

1999

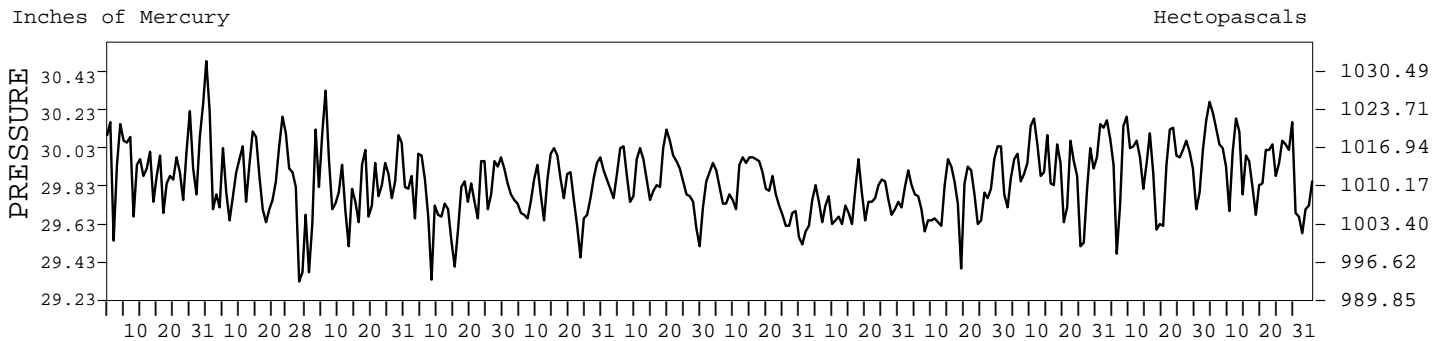
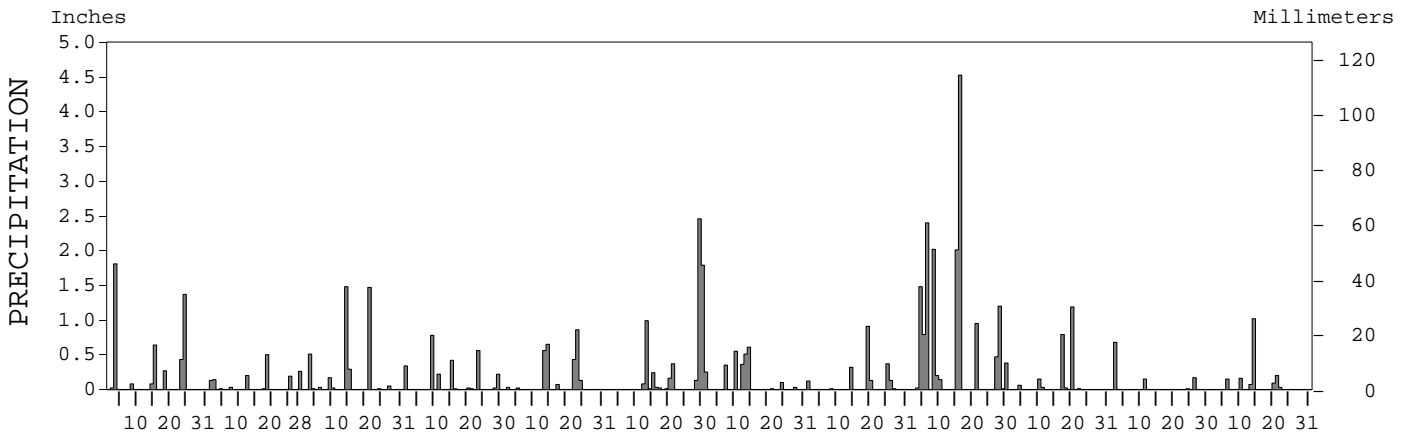
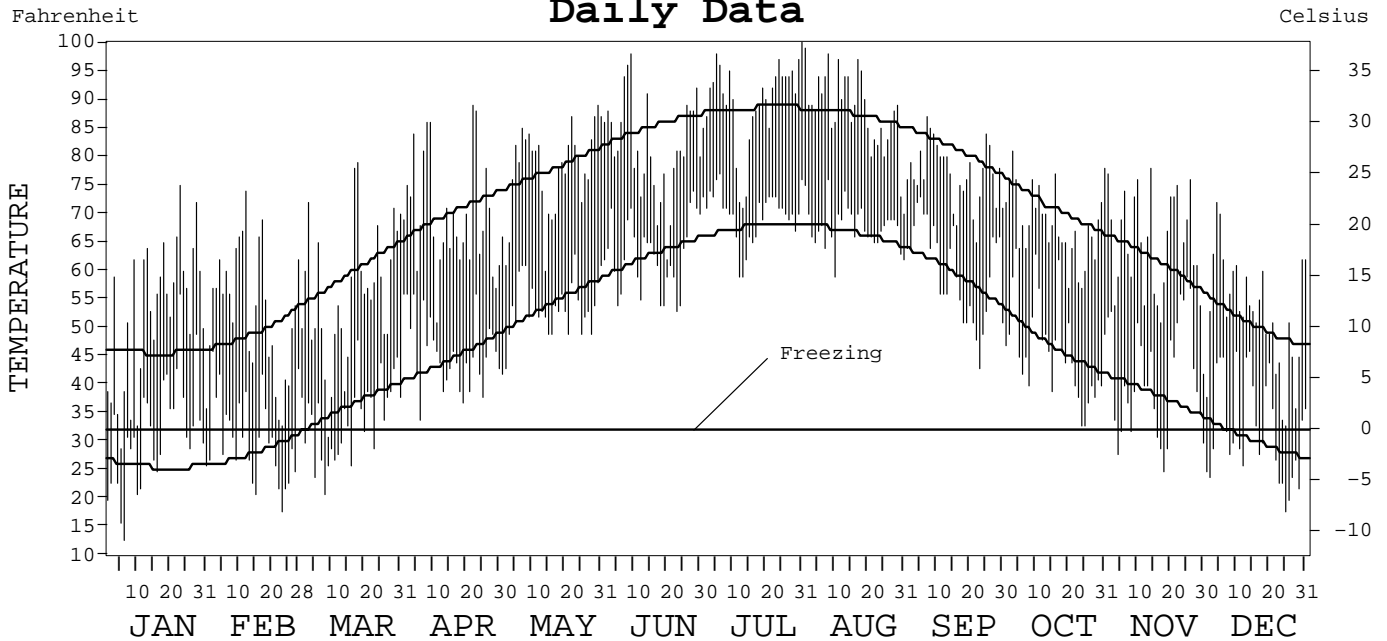
LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-5361

