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: RALEIGH 4 SW, NC **COOP ID: 317074**

Climate Division: NC 4 **NWS Call Sign:** **Elevation: 420 Feet** **Lat: 35˚44N** **Lon: 78˚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	51.4	32.0	41.7	79+	1932	14	52.3	1974	-6	1985	21	31.0	1977	723	0	.0	.0	17.6	1.3	17.5	@
Feb	55.7	34.0	44.9	82+	1977	26	52.0	1976	-2	1899	14	35.3	1978	564	0	.0	.0	19.5	.5	14.2	.0
Mar	63.8	40.8	52.3	94	1907	29	57.3	1974	13	1943	4	47.5	1996	396	3	.0	.0	28.3	.1	7.6	.0
Apr	72.7	48.1	60.4	95	1896	18	64.4	1981	23	1923	1	55.9	1983	162	24	.0	.5	29.8	.0	1.7	.0
May	79.4	56.9	68.2	99	1941	28	72.5	1991	33	1977	10	64.9+	1997	34	131	.0	1.1	31.0	.0	.0	.0
Jun	85.8	65.0	75.4	103	1959	30	80.2	1981	41	1977	8	71.7	1997	1	313	.0	7.6	30.0	.0	.0	.0
Jul	88.9	69.3	79.1	104+	1977	19	82.4	1986	48	1975	2	76.0	2000	0	437	.4	14.6	31.0	.0	.0	.0
Aug	87.2	68.2	77.7	103+	1983	22	81.7	1980	48	1976	31	74.8	1992	0	393	.3	11.1	31.0	.0	.0	.0
Sep	81.8	62.3	72.1	101	1932	1	76.2	1980	37	1983	23	69.0	1984	8	219	.0	3.3	30.0	.0	.0	.0
Oct	72.2	50.2	61.2	96	1941	6	67.6	1984	24+	1981	20	55.7	1988	166	48	.0	.1	30.9	.0	1.1	.0
Nov	63.0	41.9	52.5	85+	1974	3	59.7	1985	15+	1970	25	46.4	1976	381	4	.0	.0	27.5	.0	7.1	.0
Dec	54.2	34.9	44.6	85	1934	26	52.9	1971	0	1917	30	35.8	1989	635	0	.0	.0	20.6	.3	15.1	.0
Ann	71.3	50.3	60.8	104+	Jul 1977	19	82.4	Jul 1986	-6	Jan 1985	21	31.0	Jan 1977	3070	1572	.7	38.3	327.2	2.2	64.3	@

+ 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: 1892-2001

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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	4.43	4.59	2.90	1995	15	8.67	1998	1.02	1981
Feb	3.60	3.41	4.50	1973	2	7.12	1989	.62	1991
Mar	4.44	4.06	3.76	1983	18	8.15	1983	1.53	1988
Apr	2.98	2.68	4.48	1978	26	7.55	1978	.16	1976
May	3.95	3.72	4.50	1957	11	8.99	1984	.74	2000
Jun	4.05	4.09	4.34	1967	18	10.36	1995	.59	1993
Jul	4.48	4.64	4.83	1931	4	10.71	1975	1.06	1983
Aug	4.23	3.91	5.70	1908	24	11.99	1986	.51	1975
Sep	4.41	3.25	8.32	1996	6	18.47	1999	.28	1990
Oct	3.58	3.56	5.96	1929	1	9.01	1995	.00	2000
Nov	3.19	2.90	4.33	1963	6	7.93	1985	.69	1973
Dec	3.21	3.16	2.65	1983	6	7.53	1983	.57	1988
Ann	46.55	46.92	8.32	Sep 1996	6	18.47	Sep 1999	.00	Oct 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	10.4	7.4	3.2	1.1
Feb	9.2	6.5	2.6	.8
Mar	10.1	7.6	3.2	1.0
Apr	8.1	5.5	2.0	.7
May	9.4	6.8	3.0	1.1
Jun	8.9	6.5	2.8	1.2
Jul	10.2	7.0	3.2	1.5
Aug	8.9	6.0	2.7	1.3
Sep	8.0	5.9	2.8	1.2
Oct	6.6	4.4	2.2	1.2
Nov	8.0	5.6	2.4	.7
Dec	9.4	6.2	2.3	.8
Ann	107.2	75.4	32.4	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	1.69	2.10	2.69	3.18	3.65	4.12	4.63	5.23	5.99	7.15	8.22
Feb	1.07	1.41	1.92	2.37	2.80	3.25	3.74	4.32	5.07	6.25	7.34
Mar	1.82	2.23	2.80	3.27	3.72	4.17	4.66	5.22	5.93	7.02	8.00
Apr	.45	.70	1.13	1.54	1.97	2.44	2.98	3.64	4.52	5.97	7.35
May	1.22	1.59	2.15	2.63	3.10	3.58	4.11	4.74	5.54	6.80	7.96
Jun	.89	1.27	1.86	2.39	2.93	3.50	4.14	4.91	5.92	7.54	9.06
Jul	1.54	1.96	2.58	3.10	3.60	4.12	4.68	5.33	6.17	7.47	8.67
Aug	.95	1.34	1.96	2.52	3.08	3.67	4.34	5.14	6.19	7.86	9.43
Sep	.45	.77	1.38	1.99	2.66	3.40	4.28	5.38	6.88	9.37	11.80
Oct	.60	1.09	1.70	2.19	2.67	3.17	3.73	4.39	5.25	6.61	7.88
Nov	.84	1.14	1.61	2.01	2.41	2.83	3.30	3.85	4.57	5.71	6.77
Dec	.95	1.26	1.71	2.11	2.49	2.89	3.33	3.85	4.52	5.57	6.54
Ann	35.25	37.49	40.33	42.47	44.36	46.17	48.03	50.07	52.54	56.09	59.14

