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: CASCADE, IA **COOP ID: 131257**

Climate Division: IA 3 **NWS Call Sign:** **Elevation: 850 Feet** **Lat: 42˚18N** **Lon: 91˚01W**

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	25.8	7.1	16.5	59	1981	25	28.3	1990	-35	1982	10	3.4	1979	1505	0	.0	.0	.6	20.8	30.5	10.5
Feb	32.2	13.1	22.7	65	2000	26	36.3	1998	-33	1996	3	10.2	1979	1186	0	.0	.0	2.0	14.0	26.5	6.3
Mar	44.5	25.4	35.0	87	1986	30	42.2	1973	-26	1962	1	24.5	1975	933	0	.0	.0	10.1	4.5	23.9	.9
Apr	58.4	36.3	47.4	95	1980	22	54.8	1977	-3	1982	7	40.6	1982	531	3	.0	.1	22.9	.3	11.2	@
May	70.8	48.3	59.6	93	1985	27	67.7	1977	25+	1961	1	53.4	1997	218	49	.0	.5	30.8	.0	1.2	.0
Jun	80.4	57.7	69.1	101+	1988	21	73.3	1971	35	1972	11	64.0	1982	27	147	.1	3.2	30.0	.0	.0	.0
Jul	84.1	62.0	73.1	101+	1955	27	76.7	1983	42+	1971	31	68.7	1992	6	255	.2	6.7	31.0	.0	.0	.0
Aug	81.8	59.6	70.7	103	1988	1	77.2	1983	35	1950	20	65.4	1992	29	206	.2	4.1	31.0	.0	.0	.0
Sep	73.8	50.3	62.1	98+	1953	1	66.2	1978	21	1949	29	56.8	1993	132	44	.0	1.2	30.0	.0	1.1	.0
Oct	61.8	38.6	50.2	92	1997	4	57.7	1971	10	1952	29	44.4	1988	461	2	.0	.1	27.3	.0	10.2	.0
Nov	44.6	26.6	35.6	77+	1999	9	42.7	1975	-14	1977	26	28.2	1976	882	0	.0	.0	10.2	4.4	22.2	.3
Dec	31.1	14.2	22.7	69	1998	5	30.2	1982	-28+	1960	23	10.1	1983	1313	0	.0	.0	1.6	14.8	29.6	5.7
Ann	57.4	36.6	47.1	103	Aug 1988	1	77.2	Aug 1983	-35	Jan 1982	10	3.4	Jan 1979	7223	706	.5	15.9	227.5	58.8	156.4	23.7

\+ 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

(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	1.18	1.16	1.45	1971	4	2.60	1979	.13	1981
Feb	1.20	1.05	1.95	2001	9	3.02	1971	.00	1987
Mar	2.20	2.06	2.14	1998	31	5.70	1991	.15	1981
Apr	3.04	2.96	2.45	1974	29	6.82	1999	.68	1997
May	3.60	3.64	3.10	1978	13	8.87	1974	.18	1992
Jun	4.61	3.86	4.03	1973	17	10.57	1993	.62	1992
Jul	3.24	3.03	4.30	1951	8	12.24	1993	.32	1991
Aug	4.73	4.22	2.95	1981	31	11.67	1981	.81+	1983
Sep	3.40	3.27	4.18	1967	14	9.39	1986	.32	1979
Oct	2.35	2.31	2.75	2001	23	5.76	1984	.39	1994
Nov	2.43	1.97	2.50	1971	2	6.88	1992	.15	1976
Dec	1.50	1.43	1.53	1971	15	3.83	1971	.22	1989
Ann	33.48	34.13	4.30	Jul 1951	8	12.24	Jul 1993	.00	Feb 1987

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	7.7	3.7	.6	.1
Feb	7.0	3.2	.7	.1
Mar	8.1	5.1	1.4	.4
Apr	10.0	6.5	1.8	.6
May	11.1	7.4	2.6	.7
Jun	10.3	7.2	2.8	1.5
Jul	8.8	5.6	2.3	.8
Aug	9.2	6.3	3.0	1.6
Sep	9.1	5.9	2.6	.9
Oct	8.3	4.9	1.5	.5
Nov	8.8	4.9	1.6	.5
Dec	7.9	4.1	.8	.2
Ann	106.3	64.8	21.7	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	.27	.38	.56	.71	.87	1.03	1.21	1.43	1.72	2.18	2.61
Feb	.14	.29	.49	.66	.84	1.02	1.23	1.48	1.81	2.33	2.83
Mar	.41	.60	.92	1.22	1.52	1.85	2.23	2.68	3.27	4.24	5.16
Apr	.91	1.20	1.64	2.01	2.37	2.75	3.16	3.65	4.28	5.26	6.17
May	.94	1.28	1.80	2.26	2.71	3.19	3.72	4.34	5.15	6.44	7.64
Jun	.78	1.19	1.86	2.49	3.14	3.84	4.65	5.63	6.93	9.04	11.06
Jul	.60	.89	1.37	1.81	2.26	2.74	3.29	3.95	4.83	6.24	7.59
Aug	1.07	1.51	2.21	2.83	3.45	4.11	4.85	5.73	6.89	8.74	10.49
Sep	.66	.97	1.47	1.93	2.39	2.89	3.46	4.14	5.04	6.49	7.87
Oct	.58	.81	1.15	1.45	1.75	2.07	2.42	2.84	3.39	4.26	5.08
Nov	.43	.65	1.00	1.33	1.67	2.04	2.46	2.96	3.64	4.72	5.76
Dec	.30	.43	.65	.85	1.06	1.28	1.52	1.82	2.22	2.85	3.45
Ann	22.65	24.71	27.36	29.39	31.20	32.96	34.78	36.81	39.27	42.87	46.00

