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: CARO REGIONAL CENTER, MI **COOP ID: 201299**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 43˚27N** **Lon: 83˚27W**

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	29.5	14.0	21.8	65	1950	25	31.2	1990	-25	1976	18	11.3	1977	1342	0	.0	.0	1.0	19.1	29.4	5.0
Feb	32.8	15.5	24.2	67	1976	25	33.8	1998	-28	1959	2	13.5	1979	1145	0	.0	.0	1.8	14.4	26.0	4.2
Mar	43.9	24.4	34.2	80	2000	8	42.2	2000	-20	1962	2	27.0	1978	955	0	.0	.0	9.1	5.4	24.7	.9
Apr	57.6	34.0	45.8	88	1985	23	51.5	1985	6	1965	3	38.7	1975	576	1	.0	.0	22.1	.2	14.3	.0
May	71.1	44.1	57.6	94	1987	30	63.6+	1998	22	1967	5	49.7	1997	269	39	.0	.8	30.5	.0	3.6	.0
Jun	79.7	53.1	66.4	100+	1971	28	70.8	1987	28	1949	8	62.1	1982	61	103	.1	3.3	30.0	.0	.1	.0
Jul	84.0	58.0	71.0	101	1988	7	75.4	1987	34	1965	20	66.2	1992	9	195	.1	6.0	31.0	.0	.0	.0
Aug	81.1	56.5	68.8	101	2001	9	74.6	1995	32+	1976	30	64.3	1992	33	150	.0	2.4	31.0	.0	.1	.0
Sep	73.4	49.1	61.3	102	1953	1	66.1	1998	24	1951	29	56.6	1975	141	28	.0	.8	30.0	.0	1.2	.0
Oct	60.9	39.2	50.1	88+	1951	4	58.0	1971	12	1976	28	44.8	1988	466	3	.0	.0	27.0	.0	7.8	.0
Nov	46.5	30.9	38.7	80	1950	1	45.5	1975	-2+	1950	24	31.8	1976	790	0	.0	.0	11.0	2.2	18.0	.0
Dec	34.1	20.5	27.3	69	2001	6	35.8	1982	-18	2000	25	15.2	1989	1169	0	.0	.0	2.1	12.4	27.4	1.8
Ann	57.9	36.6	47.3	102	Sep 1953	1	75.4	Jul 1987	-28	Feb 1959	2	11.3	Jan 1977	6956	519	.2	13.3	226.6	53.7	152.6	11.9

\+ 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

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: CARO REGIONAL CENTER, MI **COOP ID: 201299**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 43˚27N** **Lon: 83˚27W**

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	1.75	1.44	1.30	1949	19	4.17	1993	.59	1984
Feb	1.23	.96	1.98	1997	21	4.92	1997	.14	1987
Mar	2.30	2.03	1.80	1976	3	7.96	1976	.55	1996
Apr	2.95	2.68	2.40	1991	9	7.78	1991	1.13	1971
May	2.89	2.73	2.84	1996	20	6.56	1996	.40	1977
Jun	3.45	3.32	4.02	1994	24	8.16	1994	1.01	1988
Jul	2.73	2.75	2.76	1970	10	5.90	1992	.59	1989
Aug	3.28	3.26	2.58	1959	27	6.29	1972	.67	1976
Sep	4.13	3.50	7.28	1986	11	18.16	1986	.64	1979
Oct	2.56	2.52	3.20	1954	3	5.50	1990	.47	1975
Nov	2.58	2.39	2.34	1995	11	5.35	1995	.60	1986
Dec	2.03	1.86	2.30	1972	30	5.37	1972	.54	1993
Ann	31.88	31.38	7.28	Sep 1986	11	18.16	Sep 1986	.14	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	12.1	5.6	.7	.2
Feb	9.2	3.8	.5	.1
Mar	10.2	6.0	1.3	.3
Apr	12.2	7.4	1.5	.3
May	11.0	6.8	1.6	.5
Jun	11.3	6.9	2.0	.6
Jul	10.6	6.0	1.7	.5
Aug	10.4	6.4	2.1	.6
Sep	10.9	6.9	2.6	1.1
Oct	10.6	6.0	1.5	.4
Nov	12.3	6.4	1.4	.2
Dec	13.1	5.7	.9	.1
Ann	133.9	73.9	17.8	4.9

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	.56	.72	.97	1.18	1.38	1.59	1.83	2.10	2.45	2.99	3.49
Feb	.24	.35	.53	.69	.86	1.04	1.25	1.49	1.82	2.34	2.84
Mar	.66	.87	1.20	1.49	1.77	2.06	2.39	2.77	3.27	4.04	4.77
Apr	1.15	1.43	1.82	2.14	2.44	2.75	3.09	3.48	3.97	4.73	5.42
May	.79	1.07	1.48	1.85	2.20	2.58	2.99	3.48	4.12	5.12	6.05
Jun	1.28	1.60	2.06	2.45	2.82	3.20	3.61	4.08	4.69	5.62	6.47
Jul	.91	1.17	1.55	1.87	2.18	2.50	2.85	3.26	3.78	4.59	5.34
Aug	1.26	1.56	2.00	2.36	2.70	3.05	3.43	3.87	4.43	5.29	6.07
Sep	.84	1.22	1.82	2.38	2.94	3.53	4.21	5.03	6.10	7.82	9.46
Oct	.94	1.18	1.53	1.81	2.09	2.37	2.67	3.03	3.48	4.18	4.81
Nov	.74	.98	1.35	1.67	1.99	2.31	2.68	3.10	3.66	4.52	5.33
Dec	.59	.78	1.07	1.33	1.57	1.83	2.11	2.44	2.87	3.54	4.17
Ann	24.36	25.85	27.75	29.18	30.43	31.64	32.87	34.23	35.87	38.22	40.24