RICHMOND,
VIRGINIA (RIC)

Daily Data



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Thomas R. Karl

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	NATIONAL ENVIRONMENTAL AND INFORMATION SERVICE	NATIONAL SATELLITE, DATA, AND INFORMATION SERVICE	NATIONAL CLIMATIC DATA CENTER ASHEVILLE, NORTH CAROLINA	DIRECTOR NATIONAL CLIMATIC DATA CENTER
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METEOROLOGICAL DATA FOR 1999

RICHMOND, VA (RIC)

LATITUDE: 37° 30' 40" N LONGITUDE: 77° 19' 24" W ELEVATION (FT): GRND: 165 BARO: 165 TIME ZONE: EASTERN (UTC + 5) WBAN: 13740

	ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE ° F	MEAN DAILY MAXIMUM	52.4	53.4	56.1	69.6	77.5	81.8	89.4	88.0	76.9	68.2	64.4	52.5	69.2	
	HIGHEST DAILY MAXIMUM	75	74	79	89	89	98	100	99	87	81	78	72	100	
	DATE OF OCCURRENCE	23	12	18	22	30	09	31	01	07	03	14	04	JUL 31	
	MEAN DAILY MINIMUM	31.5	30.9	34.3	45.7	53.4	62.7	69.8	67.8	60.0	46.1	41.3	32.2	48.0	
	LOWEST DAILY MINIMUM	13	18	21	34	42	53	59	59	43	33	25	18	13	
	DATE OF OCCURRENCE	06	23	08	06	01	23	13+	10	23	25+	18	25	JAN 06	
	AVERAGE DRY BULB	42.0	42.2	45.2	57.7	65.5	72.3	79.6	77.9	68.5	57.2	52.9	42.4	58.6	
	MEAN WET BULB	37.6	37.3	38.1	50.7	58.5	66.1	72.5	69.9	64.3	53.5	48.5	38.1	52.9	
	MEAN DEW POINT	30.6	29.3	27.5	43.3	52.9	62.6	69.2	66.1	61.6	50.1	43.3	31.0	47.3	
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	5	19	12	0	0	0	0	0	36
	MAXIMUM ≤ 32°	1	0	1	0	0	0	0	0	0	0	0	0	0	2
	MINIMUM ≤ 32°	17	18	12	0	0	0	0	0	0	0	8	18	73	
MINIMUM ≤ 0°	0	0	0	0	0	0	0	0	0	0	0	0	0		
H/C	HEATING DEGREE DAYS	710	631	606	237	60	7	0	0	29	249	362	693	3584	
	COOLING DEGREE DAYS	1	0	0	24	82	231	460	409	140	13	2	0	1362	
RH	MEAN (PERCENT)	67	65	54	63	66	75	73	72	82	80	73	67	70	
	HOUR 01 LST	72	72	63	77	80	85	85	85	91	93	82	70	80	
	HOUR 07 LST	79	80	66	77	78	85	84	85	91	94	88	79	82	
	HOUR 13 LST	54	51	42	47	49	60	54	52	67	57	55	54	54	
	HOUR 19 LST	63	59	48	56	59	68	71	68	82	84	74	66	66	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	4	3	1	2	1	1	0	0	1	0	5	1	19	
	THUNDERSTORMS	1	1	1	3	3	3	4	7	3	0	1	0	27	
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	MIDNIGHT-MIDNIGHT: (OKTAS)														
	CEILOMETER (≤ 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
NUMBER OF DAYS WITH:															
CLEAR															
PARTLY CLOUDY															
CLOUDY															
PR	MEAN STATION PRESS. (IN.)	29.98	29.89	29.84	29.78	29.82	29.88	29.82	29.76	29.79	29.96	29.97	29.95	29.87	
	MEAN SEA-LEVEL PRESS. (IN.)	30.19	30.09	30.05	29.99	30.02	30.08	30.01	29.96		30.16	30.16	30.14		
WINDS	RESULTANT SPEED (MPH)	1.5	1.9	3.9	1.7	1.6	1.5	0.4	0.7	2.3	0.8	1.4	1.7	1.0	
	RES. DIR. (TENS OF DEGS.)	23	31	31	27	36	01	27	07	04	31	26	26	31	
	MEAN SPEED (MPH)	8.4	8.0	10.2	8.7	7.9	7.8	6.8	7.5	8.2	6.1	7.1	7.2	7.8	
	PREVAIL. DIR. (TENS OF DEGS.)	20	01	01	26	01	02	19	01	02	20	01	20	01	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	32	30	34	46	32	23	33	29	40	28	36	26	46	
	DIR. (TENS OF DEGS.)	14	19	29	33	26	21	29	02	01	34	16	36	33	
	DATE OF OCCURRENCE	03	12	04+	09	24	02	28	30	16	18	02	06	APR 09	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	40	38	43	53	37	29	44	38	51	34	46	37	53	
DIR. (TENS OF DEGS.)	14	19	29	24	25	29	29	02	01	35	16	22	24		
DATE OF OCCURRENCE	03	12	04+	23+	24	29	28	30	16	18	02	05	APR 23+		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	4.70	1.47	4.04	2.60	2.75	6.29	2.77	2.00	16.60	2.25	1.01	1.72	48.20	
	GREATEST 24-HOUR (IN.)	1.83	0.51	1.66	0.78	1.29	4.13	0.87	1.04	6.52	1.19	0.68	1.05	6.52	
	DATE OF OCCURRENCE	02-03	17-18	14-15	09	22-23	29-30	12-13	19-20	15-16	20	02	13-14	SEP 15-16	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	8	9	10	10	8	12	9	8	14	7	4	7	106	
PRECIPITATION ≥ 0.10	5	6	5	6	5	7	7	6	12	3	3	4	69		
PRECIPITATION ≥ 1.00	2	0	2	0	0	2	0	0	6	1	0	1	14		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)														
	GREATEST 24-HOUR (IN.)														
	DATE OF OCCURRENCE														
	MAXIMUM SNOW DEPTH (IN.)														
	DATE OF OCCURRENCE														
NUMBER OF DAYS WITH:															
SNOWFALL ≥ 1.0															

