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: MAX, ND **COOP ID: 325638**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 2,110 Feet** **Lat: 47˚49N** **Lon: 101˚18W**

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	16.5	-2.2	7.2	50	1990	11	21.9	1990	-39+	1951	28	-9.8	1982	1795	0	.0	.0	@	25.4	31.0	17.8
Feb	23.9	5.0	14.5	66	1958	26	26.7	1984	-36+	1996	2	-2.2	1979	1415	0	.0	.0	.4	18.8	28.1	11.5
Mar	35.5	15.9	25.7	73+	1986	29	35.8	1973	-34	1962	1	16.7	1998	1219	0	.0	.0	4.4	11.7	29.9	4.9
Apr	52.1	29.0	40.6	94+	1980	22	48.9	1987	-8	1975	1	29.8	1979	734	0	.0	.1	17.1	2.3	19.9	.3
May	66.4	42.2	54.3	98	1980	23	62.9	1977	12	1967	2	46.5	1979	351	18	.0	.5	28.5	.0	4.6	.0
Jun	74.9	51.5	63.2	101+	1988	20	74.4	1988	31+	1998	3	56.1	1985	141	87	.2	1.9	29.9	.0	.1	.0
Jul	80.7	55.9	68.3	105	1988	28	74.2	1974	38+	1972	4	61.4	1993	55	158	.5	4.7	31.0	.0	.0	.0
Aug	80.2	53.0	66.6	104	1949	8	73.1	1983	33+	1979	14	60.0	1977	89	138	.4	5.3	31.0	.0	.0	.0
Sep	68.0	42.2	55.1	105	1978	6	61.1	1998	16	1974	30	49.8	1985	312	15	.1	1.1	28.4	.0	3.2	.0
Oct	54.4	30.6	42.5	92	1953	2	47.6	1973	-4+	1991	31	37.0	1991	697	0	.0	.1	20.5	1.2	18.0	.1
Nov	34.1	16.5	25.3	74	1999	1	36.5	1999	-22+	1985	29	13.9	1985	1191	0	.0	.0	4.4	13.4	28.7	3.6
Dec	21.3	3.2	12.3	59	1979	5	23.8	1987	-38	1983	23	-2.6	1983	1635	0	.0	.0	.2	22.8	31.0	12.8
Ann	50.7	28.6	39.6	105+	Jul 1988	28	74.4	Jun 1988	-39+	Jan 1951	28	-9.8	Jan 1982	9634	416	1.2	13.7	195.8	95.6	194.5	51.0

+ 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

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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	.55	.49	.67	1989	7	1.32	1999	.00	1990
Feb	.43	.32	1.40	1958	27	2.36	1998	.10+	1993
Mar	.74	.70	.98	1962	28	2.00	1987	.10	1991
Apr	1.48	1.10	1.82	1975	26	6.05	1975	.00	1988
May	2.16	2.24	2.10	1991	13	6.00	1999	.26	1980
Jun	3.21	3.23	3.95	1951	5	6.00	1990	1.16	1974
Jul	2.69	1.84	2.37	1987	22	9.32	1993	.31	1984
Aug	1.84	1.67	3.90	1962	11	5.39	1999	.17	1971
Sep	1.72	1.50	2.65	1955	21	4.40	1977	.22	1992
Oct	1.41	.68	2.10	1994	7	7.62	1994	.00	1987
Nov	.63	.60	1.22	1958	17	2.06	2000	.02	1985
Dec	.44	.39	.70	1977	17	1.76	1977	.00+	1987
Ann	17.30	16.73	3.95	Jun 1951	5	9.32	Jul 1993	.00+	Jan 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.7	2.1	.1	.0
Feb	4.8	1.6	.1	.0
Mar	5.3	2.6	.2	.0
Apr	6.2	3.4	.8	.3
May	8.0	5.0	1.5	.3
Jun	10.2	6.8	2.1	.7
Jul	8.1	5.7	1.8	.6
Aug	7.1	4.4	1.0	.3
Sep	6.6	3.6	.9	.3
Oct	4.6	3.0	.9	.3
Nov	4.5	2.4	.2	@
Dec	5.0	1.7	@	.0
Ann	76.1	42.3	9.6	2.8

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	.07	.14	.23	.31	.39	.47	.57	.68	.83	1.07	1.29
Feb	.05	.08	.14	.20	.27	.34	.42	.53	.67	.90	1.13
Mar	.15	.22	.32	.42	.52	.63	.75	.90	1.10	1.41	1.70
Apr	.04	.14	.33	.54	.78	1.05	1.38	1.81	2.39	3.39	4.38
May	.39	.58	.90	1.19	1.49	1.82	2.18	2.63	3.23	4.19	5.10
Jun	1.37	1.66	2.07	2.40	2.71	3.03	3.37	3.76	4.25	5.00	5.67
Jul	.43	.66	1.05	1.42	1.80	2.22	2.70	3.28	4.07	5.34	6.56
Aug	.27	.42	.69	.94	1.21	1.50	1.83	2.24	2.79	3.69	4.55
Sep	.37	.53	.79	1.01	1.24	1.49	1.76	2.09	2.53	3.22	3.87
Oct	.03	.11	.28	.48	.70	.96	1.29	1.70	2.29	3.29	4.28
Nov	.04	.08	.16	.25	.34	.46	.59	.77	1.01	1.42	1.83
Dec	.00	.10	.19	.26	.32	.39	.46	.55	.66	.84	1.01
Ann	10.74	11.94	13.52	14.74	15.85	16.93	18.06	19.32	20.87	23.14	25.14

