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: MUNISING, MI **COOP ID: 205690**

Climate Division: MI 2 **NWS Call Sign:** **Elevation: 680 Feet** **Lat: 46˚25N** **Lon: 86˚40W**

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	22.5	9.1	15.8	48+	1949	7	24.7	1990	-27	1994	19	7.3	1994	1525	0	.0	.0	.0	24.7	30.9	7.8
Feb	25.5	10.7	18.1	57	1981	17	30.2	1998	-30	1985	2	8.9	1979	1314	0	.0	.0	.3	19.8	27.8	6.4
Mar	33.8	19.2	26.5	71	1989	27	34.5	1973	-20	1972	3	17.6	1972	1193	0	.0	.0	2.6	11.5	28.7	2.9
Apr	45.9	29.8	37.9	89	1990	26	43.6	1987	-4	1950	6	31.2	1975	815	0	.0	.0	11.1	2.2	20.8	.1
May	60.0	39.7	49.9	95	1969	28	57.2	1977	17	1954	5	43.2	1997	478	8	.0	.0	26.0	@	7.7	.0
Jun	68.0	48.2	58.1	96+	1956	13	64.3	1995	25	1949	8	51.9	1982	228	21	.0	.5	29.7	.0	.8	.0
Jul	73.1	54.4	63.8	101	1988	7	69.8	1983	31	1960	1	58.2	1992	105	66	.1	1.4	31.0	.0	@	.0
Aug	71.7	54.4	63.1	99	1948	24	67.8	1995	31	1950	25	57.5	1977	122	62	.0	.8	31.0	.0	.1	.0
Sep	62.8	47.9	55.4	98	1953	1	59.7	1998	25+	1957	27	49.3	1974	296	6	.0	.1	29.1	.0	1.1	.0
Oct	51.8	37.6	44.7	84+	1960	10	52.2	1971	13	1981	24	40.3+	1987	629	0	.0	.0	21.4	@	8.1	.0
Nov	38.2	27.1	32.7	70+	1961	3	39.6	1999	-9	1950	25	26.7	1976	972	0	.0	.0	4.7	6.2	22.4	.1
Dec	27.3	15.7	21.5	60	1962	3	29.4	1994	-21+	1976	30	12.2	1989	1348	0	.0	.0	.2	19.5	30.0	4.0
Ann	48.4	32.8	40.6	101	Jul 1988	7	69.8	Jul 1983	-30	Feb 1985	2	7.3	Jan 1994	9025	163	.1	2.8	187.1	83.9	178.4	21.3

\+ 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	3.19	2.77	1.40	2000	3	8.11	1982	1.43	1972
Feb	1.94	1.68	1.16	1999	12	5.48	1985	.44	1994
Mar	2.36	2.17	2.23	1959	6	5.08	1979	.50	1980
Apr	2.03	2.16	2.26	1972	13	3.59	1972	.27	1984
May	2.63	2.60	3.51	1970	31	4.99	1990	.62	1986
Jun	3.01	2.79	2.16	1952	16	6.06	1974	.96	1997
Jul	3.27	2.92	3.12	1982	11	6.83	1982	.57	1981
Aug	3.20	3.25	2.50	1988	15	7.30	1988	.18	1991
Sep	3.92	3.75	2.34	1978	11	7.33	1986	1.02	1976
Oct	3.66	3.76	2.80	1967	25	6.21	1979	1.34	1985
Nov	3.27	3.08	2.14	1988	5	6.86	1988	.74	1990
Dec	3.35	3.19	1.41	1983	15	8.06	1983	.68	1994
Ann	35.83	36.07	3.51	May 1970	31	8.11	Jan 1982	.18	Aug 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	19.2	10.2	.7	.1
Feb	12.6	5.9	.6	.1
Mar	11.7	6.5	1.2	.3
Apr	9.6	6.1	.8	.1
May	9.9	6.4	1.4	.4
Jun	11.3	7.2	1.7	.7
Jul	10.9	6.8	1.9	.6
Aug	10.7	6.6	2.1	.5
Sep	12.9	8.4	2.3	.5
Oct	14.6	9.0	2.2	.4
Nov	14.6	8.9	1.6	.5
Dec	17.7	10.8	1.2	.1
Ann	155.7	92.8	17.7	4.3

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	1.19	1.48	1.91	2.27	2.61	2.96	3.34	3.78	4.34	5.20	5.99
Feb	.53	.72	1.00	1.24	1.48	1.73	2.01	2.33	2.76	3.43	4.05
Mar	.71	.94	1.27	1.56	1.84	2.13	2.45	2.83	3.31	4.07	4.78
Apr	.69	.88	1.16	1.40	1.63	1.86	2.12	2.42	2.81	3.41	3.96
May	.86	1.11	1.48	1.79	2.09	2.40	2.74	3.14	3.65	4.45	5.18
Jun	.92	1.20	1.63	2.00	2.35	2.72	3.13	3.61	4.22	5.18	6.07
Jul	.92	1.23	1.70	2.11	2.51	2.92	3.39	3.93	4.64	5.76	6.80
Aug	.93	1.24	1.69	2.09	2.48	2.88	3.33	3.85	4.53	5.59	6.58
Sep	1.60	1.96	2.46	2.88	3.28	3.68	4.11	4.61	5.24	6.20	7.08
Oct	1.63	1.96	2.41	2.78	3.12	3.47	3.84	4.27	4.81	5.62	6.36
Nov	1.22	1.53	1.97	2.33	2.68	3.03	3.42	3.86	4.43	5.30	6.10
Dec	1.10	1.42	1.89	2.29	2.67	3.06	3.49	4.00	4.64	5.65	6.58
Ann	26.85	28.63	30.88	32.58	34.08	35.52	37.00	38.63	40.60	43.44	45.88

