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CLIMATOLOGICAL NORMALS FOR KING'S PARK METEOROLOGICAL STATION

by

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1. INTRODUCTION

The meteorological station at Royal Observatory Headquarters has served as Hong Kong's synoptic and climatic station ever since observations began there in 1884 (Starbuck, 1951).

Unfortunately, the readings at this station were more and more affected by the intensive urban development around Royal Observatory Headquarters in Tsim Sha Tsui, especially in recent years.

For this reason, King's Park Meteorological Station, located about one kilometre to the north of Royal Observatory Headquarters but less affected by urbanization due to its location next to a park, was designated as Hong Kong's new synoptic and climatological station in July 1992.

In accordance with WMO's recommendation that climatic normals and extremes should be published for climatological stations, this note is prepared to report on the normals and extremes of King's Park Meteorological Station.

2. BRIEF HISTORY OF THE STATION

King's Park Meteorological Station is situated about one kilometre north of the Royal Observatory on top of a hill 65 metres above mean sea-level. It was built shortly after the war years as a consequence of difficulties experienced in launching radiosonde balloons at the Royal Observatory due to obstructions by buildings around. Thus the station was known as King's Park Upper-air Station when it was inaugurated in June 1951. It is still serving as an upper-air station in addition to some other functions acquired over the years.

One of these other functions of King's Park Meteorological Station is to record the surface meteorological elements. In the early years, only basic meteorological instruments like the barometer, thermometers and rain-gauges were installed at King's Park. More instruments were added later or re-located from the Observatory headquarters until eventually, the meteorological elements measured at King's Park exceeded those at the Observatory headquarters. Starting from July 1957, observations were made basically twice daily on the various elements when radiosonde balloons were released. It might be of interest to note that King's Park has been the only station in Hong Kong that measures evaporation and potential evapotranspiration. The Jardi rate-of-rainfall recorder at King's Park was the first one of its type operated in the territory. This site is still used for reporting the maximum instantaneous intensity of rainfall in Hong Kong. Figure 1 shows the location of the instruments at King's Park as on 1 November 1995. Table 1 summarizes the available meteorological data for King's Park and the dates of first record.

In response to United Nations General Assembly Resolution 1 629 (XVI) in 1961, the Royal Observatory began measurements of radioactivity levels at King's Park in the same year as part of an international network. King's Park remains a main monitoring station after the implementation of the Environmental Radiation Monitoring Programme in late 1989. This Programme was started in response to the construction of the Guangdong Nuclear Power Station in China. Laboratories specifically designed for the analysis of radioactivity in various kinds of environmental samples were established at the station as part of the Programme.

Besides making upper-air soundings and monitoring radioactivity levels, King's Park was also well known in its involvement in the reception of meteorological satellite pictures. As early as in 1963, satellite signals were received at King's Park using home-made equipment. The first pictures received were from the TIROS 8 satellite which was equipped with the first Automatic Picture Transmission System. Imageries from the next two series of polar orbiting satellites launched in USA, viz the ESSA and NOAA series, and also from the Japanese GMS-1 were also received at King's Park. For GMS-1, the antenna of an old wind-finding radar was used for intercepting satellite signals until 1979 when a proper reception system was purchased and installed at the Royal Observatory, ending a history of seventeen years of satellite reception at King's Park.

During the last decade or so, a series of automatic weather stations were set up in Hong Kong. King's Park was no exception and in June 1992 an automatic station was established there. Since then, weather recordings at King's Park were no longer limited to twice daily, and is now available at one minute intervals.

3. ENVIRONMENTAL AND INSTRUMENTAL CHANGES

Although both the King's Park Meteorological Station and the Royal Observatory site are located in built-up Kowloon, the former is in a much more open neighbourhood with a park adjacent to it. With some meteorological measurements made at the Royal Observatory becoming less representative, a decision was made to use King's Park Meteorological Station as the synoptic and climatological station with effect from July 1992.

It is noted that the King's Park site also has its shortcomings. The effect of urban development in the neigbourhood is a concern, though to a much lesser degree compared with Royal Observatory Headquarters. There is a noticeable decreasing trend in evaporation. Besides the effect of solar radiation (Chen, 1976), this is likely to be related to the sheltering effect with growth of trees in the neighbouring park as indicated by the decreasing wind movement shown in Figure 2. Efforts are made to maintain a similar environment with time with regular tree pruning, and keeping the same vegetation and buildings in the station compound. A new anemometer mast of about 25 metres above ground was constructed and put into operation in December 1995.

Figures 3 and 4 show by means of photographs the changes in the station environment over the years.

Table 2 highlights the instrumental and related changes. Besides those listed in the table, an International Reference Precipitation Gauge was installed in late 1963 to compare figures taken from the 5-inch, 8-inch and tilting-siphon gauges that were also installed at the station. This program was completed in mid 1971.

4. CLIMATOLOGICAL NORMALS FOR THE STATION

The climatological normals and extremes for King's Park Meteorological Station are compiled in accordance with the recommendations of the World Meteorological Organization (WMO, 1983). Data for most meteorological elements are available for the standard period of 1961-1990 except wind which is for the period 1971-1990. Basically, only two observations were available daily whereas hourly observations were made at the Observatory. Also, daily rainfall records were for the 24-hour ending at 1500 hours each day but the Observatory records were for the day ending at 2400 hours. Despite these differences, the normals compiled are quite similar to those for the Observatory. Extreme values are only computed for maximum and minimum temperatures as two observations a day would be insufficient to generate extremes for other meteorological elements.

