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: MARION 2 N, IN **COOP ID: 125337**

Climate Division: IN 5 **NWS Call Sign:** **Elevation: 790 Feet** **Lat: 40˚35N** **Lon: 85˚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	32.0	16.3	24.2	68+	1906	20	34.7	1990	-23+	1985	20	8.8	1977	1267	0	.0	.0	2.4	15.6	28.3	4.5
Feb	36.8	19.2	28.0	76	1922	22	38.3	1998	-20	1905	14	12.6	1978	1037	0	.0	.0	4.3	10.6	24.6	3.4
Mar	48.0	28.4	38.2	86	1910	24	45.5	1973	-11	1984	10	28.6	1984	831	0	.0	.0	12.8	3.4	21.2	.1
Apr	60.4	37.9	49.2	91	1915	26	55.9	1985	5	1982	7	44.1	1982	478	2	.0	.0	24.0	.1	9.6	.0
May	71.7	49.1	60.4	100	1911	27	68.1	1977	26+	1903	4	55.2	1997	208	65	.0	.4	30.5	.0	.6	.0
Jun	81.0	58.9	70.0	103+	1934	1	73.8	1971	34+	1931	9	65.2	1992	26	174	@	4.1	30.0	.0	.0	.0
Jul	84.5	63.0	73.8	108	1936	14	78.4	1999	43	1904	2	70.5	2000	2	272	.1	6.4	31.0	.0	.0	.0
Aug	82.3	60.7	71.5	103	1918	6	78.6	1995	38+	1915	31	66.9	1992	20	220	.0	3.7	31.0	.0	.0	.0
Sep	76.4	53.2	64.8	102	1951	1	68.7	1998	28+	1928	26	60.4	1993	81	74	.0	1.4	30.0	.0	.1	.0
Oct	64.2	41.5	52.9	92	1946	6	60.8	1971	16	1925	29	46.5	1987	389	12	.0	.0	28.4	.0	5.5	.0
Nov	49.9	32.8	41.4	84	1950	1	46.1	1975	-5	1950	25	33.8	1976	709	0	.0	.0	14.2	1.4	16.7	.0
Dec	37.1	22.2	29.7	71+	1982	3	39.5	1982	-22	1924	28	17.3	2000	1095	0	.0	.0	4.4	9.6	25.8	1.9
Ann	60.4	40.3	50.3	108	Jul 1936	14	78.6	Aug 1995	-23+	Jan 1985	20	8.8	Jan 1977	6143	819	.1	16.0	243.0	40.7	132.4	9.9

\+ 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: 1901-2001

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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	2.16	1.97	2.70	1959	21	5.14	1982	.49+	1986
Feb	2.03	1.88	3.65	1959	10	6.63	1990	.17	1987
Mar	3.01	2.71	2.63	1955	1	5.38	1982	.83	1981
Apr	3.58	3.59	3.60	1959	27	7.04	1972	1.05	1997
May	4.29	4.22	3.30	1989	26	7.89	1989	.57	1988
Jun	3.93	3.68	5.65	1958	9	7.40	1998	.73	1988
Jul	4.73	4.91	4.05	1998	4	11.94	1998	.61	1974
Aug	3.66	3.25	7.07	1998	5	8.81	1998	.54	1996
Sep	2.84	2.38	4.54	1933	27	9.28	1972	.18	1979
Oct	2.58	2.24	3.56	1901	12	6.87	1991	.70	1982
Nov	3.35	2.95	2.50	1927	30	8.34	1985	.23	1976
Dec	2.85	2.74	3.08	1990	30	7.76	1990	.55	1976
Ann	39.01	38.24	7.07	Aug 1998	5	11.94	Jul 1998	.17	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.7	5.8	1.3	.3
Feb	9.0	4.9	1.2	.3
Mar	10.8	6.7	2.2	.5
Apr	11.3	7.6	2.6	.6
May	11.2	7.3	3.0	1.1
Jun	10.1	7.2	2.7	.9
Jul	8.9	6.7	3.0	1.6
Aug	8.6	5.9	2.6	1.0
Sep	7.2	4.9	2.0	.9
Oct	8.8	5.6	1.6	.5
Nov	10.1	6.4	2.4	.9
Dec	11.0	6.9	1.9	.4
Ann	117.7	75.9	26.5	9.0

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	.60	.81	1.12	1.39	1.65	1.93	2.24	2.60	3.07	3.80	4.49
Feb	.33	.51	.80	1.08	1.37	1.68	2.04	2.47	3.05	3.99	4.89
Mar	1.10	1.38	1.79	2.13	2.46	2.79	3.15	3.57	4.11	4.94	5.70
Apr	1.45	1.78	2.25	2.63	2.99	3.36	3.75	4.21	4.78	5.67	6.47
May	1.30	1.71	2.32	2.84	3.35	3.88	4.46	5.15	6.03	7.41	8.70
Jun	1.21	1.59	2.14	2.62	3.08	3.56	4.09	4.71	5.51	6.76	7.91
Jul	1.18	1.62	2.31	2.92	3.53	4.17	4.88	5.73	6.83	8.59	10.23
Aug	.98	1.32	1.85	2.32	2.77	3.25	3.78	4.41	5.24	6.52	7.73
Sep	.39	.63	1.03	1.43	1.84	2.30	2.82	3.47	4.34	5.77	7.14
Oct	.82	1.07	1.43	1.74	2.04	2.35	2.69	3.08	3.59	4.39	5.12
Nov	.69	.99	1.48	1.93	2.39	2.87	3.42	4.08	4.95	6.34	7.66
Dec	.82	1.09	1.50	1.85	2.20	2.56	2.95	3.42	4.03	4.98	5.87
Ann	28.78	30.79	33.35	35.28	36.99	38.64	40.33	42.20	44.45	47.71	50.52

