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: GACKLE, ND **COOP ID: 323309**

Climate Division: ND 9 **NWS Call Sign:** **Elevation: 1,951 Feet** **Lat: 46˚38N** **Lon: 99˚09W**

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	18.0	-.3	8.9	57	1981	24	23.0	1990	-37	1951	29	-6.0	1982	1741	0	.0	.0	.1	24.6	31.0	15.8
Feb	24.8	6.9	15.9	62	1958	25	27.1	1998	-35	1994	9	.6	1979	1376	0	.0	.0	.9	17.2	27.9	10.0
Mar	36.4	18.3	27.4	80	1963	23	35.8	1986	-25	1980	1	18.3	1996	1167	0	.0	.0	5.4	9.6	28.5	3.5
Apr	54.6	31.4	43.0	97	1980	21	52.2	1987	-7+	1975	1	32.9	1975	664	3	.0	.2	20.6	1.3	16.6	.2
May	68.8	44.1	56.5	97	1964	21	64.0	1977	15	1967	2	49.8	1979	290	25	.0	.4	30.0	.0	3.2	.0
Jun	77.3	53.5	65.4	104	1961	27	75.1	1988	31	1969	2	59.9	1993	90	102	.0	2.0	30.0	.0	.0	.0
Jul	82.8	58.5	70.7	109	1973	11	76.0	1974	36	1967	3	62.7	1992	38	214	.8	6.8	31.0	.0	.0	.0
Aug	81.7	56.6	69.2	105	1982	2	77.1	1983	32	1964	13	62.5	1977	54	183	.6	6.2	31.0	.0	.0	.0
Sep	70.9	45.9	58.4	104	1983	2	64.8	1998	17	1965	26	53.2	1985	231	33	.2	1.5	29.3	.0	1.8	.0
Oct	57.1	34.1	45.6	95	1963	4	49.6	1973	-2	1991	31	40.8	1976	601	0	.0	@	23.0	.7	12.8	.1
Nov	35.6	18.5	27.1	76+	1978	2	39.1	1999	-22+	1985	29	15.6	1985	1138	0	.0	.0	5.0	12.8	27.6	2.1
Dec	22.5	5.1	13.8	61	1969	1	24.4	1999	-37	1983	23	-2.0	1983	1588	0	.0	.0	.3	22.8	30.9	11.6
Ann	52.5	31.1	41.8	109	Jul 1973	11	77.1	Aug 1983	-37+	Dec 1983	23	-6.0	Jan 1982	8978	560	1.6	17.1	206.6	89.0	180.3	43.3

\+ 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

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	.44	.33	.67	1997	4	1.28	1997	.01	1974
Feb	.38	.37	1.09	1952	19	1.30	1987	.02+	1985
Mar	.94	.88	1.92	1973	14	2.42+	1977	.05+	1986
Apr	1.49	1.10	1.83	1953	24	4.86	1986	.00	1988
May	2.61	2.52	2.30	1987	21	5.48	1993	.44	1976
Jun	3.37	3.14	4.11	1956	6	7.93	1975	1.21	1987
Jul	3.06	2.74	4.65	1954	2	8.62	1993	.21	1988
Aug	2.03	1.89	2.79	1956	31	4.66	1989	.54	1971
Sep	1.89	1.36	2.52	1973	24	6.37	1973	.04	1974
Oct	1.48	1.21	2.07	1982	9	5.57	1982	.07	1987
Nov	.77	.67	1.21	1956	2	2.29	2000	.00	1990
Dec	.35	.29	.82	1951	6	1.06	1995	.01	1986
Ann	18.81	18.21	4.65	Jul 1954	2	8.62	Jul 1993	.00+	Nov 1990

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	6.4	1.5	.1	.0
Feb	4.7	1.4	@	.0
Mar	6.2	2.4	.4	.1
Apr	7.6	4.2	.8	.2
May	9.8	5.8	1.8	.4
Jun	10.6	6.6	2.0	.9
Jul	9.8	5.5	1.9	.7
Aug	8.2	4.8	1.3	.3
Sep	7.7	3.8	1.0	.4
Oct	6.7	3.2	.9	.3
Nov	6.0	2.3	.3	.0
Dec	5.9	.9	@	.0
Ann	89.6	42.4	10.5	3.3

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	.04	.07	.13	.19	.25	.33	.42	.54	.69	.96	1.22
Feb	.02	.04	.09	.14	.20	.26	.35	.46	.61	.87	1.12
Mar	.10	.17	.30	.43	.57	.73	.91	1.15	1.46	1.99	2.51
Apr	.09	.23	.46	.68	.91	1.17	1.47	1.84	2.34	3.17	3.97
May	.57	.81	1.19	1.54	1.88	2.25	2.67	3.16	3.82	4.86	5.85
Jun	1.27	1.59	2.04	2.41	2.77	3.13	3.52	3.98	4.56	5.45	6.27
Jul	.47	.73	1.17	1.59	2.03	2.51	3.06	3.74	4.64	6.11	7.53
Aug	.73	.92	1.19	1.43	1.65	1.87	2.12	2.41	2.77	3.34	3.86
Sep	.17	.30	.55	.82	1.10	1.43	1.82	2.30	2.97	4.09	5.18
Oct	.12	.22	.41	.62	.84	1.10	1.41	1.80	2.34	3.24	4.13
Nov	.02	.07	.17	.27	.40	.54	.72	.94	1.25	1.78	2.30
Dec	.03	.06	.11	.16	.21	.27	.34	.43	.55	.76	.96
Ann	11.59	12.91	14.64	15.98	17.20	18.38	19.62	21.01	22.72	25.23	27.43

