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: TOWNER 2 NE, ND **COOP ID: 328792**

Climate Division: ND 2 **NWS Call Sign:** **Elevation: 1,480 Feet** **Lat: 48˚22N** **Lon: 100˚23W**

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	14.8	-6.9	4.0	51	1990	11	20.2	1990	-49	1996	19	-12.2	1982	1894	0	.0	.0	@	26.2	31.0	19.6
Feb	22.5	.5	11.5	63	1988	28	26.2	1998	-46	1996	1	-6.4	1979	1497	0	.0	.0	.5	19.6	28.2	13.2
Mar	34.1	12.8	23.5	75	1963	23	34.0	1973	-34	1980	1	13.6	1996	1289	0	.0	.0	3.5	12.2	30.3	6.4
Apr	52.9	27.3	40.1	95	1980	22	48.8	1987	-16	1979	2	28.2	1979	747	0	.0	.1	17.6	2.1	21.6	.4
May	67.9	40.3	54.1	98	1980	23	62.6	1977	12	1958	1	47.0	1974	358	19	.0	.9	29.1	.0	5.4	.0
Jun	76.6	49.7	63.2	102	1959	6	73.5	1988	28	1969	12	56.5	1985	135	80	.1	2.6	30.0	.0	.3	.0
Jul	81.7	53.9	67.8	105+	1988	28	72.5	1989	35+	1982	11	61.0	1993	50	137	.3	4.4	31.0	.0	.0	.0
Aug	81.2	51.7	66.5	104	1949	7	73.0	1983	22	1982	27	57.9	1977	96	141	.5	5.5	31.0	.0	.3	.0
Sep	69.3	40.8	55.1	102	2001	6	61.1	1998	12	1974	30	50.0	1984	313	15	@	1.1	28.9	.0	4.9	.0
Oct	55.8	28.9	42.4	95	1963	4	48.4	1973	-15	1991	31	36.4	1991	703	0	.0	@	20.9	1.1	20.3	.1
Nov	34.1	14.1	24.1	76	1999	8	34.8	1999	-34	1985	29	10.6	1985	1227	0	.0	.0	4.3	13.7	29.2	4.3
Dec	20.4	-.4	10.0	57	1969	1	24.2	1997	-44	1990	26	-5.0	1983	1708	0	.0	.0	.2	23.9	31.0	15.7
Ann	50.9	26.1	38.5	105+	Jul 1988	28	73.5	Jun 1988	-49	Jan 1996	19	-12.2	Jan 1982	10017	392	.9	14.6	197.0	98.8	202.5	59.7

\+ 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	.55	.54	.80	1999	13	1.56	1999	.00	1973
Feb	.55	.35	1.21	1998	25	3.26	1998	.00+	1988
Mar	.72	.52	1.60	1971	14	2.39	1971	.00	1977
Apr	1.21	.82	2.70	1953	24	4.37	1975	.00	1987
May	1.93	1.75	2.61	1996	17	5.36	1999	.00	1997
Jun	2.67	2.69	3.02	1952	28	5.08	1998	.47	1974
Jul	2.69	2.36	2.50	1980	6	8.84	1993	.38	1985
Aug	2.06	1.59	3.61	1980	4	8.50	1980	.53	1984
Sep	1.83	1.49	3.67	1996	5	5.32	1971	.00	1997
Oct	1.30	.71	2.60	1994	7	6.93	1994	.00+	1999
Nov	.64	.47	.95	2000	7	1.96	1998	.00+	1999
Dec	.53	.42	.84	1982	2	1.55	1977	.01	1997
Ann	16.68	16.19	3.67	Sep 1996	5	8.84	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.6	2.4	.1	.0
Feb	3.7	1.6	.2	.1
Mar	3.7	2.1	.3	.1
Apr	4.5	2.8	.8	.2
May	6.8	4.4	1.2	.3
Jun	9.1	5.9	1.8	.4
Jul	7.3	4.9	1.7	.6
Aug	6.8	4.4	1.4	.4
Sep	5.7	3.5	1.0	.3
Oct	4.1	2.7	.8	.3
Nov	3.7	2.2	.3	.0
Dec	4.6	1.7	.2	.0
Ann	64.6	38.6	9.8	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	.05	.11	.20	.28	.36	.46	.56	.68	.85	1.13	1.39
Feb	.00	.02	.09	.17	.26	.37	.50	.67	.90	1.30	1.69
Mar	.02	.07	.16	.27	.38	.51	.68	.88	1.17	1.65	2.13
Apr	.06	.16	.34	.52	.71	.92	1.18	1.49	1.93	2.64	3.34
May	.26	.51	.84	1.11	1.38	1.67	1.99	2.38	2.88	3.69	4.45
Jun	.79	1.05	1.43	1.76	2.08	2.41	2.78	3.21	3.77	4.64	5.45
Jul	.43	.66	1.05	1.42	1.80	2.22	2.70	3.28	4.06	5.33	6.54
Aug	.44	.63	.93	1.21	1.48	1.78	2.11	2.51	3.03	3.87	4.66
Sep	.13	.32	.61	.88	1.16	1.47	1.82	2.25	2.84	3.79	4.71
Oct	.00	.00	.15	.33	.55	.82	1.14	1.57	2.17	3.22	4.28
Nov	.00	.00	.13	.23	.35	.47	.62	.80	1.05	1.46	1.87
Dec	.03	.06	.13	.20	.28	.37	.49	.63	.84	1.19	1.53
Ann	10.36	11.52	13.04	14.22	15.28	16.32	17.40	18.62	20.10	22.29	24.22

