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: CARRINGTON 4 N, ND **COOP ID: 321362**

Climate Division: ND 5 **NWS Call Sign:** **Elevation: 1,560 Feet** **Lat: 47˚30N** **Lon: 99˚07W**

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	16.7	-3.7	6.5	55	1990	10	20.4	1990	-38	1968	4	-9.5	1982	1815	0	.0	.0	@	25.3	31.0	17.9
Feb	24.2	3.3	13.8	58	1992	29	26.9	1998	-39	1996	1	-3.6	1979	1435	0	.0	.0	.7	18.5	28.1	11.9
Mar	36.3	15.6	26.0	70	1986	29	36.2	1973	-27	1969	7	17.3	1975	1210	0	.0	.0	4.4	10.6	29.5	4.7
Apr	54.8	28.8	41.8	99	1980	21	51.5	1987	-12	1979	6	31.0	1979	699	4	.0	.2	19.3	1.6	20.1	.2
May	70.6	41.6	56.1	97+	1986	31	65.2	1977	14+	1967	3	48.8	1979	309	32	.0	.8	29.9	.0	4.7	.0
Jun	78.1	51.1	64.6	100	1968	3	73.5	1988	29	1969	20	58.8	1982	103	91	.0	2.2	30.0	.0	.1	.0
Jul	82.7	55.1	68.9	107	1973	11	74.3	1983	34+	1972	3	62.8	1992	40	161	.3	4.5	31.0	.0	.0	.0
Aug	82.1	52.8	67.5	107	1983	7	74.7	1983	28	1974	31	61.2	1974	71	146	.3	5.8	31.0	.0	.1	.0
Sep	71.5	43.3	57.4	105	1978	5	63.6	1998	15	1974	30	52.3	1984	251	23	.2	1.6	29.1	.0	2.9	.0
Oct	57.2	31.6	44.4	92	1992	2	49.4	1973	-3	1991	31	38.6	1991	638	0	.0	@	22.7	.8	16.2	.1
Nov	34.9	16.2	25.6	78	1975	5	37.5	1999	-27	1985	29	12.9	1996	1185	0	.0	.0	4.5	13.0	28.5	3.2
Dec	21.8	2.3	12.1	61	1969	1	24.3	1997	-37	1967	31	.5	1983	1642	0	.0	.0	.3	23.0	31.0	13.4
Ann	52.6	28.2	40.4	107+	Aug 1983	7	74.7	Aug 1983	-39	Feb 1996	1	-9.5	Jan 1982	9398	457	.8	15.1	202.9	92.8	192.2	51.4

\+ 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: 1967-2001

(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	.52	.39	.70	1976	1	1.43	1996	.00	1973
Feb	.40	.29	1.12	1969	27	1.38	1998	.00	1982
Mar	.75	.83	1.10	1981	31	1.79	1983	.01	1986
Apr	1.44	1.02	2.04	1986	14	4.87	1986	.00+	1987
May	2.49	2.10	2.82	1987	21	5.98	1999	.50	1976
Jun	3.79	3.29	3.33	2000	14	9.67	1990	.47	1974
Jul	3.11	2.50	2.99	1987	18	10.11	1993	.59	1975
Aug	2.48	2.06	4.00	1999	12	7.03	1980	.42	1971
Sep	1.84	1.61	2.13	1981	6	4.36	1973	.12	1993
Oct	1.82	1.24	2.55	1973	9	5.74	1982	.03	1988
Nov	.84	.71	2.70	1986	8	2.89	1986	.00+	1999
Dec	.41	.32	.55	1982	2	1.08	1978	.01+	1989
Ann	19.89	20.54	4.00	Aug 1999	12	10.11	Jul 1993	.00+	Nov 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.7	1.8	.2	.0
Feb	4.4	1.4	.0	.0
Mar	4.4	2.4	.3	@
Apr	6.1	3.3	.7	.3
May	8.5	5.6	1.6	.4
Jun	10.5	6.9	2.3	.8
Jul	9.3	6.1	2.1	.7
Aug	8.2	5.1	1.4	.5
Sep	7.2	4.0	1.3	.4
Oct	5.7	3.3	1.1	.5
Nov	4.5	2.5	.3	.1
Dec	4.5	1.4	.1	.0
Ann	78.0	43.8	11.4	3.7

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	.03	.08	.16	.23	.32	.41	.51	.64	.81	1.10	1.39
Feb	.02	.05	.11	.17	.23	.30	.39	.49	.64	.88	1.12
Mar	.09	.14	.25	.35	.46	.59	.73	.91	1.16	1.56	1.96
Apr	.00	.16	.42	.65	.88	1.14	1.44	1.80	2.29	3.09	3.87
May	.71	.95	1.30	1.61	1.92	2.23	2.58	3.00	3.53	4.37	5.15
Jun	1.00	1.36	1.91	2.39	2.86	3.36	3.91	4.57	5.42	6.77	8.02
Jul	.64	.92	1.38	1.80	2.22	2.66	3.17	3.78	4.58	5.86	7.08
Aug	.57	.80	1.16	1.49	1.81	2.16	2.55	3.01	3.62	4.59	5.50
Sep	.34	.50	.77	1.02	1.27	1.55	1.86	2.24	2.74	3.54	4.31
Oct	.04	.11	.27	.49	.77	1.11	1.54	2.13	2.98	4.48	6.02
Nov	.00	.05	.17	.29	.43	.59	.79	1.03	1.37	1.95	2.52
Dec	.03	.05	.10	.16	.22	.29	.38	.50	.65	.92	1.19
Ann	12.81	14.13	15.84	17.16	18.35	19.50	20.71	22.05	23.69	26.10	28.21

