˚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	13.9	-6.8	3.6	52	1990	26	19.9	1990	-38	1977	16	-12.1	1982	1906	0	.0	.0	.1	26.4	31.0	18.5
Feb	21.4	.1	10.8	56+	1991	7	22.2	1998	-40	1988	5	-5.9	1979	1518	0	.0	.0	.5	19.1	28.0	12.2
Mar	33.7	14.4	24.1	74	1986	29	34.7	2000	-31	1980	1	15.0	1996	1269	0	.0	.0	3.7	10.5	29.0	4.4
Apr	53.4	29.1	41.3	100	1980	21	48.4	1977	-10	1979	6	32.3	1979	713	1	@	.2	20.2	1.4	19.1	.2
May	69.2	42.5	55.9	100	1980	21	65.1	1977	13	1967	3	49.0	1979	309	26	@	1.2	29.9	.0	4.5	.0
Jun	77.1	51.7	64.4	99	1988	8	73.6	1988	26+	1964	2	57.6	1982	106	89	.0	2.6	30.0	.0	.2	.0
Jul	82.3	55.9	69.1	107+	1988	6	74.5	1988	36	1967	3	62.1	1992	38	165	.4	5.9	31.0	.0	.0	.0
Aug	81.8	54.1	68.0	107	1976	18	74.1	1983	28	1982	27	61.6	1977	65	157	.5	6.3	31.0	.0	.1	.0
Sep	70.4	43.5	57.0	104	1978	5	62.0+	1998	15	1965	26	51.9	1985	261	20	.2	1.5	29.4	.0	3.2	.0
Oct	55.8	30.8	43.3	92	1992	1	48.4	1973	0	1976	27	38.8	1976	673	0	.0	@	22.4	.5	14.8	@
Nov	33.7	14.4	24.1	77	1978	2	34.4	1999	-31	1985	29	12.1	1985	1228	0	.0	.0	4.3	13.7	28.5	3.1
Dec	19.1	.2	9.7	58	1969	1	22.2	1997	-34+	1983	23	-5.2	1983	1716	0	.0	.0	.2	24.5	30.9	13.6
Ann	51.0	27.5	39.3	107+	Jul 1988	6	74.5	Jul 1988	-40	Feb 1988	5	-12.1	Jan 1982	9802	458	1.1	17.7	202.7	96.1	189.3	52.0

\+ 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

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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	.47	.48	.55	1983	6	.95	1997	.00	1990
Feb	.39	.28	1.59	2000	26	2.00	2000	.00+	1999
Mar	.81	.68	1.50	1950	27	2.22	1977	.00	1986
Apr	1.17	.88	1.22+	1986	25	4.02	1986	.00+	1996
May	2.49	2.21	2.31	1987	21	5.28	1991	.38	1984
Jun	3.08	2.67	2.75	1953	20	6.23	1971	.51	1973
Jul	2.65	2.40	2.50	1952	2	6.73	1993	.33	1975
Aug	2.42	2.14	4.36	1989	31	7.72	1989	.02	1976
Sep	2.06	1.97	4.86	1962	8	5.39	1994	.13	1976
Oct	1.69	1.36	2.93	1982	9	7.46	1982	.00	1993
Nov	.76	.50	1.46	1986	8	2.63	2000	.00+	1999
Dec	.38	.29	.85	1949	11	1.12+	1993	.05	1986
Ann	18.37	17.46	4.86	Sep 1962	8	7.72	Aug 1989	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.8	1.8	.1	.0
Feb	3.2	1.3	.1	@
Mar	4.2	2.6	.5	@
Apr	5.1	3.2	.6	.2
May	7.5	5.7	1.8	.3
Jun	8.0	5.9	2.2	.6
Jul	7.5	5.3	1.8	.6
Aug	7.2	5.1	1.5	.4
Sep	5.6	3.9	1.3	.4
Oct	5.0	3.6	1.0	.4
Nov	4.1	2.4	.3	.1
Dec	3.5	1.6	.1	.0
Ann	64.7	42.4	11.3	3.0

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	.09	.17	.24	.31	.39	.47	.58	.72	.96	1.18
Feb	.00	.00	.08	.15	.22	.29	.38	.49	.63	.87	1.11
Mar	.05	.13	.25	.37	.50	.64	.80	1.00	1.27	1.72	2.15
Apr	.00	.00	.26	.46	.67	.89	1.15	1.47	1.89	2.60	3.29
May	.61	.84	1.21	1.53	1.85	2.19	2.56	3.01	3.60	4.53	5.40
Jun	.72	1.00	1.45	1.86	2.26	2.69	3.17	3.74	4.48	5.67	6.79
Jul	.61	.86	1.25	1.60	1.94	2.31	2.72	3.21	3.86	4.88	5.84
Aug	.35	.55	.89	1.23	1.58	1.97	2.41	2.96	3.70	4.90	6.06
Sep	.29	.46	.75	1.04	1.34	1.67	2.05	2.52	3.15	4.19	5.18
Oct	.02	.10	.29	.51	.78	1.10	1.50	2.03	2.77	4.06	5.36
Nov	.00	.07	.19	.31	.44	.58	.74	.94	1.21	1.66	2.10
Dec	.05	.08	.13	.19	.24	.31	.38	.47	.59	.79	.98
Ann	12.46	13.59	15.04	16.14	17.13	18.09	19.09	20.19	21.54	23.50	25.21

