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: DENISON, IA **COOP ID: 132171**

Climate Division: IA 4 **NWS Call Sign:** **Elevation: 1,401 Feet** **Lat: 42˚02N** **Lon: 95˚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	26.9	7.9	17.4	67	1944	25	31.0	1990	-40	1912	12	3.2	1979	1475	0	.0	.0	1.3	18.6	30.2	8.7
Feb	32.9	13.7	23.3	69+	1921	15	34.5	1987	-37	1905	2	8.3	1979	1167	0	.0	.0	3.9	13.1	26.0	4.6
Mar	45.1	24.2	34.7	88	1986	29	42.3	2000	-23	1960	5	25.3	1975	941	0	.0	.0	12.3	5.4	22.4	.9
Apr	58.8	36.2	47.5	95	1910	28	55.2	1977	5	1936	3	37.5	1983	532	7	.0	.2	23.8	.5	8.5	.0
May	70.4	49.4	59.9	105+	1934	29	67.1	1988	2	1931	7	52.5	1983	220	61	.0	.3	30.6	.0	.4	.0
Jun	80.1	59.1	69.6	109	1933	10	75.0	1988	30	1903	4	63.4	1982	31	169	.2	3.6	30.0	.0	.0	.0
Jul	83.8	63.9	73.9	112	1936	14	78.7	1974	39	1911	17	68.8	1992	7	280	.2	6.3	31.0	.0	.0	.0
Aug	81.5	61.8	71.7	111+	1930	3	78.1	1983	34	1915	30	66.5	1992	21	227	.1	4.2	31.0	.0	.0	.0
Sep	74.4	51.7	63.1	103	1939	6	68.9	1998	21	1918	21	57.4	1993	120	63	@	1.3	29.9	.0	.4	.0
Oct	62.0	39.5	50.8	92+	1953	2	55.3	1973	-1	1925	30	45.9	1976	443	1	.0	.1	26.8	.2	5.8	.0
Nov	43.9	25.4	34.7	80	1931	8	45.2	1999	-16	1937	21	26.2	1991	911	0	.0	.0	10.9	5.5	21.1	.4
Dec	30.5	13.3	21.9	69	1939	6	30.0	1987	-26	1989	22	4.1	1983	1336	0	.0	.0	2.1	16.0	29.6	5.2
Ann	57.5	37.2	47.4	112	Jul 1936	14	78.7	Jul 1974	-40	Jan 1912	12	3.2	Jan 1979	7204	808	.5	16.0	233.6	59.3	144.4	19.8

\+ 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: 1900-2001

(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	.80	.82	1.24	1937	8	2.26	1975	.02+	1986
Feb	.75	.62	2.26	1954	20	3.50	1971	.11	1996
Mar	2.16	1.60	3.23	1906	24	5.32	1990	.04	1994
Apr	3.03	2.45	3.40	1998	7	7.07	1999	.77	1989
May	4.14	3.73	4.30	1990	19	9.44	1982	1.45	1994
Jun	4.26	4.23	4.20	1951	17	9.84	1990	.80	1987
Jul	3.87	3.36	7.89	1993	9	12.01	1993	.36	1980
Aug	3.29	3.17	7.75	1907	29	7.87	1987	.29	1971
Sep	3.30	2.84	5.81	1972	11	10.41	1972	.68	1980
Oct	2.30	2.09	4.39	1928	12	4.75	1971	.00	1988
Nov	1.58	1.33	2.80	1977	9	4.79	1991	.00	1976
Dec	1.00	.86	2.27	1959	27	3.43	1984	.09	1979
Ann	30.48	30.05	7.89	Jul 1993	9	12.01	Jul 1993	.00+	Oct 1988

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	5.6	2.4	.4	.0
Feb	5.6	2.3	.3	@
Mar	8.0	4.8	1.5	.4
Apr	10.0	6.5	2.1	.7
May	12.0	7.6	2.9	.8
Jun	10.2	6.9	2.8	1.2
Jul	9.9	6.2	2.3	1.0
Aug	9.3	5.6	2.0	.9
Sep	8.2	5.6	1.9	.6
Oct	7.0	4.3	1.6	.6
Nov	6.9	3.8	1.0	.2
Dec	6.5	2.7	.4	.1
Ann	99.2	58.7	19.2	6.5

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	.06	.12	.22	.33	.45	.59	.76	.97	1.27	1.76	2.25
Feb	.13	.19	.30	.40	.51	.62	.75	.91	1.12	1.47	1.80
Mar	.24	.40	.70	1.00	1.33	1.69	2.11	2.64	3.35	4.53	5.69
Apr	.75	1.03	1.47	1.87	2.25	2.66	3.12	3.66	4.37	5.50	6.55
May	1.56	1.94	2.50	2.96	3.40	3.84	4.33	4.89	5.61	6.71	7.71
Jun	1.27	1.67	2.28	2.80	3.31	3.84	4.43	5.11	6.00	7.39	8.68
Jul	.58	.90	1.46	2.00	2.56	3.17	3.87	4.73	5.89	7.77	9.57
Aug	.64	.94	1.42	1.87	2.32	2.80	3.35	4.01	4.89	6.29	7.63
Sep	.56	.85	1.33	1.78	2.25	2.75	3.32	4.02	4.95	6.46	7.90
Oct	.32	.61	1.01	1.33	1.65	1.99	2.38	2.83	3.43	4.38	5.28
Nov	.14	.32	.58	.81	1.05	1.31	1.60	1.96	2.43	3.20	3.93
Dec	.20	.29	.43	.57	.70	.85	1.02	1.21	1.48	1.90	2.30
Ann	18.60	20.76	23.61	25.82	27.82	29.78	31.82	34.11	36.93	41.08	44.73