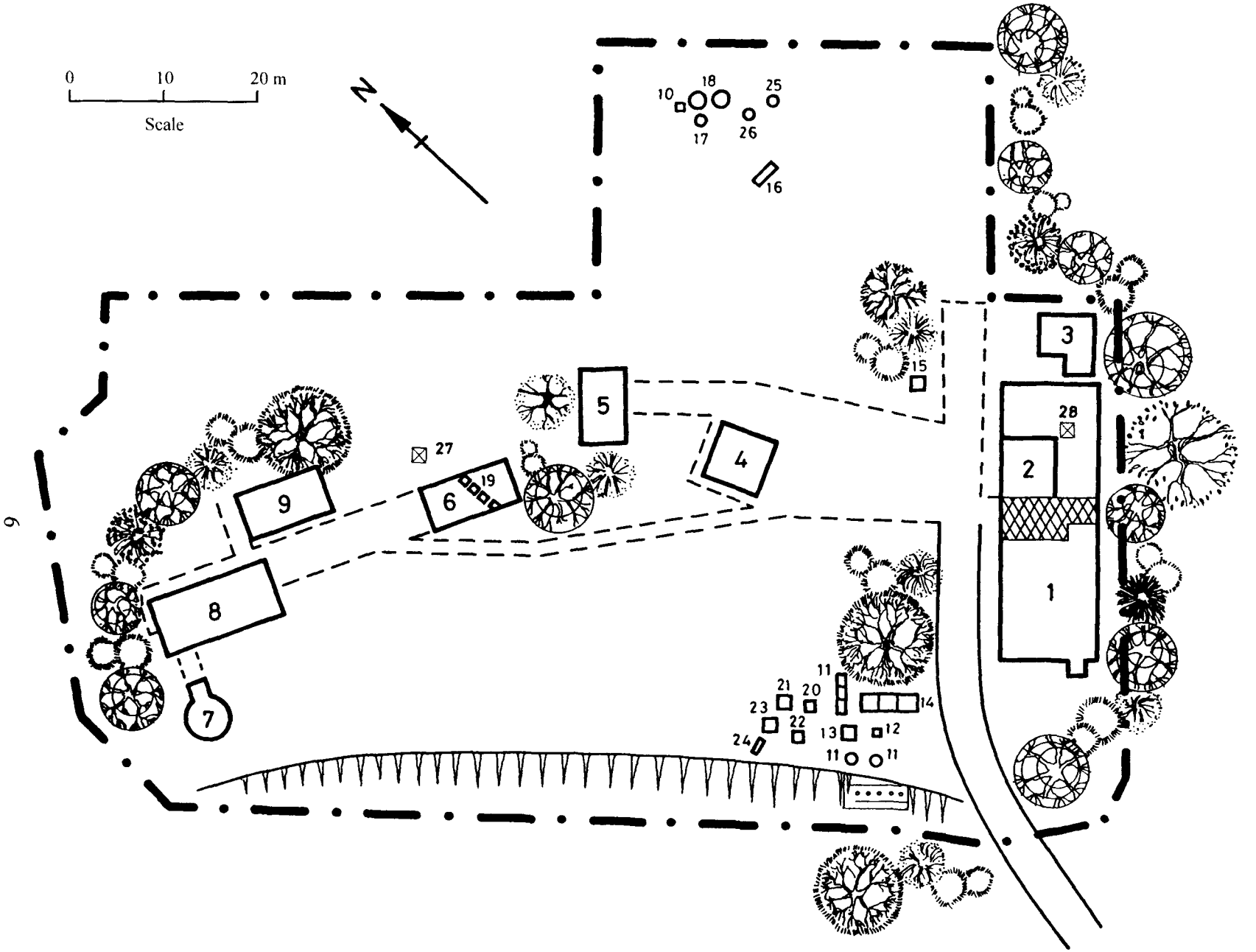
For the sake of easy interpretation, the climatology of King's Park Meteorological Station is presented graphically in Figures 5 to 8. The mean values are also tabulated in Tables 3 to 6 while those for the Royal Observatory are shown in Table 7.

REFERENCES

1. Starbuck, L. 1951 A brief general history of Royal Observatory

2. Chen, T.Y. 1976 Evaporation and Evapotranspiration in Hong Kong, Royal Observatory Tech. Note No. 42

3. WMO 1983 Guide to Climatological Practices



Buildings

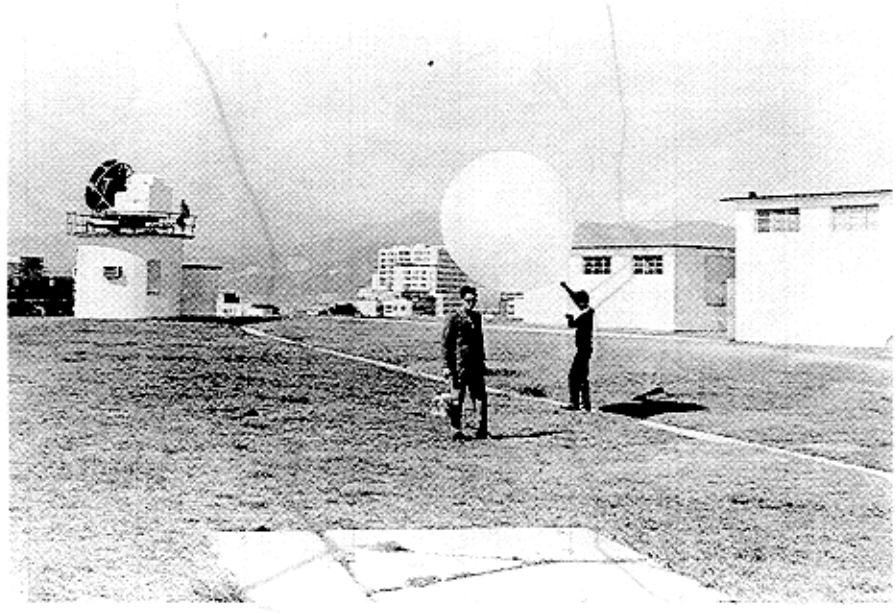
1. Station Office
2. Calibration Laboratory
3. Emergency Generator
4. Balloon filling Shed
5. Hydrogen Shed
6. Radiation Laboratory I
7. Radiation Laboratory II
8. Radiation Laboratory III
9. Radiochemistry Unit
   Government Laboratory

Equipment

10. Cup-counter Anemometer
11. Total Deposition Samplers
12. Tilting-siphon Rain-gauge
13. Rate-of-rainfall Recorder
14. Potential Evapotranspiration Tanks
15. Soil Thermometers
16. Thermometer Screen
17. Ordinary Rain-gauge
18. Evaporation Pans
19. Sunshine Recorders and Pyranometers
20. High Volume Air Sampler
21. Carbon Dioxide/Water Vapour and Iodine Samplers
22. High Pressure Ionization Chamber
23. Radio Transmitter
24. Solar Panel
25. 0.5 mm Tipping Bucket Rain-gauge
26. Precipitation Detector
27. New Mark IV Anemometer
28. Mark IV Anemometer

Figure 1. Sketch map of King's Park Meteorological Station as on 1 November 1995 showing the locations of the instruments

Figure 2. Solar radiation, evaporation and wind movement



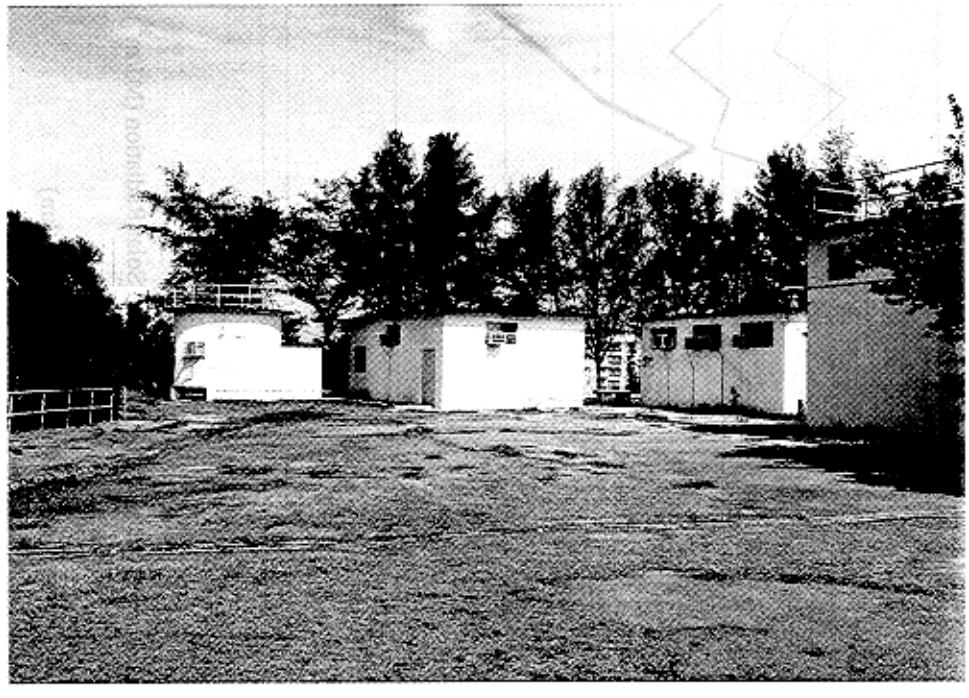


Figure 3. King's Park Meteorological Station in the 50s (upper photo) and 1994 (lower photo) both looking northwestwards

