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: HILLSBORO, OH **COOP ID: 333758**

Climate Division: OH 8 **NWS Call Sign:** **Elevation: 1,100 Feet** **Lat: 39˚12N** **Lon: 83˚37W**

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	35.3	19.4	27.4	76	1950	25	37.5	1990	-23	1985	20	12.6	1977	1167	0	.0	.0	4.3	12.3	26.9	2.6
Feb	40.3	22.5	31.4	74	1950	15	40.5	1984	-15	1951	3	17.5	1978	940	0	.0	.0	7.6	8.5	22.0	1.1
Mar	50.8	31.2	41.0	85+	1945	25	49.5	1973	-6	1943	4	33.4	1996	744	0	.0	.0	16.7	2.2	17.8	.1
Apr	61.8	41.2	51.5	93	1948	25	56.8	1986	11	1923	1	46.3	1975	408	3	.0	.0	25.4	.1	5.6	.0
May	71.3	51.5	61.4	98	1949	5	68.0	1982	23	1966	10	55.6	1997	177	65	.0	.0	30.9	.0	.1	.0
Jun	79.0	60.1	69.6	100	1914	25	73.9	1984	37+	1972	11	63.9	1972	25	162	.0	.7	30.0	.0	.0	.0
Jul	83.0	64.3	73.7	102+	1949	28	77.3	1999	44	1933	17	70.5	2000	1	267	@	3.4	31.0	.0	.0	.0
Aug	81.5	62.2	71.9	103	1948	27	76.9	1983	38	1946	30	67.5	1992	11	224	.0	2.3	31.0	.0	.0	.0
Sep	75.6	55.4	65.5	101	1953	3	69.9	1978	25	1974	23	61.5	1974	73	88	.0	.5	30.0	.0	@	.0
Oct	64.6	43.9	54.3	92	1949	9	62.0	1971	11	1952	21	47.4	1988	351	18	.0	.0	29.0	@	2.7	.0
Nov	52.0	34.4	43.2	81	1949	12	49.0	1985	-1+	1958	30	34.8	1976	654	0	.0	.0	17.2	1.1	13.9	.0
Dec	40.5	24.7	32.6	76	1982	3	42.0	1984	-23	1917	11	18.8	1989	1004	0	.0	.0	7.5	6.9	23.6	.9
Ann	61.3	42.6	52.0	103	Aug 1948	27	77.3	Jul 1999	-23+	Jan 1985	20	12.6	Jan 1977	5555	827	@	6.9	260.6	31.1	112.6	4.7

\+ 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: 1900-2001

(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	2.99	2.74	2.19	1982	23	6.44	1996	.35	1981
Feb	2.82	2.64	2.85	2000	19	6.39	2000	.43	1978
Mar	3.76	3.69	4.70	1963	5	7.94	1997	.73	1979
Apr	3.99	3.77	3.41	1948	12	8.14	1996	.87	1971
May	4.75	4.34	4.20	1962	22	11.76	1990	.88	1988
Jun	4.30	4.17	3.48	1911	18	8.70	1998	.41	1988
Jul	4.07	3.88	7.20	1965	23	7.70	1973	1.36	1982
Aug	4.20	3.49	4.72	1990	22	9.13	1990	1.03	1993
Sep	3.38	2.76	4.06	1979	14	8.79	1979	.54	1985
Oct	2.84	2.36	2.78	1945	2	9.03	1983	.33	1982
Nov	3.18	2.48	2.32	1985	27	10.94	1985	.61	1991
Dec	3.11	3.11	2.26	1921	24	8.17	1990	.72	1976
Ann	43.39	42.84	7.20	Jul 1965	23	11.76	May 1990	.33	Oct 1982

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.0	6.9	1.9	.5
Feb	9.9	5.5	1.6	.5
Mar	12.0	8.3	2.6	.7
Apr	12.4	8.1	2.8	.8
May	11.8	8.5	3.7	1.0
Jun	10.8	7.8	2.6	1.3
Jul	9.8	7.0	2.8	1.1
Aug	8.9	6.5	2.8	1.4
Sep	8.0	5.3	2.3	.9
Oct	8.5	5.6	1.7	.5
Nov	10.6	6.8	2.1	.6
Dec	10.9	6.3	2.1	.6
Ann	124.6	82.6	29.0	9.9

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	.88	1.17	1.59	1.96	2.32	2.70	3.11	3.60	4.22	5.21	6.12
Feb	.70	.96	1.37	1.74	2.10	2.48	2.91	3.41	4.07	5.12	6.10
Mar	1.44	1.79	2.29	2.70	3.10	3.50	3.93	4.43	5.07	6.06	6.95
Apr	1.06	1.44	2.01	2.52	3.02	3.54	4.12	4.81	5.71	7.11	8.43
May	1.35	1.80	2.48	3.08	3.65	4.26	4.92	5.71	6.73	8.33	9.82
Jun	1.39	1.80	2.40	2.91	3.41	3.92	4.48	5.13	5.97	7.28	8.49
Jul	1.91	2.26	2.75	3.14	3.51	3.87	4.27	4.71	5.27	6.12	6.88
Aug	1.40	1.80	2.38	2.87	3.35	3.84	4.38	5.01	5.81	7.07	8.22
Sep	.72	1.03	1.52	1.97	2.43	2.91	3.46	4.11	4.98	6.36	7.66
Oct	.57	.83	1.24	1.63	2.01	2.42	2.89	3.45	4.19	5.38	6.51
Nov	.71	1.01	1.47	1.89	2.31	2.76	3.26	3.86	4.65	5.90	7.08
Dec	1.11	1.40	1.82	2.18	2.52	2.87	3.25	3.69	4.25	5.12	5.92
Ann	31.99	34.22	37.07	39.22	41.12	42.95	44.83	46.91	49.42	53.05	56.17

