



JULY 1998

LOCAL CLIMATOLOGICAL DATA

NOAA, National Climatic Data Center

RICHMOND, VA

R.E.BYRD INTERNATIONAL AP. (RIC)
 Lat: 37°30' N Long: 77°19' W Elev (Ground): 164 Feet
 Time Zone: EASTERN WBAN: 13740 ISSN #:0198-537X

JULY 1998
RICHMOND, VA

DATE	TEMPERATURE °F							DEG DAYS BASE 65°		WEATHER	SNOW/ICE ON GND(IN)		PRECIPITATION (INCHES)		PRESSURE (INCHES OF HG)		WIND SPEED = MPH DIR = TENS OF DEGREES								DATE																															
	MAXIMUM	MINIMUM	AVERAGE	DEP FROM NORMAL	AVERAGE DEW PT	AVERAGE WET BULB	HEATING	COOLING	0700 LST		1300 LST	2400 LST	2400 LST	AVERAGE STATION	AVERAGE SEA LEVEL	RESULTANT SPEED	RES DIR	AVERAGE SPEED	MAXIMUM																																					
																			5-SEC		2-MIN																																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																	
01	88	70	79	2	62	68	0	14					0.00	29.61	29.81	7.9	31	8.5	26	30	17	34	01																																	
02	87	65	76	-1	63	67	0	11	TSRA RA BR				0.24	29.83	30.03	2.2	03	3.8	30	11	26	13	02																																	
03	85	65	75	-2	64	68	0	10	BR HZ				0.00	29.87	30.07	2.0	12	3.3	10	12	8	14	03																																	
04	91	69	80	3	68	72	0	15	TSRA RA BR HZ				0.05	29.74	29.94	3.7	23	6.2	22	23	17	24	04																																	
05	85	70	78	1	66	70	0	13	RA BR HZ				0.01	29.79	29.99	6.2	02	7.1	18	01	16	01	05																																	
06	85	65	75	-2	64	68	0	10					0.00	29.91	30.11	3.6	11	5.0	18	13	14	13	06																																	
07	86	63	75	-3	64	68	0	10	BR				0.00	29.87	30.07	3.5	13	4.8	16	04	14	13	07																																	
08	87	68	78	0	71	73	0	13	RA BR HZ				0.13	29.70	29.90	4.6	20	7.7	21	23	16	24	08																																	
09	85	69	77	-1	70	72	0	12	TSRA RA BR HZ				0.12	29.71	29.91	4.8	05	7.9	32*	03	26	03	09																																	
10	88	68	78	0	67	70	0	13	TSRA RA BR HZ				0.76	29.70	29.90	4.1	36	6.3	24	04	20	05	10																																	
11	82	63	73	-5	57	63	0	8					0.00	29.80	30.00	5.9	02	6.9	16	03	14	03	11																																	
12	82	60*	71*	-7	59	64	0	6					0.00	29.83	30.03	1.8	08	3.8	13	10	10	10	12																																	
13	86	61	74	-4	62	66	0	9					0.00	29.87	30.07	6.1	16	6.9	20	13	17	15	13																																	
14	86	63	75	-3	63	67	0	10					0.00	29.89	30.09	5.1	16	6.2	17	14	15	14	14																																	
15	86	67	77	-1	69	72	0	12					0.00	29.86	30.06	3.1	10	3.5	11	09	9	09	15																																	
16	88	72	80	2	73	75	0	15	RA BR				T	29.76	29.96	3.3	12	4.4	18	13	16	13	16																																	
17	90	75	83	5	74	76	0	18	RA BR HZ				0.40	29.65	29.85	2.7	33	4.8	15	32	13	33	17																																	
18	88	71	80	2	63	69	0	15					0.00	29.74	29.94	6.4	35	7.0	23	33	15	35	18																																	
19	93	67	80	2	70	73	0	15	RA BR HZ				0.01	29.79	29.99	6.1	19	7.0	22	22	20	23	19																																	
20	98	75	87	9	68	74	0	22	HZ				0.00	29.78	29.98	5.0	26	8.8	20	33	16	27	20																																	
21	98	69	84	6	69	74	0	19	BR				0.00	29.84	30.04	3.5	22	6.0	20	25	15	27	21																																	
22	102*	75	89*	10	69	75	0	24	TS RA				0.02	29.78	29.98	5.4	25	8.1	28	27	22	27	22																																	
23	97	72	85	6	71	75	0	20	RA BR				0.12	29.71	29.91	7.4	23	8.4	21	26	16	26	23																																	
24	90	72	81	2	69	72	0	16	BR				0.00	29.80	29.99	1.9	03	5.6	13	02	10	02	24																																	
25	87	71	79	0	64	69	0	14	RA				T	29.88	30.08	7.8	05	8.3	16	05	13	03	25																																	
26	81	66	74	-5	67	70	0	9	RA BR HZ				0.40	29.88	30.07	3.7	09	4.8	18	11	16	11	26																																	
27	82	64	73	-6	65	69	0	8	BR				0.00	29.86	30.06	5.2	18	5.4	16	18	13	18	27																																	
28	87	70	79	1	70	73	0	14	BR HZ				0.00	29.75	29.95	2.0	11	2.7	10	26	8	10	28																																	
29	93	70	82	4	68	72	0	17	BR HZ				0.00	29.71	29.91	0.5	33	3.5	17	21	13	28	29																																	
30	97	71	84	6	70	74	0	19	RA BR HZ				0.04	29.73	29.93	5.4	17	6.2	30	20	26*	20	30																																	
31	82	65	74	-4	68	70	0	9	RA BR				0.07	29.81	30.01	6.7	01	8.5	24	36	21	02	31																																	
< MONTHLY AVERAGES											TOTALS-->		<- MONTHLY AVERAGES																																											
0.1											0.6		0.3											<----- DEPARTURE FROM NORMAL ----->											-2.66											SUNSHINE, CLOUD, & VISIBILITY TABLES ON PAGE 3										
DEGREE DAYS											GREATEST 24-HR PRECIPITATION: 0.88 DATE: 09-10											SEA LEVEL PRESSURE DATE TIME																																		
MONTHLY											GREATEST 24-HR SNOWFALL:											MAXIMUM											DATE TIME																							
TOTAL DEPARTURE											GREATEST SNOW DEPTH:											MINIMUM											DATE TIME																							
HEATING: 0 0 0 0											NUMBER OF DAYS WITH =>											MAXIMUM TEMP ≥ 90: 10											PRECIPITATION ≥ 0.01 INCH : 13																							
COOLING: 420 17 893 118											MAXIMUM TEMP ≤ 32 : 0											MINIMUM TEMP ≤ 32 : 0											PRECIPITATION ≥ 0.10 INCH : 7																							
											THUNDERSTORMS : 5											HEAVY FOG : 0											SNOWFALL ≥ 1.0 INCH :																							