NORMALS, MEANS, AND EXTREMES

RICHMOND, VA (RIC)

LATITUDE: 37° 30' 40" N LONGITUDE: 77° 19' 24" W ELEVATION (FT): GRND: 165 BARO: 165 TIME ZONE: EASTERN (UTC + 5) WBAN: 13740

ELEMENT		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	45.7	49.2	59.5	70.0	77.8	85.1	88.4	87.1	80.9	70.7	61.3	50.2	68.8
	MEAN DAILY MAXIMUM	79	47.4	50.2	58.8	69.3	77.6	85.1	88.4	86.5	80.9	70.6	60.3	50.0	68.8
	HIGHEST DAILY MAXIMUM	70	80	83	93	96	100	104	105	102	103	99	86	81	105
	YEAR OF OCCURRENCE		1950	1932	1938	1990	1941	1952	1977	1983	1954	1941	1993	1998	JUL 1977
	MEAN OF EXTREME MAXS.	79	69.3	71.1	80.2	87.8	91.1	96.0	97.5	95.9	93.3	85.5	77.8	70.0	84.6
	NORMAL DAILY MINIMUM	30	25.7	28.1	36.3	44.6	54.2	62.7	67.5	66.4	59.0	46.5	37.9	29.9	46.6
	MEAN DAILY MINIMUM	79	28.4	30.0	36.6	45.4	54.7	63.5	68.1	66.6	60.1	47.8	38.4	30.9	47.5
	LOWEST DAILY MINIMUM	70	-12	-10	11	23	31	40	51	46	35	21	10	-1	-12
	YEAR OF OCCURRENCE		1940	1936	1960	1985	1956	1967	1965	1934	1974	1962	1933	1942	JAN 1940
	MEAN OF EXTREME MINS.	79	10.3	14.1	21.5	30.8	41.0	50.9	57.9	55.6	45.4	32.4	22.8	14.6	33.1
	NORMAL DRY BULB	30	35.7	38.7	48.0	57.3	66.0	73.9	78.0	76.8	70.0	58.6	49.6	40.1	57.7
	MEAN DRY BULB	79	38.0	40.1	47.7	57.4	66.2	74.3	78.2	76.6	70.5	59.2	49.4	40.4	58.2
	MEAN WET BULB	15	34.2	36.5	41.9	50.4	59.3	67.1	71.8	65.5	63.7	53.7	44.8	37.0	52.2
	MEAN DEW POINT	15	27.4	28.8	33.8	42.8	54.1	62.8	68.4	62.4	60.0	48.9	38.6	30.3	46.5
	NORMAL NO. DAYS WITH:														
MAXIMUM ≥ 90°	30	0.0	0.0	0.1	0.8	2.3	8.7	13.8	11.0	4.1	0.3	0.0	0.0	41.1	
MAXIMUM ≤ 32°	30	4.3	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	7.6	
MINIMUM ≤ 32°	30	23.0	19.5	10.8	2.3	0.1	0.0	0.0	0.0	0.0	2.1	9.4	19.2	86.4	
MINIMUM ≤ 0°	30	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	
H/C	NORMAL HEATING DEG. DAYS	30	908	736	527	241	61	0	0	0	23	233	462	772	3963
	NORMAL COOLING DEG. DAYS	30	0	0	0	10	92	270	403	366	173	34	0	0	1348
RH	NORMAL (PERCENT)	30	68	66	63	61	70	72	75	77	77	74	69	69	70
	HOUR 01 LST	30	75	73	72	73	83	86	88	90	90	86	79	76	81
	HOUR 07 LST	30	79	78	78	76	81	83	86	90	90	89	84	80	83
	HOUR 13 LST	30	56	53	49	45	52	54	57	58	57	52	51	55	53
	HOUR 19 LST	30	65	62	57	53	63	66	69	74	77	75	68	68	66
S	PERCENT POSSIBLE SUNSHINE	46	54	58	62	66	65	69	68	66	65	63	59	54	62
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	71	2.7	2.1	1.7	1.6	1.8	1.5	2.0	2.4	2.9	3.3	2.2	2.8	27.0
	THUNDERSTORMS	63	0.2	0.4	1.6	2.4	5.3	6.6	8.4	6.1	2.9	1.0	0.6	0.2	35.7
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	1			5.6		5.6	3.2							
	MIDNIGHT-MIDNIGHT (OKTAS)	1			5.6										
	MEAN NO. DAYS WITH:														
CLEAR	1	2.0	1.0	9.0		9.0	10.0								
PARTLY CLOUDY	1		1.0	5.0		4.0	8.0								
CLOUDY	1	7.0	4.0	10.0		8.0	1.0								
PR	MEAN STATION PRESSURE (IN)	26	29.91	29.89	29.85	29.81	29.81	29.81	29.83	29.86	29.89	29.92	29.92	29.93	29.87
	MEAN SEA-LEVEL PRES. (IN)	15	30.12	30.09	30.06	29.98	30.00	29.99	30.01	30.04	30.08	30.12	30.13	30.14	30.06
WINDS	MEAN SPEED (MPH)	41	8.3	8.7	9.3	9.2	7.9	7.5	7.1	6.6	7.0	7.2	7.7	7.9	7.9
	PREVAIL. DIR (TENS OF DEGS)	24	01	01	36	19	18	19	19	18	36	36	36	36	19
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	4	38	39	37	46	41	44	33	44	40	37	36	40	46
	DIR. (TENS OF DEGS)		22	23	22	33	30	21	29	36	01	10	16	15	33
	YEAR OF OCCURRENCE		1996	1997	1996	1999	1997	1998	1999	1996	1999	1996	1999	1996	APR 1999
	MAXIMUM 5-SECOND:														
SPEED (MPH)	4	46	49	49	56	60	53	44	52	53	46	46	48	60	
DIR. (TENS OF DEGS)		21	26	22	25	28	21	29	10	08	10	16	16	28	
YEAR OF OCCURRENCE		1996	1997	1996	1998	1996	1998	1999	1996	1996	1996	1999	1996	MAY 1996	
PRECIPITATION	NORMAL (IN)	30	3.24	3.16	3.61	2.96	3.84	3.62	5.03	4.40	3.34	3.53	3.17	3.26	43.16
	MAXIMUM MONTHLY (IN)	62	7.97	5.97	8.65	7.31	8.87	9.24	18.87	14.10	16.60	9.39	7.64	7.07	18.87
	YEAR OF OCCURRENCE		1978	1979	1984	1987	1972	1938	1945	1955	1999	1971	1959	1973	JUL 1945
	MINIMUM MONTHLY (IN)	62	0.64	0.48	0.94	0.64	0.87	0.38	0.51	0.52	0.26	0.30	0.36	0.40	0.26
	YEAR OF OCCURRENCE		1981	1978	1966	1963	1965	1980	1983	1943	1978	1963	1965	1980	SEP 1978
	MAXIMUM IN 24 HOURS (IN)	62	3.31	2.67	3.43	2.97	3.08	4.61	5.73	8.79	6.52	6.50	4.07	3.16	8.79
	YEAR OF OCCURRENCE		1962	1979	1992	1987	1981	1963	1969	1955	1999	1961	1956	1958	AUG 1955
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	10.4	9.4	10.2	9.0	10.7	9.6	10.4	9.5	7.6	7.0	8.0	9.1	110.9	
PRECIPITATION ≥ 1.00	30	0.8	0.7	0.8	0.6	1.0	0.9	1.4	1.3	1.0	1.2	0.8	0.7	11.2	
SNOWFALL	NORMAL (IN)	30	5.8	5.5	2.4	0.1	0.0	0.0	0.0	0.0	T	0.3	2.2	16.3	
	MAXIMUM MONTHLY (IN)	60	28.5	21.4	19.7	2.0	T	0.0	0.0	0.0	0.0	T	7.3	12.5	28.5
	YEAR OF OCCURRENCE		1940	1983	1960	1940	1994					1979	1953	1958	JAN 1940
	MAXIMUM IN 24 HOURS (IN)	60	21.6	16.8	12.1	2.0	T	0.0	0.0	0.0	0.0	T	7.3	7.5	21.6
	YEAR OF OCCURRENCE		1940	1983	1962	1940	1994					1979	1953	1966	JAN 1940
	MAXIMUM SNOW DEPTH (IN)	76	18	20	13	1	0	0	0	0	0	0	6	9	20
	YEAR OF OCCURRENCE		1922	1922	1980	1964							1938	1958	FEB 1922
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	1.5	1.4	0.6	0.*	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	4.3	