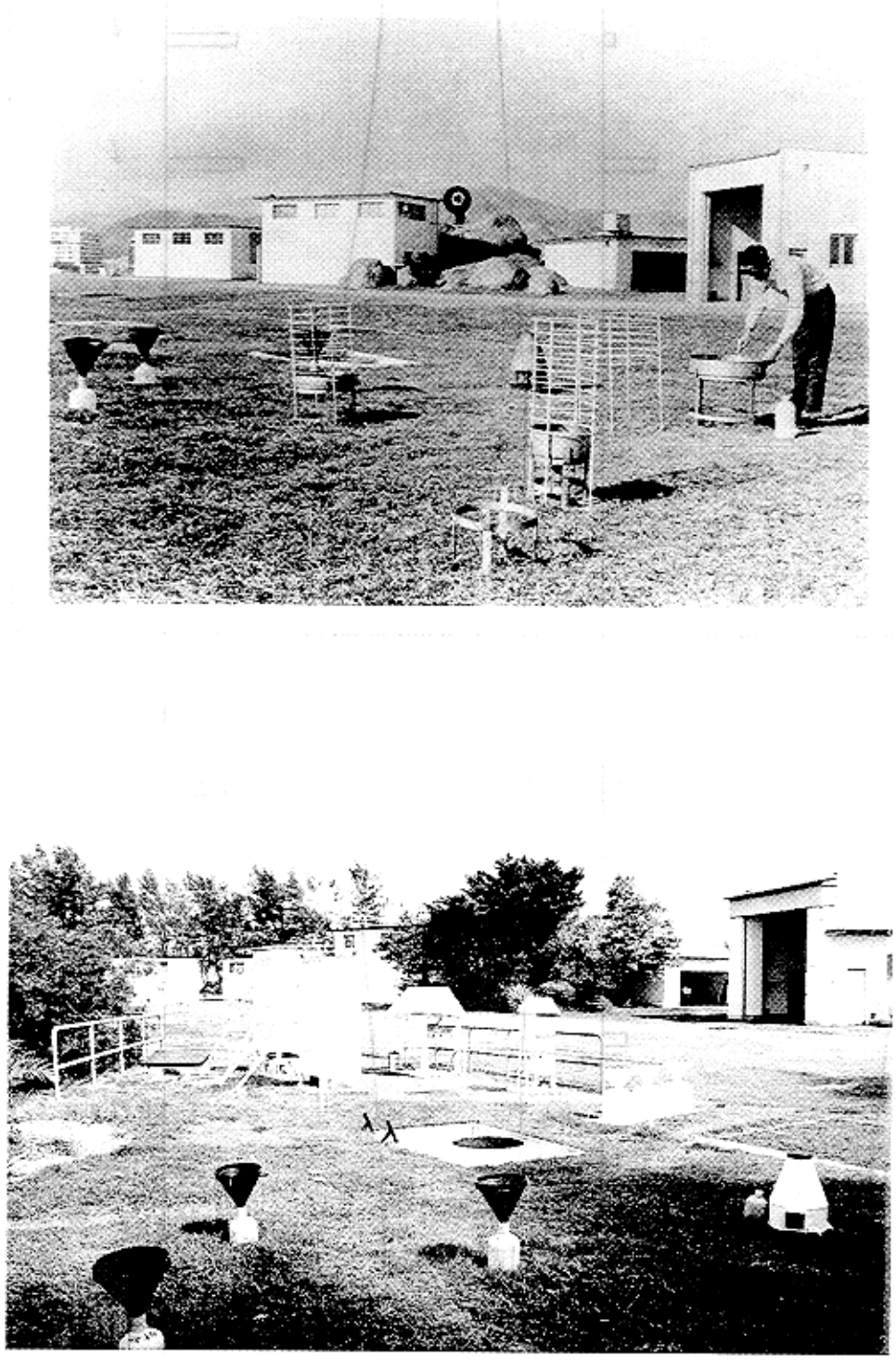


Figure 4. King's Park Meteorological Station in the 70s (upper photo) and 1994 (lower photo) both looking northwards

