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: DOWAGIAC 1 W, MI **COOP ID: 202250**

Climate Division: MI 8 **NWS Call Sign:** **Elevation: 740 Feet** **Lat: 41˚59N** **Lon: 86˚08W**

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	31.2	14.4	22.8	63+	1967	24	33.3	1990	-21	1972	16	10.1	1977	1309	0	.0	.0	1.7	16.5	29.7	4.2
Feb	35.0	16.7	25.9	72	2000	26	35.7	1998	-23	1978	7	12.7	1978	1096	0	.0	.0	2.7	11.3	25.6	3.0
Mar	45.5	25.9	35.7	80+	1963	29	43.1	1973	-13	1967	1	27.8+	1984	908	0	.0	.0	10.4	3.7	23.5	.4
Apr	57.7	36.1	46.9	88	1980	23	53.6	1977	6	1972	8	41.2	1975	545	2	.0	.0	22.6	.2	11.7	.0
May	69.8	46.5	58.2	92+	1956	23	66.3	1991	19	1966	10	52.0	1997	267	56	.0	.7	30.3	.0	2.2	.0
Jun	79.1	55.6	67.4	103	1953	20	71.8	1991	30	1972	11	62.7	1992	52	123	@	2.9	30.0	.0	.1	.0
Jul	83.1	59.5	71.3	103	1999	31	75.6	1999	38	1972	6	67.8	1992	8	205	.1	5.3	31.0	.0	.0	.0
Aug	80.9	57.4	69.2	100	1988	2	75.6	1995	36+	1963	18	64.7	1992	33	162	@	2.8	31.0	.0	.0	.0
Sep	73.8	49.5	61.7	99	1953	2	65.5	1998	26+	1957	27	56.5	1975	134	33	.0	.9	30.0	.0	.6	.0
Oct	62.0	38.8	50.4	88	1971	2	58.1	1971	17+	1972	19	44.8	1987	455	3	.0	.0	27.5	.0	7.4	.0
Nov	47.8	30.0	38.9	77+	1975	6	44.3	1999	4+	1955	28	31.4	1976	783	0	.0	.0	13.0	1.3	18.6	.0
Dec	36.0	20.4	28.2	72	2001	6	37.5	1982	-20	1989	23	18.2	2000	1142	0	.0	.0	3.1	9.5	28.1	1.4
Ann	58.5	37.6	48.1	103+	Jul 1999	31	75.6+	Jul 1999	-23	Feb 1978	7	10.1	Jan 1977	6732	584	.1	12.6	233.3	42.5	147.5	9.0

\+ 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: 1953-2001

(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	2.65	2.34	2.20	1960	12	4.88	1978	.66	1983
Feb	2.03	1.69	1.81	1954	16	4.90	1985	.14	1987
Mar	2.67	2.75	1.81	1954	25	4.75	1982	.34	1994
Apr	3.48	3.51	2.75	1993	20	7.16	1981	.74	1971
May	3.72	3.85	2.52	1958	4	8.35	2000	1.08	1977
Jun	3.67	3.72	4.20	1968	25	7.90	1993	.53	1988
Jul	3.63	3.21	4.90	1959	23	11.47	1992	1.03	1977
Aug	3.90	3.58	2.93	1955	30	7.70	1993	1.24	1996
Sep	4.19	4.79	4.78	2000	11	8.05	1986	.02	1979
Oct	3.51	3.15	3.52	1955	6	8.04	1990	1.14	1975
Nov	3.45	3.08	2.56	1990	28	7.39	1985	.79	1980
Dec	3.16	2.90	1.94	1965	24	5.91	1971	1.32	1995
Ann	40.06	39.48	4.90	Jul 1959	23	11.47	Jul 1992	.02	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	13.2	7.6	1.3	.2
Feb	9.3	6.0	.9	.3
Mar	9.1	6.8	1.7	.3
Apr	10.4	7.7	2.1	.7
May	9.6	7.1	2.8	.8
Jun	8.7	6.7	2.5	.8
Jul	8.4	6.6	2.5	.9
Aug	8.5	6.8	2.6	1.0
Sep	8.6	6.5	2.9	1.2
Oct	9.6	6.7	2.4	.8
Nov	11.4	8.0	2.1	.5
Dec	13.1	8.9	1.4	.4
Ann	119.9	85.4	25.2	7.9