\+ 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)

Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median
Jan	8.7	7.9	4	3
Feb	7.1	6.9	5	3
Mar	4.7	3.3	1	1
Apr	2.0	.0	#	#
May	.0	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.0	.0	0	0
Oct	.0	.0	#	0
Nov	3.0	1.3	#	#
Dec	6.9	5.3	2	2
Ann	32.4	24.7	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	14.0	1996	27	21.7	1996	24	1979	28	16	1979
Feb	13.5	1975	24	24.1	1975	26	1979	13	23	1979
Mar	8.8	1991	13	15.2	1975	19	1979	1	11	1979
Apr	9.0	1973	9	14.7	1973	14	1973	10	2	1973
May	.0	0	0	.0	0	#	1994	1	#	1994
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	1976	19	.5	1976	1	1997	27	#+	1997
Nov	8.2	1971	29	10.8	1971	8	1986	20	2	1986
Dec	10.3	1990	3	16.3	1977	19	2000	30	10	2000
Ann	14.0	Jan 1996	27	24.1	Feb 1975	26	Feb 1979	13	23	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	3.8	2.3	.9	.3	@
Feb	3.1	2.0	.6	.2	.0
Mar	2.1	1.6	.6	.3	@
Apr	.8	.7	.4	.1	.0
May	@	.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	.4	.2	.1	@	.0
Nov	2.3	1.6	.6	.2	.0
Dec	3.6	2.5	.8	.3	.0
Ann	16.1	10.9	4.0	1.4	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	17.2	11.1	6.9	2.5
Feb	12.6	7.8	5.8	2.6
Mar	5.4	3.3	2.1	.8
Apr	.9	.4	.2	.1
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	.3	.1	.0	.0
Nov	4.8	2.2	.7	.1
Dec	15.2	8.2	4.9	3.0
Ann	56.4	33.1	20.6	9.1

+ 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	5/29	5/24	5/20	5/17	5/14	5/11	5/08	5/04	4/29
32	5/18	5/12	5/09	5/05	5/02	4/29	4/26	4/22	4/17
28	5/04	4/28	4/25	4/22	4/19	4/16	4/12	4/09	4/03
24	4/20	4/16	4/14	4/11	4/09	4/07	4/05	4/03	3/30
20	4/16	4/11	4/07	4/04	4/01	3/29	3/26	3/23	3/18
16	4/07	4/01	3/27	3/23	3/20	3/16	3/12	3/08	3/02

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	9/10	9/14	9/17	9/19	9/21	9/24	9/26	9/29	10/03
32	9/20	9/24	9/27	9/29	10/01	10/04	10/06	10/09	10/13
28	9/26	10/01	10/05	10/08	10/11	10/14	10/17	10/21	10/27
24	10/09	10/14	10/18	10/21	10/24	10/26	10/30	11/02	11/07
20	10/21	10/25	10/29	11/01	11/04	11/06	11/09	11/13	11/18
16	11/02	11/07	11/10	11/13	11/16	11/18	11/21	11/24	11/29

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	149	142	137	133	129	125	121	116	110
32	168	163	158	155	151	148	144	140	134
28	199	191	185	180	175	170	165	159	151
24	216	209	205	200	196	193	188	183	177
20	239	231	225	220	216	211	206	200	192
16	266	257	251	245	240	235	229	223	214

***** 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	1505	1186	933	531	218	27	6	29	132	461	882	1313	7223
60	1350	1046	778	390	125	5	0	7	53	317	732	1158	5961
57	1257	962	685	312	83	2	0	2	25	240	642	1065	5275
55	1195	906	625	264	61	1	0	0	14	195	583	1003	4847
50	1040	773	482	161	24	0	0	0	2	103	442	850	3877
32	526	342	110	6	0	0	0	0	0	1	86	366	1437

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	44	80	200	467	854	1110	1272	1201	902	565	194	76	6965
55	0	0	2	35	202	421	559	488	226	45	1	0	1979
57	0	0	0	24	162	362	497	427	178	29	0	0	1679
60	0	0	0	11	111	275	404	340	115	13	0	0	1269
65	0	0	0	3	49	147	255	206	44	2	0	0	706
70	0	0	0	0	16	57	128	107	11	0	0	0	319

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	0	5	73	267	613	877	1027	955	665	331	71	5	0	5	78	345	958	1835	2862	3817	4482	4813	4884	4889
45	0	0	34	161	459	727	872	800	517	209	31	2	0	0	34	195	654	1381	2253	3053	3570	3779	3810	3812
50	0	0	13	87	314	577	717	645	371	119	14	0	0	0	13	100	414	991	1708	2353	2724	2843	2857	2857
55	0	0	5	42	194	427	562	490	243	59	4	0	0	0	5	47	241	668	1230	1720	1963	2022	2026	2026
60	0	0	2	16	100	283	408	338	141	23	0	0	0	0	2	18	118	401	809	1147	1288	1311	1311	1311
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	4	49	171	376	574	688	633	418	214	46	3	0	4	53	224	600	1174	1862	2495	2913	3127	3173	3176

(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