

# Climatography of the United States

No. 20

1971-2000

Station: WATFORD CITY, ND

COOP ID: 329233

Climate Division: ND 4

NWS Call Sign:

Elevation: 2,170 Feet Lat: 47° 48N

Lon: 103° 17W

## 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	19.1	-2.8	8.2	52+	1992	11	23.5	1992	-39	1950	18	-6.8	1982	1764	0	.0	.0	.2	22.9	30.9	15.5
Feb	28.4	5.5	17.0	64	1992	28	29.6	1998	-39	1996	2	.5	1979	1346	0	.0	.0	2.2	14.9	28.1	10.0
Mar	39.4	15.7	27.6	76+	1999	27	37.8	1986	-27	1952	2	16.8	1996	1160	0	.0	.0	7.4	10.0	30.1	4.5
Apr	55.0	27.6	41.3	92+	2001	29	49.2	1987	-13+	1975	2	32.0	1975	712	0	.0	.1	19.5	1.5	21.4	.3
May	67.9	39.9	53.9	98	1964	20	60.7	1977	12	1954	1	48.4	1996	356	12	@	.7	29.3	.0	5.9	.0
Jun	76.9	49.0	63.0	102	1956	10	74.7	1988	29	1998	3	57.5	1985	146	83	.2	2.8	29.9	.0	.2	.0
Jul	83.6	53.6	68.6	110	1960	20	74.3	1974	34+	1972	4	60.9	1993	65	177	.7	6.2	31.0	.0	.0	.0
Aug	83.4	51.6	67.5	111	1949	7	74.3	1983	30	1994	31	61.7	1977	76	152	.9	8.2	31.0	.0	.1	.0
Sep	70.5	39.9	55.2	103+	1976	7	62.8	1998	13	1974	30	49.8	1984	314	21	.2	2.0	28.4	.0	5.2	.0
Oct	57.0	29.1	43.1	96	1953	1	49.4	1973	-1	1972	31	37.5	1976	682	0	.0	.1	22.9	.8	19.9	.1
Nov	37.2	15.0	26.1	77	1999	8	37.5	1999	-22	1964	29	13.4	1985	1167	0	.0	.0	5.7	10.8	29.0	3.7
Dec	24.9	3.0	14.0	59+	1998	15	25.1	1997	-36	1972	6	-4.5	1983	1583	0	.0	.0	.5	19.5	31.0	11.9
Ann	53.6	27.3	40.5	111	Aug 1949	7	74.7	Jun 1988	-39+	Feb 1996	2	-6.8	Jan 1982	9371	445	2.0	20.1	208.0	80.4	201.8	46.0

+ 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/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

