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: GRAND FORKS INTL AP, ND **COOP ID: 323616**

Climate Division: ND 3 **NWS Call Sign: GFK** **Elevation: 839 Feet** **Lat: 47˚57N** **Lon: 97˚11W**

Temperature (˚F)

Month	Mean (1)			Extremes										Degree Days (1) Base Temp 65		Mean Number of Days (3)					
	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	14.9	-4.3	5.3	52	1990	10	18.9	1990	-36	1951	29	-7.6	1979	1860	0	.0	.0	@	27.2	31.0	19.4
Feb	22.4	3.7	13.1	67	2000	22	25.7	1998	-40	1996	1	-3.8	1979	1468	0	.0	.0	.3	21.1	27.8	12.9
Mar	34.3	17.1	25.7	80	1963	31	35.7	1973	-29	1962	1	15.9	1996	1233	0	.0	.0	2.9	12.4	27.5	5.2
Apr	53.6	31.0	42.3	100	1980	21	50.7	1987	-8	1970	1	33.4	1979	689	2	@	.2	18.0	1.7	17.3	.2
May	70.0	43.5	56.8	101	1964	21	67.4	1977	5	1967	3	48.6	1979	294	30	.0	1.1	29.0	.0	3.4	.0
Jun	77.6	52.8	65.2	100+	1995	17	72.0	1988	30+	1969	20	58.6	1982	88	85	@	2.1	30.0	.0	.0	.0
Jul	81.9	56.8	69.4	104	1988	5	74.5	1989	30	1972	3	62.7	1992	27	148	.1	3.6	31.0	.0	@	.0
Aug	81.0	54.5	67.8	104	1983	7	73.6	1983	31	1986	28	61.4	1977	53	127	.2	3.9	31.0	.0	.1	.0
Sep	69.7	44.3	57.0	103	1983	2	62.3	1997	20	1974	22	52.0	1974	276	27	.1	1.2	29.0	.0	2.2	.0
Oct	55.6	33.0	44.3	92	1992	1	50.1	1973	6	1991	31	39.2	1991	655	1	.0	@	20.8	.8	14.6	.0
Nov	34.1	17.4	25.8	75	1975	5	36.4	1981	-31	1985	29	12.0	1985	1186	0	.0	.0	3.3	14.2	28.1	3.0
Dec	20.1	2.5	11.3	56	1990	9	24.6	1997	-32	1967	31	-.4	2000	1660	0	.0	.0	.2	25.1	30.9	14.6
Ann	51.3	29.4	40.3	104+	Jul 1988	5	74.5	Jul 1989	-40	Feb 1996	1	-7.6	Jan 1979	9489	420	.4	12.1	195.5	102.5	182.9	55.3

\+ 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	.68	.56	.73	1975	11	1.71	1989	.07	2000
Feb	.58	.44	1.20	1955	20	1.65	2000	.09	1993
Mar	.89	.86	1.66	1966	4	2.27	1990	.04	1986
Apr	1.23	1.02	1.87	1972	12	3.62	1974	.00+	1988
May	2.21	2.01	1.89	1985	30	5.01	1999	.47	1976
Jun	3.03	2.95	2.59	1994	14	7.20	2000	.81	1972
Jul	3.06	2.55	4.44	1995	16	9.08	1995	.49	1989
Aug	2.72	2.54	3.85	1951	30	5.10	1974	.96	1996
Sep	1.96	1.85	2.89	1970	7	5.02	1981	.26	1998
Oct	1.70	1.59	1.86	1998	17	5.79	1998	.08	1992
Nov	.99	.76	1.18	2000	1	3.94	2000	.00	1999
Dec	.55	.41	.84	1988	13	1.96	1988	.07	1979
Ann	19.60	20.37	4.44	Jul 1995	16	9.08	Jul 1995	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.4	2.0	.1	.0
Feb	7.2	1.7	.2	.0
Mar	7.8	2.6	.3	.0
Apr	7.5	3.1	.6	.1
May	9.8	4.8	1.3	.3
Jun	10.5	6.0	1.9	.6
Jul	10.5	5.8	1.9	.7
Aug	9.3	5.9	1.8	.3
Sep	7.9	3.9	1.2	.4
Oct	7.6	3.7	1.0	.3
Nov	7.0	2.8	.4	.1
Dec	8.2	1.7	.1	.0
Ann	102.7	44.0	10.8	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	.13	.19	.29	.38	.47	.58	.69	.83	1.02	1.32	1.60
Feb	.09	.14	.22	.30	.39	.48	.58	.71	.89	1.17	1.43
Mar	.15	.23	.36	.48	.60	.74	.90	1.09	1.34	1.75	2.15
Apr	.00	.17	.40	.60	.80	1.01	1.25	1.54	1.92	2.55	3.15
May	.63	.84	1.16	1.43	1.70	1.98	2.29	2.65	3.13	3.87	4.56
Jun	.84	1.13	1.57	1.95	2.32	2.71	3.14	3.65	4.31	5.34	6.31
Jul	.69	.97	1.42	1.82	2.23	2.66	3.14	3.71	4.46	5.67	6.80
Aug	1.11	1.36	1.71	2.00	2.28	2.55	2.85	3.20	3.64	4.31	4.91
Sep	.34	.51	.79	1.06	1.34	1.64	1.98	2.39	2.95	3.84	4.70
Oct	.09	.19	.39	.62	.88	1.19	1.57	2.05	2.73	3.90	5.06
Nov	.04	.11	.25	.40	.55	.73	.94	1.21	1.58	2.19	2.80
Dec	.10	.14	.22	.30	.37	.46	.55	.67	.82	1.07	1.31
Ann	13.76	14.88	16.33	17.43	18.41	19.35	20.33	21.41	22.73	24.64	26.30

