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: HOT SPRINGS, VA **COOP ID: 444128**

Climate Division: VA 5 **NWS Call Sign:** **Elevation: 2,236 Feet** **Lat: 38˚00N** **Lon: 79˚50W**

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	39.8	20.1	30.0	73	1950	27	41.0	1974	-20	1985	21	17.6	1977	1086	0	.0	.0	6.8	8.0	27.1	1.7
Feb	43.9	22.0	33.0	75+	1985	25	39.8	1976	-10+	1996	6	22.2	1978	899	0	.0	.0	9.1	5.3	23.7	.5
Mar	52.9	29.2	41.1	83+	1998	30	47.7	1973	-2	1960	8	34.8	1996	743	0	.0	.0	19.3	1.4	19.4	@
Apr	63.7	37.4	50.6	89+	1985	24	55.0	1985	14	1985	10	46.3	1975	434	0	.0	.0	25.9	.2	9.0	.0
May	72.7	46.3	59.5	93	1996	20	65.5	1991	25+	1966	10	53.7	1997	208	37	.0	.1	30.8	.0	1.3	.0
Jun	79.8	54.8	67.3	97	1989	3	70.4	1987	33	1966	2	62.6	1972	43	112	.0	1.2	30.0	.0	.0	.0
Jul	83.4	59.3	71.4	99	1966	15	74.7	1987	38	1988	2	68.2	1976	6	203	.0	3.6	31.0	.0	.0	.0
Aug	82.3	58.1	70.2	100+	1987	29	73.5	1988	35	1986	30	67.2	1992	12	172	.1	2.6	31.0	.0	.0	.0
Sep	75.5	51.3	63.4	95	1983	11	67.7	1998	29+	1956	21	60.7	1976	97	48	.0	.3	29.9	.0	.4	.0
Oct	65.0	39.5	52.3	85	1986	1	60.6	1984	14	1962	27	46.2	1988	403	7	.0	.0	29.2	.0	5.7	.0
Nov	53.7	31.0	42.4	78+	1982	2	49.5	1985	3	1950	26	34.4	1976	680	0	.0	.0	19.9	.6	18.4	.0
Dec	43.8	23.3	33.6	75	1982	5	41.7	1984	-15	1989	23	22.2	1989	974	0	.0	.0	9.2	4.9	25.9	.5
Ann	63.0	39.4	51.2	100+	Aug 1987	29	74.7	Jul 1987	-20	Jan 1985	21	17.6	Jan 1977	5585	579	.1	7.8	272.1	20.4	130.9	2.7

\+ 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	3.62	3.45	3.00	1996	19	7.30	1998	.47	1981
Feb	2.94	2.74	2.50	1984	14	6.79	1998	.62	1978
Mar	4.07	4.29	2.80	1984	21	7.61	1993	.59	1995
Apr	3.35	2.78	3.53	1987	16	8.29	1987	.73	1976
May	4.32	4.42	2.56	1979	12	7.19	1981	1.69	1977
Jun	3.53	3.23	3.72	1972	21	8.15	1972	1.04	1980
Jul	4.29	4.05	3.55	1968	3	7.42	1980	1.61	1995
Aug	3.41	3.26	3.53	1969	20	8.49	1984	1.36	1981
Sep	3.70	3.29	3.43	1950	10	8.84	1979	.08	1985
Oct	3.33	2.80	5.85	1954	15	8.49	1976	.00	2000
Nov	3.60	3.39	8.25	1985	5	14.79	1985	1.13	1981
Dec	2.75	2.63	2.00	1996	19	6.26	1973	.42	1980
Ann	42.91	42.62	8.25	Nov 1985	5	14.79	Nov 1985	.00	Oct 2000

Mean Number of Days (3)

Daily Precipitation

Month	>= 0.01	>= 0.10	>= 0.50	>= 1.00
Jan	11.3	7.3	2.4	.7
Feb	9.7	6.6	2.2	.6
Mar	11.6	7.7	2.7	1.0
Apr	11.1	7.0	2.1	.7
May	13.0	8.3	2.9	.8
Jun	9.5	6.5	2.0	.6
Jul	12.3	8.4	2.7	.9
Aug	10.5	6.3	2.2	.8
Sep	8.2	5.2	2.1	1.0
Oct	8.6	5.2	2.4	.9
Nov	9.5	6.4	2.6	.8
Dec	9.9	6.4	1.8	.6
Ann	125.2	81.3	28.1	9.4

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	1.02	1.36	1.88	2.33	2.77	3.24	3.75	4.35	5.14	6.37	7.52
Feb	.93	1.20	1.62	1.97	2.31	2.67	3.06	3.51	4.10	5.01	5.86
Mar	1.26	1.65	2.22	2.72	3.19	3.69	4.23	4.87	5.69	6.98	8.17
Apr	1.01	1.33	1.80	2.21	2.61	3.03	3.48	4.02	4.71	5.79	6.80
May	2.10	2.47	2.97	3.38	3.75	4.13	4.53	4.99	5.56	6.42	7.19
Jun	1.18	1.52	2.01	2.42	2.82	3.23	3.68	4.21	4.89	5.93	6.90
Jul	1.83	2.22	2.76	3.20	3.62	4.04	4.49	5.01	5.67	6.67	7.58
Aug	1.51	1.81	2.24	2.58	2.90	3.23	3.58	3.98	4.48	5.24	5.93
Sep	.37	.64	1.15	1.66	2.22	2.85	3.59	4.51	5.77	7.87	9.92
Oct	.64	1.10	1.66	2.11	2.55	3.00	3.50	4.08	4.83	6.02	7.12
Nov	1.03	1.37	1.88	2.33	2.77	3.23	3.73	4.33	5.10	6.32	7.45
Dec	.90	1.16	1.55	1.87	2.19	2.51	2.86	3.28	3.81	4.64	5.41
Ann	33.43	35.33	37.73	39.52	41.10	42.61	44.15	45.85	47.89	50.82	53.32

