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: FRANKFORT 2 NE, MI **COOP ID: 202984**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 44˚39N** **Lon: 86˚12W**

Temperature (˚F)

Month	Mean (1) Daily Max	Mean (1) Daily Min	Mean (1) Mean	Extremes Highest Daily(2)	Year	Day	Highest Month(1) Mean	Year	Lowest Daily(2)	Year	Day	Lowest Month(1) Mean	Year	Degree Days (1) Base Temp 65 Heating	Cooling	Mean Number of Days (3) Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	28.4	16.8	22.6	56	1996	18	30.7	1990	-15	1982	17	14.0	1994	1315	0	.0	.0	.2	20.5	30.0	1.8
Feb	31.0	17.5	24.3	63	2000	26	34.9	1998	-12	1979	17	15.6	1979	1141	0	.0	.0	.7	16.3	26.7	1.2
Mar	39.9	24.3	32.1	74	1967	30	39.9	2000	0+	1974	24	26.2	1984	1020	0	.0	.0	5.3	7.8	25.6	.1
Apr	51.8	34.3	43.1	86	1970	29	47.5	1987	11	1995	4	38.2	1996	658	0	.0	.0	16.7	1.0	13.7	.0
May	64.8	44.5	54.7	88+	1972	25	60.9	1977	25+	1966	4	47.6	1997	345	24	.0	.0	29.1	.0	2.3	.0
Jun	73.5	53.3	63.4	95	1953	30	68.5+	1995	30	1979	24	57.8	1982	116	68	.0	.1	30.0	.0	@	.0
Jul	78.1	59.0	68.6	94	1953	21	73.3	1983	39	2001	2	63.9	1996	28	138	.0	.4	31.0	.0	.0	.0
Aug	76.2	59.2	67.7	95	1988	16	73.6	1988	32	1950	22	64.2	1982	47	130	.0	.3	31.0	.0	.0	.0
Sep	68.7	52.1	60.4	91	1999	5	64.0	1998	31+	1965	27	56.5	1975	158	21	.0	@	29.7	.0	.2	.0
Oct	57.5	42.3	49.9	82	1971	2	57.7	1971	21	1952	18	44.5	1988	471	2	.0	.0	25.0	.0	3.4	.0
Nov	44.0	32.4	38.2	79	2000	1	43.6	1999	-8	1950	25	31.8	1976	804	0	.0	.0	7.9	3.1	16.9	.0
Dec	32.8	22.4	27.6	62+	1982	2	34.1	1982	-3+	1976	30	18.9	1989	1159	0	.0	.0	.9	13.9	28.5	.3
Ann	53.9	38.2	46.1	95+	Aug 1988	16	73.6	Aug 1988	-15	Jan 1982	17	14.0	Jan 1994	7262	383	.0	.8	207.5	62.6	147.3	3.4

\+ 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: FRANKFORT 2 NE, MI **COOP ID: 202984**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 44˚39N** **Lon: 86˚12W**

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	2.77	2.77	1.34	1990	17	4.86	1982	1.27	1981
Feb	1.98	1.93	1.15	2001	9	5.44	1985	.16	1987
Mar	2.34	2.05	2.45	1998	31	5.92	1998	.36	1999
Apr	2.58	2.28	1.85	1952	13	5.59	1993	.78	1997
May	2.65	2.67	2.15	2001	16	6.67	1983	.32	1977
Jun	3.22	2.84	2.70	1996	17	8.13	1990	.70	1991
Jul	3.04	2.85	3.27	1972	11	6.56	1999	.17	1981
Aug	3.45	2.86	4.08	1995	17	9.04	1995	1.58	1989
Sep	4.13	3.82	3.20	1985	8	10.99	1986	.05	1979
Oct	3.26	2.95	2.87	1951	3	7.24	1991	1.26	2000
Nov	2.98	2.99	1.78	1982	12	6.48	1992	.75	1999
Dec	2.80	2.86	1.30	1971	10	4.74	1971	.59	1994
Ann	35.20	35.34	4.08	Aug 1995	17	10.99	Sep 1986	.05	Sep 1979

