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: GUTHRIE CENTER, IA **COOP ID: 133509**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,075 Feet** **Lat: 41˚40N** **Lon: 94˚30W**

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	28.9	8.1	18.5	68	1981	25	30.3	1989	-35	1912	12	5.9	1979	1441	0	.0	.0	1.5	17.8	30.7	9.6
Feb	34.7	14.4	24.6	77	1930	24	34.9	1987	-35	1996	2	10.6	1979	1132	0	.0	.0	4.3	13.0	26.6	5.5
Mar	47.1	25.7	36.4	89+	1986	30	42.5	2000	-29	1962	1	27.8	1975	887	0	.0	.0	12.8	4.3	23.4	.7
Apr	60.6	37.4	49.0	93+	1910	28	56.1	1977	7	1936	3	43.3	1983	483	4	.0	.3	23.5	.3	9.7	.0
May	72.5	48.3	60.4	107	1934	30	68.5	1977	19	1907	4	53.9	1997	202	60	.0	.6	30.7	.0	1.0	.0
Jun	82.4	58.2	70.3	106+	1933	10	75.4	1971	35+	1902	21	65.6	1982	22	181	.2	4.8	30.0	.0	.0	.0
Jul	86.5	62.8	74.7	113	1936	25	81.2	1974	40	1895	9	68.8	1992	7	306	.7	9.4	31.0	.0	.0	.0
Aug	84.0	60.1	72.1	113+	1934	5	79.8	1983	36+	1915	30	65.5	1992	25	243	.3	6.0	31.0	.0	.0	.0
Sep	76.9	50.2	63.6	102	1939	6	69.5	1978	19	1899	30	56.7	1993	119	75	@	2.4	29.9	.0	1.3	.0
Oct	64.2	38.0	51.1	96	1922	4	57.9	1971	0	1925	30	46.0	1988	433	3	.0	.2	27.6	.1	9.5	.0
Nov	46.6	25.9	36.3	83	1968	1	43.6	1999	-16	1991	7	28.2	1991	863	0	.0	.0	12.2	4.2	22.7	.6
Dec	32.7	13.4	23.1	70	1939	6	29.5	1987	-31	1989	23	6.9	1983	1300	0	.0	.0	2.7	14.1	30.0	5.5
Ann	59.8	36.9	48.3	113+	Jul 1936	25	81.2	Jul 1974	-35+	Feb 1996	2	5.9	Jan 1979	6914	872	1.2	23.7	237.2	53.8	154.9	21.9

\+ 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: 1895-2001

(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	.87	.73	1.10	1980	16	2.26	1979	.00+	1986
Feb	1.02	.89	1.98	1976	21	3.08	1976	.00	1991
Mar	2.36	2.24	2.63	1995	26	5.97	1990	.00	1994
Apr	3.38	2.72	2.73	1963	29	8.72	1984	.67	1988
May	4.45	4.55	4.82	1944	20	7.68	1982	1.11	1988
Jun	4.77	4.36	4.39	1971	6	12.60	1998	.52	1992
Jul	4.41	5.08	6.55	1958	2	9.15	1993	.15	1975
Aug	4.38	3.48	5.28	1954	22	11.84	1993	.53	1976
Sep	3.38	2.64	6.69	1992	15	10.16	1992	.56	1980
Oct	2.51	2.72	2.98	1919	4	5.46	1977	.19	1988
Nov	1.97	1.89	4.35	1931	23	5.35	1983	.00+	1989
Dec	1.21	1.08	2.12	1982	28	4.97	1982	.12	1988
Ann	34.71	35.15	6.69	Sep 1992	15	12.60	Jun 1998	.00+	Mar 1994

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.1	2.7	.4	.1
Feb	4.7	3.0	.5	.1
Mar	6.4	4.9	1.8	.5
Apr	9.1	6.7	2.4	.8
May	10.7	8.1	3.1	1.1
Jun	9.7	7.3	2.9	1.5
Jul	8.8	6.9	3.2	1.3
Aug	8.6	6.3	2.7	1.5
Sep	7.2	4.9	2.1	1.0
Oct	6.6	4.9	1.9	.5
Nov	6.5	4.3	1.3	.3
Dec	5.1	3.4	.8	.2
Ann	88.5	63.4	23.1	8.9

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	.00	.08	.23	.37	.52	.68	.86	1.09	1.40	1.91	2.41
Feb	.08	.18	.35	.50	.65	.82	1.02	1.26	1.58	2.11	2.61
Mar	.15	.38	.75	1.09	1.46	1.86	2.33	2.91	3.70	4.98	6.23
Apr	.84	1.15	1.65	2.08	2.51	2.97	3.48	4.09	4.88	6.13	7.31
May	1.37	1.80	2.43	2.97	3.49	4.04	4.63	5.33	6.24	7.65	8.96
Jun	1.14	1.59	2.29	2.91	3.53	4.18	4.91	5.78	6.92	8.73	10.43
Jul	.66	1.03	1.66	2.27	2.91	3.61	4.41	5.39	6.70	8.85	10.91
Aug	1.04	1.45	2.09	2.66	3.23	3.83	4.51	5.31	6.36	8.02	9.59
Sep	.51	.79	1.28	1.75	2.23	2.77	3.38	4.13	5.13	6.76	8.33
Oct	.41	.63	.99	1.34	1.69	2.08	2.52	3.06	3.78	4.95	6.07
Nov	.00	.39	.80	1.11	1.41	1.72	2.07	2.46	3.00	3.85	4.65
Dec	.16	.26	.43	.60	.78	.97	1.20	1.47	1.85	2.46	3.05
Ann	22.45	24.74	27.72	30.01	32.06	34.07	36.16	38.48	41.33	45.50	49.14