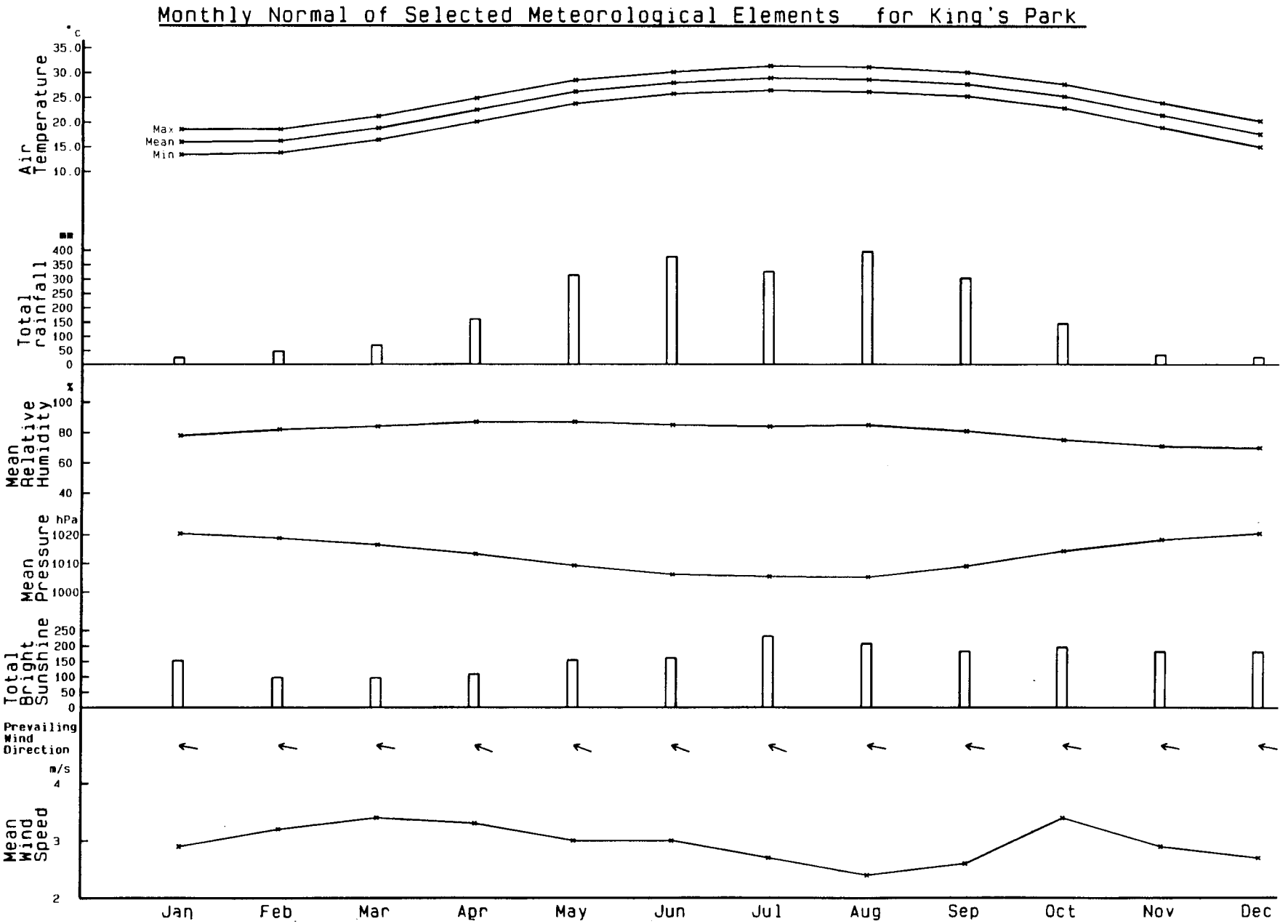


Figure 5. Monthly mean values of selected meteorological elements for King's Park Meteorological Station 1961-1990

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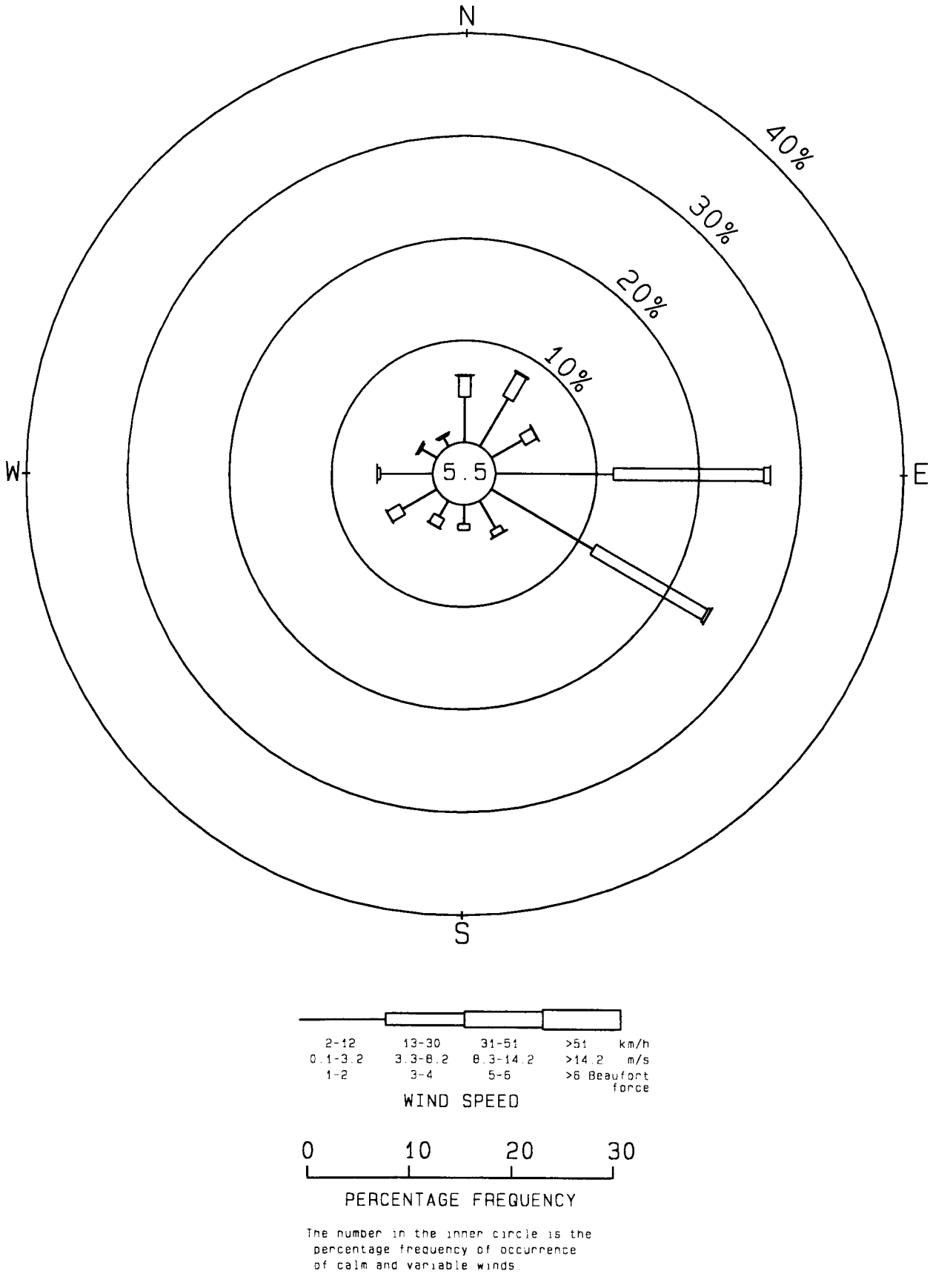