PRECIPITATION (inches) 1999 RICHMOND, VA (RIC)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	1.32	2.37	3.70	2.84	1.84	1.12	4.74	1.69	1.02	1.55	3.10	3.00	28.29
1971	1.84	4.37	2.68	1.76	6.82	4.10	4.40	3.73	2.35	9.39	2.76	0.75	44.95
1972	1.43	5.15	2.11	3.35	8.87	8.82	5.80	3.84	3.35	7.89	5.82	2.91	59.34
1973	2.66	3.11	3.44	4.58	3.56	2.45	3.64	4.34	1.82	2.56	1.27	7.07	40.50
1974	3.21	2.54	3.79	1.58	3.02	1.80	2.25	6.84	4.83	0.39	1.23	4.22	35.70
1975	5.71	2.96	8.04	2.78	2.59	4.00	12.29	2.31	10.98	3.10	2.04	4.51	61.31
1976	3.39	1.35	2.14	1.08	3.76	2.85	2.63	1.35	4.78	6.99	1.88	2.56	34.76
1977	2.22	1.34	2.67	2.33	3.99	1.25	4.20	6.15	2.16	7.88	4.32	5.57	44.08
1978	7.97	0.48	5.67	4.31	3.92	5.26	4.24	5.93	0.26	1.21	4.57	3.80	47.62
1979	6.16	5.97	2.59	3.97	3.80	2.42	4.36	7.08	9.76	3.87	5.50	1.64	57.12
1980	6.05	1.01	5.49	4.28	4.68	0.38	5.18	2.15	2.37	6.96	2.18	0.40	41.13
1981	0.64	2.76	1.52	2.96	6.62	3.69	4.01	2.89	2.70	2.36	0.68	5.04	35.87
1982	2.76	4.44	3.74	2.97	3.48	3.97	9.21	4.39	2.55	2.90	2.70	3.37	46.48
1983	1.59	3.95	6.04	5.21	2.50	5.46	0.51	0.97	3.05	4.02	5.63	4.50	43.43
1984	3.98	3.97	8.65	5.92	4.52	2.01	3.55	4.58	1.86	2.14	3.34	1.52	46.04
1985	3.54	3.20	1.80	0.65	2.36	4.01	5.31	10.58	4.97	5.09	6.99	0.58	49.08
1986	2.69	2.67	1.16	1.16	3.15	1.30	7.01	6.75	0.63	2.43	2.46	5.15	36.56
1987	5.53	2.57	1.65	7.31	2.94	6.29	1.20	1.11	4.43	1.25	3.13	2.86	40.27
1988	2.53	3.08	1.98	2.55	4.81	2.25	7.50	2.95	1.74	2.74	4.34	0.79	37.26
1989	1.88	4.34	5.00	4.27	5.02	5.85	4.00	4.89	5.33	3.54	3.00	2.62	49.74
1990	2.84	2.38	2.54	2.81	6.85	0.97	6.74	5.76	1.92	3.90	1.70	3.52	41.93
1991	3.62	1.09	5.87	0.87	0.91	6.24	3.47	3.32	2.69	2.50	0.67	4.53	35.78
1992	1.57	2.89	5.87	2.21	4.95	2.28	5.68	6.40	2.35	1.94	2.62	2.79	41.55
1993	4.48	2.88	7.24	3.23	4.66	1.75	1.91	3.89	2.97	2.23	3.24	3.77	42.25
1994	3.10	4.38	7.92	2.70	2.49	1.73	7.46	2.54	3.99	2.56	3.99	0.95	43.81
1995	3.15	1.14	3.00	1.98	4.33	1.85	2.89	2.59	3.82	5.11	2.87	1.71	34.44
1996	4.65	2.97	2.71	2.88	3.18	4.35	6.51	4.40	6.87	7.18	3.52	4.91	54.13
1997	1.93	3.71	2.96	3.94	1.36	2.21	4.85	1.41	0.82	3.25	5.33	2.36	34.13
1998	6.85	5.76	6.72	4.32	3.72	4.41	2.37	1.89	3.94	0.47	1.30	5.00	46.75
1999	4.70	1.47	4.04	2.60	2.75	6.29	2.77	2.00	16.60	2.25	1.01	1.72	48.20
POR= 62 YRS	3.21	3.01	3.74	2.97	3.69	3.62	5.22	4.55	3.73	3.30	3.09	3.13	43.26

