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: MUNCIE BALL STATE UNIV, IN **COOP ID: 126020**

Climate Division: IN 6 **NWS Call Sign:** **Elevation: 940 Feet** **Lat: 40˚13N** **Lon: 85˚25W**

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	32.9	16.1	24.5	65	1967	25	34.5	1990	-29	1994	19	7.7	1977	1256	0	.0	.0	2.7	15.1	28.2	4.4
Feb	37.5	19.4	28.5	74	2000	26	39.2	1976	-13+	1982	10	13.8	1978	1023	0	.0	.0	4.9	10.5	23.9	2.6
Mar	48.4	29.1	38.8	80+	1986	30	48.7	1976	-8	1993	1	29.2	1984	814	0	.0	.0	13.3	3.3	19.9	.1
Apr	60.6	39.4	50.0	88	1976	16	57.1	1976	10	1982	7	45.0	1975	453	3	.0	.0	25.0	.2	7.6	.0
May	71.7	51.3	61.5	93	1977	20	68.6	1977	25	1994	2	56.5	1997	183	73	.0	.5	30.8	.0	.5	.0
Jun	80.9	60.3	70.6	102	1988	26	74.9	1984	36	1993	2	65.4	1992	22	191	@	3.5	30.0	.0	.0	.0
Jul	84.9	64.0	74.5	100+	1977	7	79.8	1977	40	1984	8	71.0	1984	1	295	.2	6.9	31.0	.0	.0	.0
Aug	82.7	61.8	72.3	99	1988	18	77.5	1995	39	1986	29	67.2	1992	12	238	.0	3.7	31.0	.0	.0	.0
Sep	76.3	53.7	65.0	96	1998	7	69.4	1978	27	1995	23	60.0	1993	85	85	.0	1.4	30.0	.0	.2	.0
Oct	64.3	41.9	53.1	90	1971	1	61.3	1971	18	1988	31	46.0	1988	378	10	.0	@	28.5	.0	4.8	.0
Nov	50.0	32.6	41.3	79+	1971	16	46.6	1990	3+	1970	23	34.0	1976	711	0	.0	.0	15.0	1.7	15.8	.0
Dec	38.1	21.9	30.0	71	1982	3	39.7	1982	-21	1989	22	17.5	1989	1084	0	.0	.0	4.8	9.1	25.7	1.7
Ann	60.7	41.0	50.8	102	Jun 1988	26	79.8	Jul 1977	-29	Jan 1994	19	7.7	Jan 1977	6022	895	.2	16.0	247.0	39.9	126.6	8.8

\+ 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: 1962-2001

(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	2.06	2.04	1.61	1969	18	3.96	1974	.40	1981
Feb	2.25	2.19	2.20	1975	23	4.90	1971	.08	1987
Mar	3.10	3.16	2.64	1963	4	6.44	1985	.84	1994
Apr	3.60	3.51	2.30	2000	8	7.11	1972	1.38	1976
May	4.17	4.19	2.17	1981	25	8.11	1981	.72	1988
Jun	4.28	4.06	4.74	1992	18	8.72	1998	.46	1984
Jul	3.98	3.56	3.10	1998	8	12.01	1992	.87	1974
Aug	3.49	3.47	3.49	1969	10	9.61	1990	1.20	1988
Sep	2.98	2.49	4.20	1965	15	10.41	1972	.38	1979
Oct	2.62	2.72	2.24	1977	1	5.44	1983	.61	1982
Nov	3.38	2.73	2.69	1993	14	8.04	1985	.57	1976
Dec	3.02	2.70	3.09	1990	29	9.51	1990	1.02	1995
Ann	38.93	38.32	4.74	Jun 1992	18	12.01	Jul 1992	.08	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.1	6.1	1.1	.1
Feb	9.9	5.4	1.3	.2
Mar	11.3	7.3	1.9	.4
Apr	12.6	8.1	2.4	.6
May	12.0	8.0	3.0	.9
Jun	10.4	7.1	3.0	1.1
Jul	9.7	6.3	2.9	1.2
Aug	8.9	5.9	2.3	.9
Sep	8.0	5.2	2.2	.7
Oct	9.4	5.4	1.9	.5
Nov	10.6	6.8	2.5	.7
Dec	12.1	7.2	1.9	.4
Ann	126.0	78.8	26.4	7.7

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	.56	.76	1.05	1.31	1.57	1.83	2.13	2.48	2.93	3.65	4.31
Feb	.39	.59	.92	1.23	1.54	1.88	2.27	2.74	3.37	4.38	5.34
Mar	1.08	1.37	1.80	2.16	2.50	2.85	3.24	3.69	4.26	5.15	5.97
Apr	1.47	1.80	2.26	2.65	3.01	3.38	3.77	4.23	4.81	5.69	6.50
May	1.59	1.98	2.54	3.00	3.44	3.88	4.37	4.93	5.64	6.74	7.74
Jun	1.19	1.59	2.21	2.75	3.28	3.83	4.44	5.16	6.10	7.57	8.95
Jul	1.07	1.44	2.02	2.52	3.02	3.54	4.11	4.79	5.69	7.08	8.38
Aug	.97	1.30	1.80	2.24	2.67	3.12	3.62	4.21	4.97	6.17	7.29
Sep	.43	.68	1.11	1.52	1.95	2.42	2.97	3.64	4.54	6.01	7.42
Oct	.78	1.03	1.41	1.73	2.04	2.36	2.72	3.14	3.69	4.54	5.33
Nov	.92	1.25	1.73	2.16	2.58	3.01	3.50	4.07	4.81	5.98	7.08
Dec	1.05	1.33	1.75	2.10	2.43	2.78	3.15	3.59	4.16	5.03	5.82
Ann	28.12	30.23	32.92	34.95	36.76	38.50	40.30	42.28	44.68	48.16	51.17