Figure 6. The annual wind rose for King's Park Meteorological Station 1971-1990

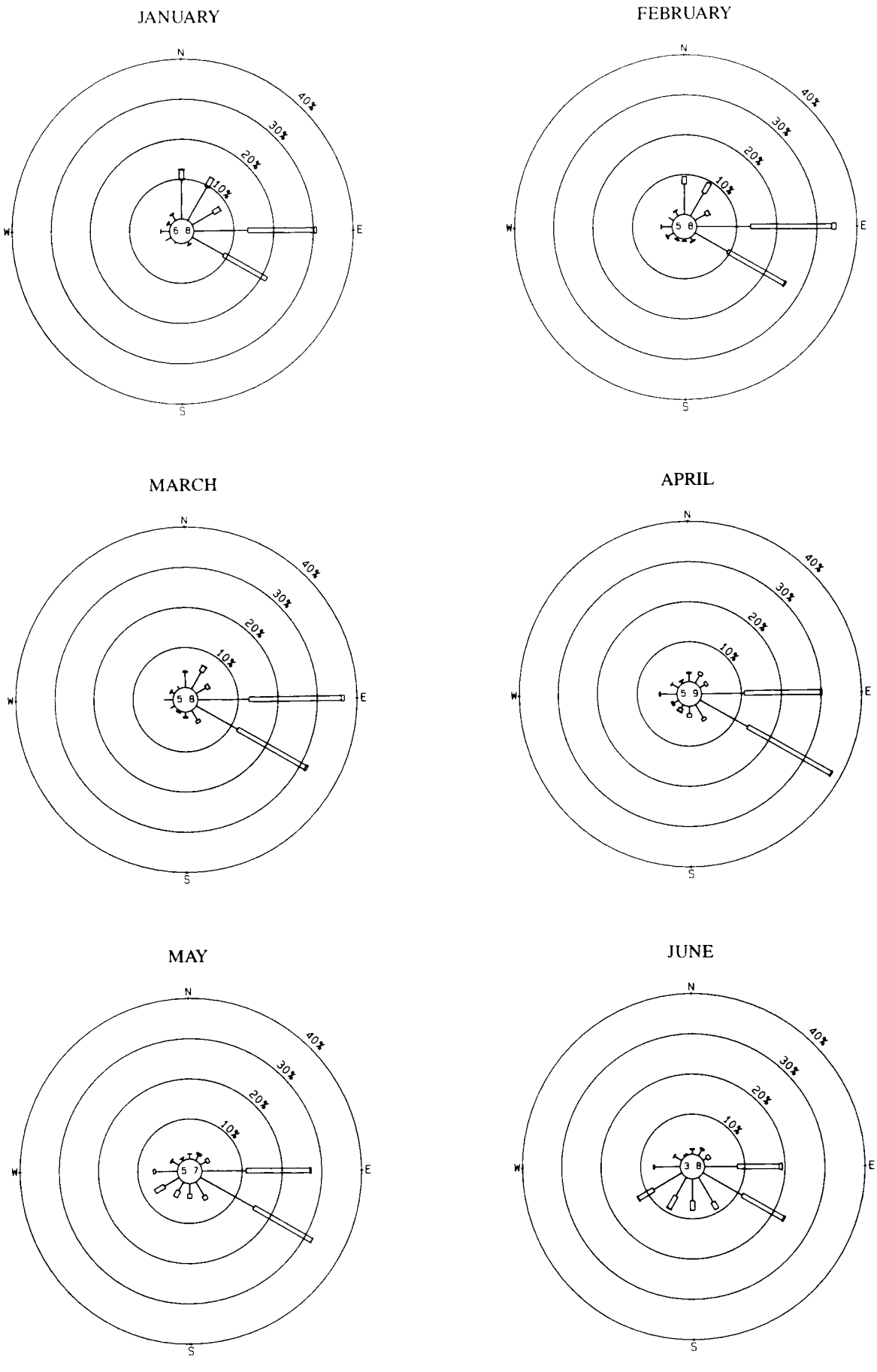

Figure 7. The monthly wind roses for King's Park Meteorological Station for January to June 1971-1990

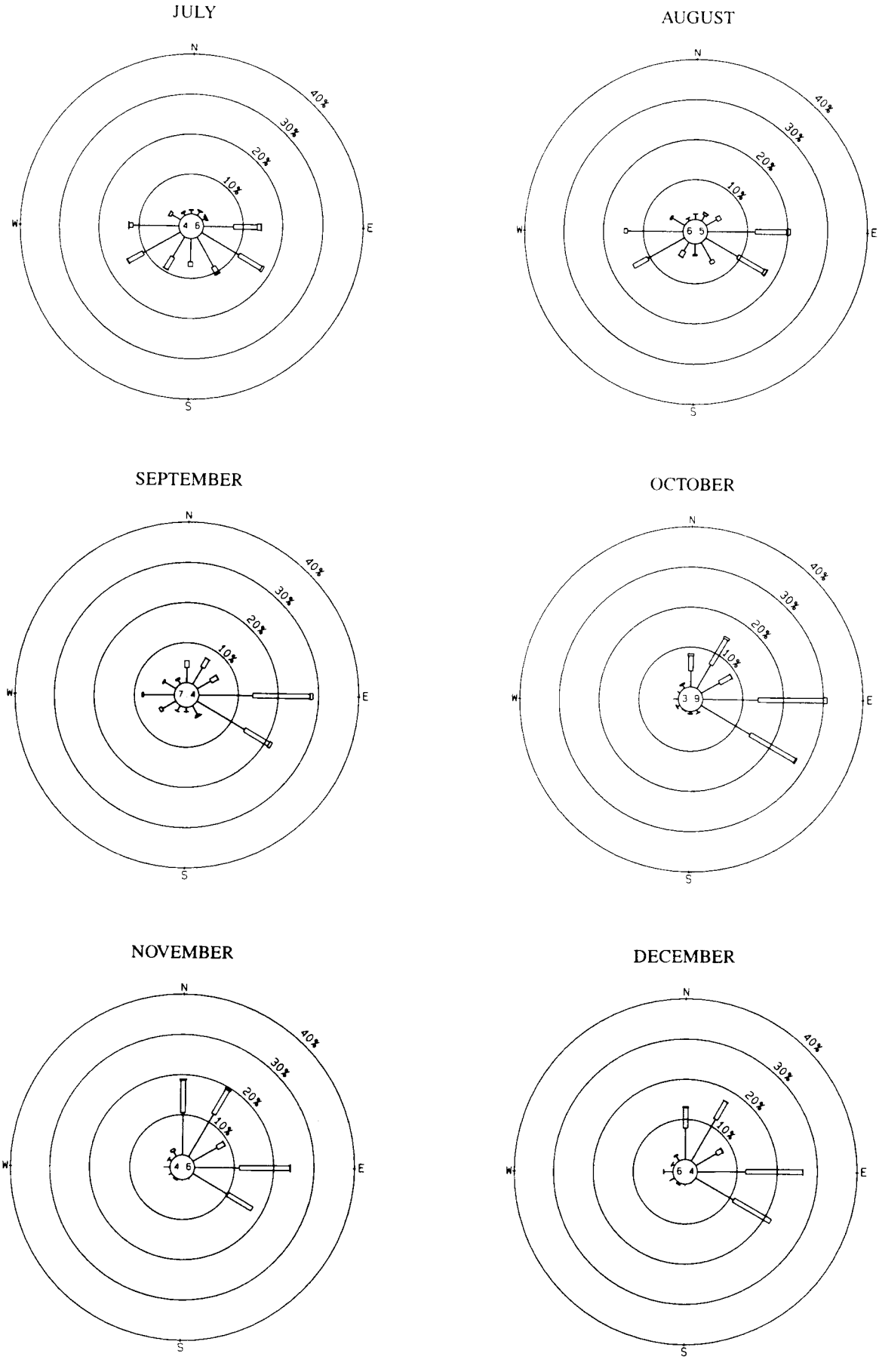

Figure 8. The monthly wind roses for King's Park Meteorological Station for July to December 1971-1990

Table 1 Availability of Meteorological Data for King's Park Meteorological Station

