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: ARTHUR, NE **COOP ID: 250365**

Climate Division: NE 2 **NWS Call Sign:** **Elevation: 3,500 Feet** **Lat: 41˚34N** **Lon: 101˚41W**

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	35.0	11.2	23.1	71	1997	3	31.1	1986	-31	1950	26	5.9	1979	1300	0	.0	.0	5.2	11.6	30.7	7.4
Feb	41.2	16.4	28.8	78	1962	11	37.3	1999	-29	1996	3	12.9	1978	1015	0	.0	.0	10.0	7.6	27.5	4.1
Mar	49.2	24.1	36.7	84+	1967	29	43.5	1986	-27	1960	3	28.9	1975	879	0	.0	.0	16.5	4.0	27.2	1.0
Apr	59.4	34.1	46.8	93	1989	23	53.1	1981	-1	1975	2	41.1	1997	549	0	.0	.1	23.3	.4	15.0	@
May	69.3	45.1	57.2	95	1989	29	61.9	1977	14	1954	3	51.3	1995	264	23	.0	.4	29.9	.0	2.6	.0
Jun	79.8	54.3	67.1	105	1952	15	74.7	1988	29	1951	2	61.2	1982	68	129	.4	4.8	29.9	.0	@	.0
Jul	86.6	59.9	73.3	110	1954	11	76.9	1974	37	1990	13	67.5	1992	5	261	1.1	12.8	31.0	.0	.0	.0
Aug	84.8	58.1	71.5	106	1954	3	76.8	2000	36+	1993	31	66.7	1992	21	220	.2	10.3	31.0	.0	.0	.0
Sep	75.6	47.5	61.6	100	1998	7	68.7	1998	14	1984	29	56.3	1974	160	56	@	3.6	29.3	@	2.0	.0
Oct	63.4	34.1	48.8	91+	1989	1	52.2	1973	-1	1991	31	44.8	1976	503	0	.0	@	26.4	.4	13.9	@
Nov	46.6	21.9	34.3	80	1999	9	43.9	1999	-14	1952	28	24.1	1985	923	0	.0	.0	13.7	5.1	27.0	1.0
Dec	37.8	13.6	25.7	69+	1998	2	33.8	1979	-33	1989	22	9.8	1983	1219	0	.0	.0	7.1	9.5	30.6	4.7
Ann	60.7	35.0	47.9	110	Jul 1954	11	76.9	Jul 1974	-33	Dec 1989	22	5.9	Jan 1979	6906	689	1.7	32.0	253.3	38.6	176.5	18.2

\+ 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: 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	.34	.23	.75	1988	19	1.26	1976	.00+	1997
Feb	.40	.23	1.23	1987	27	1.94	1987	.00+	1996
Mar	1.16	.98	1.90	1980	28	3.42	1980	.00	1997
Apr	1.87	1.65	1.78	1976	8	4.88	1999	.00	1992
May	3.34	3.13	2.82	1955	26	6.86	1988	.98	1992
Jun	2.66	2.69	3.33	1966	8	4.78	1993	.78	1989
Jul	3.16	2.84	3.43	1993	17	7.09	1993	.75	1980
Aug	1.84	1.71	2.00+	1968	28	3.50	1977	.25	1995
Sep	1.71	1.30	2.55	2001	14	6.54	1973	.08	1977
Oct	1.12	.97	2.20	2000	29	4.17	1994	.00+	1999
Nov	.69	.55	1.27	1987	8	2.40	1972	.00+	1997
Dec	.36	.19	.60	1973	26	1.79	1973	.00+	1999
Ann	18.65	18.66	3.43	Jul 1993	17	7.09	Jul 1993	.00+	Dec 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	2.5	1.2	.1	.0
Feb	2.6	1.6	@	@
Mar	4.5	3.2	.4	.2
Apr	5.8	4.3	1.2	.3
May	8.5	6.1	2.3	.9
Jun	8.2	6.0	1.9	.4
Jul	7.5	5.7	2.0	.8
Aug	6.2	4.5	1.4	.2
Sep	5.5	3.7	1.0	.4
Oct	3.8	2.4	.6	.2
Nov	3.0	2.0	.3	.1
Dec	2.5	1.3	.2	.0
Ann	60.6	42.0	11.4	3.5

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	.00	.00	.06	.12	.18	.24	.32	.42	.56	.79	1.01
Feb	.00	.00	.06	.12	.18	.26	.36	.49	.66	.96	1.26
Mar	.05	.14	.31	.48	.67	.88	1.12	1.43	1.85	2.56	3.24
Apr	.26	.50	.82	1.08	1.35	1.62	1.93	2.30	2.79	3.56	4.29
May	1.04	1.36	1.83	2.23	2.62	3.03	3.48	4.00	4.68	5.73	6.70
Jun	1.05	1.30	1.65	1.94	2.21	2.49	2.79	3.14	3.58	4.26	4.87
Jul	.85	1.15	1.60	2.00	2.40	2.81	3.27	3.81	4.52	5.63	6.66
Aug	.51	.68	.95	1.18	1.40	1.64	1.90	2.21	2.62	3.25	3.84
Sep	.17	.29	.53	.77	1.02	1.31	1.66	2.09	2.67	3.65	4.60
Oct	.00	.14	.34	.52	.71	.90	1.13	1.40	1.77	2.36	2.94
Nov	.00	.00	.15	.26	.38	.52	.67	.86	1.12	1.55	1.97
Dec	.00	.00	.04	.09	.15	.22	.32	.43	.60	.89	1.18
Ann	12.44	13.61	15.13	16.29	17.33	18.34	19.39	20.56	21.98	24.06	25.87