\+ 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: 1900-2001
(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	7.7	7.0	3	3
Feb	7.1	5.3	3	2
Mar	6.3	5.6	1	#
Apr	2.3	.5	#	#
May	.0	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	0	0
Oct	.7	.0	#	0
Nov	3.9	3.2	1	#
Dec	8.9	8.8	3	2
Ann	36.9	30.4	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	1975	11	21.7	1975	20	1979	29	10	1991
Feb	8.0	1983	2	20.5	1983	18	1979	18	16	1979
Mar	15.0	1987	29	21.5	1984	15	1979	5	9	1979
Apr	7.5	1982	8	12.3	1997	10	1997	12	1	1997
May	.5	1994	1	.5	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	#	1985	30	#	1985	0	0	0	0	0
Oct	5.0	1979	23	5.0	1979	3	1991	31	#+	1997
Nov	8.0	1983	28	16.0	1991	11	1991	7	5	1991
Dec	8.0	1982	28	19.8	1985	21	2000	30	14	2000
Ann	15.0	Mar 1987	29	21.7	Jan 1975	21	Dec 2000	30	16	Feb 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	4.6	3.0	.9	.3	.0
Feb	4.2	2.5	.9	.2	.0
Mar	3.0	1.8	.7	.4	@
Apr	1.1	.8	.3	.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	.3	.2	.1	@	.0
Nov	2.7	1.5	.4	.1	.0
Dec	4.6	3.2	1.0	.2	.0
Ann	20.5	13.0	4.3	1.3	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	18.4	12.7	8.4	2.3
Feb	15.8	9.3	6.1	2.2
Mar	7.5	4.4	3.2	.5
Apr	1.2	.5	.3	@
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	5.2	1.7	.8	.1
Dec	13.6	8.4	4.3	1.1
Ann	62.0	37.1	23.1	6.2

+ 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	5/15	5/11	5/07	5/04	5/02	4/29	4/26	4/22	4/18
32	5/10	5/05	5/02	4/29	4/26	4/23	4/20	4/16	4/11
28	4/29	4/24	4/20	4/17	4/14	4/11	4/08	4/05	3/30
24	4/17	4/13	4/10	4/08	4/05	4/03	4/01	3/29	3/25
20	4/11	4/06	4/02	3/30	3/27	3/24	3/21	3/17	3/12
16	4/03	3/29	3/25	3/22	3/19	3/16	3/13	3/09	3/04

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	9/16	9/21	9/24	9/27	9/29	10/02	10/05	10/08	10/13
32	9/22	9/27	10/01	10/04	10/07	10/10	10/14	10/17	10/23
28	10/03	10/09	10/13	10/16	10/20	10/23	10/26	10/31	11/05
24	10/16	10/21	10/25	10/28	10/31	11/03	11/06	11/10	11/15
20	10/25	10/30	11/03	11/07	11/10	11/13	11/16	11/20	11/25
16	10/30	11/05	11/10	11/14	11/17	11/21	11/25	11/29	12/06

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	158	154	150	147	143	138	132
32	187	179	173	168	164	159	154	149	141
28	208	201	196	191	187	184	179	174	167
24	226	220	215	212	208	204	200	196	190
20	248	241	236	231	227	223	218	213	206
16	266	258	252	247	243	238	233	227	219

***** 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	1475	1167	941	532	220	31	7	21	120	443	911	1336	7204
60	1320	1027	786	396	130	7	0	4	49	298	761	1181	5959
57	1227	943	695	321	89	3	0	1	23	221	672	1088	5283
55	1165	887	636	275	67	1	0	0	13	176	614	1026	4860
50	1013	759	494	178	29	0	0	0	2	87	475	876	3913
32	516	338	124	11	0	0	0	0	0	1	114	394	1498

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	64	95	206	476	864	1127	1296	1229	932	582	193	80	7144
55	0	0	4	51	218	439	583	516	255	43	2	0	2111
57	0	0	2	36	179	380	521	455	206	27	0	0	1806
60	0	0	0	21	127	295	428	365	141	11	0	0	1388
65	0	0	0	7	61	169	280	227	63	1	0	0	808
70	0	0	0	1	23	76	151	119	20	0	0	0	390

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	1	22	99	309	647	913	1066	1002	726	388	83	7	1	23	122	431	1078	1991	3057	4059	4785	5173	5256	5263
45	0	3	53	197	495	763	911	847	576	262	36	1	0	3	56	253	748	1511	2422	3269	3845	4107	4143	4144
50	0	0	23	112	347	614	756	692	428	157	15	0	0	0	23	135	482	1096	1852	2544	2972	3129	3144	3144
55	0	0	6	58	220	466	601	537	295	78	3	0	0	0	6	64	284	750	1351	1888	2183	2261	2264	2264
60	0	0	2	30	120	322	446	383	179	32	0	0	0	0	2	32	152	474	920	1303	1482	1514	1514	1514
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	1	19	68	188	388	601	730	669	455	226	49	2	1	20	88	276	664	1265	1995	2664	3119	3345	3394	3396

(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