HONG KONG OBSERVATORY

Technical Note No. 94

CLIMATOLOGY OF TA KWU LING 1986-1997

by

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Published October 1998

Prepared by

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134A Nathan Road
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551.506.1:551.582(512.317)

摘要

本報告是打鼓嶺自動氣象站在 1986 - 1997 期間的氣候摘要。除列出標準氣候圖表外，亦將打鼓嶺的紀錄與橫瀾島的風紀錄及天文台的氣溫紀錄作出比較。

Abstract

This note gives a climatological summary for Ta Kwu Ling Automatic Weather Station during 1986-1997. In addition to standard climatological tables and diagrams, comparisons of wind with Waglan Island and temperature with Hong Kong Observatory are also made.

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1. INTRODUCTION

Automatic weather stations were set up in Hong Kong to meet increasing demands for regional meteorological data for engineering projects in areas under development and to improve weather services. There are 27 such stations in operation at present. Ta Kwu Ling Automatic Weather Station is one of these stations with a history of more than 12 years. This note is to give a climatological summary for this station.

2. HISTORY OF THE STATION

Ta Kwu Ling Automatic Weather Station (22°31'50"N, 114°09'13"E) has been in operation since 14 October 1985. It is situated at a Government farm about 4 km northeast of Sheung Shui. The farm is a pig breeding centre which covers about 5 hectares of land. The land is undulating and about half of the area is used for growing fruit trees and the rest for raising livestock. Its location is shown in Figures 1 and 2.

The high hills around the station are :

Wong Mau Hang Shan	(243 m)	3 km to NE
Wo Keng Shan	(297 m)	2 km to ENE
Robin's Nest	(492 m)	4 km to ENE
Kwai Tau Leng	(486 m)	4 km to ESE
Ma Tau Leng	(164 m)	2 km to SSW

3. DATA

The data used in this note are hourly records measured at Ta Kwu Ling Automatic Weather Station between January 1986 and December 1997. A total of 105 192 observations was loaded into the Oracle database of the Hong Kong Observatory and analyzed using SQL (Structured Query Language). It should be noted that there are periods of incomplete data due to equipment or transmission failure.

4. INSTRUMENTS AND METHODS OF OBSERVATION

At automatic weather stations, measurements of wind, dry-bulb temperature, dew point, relative humidity, atmospheric pressure and rainfall are recorded by automatic instruments and data are transmitted to the Hong Kong Observatory at one-minute intervals via telephone circuits. Figures 3(a) and (b) show the instruments viewed from different directions. The following paragraphs describe the instruments and methods of observation used in Ta Kwu Ling during the years 1986-1997.

(a) Atmospheric pressure

Atmospheric pressure was measured with a Setra Systems digital barometer, model 361B, placed inside a hut next to the anemometer mast.

Height above floor = 1.5 m
Height above mean sea-level = 13.5 m

(b) Air temperature, dew point and relative humidity

Dry-bulb temperature and dew point were measured with a Climatronics temperature and dew-point sensor with its sensing elements placed in a Stevenson screen box. Values of relative humidity were calculated from the dry-bulb temperature and dew point. In March 1996, the dew-point sensor was replaced by a relative humidity sensor.

Daily maximum and minimum temperatures were extracted from 1-minute data in each day.

Before June 1988, the temperature sensor was placed inside a motor-aspirated shield close to the wall of the site office and to the instrument hut of the station. A previous study concluded that due to improper siting, the temperature recorded was higher than the ambient temperature on summer afternoons. It was then re-sited to the screen box next to the conventional rain-gauges at the same station. Therefore, only those data since June 1988 are used in this note.

(c) Wind

Winds were measured with a Teledyne Geotech WS201 cup anemometer with its head 27.6 m above mean sea-level. Hourly mean wind was computed from the 1-minute data in the hour (Yeung et al 1987).

(d) Rainfall

Rainfall was recorded with a Casella tipping bucket rain-gauge with a step size of 0.5 mm.

5. ANALYSIS

(a) Climatological summary

Monthly values of meteorological elements are summarized in Table 1. Readers are reminded that data are subject to loss because of equipment or transmission failure. The effect on rainfall is significant due to missing records during some major rainstorms particularly in April & May 1992, July & August 1994 and July & August 1997. Rainfall records from the ordinary or autographic rain-gauges at the same station are then substituted in the calculation of mean monthly and annual rainfall.

(b) Monthly and annual wind roses

The total number of occurrences of concurrent wind speed and direction is computed for each month. Wind directions are grouped into ranges of 30° and wind speeds in m/s into categories as follows : 0.1-3.2, 3.3-8.2, 8.3-14.2 and >14.2. The percentage frequencies are shown in Table 2 and are plotted in the form of wind roses in Figures 4-6.

