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: CARPENTER 2 S, OH **COOP ID: 331288**

Climate Division: OH 9 **NWS Call Sign:** **Elevation: 822 Feet** **Lat: 39˚09N** **Lon: 82˚13W**

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	37.0	16.9	27.0	75	1999	23	39.3	1990	-25	1994	19	8.8	1977	1180	0	.0	.0	6.1	9.8	26.8	2.5
Feb	41.6	19.1	30.4	77	2000	27	39.1	2000	-14	1977	2	16.4+	1979	971	0	.0	.0	9.0	6.4	22.5	1.5
Mar	52.3	26.8	39.6	83+	1998	31	46.4	1973	-5	1980	3	33.0	1984	789	0	.0	.0	19.3	1.3	18.7	.1
Apr	63.3	36.2	49.8	89	1985	22	55.2	1985	14	1964	1	42.8	1975	460	2	.0	.0	26.9	.1	8.8	.0
May	72.4	46.1	59.3	92	1965	3	66.6	1991	21	1966	10	54.8	1979	219	41	.0	.1	30.9	.0	1.4	.0
Jun	80.3	54.9	67.6	99	1988	25	71.0	1994	31	1972	11	62.6	1972	47	124	.0	1.7	30.0	.0	@	.0
Jul	83.8	58.9	71.4	102	1964	26	76.5	1999	39	1979	6	67.6	1976	9	207	@	5.6	31.0	.0	.0	.0
Aug	82.4	57.4	69.9	101	1983	22	76.1	1995	35	1986	29	64.1	1976	23	175	.1	4.0	31.0	.0	.0	.0
Sep	76.1	50.0	63.1	97	1983	10	67.9	1998	28+	1975	14	57.2	1976	112	53	.0	1.2	30.0	.0	.3	.0
Oct	65.1	37.0	51.1	88+	1984	19	58.3	1984	14	1974	21	42.7	1976	446	13	.0	.0	29.7	.0	8.3	.0
Nov	52.8	30.1	41.5	80+	1984	1	47.9	1994	-1	1976	30	31.4	1976	707	0	.0	.0	18.4	.4	15.7	@
Dec	41.8	22.0	31.9	78	1982	3	40.4	1984	-18	1989	22	19.9	1989	1026	0	.0	.0	9.3	5.6	23.8	.7
Ann	62.4	38.0	50.2	102	Jul 1964	26	76.5	Jul 1999	-25	Jan 1994	19	8.8	Jan 1977	5989	615	.1	12.6	271.6	23.6	126.3	4.8

\+ 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: 1963-2001

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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	2.84	2.70	1.81	1998	8	6.64	1999	.67	1981
Feb	2.80	2.72	3.60	2000	19	6.34	2000	.50	1978
Mar	3.49	2.94	4.87	1997	2	10.08	1997	1.13	1983
Apr	3.35	3.18	2.93	1975	24	6.11	1972	.86	1971
May	4.22	3.46	2.96	1985	16	8.40	1996	1.49	1991
Jun	3.82	3.72	2.23	1994	8	8.06	1998	.19	1988
Jul	4.36	4.22	2.76	1987	23	8.85	1980	1.83	1975
Aug	4.11	3.88	3.22	1999	25	10.41	1979	.77	1983
Sep	3.07	3.10	3.39	1966	21	7.12	1975	.60	1985
Oct	2.59	2.27	2.35	1975	17	6.73	1983	.73	1982
Nov	3.03	2.73	2.00	1996	8	8.32	1985	.55	1976
Dec	3.09	2.73	3.55	1991	3	7.64	1990	1.60+	1993
Ann	40.77	40.11	4.87	Mar 1997	2	10.41	Aug 1979	.19	Jun 1988

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.5	7.2	1.8	.4
Feb	9.6	6.2	1.7	.5
Mar	10.9	7.5	2.5	.5
Apr	11.4	7.6	2.0	.6
May	11.8	8.4	2.9	.9
Jun	10.4	7.2	2.8	1.0
Jul	10.8	8.1	3.1	1.0
Aug	9.0	6.5	2.9	1.2
Sep	8.6	5.7	1.9	.8
Oct	8.1	5.5	1.8	.5
Nov	9.9	6.7	2.2	.5
Dec	10.7	6.6	1.8	.6
Ann	122.7	83.2	27.4	8.5

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	.87	1.14	1.54	1.89	2.23	2.57	2.96	3.41	3.99	4.90	5.74
Feb	.79	1.06	1.46	1.81	2.15	2.51	2.90	3.37	3.97	4.93	5.81
Mar	1.21	1.54	2.02	2.43	2.82	3.21	3.65	4.15	4.80	5.80	6.72
Apr	1.18	1.50	1.96	2.34	2.71	3.08	3.49	3.97	4.58	5.53	6.39
May	1.50	1.89	2.47	2.95	3.42	3.89	4.41	5.01	5.78	6.96	8.05
Jun	1.05	1.41	1.96	2.44	2.91	3.41	3.96	4.60	5.45	6.77	8.01
Jul	1.87	2.26	2.81	3.26	3.69	4.11	4.57	5.10	5.77	6.78	7.70
Aug	1.18	1.57	2.16	2.67	3.17	3.69	4.26	4.94	5.82	7.20	8.48
Sep	.92	1.22	1.65	2.03	2.39	2.77	3.19	3.68	4.32	5.31	6.23
Oct	.58	.82	1.19	1.54	1.88	2.24	2.65	3.14	3.78	4.81	5.77
Nov	.89	1.18	1.61	1.98	2.35	2.73	3.14	3.63	4.27	5.27	6.19
Dec	1.22	1.51	1.92	2.25	2.57	2.89	3.24	3.64	4.16	4.94	5.65
Ann	30.37	32.42	35.02	36.99	38.72	40.40	42.12	44.01	46.29	49.59	52.43

