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: CLAY CENTER, NE **COOP ID: 251684**

Climate Division: NE 9 **NWS Call Sign:** **Elevation: 1,750 Feet** **Lat: 40˚31N** **Lon: 98˚03W**

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	33.4	12.1	22.8	76	1990	11	33.6	1986	-30	1984	13	9.2	1979	1309	0	.0	.0	3.9	14.1	30.9	7.1
Feb	39.8	17.5	28.7	80	1995	26	38.0	1991	-24	1981	11	14.4	1979	1017	0	.0	.0	7.9	9.8	26.4	3.5
Mar	50.2	26.4	38.3	89	1986	29	42.7	1992	-15	1978	4	31.3	1996	828	0	.0	.0	16.2	3.4	23.2	.7
Apr	62.0	37.1	49.6	95+	1989	27	56.9	1981	3	1975	3	42.8	1983	468	4	.0	.4	24.8	.3	9.6	.0
May	72.2	49.4	60.8	97	2000	30	67.7	1977	24+	1983	2	54.3	1995	187	56	.0	.8	30.6	.0	.8	.0
Jun	82.9	59.4	71.2	106	1988	22	76.8	1988	35	1982	1	65.4	1982	28	211	.4	6.5	30.0	.0	.0	.0
Jul	87.6	64.4	76.0	106	1974	28	81.3	1974	42	1971	30	70.2	1992	1	342	1.9	12.7	31.0	.0	.0	.0
Aug	85.3	61.8	73.6	107	1983	17	82.1	1983	42	1974	4	68.7+	1992	16	281	.9	10.3	31.0	.0	.0	.0
Sep	77.9	52.1	65.0	102+	1984	1	70.8	1998	21	1984	30	58.0	1993	89	89	.2	4.5	29.8	.0	1.0	.0
Oct	65.7	39.8	52.8	94	1975	13	56.1	1971	9	1972	19	46.4	1976	382	2	.0	.3	27.9	.2	7.7	.0
Nov	48.1	26.4	37.3	81	1980	7	46.6	1999	-11	1976	28	29.2	1985	832	0	.0	.0	14.5	3.8	23.4	.4
Dec	36.4	16.8	26.6	76	1995	1	33.0	1988	-39	1983	22	7.6	1983	1190	0	.0	.0	5.2	10.8	30.3	3.4
Ann	61.8	38.6	50.2	107	Aug 1983	17	82.1	Aug 1983	-39	Dec 1983	22	7.6	Dec 1983	6347	985	3.4	35.5	252.8	42.4	153.3	15.1

\+ 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: 1971-2001

(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	.40	.46	.65+	1992	1	.84	1993	.00+	1998
Feb	.50	.36	1.15	1998	10	1.48	1997	.00+	1991
Mar	1.90	1.35	2.15	1981	29	6.50	1973	.00+	1999
Apr	3.05	3.18	2.19	1984	21	6.85	1994	.18	1989
May	4.71	4.50	4.50	1987	3	9.15	1995	.81	1992
Jun	3.91	3.22	4.03	1989	25	7.86	1993	.77	1973
Jul	4.20	4.07	7.20	1998	30	14.56	1998	.12	1983
Aug	3.31	2.81	3.17	1992	5	7.70	1996	.29	2000
Sep	2.57	1.83	4.05	1977	12	10.53	1973	.15	1991
Oct	1.89	1.85	2.81	1979	30	5.47	2000	.00	1988
Nov	1.39	.99	2.10	1996	16	3.69	1972	.00+	1989
Dec	.61	.49	.80	1983	1	2.08	1973	.00+	1992
Ann	28.44	27.00	7.20	Jul 1998	30	14.56	Jul 1998	.00+	Mar 1999

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	3.9	1.8	.2	.0
Feb	3.6	1.2	.2	@
Mar	5.7	3.7	1.3	.3
Apr	7.4	5.2	2.4	.8
May	9.4	7.4	3.7	1.3
Jun	7.2	5.4	2.6	1.5
Jul	7.2	5.5	2.6	1.2
Aug	7.1	5.1	2.3	1.1
Sep	5.8	4.2	1.6	.6
Oct	4.9	3.3	1.5	.6
Nov	4.5	2.5	1.1	.4
Dec	3.8	2.0	.2	.0
Ann	70.5	47.3	19.7	7.8

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	.11	.18	.25	.32	.40	.51	.64	.86	1.07
Feb	.00	.00	.09	.19	.28	.38	.50	.64	.83	1.14	1.45
Mar	.00	.00	.40	.77	1.12	1.50	1.92	2.43	3.13	4.22	5.29
Apr	.60	.87	1.32	1.73	2.15	2.60	3.10	3.71	4.52	5.81	7.04
May	1.56	2.01	2.66	3.22	3.76	4.31	4.91	5.62	6.53	7.94	9.25
Jun	1.19	1.56	2.12	2.59	3.06	3.54	4.07	4.69	5.49	6.74	7.91
Jul	.37	.66	1.22	1.80	2.44	3.17	4.03	5.12	6.61	9.11	11.57
Aug	.52	.80	1.28	1.73	2.21	2.72	3.31	4.04	5.01	6.58	8.09
Sep	.20	.37	.71	1.06	1.45	1.90	2.44	3.12	4.06	5.64	7.20
Oct	.13	.33	.63	.90	1.19	1.51	1.88	2.33	2.93	3.92	4.88
Nov	.00	.00	.21	.42	.66	.94	1.28	1.71	2.30	3.31	4.32
Dec	.00	.04	.14	.23	.34	.45	.59	.76	.99	1.38	1.77
Ann	17.51	19.51	22.13	24.17	26.00	27.80	29.68	31.78	34.36	38.16	41.50