HOURLY PRECIPITATION

(WATER EQUIVALENT IN INCHES)

RICHMOND, VA

JULY 1998

RIC

WBAN # 13740

DATE	FOR HOUR (LST) ENDING AT												DATE	FOR HOUR (LST) ENDING AT												DATE	Sum if Different (See Note 2)	2400 LST	
	1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	18	19	20	21	22	23	24			Water	Equiv.
01													01												01			0.00	
02													02					0.03	0.21	T					02			0.24	
03													03												03			0.00	
04													04					T	0.04	0.01	T	T			04			0.05	
05			0.01	T									05												05			0.01	
06													06												06			0.00	
07													07												07			0.00	
08				T	0.05	T	0.04	0.02	T	0.01	0.01	T	08	T	T										08			0.13	
09													09									0.03	T		09	0.10		0.12	
10	0.46	0.32	T										10										0.07		10	0.78		0.76	
11													11												11			0.00	
12													12												12			0.00	
13													13												13			0.00	
14													14												14			0.00	
15													15												15			0.00	
16													16												16			T	
17						T							17		0.37	0.03	T								17			0.40	
18													18												18			0.00	
19													19					0.01							19			0.01	
20													20												20			0.00	
21													21												21			0.00	
22													22						0.02	T	T				22			0.02	
23													23												23			0.12	
24													24												24			0.00	
25													25												25		T	T	
26	T			T	0.04	0.04	0.04	T					26						0.08	0.19	0.01				26			0.40	
27													27												27			0.00	
28													28												28			0.00	
29													29												29			0.00	
30													30												30			0.04	
31									0.01	0.06			31					T	0.04						31			0.07	

MAXIMUM SHORT DURATION PRECIPITATION (See Note 1)

Time Period (Minutes)	5	10	15	20	30	45	60	80	100	120	150	180
Precipitation (Inches)												
Ending Date												
Ending Time (Hour/Min)												

Date and time are not entered for TRACE amounts.