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	18.0	9.6	.7	.1
Feb	12.8	6.8	.6	@
Mar	11.3	6.6	.9	.2
Apr	10.7	6.2	1.7	.3
May	9.9	6.1	1.6	.5
Jun	9.1	5.9	2.0	.9
Jul	8.4	5.5	2.0	.7
Aug	9.5	6.6	2.5	.7
Sep	11.5	7.6	2.5	1.0
Oct	11.6	7.2	2.0	.6
Nov	13.1	8.2	1.5	.2
Dec	16.4	9.5	.8	.1
Ann	142.3	85.8	18.8	5.3

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	1.42	1.65	1.96	2.21	2.44	2.66	2.91	3.18	3.52	4.04	4.50
Feb	.59	.78	1.06	1.30	1.54	1.79	2.06	2.38	2.79	3.44	4.04
Mar	.56	.78	1.12	1.42	1.73	2.05	2.40	2.83	3.39	4.27	5.10
Apr	1.01	1.25	1.59	1.87	2.14	2.41	2.70	3.04	3.48	4.14	4.75
May	.73	.98	1.36	1.69	2.02	2.36	2.74	3.19	3.77	4.69	5.55
Jun	.93	1.24	1.70	2.10	2.49	2.89	3.34	3.87	4.56	5.63	6.63
Jul	.74	1.02	1.46	1.86	2.25	2.66	3.12	3.67	4.39	5.54	6.61
Aug	1.15	1.47	1.95	2.36	2.75	3.15	3.60	4.11	4.77	5.80	6.75
Sep	.74	1.10	1.71	2.27	2.85	3.47	4.18	5.03	6.18	8.02	9.77
Oct	1.35	1.65	2.07	2.41	2.74	3.06	3.42	3.83	4.34	5.13	5.84
Nov	1.03	1.31	1.72	2.07	2.40	2.74	3.11	3.54	4.09	4.95	5.74
Dec	1.22	1.47	1.82	2.10	2.37	2.64	2.93	3.26	3.68	4.32	4.90
Ann	28.42	29.79	31.52	32.80	33.93	35.00	36.10	37.30	38.74	40.79	42.54

\+ 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

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: FRANKFORT 2 NE, MI **COOP ID: 202984**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 44°39N** **Lon: 86°12W**

Snow (inches)

Snow Totals

Means/Medians (1)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	34.6	29.2	14	10
Feb	22.5	23.6	15	12
Mar	15.0	14.5	8	6
Apr	4.7	4.4	#	#
May	.3	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	.5	.0	#	0
Nov	9.3	7.3	1	1
Dec	26.6	24.5	6	5
Ann	113.5	103.5	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	13.0	1990	25	65.0	1976	42	1994	31	31	1979
Feb	8.0	1977	13	39.5	1985	48	1994	7	41	1979
Mar	11.0	1989	3	36.4	1989	34	1978	6	21	1972
Apr	8.0	1985	6	15.0	1985	8	1985	6	3	1972
May	2.0	1996	1	2.0	1996	1	1979	5	#+	1997
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	#	1995	22	#+	1995	#	1995	22	#	1995
Oct	4.0	1974	19	4.3	1974	2	1992	20	#+	1997
Nov	9.0	1978	20	25.1	1995	11	1978	23	5	1995
Dec	16.0	1989	22	55.0	1985	35	1989	31	16	1985
Ann	16.0	Dec 1989	22	65.0	Jan 1976	48	Feb 1994	7	41	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	17.0	12.6	5.1	1.6	.2
Feb	12.2	8.3	3.2	.8	.0
Mar	8.3	5.7	1.7	.6	.1
Apr	2.8	2.1	.6	.1	.0
May	.4	.1	.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	.6	.2	.1	.0	.0
Nov	5.9	4.4	1.1	.2	.0
Dec	13.9	10.7	4.4	1.1	.1
Ann	61.1	44.1	16.2	4.4	.4

