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: SOUTH BEND RGNL AP, IN **COOP ID: 128187**

Climate Division: IN 2 **NWS Call Sign: SBN** **Elevation: 773 Feet** **Lat: 41˚42N** **Lon: 86˚20W**

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	31.0	15.7	23.4	68	1950	25	33.9	1990	-21+	1984	21	10.7	1977	1274	0	.0	.0	1.8	16.6	27.9	3.7
Feb	35.5	19.0	27.3	74	2000	25	37.0	1998	-17	1951	2	13.3	1978	1055	0	.0	.0	3.2	11.9	23.8	2.4
Mar	46.8	28.2	37.5	85	1981	31	45.4	1973	-2+	1960	6	28.7	1984	844	1	.0	.0	11.5	3.4	19.7	.1
Apr	58.9	37.7	48.3	89	1980	22	55.2	1985	11	1972	8	42.6	1975	498	10	.0	.0	23.3	.1	8.2	.0
May	70.7	48.4	59.6	92+	1953	30	67.8	1977	24	1968	6	52.5	1997	213	53	.0	.6	30.3	.0	.4	.0
Jun	79.6	58.3	69.0	104	1988	25	74.7	1971	35+	1956	2	63.6	1982	41	172	.1	3.2	30.0	.0	.0	.0
Jul	83.1	62.8	73.0	102	1999	30	78.0	1999	42	2001	2	68.5	1996	6	268	.2	5.7	31.0	.0	.0	.0
Aug	80.7	61.3	71.0	103	1988	1	77.2	1983	40	1965	29	67.0	1992	13	214	@	2.9	31.0	.0	.0	.0
Sep	73.6	53.3	63.4	99	1953	1	67.7	1978	32+	1951	29	58.5	1993	117	85	.0	.9	30.0	.0	@	.0
Oct	61.8	42.3	52.1	92	1963	6	60.3	1971	20	1988	30	45.5	1988	393	9	.0	.0	27.6	.0	2.9	.0
Nov	47.7	32.6	40.1	82	1950	1	46.5	1975	-7	1950	25	31.7	1976	731	0	.0	.0	12.8	1.8	14.6	.0
Dec	35.6	21.7	28.7	70+	1982	2	37.4	1982	-16+	1951	16	16.8	1983	1109	0	.0	.0	3.3	9.8	25.3	1.5
Ann	58.8	40.1	49.5	104	Jun 1988	25	78.0	Jul 1999	-21+	Jan 1984	21	10.7	Jan 1977	6294	812	.3	13.3	235.8	43.6	122.8	7.7

\+ 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: 1948-2001

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Issue Date: February 2004

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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	2.27	2.26	2.81	1960	12	4.58	1975	.68	1981
Feb	1.98	1.66	1.95	1968	1	5.23	1976	.79	1983
Mar	2.89	2.71	1.48	1976	27	7.96	1976	.80	1994
Apr	3.62	3.62	1.95	1975	18	7.48	1999	.50	1971
May	3.50	3.39	2.94	1976	6	8.09	1996	.80	1994
Jun	4.19	3.89	4.69	1968	25	10.86	1993	.48	1988
Jul	3.73	3.47	3.64	1989	9	7.47	1982	1.17	1974
Aug	3.98	3.81	3.96	1995	3	8.30	1979	1.28	1983
Sep	3.79	3.49	3.00	1977	1	9.01	1977	.01	1979
Oct	3.27	3.23	3.47	1988	17	8.75	1991	.91	1982
Nov	3.39	2.99	3.92	1990	27	6.72	1985	1.24	1998
Dec	3.09	2.96	2.99	1965	24	5.04	1990	1.50	1993
Ann	39.70	38.13	4.69	Jun 1968	25	10.86	Jun 1993	.01	Sep 1979

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	16.4	6.0	.8	.3
Feb	12.2	5.6	.9	.2
Mar	13.7	6.9	1.7	.3
Apr	13.5	7.9	2.3	.7
May	11.7	6.8	2.3	.5
Jun	10.4	7.4	2.8	1.1
Jul	9.4	6.6	2.5	.9
Aug	10.5	6.7	2.8	1.1
Sep	9.7	6.3	2.7	.9
Oct	11.0	6.4	1.9	.8
Nov	13.7	7.6	2.0	.6
Dec	15.6	7.6	1.6	.5
Ann	147.8	81.8	24.3	7.9

