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: SANDUSKY, MI **COOP ID: 207350**

Climate Division: MI 7 **NWS Call Sign:** **Elevation: 774 Feet** **Lat: 43˚25N** **Lon: 82˚49W**

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	28.7	14.2	21.5	63+	1950	25	31.0	1990	-28	1994	20	12.5	1994	1351	0	.0	.0	.7	19.8	30.0	3.7
Feb	31.2	16.4	23.8	65+	1984	24	32.6	1998	-17	1976	2	13.8	1979	1155	0	.0	.0	1.0	15.7	27.0	3.0
Mar	41.1	24.4	32.8	80	2000	9	40.8+	2000	-10	1962	2	25.4	1984	1000	0	.0	.0	6.9	6.5	26.4	.4
Apr	53.6	35.3	44.5	87+	1960	23	49.3	1985	5	1954	3	37.9	1975	615	0	.0	.0	18.6	.6	14.4	.0
May	67.6	45.2	56.4	92	1962	17	62.6	1991	22+	1966	10	49.1	1997	296	29	.0	.3	29.8	.0	1.8	.0
Jun	76.8	54.5	65.7	101	1971	29	70.0	1971	33+	1949	8	60.0	1980	81	101	.1	1.9	30.0	.0	.0	.0
Jul	81.4	59.1	70.3	103	1977	15	74.1	1988	40	1965	6	66.2	2000	11	174	@	3.6	31.0	.0	.0	.0
Aug	79.1	58.0	68.6	99	1948	27	74.0	1995	26	1977	20	64.4	1997	35	145	.0	1.7	31.0	.0	.1	.0
Sep	71.6	50.5	61.1	99+	1953	1	65.9	1998	29	1989	24	55.7	1975	144	26	.0	.4	30.0	.0	.4	.0
Oct	59.1	39.8	49.5	88	1971	2	56.4	1971	19+	1965	29	44.5	1988	484	2	.0	.0	25.3	@	6.2	.0
Nov	45.5	31.4	38.5	80	1950	1	44.9	1975	0	1950	24	32.9	1995	796	0	.0	.0	10.3	2.4	18.9	.0
Dec	33.9	20.9	27.4	67	2001	6	35.3	1982	-10	1960	24	15.8	2000	1165	0	.0	.0	2.0	12.2	28.4	1.2
Ann	55.8	37.5	46.7	103	Jul 1977	15	74.1	Jul 1988	-28	Jan 1994	20	12.5	Jan 1994	7133	477	.1	7.9	216.6	57.2	153.6	8.3

\+ 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

Issue Date: February 2004

(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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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	1.58	1.50	1.57	1967	27	2.80	1978	.40	1991
Feb	1.28	1.07	2.12	1954	16	2.76	1990	.00	1991
Mar	1.96	1.56	2.16	1976	2	6.80	1976	.31	1999
Apr	2.34	2.44	2.09	1949	22	4.34	1985	.31+	1997
May	2.50	2.62	2.80	1991	26	6.33	1991	.34	1977
Jun	2.82	2.56	2.70	1984	18	5.84	1984	.35	1991
Jul	2.80	2.42	2.75	1989	21	6.09	1992	.62	1986
Aug	2.98	2.90	2.92	1983	11	6.76	1983	.73	1980
Sep	3.87	3.40	7.75	1986	11	15.27	1986	.49	1979
Oct	2.47	2.47	1.61	1951	24	4.88	1991	.42	1975
Nov	2.51	2.40	1.91	1963	18	4.83	1992	.49	1980
Dec	2.14	1.91	1.80	1972	30	5.23	1990	.47	1993
Ann	29.25	28.85	7.75	Sep 1986	11	15.27	Sep 1986	.00	Feb 1991

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.1	5.1	.5	.1
Feb	7.9	3.6	.5	.2
Mar	9.4	5.3	1.1	.2
Apr	10.3	5.9	1.6	.4
May	10.7	6.1	1.5	.4
Jun	9.4	6.2	1.6	.5
Jul	9.7	5.8	1.6	.5
Aug	9.2	6.0	2.0	.5
Sep	10.8	6.8	2.5	1.0
Oct	10.0	5.6	1.5	.2
Nov	10.2	6.3	1.3	.3
Dec	11.2	5.5	.9	.2
Ann	119.9	68.2	16.6	4.5

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	.53	.68	.90	1.08	1.26	1.45	1.65	1.88	2.18	2.64	3.07
Feb	.18	.35	.56	.74	.92	1.11	1.32	1.58	1.91	2.43	2.93
Mar	.47	.65	.93	1.19	1.44	1.71	2.01	2.37	2.84	3.58	4.28
Apr	.65	.87	1.21	1.50	1.79	2.09	2.43	2.82	3.33	4.14	4.89
May	.57	.81	1.17	1.50	1.83	2.18	2.56	3.03	3.64	4.61	5.52
Jun	.74	1.01	1.41	1.77	2.13	2.50	2.91	3.40	4.04	5.05	5.99
Jul	1.07	1.33	1.70	2.01	2.31	2.61	2.93	3.31	3.79	4.52	5.20
Aug	1.07	1.35	1.75	2.09	2.42	2.75	3.12	3.54	4.08	4.91	5.67
Sep	.84	1.19	1.76	2.27	2.79	3.34	3.96	4.70	5.68	7.24	8.71
Oct	.74	.98	1.33	1.63	1.93	2.23	2.57	2.97	3.48	4.28	5.03
Nov	.66	.89	1.26	1.58	1.89	2.23	2.59	3.03	3.60	4.50	5.34
Dec	.58	.78	1.09	1.36	1.63	1.91	2.22	2.58	3.06	3.81	4.51
Ann	21.85	23.31	25.17	26.57	27.80	28.99	30.21	31.56	33.19	35.53	37.54