Issue Date: February 2004

(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

090-A

# 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: WATFORD CITY, ND**

**COOP ID: 329233**

**Climate Division: ND 4**

**NWS Call Sign:**

**Elevation: 2,170 Feet Lat: 47° 48N**

**Lon: 103° 17W**

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med-ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	.45	.34	.64	1994	5	1.33	1994	.10+	1981	7.5	1.2	@	.0	.08	.12	.19	.25	.31	.38	.46	.55	.67	.87	1.06
Feb	.39	.34	.81	1951	28	1.05	1998	.04+	1997	6.2	.9	@	.0	.04	.06	.12	.17	.23	.29	.37	.47	.60	.82	1.04
Mar	.56	.44	.71	1950	27	1.33	1972	.11	1994	7.3	1.8	.1	.0	.13	.18	.27	.34	.41	.49	.57	.68	.81	1.03	1.23
Apr	1.04	.92	1.52	1950	24	4.05	1975	.12	1987	8.1	3.0	.4	.1	.16	.25	.40	.54	.69	.85	1.04	1.27	1.58	2.09	2.57
May	2.13	2.04	3.35	1965	25	5.13	1972	.46+	1997	11.7	5.1	1.2	.2	.56	.77	1.07	1.34	1.61	1.89	2.20	2.57	3.05	3.80	4.51
Jun	3.05	2.77	3.05	1975	9	5.46	1994	.76	1997	13.5	7.3	1.6	.4	1.20	1.48	1.88	2.22	2.53	2.85	3.19	3.59	4.10	4.88	5.59
Jul	2.11	1.71	3.30	1952	1	8.90	1993	.34	1984	11.4	5.7	1.3	.4	.40	.59	.90	1.18	1.47	1.79	2.15	2.58	3.15	4.07	4.94
Aug	1.55	1.49	2.45	1960	25	3.30	1980	.08	1971	7.7	3.3	.8	.2	.35	.49	.72	.92	1.12	1.34	1.59	1.88	2.26	2.88	3.46
Sep	1.30	1.04	2.63	1971	5	3.49	1971	.17	1997	7.7	3.4	.6	.2	.20	.31	.50	.67	.86	1.06	1.30	1.59	1.97	2.59	3.19
Oct	.77	.60	1.46	1971	2	2.96	1998	.07	1987	6.3	2.5	.6	.1	.06	.11	.21	.32	.44	.57	.74	.94	1.22	1.69	2.16
Nov	.65	.57	1.82	2000	2	3.03	2000	.03	1999	6.9	1.8	.1	@	.09	.14	.24	.33	.42	.53	.65	.79	.99	1.32	1.63
Dec	.41	.42	.52	1953	10	1.09	1977	.02	1997	8.2	1.0	.0	.0	.07	.11	.17	.22	.28	.34	.41	.50	.62	.80	.98
Ann	14.41	14.93	3.35	May 1965	25	8.90	Jul 1993	.02	Dec 1997	102.5	37.0	6.7	1.6	9.86	10.73	11.85	12.70	13.46	14.20	14.97	15.82	16.85	18.36	19.66

+ 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:  
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

Station: WATFORD CITY, ND

COOP ID: 329233

Climate Division: ND 4

NWS Call Sign:

Elevation: 2,170 Feet

Lat: 47°48N

Lon: 103°17W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										Snow Fall >= Thresholds					Snow Depth >= Thresholds			
Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	6.5	5.2	6	5	5.0	1994	5	22.3	1999	20	1971	31	14	1994	8.5	2.7	.3	.1	.0	-9.9	-9.9	-9.9	-9.9
Feb	5.2	3.1	4	3	7.0	1998	26	20.5	1998	22	1971	10	16	1971	5.3	1.8	.5	.2	.0	-9.9	-9.9	-9.9	-9.9
Mar	6.4	2.9	3	1	5.5	1996	24	18.4	1997	23	1998	5	14	1998	4.9	2.2	.7	.1	.0	7.4	4.4	2.8	1.4
Apr	2.4	1.6	1	#	5.0	1997	6	9.0	2000	20	1975	3	7	1975	2.3	1.1	.3	.1	.0	2.0	1.0	.4	.0
May	.2	.0	#	0	2.5	1974	14	2.5	1999	1	1999	11	#+	2000	.3	.1	.0	.0	.0	.1	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.3	.0	#	0	4.5	1972	26	4.5	1972	5	1972	26	#+	1995	.1	.1	.1	.0	.0	.1	.1	.1	.0
Oct	.9	.5	#	#	4.0	1996	21	4.0	1996	4	1996	21	#+	1997	.9	.5	.1	.0	.0	.8	.1	.0	.0
Nov	7.5	4.1	2	1	6.0	1993	26	19.5	1993	16	1993	26	7	2000	5.0	2.7	.9	.4	.0	10.9	5.4	3.8	.6
Dec	5.6	4.8	3	3	6.5	1994	4	14.5	1996	12	1996	31	9	1996	6.7	2.1	.4	.1	.0	-9.9	-9.9	-9.9	-9.9
Ann	35.0	22.2	N/A	N/A	7.0	Feb 1998	26	22.3	Jan 1999	23	Mar 1998	5	16	Feb 1971	34.0	13.3	3.3	1.0	.0	-9.9	-9.9	-9.9	-9.9

+ 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

Complete documentation available from:

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**Lat: 47° 48N**

**Lon: 103° 17W**

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	6/18	6/11	6/06	6/02	5/29	5/26	5/22	5/17	5/10
32	6/01	5/27	5/24	5/21	5/18	5/15	5/12	5/08	5/03
28	5/19	5/14	5/11	5/09	5/06	5/04	5/01	4/28	4/24
24	5/12	5/07	5/04	4/30	4/27	4/25	4/21	4/18	4/13
20	5/04	4/28	4/24	4/21	4/17	4/14	4/10	4/06	3/31
16	4/20	4/16	4/13	4/10	4/08	4/05	4/02	3/30	3/26
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	8/21	8/27	8/30	9/03	9/06	9/09	9/12	9/16	9/22
32	9/03	9/07	9/10	9/12	9/14	9/17	9/19	9/22	9/26
28	9/13	9/17	9/20	9/23	9/25	9/28	10/01	10/04	10/08
24	9/20	9/26	9/30	10/04	10/07	10/10	10/14	10/18	10/24
20	9/25	10/02	10/07	10/11	10/15	10/19	10/23	10/28	11/04
16	10/04	10/11	10/16	10/20	10/24	10/28	11/01	11/06	11/12
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	122	114	108	103	99	94	89	83	76
32	135	130	126	122	119	116	112	108	102
28	161	154	149	145	141	137	133	129	122
24	183	176	171	166	162	158	153	148	140
20	208	198	191	185	180	175	169	162	153
16	223	215	209	204	199	194	189	182	174

\* 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

Complete documentation available from:

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**NWS Call Sign:**

**Elevation: 2,170 Feet    Lat: 47° 48N    Lon: 103° 17W**

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	1764	1346	1160	712	356	146	65	76	314	682	1167	1583	9371
60	1609	1206	1005	565	229	72	23	29	199	527	1017	1428	7909
57	1516	1122	912	479	166	41	12	15	141	436	927	1335	7102
55	1454	1066	850	425	130	27	7	8	109	376	867	1273	6592
50	1299	938	704	299	61	8	0	1	48	241	719	1118	5436
32	782	496	253	37	0	0	0	0	0	13	271	611	2463

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	41	74	116	316	679	927	1135	1099	696	355	94	52	5584
55	0	0	0	13	95	264	429	394	115	5	0	0	1315
57	0	0	0	8	70	219	372	339	87	2	0	0	1097
60	0	0	0	3	40	160	290	260	55	1	0	0	809
65	0	0	0	0	12	83	177	152	21	0	0	0	445
70	0	0	0	0	2	33	95	75	6	0	0	0	211

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	18	151	440	688	859	844	468	184	19	0	0	1	19	170	610	1298	2157	3001	3469	3653	3672	3672
45	0	0	5	81	300	538	704	689	328	99	6	0	0	0	5	86	386	924	1628	2317	2645	2744	2750	2750
50	0	0	0	38	181	392	549	536	208	42	0	0	0	0	0	38	219	611	1160	1696	1904	1946	1946	1946
55	0	0	0	14	94	253	396	382	118	10	0	0	0	0	0	14	108	361	757	1139	1257	1267	1267	1267
60	0	0	0	4	41	141	249	242	57	3	0	0	0	0	0	4	45	186	435	677	734	737	737	737
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	0	1	24	128	288	426	543	526	317	151	23	0	0	1	25	153	441	867	1410	1936	2253	2404	2427	2427

(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:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormals.html)

## 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.  
Complete documentation for the 1971-2000 Normals is available on the internet from:  
[www.ncdc.noaa.gov/oa/climate/normal/usnormals.html](http://www.ncdc.noaa.gov/oa/climate/normal/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 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.

- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>a. Temperature/ Precipitation Tables<ol style="list-style-type: none"><li>1. 1971-2000 Monthly Normals</li><li>2. Cooperative Summary of the Day</li><li>3. National Weather Service station records</li><li>4. 1971-2000 serially complete daily data</li></ol></li><li>b. Degree Day Table<ol style="list-style-type: none"><li>1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals</li><li>2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data</li></ol></li></ol> | <ol style="list-style-type: none"><li>c. Snow Tables<ol style="list-style-type: none"><li>1. Snow Climatology</li><li>2. Cooperative Summary of the Day</li></ol></li><li>d. Freeze Data Table<br/>1971-2000 serially complete daily data</li></ol> |
|---|---|

## References

U.S. Climate Normals 1971-2000, [www.ncdc.noaa.gov/normal.html](http://www.ncdc.noaa.gov/normal.html)  
U.S. Climate Normals 1971-2000-Products Clim20, [www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html](http://www.ncdc.noaa.gov/oa/climate/normal/usnormalsprods.html)  
Snow Climatology Project Description, [www.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html](http://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](http://www1.ncdc.noaa.gov/pub/data/special/serialcomplete_jam_0900.pdf)