It can be seen that the most frequent and prevailing wind direction is east-southeast throughout the year (see Table 1).

(c) Diurnal variation of wind

Hourly vector mean winds are computed for each month. These are shown in Table 3 and plotted in Figures 7-8. No regular change in direction is observed from January to June. From July to December, winds begin to veer around 10 a.m. until late afternoon when they start to back again. Maximum wind speeds occur around noon from September to April, but shift to the evening from May to August.

(d) Hourly means of meteorological elements

Hourly means in each month for the following elements are shown in Tables 4-7 and are plotted in Figures 9-12.

(i) mean sea-level pressure
(ii) air temperature
(iii) dew point
(iv) relative humidity

(e) Gust factor

Gust factor is defined as the ratio of hourly instantaneous maximum gust to hourly mean wind. Using the regression equation of gust(G) on hourly mean wind(M), gust factor(GF) can be obtained. If the regression equation is written as

$$G = a M + b$$

then $$GF = a + b/M$$

Regression equations for winds in different quadrants and their corresponding gust factors are shown below :

$G = 1.90 M + 1.03$,	$r=0.94$	(direction between 050° and 130° , east)
$G = 2.21 M + 0.69$,	$r=0.95$	(direction between 140° and 220° , south)
$G = 2.29 M + 0.67$,	$r=0.94$	(direction between 230° and 310° , west)
$G = 2.07 M + 1.03$,	$r=0.96$	(direction between 320° and 040° , north)

where r is the correlation coefficient.

Hourly mean wind (m/s)	Gust factor			
	East	South	West	North
5	2.11	2.35	2.42	2.28
10	2.00	2.28	2.35	2.18
15	1.97	2.26	2.33	2.14
20	1.95	2.25	2.32	2.13

(f) Extreme values of temperature, rainfall and gust

The top 20 extreme values of maximum and minimum temperatures, maximum gust and maximum hourly, daily and monthly rainfall are listed in Table 8. The extreme values recorded at the Hong Kong Observatory during the same period are also given on the last line for comparison.

Extreme maximum temperatures were due to subsidence ahead of tropical cyclones or prolonged fine weather brought about by ridges. Extreme minimum temperatures were due to cold surges in winter times.

The heaviest rainfall at Ta Kwu Ling, as characteristic of Hong Kong, was brought by tropical cyclones and monsoon troughs.

The occurrences of maximum gusts, except the cases on 28 & 29 November 1987 (Ranks 4,9,14,17 & 19) when an intense northeast monsoon affected the South China coastal areas with the enhancement by Typhoon Nina, were recorded during the passage of tropical cyclones. They were Brenda, Gordon, Koryn, Becky, Sibyl and Victor in May 1989, July 1989, June 1993, September 1993, October 1995 and August 1997 respectively.

(g) Comparison of wind with Waglan Island

Differences in wind direction between Ta Kwu Ling and Waglan Island, grouped by four quadrants (as in (e) above), are measured with the angle veering or backing from the prevailing wind direction recorded at Waglan Island. These differences are shown in Figure 13. For the east and south quadrants, the distributions are single-peak bell-shaped. Winds at Ta Kwu Ling most often veer 30 degrees from the easterlies at Waglan but back 30 degrees from the southerlies. No significant veering or backing in the west quadrant is observed. Two peaks are observed for the north quadrant, indicating that when winds at Waglan are northerlies, winds at Ta Kwu Ling would also likely to be northerlies, but the second likely direction would be easterlies.

Regression equations of hourly wind speeds at Ta Kwu Ling (TKL) against those at Waglan Island (WGL) in different quadrants with the speed at Waglan Island exceeding 5 m/s are shown below:

East	:	$V_{TKL} = 0.15\ V_{WGL} + 1.60$	($r = 0.28$)
South	:	$V_{TKL} = 0.17\ V_{WGL} + 0.78$	($r = 0.33$)
West	:	$V_{TKL} = 0.15\ V_{WGL} + 0.57$	($r = 0.27$)
North	:	$V_{TKL} = 0.35\ V_{WGL} + 0.07$	($r = 0.51$)

The linear relationships can only be regarded as fair, as reflected by the small values of correlation coefficients. The wind speed of Ta Kwu Ling is about 35% of that at Waglan Island with northerlies but only 20% from other wind directions.