\+ 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)

Extremes (2)

Mean Number of Days (1)

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	10.1	7.6	7	6	13.5	1996	17	30.9	1989	39+	1989	12	27	1997	10.1	2.7	1.0	.3	.1	29.1	23.1	18.9	8.5
Feb	6.2	4.8	7	5	9.0	1996	27	19.1	1987	29+	1997	18	27	1997	6.8	1.9	.4	.1	.0	23.4	18.6	15.0	7.8
Mar	6.4	5.9	3	3	8.8	1985	28	19.1	1985	30	1979	3	17	1979	5.7	2.1	.6	.2	.0	17.4	12.9	8.3	2.0
Apr	2.5	.5	#	0	9.6	1994	26	10.6	1972	11+	1997	9	2+	1997	2.0	.6	.3	.1	.0	2.9	1.1	.6	.1
May	.0	.0	#	0	.5	1983	15	.6	1983	#+	1991	2	#	2000	.2	.0	.0	.0	.0	.0	.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	.0	.0	0	0	.2	1991	17	.2	1991	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	1.1	.2	#	0	5.9	1983	12	6.8	1985	4	1983	12	#	1991	.9	.3	.1	.1	.0	.5	.1	.0	.0
Nov	8.3	8.0	2	1	12.4	1998	18	29.0	1985	24	1985	26	6	1985	5.5	2.5	.9	.3	.1	12.2	5.9	3.1	1.3
Dec	7.8	6.1	4	2	8.7	1995	13	27.1	1996	33	1996	31	20+	1996	8.4	2.6	.5	.2	.0	23.2	13.2	9.5	2.8
Ann	42.4	33.1	N/A	N/A	13.5	Jan 1996	17	30.9	Jan 1989	39+	Jan 1989	12	27+	Feb 1997	39.6	12.7	3.8	1.3	.2	108.7	74.9	55.4	22.5

+ 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	6/12	6/06	6/02	5/29	5/26	5/22	5/18	5/14	5/08
32	5/30	5/24	5/19	5/15	5/12	5/08	5/04	4/30	4/24
28	5/15	5/09	5/05	5/02	4/28	4/25	4/21	4/17	4/11
24	5/01	4/25	4/21	4/18	4/14	4/11	4/08	4/04	3/29
20	4/24	4/18	4/14	4/11	4/08	4/04	4/01	3/28	3/22
16	4/13	4/08	4/05	4/03	3/31	3/29	3/26	3/23	3/18

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	8/26	9/01	9/05	9/08	9/11	9/14	9/17	9/21	9/27
32	9/05	9/10	9/14	9/17	9/20	9/24	9/27	10/01	10/06
28	9/21	9/26	9/29	10/03	10/05	10/08	10/11	10/15	10/20
24	9/25	10/01	10/05	10/08	10/12	10/15	10/18	10/23	10/28
20	10/02	10/09	10/13	10/17	10/21	10/25	10/29	11/02	11/09
16	10/16	10/21	10/25	10/29	11/01	11/04	11/07	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	134	125	119	113	108	102	97	90	81
32	156	147	141	136	131	126	121	115	106
28	182	174	169	164	159	155	150	144	137
24	202	195	189	184	180	175	170	165	157
20	222	213	206	201	196	190	185	179	170
16	237	229	223	219	214	210	205	199	191

***** 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	1860	1468	1233	689	294	88	27	53	276	655	1186	1660	9489
60	1697	1316	1063	539	191	39	9	20	147	487	1028	1510	8046
57	1604	1232	970	457	140	20	2	8	95	396	938	1417	7279
55	1542	1176	909	405	110	12	0	4	67	338	878	1355	6796
50	1387	1036	760	287	55	2	0	0	22	208	730	1200	5687
32	849	575	303	40	0	0	0	0	0	11	279	674	2731

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	1	9	67	329	756	984	1144	1097	739	383	57	3	5569
55	0	0	0	15	141	301	432	386	130	14	0	0	1419
57	0	0	0	11	110	248	371	328	99	8	0	0	1175
60	0	0	0	6	71	176	281	244	64	4	0	0	846
65	0	0	0	2	30	85	148	127	27	1	0	0	420
70	0	0	0	0	9	29	57	49	9	0	0	0	153

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	9	158	520	752	905	856	510	192	17	0	0	0	9	167	687	1439	2344	3200	3710	3902	3919	3919
45	0	0	0	81	378	602	750	701	369	102	6	0	0	0	0	81	459	1061	1811	2512	2881	2983	2989	2989
50	0	0	0	36	247	454	595	546	238	46	0	0	0	0	0	36	283	737	1332	1878	2116	2162	2162	2162
55	0	0	0	15	146	312	441	393	134	15	0	0	0	0	0	15	161	473	914	1307	1441	1456	1456	1456
60	0	0	0	4	78	184	289	252	68	3	0	0	0	0	0	4	82	266	555	807	875	878	878	878
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	4	113	329	472	589	549	311	122	10	0	0	0	4	117	446	918	1507	2056	2367	2489	2499	2499

(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