\+ 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:
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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	7.7	6.9	8	6
Feb	4.6	4.2	8	6
Mar	5.1	4.0	4	3
Apr	1.6	.0	1	#
May	.2	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.6	.0	#	0
Nov	7.6	6.0	2	1
Dec	4.4	4.0	4	3
Ann	31.8	25.1	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	8.0	1997	9	18.0	1997	30	1997	14	27	1997
Feb	8.0	1998	28	11.0	1998	28+	1997	3	23	1979
Mar	5.0	1976	1	14.0	1975	29	1979	2	17	1997
Apr	6.0	1990	28	8.0	1979	12	1975	1	7	1979
May	2.0	1979	1	4.0	1979	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Oct	3.0	1972	30	4.0+	1981	4	1971	31	#+	1995
Nov	8.0	1985	25	22.5	1985	19	1996	26	7	1996
Dec	6.0	1988	26	12.7	1972	20	1996	31	17	1996
Ann	8.0+	Feb 1998	28	22.5	Nov 1985	30	Jan 1997	14	27	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.5	2.7	1.0	.2	.0
Feb	2.7	2.0	.5	.1	.0
Mar	2.6	2.2	.6	.1	.0
Apr	.7	.6	.3	.1	.0
May	.1	.1	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.0	.0	.0	.0	.0
Oct	.3	.3	.1	.0	.0
Nov	2.7	2.3	1.1	.4	.0
Dec	2.9	2.2	.5	.1	.0
Ann	15.5	12.4	4.1	1.0	.0

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	25.2	19.5	16.6	7.4
Feb	20.1	16.1	12.9	6.1
Mar	13.2	10.9	8.2	1.1
Apr	1.4	.9	.5	.2
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	.3	@	.0	.0
Nov	8.4	4.7	3.8	1.2
Dec	23.9	14.7	8.3	2.3
Ann	92.5	66.8	50.3	18.3

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	5/18	5/14	5/09
32	5/30	5/25	5/21	5/18	5/15	5/12	5/09	5/05	4/30
28	5/18	5/13	5/10	5/07	5/04	5/01	4/29	4/25	4/21
24	5/09	5/03	4/29	4/25	4/21	4/18	4/14	4/10	4/04
20	4/29	4/23	4/19	4/15	4/12	4/09	4/05	4/01	3/26
16	4/17	4/12	4/09	4/06	4/03	4/01	3/29	3/26	3/21

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	8/23	8/29	9/02	9/06	9/09	9/13	9/16	9/21	9/26
32	9/06	9/11	9/15	9/18	9/20	9/23	9/26	9/29	10/04
28	9/14	9/19	9/23	9/26	9/29	10/02	10/05	10/09	10/14
24	9/22	9/28	10/02	10/05	10/08	10/12	10/15	10/19	10/25
20	9/29	10/05	10/10	10/13	10/17	10/21	10/25	10/29	11/04
16	10/09	10/15	10/20	10/24	10/28	11/01	11/05	11/10	11/16

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	135	126	119	113	108	103	97	90	81
32	150	142	137	132	128	123	118	113	105
28	167	161	156	151	147	143	139	134	127
24	197	187	180	175	169	164	158	151	142
20	211	203	197	192	187	182	177	171	163
16	231	223	217	212	207	202	197	191	182

***** 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)

Base	Heating Degree Days (1)												
Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1906	1518	1269	713	309	106	38	65	261	673	1228	1716	9802
60	1751	1378	1114	568	196	43	10	23	148	518	1078	1561	8388
57	1658	1294	1021	484	141	22	2	11	94	426	988	1468	7609
55	1596	1238	959	430	110	13	0	5	66	366	928	1406	7117
50	1441	1098	806	308	52	2	0	0	20	230	778	1251	5986
32	903	627	330	45	0	0	0	0	0	13	311	718	2947

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	20	33	85	322	739	973	1150	1115	749	364	73	25	5648
55	0	0	0	18	136	296	437	407	125	3	0	0	1422
57	0	0	0	11	105	245	377	351	93	1	0	0	1183
60	0	0	0	5	67	176	291	270	57	0	0	0	866
65	0	0	0	1	26	89	165	157	20	0	0	0	458
70	0	0	0	0	7	32	78	77	5	0	0	0	199

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	10	170	530	762	927	885	542	208	17	0	0	0	10	180	710	1472	2399	3284	3826	4034	4051	4051
45	0	0	2	89	387	612	772	730	396	116	7	0	0	0	2	91	478	1090	1862	2592	2988	3104	3111	3111
50	0	0	0	47	256	462	617	575	262	52	0	0	0	0	0	47	303	765	1382	1957	2219	2271	2271	2271
55	0	0	0	19	148	317	462	421	157	18	0	0	0	0	0	19	167	484	946	1367	1524	1542	1542	1542
60	0	0	0	5	73	186	310	274	77	5	0	0	0	0	0	5	78	264	574	848	925	930	930	930
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	10	134	348	483	600	570	344	148	17	0	0	1	11	145	493	976	1576	2146	2490	2638	2655	2655

(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