+ 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: 1963-2001
(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	6.3	3.8	2	#
Feb	4.2	3.8	1	#
Mar	2.7	2.5	#	#
Apr	1.0	.0	#	0
May	#	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.2	.0	0	0
Nov	.6	.0	#	0
Dec	2.0	.8	#	#
Ann	17.0	10.9	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	15.0	1994	17	27.2	1994	20	1978	20	8	1978
Feb	6.0	1986	11	16.0	1979	11	1977	5	7	1978
Mar	10.0	1999	15	10.0	1999	11	1978	3	3	1978
Apr	14.0	1987	5	20.5	1987	#+	2000	5	#+	2000
May	#	1989	7	#	1989	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	.0	0	0	.0	0	0	0	0	0	0
Oct	5.0	1974	20	5.0	1974	0	0	0	0	0
Nov	3.0	1971	24	3.8	1996	3	1996	22	#+	2000
Dec	6.0	1989	16	9.2	1993	4+	1999	29	1+	2000
Ann	15.0	Jan 1994	17	27.2	Jan 1994	20	Jan 1978	20	8	Jan 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.6	2.6	.8	.2	@
Feb	2.9	1.7	.6	.1	.0
Mar	1.7	1.2	.4	@	@
Apr	.2	.1	.1	.1	@
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	.0	.0	.0
Oct	@	@	@	@	.0
Nov	.6	.3	@	.0	.0
Dec	1.9	.9	.3	.1	.0
Ann	10.9	6.8	2.2	.5	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	6.9	4.2	2.2	.8
Feb	5.7	3.0	2.7	.2
Mar	2.4	1.2	.6	.1
Apr	.0	.0	.0	.0
May	.0	.0	.0	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.0	.0	.0	.0
Oct	.0	.0	.0	.0
Nov	.6	.2	.0	.0
Dec	1.9	.3	.0	.0
Ann	17.5	8.9	5.5	1.1

+ 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	6/01	5/26	5/21	5/17	5/14	5/10	5/06	5/01	4/25
32	5/22	5/16	5/12	5/08	5/05	5/01	4/27	4/23	4/17
28	5/09	5/03	4/29	4/25	4/22	4/18	4/14	4/10	4/04
24	4/22	4/16	4/12	4/09	4/05	4/02	3/30	3/26	3/20
20	4/11	4/06	4/02	3/29	3/26	3/23	3/20	3/16	3/11
16	4/03	3/26	3/20	3/15	3/11	3/06	3/01	2/23	2/15

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	9/16	9/21	9/24	9/27	9/29	10/02	10/04	10/08	10/12
32	9/23	9/28	10/01	10/04	10/06	10/09	10/12	10/15	10/19
28	10/01	10/07	10/12	10/16	10/20	10/24	10/28	11/01	11/08
24	10/10	10/17	10/22	10/26	10/30	11/03	11/07	11/12	11/19
20	10/21	10/28	11/03	11/08	11/12	11/17	11/21	11/27	12/05
16	10/30	11/07	11/13	11/18	11/23	11/28	12/03	12/09	12/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	159	152	147	142	138	134	129	124	117
32	174	167	162	158	154	150	146	141	134
28	207	198	191	186	181	175	170	163	154
24	232	223	217	212	207	202	196	190	181
20	262	251	243	236	230	224	217	209	198
16	293	280	271	263	256	249	241	232	220

***** 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	1180	971	789	460	219	47	9	23	112	446	707	1026	5989
60	1025	831	634	320	122	12	0	4	45	313	559	871	4736
57	932	747	545	243	79	4	0	0	23	245	472	778	4068
55	878	691	488	198	56	2	0	0	13	205	417	721	3669
50	731	563	349	106	19	0	0	0	3	122	286	577	2756
32	292	185	49	1	0	0	0	0	0	5	25	175	732

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	135	138	283	533	845	1067	1220	1175	931	595	308	172	7402
55	8	0	9	40	188	379	507	462	254	82	10	4	1943
57	0	0	4	26	149	321	445	400	203	60	5	0	1613
60	0	0	0	12	99	239	352	311	136	36	2	0	1187
65	0	0	0	2	41	124	207	175	53	13	0	0	615
70	0	0	0	0	13	47	92	79	12	3	0	0	246

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	38	64	183	384	664	885	1025	979	751	424	190	68	38	102	285	669	1333	2218	3243	4222	4973	5397	5587	5655
45	15	29	107	258	511	735	870	824	601	280	113	32	15	44	151	409	920	1655	2525	3349	3950	4230	4343	4375
50	4	11	58	157	362	585	715	669	453	169	56	17	4	15	73	230	592	1177	1892	2561	3014	3183	3239	3256
55	0	0	27	87	228	435	560	515	310	88	24	4	0	0	27	114	342	777	1337	1852	2162	2250	2274	2278
60	0	0	11	38	123	287	405	362	190	40	6	0	0	0	11	49	172	459	864	1226	1416	1456	1462	1462
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	28	47	131	252	423	585	694	659	488	285	120	41	28	75	206	458	881	1466	2160	2819	3307	3592	3712	3753

(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/normals/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.
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