\+ 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: 1892-2001
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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	2.0	.0	#	0
Feb	2.5	.0	#	0
Mar	1.1	.0	0	0
Apr	#	.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
Dec	.4	.0	#	0
Ann	6.0	.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	12.3	2000	25	17.3	2000	12	2000	25	1+	2000
Feb	8.5	1979	18	15.0	1979	5	1989	25	1	1987
Mar	10.0	1980	2	12.0	1980	0	0	0	0	0
Apr	#	1983	18	#	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	.0	0	0	.0	0	3	2000	19	#	2000
Dec	3.0	1980	27	3.0	1980	1	1993	23	#	1993
Ann	12.3	Jan 2000	25	17.3	Jan 2000	12	Jan 2000	25	1+	Jan 2000

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	.6	.6	.3	.1	.1
Feb	.7	.7	.4	.1	.0
Mar	.4	.4	.1	.1	.1
Apr	.0	.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	.0	.0	.0	.0	.0
Dec	.2	.1	.1	.0	.0
Ann	1.9	1.8	.9	.3	.2

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	.8	.6	.1	@
Feb	.3	.1	@	.0
Mar	.0	.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	.0	.0	.0	.0
Ann	1.1	.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	5/07	5/01	4/26	4/23	4/19	4/16	4/12	4/08	4/02
32	4/20	4/14	4/10	4/07	4/04	3/31	3/28	3/24	3/19
28	4/15	4/09	4/04	4/01	3/28	3/24	3/20	3/16	3/09
24	3/30	3/22	3/16	3/11	3/06	3/02	2/25	2/19	2/11
20	3/12	3/03	2/25	2/20	2/15	2/10	2/05	1/30	1/22
16	3/03	2/21	2/14	2/07	2/01	1/26	1/19	1/10	12/25

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	10/09	10/14	10/17	10/20	10/22	10/25	10/28	10/31	11/05
32	10/14	10/19	10/22	10/25	10/28	10/31	11/03	11/07	11/12
28	10/23	10/28	11/01	11/05	11/08	11/11	11/14	11/18	11/23
24	11/02	11/10	11/16	11/21	11/26	12/01	12/06	12/12	12/20
20	11/26	12/04	12/09	12/14	12/18	12/23	12/27	1/02	1/10
16	12/05	12/16	12/23	12/30	1/05	1/12	1/19	1/28	2/14

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	209	201	195	190	185	180	175	169	161
32	231	222	217	211	207	202	197	191	183
28	251	242	235	229	224	219	213	206	197
24	294	284	276	270	264	258	251	244	233
20	341	327	318	311	304	298	290	282	271
16	>365	>365	355	338	329	321	314	306	295

***** 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	723	564	396	162	34	1	0	0	8	166	381	635	3070
60	578	429	256	71	6	0	0	0	1	81	247	489	2158
57	492	350	185	36	1	0	0	0	0	47	178	403	1692
55	437	300	144	21	0	0	0	0	0	30	139	349	1420
50	311	189	67	4	0	0	0	0	0	8	65	231	875
32	43	9	0	0	0	0	0	0	0	0	0	18	70

Base — Cooling Degree Days (1)

Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	344	369	630	852	1120	1302	1460	1416	1201	905	613	406	10618
55	24	15	61	183	408	612	747	703	511	222	63	24	3573
57	17	10	40	138	347	552	685	641	451	177	41	16	3115
60	10	5	19	83	258	462	592	548	362	118	20	9	2486
65	0	0	3	24	131	313	437	393	219	48	4	0	1572
70	0	0	0	4	47	175	282	242	100	13	0	0	863

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	150	206	396	612	871	1055	1206	1166	958	656	378	200	150	356	752	1364	2235	3290	4496	5662	6620	7276	7654	7854
45	80	122	263	463	716	905	1051	1011	808	501	251	114	80	202	465	928	1644	2549	3600	4611	5419	5920	6171	6285
50	37	64	161	321	561	755	896	856	658	354	157	56	37	101	262	583	1144	1899	2795	3651	4309	4663	4820	4876
55	14	25	80	206	408	605	741	701	508	220	77	29	14	39	119	325	733	1338	2079	2780	3288	3508	3585	3614
60	0	4	35	110	264	455	586	546	361	121	32	5	0	4	39	149	413	868	1454	2000	2361	2482	2514	2519
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	90	135	249	394	570	726	835	812	646	417	231	122	90	225	474	868	1438	2164	2999	3811	4457	4874	5105	5227

(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