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	.89	1.14	1.51	1.82	2.12	2.43	2.76	3.16	3.66	4.45	5.17
Feb	.46	.65	.95	1.22	1.48	1.76	2.08	2.46	2.95	3.74	4.49
Mar	.87	1.12	1.50	1.82	2.12	2.44	2.78	3.19	3.71	4.52	5.27
Apr	1.40	1.72	2.17	2.54	2.90	3.26	3.64	4.09	4.66	5.53	6.32
May	1.14	1.50	2.02	2.48	2.91	3.37	3.87	4.46	5.22	6.40	7.50
Jun	1.02	1.37	1.90	2.36	2.81	3.28	3.80	4.41	5.21	6.47	7.64
Jul	1.16	1.50	2.01	2.45	2.87	3.30	3.78	4.34	5.06	6.18	7.21
Aug	1.27	1.64	2.18	2.65	3.09	3.56	4.06	4.65	5.41	6.60	7.69
Sep	.55	.89	1.49	2.07	2.69	3.36	4.15	5.12	6.43	8.57	10.64
Oct	1.12	1.46	1.95	2.37	2.78	3.20	3.66	4.20	4.90	5.98	6.98
Nov	1.24	1.57	2.04	2.43	2.80	3.19	3.60	4.09	4.71	5.67	6.54
Dec	1.45	1.72	2.11	2.42	2.71	3.00	3.31	3.67	4.12	4.80	5.41
Ann	31.61	33.31	35.45	37.05	38.46	39.81	41.18	42.69	44.50	47.10	49.31

\+ 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: 1953-2001
(3) Derived from 1971-2000 serially complete daily data

Complete documentation available from:
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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	19.4	18.3	6	5
Feb	13.0	11.5	6	4
Mar	5.9	6.0	1	1
Apr	1.2	.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	.1	.0	#	0
Nov	5.9	5.2	1	#
Dec	17.0	17.5	3	2
Ann	62.5	58.5	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	15.0	1978	26	50.9	1978	33	1978	29	16	1979
Feb	8.5	1995	4	28.1	1988	32	1978	2	27	1978
Mar	12.0	1973	17	13.0	1993	30	1978	4	10	1978
Apr	7.0	1975	3	8.0	1975	8	1975	3	1	1975
May	#	1989	6	#	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	2.0	1997	27	2.0	1997	2	1997	27	#+	1997
Nov	12.0	2000	21	19.5	1976	12+	2000	21	2+	2000
Dec	13.0	2000	12	28.5	1976	19	2000	25	11	2000
Ann	15.0	Jan 1978	26	50.9	Jan 1978	33	Jan 1978	29	27	Feb 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	9.4	7.1	2.5	.9	.1
Feb	5.9	4.9	1.7	.6	.0
Mar	2.8	2.0	.7	.2	@
Apr	.6	.4	.1	.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	2.8	2.5	.9	.3	@
Dec	7.9	6.1	2.4	.6	.1
Ann	29.4	23.0	8.3	2.7	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	20.2	15.3	11.8	5.0
Feb	16.7	13.1	9.3	5.1
Mar	5.6	3.1	2.1	.6
Apr	.7	.2	.1	.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	4.0	2.1	1.0	.1
Dec	13.9	9.1	5.6	1.8
Ann	61.1	42.9	29.9	12.6

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

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	146	139	133	128	124	120	115	109	102
32	168	161	156	152	148	144	139	134	128
28	202	193	187	182	177	172	166	160	151
24	233	224	218	212	207	202	196	190	181
20	255	246	240	235	230	225	219	213	204
16	275	267	261	256	252	247	242	236	228

***** 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	1309	1096	908	545	267	52	8	33	134	455	783	1142	6732
60	1154	956	753	401	170	16	0	7	52	312	633	987	5441
57	1061	872	660	319	122	7	0	1	25	236	543	894	4740
55	999	816	599	269	95	4	0	0	13	191	484	832	4302
50	844	677	454	159	45	1	0	0	2	100	344	682	3308
32	342	248	87	3	0	0	0	0	0	1	35	231	947

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	56	76	203	449	812	1061	1220	1152	889	571	242	112	6843
55	0	0	1	25	194	375	507	439	212	48	1	0	1802
57	0	0	0	15	159	318	445	378	163	31	0	0	1509
60	0	0	0	7	113	237	352	291	101	14	0	0	1115
65	0	0	0	2	56	123	205	162	33	3	0	0	584
70	0	0	0	0	23	46	90	72	6	0	0	0	237

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	5	11	92	262	578	837	992	923	669	355	111	21	5	16	108	370	948	1785	2777	3700	4369	4724	4835	4856
45	0	3	49	158	427	687	837	768	519	229	59	5	0	3	52	210	637	1324	2161	2929	3448	3677	3736	3741
50	0	0	26	90	297	539	682	613	375	129	26	3	0	0	26	116	413	952	1634	2247	2622	2751	2777	2780
55	0	0	8	49	183	393	527	459	249	62	7	0	0	0	8	57	240	633	1160	1619	1868	1930	1937	1937
60	0	0	1	22	99	259	372	311	142	22	1	0	0	0	1	23	122	381	753	1064	1206	1228	1229	1229
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	10	61	163	361	542	662	614	426	220	64	6	0	10	71	234	595	1137	1799	2413	2839	3059	3123	3129

(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