WBAN : 13740

AVERAGE TEMPERATURE (°F) 1999 RICHMOND, VA (RIC)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	30.1	37.1	42.9	58.2	69.1	75.7	78.3	78.0	74.8	62.9	49.9	40.4	58.1
1971	33.8	39.5	44.5	55.0	63.3	74.7	76.6	75.3	71.4	64.6	48.5	48.0	57.9
1972	40.7	37.6	47.2	56.2	64.6	70.1	77.1	75.2	70.1	55.8	47.9	45.9	57.4
1973	37.6	38.5	52.6	57.9	65.1	76.0	77.4	77.5	72.3	60.6	51.3	40.8	59.0
1974	45.8	40.1	50.4	59.9	65.8	70.6	76.9	75.7	67.4	55.4	48.5	41.7	58.2
1975	40.7	41.4	45.3	52.9	67.7	73.6	76.0	78.8	69.3	62.5	53.6	40.0	58.5
1976	35.1	48.5	52.6	60.5	65.2	74.6	77.3	75.7	68.7	54.4	42.7	36.7	57.7
1977	25.3	40.5	53.7	61.1	68.2	73.0	81.4	79.8	74.2	57.3	52.3	39.5	58.9
1978	33.4	30.3	44.5	57.3	65.5	74.7	77.5	80.1	72.9	58.3	52.5	42.5	57.5
1979	36.4	28.6	51.1	58.4	67.1	70.8	76.9	77.8	71.0	58.3	53.3	42.3	57.7
1980	38.8	36.0	47.4	61.1	68.3	72.8	80.0	80.7	74.7	56.9	46.2	38.6	58.5
1981	31.2	42.2	44.6	60.6	64.1	77.9	79.6	75.1	69.4	56.4	49.1	38.0	57.4
1982	31.6	41.7	49.1	55.9	70.4	73.4	78.6	75.0	69.8	59.2	51.9	46.1	58.6
1983	37.8	39.1	50.4	56.1	66.1	75.6	79.4	77.7	68.8	58.1	49.0	36.2	57.9
1984	32.6	44.5	43.6	55.8	65.4	77.7	76.0	77.0	67.5	66.1	46.6	47.7	58.4
1985	32.6	40.2	49.7	62.0	68.0	74.3	79.0	77.5	70.8	62.6	56.6	37.8	59.3
1986	36.2	39.3	50.0	59.2	66.9	76.1	80.9	74.2	70.8	61.8	49.1	40.9	58.8
1987	34.7	37.0	47.1	54.3	67.3	75.8	81.3	78.5	72.3	52.9	51.3	43.0	58.0
1988	32.3	39.1	47.9	56.0	65.8	72.8	79.9	79.8	68.4	53.6	50.6	39.2	57.1
1989	42.3	39.6	47.9	55.8	64.1	76.1	77.7	75.3	70.8	60.2	49.3	31.3	57.5
1990	46.3	48.0	52.1	57.9	65.8	75.0	79.9	76.3	69.5	63.1	52.6	46.3	61.1
1991	40.2	44.0	50.8	60.2	72.1	75.3	80.7	78.6	71.6	59.9	49.6	44.3	60.6
1992	40.7	42.7	47.2	57.8	61.7	70.8	79.5	73.7	70.3	56.3	50.6	40.9	57.7
1993	41.4	37.8	45.9	55.9	67.7	75.0	82.5	78.5	72.5	58.6	50.9	39.0	58.8
1994	33.4	40.2	48.9	63.2	63.2	78.0	81.1	75.4	69.2	57.6	52.6	45.6	59.0
1995	40.7	38.7	50.2	58.1	65.8	74.1	80.8	78.9	69.1	61.1	44.2	35.6	58.1
1996	34.1	37.8	43.2	57.9	64.8	75.1	76.4	74.3	70.1	58.9	43.2	43.8	56.6
1997	37.7	43.7	49.6	53.6	62.9	71.4	77.8	75.8	70.3	58.9	46.5	39.9	57.3
1998	43.2	44.2	48.5	58.0	67.4	74.0	78.3	78.3	74.2	59.7	49.5	44.2	60.0
1999	42.0	42.2	45.2	57.7	65.5	72.3	79.6	77.9	68.5	57.2	52.9	42.4	58.6
POR= 70 YRS	37.6	39.7	47.3	57.2	66.2	74.2	78.1	76.4	70.2	58.8	49.1	40.1	57.9