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	1.09	1.39	1.64	1.88	2.12	2.38	2.68	3.07	3.65	4.19
Feb	.70	.89	1.16	1.39	1.61	1.83	2.07	2.36	2.72	3.28	3.79
Mar	.90	1.17	1.58	1.93	2.27	2.62	3.00	3.45	4.04	4.94	5.79
Apr	1.27	1.61	2.11	2.52	2.92	3.33	3.78	4.30	4.96	5.99	6.93
May	1.01	1.34	1.84	2.28	2.70	3.14	3.63	4.20	4.95	6.11	7.19
Jun	1.01	1.41	2.02	2.56	3.10	3.68	4.32	5.08	6.07	7.65	9.14
Jul	1.17	1.52	2.05	2.50	2.94	3.39	3.89	4.47	5.22	6.39	7.47
Aug	1.13	1.51	2.08	2.58	3.06	3.57	4.12	4.78	5.64	6.98	8.22
Sep	.49	.80	1.34	1.87	2.42	3.04	3.75	4.63	5.82	7.77	9.66
Oct	1.02	1.33	1.79	2.19	2.57	2.97	3.41	3.92	4.58	5.61	6.57
Nov	1.29	1.61	2.06	2.43	2.79	3.15	3.55	4.01	4.59	5.49	6.30
Dec	1.50	1.76	2.12	2.42	2.69	2.96	3.24	3.57	3.98	4.60	5.15
Ann	29.73	31.70	34.21	36.09	37.76	39.36	41.00	42.82	45.00	48.15	50.87

\+ 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)

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	17.8	15.6	5	4	15.6	1978	26	45.1	1979	41	1978	30	18	1977	13.6	5.4	2.1	.9	.1	21.5	14.8	11.1	5.3
Feb	14.8	13.9	4	3	11.5	1991	15	28.9	1985	35	1978	1	22	1978	9.4	4.7	1.5	.6	@	16.4	10.9	7.6	4.0
Mar	8.0	5.9	1	1	12.2	1998	9	19.1	1971	16	1978	3	6	1978	6.2	2.6	.8	.3	@	6.2	3.0	1.5	.3
Apr	1.3	.9	#	0	4.2	1972	1	7.1	1972	7	1982	5	1	1982	1.8	.5	.1	.0	.0	.7	.3	.1	.0
May	.0	.0	#	0	.1	1976	3	.1	1976	#	1989	7	#	2000	.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	.1	1993	29	.1	1993	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	.5	.0	#	0	7.4	1989	19	8.8	1989	6	1989	20	#	1992	.5	.1	@	@	.0	.1	@	@	.0
Nov	7.7	7.6	#	0	14.6	1977	25	30.3	1977	20	1977	27	3	1977	5.2	2.4	.8	.3	@	3.9	1.3	.6	.2
Dec	17.6	14.2	2	1	10.9	1973	19	44.6	2000	18	1976	31	6+	2000	11.2	5.5	2.0	.8	@	14.3	8.5	5.0	1.3
Ann	67.7	58.1	N/A	N/A	15.6	Jan 1978	26	45.1	Jan 1979	41	Jan 1978	30	22	Feb 1978	47.9	21.2	7.3	2.9	.1	63.1	38.8	25.9	11.1

+ 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	5/27	5/21	5/17	5/13	5/10	5/07	5/03	4/29	4/24
32	5/11	5/06	5/02	4/29	4/26	4/23	4/20	4/16	4/11
28	4/28	4/23	4/20	4/16	4/14	4/11	4/08	4/04	3/30
24	4/17	4/13	4/10	4/07	4/04	4/02	3/30	3/27	3/22
20	4/10	4/04	3/31	3/27	3/24	3/20	3/17	3/12	3/06
16	4/04	3/28	3/23	3/18	3/14	3/10	3/05	2/28	2/20

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

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	157	153	149	145	141	136	129
32	198	190	184	180	175	171	166	161	153
28	224	216	211	206	201	197	192	186	179
24	248	241	236	232	228	224	219	214	207
20	273	264	257	251	246	241	235	228	219
16	292	283	276	271	266	261	255	249	240

***** 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	1274	1055	844	498	213	41	6	13	117	393	731	1109	6294
60	1135	917	698	360	141	12	0	5	37	272	597	971	5145
57	1042	833	605	282	98	5	0	0	17	203	508	878	4471
55	980	777	547	233	74	3	0	0	9	162	451	816	4052
50	825	643	405	131	32	0	0	0	1	84	316	672	3109
32	341	234	71	1	0	0	0	0	0	0	35	237	919

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	46	77	244	504	864	1119	1282	1223	961	644	290	88	7342
55	0	1	14	50	202	432	569	510	286	79	13	1	2157
57	0	0	10	37	161	375	507	448	236	57	8	1	1840
60	0	0	5	23	111	292	414	356	170	32	4	0	1407
65	0	0	1	10	53	172	268	214	85	9	0	0	812
70	0	0	0	3	19	79	136	99	34	2	0	0	372

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	9	26	112	295	624	890	1044	984	729	411	134	26	9	35	147	442	1066	1956	3000	3984	4713	5124	5258	5284
45	1	9	64	185	472	740	889	829	579	274	72	11	1	10	74	259	731	1471	2360	3189	3768	4042	4114	4125
50	0	1	32	107	330	590	734	674	431	164	33	4	0	1	33	140	470	1060	1794	2468	2899	3063	3096	3100
55	0	0	12	54	209	445	579	519	295	82	11	0	0	0	12	66	275	720	1299	1818	2113	2195	2206	2206
60	0	0	3	23	118	302	424	364	176	35	3	0	0	0	3	26	144	446	870	1234	1410	1445	1448	1448
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	14	67	174	376	582	710	664	455	227	66	8	0	14	81	255	631	1213	1923	2587	3042	3269	3335	3343

(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