Meteorological Element	Frequency of Records	Date of First Record	Date of First Record on Tape
Cloud Amount	Twice daily	15 Jul 1957	1 Jan 1968
Wind Direction and Speed	Twice daily	15 Jul 1957	1 Jan 1968
Visibility	Twice daily	15 Jul 1957	1 Jan 1968
Weather	Twice daily	15 Jul 1957	1 Jan 1968
Atmospheric Pressure	Twice daily	1 Jun 1951	1 Jan 1968
Dry-Bulb Temperature	Twice daily	1 Jun 1951	1 Jan 1968
Dew Point	Twice daily	1 Jun 1951	1 Jan 1968
Extreme Temperatures	Daily	15 Jul 1957	1 Jan 1968
Grass Minimum Temperature	Daily	15 Jul 1957	1 Jan 1968
State of Ground	Twice daily	15 Jul 1957	1 Jan 1968
Soil Temperature	Twice daily	15 Jul 1957	1 Jan 1968
Sunshine Duration	Hourly (between sunrise and sunset)	1 Aug 1957	1 Jan 1968
Rainfall Amount	Daily Thrice daily	1 Oct 1951 15 Jul 1957	1 Jan 1953 1 Jan 1968
Evaporation	Daily	4 Jul 1957	1 Jan 1968
Potential Evapotranspiration	Daily	1 Oct 1951	1 Jan 1968
Global Solar Radiation	Daily Hourly	28 Jan 1959 1 Jan 1979	1 Jan 1968 1 Jan 1979
Maximum Jardi Rate of Rainfall	Daily Quarter-hourly	10 Jun 1952 1 Jan 1968	1 Jan 1968 1 Jan 1968

Table 2 Instrumental and Related Changes at King's Park Meteorological Station

Type of instrument	Date of first installation	Changes in instrumentation, siting and exposure
Barometers		
Kew-pattern (F. Darton Co. Ltd.)	1 Jun 1951	
digital (Setra M370)	19 Sep 1991	
Thermometers		
mercury in glass	1 Jun 1951	Stevenson screen re-sited in May 1992
platinum resistance	19 Sep 1991	digital thermometers replaced bimetallic thermograph
Raingauges		
ordinary	1 Oct 1951	
tilting-siphon (Dines)	1 Nov 1957	changed to tropical type on 22 April 1966
tipping-bucket	5 May 1992	changed to 0.5 mm type on 6 March 1995
rate-of-rainfall recorder (Jardi)	10 Jun 1952	
Anemometer		
3-cup contact anemometer	-	changed to a 'counter' type in first quarter of 1957
cup generator (R.W. Munro Mk 4)	26 Mar 1971	with chart recorder
Sunshine Recorder		
Campbell-Stoke	15 Jul 1957	moved to roof of the Radiation Laboratory I on 1 January 1969
Interim Reference Sunshine Recorder	Oct 1964	moved to roof of the Radiation Laboratory I on 1 December 1968
Pyranometer		
thermal-electric (Kipp & Zoen thermo-pile dome solarimeter)	16 Nov 1968	
Actinograph		
bimetallic (British Meteorological Office Mk 3)	28 Jan 1959	moved to roof of the Radiation Laboratory I on 1 January 1969
Earth Thermometers		
1 ft and 4 ft	1 Jul 1957	discontinued on 25 March 1977
50, 100, 150 cm	1 Apr 1971	
300 cm	15 Nov 1977	
10, 20 cm	22 Nov 1977	
5 cm	1 Oct 1978	
Evapotranspiration Tanks		
lysimeters	1 Oct 1951	
Evaporation Pans		
U.S. Weather Bureau class 'A' pans	4 Jul 1957	

Table 3 Climatological normals and extremes of pressure, temperature and relative humidity for King's Park Meteorological Station for the 30 Years 1961-1990

MONTH			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
ATMOSPHERIC PRESSURE *		hPa	1020.4	1018.8	1016.4	1013.2	1009.2	1006.1	1005.4	1005.2	1009.0	1014.3	1018.3	1020.5	1013.0
TEMPERATURE	Absolute Maximum	°C	29.3	28.5	29.9	32.4	35.5	35.1	35.8	35.0	35.0	33.8	31.0	29.7	35.8
	Mean Maximum	°C	25.1	25.7	27.4	29.8	32.2	33.0	33.8	33.6	33.2	31.8	29.6	26.6	34.3
	Mean Daily Maximum	°C	19.1	18.9	21.4	25.0	28.5	30.2	31.4	31.2	30.5	28.3	24.7	21.2	25.9
	Mean #	°C	15.9	16.0	18.7	22.4	26.0	27.8	28.8	28.5	27.7	25.4	21.5	17.8	23.0
	Mean Daily Minimum	°C	12.6	13.1	15.9	19.7	23.5	25.4	26.2	25.8	24.9	22.4	18.9	14.4	20.2
	Mean Minimum	°C	7.4	7.6	10.6	14.6	19.8	22.4	23.1	23.1	22.1	18.2	12.4	8.6	5.6
	Absolute Minimum	°C	3.7	3.1	3.7	9.1	16.9	19.8	20.8	20.3	18.9	13.0	6.3	3.4	3.1
DEW POINT *		°C	10.7	12.2	15.2	19.0	22.5	24.4	24.9	24.7	23.1	19.5	14.7	11.4	18.6
VAPOUR PRESSURE *		hPa	12.7	14.2	17.4	22.2	27.3	30.5	31.5	31.0	28.2	22.9	17.4	13.6	22.4
RELATIVE HUMIDITY (%)	at 0800 hours	%	77	83	85	87	88	86	85	86	82	76	71	71	82
	at 2000 hours	%	74	80	83	86	85	84	82	83	80	75	70	69	79

* Based on two observations per day at 0800 and 2000 hours local time.

\# Computed as the mean of daily maximum and minimum temperatures.

Table 4 Climatological normals of rainfall for King's Park Meteorological Station 1961- 1990