HEATING DEGREE DAYS (base 65°F) 1999 RICHMOND, VA (RIC)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	0	0	12	124	445	756	960	709	627	295	104	3	4035
1971-72	0	0	11	69	512	526	748	788	554	286	58	21	3573
1972-73	0	0	17	285	513	588	843	735	394	247	79	0	3701
1973-74	0	0	5	163	414	744	589	691	455	204	75	5	3345
1974-75	0	0	62	310	513	715	746	654	604	368	44	1	4017
1975-76	0	0	27	121	356	770	917	480	386	227	78	11	3373
1976-77	0	1	15	332	660	869	1227	680	366	176	42	7	4375
1977-78	0	0	4	259	401	784	974	964	627	235	88	5	4341
1978-79	0	0	16	214	366	694	876	1011	439	218	44	4	3882
1979-80	0	0	8	242	353	698	806	835	541	135	47	2	3667
1980-81	0	0	14	267	557	813	1042	633	626	171	107	0	4230
1981-82	0	1	29	273	473	834	1029	645	486	280	6	1	4057
1982-83	0	6	10	213	399	585	836	718	445	282	69	2	3565
1983-84	0	1	86	236	475	887	994	589	657	282	93	3	4303
1984-85	0	0	73	57	546	531	997	692	484	177	35	5	3597
1985-86	0	0	31	114	257	838	886	713	465	187	78	3	3572
1986-87	0	16	24	172	476	741	931	777	550	317	57	0	4061
1987-88	0	0	5	370	409	677	1008	746	527	279	79	32	4132
1988-89	0	0	27	361	425	794	696	709	546	293	108	0	3959
1989-90	0	3	38	181	468	1036	574	472	436	258	50	3	3519
1990-91	0	0	33	146	365	574	762	582	443	193	27	1	3126
1991-92	0	0	25	190	458	637	749	640	545	261	142	10	3657
1992-93	0	0	37	275	427	739	724	757	585	280	24	0	3848
1993-94	0	0	26	213	436	799	973	687	497	130	120	0	3881
1994-95	0	0	11	232	365	595	750	731	453	236	72	1	3446
1995-96	0	0	28	166	620	905	952	782	669	247	122	8	4499
1996-97	0	0	10	193	652	654	840	589	472	337	117	45	3909
1997-98	0	0	19	247	547	771	667	575	536	232	50	7	3651
1998-99	0	0	10	173	457	652	710	631	606	237	60	7	3543
1999-	0	0	29	249	362	693							

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COOLING DEGREE DAYS (base 65°F) 1999 RICHMOND, VA (RIC)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	0	0	0	35	185	328	418	410	313	67	0	0	1756
1971	0	0	0	0	56	297	367	327	209	62	22	5	1345
1972	0	0	7	30	52	180	381	326	178	9	8	0	1171
1973	0	0	13	42	91	338	391	395	231	32	9	2	1544
1974	0	0	10	58	106	180	377	340	141	21	26	0	1259
1975	0	0	0	16	135	267	348	433	165	51	18	0	1433
1976	0	8	9	99	91	307	389	337	133	12	0	0	1385
1977	0	0	22	66	148	258	513	467	289	24	27	0	1814
1978	0	0	0	12	112	302	393	475	263	15	0	1	1573
1979	0	0	16	30	117	188	374	404	195	42	9	0	1375
1980	0	0	1	25	157	243	472	494	313	23	1	0	1729
1981	0	0	1	45	89	395	458	319	169	16	0	0	1492
1982	0	0	0	13	181	259	428	323	157	43	13	7	1424
1983	0	0	0	23	108	325	452	405	207	27	0	0	1547
1984	0	0	0	10	114	392	346	381	154	100	0	2	1499
1985	0	4	20	94	139	290	441	392	213	51	10	0	1654
1986	0	0	8	19	142	344	498	308	205	79	6	0	1609
1987	0	0	0	2	136	329	513	427	227	0	3	0	1637
1988	0	0	3	16	108	269	466	465	137	12	0	0	1476
1989	0	3	24	27	88	341	403	331	218	42	4	0	1481
1990	0	1	43	51	81	312	470	356	177	96	0	2	1589
1991	0	0	10	53	254	316	494	428	227	40	3	0	1825
1992	0	0	0	51	48	192	457	275	202	12	3	0	1240
1993	0	0	0	14	112	307	547	426	261	20	18	0	1705
1994	0	0	5	80	70	396	507	332	142	9	2	2	1545
1995	1	0	0	35	105	281	495	437	157	52	3	0	1566
1996	0	0	0	40	123	315	360	293	173	12	0	0	1316
1997	0	0	4	2	59	244	406	341	182	65	0	0	1303
1998	2	0	32	26	131	282	420	418	292	15	0	12	1630
1999	1	0	0	24	82	231	460	409	140	13	2	0	1362

