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: HIGHLANDS, NC **COOP ID: 314055**

Climate Division: NC 1 **NWS Call Sign:** **Elevation: 3,840 Feet** **Lat: 35˚03N** **Lon: 83˚11W**

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	41.9	23.4	32.7	70+	1952	1	44.0	1974	-19	1985	21	21.6	1977	1003	0	.0	.0	7.1	3.7	23.7	.7
Feb	46.0	25.1	35.6	73	1996	28	41.4	1976	-9	1958	17	26.3	1980	824	0	.0	.0	11.2	2.3	20.9	.2
Mar	54.3	31.5	42.9	78	1967	14	48.1	1989	-1	1960	5	36.6	1971	685	0	.0	.0	22.2	.6	15.8	@
Apr	62.4	37.5	50.0	83+	1986	26	55.9	1981	13	1987	1	45.5	1983	452	0	.0	.0	27.3	.1	8.1	.0
May	69.5	46.0	57.8	86	1996	19	62.1	2000	28	1996	1	53.4	1997	238	13	.0	.0	30.8	.0	1.0	.0
Jun	75.1	52.9	64.0	91	1952	27	68.1	1981	35	1984	1	60.5	1974	79	49	.0	.0	30.0	.0	.0	.0
Jul	78.0	57.2	67.6	93	1952	29	71.3	1993	43	1988	2	64.1	1979	23	103	.0	.1	31.0	.0	.0	.0
Aug	76.3	56.4	66.4	91	1955	19	70.4	1979	44+	1997	23	63.6	1992	34	76	.0	.1	31.0	.0	.0	.0
Sep	70.9	50.7	60.8	89	1954	4	64.9	1998	30	1983	23	57.6	1976	140	14	.0	.0	30.0	.0	.2	.0
Oct	61.7	39.7	50.7	82	1951	6	56.2	1984	18	2001	28	45.2	1987	445	1	.0	.0	29.8	@	6.5	.0
Nov	52.0	31.9	42.0	77	1950	1	51.0	1985	-3	1950	25	36.0	1976	691	0	.0	.0	20.0	.3	15.5	.0
Dec	44.0	26.2	35.1	72	1951	31	43.1	1971	-11	1983	25	27.2	2000	927	0	.0	.0	10.6	3.2	22.7	.3
Ann	61.0	39.9	50.5	93	Jul 1952	29	71.3	Jul 1993	-19	Jan 1985	21	21.6	Jan 1977	5541	256	.0	.2	281.0	10.2	114.4	1.2

\+ 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	8.06	7.57	7.12	1998	8	19.05	1998	.81	1981
Feb	7.05	7.55	6.60	1990	16	15.68	1990	1.10	1978
Mar	8.98	8.84	8.88	1979	4	16.56	1980	1.91	1985
Apr	6.47	6.58	4.03	1979	13	13.86	1983	.17	1976
May	7.90	6.73	8.21	1976	15	24.08	1976	2.43	1988
Jun	7.12	6.99	7.63	1949	16	17.28	1989	.76	1990
Jul	6.61	5.70	6.20	1995	28	21.48	1979	1.97	1980
Aug	6.59	5.80	5.09	1992	28	14.34	1992	.73	1997
Sep	6.76	5.60	11.87	1964	29	17.27	1979	.46	1984
Oct	6.05	6.40	9.91	1964	4	14.24	1995	.15	2000
Nov	8.24	7.70	5.80	2000	9	19.16	1992	3.44	1997
Dec	7.74	7.16	5.99	1996	1	17.16	1982	.40	1980
Ann	87.57	89.04	11.87	Sep 1964	29	24.08	May 1976	.15	Oct 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	13.4	9.2	5.0	2.7
Feb	11.4	8.1	4.7	2.5
Mar	13.2	9.3	5.4	3.1
Apr	11.3	8.0	4.3	2.0
May	13.8	10.0	5.3	2.3
Jun	14.2	9.8	4.6	2.3
Jul	15.8	10.4	4.4	2.0
Aug	15.4	9.9	4.2	2.1
Sep	12.6	8.2	4.1	2.3
Oct	9.2	6.3	3.7	2.1
Nov	11.9	8.7	5.1	2.7
Dec	13.0	8.9	4.8	2.3
Ann	155.2	106.8	55.6	28.4

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	2.63	3.39	4.52	5.48	6.40	7.35	8.40	9.62	11.19	13.63	15.88
Feb	2.16	2.83	3.83	4.69	5.52	6.38	7.33	8.45	9.89	12.13	14.21
Mar	3.13	3.98	5.21	6.25	7.24	8.26	9.37	10.67	12.33	14.90	17.26
Apr	1.31	1.89	2.84	3.71	4.59	5.53	6.60	7.88	9.57	12.28	14.85
May	2.71	3.45	4.54	5.46	6.35	7.26	8.25	9.40	10.89	13.18	15.30
Jun	2.60	3.27	4.23	5.04	5.80	6.59	7.44	8.44	9.70	11.65	13.44
Jul	1.67	2.29	3.25	4.10	4.94	5.83	6.82	7.99	9.52	11.94	14.21
Aug	1.45	2.05	3.02	3.89	4.77	5.70	6.75	8.00	9.65	12.28	14.77
Sep	1.53	2.16	3.15	4.04	4.93	5.88	6.94	8.21	9.88	12.53	15.03
Oct	.72	1.19	2.04	2.89	3.78	4.78	5.94	7.39	9.34	12.56	15.69
Nov	3.46	4.21	5.26	6.12	6.93	7.75	8.64	9.65	10.94	12.90	14.68
Dec	2.00	2.73	3.85	4.84	5.82	6.85	7.99	9.35	11.12	13.92	16.53
Ann	62.70	67.53	73.70	78.39	82.54	86.56	90.70	95.28	100.83	108.88	115.83