\+ 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

Complete documentation available from:
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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	5.3	5.0	3	3
Feb	4.8	3.0	2	1
Mar	8.0	6.0	1	1
Apr	3.9	2.0	#	#
May	.2	.0	#	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	.4	.0	#	0
Oct	1.0	.0	#	#
Nov	5.2	4.5	1	#
Dec	4.8	3.5	2	1
Ann	33.6	24.0	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	10.0	1988	19	16.0	1994	17	1979	30	14	1979
Feb	6.0	1971	19	17.0	1993	17	1993	27	12	1993
Mar	15.0	1980	29	29.0	1980	25	1980	31	5	1977
Apr	13.0	1995	18	15.0	1979	20	1980	1	5	1980
May	6.0	1979	10	6.0	1979	6	1979	10	#+	1983
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	4.0	1985	29	4.0	1985	4	1985	29	#+	2000
Oct	5.0	1990	8	5.0+	1991	8	1995	24	1	1995
Nov	7.3	1975	20	17.0	1972	12	1983	30	5	1972
Dec	8.0	1987	27	16.0	1978	15	1983	31	11	1978
Ann	15.0	Mar 1980	29	29.0	Mar 1980	25	Mar 1980	31	14	Jan 1979

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.5	2.1	.5	.3	@
Feb	2.3	2.1	.6	.2	.0
Mar	3.3	3.2	1.0	.3	.1
Apr	1.6	1.6	.6	.3	@
May	@	@	@	@	.0
Jun	.0	.0	.0	.0	.0
Jul	.0	.0	.0	.0	.0
Aug	.0	.0	.0	.0	.0
Sep	.1	.1	.1	.0	.0
Oct	.5	.5	.1	@	.0
Nov	2.0	1.9	.8	.2	.0
Dec	2.5	2.3	.5	.1	.0
Ann	14.8	13.8	4.2	1.4	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	15.8	10.2	7.5	2.7
Feb	9.6	6.5	4.2	1.6
Mar	7.6	4.6	2.4	.5
Apr	2.2	1.2	.8	.4
May	@	@	@	.0
Jun	.0	.0	.0	.0
Jul	.0	.0	.0	.0
Aug	.0	.0	.0	.0
Sep	.1	.1	.0	.0
Oct	.7	.1	@	.0
Nov	6.3	3.5	1.8	.3
Dec	11.7	6.5	3.5	1.6
Ann	54.0	32.7	20.2	7.1

+ 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	6/07	6/01	5/28	5/25	5/21	5/18	5/15	5/11	5/05
32	5/22	5/18	5/15	5/12	5/10	5/08	5/05	5/02	4/28
28	5/14	5/10	5/07	5/05	5/02	4/30	4/27	4/24	4/20
24	5/05	4/30	4/27	4/24	4/22	4/19	4/17	4/13	4/09
20	4/26	4/20	4/16	4/13	4/10	4/07	4/03	3/30	3/25
16	4/16	4/10	4/05	4/01	3/28	3/24	3/20	3/15	3/08

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	9/07	9/11	9/14	9/16	9/19	9/21	9/24	9/27	10/01
32	9/14	9/18	9/20	9/23	9/25	9/27	9/30	10/02	10/06
28	9/18	9/23	9/27	10/01	10/04	10/07	10/10	10/14	10/20
24	9/29	10/04	10/07	10/10	10/13	10/16	10/19	10/23	10/28
20	10/09	10/13	10/16	10/19	10/21	10/24	10/26	10/29	11/03
16	10/15	10/21	10/25	10/28	10/31	11/03	11/07	11/11	11/17

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	140	133	128	124	120	116	111	106	99
32	153	148	144	140	137	134	131	127	121
28	174	167	162	158	154	150	146	141	134
24	192	186	181	177	174	170	166	161	155
20	216	208	203	198	194	189	185	179	172
16	240	232	226	221	217	212	207	202	194

***** 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	1300	1015	879	549	264	68	5	21	160	503	923	1219	6906
60	1145	875	724	402	152	24	0	4	75	350	773	1064	5588
57	1052	795	631	319	100	11	0	1	41	260	683	971	4864
55	990	743	570	266	72	6	0	1	25	205	623	909	4410
50	839	613	424	154	26	1	0	0	5	92	484	760	3398
32	358	236	68	2	0	0	0	0	0	1	115	294	1074

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	81	145	212	444	782	1051	1279	1222	886	520	183	98	6903
55	0	9	1	18	141	367	566	510	222	11	0	0	1845
57	0	5	0	10	107	311	504	448	178	5	0	0	1568
60	0	0	0	4	66	234	411	358	122	1	0	0	1196
65	0	0	0	0	23	129	261	220	56	0	0	0	689
70	0	0	0	0	5	56	131	110	20	0	0	0	322

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	5	31	91	246	527	809	1034	978	654	307	65	14	5	36	127	373	900	1709	2743	3721	4375	4682	4747	4761
45	0	6	44	150	381	659	879	823	506	191	25	0	0	6	50	200	581	1240	2119	2942	3448	3639	3664	3664
50	0	1	11	81	245	510	724	668	369	96	5	0	0	1	12	93	338	848	1572	2240	2609	2705	2710	2710
55	0	0	1	35	139	366	569	513	245	39	0	0	0	0	1	36	175	541	1110	1623	1868	1907	1907	1907
60	0	0	0	10	65	233	415	360	147	11	0	0	0	0	0	10	75	308	723	1083	1230	1241	1241	1241
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	17	43	100	190	330	508	665	629	418	241	72	29	17	60	160	350	680	1188	1853	2482	2900	3141	3213	3242

(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