\+ 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	38.4	33.6	21	22	12.5	1997	11	84.3	1982	58	1979	25	38	1979	16.9	14.2	5.6	2.1	.3	-9.9	-9.9	-9.9	-9.9
Feb	24.1	21.6	31	29	10.5	1985	13	54.6	1972	63	1979	7	52	1979	10.9	8.5	3.3	1.1	.1	-9.9	-9.9	-9.9	-9.9
Mar	17.1	14.4	24	25	17.0	1983	19	33.3	1981	76	1972	9	52	1972	7.6	5.9	2.3	1.0	.2	-9.9	-9.9	-9.9	-9.9
Apr	5.9	4.6	4	1	6.5	1979	6	19.5	1996	38	1997	1	20	1996	3.0	2.1	.6	.3	.0	5.3	4.4	3.9	2.6
May	.6	.0	#	0	6.0	1990	10	7.0	1990	1	1997	1	#	1997	.2	.2	.1	@	.0	.1	.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	#	1991	19	#	1991	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	2.5	.0	#	0	6.0	1992	19	11.5	1992	10	1992	19	1	1992	1.2	1.0	.2	.1	.0	1.1	.4	.2	.1
Nov	13.6	10.5	2	1	11.8	1996	10	40.7	1996	19	2000	22	8	1995	6.8	5.0	1.5	.4	@	8.6	6.1	4.0	1.1
Dec	39.2	32.3	9	7	14.0	1983	15	83.5	1983	33	1983	31	24	1978	15.3	12.5	5.6	2.0	.3	24.9	22.3	19.5	12.6
Ann	141.4	117.0	N/A	N/A	17.0	Mar 1983	19	84.3	Jan 1982	76	Mar 1972	9	52+	Feb 1979	61.9	49.4	19.2	7.0	.9	-9.9	-9.9	-9.9	-9.9

+ 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	7/05	6/27	6/22	6/17	6/13	6/08	6/03	5/29	5/21
32	6/18	6/11	6/06	6/01	5/28	5/24	5/19	5/14	5/07
28	5/30	5/24	5/19	5/15	5/12	5/08	5/04	4/29	4/23
24	5/15	5/09	5/05	5/01	4/28	4/24	4/21	4/16	4/10
20	5/06	4/28	4/22	4/18	4/13	4/09	4/04	3/30	3/22
16	4/22	4/16	4/12	4/08	4/05	4/02	3/29	3/25	3/19

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	136	121	111	102	94	85	76	66	51
32	156	145	136	129	123	116	109	101	90
28	187	177	170	164	158	152	146	139	129
24	219	209	201	194	188	181	175	167	156
20	243	232	224	217	210	204	196	188	177
16	255	246	240	234	229	224	219	212	204

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1525	1314	1193	815	478	228	105	122	296	629	972	1348	9025
60	1370	1174	1038	665	340	126	36	48	170	477	822	1193	7459
57	1277	1090	945	576	267	80	15	22	111	389	732	1100	6604
55	1215	1034	883	517	223	56	8	12	79	333	672	1038	6070
50	1060	894	728	376	132	18	0	1	27	210	522	883	4851
32	515	414	236	45	4	0	0	0	0	8	98	366	1686

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	13	24	65	220	557	783	984	963	700	402	117	41	4869
55	0	0	0	3	63	149	280	262	89	14	0	0	860
57	0	0	0	1	45	113	224	210	61	8	0	0	662
60	0	0	0	0	25	69	152	143	30	3	0	0	422
65	0	0	0	0	8	21	66	62	6	0	0	0	163
70	0	0	0	0	1	5	17	17	0	0	0	0	40

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	12	85	343	575	781	764	503	214	28	0	0	0	12	97	440	1015	1796	2560	3063	3277	3305	3305
45	0	0	0	42	219	430	626	609	357	113	9	0	0	0	0	42	261	691	1317	1926	2283	2396	2405	2405
50	0	0	0	20	129	291	471	454	224	45	1	0	0	0	0	20	149	440	911	1365	1589	1634	1635	1635
55	0	0	0	9	70	172	318	303	122	15	0	0	0	0	0	9	79	251	569	872	994	1009	1009	1009
60	0	0	0	2	29	87	186	172	54	3	0	0	0	0	0	2	31	118	304	476	530	533	533	533
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	4	61	212	346	484	470	273	107	12	0	0	0	4	65	277	623	1107	1577	1850	1957	1969	1969

(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