SNOWFALL (inches) 1999 RICHMOND, VA (RIC)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	0.0	0.0	0.0	0.0	0.0	0.9	3.3	2.0	8.4	0.6	0.0	0.0	15.2
1971-72	0.0	0.0	0.0	0.0	T	0.0	T	13.7	0.0	T	0.0	0.0	13.7
1972-73	0.0	0.0	0.0	T	0.6	0.0	4.3	0.4	1.4	0.0	0.0	0.0	6.7
1973-74	0.0	0.0	0.0	0.0	0.0	9.9	T	5.0	T	0.0	0.0	0.0	14.9
1974-75	0.0	0.0	0.0	0.0	0.0	T	2.7	2.9	0.4	0.0	0.0	0.0	6.0
1975-76	0.0	0.0	0.0	0.0	0.0	T	0.2	T	1.0	0.0	0.0	0.0	1.2
1976-77	0.0	0.0	0.0	0.0	1.0	1.7	11.1	T	0.0	0.0	0.0	0.0	13.8
1977-78	0.0	0.0	0.0	0.0	T	T	1.3	5.1	5.0	0.0	0.0	0.0	11.4
1978-79	0.0	0.0	0.0	0.0	0.0	0.0	0.7	19.5	T	0.0	0.0	0.0	20.2
1979-80	0.0	0.0	0.0	T	0.0	T	16.6	7.0	15.0	0.0	0.0	0.0	38.6
1980-81	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.2	0.0	0.0	0.0	1.0
1981-82	0.0	0.0	0.0	0.0	T	1.9	8.3	10.8	T	0.2	0.0	0.0	21.2
1982-83	0.0	0.0	0.0	0.0	0.0	7.9	0.1	21.4	0.0	T	0.0	0.0	29.4
1983-84	0.0	0.0	0.0	0.0	0.1	T	1.1	2.8	0.3	0.0	0.0	0.0	4.3
1984-85	0.0	0.0	0.0	0.0	0.0	T	8.3	T	T	0.0	0.0	0.0	8.3
1985-86	0.0	0.0	0.0	0.0	0.0	1.3	3.3	4.4	T	T	0.0	0.0	9.0
1986-87	0.0	0.0	0.0	0.0	0.0	0.0	15.8	5.3	0.7	T	0.0	0.0	21.8
1987-88	0.0	0.0	0.0	0.0	4.5	T	8.1	T	T	T	0.0	0.0	12.6
1988-89	0.0	0.0	0.0	0.0	0.0	1.8	T	13.6	T	T	T	0.0	15.4
1989-90	0.0	0.0	0.0	0.0	1.1	9.9	0.0	T	T	0.2	0.0	0.0	11.2
1990-91	0.0	0.0	0.0	0.0	0.0	T	T	1.9	T	0.0	0.0	0.0	1.9
1991-92	0.0	0.0	0.0	0.0	0.1	T	0.0	0.8	T	T	0.0	0.0	0.9
1992-93	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.3	3.5	T	0.0	0.0	9.3
1993-94	0.0	0.0	0.0	0.0	0.0	5.1	2.2	1.7	0.7	0.0	T	0.0	9.7
1994-95	0.0	0.0	0.0	0.0	0.0	T	3.1	T	0.8	0.0	0.0	0.0	3.9
1995-96	0.0	0.0	0.0	0.0	T		12.3						
1996-97					T	1.0	0.7	1.0	T	T	0.0	0.0	
1997-98	0.0	0.0	0.0	0.0									
1998-99													
1999-													
POR= 59 YRS	0.0	0.0	0.0	T	0.4	2.0	4.7	3.9	2.4	0.1	T	0.0	13.5

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REFERENCE NOTES:

<p>PAGE 1: THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).</p> <p>PAGE 2 AND 3: H/C INDICATES HEATING AND COOLING DEGREE DAYS. RH INDICATES RELATIVE HUMIDITY W/O INDICATES WEATHER AND OBSTRUCTIONS S INDICATES SUNSHINE. PR INDICATES PRESSURE. CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS(OKTAS).</p> <p>GENERAL: T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE. + INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES. BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA. NORMALS ARE 30-YEAR AVERAGES (1961 - 1990). ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM. PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH. POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING. WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED. 0.* OR * INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05. CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET. THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD.</p>	<p>GENERAL CONTINUED: CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED. WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65° F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY.</p> <p>ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTHS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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1999
RICHMOND,
VIRGINIA (RIC)

Richmond is located in east-central Virginia at the head of navigation on the James River and along a line separating the Coastal Plains (Tidewater Virginia) from the Piedmont. The Blue Ridge Mountains lie about 90 miles to the west and the Chesapeake Bay 60 miles to the east. Elevations range from a few feet above sea level along the river to a little over 300 feet in parts of the western section of the city.