\+ 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: 1971-2001
(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	4.9	4.0	2	1
Feb	2.3	1.7	2	#
Mar	4.4	1.5	1	#
Apr	1.3	.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
Oct	.1	.0	#	0
Nov	2.7	.7	#	#
Dec	4.8	3.3	1	#
Ann	20.5	11.2	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	4.0	1974	2	10.5	1979	26	1974	14	14	1974
Feb	10.0	1994	22	10.0	1994	14	1978	14	12	1978
Mar	9.0	1975	10	15.0	1977	16	1978	4	5	1978
Apr	7.0	1996	14	10.1	1997	10	1997	12	1	1997
May	.0	0	0	.0	0	#	1996	5	#	1996
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	21	#	1995	0	0	0	0	0
Oct	2.5	1980	27	2.5	1980	23	1997	26	1	1997
Nov	13.0	1991	1	16.0	1972	13	1972	19	3	1972
Dec	8.0	1983	1	22.2	1973	18	1973	31	10	1983
Ann	13.0	Nov 1991	1	22.2	Dec 1973	26	Jan 1974	14	14	Jan 1974

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.7	2.0	.5	.0	.0
Feb	1.8	1.0	.3	.1	@
Mar	1.1	.8	.4	.2	.0
Apr	.3	.3	.1	.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	@	.0	.0	.0
Nov	.9	.6	.3	.2	@
Dec	1.8	1.4	.6	.2	.0
Ann	8.7	6.1	2.2	.8	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	9.8	6.8	5.2	1.7
Feb	3.8	.9	.2	.0
Mar	2.1	1.3	.4	.0
Apr	.3	.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	.1	@	.0	.0
Nov	1.8	.9	.8	.2
Dec	5.6	3.8	1.9	.5
Ann	23.5	13.9	8.6	2.4

+ 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	5/11	5/08	5/05	5/01	4/27	4/22
32	5/12	5/06	5/03	4/30	4/27	4/23	4/20	4/17	4/11
28	5/02	4/27	4/23	4/19	4/16	4/13	4/10	4/06	3/31
24	4/26	4/20	4/16	4/12	4/09	4/06	4/02	3/29	3/23
20	4/12	4/06	4/02	3/30	3/26	3/23	3/20	3/15	3/10
16	4/04	3/30	3/25	3/22	3/18	3/15	3/12	3/07	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	9/15	9/19	9/22	9/24	9/26	9/28	10/01	10/03	10/07
32	9/15	9/22	9/26	9/30	10/03	10/07	10/11	10/15	10/21
28	9/26	10/01	10/05	10/09	10/12	10/15	10/18	10/22	10/28
24	10/06	10/12	10/17	10/21	10/25	10/28	11/01	11/06	11/12
20	10/20	10/26	10/30	11/02	11/06	11/09	11/12	11/16	11/22
16	10/25	11/01	11/07	11/11	11/15	11/20	11/24	11/29	12/07

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	163	156	150	145	140	136	131	125	117
32	183	175	169	164	159	154	149	143	135
28	203	195	188	183	178	173	168	161	153
24	225	216	209	203	198	193	187	180	171
20	249	240	234	228	223	218	213	207	198
16	268	259	252	246	241	236	230	224	215

***** 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	1309	1017	828	468	187	28	1	16	89	382	832	1190	6347
60	1154	877	673	329	99	7	0	3	30	240	682	1035	5129
57	1061	801	580	254	62	2	0	0	13	167	593	942	4475
55	1000	749	519	209	43	1	0	0	6	126	536	880	4069
50	849	620	375	115	14	0	0	0	0	54	399	733	3159
32	369	248	51	1	0	0	0	0	0	0	75	278	1022

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	82	155	246	527	893	1173	1363	1288	990	643	232	112	7704
55	1	12	2	45	222	484	650	575	306	56	4	0	2357
57	0	8	0	30	179	426	588	513	253	35	1	0	2033
60	0	0	0	15	124	340	495	423	180	15	0	0	1592
65	0	0	0	4	56	211	342	281	89	2	0	0	985
70	0	0	0	0	19	111	201	162	34	0	0	0	527

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	7	39	119	320	627	918	1098	1035	742	405	94	12	7	46	165	485	1112	2030	3128	4163	4905	5310	5404	5416
45	0	11	61	204	475	768	943	880	593	273	39	2	0	11	72	276	751	1519	2462	3342	3935	4208	4247	4249
50	0	1	29	118	332	619	788	725	452	163	13	0	0	1	30	148	480	1099	1887	2612	3064	3227	3240	3240
55	0	0	7	59	204	471	633	570	317	84	2	0	0	0	7	66	270	741	1374	1944	2261	2345	2347	2347
60	0	0	1	23	105	327	478	416	201	32	0	0	0	0	1	24	129	456	934	1350	1551	1583	1583	1583
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	14	43	99	213	380	599	727	680	471	275	77	20	14	57	156	369	749	1348	2075	2755	3226	3501	3578	3598

(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