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	28.2	25.8	23.7	16.4
Feb	25.9	24.8	23.0	16.2
Mar	20.6	17.4	14.5	8.6
Apr	3.2	1.7	.6	.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	.0
Nov	6.7	2.9	1.1	.1
Dec	21.7	17.1	13.2	5.7
Ann	106.4	89.7	76.1	47.0

+ 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: FRANKFORT 2 NE, MI **COOP ID: 202984**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 44˚39N** **Lon: 86˚12W**

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	6/09	6/03	5/30	5/27	5/23	5/20	5/17	5/13	5/07
32	5/26	5/20	5/15	5/11	5/07	5/04	4/30	4/25	4/19
28	5/06	5/01	4/28	4/25	4/23	4/20	4/17	4/14	4/09
24	4/20	4/16	4/14	4/11	4/09	4/07	4/04	4/01	3/29
20	4/12	4/07	4/04	4/01	3/29	3/27	3/24	3/20	3/16
16	4/08	4/02	3/29	3/26	3/22	3/19	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	9/19	9/24	9/28	10/01	10/04	10/07	10/10	10/13	10/18
32	9/26	10/02	10/06	10/09	10/13	10/16	10/20	10/24	10/29
28	10/17	10/23	10/27	10/30	11/02	11/05	11/09	11/12	11/18
24	10/30	11/04	11/08	11/11	11/14	11/17	11/20	11/23	11/28
20	11/11	11/16	11/21	11/24	11/27	12/01	12/04	12/08	12/14
16	11/24	11/30	12/04	12/07	12/10	12/13	12/17	12/21	12/26

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	153	146	141	137	133	128	124	119	112
32	181	173	167	162	158	153	148	142	134
28	216	208	202	197	193	188	184	178	170
24	238	231	226	222	218	214	210	205	198
20	265	257	252	247	242	238	233	228	220
16	287	279	273	267	262	257	252	246	237

***** 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: FRANKFORT 2 NE, MI **COOP ID: 202984**

Climate Division: MI 3 **NWS Call Sign:** **Elevation: 865 Feet** **Lat: 44˚39N** **Lon: 86˚12W**

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	1315	1141	1020	658	345	116	28	47	158	471	804	1159	7262
60	1160	1001	865	510	226	49	5	11	65	327	654	1004	5877
57	1067	917	772	423	168	25	0	3	32	250	564	911	5132
55	1005	861	710	366	134	15	0	0	18	204	504	849	4666
50	850	721	556	236	67	4	0	0	3	110	360	694	3601
32	321	260	121	8	0	0	0	0	0	1	33	214	958

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	29	43	124	339	702	942	1133	1106	853	555	220	78	6124
55	0	0	0	7	123	267	420	393	181	45	1	0	1437
57	0	0	0	4	95	217	358	335	135	29	0	0	1173
60	0	0	0	1	61	151	270	249	78	13	0	0	823
65	0	0	0	0	24	68	138	130	21	2	0	0	383
70	0	0	0	0	8	20	52	52	3	0	0	0	135

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	2	36	148	439	683	868	843	600	311	72	3	0	2	38	186	625	1308	2176	3019	3619	3930	4002	4005
45	0	2	18	77	294	533	713	688	451	184	26	1	0	2	20	97	391	924	1637	2325	2776	2960	2986	2987
50	0	0	3	37	180	385	558	533	306	92	7	0	0	0	3	40	220	605	1163	1696	2002	2094	2101	2101
55	0	0	0	13	98	246	403	379	179	37	1	0	0	0	0	13	111	357	760	1139	1318	1355	1356	1356
60	0	0	0	5	44	132	250	233	89	10	0	0	0	0	0	5	49	181	431	664	753	763	763	763
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	1	19	81	247	413	560	537	335	141	25	0	0	1	20	101	348	761	1321	1858	2193	2334	2359	2359

(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