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: GLENWOOD 3 SW, IA **COOP ID: 133290**

Climate Division: IA 7 **NWS Call Sign:** **Elevation: 980 Feet** **Lat: 41˚00N** **Lon: 95˚46W**

Temperature (˚F)

Month	Mean (1) Daily Max	Mean (1) Daily Min	Mean (1) Mean	Extremes Highest Daily(2)	Extremes Year	Extremes Day	Extremes Highest Month(1) Mean	Extremes Year	Extremes Lowest Daily(2)	Extremes Year	Extremes Day	Extremes Lowest Month(1) Mean	Extremes Year	Degree Days (1) Base Temp 65 Heating	Degree Days (1) Base Temp 65 Cooling	Mean Number of Days (3) Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
Jan	31.8	10.4	21.1	69+	1944	25	32.4	1989	-28	1974	12	8.1	1979	1361	0	.0	.0	3.0	14.5	30.2	7.1
Feb	38.1	16.3	27.2	78+	1896	26	37.6	1987	-29	1905	13	13.1	1978	1059	0	.0	.0	6.9	9.8	25.8	3.9
Mar	50.4	27.2	38.8	92	1986	30	44.4	1977	-24	1960	5	29.1	1984	812	0	.0	@	16.6	3.0	20.1	.7
Apr	63.3	38.6	51.0	99	1989	23	58.4	1981	3	1975	3	43.9	1983	428	5	.0	.7	25.9	.1	8.5	.0
May	74.3	50.2	62.3	104+	1895	28	68.3	1977	26+	1976	3	56.5	1997	160	75	.1	1.3	30.9	.0	.5	.0
Jun	84.1	60.0	72.1	106+	1933	6	77.4	1988	35+	1945	4	67.0	1982	15	226	.3	7.7	30.0	.0	.0	.0
Jul	87.7	64.7	76.2	115	1936	25	81.8	1974	41	1972	5	71.4+	1994	4	351	1.2	12.1	31.0	.0	.0	.0
Aug	85.7	62.3	74.0	110+	1934	5	80.9	1983	37+	1950	20	68.3	1992	13	291	.4	9.5	31.0	.0	.0	.0
Sep	79.0	52.6	65.8	107	1939	7	72.1	1998	22+	1899	29	59.8	1993	79	103	@	4.2	29.9	.0	.5	.0
Oct	67.2	39.5	53.4	96	1994	1	58.2	1973	0	1925	30	47.6	1987	367	6	.0	.4	28.9	.1	7.0	.0
Nov	49.1	27.4	38.3	86+	1893	6	46.9	1999	-13	1964	30	30.3	1991	803	0	.0	.0	15.0	2.9	20.8	.3
Dec	35.4	15.8	25.6	72	1939	6	31.8	1979	-27	1919	10	7.3	1983	1222	0	.0	.0	4.4	11.0	29.6	3.8
Ann	62.2	38.8	50.5	115	Jul 1936	25	81.8	Jul 1974	-29	Feb 1905	13	7.3	Dec 1983	6323	1057	2.0	35.9	253.5	41.4	143.0	15.8

\+ 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: 1893-2001

(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	.70	.53	1.65	1949	3	1.66+	1975	.00	1986
Feb	.81	.71	1.57	2001	9	3.11	1971	.05	1977
Mar	2.14	1.85	1.99	1946	5	5.98	1973	.00	1994
Apr	3.36	2.47	3.25	1998	7	8.07	1999	.90	1981
May	4.82	4.08	4.98	1987	26	11.31	1987	.27	1989
Jun	4.75	3.82	4.96	1967	21	12.26	1984	1.34	1972
Jul	4.57	3.77	6.48	1990	26	14.29	1993	.63	1974
Aug	3.71	3.11	4.26	1975	25	9.12	1977	.81	1988
Sep	3.30	2.01	6.00	1997	2	8.75	1973	.70	1971
Oct	2.27	2.11	2.60	1899	25	5.33	1986	.00+	1999
Nov	1.83	1.68	2.76	1931	23	5.14	1975	.00	1989
Dec	.99	.79	2.50	1984	17	4.19	1984	.11+	1998
Ann	33.25	33.28	6.48	Jul 1990	26	14.29	Jul 1993	.00+	Oct 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	4.5	2.1	.3	.0
Feb	4.7	2.6	.3	@
Mar	7.5	4.9	1.4	.4
Apr	9.7	6.3	2.2	.8
May	11.5	8.1	3.3	1.2
Jun	9.5	7.1	3.1	1.4
Jul	8.9	6.1	3.0	1.3
Aug	8.1	5.9	2.2	1.1
Sep	7.3	5.0	2.0	1.0
Oct	6.2	4.3	1.5	.6
Nov	5.8	3.7	1.3	.3
Dec	5.1	2.4	.6	.1
Ann	88.8	58.5	21.2	8.2

