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: ARNOLD, NE **COOP ID: 250355**

Climate Division: NE 5 **NWS Call Sign:** **Elevation: 2,750 Feet** **Lat: 41˚25N** **Lon: 100˚12W**

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	35.4	7.4	21.4	71	1990	10	31.8	1986	-30	1988	9	7.0	1979	1351	0	.0	.0	5.4	11.2	30.8	6.5
Feb	40.7	12.6	26.7	76	1995	25	35.8	1991	-25	1996	3	13.1	1978	1075	0	.0	.0	9.2	7.6	27.0	3.3
Mar	50.2	21.6	35.9	87	1998	26	42.1	1986	-18	1998	11	29.3	1975	903	0	.0	.0	16.9	2.7	25.7	.6
Apr	61.4	32.5	47.0	95	1989	22	54.9	1981	9+	1997	13	40.6	1983	541	0	.0	.3	25.2	.3	13.1	.0
May	71.0	44.9	58.0	97	2000	30	62.7	1987	20	1989	1	52.2	1995	238	20	.0	.6	30.7	.0	1.9	.0
Jun	81.8	54.1	68.0	106	1988	21	73.9	1988	34+	1989	15	62.5	1982	51	140	.6	6.4	30.0	.0	.0	.0
Jul	88.0	59.4	73.7	106	1990	2	78.5	1980	32	1977	31	67.9	1992	7	277	1.1	11.8	31.0	.0	@	.0
Aug	85.6	56.6	71.1	105	1990	27	78.3	1983	37	1993	31	66.4	1992	29	218	.6	10.3	31.0	.0	.0	.0
Sep	77.0	46.3	61.7	100	1990	13	68.7	1998	21	1995	22	57.4	1974	155	54	@	4.2	29.8	.0	1.8	.0
Oct	64.5	33.0	48.8	93	1990	5	51.9	1997	7	1993	31	42.8	1976	504	0	.0	.3	28.1	.2	11.5	.0
Nov	46.9	20.0	33.5	81	1999	7	43.7	1999	-15+	1986	11	23.1	1985	947	0	.0	.0	14.1	4.4	26.6	1.0
Dec	36.6	10.3	23.5	68	1991	7	32.6	1999	-31	1989	22	5.1	1983	1289	0	.0	.0	6.9	9.0	30.8	2.4
Ann	61.6	33.2	47.4	106+	Jul 1990	2	78.5	Jul 1980	-31	Dec 1989	22	5.1	Dec 1983	7090	709	2.3	33.9	258.3	35.4	169.2	13.8

\+ 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: 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	.48	.37	1.08	1988	19	1.45	1992	.00	1986
Feb	.58	.43	1.22	1987	27	1.82	1987	.01	1982
Mar	1.50	1.04	2.30	1977	11	4.81	1983	.07	1994
Apr	2.53	2.42	2.00	1968	19	6.11	1984	.19	1992
May	3.64	3.39	4.28	1951	15	7.60	1991	.38	1994
Jun	3.72	3.24	3.74	1974	9	8.74	1983	1.44	1977
Jul	3.26	3.13	3.02	1988	8	8.89	1973	.28	1980
Aug	2.55	2.27	3.10	1990	12	6.23	1992	.54	1979
Sep	1.68	1.47	2.80	1995	19	4.88	1973	.27	1992
Oct	1.38	1.15	1.90	1997	12	3.34	1997	.06	1988
Nov	1.03	.79	1.67	2001	24	2.80	1982	.00	1989
Dec	.47	.38	1.10	1981	1	1.42	1981	.00+	2000
Ann	22.82	22.98	4.28	May 1951	15	8.89	Jul 1973	.00+	Dec 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.8	1.4	.2	@
Feb	4.1	1.8	.3	.1
Mar	6.4	3.4	.8	.1
Apr	8.2	5.0	1.7	.4
May	10.9	7.3	2.6	.6
Jun	9.6	6.8	2.3	.7
Jul	8.7	5.7	2.3	1.0
Aug	8.0	5.1	1.9	.7
Sep	6.8	3.5	1.1	.2
Oct	5.1	2.9	.8	.3
Nov	4.5	2.4	.7	.3
Dec	3.5	1.5	.1	@
Ann	79.6	46.8	14.8	4.4

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	.02	.07	.14	.21	.29	.37	.47	.59	.76	1.03	1.30
Feb	.02	.05	.12	.19	.28	.39	.52	.69	.93	1.35	1.77
Mar	.21	.33	.55	.76	.97	1.22	1.50	1.84	2.30	3.06	3.79
Apr	.47	.69	1.06	1.41	1.76	2.13	2.56	3.08	3.77	4.88	5.94
May	1.04	1.38	1.90	2.36	2.80	3.27	3.78	4.38	5.17	6.40	7.54
Jun	1.41	1.75	2.25	2.66	3.05	3.45	3.89	4.39	5.03	6.01	6.91
Jul	.54	.82	1.29	1.74	2.20	2.70	3.28	3.98	4.91	6.42	7.87
Aug	.53	.77	1.14	1.48	1.83	2.19	2.61	3.10	3.76	4.81	5.80
Sep	.21	.34	.58	.81	1.06	1.33	1.65	2.05	2.58	3.46	4.32
Oct	.14	.24	.43	.62	.83	1.06	1.34	1.68	2.15	2.93	3.68
Nov	.02	.08	.20	.34	.51	.70	.94	1.24	1.67	2.40	3.13
Dec	.00	.00	.09	.17	.25	.34	.45	.59	.77	1.08	1.38
Ann	15.31	16.73	18.56	19.97	21.22	22.44	23.71	25.12	26.83	29.34	31.52