Month			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total			23.7	47.3	68.2	160.4	313.9	377.6	326.5	395.2	304.5	145.3	34.1	27.0	2223.8
Frequency Groups of Precipitation (Quintiles)	1	Rainfall amount (mm)	Trace / 3.0	1.0 / 6.9	1.6 / 9.2	8.3 / 52.1	10.0 / 143.9	114.8 / 210.1	104.0 / 175.3	63.9 / 194.5	11.5 / 117.1	0.0 / 32.9	Trace / 3.3	0.0 / 0.4	895.5 / 1792.9
	2		3.1 / 11.0	7.0 / 15.3	9.3 / 32.1	52.2 / 115.3	144.0 / 215.2	210.2 / 324.7	175.4 / 268.9	194.6 / 285.4	117.2 / 216.4	33.0 / 62.1	3.4 / 13.9	0.5 / 2.8	1793.0 / 2063.3
	3		11.1 / 19.4	15.4 / 33.3	32.2 / 56.7	115.4 / 197.8	215.3 / 325.7	324.8 / 409.1	269.0 / 323.2	285.5 / 411.1	216.5 / 373.0	62.2 / 114.2	14.0 / 30.6	2.9 / 10.9	2063.4 / 2381.6
	4		19.5 / 43.3	33.4 / 73.2	56.8 / 103.7	197.9 / 253.9	325.8 / 454.3	409.2 / 485.5	323.3 / 468.8	411.2 / 573.5	373.1 / 482.4	114.3 / 160.9	30.7 / 65.0	11.0 / 35.4	2381.7 / 2545.4
	5		43.4 / 105.6	73.3 / 232.3	103.8 / 423.7	254.0 / 373.4	454.4 / 788.2	485.6 / 949.0	468.9 / 725.6	573.6 / 916.1	482.5 / 748.4	161.0 / 737.8	65.1 / 107.7	35.5 / 225.2	2545.5 / 3195.4
Number of Days with Rainfall	>=0.1 mm		5.60	8.70	10.53	11.50	15.03	19.53	17.23	16.87	14.80	7.93	5.47	3.90	137.09
	>=1.0 mm		3.73	5.57	5.93	8.07	11.30	15.77	14.23	14.17	12.03	5.93	3.67	2.10	102.50
	>=25.0 mm		0.17	0.43	0.67	1.93	3.47	4.30	4.13	4.57	3.70	1.37	0.40	0.27	25.41
	>=50.0 mm		0.00	0.03	0.20	0.90	1.90	2.03	1.80	2.03	1.57	0.73	0.03	0.10	11.32

Based on daily rainfall totals (mm) at 1500 hours local time
e.g. January rainfall refers to accumulated up to 1500 HKT 31 Jan

Table 5 Climatological normals of cloud, sunshine, solar radiation, wind, evaporation and soil temperature for King's Park Meteorological Station 1961 - 1990

MONTH				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MEAN CLOUD AMOUNT *			oktas	4.8	5.9	6.3	6.4	6.2	6.2	5.4	5.5	5.1	4.6	4.2	3.8	5.4
TOTAL DURATION OF SUNSHINE			hours	152.4	97.7	96.4	108.9	153.8	161.1	231.1	207.0	181.7	195.0	181.5	181.5	1948.1
DAILY SOLAR RADIATION			MJ/m^2	11.6	10.7	11.2	13.1	16.1	16.6	19.2	17.6	16.5	15.5	13.4	12.0	14.5
WIND * #	Mean Speed		m/s	2.9	3.2	3.4	3.3	3.0	3.0	2.7	2.4	2.6	3.4	2.9	2.7	2.9
	Prevailing Direction		deg	100	100	100	110	110	110	110	100	100	100	100	100	100
	Vector Direction		deg	80	90	100	110	110	140	150	130	90	80	60	70	100
	Vector Magnitude		m/s	2.1	2.5	2.9	2.7	2.0	1.6	1.1	1.0	1.7	2.5	2.0	1.9	1.8
	Wind steadiness		%	74.4	77.2	85.1	81.6	67.7	53.0	41.4	40.9	63.9	74.6	69.7	69.8	62.3
TOTAL EVAPORATION			mm	97.5	79.0	92.2	106.9	137.7	143.9	171.6	156.9	150.3	152.2	129.1	111.5	1528.8
SOIL TEMPERATURE # (°C)	0.5 m	0700 hours		19.7	19.4	20.6	23.2	26.3	28.2	29.5	29.5	29.0	27.3	24.5	21.3	25.0
		1900 hours		19.6	19.3	20.6	23.2	26.3	28.1	29.5	29.4	29.0	27.3	24.4	21.3	24.9
	1.0 m	0700 hours		21.1	20.5	20.9	22.7	25.3	27.2	28.7	29.0	28.8	27.7	25.7	23.0	25.1
		1900 hours		21.1	20.5	21.0	22.7	25.3	27.2	28.7	29.0	28.8	27.7	25.6	23.0	25.1
	1.5 m	0700 hours		22.6	21.7	21.6	22.5	24.6	26.4	27.8	28.5	28.6	27.9	26.5	24.4	25.3
		1900 hours		22.6	21.7	21.6	22.6	24.6	26.4	27.9	28.5	28.6	27.9	26.5	24.4	25.3

* Based on two observations per day at 0800 and 2000 hours local time

1971 - 1990

Table 6 Percentage frequency distribution of wind direction at King' Park Meteorological Station 1971 - 1990

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Direction													
010°	5.81	3.98	1.77	1.08	0.56	0.50	0.32	0.40	2.50	4.35	7.83	5.48	2.87
020°	4.76	3.01	2.50	1.17	0.48	0.75	0.48	1.05	2.92	5.32	6.92	6.45	2.98
030°	4.76	4.07	2.42	0.92	1.05	0.58	0.24	0.81	2.83	6.69	7.83	6.61	3.23
040°	2.74	2.39	1.61	1.00	0.48	0.83	0.73	0.40	1.58	2.90	4.92	4.11	1.97
050°	2.42	1.42	1.37	0.67	0.32	0.17	0.32	1.05	1.50	2.26	3.25	2.74	1.46
060°	2.74	1.15	1.13	0.75	0.89	0.75	0.48	1.29	2.58	3.63	3.17	2.26	1.74
070°	2.82	1.50	1.21	0.75	1.29	1.08	0.56	1.77	1.75	2.74	2.58	2.66	1.73
080°	3.87	4.51	4.44	2.33	2.02	2.42	1.29	1.69	2.67	3.23	4.42	2.66	2.95
090°	10.97	10.62	12.26	9.67	8.47	6.25	4.92	7.02	9.33	11.13	8.42	9.76	9.06
100°	15.97	19.56	20.08	18.08	16.85	10.67	8.47	11.94	16.58	16.61	11.33	14.03	14.99
110°	14.52	16.81	22.66	27.00	21.85	13.08	9.35	11.37	11.92	16.69	10.75	12.98	15.74
120°	5.81	7.70	7.26	9.00	7.90	7.17	5.40	3.95	7.67	9.03	4.92	6.85	6.88
130°	1.05	1.33	1.94	1.75	2.26	3.00	3.23	2.18	2.08	1.53	1.67	1.85	1.99
140°	0.32	0.71	0.89	0.92	1.53	1.17	2.02	1.77	1.08	0.40	0.17	0.16	0.93
150°	0.24	0.53	1.05	1.42	1.53	2.67	4.60	2.26	1.42	0.40	0.08	0.08	1.36
160°	0.32	--	1.61	2.25	2.10	5.25	4.03	2.02	0.58	0.08	0.17	--	1.54
170°	0.08	0.09	0.73	0.92	1.61	2.67	1.61	1.21	0.50	0.08	0.08	0.32	0.83
180°	0.08	0.44	0.48	1.25	1.37	2.67	3.63	1.21	0.33	0.32	0.08	0.16	1.01
190°	--	0.09	0.32	0.58	0.73	2.50	1.77	0.56	0.33	0.24	0.08	--	0.60
200°	0.24	0.18	0.16	0.92	0.97	3.08	4.11	1.29	0.50	0.08	0.08	0.08	0.98
210°	0.08	0.44	0.24	0.58	2.26	3.75	3.23	1.45	0.50	0.08	0.08	0.08	1.07
220°	0.16	0.18	0.16	0.50	1.05	2.17	2.02	1.37	0.58	0.00	0.25	0.32	0.73
230°	0.24	0.62	0.32	0.42	1.05	3.08	3.23	2.42	1.08	0.24	0.17	0.16	1.09
240°	0.65	0.53	0.16	0.83	2.82	5.92	5.97	6.29	0.92	0.16	0.25	0.48	2.09
250°	0.73	0.88	0.81	0.67	3.06	3.75	5.81	5.97	2.58	0.48	0.33	0.81	2.17
260°	0.89	0.88	0.89	1.50	1.77	2.08	3.71	4.44	2.00	0.32	0.58	0.81	1.66
270°	0.56	1.06	0.97	1.67	2.66	2.67	5.81	6.37	3.58	0.56	0.58	0.97	2.30
280°	0.81	0.88	0.48	1.25	1.69	2.00	3.06	4.03	2.50	0.48	0.42	0.65	1.53
290°	0.56	1.06	0.40	1.50	1.29	1.50	2.10	2.90	2.08	0.32	0.50	0.40	1.22
300°	0.24	0.35	0.32	0.42	0.65	0.58	0.89	0.73	0.83	0.40	0.25	0.24	0.49
310°	0.16	0.18	0.40	0.08	0.32	0.17	0.24	0.40	0.75	0.08	0.17	0.08	0.25
320°	0.16	0.35	0.08	0.17	0.24	0.00	0.16	0.24	0.33	0.08	0.08	0.24	0.18
330°	0.73	0.27	0.40	0.33	0.16	0.17	0.65	0.32	0.50	0.56	0.67	0.48	0.44
340°	1.05	0.88	0.32	0.33	0.32	0.25	0.24	0.24	0.75	0.65	1.25	0.97	0.60
350°	2.18	1.24	0.73	0.25	0.32	0.17	0.32	0.40	1.00	0.81	3.17	2.26	1.07
360°	4.52	4.25	1.61	1.08	0.40	0.75	0.40	0.65	2.00	3.15	7.92	5.40	2.66
calm/variable	6.76	5.86	5.82	5.99	5.68	3.73	4.60	6.54	7.37	3.92	4.58	6.41	5.61
All Directions	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 7 Monthly Normals of Meteorological Elements for the 30 Years 1961-1990 and Extreme Values between 1884-1939 and 1947-1995 (Royal Observatory)

