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: TURTLE LAKE, ND **COOP ID: 328840**

Climate Division: ND 4 **NWS Call Sign:** **Elevation: 1,906 Feet** **Lat: 47˚31N** **Lon: 100˚54W**

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	17.6	-2.8	7.4	53	1990	11	23.6	1990	-41	1951	29	-8.9	1982	1787	0	.0	.0	.1	24.6	31.0	16.8
Feb	24.6	4.7	14.7	65	1958	25	27.5	1998	-38+	1996	2	-2.2	1979	1410	0	.0	.0	.8	17.4	28.0	10.7
Mar	36.7	17.0	26.9	77	1967	29	37.7	1986	-29	1962	1	17.0	1996	1183	0	.0	.0	5.7	10.1	29.8	4.0
Apr	53.6	29.1	41.4	95	1980	21	49.4	1987	-8	1975	1	31.9	1979	711	0	.0	.1	20.0	1.6	20.2	.4
May	67.6	41.7	54.7	98	1969	27	63.7	1977	11	1967	1	48.4	1979	339	18	.0	.6	29.5	.0	4.5	.0
Jun	75.9	51.1	63.5	103+	1988	28	74.5	1988	32+	1998	6	57.3	1985	130	85	.1	2.1	30.0	.0	.1	.0
Jul	82.0	55.6	68.8	105+	1988	28	74.1	1974	37	1950	15	61.4	1992	48	165	.6	5.7	31.0	.0	.0	.0
Aug	81.4	53.9	67.7	106+	1971	21	74.6	1983	31	1982	27	61.7	1985	77	161	.7	6.9	31.0	.0	@	.0
Sep	70.1	43.2	56.7	106	1978	5	61.9	1978	18+	1995	22	51.2	1993	275	24	.2	1.5	28.8	@	3.1	.0
Oct	56.6	31.4	44.0	95	1963	4	48.5+	1974	-9	1991	31	39.4	1991	652	0	.0	.1	22.1	.9	16.9	.1
Nov	35.8	15.9	25.9	78	1999	8	37.3	1999	-25	1985	29	14.4	1985	1174	0	.0	.0	5.1	12.1	28.4	3.3
Dec	22.6	2.9	12.8	59	1969	1	25.0	1997	-38+	1983	23	-4.0	1983	1620	0	.0	.0	.4	22.1	31.0	12.4
Ann	52.0	28.6	40.4	106+	Sep 1978	5	74.6	Aug 1983	-41	Jan 1951	29	-8.9	Jan 1982	9406	453	1.6	17.0	204.5	88.8	193.0	47.7

\+ 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	.63	.61	.68	1982	22	1.90	1982	.00	1985
Feb	.49	.33	1.51	1998	26	2.11	1998	.00	1999
Mar	.85	.80	.85	1995	23	2.65	1996	.02	1981
Apr	1.44	1.24	1.50	1997	7	4.15+	1986	.02+	1988
May	2.19	1.90	2.96	1985	12	5.66	1999	.37	1980
Jun	3.32	3.40	4.27	1952	28	6.65	1975	.67	1974
Jul	2.67	2.63	2.46	1983	2	6.73	1993	.64	1988
Aug	1.96	1.63	3.50	1999	12	6.63	2000	.03	1971
Sep	1.50	1.47	3.05	1978	12	5.16	1977	.23	1997
Oct	1.32	.88	1.87	1971	2	4.58	1994	.04	1987
Nov	.73	.61	1.43	1993	25	1.78	1993	.00+	1999
Dec	.52	.52	.85	1988	27	1.78	1977	.00	1986
Ann	17.62	17.86	4.27	Jun 1952	28	6.73	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.7	1.8	.3	.0
Feb	3.2	1.7	.2	@
Mar	4.7	2.5	.3	.0
Apr	6.0	3.6	.9	.3
May	7.8	5.1	1.4	.4
Jun	10.9	6.9	2.2	.6
Jul	8.9	5.8	1.8	.4
Aug	6.9	4.3	1.3	.4
Sep	6.6	3.7	.8	.2
Oct	4.6	2.6	.9	.2
Nov	3.9	2.2	.4	.1
Dec	3.6	1.8	.1	.0
Ann	70.8	42.0	10.6	2.6

