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: CHAPEL HILL 2 W, NC **COOP ID: 311677**

Climate Division: NC 3 **NWS Call Sign:** **Elevation: 500 Feet** **Lat: 35˚55N** **Lon: 79˚05W**

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	49.3	27.3	38.3	79	1949	25	48.5	1974	-8	1985	21	27.2	1977	828	0	.0	.0	15.1	2.0	22.0	.1
Feb	53.3	29.4	41.4	83+	1989	16	49.4	1976	3+	1996	6	31.2	1978	662	0	.0	.0	17.2	1.1	18.8	.0
Mar	61.6	36.9	49.3	89	1990	13	54.3	1976	9	1980	3	44.2	1978	489	1	.0	.0	26.1	.2	10.9	.0
Apr	71.1	44.7	57.9	94	1990	27	61.9	1994	23	1985	10	53.2	1983	225	12	.0	.4	29.5	.0	2.5	.0
May	78.0	53.6	65.8	98	1953	31	71.6	1991	29+	1980	10	62.0	1978	68	93	.0	1.7	31.0	.0	.2	.0
Jun	85.0	61.9	73.5	103	1954	27	76.5	1994	40	1977	8	69.3	1979	4	259	.1	8.2	30.0	.0	.0	.0
Jul	89.1	66.1	77.6	105+	1977	9	82.2	1993	48+	1984	10	72.9	1984	0	390	.7	15.6	31.0	.0	.0	.0
Aug	87.2	64.7	76.0	106+	1988	20	80.4	1983	40	1986	29	71.8	1982	1	340	.3	11.3	31.0	.0	.0	.0
Sep	81.3	58.1	69.7	102	1954	6	74.5	1998	36+	1990	25	63.5	1984	26	167	@	3.5	30.0	.0	.0	.0
Oct	71.3	45.1	58.2	97	1954	5	63.9	1971	20	1962	27	51.1	1987	242	31	.0	.2	30.7	.0	2.9	.0
Nov	62.3	37.1	49.7	86+	1974	3	58.0	1985	12	1950	25	43.7	1976	460	1	.0	.0	26.6	.0	10.7	.0
Dec	52.8	30.3	41.6	80+	1998	7	49.5	1971	0+	1983	26	31.7	1989	728	0	.0	.0	19.1	.7	19.5	.1
Ann	70.2	46.3	58.3	106+	Aug 1988	20	82.2	Jul 1993	-8	Jan 1985	21	27.2	Jan 1977	3733	1294	1.1	40.9	317.3	4.0	87.5	.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	4.41	4.28	3.20	1999	3	8.93	1998	1.19	1981
Feb	3.62	3.34	2.42	1998	17	6.76	1984	.92	1991
Mar	4.48	3.90	3.27	1998	19	7.95	1984	1.63	1985
Apr	3.22	3.01	3.50	1978	26	6.25	2000	.73	1976
May	4.44	4.51	3.27	1987	20	7.62	1972	1.10	1999
Jun	3.98	3.22	4.62	1980	26	10.16	1980	.88	1971
Jul	3.96	3.64	5.12	2000	24	8.41	1975	.27	1977
Aug	4.46	4.39	4.57	1995	28	9.04	1985	.79	1997
Sep	4.45	3.32	7.68	1999	6	24.01	1999	.09	1990
Oct	3.72	3.27	4.57	1954	15	9.69	1971	.26	2000
Nov	3.62	2.81	5.05	1962	10	12.56	1985	.72	1981
Dec	3.24	3.38	2.34	1958	29	7.15	1983	.89	1988
Ann	47.60	49.21	7.68	Sep 1999	6	24.01	Sep 1999	.09	Sep 1990

Mean Number of Days (3)

Month	Daily Precipitation >= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.7	7.8	3.2	1.0
Feb	10.1	6.3	2.9	1.0
Mar	12.0	7.7	3.0	1.1
Apr	9.9	6.3	2.1	.8
May	11.4	7.2	3.0	1.2
Jun	9.9	6.7	2.4	1.0
Jul	10.5	6.7	2.7	.9
Aug	10.0	6.8	2.8	1.2
Sep	8.8	5.6	2.6	1.4
Oct	7.9	5.1	2.4	1.2
Nov	9.8	5.3	2.4	1.1
Dec	10.5	6.2	2.1	.7
Ann	122.5	77.7	31.6	12.6

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	1.57	1.98	2.58	3.09	3.57	4.07	4.61	5.24	6.05	7.29	8.44
Feb	1.28	1.63	2.12	2.53	2.93	3.34	3.78	4.30	4.96	5.97	6.91
Mar	1.69	2.11	2.71	3.21	3.68	4.16	4.69	5.30	6.07	7.26	8.35
Apr	.91	1.21	1.67	2.07	2.47	2.88	3.33	3.87	4.56	5.66	6.67
May	1.86	2.26	2.83	3.30	3.73	4.18	4.66	5.21	5.90	6.96	7.93
Jun	.99	1.37	1.95	2.46	2.97	3.50	4.10	4.81	5.74	7.21	8.59
Jul	.73	1.08	1.66	2.20	2.74	3.34	4.01	4.82	5.91	7.65	9.31
Aug	1.50	1.92	2.54	3.07	3.57	4.09	4.65	5.31	6.16	7.47	8.69
Sep	.28	.55	1.10	1.71	2.39	3.19	4.16	5.39	7.10	10.01	12.90
Oct	.65	.98	1.52	2.03	2.55	3.12	3.76	4.54	5.57	7.25	8.85
Nov	.87	1.20	1.73	2.20	2.67	3.17	3.72	4.38	5.25	6.62	7.91
Dec	1.05	1.35	1.81	2.19	2.57	2.95	3.37	3.87	4.50	5.49	6.41
Ann	35.32	37.73	40.81	43.12	45.17	47.15	49.17	51.41	54.11	58.01	61.36