\+ 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	7.3	5.5	11	9
Feb	4.1	4.5	9	7
Mar	4.3	4.1	6	4
Apr	3.2	1.0	1	#
May	.3	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	2.0	.0	#	0
Nov	5.2	3.8	2	1
Dec	6.4	5.0	6	5
Ann	32.9	23.9	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	15.0	1989	7	30.6	1989	41	1997	29	38	1997
Feb	7.0	1998	27	9.0	1972	39	1997	2	23	1989
Mar	10.0	1971	14	13.0	1971	28	1976	15	20	1976
Apr	13.0	1999	2	18.0	1999	24	1979	12	13	1979
May	4.5	1991	4	4.5	1991	5	1991	4	#+	1991
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	1995	21	2.3	1995	2	1995	21	#+	1995
Oct	9.0	1991	28	12.5	1991	9+	1991	28	1	1991
Nov	8.0	1985	19	21.0	1985	22	1998	21	12	1986
Dec	6.0	1993	26	14.5+	1992	34	1996	31	26	1996
Ann	15.0	Jan 1989	7	30.6	Jan 1989	41	Jan 1997	29	38	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.1	3.3	.9	.2	@
Feb	2.8	2.1	.4	.1	.0
Mar	2.4	1.9	.5	.3	@
Apr	1.1	.9	.5	.4	@
May	.1	.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	.0	.0
Oct	.6	.5	.3	.1	.0
Nov	2.6	2.0	.7	.2	.0
Dec	2.7	2.1	.9	.1	.0
Ann	16.5	13.0	4.2	1.4	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	25.9	22.7	17.2	6.6
Feb	22.1	17.2	11.8	4.4
Mar	9.1	7.3	6.2	3.2
Apr	2.7	2.0	1.6	.6
May	.1	.1	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.0	.0	.0
Oct	1.1	.5	.3	.0
Nov	7.5	4.0	1.9	.1
Dec	14.2	11.0	5.4	1.4
Ann	82.8	64.8	44.4	16.3

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

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	124	114	106	100	94	88	81	74	63
32	142	134	128	123	118	114	109	103	95
28	161	153	148	143	139	134	130	124	116
24	181	173	168	163	158	154	149	143	135
20	199	191	185	180	176	171	166	160	153
16	217	210	205	200	196	192	188	183	175

***** 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	1894	1497	1289	747	358	135	50	96	313	703	1227	1708	10017
60	1739	1357	1134	602	235	64	13	40	192	548	1077	1553	8554
57	1646	1273	1041	518	175	36	5	22	132	456	987	1460	7751
55	1584	1217	979	464	139	23	1	14	97	395	927	1398	7238
50	1429	1077	835	338	71	7	0	3	37	255	780	1243	6075
32	899	617	369	61	1	0	0	0	0	18	322	715	3002

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	28	44	103	303	685	935	1110	1069	691	337	85	31	5421
55	0	0	1	17	111	268	398	369	99	2	0	0	1265
57	0	0	0	11	84	221	341	315	73	1	0	0	1046
60	0	0	0	5	52	159	255	241	43	0	0	0	755
65	0	0	0	0	19	80	137	141	15	0	0	0	392
70	0	0	0	0	5	29	58	69	4	0	0	0	165

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	6	139	466	712	873	828	465	166	12	0	0	0	6	145	611	1323	2196	3024	3489	3655	3667	3667
45	0	0	0	71	325	562	718	673	328	86	3	0	0	0	0	71	396	958	1676	2349	2677	2763	2766	2766
50	0	0	0	33	204	416	563	519	203	36	0	0	0	0	0	33	237	653	1216	1735	1938	1974	1974	1974
55	0	0	0	13	114	274	409	368	109	11	0	0	0	0	0	13	127	401	810	1178	1287	1298	1298	1298
60	0	0	0	3	48	156	262	231	51	0	0	0	0	0	0	3	51	207	469	700	751	751	751	751
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	8	113	299	445	559	529	305	138	15	0	0	1	9	122	421	866	1425	1954	2259	2397	2412	2412

(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