Note 1: NCDC derives these data from one-minute ASOS values. The table is not printed when inconsistent with ASOS hourly totals.

Note 2: The sum of the hourly totals is given when it differs from the daily total. NWS does not edit ASOS hourly values but may edit daily and monthly totals. Hourly, daily, and monthly totals are printed as reported by the ASOS site.

REFERENCE NOTES & SUPPLEMENTAL SUMMARIES

* = Extreme for the month (last occurrence if more than one)

T = Trace precipitation amount

+ = also occurs on earlier date

FG+ = Heavy fog, visibility .25 miles or less
BLANK entries denote missing or unreported data

Resultant wind is the vector sum of the wind speeds and directions divided by the number of observations.

Wind direction is recorded in tens of degrees (2 digits) clockwise from true north. '00' = calm, 'VR' = variable.

Precipitation is for the 24-hour period ending at the time indicated in the column heading.

Water Equivalent of snow on the ground is reported only when the depth is 2 or more inches.

NORMALS ARE FOR THE YEARS 1961 – 1990

WEATHER NOTATIONS

QUALIFIER	WEATHER PHENOMENA		
	PRECIPITATION	OBSCURATION	OTHER
BC Patches	DZ Drizzle	BR Mist	DS Duststorm
BL Blowing	GR Hail	DU Widespread Dust	FC Funnel Cloud
DR Low Drifting	GS Small Hail and/or Snow Pellets	FG Fog	+FC Tornado Waterspout
FZ Freezing	IC Ice Crystals	FU Smoke	PO Well-Developed Dust/Sand Whirls
MI Shallow	PE Ice Pellets	HZ Haze	SQ Squalls
PR Partial	RA Rain	PY Spray	SS Sandstorm
SH Shower(s)	SG Snow Grains	SA Sand	GL Glaze
TS Thunderstorm	SN Snow	VA Volcanic Ash	
VC In the Vicinity	UP Unknown Precipitation		
Intensity (as indicated on pages 4 to 6): '+' = Heavy '' = Moderate '-' = Light			

RICHMOND, VA JULY 1998

Ceilometer (30-second) data are used to derive cloudiness at or below 12,000 feet. This cloudiness is the mean cloud cover detected during sunrise to sunset (SR-SS), or midnight to midnight (MN-MN).

Satellite data are used to derive cloudiness above 12,000 feet. Effective Cloud Amount is based on the cloud cover and the transparency of the clouds within the satellite field of view (approx. 31x31 miles).

Sky Condition is based on the sum (not to exceed 8) of the sunrise to sunset cloud cover below and above 12,000 feet. Both ceilometer and satellite data must be present to compute Sky Condition. Clear = 0-2 oktas, Partly Cloudy = 3-6 oktas, Cloudy = 7-8 oktas.

A Heating (Cooling) Degree Day is the difference between the average daily temperature and 65 degrees F. The HDD season begins July 1, the CDD season begins January 1.

Dew Point is the temperature to which the air must be cooled to achieve 100% relative humidity. Wet Bulb is the temperature the air would have if cooled at constant pressure by evaporation of moisture into it, to 100% relative humidity.

Snow Depth, Snowfall, and Sunshine data may come from nearby sites that the National Weather Service deems Climatologically representative of this site.

ADDITIONAL NOTES AND CORRECTIONS:
Sunrise and sunset times listed in the March and April 1998 LCD were incorrect and should not be used.

DATE	SUNSHINE		CLOUDINESS (OKTAS)				VISIBILITY (MILES)		RESERVED
	TOTAL MINUTES	PERCENT POSSIBLE	SR-SS		MN-MN		MINIMUM	MAXIMUM	
			CEILOMETER	SATELLITE	CEILOMETER	SATELLITE			
01							10.00	10.00	
02							5.00	10.00	
03							6.00	10.00	
04							2.00	10.00	
05							2.50	10.00	
06							8.00	10.00	
07							6.00	10.00	
08							2.50	10.00	
09							2.50	9.00	
10							1.75	10.00	
11							10.00	10.00	
12							8.00	10.00	
13							9.00	10.00	
14							10.00	10.00	
15							9.00	10.00	
16							4.00	10.00	
17							.50	10.00	
18							7.00	10.00	
19							3.00	10.00	
20							6.00	10.00	
21							5.00	10.00	
22							7.00	10.00	
23							6.00	10.00	
24							6.00	10.00	
25							8.00	10.00	
26							1.75	10.00	
27							4.00	10.00	
28							4.00	10.00	
29							2.50	7.00	
30							3.00	10.00	
31							1.00	10.00	
MONTHLY AVGS							5.19	9.87	
SUNSHINE (MINUTES)									
Total:					Possible:				
					Percent Possible:				
NUMBER OF DAYS WITH:									
SKY CONDITION									
CLR		PTLY CLDY		CLOUDY		MISSING		31	
MINIMUM VISIBILITY (MILES)									
<=0.25		<=3.0		>=7.0					
0		11		10					