MONTH	ATMOSPHERIC PRESSURE				AIR TEMPERATURE					WET-BULB TEMPERATURE	DEW POINT	VAPOUR PRESSURE	RELATIVE HUMIDITY				AMOUNT OF CLOUD	RAINFALL							WIND		
																				Number of Days with								
	Absolute Maximum	Mean	Absolute Minimum	Mean Diurnal Range	Absolute Maximum	Mean Daily Maximum	Mean	Mean Daily Minimum	Absolute Minimum				Mean	Mean at 0200 hours	Mean at 1400 hours	Absolute Minimum		Total	Duration	0.1 mm or more	25.0 mm or more	50.0 mm or more	Maximum Hourly	Maximum Daily	Maximum Monthly	Prevailing Direction	Mean Speed	Maximum Gust *
	hPa	hPa	hPa	hPa	°C	°C	°C	°C	°C	°C	°C	hPa	%	%	%	%	%	mm	h				mm	mm	mm	degrees	km/h	km/h
January	1035.4	1020.2	1003.1	4.1	26.9	18.6	15.8	13.6	0.0	13.0	10.2	13.1	71	76	62	10	58	23.4	41	5.63	0.10	0.00	21.8	99.8	214.3	090	11.2	96
February	1032.7	1018.7	998.3	4.1	27.8	18.6	15.9	13.9	2.4	13.8	11.8	14.5	78	82	70	13	73	48.0	69	8.93	0.43	0.03	31.9	86.1	241.0	090	11.9	103
March	1032.4	1016.2	1001.9	4.2	30.1	21.3	18.5	16.5	4.8	16.5	15.0	17.6	81	85	73	16	76	66.9	89	10.07	0.60	0.27	50.1	126.4	428.0	090	12.6	108
April	1028.4	1013.1	999.9	3.8	33.4	24.9	22.2	20.2	9.9	20.2	19.0	22.4	83	88	75	22	78	161.5	82	11.13	2.20	0.97	92.4	190.2	492.2	090	11.7	106
May	1020.2	1009.1	981.1	3.4	35.5	28.7	25.9	23.9	15.4	23.7	22.6	27.7	83	87	76	23	74	316.7	92	14.93	3.40	1.93	109.9	520.6	1241.1	090	10.6	166
June	1014.4	1006.0	973.8	3.0	35.6	30.3	27.8	25.9	19.2	25.4	24.4	30.7	82	86	76	29	75	376.0	86	19.23	4.23	1.97	108.2	382.6	962.9	090	10.4	191
July	1014.8	1005.3	975.8	3.4	35.7	31.5	28.8	26.6	21.7	26.0	24.9	31.6	80	85	73	43	65	323.5	67	17.47	3.93	1.97	100.7	534.1	1147.2	090	10.1	151
August	1016.3	1005.1	961.6	3.5	36.1	31.3	28.4	26.3	21.6	25.9	24.8	31.4	81	86	74	41	66	391.4	73	17.30	4.70	2.17	82.1	334.2	1090.1	090	9.4	224
September	1018.2	1008.8	953.2	3.6	35.2	30.3	27.6	25.5	18.4	24.6	23.3	28.8	78	83	71	26	63	299.7	68	14.37	3.57	1.63	84.0	325.5	844.2	090	10.7	259
October	1024.5	1014.0	977.3	3.6	34.3	27.9	25.2	23.1	13.5	21.8	19.8	23.6	73	78	66	21	56	144.8	48	8.60	1.50	0.87	71.6	292.2	718.4	090	12.2	175
November	1033.2	1017.9	974.9	3.8	31.8	24.2	21.4	19.2	6.5	17.9	15.2	18.0	69	74	61	17	53	35.1	37	5.87	0.40	0.10	44.2	149.2	224.2	090	11.0	155
December	1033.5	1020.2	1004.6	4.0	28.7	20.5	17.6	15.4	4.3	14.3	11.2	14.1	68	73	59	14	49	27.3	31	3.87	0.23	0.10	51.7	177.3	206.9	090	10.5	104
Year	1035.4	1012.9	953.2	3.7	36.1	25.7	23.0	20.9	0.0	20.3	18.6	22.8	77	82	70	10	65	2214.3	782	137.40	25.30	12.00	109.9	534.1	1241.1	090	11.0	259
Date on which the extreme value was recorded	6 January 1903		1 September 1962		19 August 1900 18 August 1990				18 January 1893							16 January 1959						8 May 1992	19 July 1926	May 1889			1 September 1962

* 1911-1939 and April 1947-1995