\+ 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	2.1	.2	#	0
Feb	2.6	.9	#	0
Mar	1.0	.0	#	0
Apr	.0	.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	.0	.0	0	0
Nov	.1	.0	#	0
Dec	.7	.0	#	0
Ann	6.5	1.1	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	11.8	2000	25	18.2	2000	6+	1982	15	1+	1982
Feb	10.5	1979	19	14.5	1979	4	1980	10	#+	1991
Mar	8.5	1980	3	12.0	1980	2+	1972	26	#+	1972
Apr	.3	1983	19	.3	1983	0	0	0	0	0
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	.0	0	0	.0	0	0	0	0	0	0
Oct	.0	0	0	.0	0	0	0	0	0	0
Nov	2.5	2000	20	2.5	2000	#+	2000	19	#+	2000
Dec	4.0	1973	17	4.0	1973	4	1973	17	#+	1981
Ann	11.8	Jan 2000	25	18.2	Jan 2000	6+	Jan 1982	15	1+	Jan 1982

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	1.0	.5	.2	.1	@
Feb	1.3	.9	.4	.1	@
Mar	.3	.3	.1	@	.0
Apr	@	.0	.0	.0	.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	.0	.0	.0	.0	.0
Nov	.1	@	.0	.0	.0
Dec	.5	.2	.1	.0	.0
Ann	3.2	1.9	.8	.2	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.6	.5	.2	.0
Feb	.3	.1	.0	.0
Mar	.2	.0	.0	.0
Apr	.0	.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	.0	.0	.0	.0
Nov	.0	.0	.0	.0
Dec	.2	.2	.0	.0
Ann	1.3	.8	.2	.0

+ 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	5/12	5/06	5/02	4/28	4/24	4/21	4/17	4/12	4/06
32	4/30	4/24	4/19	4/15	4/12	4/08	4/04	3/30	3/24
28	4/17	4/10	4/06	4/02	3/29	3/25	3/21	3/17	3/10
24	3/28	3/21	3/16	3/12	3/08	3/04	2/28	2/23	2/16
20	3/16	3/09	3/03	2/27	2/23	2/18	2/14	2/09	2/01
16	3/06	2/24	2/16	2/10	2/04	1/29	1/22	1/14	1/02

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	9/30	10/05	10/09	10/12	10/15	10/18	10/21	10/24	10/29
32	10/09	10/15	10/18	10/22	10/25	10/28	10/31	11/04	11/09
28	10/16	10/22	10/26	10/30	11/03	11/06	11/10	11/14	11/21
24	10/31	11/07	11/13	11/17	11/22	11/26	12/01	12/06	12/14
20	11/21	11/29	12/04	12/09	12/13	12/18	12/22	12/28	1/05
16	12/02	12/12	12/20	12/27	1/02	1/09	1/15	1/24	2/06

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	199	190	184	178	173	168	162	155	146
32	224	214	207	201	195	190	184	177	167
28	245	235	229	223	218	213	207	200	191
24	287	277	270	264	258	252	246	239	229
20	322	312	305	299	293	287	281	274	264
16	>365	>365	343	332	323	315	307	299	287

***** 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	828	662	489	225	68	4	0	1	26	242	460	728	3733
60	679	522	344	114	19	0	0	0	5	137	319	579	2718
57	591	445	263	67	7	0	0	0	2	91	241	491	2198
55	534	392	215	43	3	0	0	0	1	66	195	434	1883
50	398	269	119	10	0	0	0	0	0	24	104	303	1227
32	78	25	2	0	0	0	0	0	0	0	1	36	142

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	274	287	537	777	1048	1245	1413	1362	1131	813	532	332	9751
55	16	9	37	130	338	555	700	649	441	165	37	16	3093
57	12	6	23	94	279	495	638	587	382	128	23	11	2678
60	6	0	11	51	199	405	545	494	296	82	11	6	2106
65	0	0	1	12	93	259	390	340	167	31	1	0	1294
70	0	0	0	1	30	133	244	198	70	8	0	0	684

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	103	149	324	548	812	1014	1179	1126	904	579	319	148	103	252	576	1124	1936	2950	4129	5255	6159	6738	7057	7205
45	48	82	206	403	657	864	1024	971	754	430	204	78	48	130	336	739	1396	2260	3284	4255	5009	5439	5643	5721
50	22	39	115	272	502	714	869	816	604	284	116	43	22	61	176	448	950	1664	2533	3349	3953	4237	4353	4396
55	3	14	55	162	351	564	714	661	455	169	52	19	3	17	72	234	585	1149	1863	2524	2979	3148	3200	3219
60	0	2	22	83	216	415	559	507	312	80	18	2	0	2	24	107	323	738	1297	1804	2116	2196	2214	2216
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	74	111	213	353	525	690	803	768	601	375	212	103	74	185	398	751	1276	1966	2769	3537	4138	4513	4725	4828

(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