OBSERVATIONS AT 3-HOURLY INTERVALS

RICHMOND, VA

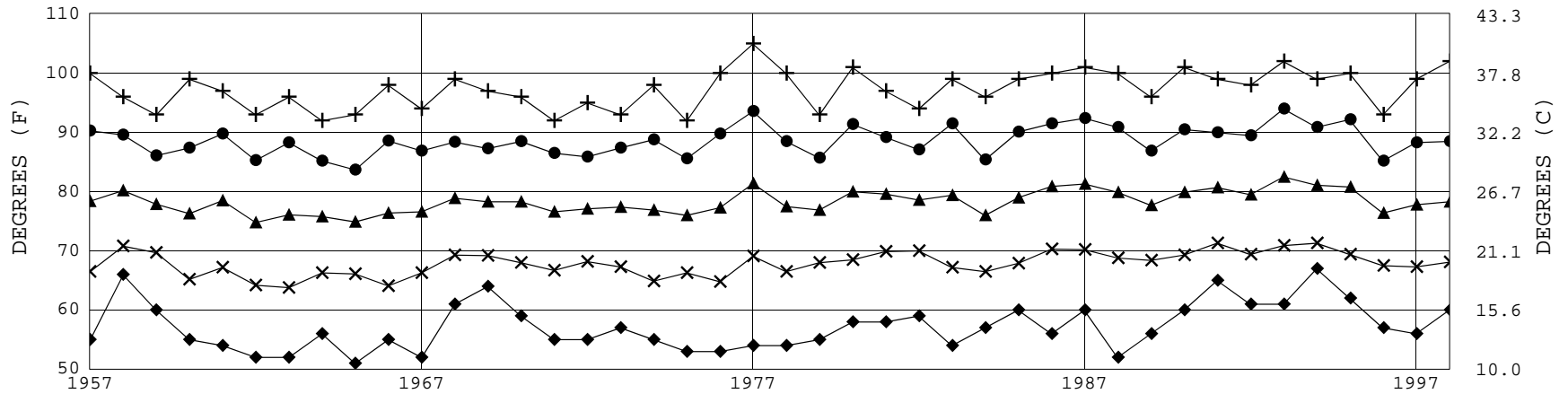
JULY 1998

RIC

WBAN # 13740

HOUR (LST)	SKY COVER		CEILING 100'S OF FT	SATELLITE		VISIBILITY (MILES)	WEATHER	TEMPERATURE ° F				WIND		PRESSURE (INCHES, HG)		HOUR (LST)	SKY COVER		CEILING 100'S OF FT	SATELLITE		VISIBILITY (MILES)	WEATHER	TEMPERATURE ° F				WIND		PRESSURE (INCHES, HG)																	
	DRY BULB	DEW POINT		WET BULB	RELATIVE HUMIDITY (PCT)			SPEED (MPH)	DIRECTION TENS OF DEG	STATION	SEA LEVEL	DRY BULB	DEW POINT	WET BULB	RELATIVE HUMIDITY (PCT)		SPEED (MPH)	DIRECTION TENS OF DEG		STATION	SEA LEVEL																										
SUNRISE: 0508								JUL 25								SUNSET: 1924								SUNRISE: 0512								JUL 31								SUNSET: 1919							
01	CLR	NC				8.00		71	68	69	90	3	05	29.85	30.05	01	BKN	008				5.00	BR	75	74	74	96	7	18	29.67	29.87																
04	CLR	NC				10.00		72	65	68	79	10	03	29.85	30.05	04	OVC	015				5.00	BR	76	75	75	97	3	03	29.66	29.86																
07	SCT	NC				10.00		74	64	68	71	9	02	29.90	30.09	07	OVC	010				5.00	BR	72	69	70	91	13	36	29.73	29.93																
10	BKN	044				10.00		79	64	69	60	8	07	29.91	30.11	10	OVC	042				5.00	BR	70	68	69	93	12	01	29.81	30.01																
13	BKN	250				10.00		85	61	70	45	10	07	29.90	30.10	13	OVC	150				9.00		79	67	71	67	16	02	29.84	30.04																
16	BKN	150				10.00		85	62	70	46	8	05	29.87	30.06	16	BKN	055				10.00		80	65	70	60	6	05	29.86	30.06																
19	OVC	060				10.00		79	63	69	58	9	05	29.86	30.06	19	CLR	NC				10.00		76	64	68	67	7	05	29.88	30.09																
22	OVC	070				10.00		77	65	69	66	5	08	29.88	30.08	22	CLR	NC				10.00		69	65	66	67	0	00	29.95	30.15																
SUNRISE: 0508								JUL 26								SUNSET: 1923								3-HOURLY OBSERVATION NOTES																							
01	OVC	080				10.00		75	69	71	82	5	10	29.86	30.05	Sky Cover is the amount of the sky obscured. CLR or SKC = 0, FEW = 1/8-2/8, SCT = 3/8-4/8, BKN = 5/8-7/8, OVC = 8/8, VV = Vertical Visibility = 8/8.																															
04	OVC	041				4.00	RA BR	73	72	72	96	3	16	29.85	30.05	Ceiling is reported in hundreds of feet above ground level for clouds at or below 12,000 feet.																															
07	OVC	006				3.00	BR	74	73	73	97	3	15	29.87	30.06	NC = No ceiling detected.																															
10	OVC	037				3.00	-RA BR	72	71	71	97	6	04	29.86	30.06	& = Original observation contained additional weather elements.																															
13	BKN	075				10.00		78	66	70	67	12	07	29.89	30.09	See page 3 for additional notes.																															
16	BKN	250				10.00		78	63	68	60	8	10	29.88	30.07																																
19	OVC	110				10.00		73	58	64	59	5	12	29.88	30.07																																
22	OVC	250				10.00		70	64	66	82	3	12	29.90	30.10																																
SUNRISE: 0509								JUL 27								SUNSET: 1923								SUMMARY BY HOUR																							
01	BKN	250				6.00	BR	67	64	65	91	0	00	29.90	30.10	AVERAGES																															
