

Climatology of the United States

No. 20

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801
www.ncdc.noaa.gov

Station: RICHMOND BYRD INTL AP, VA

1971-2000

COOP ID: 447201

Climate Division: VA 2

NWS Call Sign: RIC

Elevation: 164 Feet

Lat: 37° 31N

Lon: 77° 19W

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	45.3	27.6	36.4	80	1950	26	45.4	1990	-6	1985	21	24.4	1977	873	0	.0	.0	12.1	3.5	21.6	.2
Feb	49.3	29.7	39.5	82+	1989	15	47.6	1976	-8	1979	10	27.7	1979	705	1	.0	.0	14.5	1.9	18.3	.1
Mar	58.4	37.0	47.7	91	1985	29	52.8	1977	11	1960	14	42.7	1984	528	8	.0	@	24.7	.2	10.3	.0
Apr	68.9	45.3	57.1	96+	1990	27	62.4	1994	23	1985	10	52.1	1975	254	33	.0	.8	29.4	.0	1.9	.0
May	76.2	54.6	65.4	98+	1991	31	71.3	1991	31	1956	9	60.9	1992	80	107	.0	1.9	31.0	.0	@	.0
Jun	83.6	63.3	73.5	104	1952	26	77.0	1994	40	1967	2	69.2	1972	8	277	.1	8.2	30.0	.0	.0	.0
Jul	87.5	68.3	77.9	105	1977	6	81.5	1993	51	1965	2	74.7	2000	0	415	.9	15.0	31.0	.0	.0	.0
Aug	85.7	66.8	76.3	102+	1983	22	79.9	1980	47+	1986	29	72.8	1992	1	367	.2	10.9	31.0	.0	.0	.0
Sep	79.7	59.9	69.8	103	1954	7	74.2	1998	35	1974	24	66.7	1974	27	187	.1	3.6	30.0	.0	.0	.0
Oct	69.3	47.2	58.3	94+	1986	4	65.5	1984	21	1962	27	52.2	1987	225	33	.0	.3	30.9	.0	1.3	.0
Nov	59.7	38.4	49.0	86+	1993	15	55.9	1985	14+	1974	27	42.0	1976	470	6	.0	.0	25.4	.0	9.2	.0
Dec	49.7	31.1	40.4	81+	1998	7	47.3	1971	1	1958	16	30.5	1989	748	1	.0	.0	16.4	1.6	18.3	.0
Ann	67.8	47.4	57.6	105	Jul 1977	6	81.5	Jul 1993	-8	Feb 1979	10	24.4	Jan 1977	3919	1435	1.3	40.7	306.4	7.2	80.9	.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/normal/usnormals.html

Issue Date: February 2004

(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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Climate Division: VA 2