The climate might be classified as modified continental. Summers are warm and humid and winters generally mild. The mountains to the west act as a partial barrier to outbreaks of cold, continental air in winter. The cold winter air is delayed long enough to be modified, then further warmed as it subsides in its approach to Richmond. The open waters of the Chesapeake Bay and Atlantic Ocean contribute to the humid summers and mild winters. The coldest weather normally occurs in late December and January, when low temperatures usually average in the upper 20s, and the high temperatures in the upper 40s. Temperatures seldom lower to zero, but there have been several occurrences of below zero temperatures. Summertime high temperatures above 100 degrees are not uncommon, but do not occur every year.

Precipitation is rather uniformly distributed throughout the year. However, dry periods lasting several weeks do occur, especially in autumn when long periods of pleasant, mild weather are most common. There is considerable variability in total monthly amounts from year to year. Snow usually remains on the ground only one or two days at a time. Ice storms (freezing rain or glaze) are not uncommon, but they are seldom severe enough to do any considerable damage. A notable exception was the spectacular glaze storm of January 27-28, 1943, when nearly 1 inch of ice accumulation caused heavy damage to trees and overhead transmission lines.

The James River reaches tidewater at Richmond where flooding may occur in every month of the year, most frequently in March and least in July. Hurricanes and tropical storms have been responsible for most of the flooding during the summer and early fall months. Hurricanes passing near Richmond have produced record rainfalls. In 1955, three hurricanes brought record rainfall to Richmond within a six-week period. The most noteworthy of these were Hurricanes Connie and Diane that brought heavy rains five days apart.

Damaging storms occur mainly from snow and freezing rain in winter and from hurricanes, tornadoes, and severe thunderstorms in other seasons. Damage may be from wind, flooding, or rain, or from any combination of these. Tornadoes are infrequent but some notable occurrences have been observed within the Richmond area.

Based on the 1951-1980 period, the average first occurrence of 32 degrees Fahrenheit in the fall is October 26 and the average last occurrence in the spring is April 10.

STATION LOCATION

RICHMOND, VIRGINIA

LOCATION	OCCUPIED FROM	OCCUPIED TO	AIRLINE DISTANCES AND DIRECTIONS FROM PREVIOUS LOCATION	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE											AUCI T O M A T I C O M P U T E R I Z E D E L E V A T I O N S * *	* Type M = AMOS T = AUTOB S = ASOS W = AWOS	REMARKS
						SEA LEVEL	GROUND												
							G E O I D E O L O G Y	W I N D	E M E R S O N	E M E R S O N	P R E S E N T	S U R F A C E	T E R R A C E	R A I N	W E E T I N G	8 I N C H			
CITY - - NOTE: For period January 1880 through May 31, 1900, refer to previous editions.																			
Times Building 10th & Bank Streets	5/31/00	6/30/05	1/8 mi. NE	37°32'	77°27'	115	92	82	82					76		76			
Mutual Assurance Bldg. Ninth & Main Streets	6/30/05	1/30/10	1/8 mi. SW			104	154	145	145					138		138			
Weather Bureau Building Chimborazo Park 3301 E Broad Street	1/30/10	7/01/53	1-1/2 mi. E	37°32'	77°25'	162	53	11	11					3	A4	3		Climatological observations were continuous at City Office sites 10/5/97 through 6/30/53. A - At this site 9/24/42 to 4/19/46 and after 6/1/50.	
AIRPORT WB-CAA Building	7/15/25	9/24/42	None	37°30'	77°20'	158	#	5	5							3		CAA to 8/3/30. WBAS 8/3/30 to 5/26/35 and 7/14/38 to 9/24/42. # - 40 feet 8/3/30 to 5/26/35, estimated 40 feet 5/26/35 to 7/14/38 and estimated 50 feet to 9/24/42.	
Army Hangar (Operations Annex)	9/24/42	4/19/46	1/2 mi. NNW	37°30'	77°20'	156	55	5	5							3		AF operation.	
Old Airport Administration Bldg.	4/19/46	6/01/50	1/3 mi. SSE	37°30'	77°20'	156	46	5	5							4		WBAS reopened.	
Byrd Field + New Terminal Building + R.E. Byrd International Airport effective 2/18/71 ++	6/01/50	8/19/88	4/5 mi. N	37°30'	77°20'	c164	b20 g33	d6	d6	%60 j30	e19	f19	e19	a4 h4 l4	NA M			a - Installed 2700 feet ENE of thermometer site 6/26/59. b - 67 feet to 1/11/61. c - 162 feet to 6/26/59. d - Discontinued 6/26/59. e - 3 feet to 10/9/69. f - Commissioned 11/19/63. g - Installed on roof 1/1/80. h - Minor move 12/2/82. i - Type change 7/8/84. M - ASOS installed 10/1985. j - Type change 11/12/85. k - Inactive summer 1985 until relocated 12/10/85. l - Not moved 8/19/88, other instruments moved 8/20-31/88.	
++ Richmond International Airport effective 9/22/85.																			
Executive Terminal Richmond International Airport	8/19/88	10/01/95	1/4 mi. N	37°31'	77°20'	164	k33	NA	NA	NA	3	3	3	k4	M				
R.E. Byrd International Airport	10/01/95	Present	NA	37°31'	77°19'	165										S		ASOS Commissioned 10/01/95	

SUBSCRIPTION: Price and ordering information available through: National Climatic Data Center, Federal Building, Asheville, North Carolina 28801.
INQUIRIES/COMMENTS CALL: (828) 271-4800

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