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: CARBONDALE SEWAGE PLANT, IL **COOP ID: 111265**

Climate Division: IL 8 **NWS Call Sign:** **Elevation: 390 Feet** **Lat: 37˚45N** **Lon: 89˚10W**

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	39.3	20.8	30.1	76	1943	24	40.5	1990	-25	1977	11	14.0	1977	1085	0	.0	.0	6.7	8.8	25.9	2.0
Feb	45.3	24.2	34.8	79	1982	24	42.5	1998	-22	1951	2	20.2	1978	847	0	.0	.0	11.1	5.1	21.1	1.4
Mar	55.3	33.5	44.4	93	1910	23	50.6	1976	-11	1978	5	37.4	1978	639	0	.0	.0	21.5	.8	15.0	.1
Apr	66.2	42.4	54.3	92	1915	28	62.0	1981	20	1954	1	48.5	1983	329	9	.0	.1	28.0	.0	4.4	.0
May	75.5	52.1	63.8	101	1911	28	70.0	1987	30+	1978	2	58.4	1976	134	96	.0	.7	30.9	.0	.1	.0
Jun	84.0	61.4	72.7	106+	1936	19	76.2	1984	39	1917	16	66.8	1974	10	241	.1	7.3	30.0	.0	.0	.0
Jul	87.8	65.9	76.9	112+	1936	14	81.2	1980	42	1972	6	72.7	1972	0	368	.4	14.3	31.0	.0	.0	.0
Aug	86.8	63.1	75.0	113	1930	9	80.9	1980	41	1915	31	70.7	1992	8	315	.5	11.4	31.0	.0	.0	.0
Sep	79.9	55.1	67.5	108+	1925	6	72.9	1998	30+	1983	23	60.8	1974	57	132	.0	3.7	30.0	.0	.2	.0
Oct	69.2	43.3	56.3	96+	1938	5	62.5	1971	16	1952	29	50.3	1976	288	18	.0	@	30.5	.0	5.7	.0
Nov	55.4	35.0	45.2	88	1933	1	51.2	1999	-1	1929	30	36.5	1976	594	0	.0	.0	20.4	.4	14.1	.0
Dec	43.8	25.6	34.7	77	1982	3	42.8	1982	-14	1989	22	22.8	1989	939	0	.0	.0	10.0	4.7	23.1	.7
Ann	65.7	43.5	54.6	113	Aug 1930	9	81.2	Jul 1980	-25	Jan 1977	11	14.0	Jan 1977	4930	1179	1.0	37.5	281.1	19.8	109.6	4.2

\+ 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: 1910-2001

(3) Derived from 1971-2000 serially complete daily data

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	2.91	2.64	4.78	1937	14	8.70	1982	.46	1986
Feb	3.01	2.73	3.30	1945	26	7.09	1990	.89	1983
Mar	4.25	3.44	5.67	1977	28	9.23	1977	1.11	1971
Apr	4.45	3.15	4.96	1996	29	11.83	1996	1.68	1981
May	4.78	4.17	5.77	1957	22	10.94	1981	1.05	1994
Jun	4.77	4.70	6.90	2000	17	14.38	2000	.42	1991
Jul	3.35	2.87	3.50	1961	25	7.34	1981	.54	1974
Aug	3.94	3.09	5.04	1959	17	10.01	1985	.85	1980
Sep	3.13	2.32	4.22	1988	12	9.52	1993	.16	1978
Oct	2.93	2.89	4.42	1910	4	6.30	1983	.58	1971
Nov	4.62	4.47	5.35	1991	20	9.13	1994	.51	1999
Dec	3.71	3.29	3.57	1982	3	12.23	1982	.63	1976
Ann	45.85	44.47	6.90	Jun 2000	17	14.38	Jun 2000	.16	Sep 1978

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	9.6	5.8	1.8	.5
Feb	8.6	5.4	2.1	.7
Mar	11.5	7.4	3.2	1.0
Apr	11.6	8.0	2.7	1.0
May	11.7	7.9	3.2	1.1
Jun	9.5	6.6	3.2	1.5
Jul	8.5	5.6	2.3	.8
Aug	8.1	5.7	2.6	1.3
Sep	7.8	5.2	2.2	.7
Oct	8.2	5.5	2.3	.7
Nov	9.8	6.8	3.0	1.2
Dec	10.3	6.7	2.6	.9
Ann	115.2	76.6	31.2	11.4

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	.57	.83	1.26	1.65	2.05	2.48	2.96	3.55	4.32	5.57	6.75
Feb	.89	1.17	1.60	1.97	2.33	2.71	3.12	3.61	4.24	5.22	6.14
Mar	1.60	2.00	2.57	3.04	3.49	3.95	4.44	5.02	5.75	6.88	7.91
Apr	1.19	1.61	2.25	2.82	3.37	3.96	4.61	5.37	6.38	7.94	9.41
May	1.29	1.74	2.43	3.03	3.63	4.25	4.94	5.76	6.83	8.50	10.06
Jun	1.04	1.48	2.18	2.82	3.45	4.12	4.88	5.79	6.99	8.90	10.70
Jul	1.01	1.33	1.80	2.21	2.61	3.02	3.48	4.01	4.71	5.79	6.79
Aug	.97	1.34	1.91	2.42	2.93	3.46	4.05	4.76	5.69	7.15	8.53
Sep	.41	.66	1.11	1.54	2.00	2.51	3.10	3.83	4.81	6.43	7.99
Oct	1.00	1.28	1.68	2.02	2.35	2.68	3.05	3.48	4.03	4.89	5.67
Nov	.99	1.41	2.09	2.70	3.32	3.98	4.72	5.62	6.79	8.67	10.44
Dec	.93	1.28	1.82	2.30	2.77	3.27	3.83	4.49	5.35	6.72	8.00
Ann	33.45	35.88	38.97	41.30	43.37	45.37	47.43	49.70	52.44	56.41	59.83