+ 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: 1895-2001
(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	5.9	6.0	2	#
Feb	6.4	5.5	2	1
Mar	4.7	3.0	#	0
Apr	1.6	.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	.2	.0	#	0
Nov	3.2	1.5	#	0
Dec	5.8	4.9	1	#
Ann	27.8	20.9	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	8.0	1971	4	20.5	1979	14+	1999	11	8	1991
Feb	10.0	1994	23	17.0	1978	17	1993	28	6	1971
Mar	9.5	1985	31	16.3	1984	15	1998	13	5	1998
Apr	6.0	1973	9	12.5	1973	7	1997	12	1	1997
May	#	1994	1	#	1994	0	0	0	0	0
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	4.0	1980	28	4.0	1980	7	1997	26	1	1997
Nov	10.5	1972	14	12.0	1983	5	1991	26	1	1992
Dec	12.0	1985	1	18.5	1985	18	2000	29	12	2000
Ann	12.0	Dec 1985	1	20.5	Jan 1979	18	Dec 2000	29	12	Dec 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.1	2.1	.8	.3	.0
Feb	2.9	2.0	.9	.4	@
Mar	2.0	1.2	.6	.3	.0
Apr	.8	.6	.2	.1	.0
May	.0	.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	.1	.1	@	.0	.0
Nov	1.5	1.1	.2	.1	@
Dec	3.3	2.2	.6	.2	.1
Ann	14.7	9.3	3.3	1.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	-9.9	-9.9	-9.9	-9.9
Feb	-9.9	-9.9	-9.9	-9.9
Mar	1.4	1.1	.6	.3
Apr	.1	.0	.0	.0
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	.1	.0	.0	.0
Nov	.6	.0	.0	.0
Dec	-9.9	-9.9	-9.9	-9.9
Ann	-9.9	-9.9	-9.9	-9.9

+ 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	5/24	5/19	5/15	5/12	5/09	5/06	5/03	4/29	4/24
32	5/13	5/09	5/05	5/02	4/30	4/27	4/24	4/21	4/17
28	5/02	4/27	4/24	4/21	4/18	4/15	4/12	4/08	4/03
24	4/20	4/16	4/12	4/10	4/07	4/04	4/02	3/29	3/25
20	4/14	4/09	4/05	4/02	3/30	3/27	3/23	3/20	3/14
16	4/07	4/01	3/28	3/24	3/20	3/17	3/13	3/09	3/03

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	9/09	9/13	9/15	9/17	9/19	9/21	9/23	9/26	9/29
32	9/18	9/23	9/27	9/30	10/02	10/05	10/08	10/12	10/17
28	9/22	9/28	10/03	10/06	10/10	10/13	10/17	10/21	10/28
24	10/06	10/12	10/16	10/20	10/23	10/27	10/30	11/04	11/10
20	10/18	10/24	10/28	10/31	11/03	11/06	11/10	11/14	11/19
16	10/24	10/30	11/04	11/07	11/11	11/15	11/19	11/23	11/30

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	153	146	141	137	133	129	124	119	112
32	175	168	163	159	155	151	147	142	135
28	200	192	185	180	174	169	164	157	148
24	218	211	207	202	199	195	191	186	179
20	242	234	228	223	218	213	208	201	193
16	260	252	245	240	235	230	225	218	210

***** 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	1441	1132	887	483	202	22	7	25	119	433	863	1300	6914
60	1286	992	732	345	114	4	0	6	50	291	713	1145	5678
57	1193	908	640	270	75	1	0	1	25	217	624	1052	5006
55	1131	852	584	224	54	0	0	0	15	173	566	990	4589
50	977	723	441	129	20	0	0	0	2	87	428	839	3646
32	475	307	94	3	0	0	0	0	0	1	88	359	1327

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	57	99	230	513	880	1149	1322	1241	946	593	215	82	7327
55	0	0	7	44	222	459	609	528	271	53	3	0	2196
57	0	0	1	30	180	400	547	467	221	35	1	0	1882
60	0	0	0	15	127	313	454	379	156	16	0	0	1460
65	0	0	0	4	60	181	306	243	75	3	0	0	872
70	0	0	0	0	22	81	174	136	27	0	0	0	440

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	15	93	303	635	901	1068	983	699	357	81	7	0	15	108	411	1046	1947	3015	3998	4697	5054	5135	5142
45	0	3	50	195	480	751	913	828	550	231	34	2	0	3	53	248	728	1479	2392	3220	3770	4001	4035	4037
50	0	0	22	112	334	601	758	673	405	134	16	0	0	0	22	134	468	1069	1827	2500	2905	3039	3055	3055
55	0	0	6	61	210	453	603	518	273	67	3	0	0	0	6	67	277	730	1333	1851	2124	2191	2194	2194
60	0	0	3	29	113	310	448	365	166	25	0	0	0	0	3	32	145	455	903	1268	1434	1459	1459	1459
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	0	20	74	195	388	590	717	654	452	235	64	5	0	20	94	289	677	1267	1984	2638	3090	3325	3389	3394

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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