\+ 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: 1901-2001
(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	7.1	7.0	2	2
Feb	6.9	5.5	2	1
Mar	3.8	3.0	1	#
Apr	.9	#	#	#
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	.4	.0	#	0
Nov	1.0	.0	#	#
Dec	6.7	3.0	1	1
Ann	26.8	18.5	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	10.0	1996	3	17.0	1979	18	1999	11	7	1999
Feb	9.0	1984	28	21.5	1980	17	1982	4	10	1982
Mar	8.0	1999	9	11.5	1984	13	1984	1	4	1984
Apr	6.0	1973	12	11.5	1982	8	1982	9	1	1994
May	.0	0	0	.0	0	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	5.5	1989	20	9.0	1989	5	1989	20	#+	1993
Nov	4.0	1996	9	5.0+	1996	4	1996	9	#+	2000
Dec	10.0	1973	31	33.1	1973	15	2000	31	8	2000
Ann	10.0+	Jan 1996	3	33.1	Dec 1973	18	Jan 1999	11	10	Feb 1982

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.8	2.9	.9	.3	@
Feb	3.9	2.4	.9	.3	.0
Mar	1.7	1.1	.4	.2	.0
Apr	.3	.2	.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	.2	.1	@	@	.0
Nov	.7	.5	.1	.0	.0
Dec	3.6	2.3	.9	.3	@
Ann	15.2	9.5	3.3	1.2	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	14.2	8.3	3.8	.5
Feb	10.0	6.8	4.3	1.5
Mar	3.6	2.0	.8	.1
Apr	.2	.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	.1	.1	@	.0
Nov	.5	.1	.0	.0
Dec	7.5	4.2	2.3	.7
Ann	36.1	21.7	11.3	2.8

+ 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	5/21	5/16	5/13	5/10	5/08	5/05	5/02	4/29	4/24
32	5/10	5/05	5/02	4/29	4/26	4/23	4/20	4/16	4/11
28	4/28	4/24	4/21	4/18	4/15	4/12	4/10	4/06	4/02
24	4/17	4/12	4/09	4/06	4/04	4/01	3/29	3/26	3/21
20	4/06	4/01	3/29	3/27	3/24	3/21	3/19	3/15	3/11
16	3/27	3/22	3/18	3/16	3/13	3/10	3/07	3/04	2/27

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	9/23	9/27	9/30	10/03	10/05	10/07	10/09	10/12	10/16
32	9/28	10/03	10/06	10/09	10/12	10/15	10/18	10/21	10/26
28	10/10	10/16	10/20	10/24	10/28	10/31	11/04	11/08	11/14
24	10/24	10/29	11/02	11/06	11/09	11/12	11/16	11/20	11/25
20	10/31	11/08	11/13	11/18	11/23	11/27	12/02	12/07	12/15
16	11/14	11/21	11/27	12/01	12/05	12/09	12/14	12/19	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	168	162	157	153	150	146	142	137	131
32	186	180	176	172	169	165	161	157	151
28	220	211	205	200	195	190	184	178	169
24	239	232	227	223	219	215	210	205	198
20	269	260	253	248	243	238	232	226	217
16	290	282	276	271	267	262	257	251	243

***** 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	1267	1037	831	478	208	26	2	20	81	389	709	1095	6143
60	1112	897	676	336	119	6	0	4	27	259	559	940	4935
57	1019	813	584	259	79	2	0	0	11	194	471	847	4279
55	957	757	528	211	58	1	0	0	6	156	413	790	3877
50	805	627	386	114	22	0	0	0	1	81	281	645	2962
32	328	228	64	1	0	0	0	0	0	0	23	224	868

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	84	115	257	514	881	1139	1293	1223	983	646	305	152	7592
55	0	0	7	35	226	450	580	510	298	89	5	4	2204
57	0	0	1	22	185	391	518	448	244	65	2	0	1876
60	0	0	0	10	132	305	425	359	170	37	0	0	1438
65	0	0	0	2	65	174	272	220	74	12	0	0	819
70	0	0	0	0	26	76	137	115	21	2	0	0	377

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	12	28	117	299	632	899	1052	978	745	411	145	31	12	40	157	456	1088	1987	3039	4017	4762	5173	5318	5349
45	3	7	64	188	480	749	897	823	595	277	77	14	3	10	74	262	742	1491	2388	3211	3806	4083	4160	4174
50	0	2	33	108	336	599	742	668	447	165	38	4	0	2	35	143	479	1078	1820	2488	2935	3100	3138	3142
55	0	0	13	53	212	452	587	514	307	87	15	0	0	0	13	66	278	730	1317	1831	2138	2225	2240	2240
60	0	0	2	22	117	308	432	361	190	42	4	0	0	0	2	24	141	449	881	1242	1432	1474	1478	1478
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	2	16	81	189	385	591	714	657	476	249	84	13	2	18	99	288	673	1264	1978	2635	3111	3360	3444	3457

(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