04	OVC	110				7.00		67	63	64	87	0	00	29.91	30.11	RESULTANT WIND (MPH)																															
07	CLR	NC				4.00	BR	68	64	66	87	0	00	29.91	30.11	HOUR (LST)																															
10	SCT	NC				10.00		78	63	68	61	10	17	29.90	30.10	CEILOMETER																															
13	OVC	120				10.00		81	65	71	58	10	18	29.87	30.07	EFF CLD AMT																															
16	OVC	085				10.00		81	66	71	61	9	19	29.82	30.02	DRY BULB																															
19	OVC	080				9.00		78	68	71	71	7	19	29.80	29.99	DEW POINT																															
22	OVC	080				10.00		75	68	70	79	5	17	29.81	30.01	WET BULB																															
SUNRISE: 0510								JUL 28								SUNSET: 1922								PRESSURE (INCHES, HG)																							
01	OVC	110				10.00		72	68	69	87	3	13	29.79	29.99	STATION																															
04	OVC	075				10.00		72	69	70	91	0	00	29.77	29.97	SEA LEVEL																															
07	FEW	NC				8.00		73	70	71	90	3	22	29.79	29.99	VISIBILITY (MILES)																															
10	BKN	060				6.00	HZ	80	68	72	67	0	00	29.80	30.00	WIND SPEED (MPH)																															
13	SCT	NC				8.00		87	71	76	59	5	09	29.76	29.95	SPEED																															
16	SCT	NC				7.00		86	70	75	59	5	09	29.72	29.92	DIRECTION																															
19	BKN	055				5.00	HZ	83	73	76	72	5	12	29.71	29.91																																
22	CLR	NC				6.00	BR	76	72	73	88	0	00	29.73	29.93																																
SUNRISE: 0511								JUL 29								SUNSET: 1921																															
01	CLR	NC				4.00	BR	73	71	72	94	3	16	29.71	29.91																																
04	BKN	065				4.00	BR	72	70	71	94	0	00	29.70	29.90																																
07	CLR	NC				3.00	HZ	76	70	72	82	3	28	29.72	29.92																																
10	CLR	NC				6.00	HZ	85	66	72	53	7	33	29.73	29.93																																
13	FEW	NC				6.00	HZ	89	65	73	45	3	VR	29.71	29.91																																
16	SCT	NC				7.00		92	63	73	38	9	22	29.68	29.88																																
19	SCT	NC				4.00	HZ	84	69	74	61	5	06	29.70	29.90																																
22	SCT	NC				4.00	HZ	75	69	71	82	0	00	29.72	29.92																																
SUNRISE: 0512								JUL 30								SUNSET: 1920																															
01	CLR	NC				4.00	HZ	74	69	71	85	0	00	29.74	29.93																																
04	CLR	NC				4.00	BR	72	68	69	87	3	20	29.75	29.95																																
07	FEW	NC				3.00	HZ	74	69	71	85	3	08	29.78	29.98																																
10	OVC	250				6.00	HZ	87	71	76	59	5	10	29.79	29.98																																
13	SCT	NC				7.00		93	66	75	41	9	15	29.73	29.93																																
16	SCT	NC				6.00	HZ	94	70	77	46	13	17	29.70	29.89																																
19	SCT	NC				10.00		78	72	74	82	7	14	29.70	29.90																																
22	BKN	100				6.00	BR	75	74	74	96	8	16	29.70	29.90																																