\+ 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	8.5	8.0	8	7
Feb	5.9	5.0	6	5
Mar	7.3	8.0	4	3
Apr	3.3	2.0	1	#
May	.4	.0	#	0
Jun	#	.0	#	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.3	.0	#	0
Oct	3.6	.5	#	#
Nov	6.8	6.3	2	1
Dec	6.2	6.0	4	3
Ann	42.3	35.8	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	9.0	1989	7	22.0	1999	23	1994	18	20	1997
Feb	7.0	1998	26	20.0	1998	23+	1994	25	18	1994
Mar	8.1	1971	14	14.0+	1996	22	1998	7	14	1998
Apr	9.0	1975	8	15.0	1997	22	1975	9	11	1975
May	4.0	1990	1	4.0+	1991	8	1984	1	#+	2000
Jun	#	1998	2	#	1998	#	1996	5	#	1996
Jul	.0	0	0	.0	0	0	0	0	0	0
Aug	.0	0	0	.0	0	0	0	0	0	0
Sep	6.0	1984	24	6.0	1984	3	1984	24	#+	1995
Oct	14.0	1982	6	21.0	1991	18	1991	31	2	1991
Nov	9.0	1993	24	24.0	1993	21	1993	27	7	1991
Dec	7.0	1988	27	17.0	1996	22	1996	31	16	1996
Ann	14.0	Oct 1982	6	24.0	Nov 1993	23+	Feb 1994	25	20	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.5	4.3	.9	.2	.0
Feb	3.6	3.5	.5	.1	.0
Mar	3.5	3.2	.9	.5	.0
Apr	1.3	1.2	.5	.2	.0
May	.2	.2	.1	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	@	@	.0
Oct	1.0	1.0	.4	.2	.1
Nov	3.2	3.0	.9	.3	.0
Dec	3.9	3.7	.5	.1	.0
Ann	21.3	20.2	4.7	1.6	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.8	24.9	18.5	10.5
Feb	23.1	18.5	13.7	5.8
Mar	17.9	12.1	8.0	2.9
Apr	4.0	2.8	1.6	.9
May	.3	.1	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	@	.0	.0
Oct	2.2	1.0	.6	.2
Nov	12.5	7.3	4.3	1.3
Dec	24.7	17.9	11.4	2.1
Ann	113.6	84.6	58.1	23.7

+ 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	6/09	6/03	5/31	5/28	5/25	5/22	5/19	5/15	5/10
32	5/25	5/21	5/18	5/15	5/13	5/11	5/09	5/06	5/02
28	5/17	5/13	5/09	5/06	5/03	5/01	4/28	4/24	4/19
24	5/08	5/03	4/29	4/26	4/23	4/20	4/17	4/14	4/09
20	4/27	4/21	4/17	4/14	4/11	4/08	4/05	4/01	3/27
16	4/17	4/13	4/10	4/07	4/05	4/03	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	8/29	9/03	9/06	9/09	9/12	9/15	9/18	9/22	9/27
32	9/10	9/14	9/17	9/20	9/22	9/24	9/27	9/30	10/04
28	9/18	9/23	9/26	9/29	10/02	10/04	10/07	10/10	10/15
24	9/26	10/01	10/04	10/07	10/10	10/13	10/16	10/19	10/24
20	10/05	10/11	10/15	10/18	10/22	10/25	10/29	11/02	11/08
16	10/11	10/17	10/22	10/26	10/29	11/02	11/06	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	131	124	119	114	110	106	101	96	88
32	148	142	138	134	131	128	124	120	114
28	172	165	160	155	151	146	142	136	129
24	188	182	177	173	169	165	161	156	149
20	215	208	202	197	193	188	184	178	170
16	229	221	216	211	206	202	197	192	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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1795	1415	1219	734	351	141	55	89	312	697	1191	1635	9634
60	1640	1275	1064	590	228	69	17	36	192	542	1041	1480	8174
57	1547	1191	971	506	168	40	8	19	132	450	951	1387	7370
55	1485	1135	909	453	133	26	3	12	98	389	891	1325	6859
50	1330	995	764	328	67	8	0	2	38	248	744	1170	5694
32	806	541	305	56	1	0	0	0	0	14	292	645	2660

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	34	50	109	312	691	936	1125	1072	693	340	91	33	5486
55	0	0	0	19	111	272	415	371	101	2	0	0	1291
57	0	0	0	12	83	225	358	316	75	1	0	0	1070
60	0	0	0	6	51	165	274	240	45	0	0	0	781
65	0	0	0	0	18	87	158	138	15	0	0	0	416
70	0	0	0	0	4	34	76	66	4	0	0	0	184

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	12	145	458	704	885	839	474	171	17	0	0	0	12	157	615	1319	2204	3043	3517	3688	3705	3705
45	0	0	3	79	322	554	730	685	334	90	4	0	0	0	3	82	404	958	1688	2373	2707	2797	2801	2801
50	0	0	0	36	206	407	575	531	214	42	1	0	0	0	0	36	242	649	1224	1755	1969	2011	2012	2012
55	0	0	0	14	113	268	423	379	117	12	0	0	0	0	0	14	127	395	818	1197	1314	1326	1326	1326
60	0	0	0	6	49	149	271	238	56	3	0	0	0	0	0	6	55	204	475	713	769	772	772	772
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	12	108	279	428	559	526	292	131	16	0	0	0	12	120	399	827	1386	1912	2204	2335	2351	2351

(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