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	10.8	10.3	5	5
Feb	6.9	7.1	4	4
Mar	9.3	8.8	1	1
Apr	1.6	.3	#	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	.0	.0	0	0
Nov	2.9	2.0	#	#
Dec	11.4	13.3	2	1
Ann	42.9	41.8	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	10.5	1979	14	19.1	1976	15	1979	17	10	1985
Feb	6.0	1976	21	15.8	1982	16+	1988	12	10	1982
Mar	11.0	1973	17	19.5	1971	15	1978	4	7	1978
Apr	7.0	1975	3	13.0	1975	14	1975	3	2	1975
May	#	1976	4	#+	1976	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	1972	18	.5	1972	0	0	0	0	0
Nov	6.0	1983	12	10.0	1971	6	1983	12	1	1989
Dec	12.0	2000	12	19.0	1972	11	1973	21	4	1983
Ann	12.0	Dec 2000	12	19.5	Mar 1971	16+	Feb 1988	12	10+	Jan 1985

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	6.6	4.5	1.1	.3	.1
Feb	4.2	2.5	.4	.2	.0
Mar	2.9	2.3	.9	.3	.1
Apr	.6	.3	.2	.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	.0
Nov	1.4	.9	.2	.1	.0
Dec	4.3	2.8	1.1	.4	.1
Ann	20.0	13.3	3.9	1.4	.3

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	6.8	3.4	2.0	.4
Apr	.6	.3	.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	.0
Nov	2.0	.6	.1	.0
Dec	11.6	6.3	3.5	.2
Ann	-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	6/04	5/30	5/26	5/22	5/19	5/16	5/13	5/09	5/03
32	5/17	5/13	5/10	5/07	5/05	5/02	4/29	4/26	4/22
28	5/05	5/01	4/28	4/25	4/22	4/20	4/17	4/14	4/10
24	4/23	4/19	4/16	4/13	4/10	4/08	4/05	4/02	3/28
20	4/14	4/09	4/05	4/03	3/31	3/28	3/25	3/22	3/17
16	4/03	3/30	3/26	3/24	3/21	3/19	3/16	3/13	3/08

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	9/17	9/20	9/23	9/26	9/28	10/01	10/04	10/09
32	9/17	9/24	9/29	10/03	10/07	10/11	10/15	10/20	10/27
28	9/30	10/08	10/13	10/18	10/22	10/27	11/01	11/06	11/14
24	10/23	10/29	11/01	11/05	11/08	11/11	11/14	11/18	11/23
20	11/05	11/11	11/15	11/19	11/22	11/25	11/29	12/03	12/08
16	11/12	11/18	11/23	11/27	11/30	12/04	12/07	12/12	12/18

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	145	140	135	132	129	125	122	118	112
32	179	170	164	159	155	150	145	139	131
28	212	202	194	188	182	177	170	163	153
24	233	225	220	215	211	206	201	196	188
20	257	250	244	240	235	231	226	221	213
16	275	268	262	258	253	249	244	239	231

***** 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	1351	1155	1000	615	296	81	11	35	144	484	796	1165	7133
60	1196	1015	845	467	185	30	0	7	57	339	646	1010	5797
57	1103	931	752	381	131	14	0	1	28	261	556	917	5075
55	1041	875	690	326	101	8	0	0	15	213	496	855	4620
50	886	735	542	204	45	2	0	0	3	117	350	702	3586
32	363	273	133	7	0	0	0	0	0	1	29	240	1046

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	35	42	155	382	756	1010	1185	1133	872	542	223	98	6433
55	0	0	0	11	144	328	472	420	198	41	0	0	1614
57	0	0	0	6	112	274	410	359	150	26	0	0	1337
60	0	0	0	2	73	200	318	272	89	12	0	0	966
65	0	0	0	0	29	101	174	145	26	2	0	0	477
70	0	0	0	0	9	36	69	60	4	0	0	0	178

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	1	3	49	187	511	765	932	880	632	301	82	9	1	4	53	240	751	1516	2448	3328	3960	4261	4343	4352
45	0	0	22	106	364	615	777	725	484	180	37	4	0	0	22	128	492	1107	1884	2609	3093	3273	3310	3314
50	0	0	10	58	237	468	622	570	343	94	12	0	0	0	10	68	305	773	1395	1965	2308	2402	2414	2414
55	0	0	1	27	135	325	468	416	212	44	1	0	0	0	1	28	163	488	956	1372	1584	1628	1629	1629
60	0	0	0	9	69	195	315	268	113	9	0	0	0	0	0	9	78	273	588	856	969	978	978	978
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	0	33	120	311	485	614	571	383	166	40	3	0	0	33	153	464	949	1563	2134	2517	2683	2723	2726

(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