\+ 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	7.9	7.1	1	#
Feb	7.9	6.0	1	#
Mar	3.7	2.0	#	#
Apr	1.3	.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	.2	.0	#	0
Nov	1.2	.0	#	0
Dec	4.5	1.8	#	#
Ann	26.7	16.9	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	15.0	1971	1	26.5	1978	18	1987	26	8	1978
Feb	10.0	1983	11	24.0	1983	18	1983	12	6	1978
Mar	15.0	1999	15	25.0	1999	13	1980	2	2	1980
Apr	12.0	1971	7	12.0+	1987	12	1971	7	1+	1987
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	4.0	1979	10	4.0	1979	4	1979	10	#	1979
Nov	8.0	1971	25	10.0	1971	8	1971	25	1	1976
Dec	10.0	1982	11	14.0	1974	11	1997	30	3	1974
Ann	15.0+	Mar 1999	15	26.5	Jan 1978	18+	Jan 1987	26	8	Jan 1978

Mean Number of Days (1)

Snow Fall >= Thresholds

Month	0.1	1.0	3.0	5.0	10.0
Jan	2.8	2.5	.8	.3	.1
Feb	2.3	2.0	.8	.4	@
Mar	1.5	1.4	.4	.1	@
Apr	.3	.3	.1	.1	@
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
Nov	.5	.5	.2	.1	.0
Dec	1.6	1.5	.3	.2	@
Ann	9.0	8.2	2.6	1.2	.1

Snow Depth >= Thresholds

Month	1	3	5	10
Jan	8.6	4.7	2.2	1.2
Feb	9.3	5.7	3.3	.3
Mar	2.4	1.1	.4	.0
Apr	.4	.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	.1	.0	.0
Nov	.8	.3	.2	.0
Dec	3.5	1.5	.6	.1
Ann	25.1	13.7	6.9	1.7

+ 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	6/02	5/27	5/23	5/19	5/16	5/12	5/08	5/04	4/28
32	5/18	5/13	5/09	5/06	5/03	4/30	4/27	4/23	4/18
28	5/02	4/26	4/23	4/19	4/16	4/13	4/10	4/06	4/01
24	4/16	4/12	4/09	4/06	4/03	4/01	3/29	3/26	3/22
20	4/08	4/03	3/30	3/26	3/23	3/20	3/16	3/12	3/07
16	3/26	3/19	3/14	3/10	3/06	3/02	2/26	2/21	2/14

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	9/23	9/26	9/29	10/02	10/05	10/08	10/13
32	9/26	10/01	10/06	10/09	10/13	10/16	10/20	10/24	10/30
28	10/07	10/14	10/19	10/24	10/28	11/01	11/05	11/11	11/18
24	10/22	10/29	11/02	11/06	11/10	11/14	11/18	11/22	11/29
20	11/02	11/08	11/13	11/17	11/20	11/24	11/28	12/02	12/09
16	11/13	11/20	11/25	11/30	12/04	12/08	12/12	12/18	12/25

Freeze Free Period

Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	156	149	144	139	135	131	127	122	115
32	185	177	172	167	162	158	153	147	139
28	223	213	206	200	194	188	182	175	165
24	245	236	230	225	220	215	210	204	195
20	263	256	250	246	242	237	233	227	220
16	300	290	283	277	272	267	261	254	244

***** 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	1086	899	743	434	208	43	6	12	97	403	680	974	5585
60	931	759	588	287	110	10	0	0	34	268	531	819	4337
57	838	675	500	207	67	3	0	0	15	199	444	726	3674
55	776	619	442	158	45	1	0	0	8	159	388	664	3260
50	631	481	306	66	13	0	0	0	1	82	258	521	2359
32	198	103	32	0	0	0	0	0	0	0	16	126	475

Cooling Degree Days (1)

Base Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	135	128	312	556	851	1059	1220	1183	941	628	326	175	7514
55	0	0	9	24	183	370	507	470	259	74	8	0	1904
57	0	0	5	13	143	312	445	408	206	52	4	0	1588
60	0	0	0	3	94	229	352	316	135	27	1	0	1157
65	0	0	0	0	37	112	203	172	48	7	0	0	579
70	0	0	0	0	10	36	83	68	9	0	0	0	206

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	32	50	157	352	624	826	974	946	709	403	156	48	32	82	239	591	1215	2041	3015	3961	4670	5073	5229	5277
45	5	18	86	234	470	676	819	791	559	262	81	19	5	23	109	343	813	1489	2308	3099	3658	3920	4001	4020
50	0	2	41	132	325	527	664	636	410	143	34	1	0	2	43	175	500	1027	1691	2327	2737	2880	2914	2915
55	0	0	12	66	194	381	509	482	274	64	9	0	0	0	12	78	272	653	1162	1644	1918	1982	1991	1991
60	0	0	3	22	94	241	354	327	152	20	2	0	0	0	3	25	119	360	714	1041	1193	1213	1215	1215
Base	**Growing Degree Units for Corn (Monthly)**												**Growing Degree Units for Corn (Accumulated Monthly)**											
50/86	24	42	118	237	393	538	646	627	451	256	103	36	24	66	184	421	814	1352	1998	2625	3076	3332	3435	3471

(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