\+ 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

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data,
and Information Services

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: CARO REGIONAL CENTER, MI **COOP ID: 201299**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 43°27N** **Lon: 83°27W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	11.0	10.4	4	3
Feb	6.9	6.9	4	3
Mar	5.2	4.5	1	1
Apr	1.0	#	#	#
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	.1	.0	#	0
Nov	2.7	2.5	#	#
Dec	8.4	8.3	2	2
Ann	35.3	32.6	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	8.0	1978	26	25.3	1978	18	1978	27	11	1979
Feb	6.3	1990	15	18.9	1990	18	1985	18	13	1979
Mar	10.5	1983	21	15.5	1971	12	1983	22	6	1978
Apr	5.5	1975	3	9.0	1975	8	1975	5	2	1975
May	#	1990	11	#+	1990	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	1.4	1997	27	1.4+	1997	1	1997	27	#+	2000
Nov	6.2	1989	16	7.5	1975	7	1975	27	1	1995
Dec	7.0	2000	12	17.3	1983	16	2000	31	10	2000
Ann	10.5	Mar 1983	21	25.3	Jan 1978	18+	Feb 1985	18	13	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	8.0	4.1	1.1	.2	.0
Feb	5.0	2.9	.7	.1	.0
Mar	3.0	1.8	.6	.2	.1
Apr	.5	.3	.1	@	.0
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	.0	.0
Nov	1.9	1.1	.2	.1	.0
Dec	6.5	3.4	.9	.1	.0
Ann	24.9	13.6	3.6	.7	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	22.6	16.1	10.5	3.4
Feb	18.2	12.4	8.0	3.2
Mar	7.2	4.0	1.9	.4
Apr	.9	.4	.2	.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
Nov	2.4	.6	.1	.0
Dec	13.0	5.6	1.8	.0
Ann	64.3	39.1	22.5	7.0

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

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: CARO REGIONAL CENTER, MI **COOP ID: 201299**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 43˚27N** **Lon: 83˚27W**

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

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	9/01	9/06	9/09	9/12	9/15	9/18	9/21	9/24	9/29
32	9/09	9/15	9/19	9/22	9/25	9/28	10/01	10/05	10/10
28	9/26	10/01	10/05	10/08	10/11	10/14	10/18	10/21	10/27
24	10/13	10/18	10/22	10/25	10/29	11/01	11/04	11/08	11/13
20	10/20	10/27	11/01	11/05	11/09	11/13	11/18	11/23	11/30
16	10/30	11/06	11/12	11/16	11/21	11/25	11/30	12/05	12/12

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	127	120	114	110	105	101	96	91	83
32	153	144	138	133	128	124	118	112	104
28	181	174	169	165	161	157	153	148	142
24	213	205	200	195	191	186	181	176	168
20	243	233	225	219	213	208	201	194	184
16	266	257	250	244	239	233	228	221	211

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

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: CARO REGIONAL CENTER, MI **COOP ID: 201299**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 670 Feet** **Lat: 43˚27N** **Lon: 83˚27W**

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	1342	1145	955	576	269	61	9	33	141	466	790	1169	6956
60	1187	1005	800	430	166	18	0	6	56	323	640	1014	5645
57	1094	921	707	347	116	8	0	1	27	247	550	921	4939
55	1032	865	645	294	89	4	0	0	15	201	491	859	4495
50	877	725	499	179	39	0	0	0	3	109	350	709	3490
32	361	276	108	5	0	0	0	0	0	1	35	248	1034

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	42	55	175	419	793	1033	1209	1140	877	562	235	102	6642
55	0	0	0	19	169	347	496	427	202	49	1	0	1710
57	0	0	0	11	134	290	434	366	154	32	0	0	1421
60	0	0	0	5	91	211	341	278	93	15	0	0	1034
65	0	0	0	1	39	103	195	150	28	3	0	0	519
70	0	0	0	0	13	34	83	62	4	0	0	0	196

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	2	8	71	226	556	807	970	901	644	334	96	15	2	10	81	307	863	1670	2640	3541	4185	4519	4615	4630
45	0	0	36	136	406	657	815	746	495	209	48	5	0	0	36	172	578	1235	2050	2796	3291	3500	3548	3553
50	0	0	17	73	270	507	660	592	353	118	17	1	0	0	17	90	360	867	1527	2119	2472	2590	2607	2608
55	0	0	5	37	164	364	505	437	227	57	5	0	0	0	5	42	206	570	1075	1512	1739	1796	1801	1801
60	0	0	1	16	87	231	352	287	127	22	0	0	0	0	1	17	104	335	687	974	1101	1123	1123	1123
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	47	153	364	527	646	597	408	200	52	4	0	1	48	201	565	1092	1738	2335	2743	2943	2995	2999

(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