\+ 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	4.9	3.4	1	#
Feb	4.2	3.7	#	#
Mar	2.8	.4	#	0
Apr	.9	.0	#	0
May	.2	.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
Nov	.5	.0	#	0
Dec	2.2	.1	#	#
Ann	15.7	7.6	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	9.0	1987	22	19.5	1996	18	1996	12	7	1996
Feb	11.0	1979	18	19.0	1979	11	1979	18	3	1979
Mar	10.0	1993	13	17.0	1993	17	1993	14	4	1993
Apr	9.0	1987	4	9.0+	1989	9	1987	4	1	1989
May	2.5	1992	7	5.5	1992	3	1992	7	#+	1999
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	#	1989	21	#+	1989	0	0	0	0	0
Nov	4.5	1975	23	4.5	1975	4	2000	19	#+	2000
Dec	6.5	1993	21	12.3	1993	8	1997	31	2	1993
Ann	11.0	Feb 1979	18	19.5	Jan 1996	18	Jan 1996	12	7	Jan 1996

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.1	1.4	.9	.4	.0
Feb	2.1	1.4	.6	.2	@
Mar	1.4	.8	.4	.1	@
Apr	.3	.2	.1	.1	.0
May	.1	.1	.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	.3	.1	.1	.0	.0
Dec	1.3	.8	.3	.1	.0
Ann	7.6	4.8	2.4	.9	@

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	4.7	2.3	1.4	.5
Feb	2.7	1.4	.6	.1
Mar	1.2	.6	.4	.2
Apr	.3	.2	.2	.0
May	@	@	.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
Dec	1.0	.6	.4	.0
Ann	9.9	5.1	3.0	.8

+ 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	5/28	5/23	5/19	5/16	5/13	5/09	5/06	5/02	4/27
32	5/19	5/13	5/09	5/06	5/02	4/29	4/25	4/21	4/15
28	4/27	4/22	4/19	4/16	4/14	4/11	4/08	4/05	4/01
24	4/16	4/11	4/07	4/04	4/01	3/29	3/26	3/22	3/17
20	4/08	4/01	3/28	3/24	3/20	3/16	3/12	3/07	3/01
16	3/22	3/15	3/11	3/07	3/03	2/27	2/23	2/19	2/12

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	9/24	9/27	9/29	10/01	10/03	10/05	10/07	10/09	10/12
32	9/26	10/01	10/05	10/08	10/11	10/14	10/17	10/21	10/27
28	10/06	10/11	10/15	10/19	10/22	10/25	10/29	11/02	11/08
24	10/20	10/26	10/29	11/02	11/05	11/08	11/11	11/15	11/21
20	10/30	11/05	11/09	11/12	11/15	11/19	11/22	11/26	12/02
16	11/10	11/18	11/24	11/29	12/04	12/09	12/14	12/20	12/28

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	160	154	150	146	143	139	136	132	126
32	183	175	170	165	161	157	152	147	139
28	213	205	200	195	191	186	182	176	169
24	235	229	225	221	217	214	210	205	199
20	267	258	251	245	240	234	229	222	212
16	301	292	286	280	275	270	264	258	249

***** 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	1003	824	685	452	238	79	23	34	140	445	691	927	5541
60	848	684	531	308	123	20	1	3	49	300	541	772	4180
57	755	600	442	228	73	6	0	0	21	222	453	679	3479
55	693	544	385	180	48	2	0	0	10	176	395	617	3050
50	550	406	252	87	12	0	0	0	1	88	261	472	2129
32	147	56	14	0	0	0	0	0	0	0	13	91	321

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	167	156	352	538	798	960	1104	1065	863	579	312	188	7082
55	0	0	10	28	132	273	391	352	184	42	4	0	1416
57	0	0	5	16	95	216	329	290	134	26	1	0	1112
60	0	0	1	6	52	140	237	199	72	11	0	0	718
65	0	0	0	0	13	49	103	76	14	1	0	0	256
70	0	0	0	0	1	8	24	13	0	0	0	0	46

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	39	62	178	338	581	748	882	846	660	367	156	67	39	101	279	617	1198	1946	2828	3674	4334	4701	4857	4924
45	18	22	91	212	428	598	727	691	510	231	76	29	18	40	131	343	771	1369	2096	2787	3297	3528	3604	3633
50	0	3	37	115	279	448	572	536	360	117	29	4	0	3	40	155	434	882	1454	1990	2350	2467	2496	2500
55	0	0	3	48	148	299	417	381	219	44	2	0	0	0	3	51	199	498	915	1296	1515	1559	1561	1561
60	0	0	0	13	54	162	264	228	99	5	0	0	0	0	0	13	67	229	493	721	820	825	825	825
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	19	38	108	208	340	459	572	539	391	213	85	31	19	57	165	373	713	1172	1744	2283	2674	2887	2972	3003

(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:
www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

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