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	.05	.12	.23	.33	.44	.56	.69	.86	1.09	1.45	1.81
Feb	.08	.14	.26	.37	.49	.63	.79	.99	1.27	1.72	2.17
Mar	.13	.34	.67	.99	1.32	1.69	2.11	2.64	3.35	4.52	5.65
Apr	.77	1.08	1.57	2.01	2.45	2.92	3.44	4.07	4.89	6.20	7.43
May	.98	1.42	2.13	2.78	3.43	4.13	4.92	5.87	7.12	9.13	11.04
Jun	1.25	1.70	2.39	3.00	3.59	4.22	4.91	5.74	6.81	8.50	10.09
Jul	.69	1.07	1.73	2.37	3.02	3.74	4.57	5.58	6.94	9.16	11.29
Aug	.78	1.12	1.67	2.16	2.66	3.19	3.79	4.51	5.46	6.98	8.42
Sep	.53	.81	1.29	1.75	2.22	2.73	3.32	4.03	4.99	6.54	8.02
Oct	.00	.56	1.04	1.39	1.71	2.05	2.42	2.82	3.38	4.24	5.04
Nov	.10	.27	.55	.82	1.11	1.43	1.80	2.26	2.89	3.92	4.92
Dec	.11	.18	.32	.45	.60	.77	.96	1.21	1.54	2.09	2.62
Ann	21.21	23.45	26.36	28.61	30.63	32.61	34.67	36.96	39.78	43.90	47.51

\+ 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: 1893-2001
(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	6.1	5.0	2	2	8.0	1971	3	18.8	1975	22	1984	1	9	1984	3.4	2.3	.6	.3	.0	14.1	8.8	5.5	.8
Feb	4.9	3.6	2	1	10.3	1978	13	17.6	1978	16	1978	20	9	1978	2.6	1.6	.7	.2	@	9.7	6.0	4.4	.9
Mar	3.4	2.3	1	#	10.0	1998	8	15.0	1998	14	1998	9	4	1998	1.6	1.2	.4	.2	@	3.4	1.4	.5	.2
Apr	.5	.0	#	0	4.0	1992	21	4.0	1992	6	1997	12	1	1997	.5	.2	.1	.0	.0	.4	.2	@	.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	.3	.0	#	0	7.0	1997	26	7.0	1997	7	1997	26	1	1997	.1	.1	@	@	.0	.2	.1	.1	.0
Nov	2.3	.8	#	#	6.1	1971	28	11.3	1971	7	1987	29	1	1991	1.1	.8	.2	.1	.0	2.1	.7	.2	.0
Dec	4.3	3.7	1	1	5.4	1972	12	13.7	1973	20	1983	30	10	1983	3.0	1.8	.5	.1	.0	7.5	3.0	.8	.0
Ann	21.8	15.4	N/A	N/A	10.3	Feb 1978	13	18.8	Jan 1975	22	Jan 1984	1	10	Dec 1983	12.3	8.0	2.5	.9	@	37.4	20.2	11.5	1.9

+ 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	5/12	5/08	5/05	5/02	4/29	4/25	4/20
32	5/10	5/05	5/02	4/29	4/26	4/23	4/20	4/16	4/11
28	4/28	4/23	4/19	4/16	4/14	4/11	4/08	4/04	3/31
24	4/17	4/13	4/10	4/08	4/06	4/03	4/01	3/29	3/25
20	4/10	4/05	4/02	3/30	3/27	3/24	3/21	3/18	3/13
16	3/31	3/25	3/21	3/17	3/14	3/11	3/07	3/03	2/25

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

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	163	156	151	146	142	138	134	129	122
32	185	178	172	167	163	158	153	147	140
28	203	195	190	185	180	176	171	166	158
24	223	216	210	206	201	197	192	187	180
20	250	241	234	228	223	218	212	205	196
16	276	266	258	252	246	241	234	227	217

***** 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	1361	1059	812	428	160	15	4	13	79	367	803	1222	6323
60	1206	919	658	294	83	2	0	2	27	234	654	1067	5146
57	1113	838	572	223	50	1	0	0	12	167	567	974	4517
55	1051	786	514	181	34	0	0	0	6	129	511	912	4124
50	899	655	377	97	11	0	0	0	0	60	376	766	3241
32	412	266	71	1	0	0	0	0	0	0	69	307	1126

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	74	131	282	569	938	1201	1370	1302	1014	662	256	108	7907
55	0	7	12	59	259	511	657	589	330	78	7	0	2509
57	0	3	8	40	213	452	595	527	276	54	3	0	2171
60	0	0	1	21	152	364	502	435	202	28	0	0	1705
65	0	0	0	5	75	226	351	291	103	6	0	0	1057
70	0	0	0	1	28	114	210	169	42	1	0	0	565

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	3	35	147	379	709	972	1128	1059	787	442	112	11	3	38	185	564	1273	2245	3373	4432	5219	5661	5773	5784
45	0	12	79	256	554	822	973	904	637	311	54	4	0	12	91	347	901	1723	2696	3600	4237	4548	4602	4606
50	0	2	41	158	403	672	818	749	492	193	21	0	0	2	43	201	604	1276	2094	2843	3335	3528	3549	3549
55	0	1	15	88	269	522	663	594	352	101	3	0	0	1	16	104	373	895	1558	2152	2504	2605	2608	2608
60	0	0	3	42	153	377	508	440	228	43	1	0	0	0	3	45	198	575	1083	1523	1751	1794	1795	1795
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	8	37	110	245	445	653	764	712	509	294	79	15	8	45	155	400	845	1498	2262	2974	3483	3777	3856	3871

(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