\+ 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: 1910-2001
(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	5.0	2.9	1	#	8.5	1978	17	20.6	1979	14	1978	21	7	1978	2.5	1.5	.4	.2	.0	5.6	2.8	2.2	.7
Feb	3.4	1.5	1	#	10.0	1979	26	19.8	1993	12	1979	27	5	1978	1.6	1.2	.3	.2	@	4.4	3.0	2.0	.4
Mar	2.0	.5	#	#	7.5	1999	15	12.5	1999	10	1999	15	1	1999	.7	.5	.3	.1	.0	1.3	.8	.5	@
Apr	.3	.0	#	0	6.0	1971	6	9.0	1971	6	1971	6	#+	1980	.1	.1	.1	@	.0	.1	.1	.1	.0
May	.0	.0	0	0	.0	0	0	.0	0	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	.1	.0	#	0	1.9	1993	31	3.7	1993	2	1993	31	#	1993	.1	.1	.0	.0	.0	.1	.0	.0	.0
Nov	.5	.0	#	0	6.5	1980	27	6.5	1980	7	1980	27	1	1980	.2	.1	.1	@	.0	.4	.2	@	.0
Dec	2.2	1.0	#	#	8.0	1990	28	11.3	2000	9	1990	28	2	2000	1.5	.8	.3	.1	.0	2.6	1.5	.5	.0
Ann	13.5	5.9	N/A	N/A	10.0	Feb 1979	26	20.6	Jan 1979	14	Jan 1978	21	7	Jan 1978	6.7	4.3	1.5	.6	@	14.5	8.4	5.3	1.1

+ 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	5/10	5/05	5/01	4/28	4/25	4/22	4/18	4/15	4/10
32	4/29	4/24	4/21	4/18	4/15	4/12	4/09	4/06	4/01
28	4/16	4/11	4/08	4/05	4/02	3/30	3/27	3/24	3/19
24	4/08	4/04	3/31	3/28	3/25	3/22	3/19	3/16	3/11
20	3/25	3/19	3/15	3/12	3/09	3/06	3/02	2/26	2/21
16	3/17	3/10	3/04	2/28	2/23	2/19	2/14	2/09	2/02

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	9/24	9/27	9/30	10/03	10/05	10/07	10/10	10/12	10/16
32	9/25	10/01	10/05	10/09	10/12	10/16	10/19	10/24	10/29
28	10/09	10/15	10/19	10/23	10/26	10/29	11/01	11/05	11/11
24	10/25	10/31	11/04	11/08	11/12	11/15	11/19	11/23	11/29
20	10/31	11/07	11/12	11/16	11/20	11/24	11/28	12/03	12/10
16	11/18	11/25	12/01	12/05	12/09	12/13	12/17	12/23	12/30

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	163	159	154	149	142
32	201	194	188	184	180	175	171	165	158
28	223	217	213	209	206	203	199	195	189
24	255	246	240	235	231	226	221	215	207
20	277	270	264	260	255	251	246	241	233
16	314	305	299	293	288	283	277	271	262

***** 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	1085	847	639	329	134	10	0	8	57	288	594	939	4930
60	930	707	490	203	64	2	0	0	17	171	448	784	3816
57	837	630	403	141	37	0	0	0	7	116	366	697	3234
55	783	577	348	107	24	0	0	0	3	86	314	640	2882
50	637	449	227	43	7	0	0	0	0	34	200	497	2094
32	223	122	17	0	0	0	0	0	0	0	12	132	506

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	161	199	401	669	986	1221	1391	1330	1065	753	408	215	8799
55	8	10	19	86	297	531	678	617	378	126	20	10	2780
57	1	7	12	61	247	471	616	555	322	93	13	5	2403
60	0	0	6	33	182	383	523	462	242	56	5	0	1892
65	0	0	0	9	96	241	368	315	132	18	0	0	1179
70	0	0	0	1	40	123	221	184	57	4	0	0	630

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	37	88	231	466	775	1012	1172	1105	839	519	224	73	37	125	356	822	1597	2609	3781	4886	5725	6244	6468	6541
45	17	45	140	333	620	862	1017	950	689	374	136	33	17	62	202	535	1155	2017	3034	3984	4673	5047	5183	5216
50	4	16	76	215	466	712	862	795	541	245	76	12	4	20	96	311	777	1489	2351	3146	3687	3932	4008	4020
55	0	4	34	125	317	562	707	640	399	147	35	4	0	4	38	163	480	1042	1749	2389	2788	2935	2970	2974
60	0	0	13	61	193	415	552	485	261	70	12	0	0	0	13	74	267	682	1234	1719	1980	2050	2062	2062
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	27	62	146	293	495	687	807	749	556	344	137	40	27	89	235	528	1023	1710	2517	3266	3822	4166	4303	4343

(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