\+ 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	7.2	6.5	8	7
Feb	5.2	4.0	8	5
Mar	6.3	6.0	4	2
Apr	2.5	1.5	1	#
May	.2	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.1	.0	#	0
Oct	1.2	.5	#	0
Nov	6.4	5.5	2	1
Dec	5.1	4.5	4	4
Ann	34.2	28.5	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	7.0	1993	12	17.5	1997	40	1997	26	35	1997
Feb	5.0	1977	24	16.0	1979	38	1997	1	34	1997
Mar	9.0	1975	24	17.0	1997	34	1997	13	25	1997
Apr	11.0	1986	14	12.8	1986	25	1975	3	14	1975
May	4.0	1991	3	4.0	1991	4	1991	3	#+	1996
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	1984	24	3.0	1984	1	1984	24	#+	1995
Oct	5.0	1977	7	6.0	1977	5	1977	7	#+	1999
Nov	6.0	1977	19	20.0	1977	20	1993	27	7	1992
Dec	5.0	1988	26	11.5	1993	22	1996	31	22	1996
Ann	11.0	Apr 1986	14	20.0	Nov 1977	40	Jan 1997	26	35	Jan 1997

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	5.1	3.0	.6	.3	.0
Feb	3.6	2.3	.5	.1	.0
Mar	3.5	2.4	.7	.2	.0
Apr	1.3	.9	.3	.1	@
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	.8	.5	.1	@	.0
Nov	3.7	2.5	.9	.3	.0
Dec	4.5	2.5	.4	@	.0
Ann	22.7	14.3	3.5	1.0	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	26.9	18.9	12.5	4.6
Feb	25.1	16.5	12.6	4.7
Mar	11.0	7.3	5.6	1.2
Apr	1.7	1.2	.6	.1
May	@	@	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.0	.0	.0
Oct	.4	.1	@	.0
Nov	8.7	3.9	2.7	.9
Dec	20.7	13.7	7.8	.7
Ann	94.6	61.6	41.8	12.2

+ 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	6/02	5/29	5/25	5/22	5/20	5/17	5/14	5/11	5/06
32	5/24	5/19	5/16	5/13	5/11	5/08	5/06	5/02	4/28
28	5/15	5/10	5/07	5/05	5/02	4/30	4/27	4/24	4/20
24	5/09	5/03	4/29	4/25	4/22	4/18	4/15	4/11	4/05
20	4/25	4/20	4/16	4/13	4/10	4/07	4/04	4/01	3/27
16	4/14	4/10	4/07	4/04	4/02	3/30	3/28	3/25	3/21

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	9/06	9/10	9/13	9/15	9/17	9/19	9/22	9/24	9/28
32	9/16	9/20	9/22	9/24	9/26	9/28	10/01	10/03	10/07
28	9/21	9/26	9/29	10/02	10/04	10/07	10/09	10/13	10/17
24	9/27	10/02	10/06	10/10	10/13	10/17	10/20	10/24	10/30
20	10/07	10/13	10/17	10/21	10/25	10/28	11/01	11/06	11/12
16	10/15	10/21	10/25	10/29	11/01	11/04	11/08	11/12	11/18

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	139	132	128	123	120	116	112	107	100
32	155	149	145	141	138	134	131	127	121
28	173	166	162	158	154	150	146	142	135
24	199	190	184	179	174	169	163	157	148
20	220	212	206	201	197	192	187	182	174
16	233	226	221	216	212	208	204	199	192

***** 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	1741	1376	1167	664	290	90	38	54	231	601	1138	1588	8978
60	1586	1236	1012	523	178	33	12	18	128	447	988	1433	7594
57	1493	1152	919	442	126	15	6	9	81	356	898	1340	6837
55	1431	1096	858	391	97	9	0	4	57	297	838	1278	6356
50	1276	956	706	277	44	1	0	0	17	170	693	1123	5263
32	754	506	255	39	0	0	0	0	0	6	255	608	2423

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	36	54	111	368	758	1002	1199	1152	791	428	107	43	6049
55	0	0	0	30	142	321	486	442	158	6	0	0	1585
57	0	0	0	21	109	267	429	386	122	3	0	0	1337
60	0	0	0	12	68	195	343	302	80	1	0	0	1001
65	0	0	0	3	25	102	214	183	33	0	0	0	560
70	0	0	0	0	7	40	120	96	10	0	0	0	273

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	17	194	534	781	967	925	576	242	24	0	0	1	18	212	746	1527	2494	3419	3995	4237	4261	4261
45	0	0	5	109	388	631	812	770	430	137	8	0	0	0	5	114	502	1133	1945	2715	3145	3282	3290	3290
50	0	0	0	56	256	481	657	615	293	62	0	0	0	0	0	56	312	793	1450	2065	2358	2420	2420	2420
55	0	0	0	23	146	336	502	461	179	26	0	0	0	0	0	23	169	505	1007	1468	1647	1673	1673	1673
60	0	0	0	7	72	202	350	310	96	9	0	0	0	0	0	7	79	281	631	941	1037	1046	1046	1046
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	17	138	330	489	632	594	354	158	18	0	0	1	18	156	486	975	1607	2201	2555	2713	2731	2731

(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