\+ 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: 1967-2001
(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	11.3	10.2	5	4	15.0	1997	4	33.1	1997	21	1979	20	18	1979	3.3	2.4	.9	.3	.1	-9.9	-9.9	-9.9	-9.9
Feb	5.6	3.2	5	2	12.0	1996	27	21.0	1979	22	1979	19	21	1979	2.6	2.0	.3	.2	.1	-9.9	-9.9	-9.9	-9.9
Mar	5.9	2.5	2	0	9.0	1972	27	20.5	1989	19	1979	31	19	1979	2.1	1.8	.6	.2	.0	-9.9	-9.9	-9.9	-9.9
Apr	1.0	.0	0	0	10.0	1979	12	11.5	1979	0	0	0	0	0	.3	.3	.2	.1	@	-9.9	-9.9	-9.9	-9.9
May	.1	.0	0	0	2.0	1979	4	2.0	1979	0	0	0	0	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	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	1.1	.0	#	0	6.0	1991	29	15.0	1991	1	1979	31	#	1979	.3	.3	.2	.1	.0	.1	.0	.0	.0
Nov	4.8	3.0	#	0	8.0	1998	10	19.0	1998	6	1978	13	4	1974	1.8	1.5	.5	.2	.0	-9.9	-9.9	-9.9	-9.9
Dec	6.1	5.0	2	0	8.4	1996	28	16.7	1995	14	1978	31	11	1978	3.0	2.2	.8	.3	.0	-9.9	-9.9	-9.9	-9.9
Ann	35.9	23.9	N/A	N/A	15.0	Jan 1997	4	33.1	Jan 1997	22	Feb 1979	19	21	Feb 1979	13.4	10.5	3.5	1.4	.2	-9.9	-9.9	-9.9	-9.9

+ Also occurred on an earlier date(s) #Denotes trace amounts

(1) Derived from Snow Climatology and 1971-2000 daily data

@ Denotes mean number of days greater than 0 but less than .05

(2) Derived from 1971-2000 daily data

-9/-9.9 represents missing values

Annual statistics for Mean/Median snow depths are not appropriate

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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	6/17	6/10	6/05	5/31	5/27	5/23	5/19	5/14	5/07
32	5/26	5/22	5/19	5/16	5/14	5/11	5/09	5/05	5/01
28	5/17	5/13	5/10	5/08	5/05	5/03	4/30	4/27	4/23
24	5/12	5/07	5/03	4/30	4/27	4/24	4/20	4/16	4/11
20	5/02	4/26	4/21	4/18	4/14	4/10	4/07	4/02	3/27
16	4/19	4/15	4/11	4/09	4/06	4/03	4/01	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	8/27	8/31	9/04	9/07	9/10	9/12	9/15	9/19	9/23
32	9/07	9/11	9/13	9/16	9/18	9/20	9/22	9/25	9/29
28	9/13	9/18	9/21	9/24	9/27	9/30	10/03	10/06	10/11
24	9/24	9/29	10/03	10/06	10/09	10/12	10/16	10/20	10/25
20	10/03	10/09	10/13	10/17	10/20	10/24	10/27	10/31	11/06
16	10/07	10/13	10/18	10/22	10/26	10/30	11/03	11/08	11/14

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	122	115	110	104	99	93	87	77
32	144	138	134	130	126	123	119	115	109
28	163	156	152	148	144	140	136	132	125
24	186	179	174	169	165	161	156	151	144
20	214	205	199	193	188	183	178	172	163
16	225	217	212	207	202	198	193	187	179

***** 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	1815	1435	1210	699	309	103	40	71	251	638	1185	1642	9398
60	1660	1295	1055	558	200	41	10	25	142	483	1035	1487	7991
57	1567	1211	962	477	147	21	3	12	90	392	945	1394	7221
55	1505	1155	901	426	116	12	0	6	63	332	885	1332	6733
50	1350	1015	752	309	59	2	0	1	20	202	738	1177	5625
32	822	559	297	53	1	0	0	0	0	10	288	650	2680

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	30	48	110	347	747	978	1144	1099	762	396	94	32	5787
55	0	0	1	30	149	301	431	392	135	5	0	0	1444
57	0	0	0	21	118	249	372	336	103	2	0	0	1201
60	0	0	0	12	78	180	286	256	64	0	0	0	876
65	0	0	0	4	32	91	161	146	23	0	0	0	457
70	0	0	0	0	11	33	75	69	6	0	0	0	194

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	10	160	509	737	893	860	529	210	21	0	0	1	11	171	680	1417	2310	3170	3699	3909	3930	3930
45	0	0	2	84	363	587	738	705	385	118	7	0	0	0	2	86	449	1036	1774	2479	2864	2982	2989	2989
50	0	0	0	43	235	437	583	550	254	51	0	0	0	0	0	43	278	715	1298	1848	2102	2153	2153	2153
55	0	0	0	17	134	292	429	397	149	15	0	0	0	0	0	17	151	443	872	1269	1418	1433	1433	1433
60	0	0	0	8	69	167	277	257	73	4	0	0	0	0	0	8	77	244	521	778	851	855	855	855
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	10	125	331	464	577	547	337	151	14	0	0	1	11	136	467	931	1508	2055	2392	2543	2557	2557

(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