NWS Call Sign: RIC

Elevation: 164 Feet Lat: 37°31N

Lon: 77°19W

Precipitation (inches)																								
	Precipitation Totals									Mean Number of Days (3)				Precipitation Probabilities (1) Probability that the monthly/annual precipitation will be equal to or less than the indicated amount										
	Means/ Medians(1)		Extremes							Daily Precipitation				Monthly/Annual Precipitation vs Probability Levels These values were determined from the incomplete gamma distribution										
Month	Mean	Med- ian	Highest Daily(2)	Year	Day	Highest Monthly(1)	Year	Lowest Monthly(1)	Year	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.05	.10	.20	.30	.40	.50	.60	.70	.80	.90	.95
Jan	3.55	3.18	3.31	1962	6	7.97	1978	.64	1981	10.7	6.6	2.5	1.0	1.13	1.46	1.96	2.39	2.80	3.23	3.70	4.25	4.96	6.06	7.08
Feb	2.98	2.93	2.64	1979	24	5.97	1979	.48	1978	9.5	6.2	1.8	.7	.89	1.18	1.60	1.97	2.32	2.69	3.10	3.58	4.20	5.17	6.07
Mar	4.09	3.56	3.14	1992	7	8.65	1984	1.16	1986	10.5	7.1	2.8	1.0	1.23	1.62	2.20	2.70	3.19	3.70	4.25	4.91	5.75	7.07	8.30
Apr	3.18	2.92	2.76	1987	16	7.31	1987	.65	1985	9.2	6.0	2.2	.8	.99	1.29	1.74	2.12	2.50	2.88	3.31	3.81	4.45	5.45	6.38
May	3.96	3.74	3.05	1981	11	8.87	1972	.91	1991	11.0	7.4	2.8	1.0	1.57	1.93	2.45	2.88	3.28	3.70	4.14	4.66	5.31	6.31	7.23
Jun	3.54	3.27	3.91	1972	18	8.82	1972	.38	1980	9.6	5.9	2.3	.8	.82	1.14	1.66	2.13	2.59	3.09	3.64	4.30	5.16	6.54	7.84
Jul	4.67	4.22	4.90	1969	22	12.29	1975	.51	1983	11.1	7.5	3.2	1.3	1.30	1.74	2.41	3.00	3.57	4.17	4.83	5.62	6.64	8.23	9.72
Aug	4.18	3.87	8.79	1955	12	10.58	1985	.97	1983	9.0	6.0	2.9	1.2	1.10	1.49	2.10	2.63	3.15	3.71	4.32	5.04	5.99	7.48	8.87
Sep	3.98	3.01	4.53	1999	16	16.60	1999	.26	1978	8.7	5.7	2.4	1.2	.57	.90	1.48	2.03	2.61	3.24	3.97	4.87	6.07	8.04	9.93
Oct	3.60	2.82	4.76	1961	20	9.39	1971	.01	2000	7.5	5.0	2.3	1.2	.34	.59	1.08	1.58	2.13	2.75	3.48	4.39	5.65	7.75	9.80
Nov	3.06	2.82	3.00	1959	24	6.99	1985	.67	1991	8.1	5.6	2.1	.8	.81	1.10	1.54	1.93	2.31	2.72	3.16	3.69	4.39	5.48	6.49
Dec	3.12	2.89	2.46	1958	29	7.07	1973	.40	1980	9.7	6.1	2.4	.5	.67	.96	1.42	1.83	2.25	2.69	3.19	3.79	4.57	5.83	7.02
Ann	43.91	43.29	8.79	Aug 1955	12	16.60	Sep 1999	.01	Oct 2000	114.6	75.1	29.7	11.5	32.57	34.81	37.65	39.79	41.68	43.50	45.38	47.45	49.94	53.54	56.64

+ 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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Climate Division: VA 2

NWS Call Sign: RIC

Elevation: 164 Feet

Lat: 37°31N

Lon: 77°19W

Snow (inches)																							
Snow Totals															Mean Number of Days (1)								
Means/Medians (1)					Extremes (2)										Snow Fall >= Thresholds					Snow Depth >= Thresholds			
Month	Snow Fall Mean	Snow Fall Median	Snow Depth Mean	Snow Depth Median	Highest Daily Snow Fall	Year	Day	Highest Monthly Snow Fall	Year	Highest Daily Snow Depth	Year	Day	Highest Monthly Mean Snow Depth	Year	0.1	1.0	3.0	5.0	10.0	1	3	5	10
Jan	4.3	1.8	#	0	13.3	1980	5	16.6	1980	14+	1987	28	3	1987	2.3	1.1	.5	.2	.1	3.4	1.4	.7	.3
Feb	4.8	2.0	#	0	13.3	1983	11	21.6	1983	14	1979	19	3	1979	2.2	1.3	.7	.2	@	2.9	1.5	.5	.2
Mar	1.4	.0	#	0	10.6	1980	1	15.0	1980	13	1980	3	1	1980	.8	.4	.1	.1	@	.6	.3	.2	.1
Apr	.0	.0	0	0	.6	1971	7	.6	1971	#	1971	7	0	0	.1	.0	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	#	0	.0	0	0	.0	0	0	0	0	#	1997	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jun	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Jul	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Aug	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Sep	.0	.0	0	0	.0	0	0	.0	0	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Oct	#	.0	0	0	#	1979	10	#+	1979	0	0	0	0	0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Nov	.3	.0	#	0	4.5	1987	11	4.5	1987	1+	1989	23	#	1989	.2	.1	@	.0	.0	.1	.0	.0	.0
Dec	1.7	.0	#	0	6.1	1982	12	11.7	1989	5+	1982	14	1+	1989	1.0	.6	.1	@	.0	1.2	.5	.1	.0
Ann	12.5	3.8	N/A	N/A	13.3+	Feb 1983	11	21.6	Feb 1983	14+	Jan 1987	28	3+	Jan 1987	6.6	3.5	1.4	.5	.1	8.2	3.7	1.5	.6

+ 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

Complete documentation available from:

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Climate Division: VA 2

NWS Call Sign: RIC

Elevation: 164 Feet

Lat: 37°31N

Lon: 77°19W

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	4/28	4/24	4/21	4/18	4/15	4/11	4/06
32	4/21	4/16	4/12	4/09	4/06	4/03	3/31	3/28	3/22
28	4/11	4/06	4/02	3/30	3/27	3/24	3/20	3/17	3/11
24	3/28	3/21	3/17	3/12	3/08	3/05	2/28	2/23	2/17
20	3/18	3/11	3/06	3/02	2/26	2/21	2/17	2/12	2/05
16	3/05	2/24	2/18	2/12	2/07	2/02	1/27	1/21	1/12
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	10/06	10/11	10/14	10/17	10/20	10/22	10/25	10/28	11/02
32	10/15	10/20	10/24	10/27	10/30	11/02	11/05	11/09	11/14
28	10/21	10/27	11/01	11/04	11/08	11/11	11/15	11/20	11/26
24	11/04	11/12	11/17	11/21	11/25	11/30	12/04	12/09	12/16
20	11/21	11/28	12/04	12/08	12/12	12/16	12/21	12/26	1/02
16	12/04	12/12	12/18	12/23	12/28	1/01	1/06	1/12	1/20
Freeze Free Period									
Temp (F)	Probability of longer than indicated freeze free period (Days)								
	.10	.20	.30	.40	.50	.60	.70	.80	.90
36	201	194	189	185	181	176	172	167	160
32	229	221	215	210	206	201	196	191	183
28	252	243	236	231	225	220	214	207	198
24	291	281	273	267	261	255	249	242	231
20	316	307	300	294	289	283	277	271	261
16	>365	342	332	326	320	314	308	301	292

* 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

Complete documentation available from:

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COOP ID: 447201

Climate Division: VA 2 NWS Call Sign: RIC Elevation: 164 Feet Lat: 37°31N Lon: 77°19W

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	873	705	528	254	80	8	0	1	27	225	470	748	3919
60	730	575	384	132	20	0	0	0	4	137	339	608	2929
57	645	496	300	81	7	0	0	0	1	90	261	523	2404
55	586	443	247	54	3	0	0	0	0	66	213	465	2077
50	444	317	138	15	0	0	0	0	0	24	118	329	1385
32	96	41	2	0	0	0	0	0	0	0	1	42	182

Base	Cooling Degree Days (1)												
Above	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
32	222	261	513	772	1057	1266	1446	1394	1153	832	529	307	9752
55	6	11	48	148	348	576	733	681	464	169	54	14	3252
57	4	7	35	115	292	516	671	619	405	131	38	9	2842
60	2	3	20	76	213	427	578	526	319	84	21	4	2273
65	0	1	8	33	107	277	415	367	187	33	6	1	1435
70	0	0	2	8	40	156	271	223	91	9	1	0	801

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	89	130	295	542	818	1034	1210	1155	918	595	314	138	89	219	514	1056	1874	2908	4118	5273	6191	6786	7100	7238
45	44	73	187	396	663	884	1055	1000	768	442	199	77	44	117	304	700	1363	2247	3302	4302	5070	5512	5711	5788
50	18	31	104	258	508	734	900	845	618	299	112	37	18	49	153	411	919	1653	2553	3398	4016	4315	4427	4464
55	3	14	52	151	357	584	745	690	468	177	55	14	3	17	69	220	577	1161	1906	2596	3064	3241	3296	3310
60	0	1	22	80	221	435	590	535	325	87	21	2	0	1	23	103	324	759	1349	1884	2209	2296	2317	2319
Base	Growing Degree Units for Corn (Monthly)												Growing Degree Units for Corn (Accumulated Monthly)											
50/86	59	85	186	332	523	705	833	795	612	366	195	84	59	144	330	662	1185	1890	2723	3518	4130	4496	4691	4775

(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.
Complete documentation for the 1971-2000 Normals is available on the internet from:
www.ncdc.noaa.gov/oa/climate/normal/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 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.

- | | |
|---|---|
| <ol style="list-style-type: none">a. Temperature/ Precipitation Tables<ol style="list-style-type: none">1. 1971-2000 Monthly Normals2. Cooperative Summary of the Day3. National Weather Service station records4. 1971-2000 serially complete daily datab. Degree Day Table<ol style="list-style-type: none">1. Monthly and Annual Heating and Cooling Degree Days Normals to Selected Bases derived from 1971-2000 Monthly Normals2. Daily Normal Growing Degree Units to Selected Base Temperatures derived from 1971-2000 serially complete daily data | <ol style="list-style-type: none">c. Snow Tables<ol style="list-style-type: none">1. Snow Climatology2. Cooperative Summary of the Dayd. Freeze Data Table
1971-2000 serially complete daily data |
|---|---|

References

U.S. Climate Normals 1971-2000, www.ncdc.noaa.gov/normal.html
U.S. Climate Normals 1971-2000-Products Clim20, www.ncdc.noaa.gov/oa/climate/normal/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