\+ 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: 1900-2001
(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	8.1	4.0	1	#	11.0	1996	7	33.4	1978	26	1978	21	10	1978	4.2	2.6	.7	.3	@	8.4	4.6	2.3	1.0
Feb	5.3	3.9	1	#	15.5	1998	5	22.9	1998	12	1985	15	7	1985	3.0	1.9	.5	.1	@	6.7	3.8	2.3	.4
Mar	3.8	2.5	#	#	15.2	1972	3	15.2	1972	10	1980	2	3	1978	1.7	1.4	.5	.1	@	2.5	1.2	.6	@
Apr	.5	.0	#	0	7.0	1987	5	7.0	1987	7	1987	5	#+	1996	.2	.1	.1	.1	.0	.1	@	@	.0
May	#	.0	0	0	#	1989	7	#	1989	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.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	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.2	.0	#	0	3.0	1993	31	4.0	1993	3	1993	31	#+	1993	.1	.1	@	.0	.0	.1	@	.0	.0
Nov	.9	.0	#	#	6.5	1984	19	6.5+	1984	5	1972	28	#+	2000	.4	.3	.1	@	.0	.5	.1	@	.0
Dec	3.0	1.4	#	#	9.1	1974	1	14.5	1981	9	1974	2	3	1989	1.8	1.0	.2	.2	.0	3.8	1.2	.5	.0
Ann	21.8	11.8	N/A	N/A	15.5	Feb 1998	5	33.4	Jan 1978	26	Jan 1978	21	10	Jan 1978	11.4	7.4	2.1	.8	@	22.1	10.9	5.7	1.4

+ 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	5/14	5/10	5/07	5/04	5/01	4/29	4/26	4/23	4/19
32	5/01	4/26	4/23	4/20	4/17	4/15	4/12	4/08	4/04
28	4/20	4/16	4/13	4/11	4/08	4/06	4/04	4/01	3/28
24	4/10	4/05	4/02	3/30	3/27	3/24	3/21	3/18	3/13
20	4/04	3/29	3/24	3/21	3/17	3/14	3/10	3/06	2/28
16	3/24	3/18	3/13	3/09	3/05	3/01	2/25	2/20	2/14

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	9/26	10/01	10/05	10/08	10/11	10/14	10/18	10/22	10/27
32	10/07	10/13	10/17	10/21	10/24	10/27	10/31	11/04	11/09
28	10/15	10/22	10/26	10/30	11/03	11/06	11/10	11/15	11/21
24	11/01	11/06	11/10	11/14	11/17	11/20	11/23	11/27	12/03
20	11/06	11/13	11/17	11/21	11/25	11/29	12/03	12/07	12/14
16	11/17	11/24	11/29	12/03	12/07	12/11	12/16	12/21	12/28

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	183	176	171	166	162	158	154	148	141
32	213	205	199	194	189	184	179	173	164
28	230	222	217	212	208	203	199	193	186
24	253	246	242	238	234	230	226	222	215
20	279	270	263	257	252	247	241	235	226
16	304	295	288	282	276	271	265	258	249

***** 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	1167	940	744	408	177	25	1	11	73	351	654	1004	5555
60	1012	800	590	270	93	5	0	1	24	228	506	849	4378
57	919	716	504	198	57	2	0	0	10	168	422	759	3755
55	857	662	447	155	39	1	0	0	5	134	367	702	3369
50	713	532	314	73	12	0	0	0	1	67	243	558	2513
32	263	162	41	0	0	0	0	0	0	0	18	170	654

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	118	146	321	585	911	1127	1290	1236	1005	690	355	190	7974
55	0	2	13	50	237	437	577	523	320	110	14	9	2292
57	0	0	9	32	193	378	515	461	265	83	9	4	1949
60	0	0	1	15	136	292	422	368	189	50	2	0	1475
65	0	0	0	3	65	162	267	224	88	18	0	0	827
70	0	0	0	0	23	66	129	108	28	4	0	0	358

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	30	57	174	378	677	897	1056	1003	775	467	193	57	30	87	261	639	1316	2213	3269	4272	5047	5514	5707	5764
45	8	25	106	253	522	747	901	848	625	324	113	31	8	33	139	392	914	1661	2562	3410	4035	4359	4472	4503
50	3	6	57	157	373	598	746	693	477	203	62	10	3	9	66	223	596	1194	1940	2633	3110	3313	3375	3385
55	0	0	28	80	240	449	591	538	337	109	23	1	0	0	28	108	348	797	1388	1926	2263	2372	2395	2396
60	0	0	7	36	132	306	436	383	211	49	6	0	0	0	7	43	175	481	917	1300	1511	1560	1566	1566
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	13	34	107	224	410	597	730	685	496	270	106	33	13	47	154	378	788	1385	2115	2800	3296	3566	3672	3705

(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