\+ 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: 1962-2001
(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	8.6	7.4	2	1	15.0	1978	26	36.4	1978	25	1978	27	11	1977	5.4	3.2	.8	.2	.1	10.3	5.8	2.3	.8
Feb	6.2	4.2	2	1	10.0	1984	28	15.8	1985	21	1978	5	13	1978	4.1	2.2	.4	.2	@	8.1	4.3	2.7	1.2
Mar	3.4	2.3	#	#	6.0	1975	14	10.8	1984	9	1984	1	3	1978	2.1	.9	.4	.1	.0	2.2	1.0	.5	.0
Apr	.5	.0	#	0	5.0	1982	9	6.3	1982	6	1982	9	#+	2000	.5	.2	@	@	.0	.2	@	@	.0
May	.0	.0	#	0	.0	0	0	.0	0	#	1982	20	#	1982	.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	6.0	1989	19	7.0	1989	3	1989	19	#+	1993	.1	.1	@	@	.0	.1	@	.0	.0
Nov	1.3	.0	#	#	4.2	1972	19	7.0	1980	4	1997	16	1	1997	1.2	.4	.1	.0	.0	.9	.2	.0	.0
Dec	7.3	3.8	1	#	12.5	1973	20	26.5	1973	10	1989	27	4+	2000	4.2	2.3	.6	.3	@	6.4	3.0	1.5	.0
Ann	27.5	17.7	N/A	N/A	15.0	Jan 1978	26	36.4	Jan 1978	25	Jan 1978	27	13	Feb 1978	17.6	9.3	2.3	.8	.1	28.2	14.3	7.0	2.0

+ 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

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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	5/22	5/16	5/12	5/09	5/06	5/02	4/29	4/25	4/19
32	5/10	5/05	5/01	4/29	4/26	4/23	4/20	4/17	4/12
28	4/25	4/20	4/17	4/14	4/11	4/08	4/05	4/01	3/27
24	4/18	4/12	4/09	4/05	4/03	3/31	3/27	3/24	3/18
20	4/12	4/06	4/02	3/29	3/25	3/22	3/18	3/14	3/08
16	3/31	3/24	3/19	3/15	3/11	3/07	3/02	2/25	2/18

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	9/18	9/23	9/26	9/28	10/01	10/03	10/06	10/09	10/13
32	9/26	10/01	10/05	10/08	10/12	10/15	10/18	10/22	10/27
28	10/07	10/14	10/18	10/22	10/26	10/29	11/02	11/07	11/13
24	10/21	10/28	11/01	11/05	11/09	11/12	11/16	11/21	11/27
20	10/31	11/06	11/11	11/15	11/18	11/22	11/26	11/30	12/07
16	11/14	11/21	11/26	11/30	12/04	12/07	12/12	12/16	12/23

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	169	162	156	152	148	143	139	133	126
32	187	181	176	172	168	164	160	155	149
28	222	213	207	202	197	192	187	181	173
24	242	234	229	224	220	215	210	205	197
20	263	254	248	242	237	232	227	220	211
16	293	284	278	272	267	262	257	250	241

***** 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	1256	1023	814	453	183	22	1	12	85	378	711	1084	6022
60	1101	883	660	315	100	5	0	1	31	248	561	929	4834
57	1008	799	575	240	63	2	0	0	14	182	473	836	4192
55	946	745	517	195	45	1	0	0	7	144	416	780	3796
50	796	614	381	105	16	0	0	0	1	71	284	636	2904
32	323	220	73	1	0	0	0	0	0	0	25	221	863

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	90	121	282	541	913	1159	1316	1248	990	655	304	160	7779
55	0	2	13	45	245	469	603	535	307	85	5	6	2315
57	0	0	9	29	201	410	541	473	253	62	2	0	1980
60	0	0	2	15	145	323	448	381	181	35	0	0	1530
65	0	0	0	3	73	191	295	238	85	10	0	0	895
70	0	0	0	0	29	89	156	121	28	2	0	0	425

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	18	34	131	338	679	931	1078	1011	767	433	156	33	18	52	183	521	1200	2131	3209	4220	4987	5420	5576	5609
45	5	11	77	221	525	781	923	856	617	296	90	13	5	16	93	314	839	1620	2543	3399	4016	4312	4402	4415
50	0	5	41	133	376	631	768	701	469	182	46	4	0	5	46	179	555	1186	1954	2655	3124	3306	3352	3356
55	0	1	22	66	247	482	613	546	327	101	18	1	0	1	23	89	336	818	1431	1977	2304	2405	2423	2424
60	0	0	2	31	143	339	459	392	205	47	4	0	0	0	2	33	176	515	974	1366	1571	1618	1622	1622
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	4	20	83	201	414	621	737	686	491	259	90	18	4	24	107	308	722	1343	2080	2766	3257	3516	3606	3624

(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