\+ 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	6.2	4.8	2	1
Feb	4.6	2.5	2	#
Mar	6.4	4.8	#	#
Apr	1.9	.0	#	#
May	.0	.0	0	0
Jun	.0	.0	0	0
Jul	.0	.0	0	0
Aug	.0	.0	0	0
Sep	#	.0	#	0
Oct	1.0	.0	#	0
Nov	5.4	3.0	1	#
Dec	5.7	5.2	1	1
Ann	31.2	20.3	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	1988	19	19.0	1988	20	1988	21	10	1988
Feb	8.0	1994	22	18.0	1993	16	1978	12	10	1978
Mar	9.0	1980	28	20.0	1980	12	1980	29	2	1993
Apr	7.0	1994	28	16.0	1994	6	1997	11	1	1997
May	.0	0	0	.0	0	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	#	1995	20	#	1995	#	1995	20	#	1995
Oct	6.0	1995	23	6.0	1995	5	1991	31	#+	1995
Nov	12.0	1979	22	28.0	1979	15	1975	30	4+	2000
Dec	8.0	1981	1	15.9	1973	14	1975	1	5	1981
Ann	14.0	Jan 1988	19	28.0	Nov 1979	20	Jan 1988	21	10+	Jan 1988

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.8	1.7	.6	.1	.1
Feb	2.7	1.7	.6	.3	.0
Mar	3.2	2.1	.8	.2	.0
Apr	.9	.7	.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	.5	.4	.1	@	.0
Nov	1.6	1.5	.7	.3	.1
Dec	2.3	1.6	.7	.2	.0
Ann	14.0	9.7	3.7	1.2	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	11.3	7.4	5.2	2.1
Feb	7.4	4.9	2.6	.4
Mar	4.2	2.6	.9	.1
Apr	.8	.3	.1	.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	.5	.1	@	.0
Nov	3.9	2.2	1.3	.3
Dec	9.6	4.3	1.9	.3
Ann	37.7	21.8	12.0	3.2

+ 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	6/11	6/04	5/29	5/24	5/19	5/15	5/10	5/04	4/26
32	6/02	5/25	5/19	5/14	5/10	5/05	4/30	4/24	4/16
28	5/12	5/07	5/04	5/01	4/29	4/26	4/24	4/20	4/16
24	5/02	4/27	4/24	4/21	4/19	4/16	4/14	4/10	4/06
20	4/23	4/18	4/15	4/11	4/09	4/06	4/03	3/30	3/25
16	4/09	4/04	3/31	3/28	3/25	3/22	3/19	3/15	3/10

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	9/12	9/15	9/17	9/19	9/21	9/23	9/25	9/29
32	9/13	9/18	9/21	9/23	9/26	9/28	10/01	10/04	10/09
28	9/19	9/24	9/28	10/01	10/04	10/07	10/10	10/14	10/19
24	10/02	10/07	10/11	10/14	10/17	10/20	10/23	10/27	11/01
20	10/10	10/14	10/18	10/21	10/24	10/26	10/29	11/02	11/06
16	10/19	10/25	10/29	11/01	11/05	11/08	11/11	11/16	11/21

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	146	138	132	127	122	117	111	105	97
32	163	154	149	143	139	134	129	123	115
28	175	169	165	161	158	154	151	146	141
24	202	194	189	185	180	176	172	166	159
20	215	209	204	201	197	194	190	186	179
16	248	240	234	229	224	219	214	208	200

***** 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)

Base — Heating Degree Days (1)

Below	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
65	1351	1075	903	541	238	51	7	29	155	504	947	1289	7090
60	1196	935	748	397	127	15	0	7	71	352	797	1134	5779
57	1103	851	655	315	79	5	0	2	39	266	707	1041	5063
55	1041	797	593	265	55	2	0	1	24	214	647	979	4618
50	889	668	445	157	17	0	0	0	5	107	505	827	3620
32	397	266	72	3	0	0	0	0	0	1	121	347	1207

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	69	115	192	453	805	1079	1293	1212	890	520	164	82	6874
55	0	2	0	24	147	391	580	500	223	20	0	0	1887
57	0	0	0	15	109	334	518	439	178	10	0	0	1603
60	0	0	0	6	65	253	425	351	121	3	0	0	1224
65	0	0	0	0	20	140	277	218	54	0	0	0	709
70	0	0	0	0	4	62	149	115	18	0	0	0	348

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	4	30	100	292	594	879	1061	1008	695	350	67	3	4	34	134	426	1020	1899	2960	3968	4663	5013	5080	5083
45	0	7	45	177	440	729	906	853	545	223	22	0	0	7	52	229	669	1398	2304	3157	3702	3925	3947	3947
50	0	0	12	100	295	579	751	698	403	119	6	0	0	0	12	112	407	986	1737	2435	2838	2957	2963	2963
55	0	0	3	46	175	429	596	544	271	51	0	0	0	0	3	49	224	653	1249	1793	2064	2115	2115	2115
60	0	0	0	16	85	288	441	390	163	13	0	0	0	0	0	16	101	389	830	1220	1383	1396	1396	1396
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	21	47	107	214	373	561	699	663	449	260	72	25	21	68	175	389	762	1323	2022	2685	3134	3394	3466	3491

(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