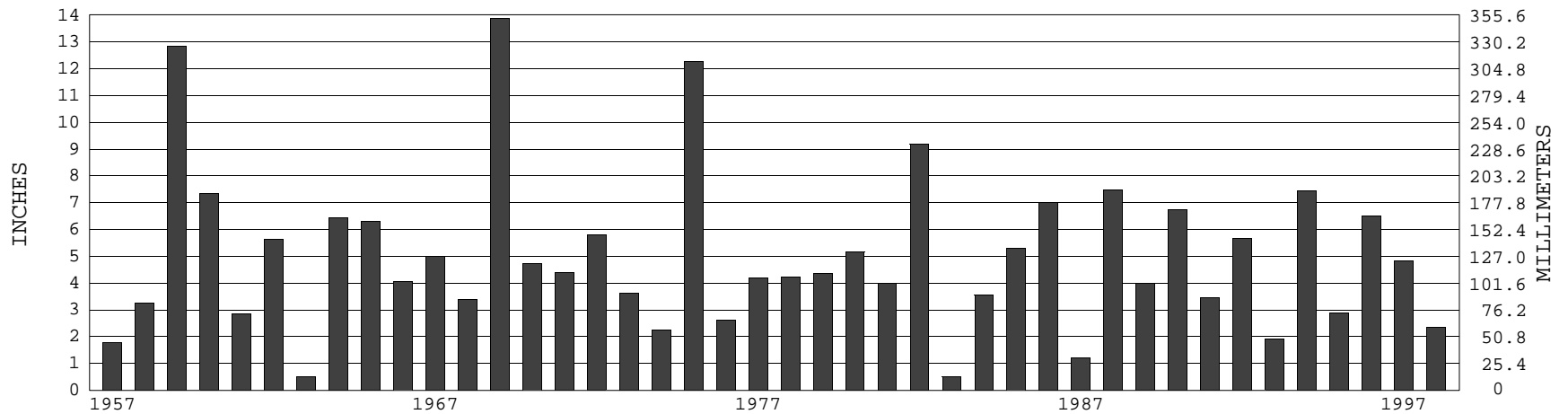
RICHMOND, VA JULY TEMPERATURES



+ Extreme Max. ● Mean Max. ▲ Mean × Mean Min. ◆ Extreme Min.

Long-Term (1957-1998) Mean: 78.3 1961-1990 Normal: 78.0

RICHMOND, VA JULY PRECIPITATION



Long-Term (1957-1998) Mean Monthly Total: 5.03

1961-1990 Normal: 5.03



JULY 1998
RICHMOND, VA

LOCAL CLIMATOLOGICAL DATA

NOAA, National Climatic Data Center

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DIRECTOR

NOTICE

Effective July 1, 1996, the National Weather Service & Federal Aviation Administration began using the METAR format for Hourly Observations.

We welcome your questions or comments, please contact us at
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