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	.02	.06	.15	.24	.34	.46	.60	.77	1.01	1.42	1.82
Feb	.03	.07	.15	.22	.30	.38	.48	.61	.78	1.06	1.33
Mar	.10	.17	.28	.40	.53	.67	.83	1.03	1.31	1.76	2.20
Apr	.07	.15	.31	.50	.73	.99	1.31	1.73	2.32	3.33	4.34
May	.45	.65	.97	1.26	1.56	1.88	2.23	2.66	3.23	4.13	4.99
Jun	1.18	1.49	1.94	2.32	2.69	3.06	3.46	3.94	4.54	5.47	6.33
Jul	.75	1.00	1.39	1.72	2.05	2.39	2.77	3.21	3.79	4.70	5.55
Aug	.12	.23	.47	.73	1.04	1.39	1.82	2.37	3.13	4.44	5.74
Sep	.28	.41	.63	.83	1.04	1.26	1.52	1.82	2.23	2.88	3.51
Oct	.05	.11	.25	.41	.62	.86	1.17	1.57	2.15	3.15	4.16
Nov	.00	.09	.23	.35	.46	.59	.74	.91	1.15	1.53	1.91
Dec	.06	.12	.21	.28	.36	.44	.53	.64	.79	1.03	1.25
Ann	11.23	12.42	13.96	15.15	16.22	17.27	18.35	19.57	21.06	23.24	25.15

\+ 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	8.8	4.5	6	5
Feb	6.5	5.5	4	3
Mar	5.0	4.0	3	1
Apr	.9	.0	#	0
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	1.1	.0	#	0
Nov	8.4	6.0	1	#
Dec	5.8	6.0	3	1
Ann	36.6	26.0	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	14.0	1997	6	32.5	1999	23	1982	27	13	1978
Feb	15.0	1998	26	21.7	1998	25	1979	24	16	1979
Mar	8.5	1995	23	18.5	1995	26	1979	3	15	1979
Apr	8.0	1975	8	8.0	1975	14	1975	8	4	1975
May	#	1976	2	#	1976	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	4.0	1984	24	4.0	1984	2	1984	24	#	1984
Oct	8.6	1972	29	10.0	1985	9	1972	29	1+	1980
Nov	19.0	1993	25	32.0	1996	12	1977	28	5	1978
Dec	8.0	1988	27	11.4	1996	17	1977	11	14	1977
Ann	19.0	Nov 1993	25	32.5	Jan 1999	26	Mar 1979	3	16	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.3	2.3	1.0	.6	.1
Feb	2.1	2.0	.7	.2	@
Mar	1.8	1.5	.8	.2	.0
Apr	.3	.2	.2	@	.0
May	.0	.0	.0	.0	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	@	@	@	.0	.0
Oct	.4	.4	.2	.1	.0
Nov	2.1	2.1	1.0	.4	.1
Dec	2.3	2.1	.9	.2	.0
Ann	11.3	10.6	4.8	1.7	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	24.9	23.0	20.9	8.9
Feb	20.8	19.0	16.8	5.3
Mar	10.5	8.7	6.5	3.3
Apr	1.8	1.5	1.2	.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
Oct	.6	.2	@	.0
Nov	8.5	4.8	3.2	.9
Dec	17.7	12.7	8.8	2.8
Ann	84.8	69.9	57.4	21.4

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

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	115	111	107	102	97	91
32	150	142	137	133	129	124	120	115	107
28	167	160	154	150	146	142	137	132	125
24	188	180	174	169	164	160	155	149	141
20	209	200	194	188	183	178	173	167	158
16	224	217	213	209	205	202	198	193	187

***** 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	1787	1410	1183	711	339	130	48	77	275	652	1174	1620	9406
60	1632	1270	1028	566	217	61	14	30	163	497	1024	1465	7967
57	1539	1186	935	483	158	33	6	16	109	406	934	1372	7177
55	1477	1130	873	430	124	21	1	9	80	346	874	1310	6675
50	1322	990	724	307	60	6	0	2	29	211	728	1155	5534
32	801	535	272	46	0	0	0	0	0	10	279	636	2579

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	37	49	113	326	702	945	1140	1106	740	381	95	38	5672
55	0	0	0	20	113	276	428	403	130	4	0	0	1374
57	0	0	0	13	85	228	371	347	99	2	0	0	1145
60	0	0	0	6	51	165	286	269	63	0	0	0	840
65	0	0	0	0	18	85	165	161	24	0	0	0	453
70	0	0	0	0	4	32	81	82	8	0	0	0	207

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	16	159	477	719	901	871	505	194	20	0	0	0	16	175	652	1371	2272	3143	3648	3842	3862	3862
45	0	0	4	87	339	569	746	716	366	108	7	0	0	0	4	91	430	999	1745	2461	2827	2935	2942	2942
50	0	0	0	43	213	422	591	561	238	48	1	0	0	0	0	43	256	678	1269	1830	2068	2116	2117	2117
55	0	0	0	16	118	285	437	410	135	13	0	0	0	0	0	16	134	419	856	1266	1401	1414	1414	1414
60	0	0	0	4	53	158	284	263	67	3	0	0	0	0	0	4	57	215	499	762	829	832	832	832
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	20	125	309	444	575	548	319	146	20	0	0	0	20	145	454	898	1473	2021	2340	2486	2506	2506

(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