(h) Comparison of temperature with Hong Kong Observatory

Regression equations of daily maximum, minimum and mean temperatures at Ta Kwu Ling against those at the Observatory (HKO) are shown below:

daily maximum temperature	:	$T_{TKL} = 1.04\ T_{HKO} - 0.09$	($r = 0.95$)
daily minimum temperature	:	$T_{TKL} = 1.09\ T_{HKO} - 4.02$	($r = 0.89$)
daily mean temperature	:	$T_{TKL} = 1.05\ T_{HKO} - 2.02$	($r = 0.96$)

Excellent linear relationships can be seen in the scatter diagrams with associated regression lines shown in Figures 14.

Generally, the daily maximum temperature is about 1 °C higher than that of the Observatory in summer while the daily minimum temperature is about 3 °C lower in winter. Daily mean temperature is 0.5 °C lower in summer and 1.5 °C lower in winter at Ta Kwu Ling.

Despite the high value of correlation coefficient, it has been experienced that the minimum temperatures at Ta Kwu Ling in winter are usually more than three degrees (sometimes more than ten) lower than that recorded at the Observatory. It is observed that

in the diagram for the minimum temperatures of Figure 14, there is a cluster of data points at the lower left portion with larger deviation from the regression line. It is checked that they correspond to clear sky condition.

To study the difference in daily minimum temperatures between Ta Kwu Ling and the Observatory in winter, regression equations under different wind and cloud conditions with HKO minimum temperatures equal to or below 15°C are obtained and shown below and in Figures 15 and 16. It can be seen that cloud cover is the dominant factor for the temperature difference. Whether the winds are fresh easterly, northerly or light variable, the difference in minimum temperatures between HKO and TKL under clear sky condition (daily mean cloud amount at HKO being less than 25%) would be more than double the difference when there are more clouds.

Case	Daily mean cloud amount at HKO (%)	Daily prevailing wind direction at WGL	Daily mean wind speed at WGL (m/s)	Regression equation	Correlation coefficient	MIN_{HKO} - MIN_{TKL} when MIN_{HKO} = 12°C
1	> 25	north	> 5.4	$MIN_{TKL} = 1.00\ MIN_{HKO} - 2.14$	0.91	2.1
2	> 25	east	> 5.4	$MIN_{TKL} = 1.12\ MIN_{HKO} - 4.29$	0.58	2.8
3	<= 25	north	> 5.4	$MIN_{TKL} = 1.11\ MIN_{HKO} - 6.76$	0.74	5.4
4	<= 25	east	> 5.4	$MIN_{TKL} = 1.11\ MIN_{HKO} - 7.85$	0.54	6.5
5	> 25	-----	<= 5.4	$MIN_{TKL} = 1.13\ MIN_{HKO} - 4.76$	0.74	3.2
6	<= 25	-----	<= 5.4	$MIN_{TKL} = 0.90\ MIN_{HKO} - 6.92$	0.58	8.1

From Figure 15, it can be observed that the temperature at HKO would be much lower in northerlies than in easterlies while the range of minimum temperature at TKL remains much the same irrespective of wind direction. There are cases where temperature at HKO rose rapidly when winds at WGL turned easterly following a northerly surge but TKL stayed very cold even after the change of wind. The easterlies at HKO also have a longer sea track and would be warmer. These may be contributing factors towards larger difference between minimum temperatures at HKO and TKL in easterlies than in northerlies. Wind speed also has an influence. The minimum temperature at TKL can be lower than that of HKO by 10°C or more in clear sky and light wind condition in cold weather, as shown in Figure 16.

A similar analysis on maximum temperature for different sky conditions in light winds is also made with maximum temperature at HKO reaching 30°C or more. Their scatter diagrams with associated regression lines are shown in Figure 17 and their regression equations are shown below.

Cloud amount at HKO > 25% : $MAX_{TKL} = 0.94\ MAX_{HKO} + 3.06$ (r = 0.70)
Cloud amount at HKO <= 25% : $MAX_{TKL} = 0.87\ MAX_{HKO} + 5.90$ (r = 0.72)

Maximum temperatures at Ta Kwu Ling are generally 1.5°C higher than that at the Observatory under clear sky and light wind condition in summer. This is only slightly different from the overall estimation.

ACKNOWLEDGEMENT

The authors would like to thank Mr. W.K. Kwan for his valuable comments on reviewing this note.

REFERENCES

1.	Chen, T.Y.	1975	Comparison of Surface Winds in Hong Kong, Hong Kong Observatory Technical Note No. 41
2.	Lui, W.H.	1991	Preliminary Analysis of Wind Data Recorded by Automatic Weather Stations in Hong Kong, Hong Kong Observatory Technical Note (Local) No. 59
3.	Ng, M.C. and K.P. Wong	1996	30-Year Mean Rainfall in Hong Kong 1961-1990, Hong Kong Technical Note No. 88
4.	Yeung, K.H., K.K. Ng and L.K. Yau	1987	A Solar-powered Automatic Weather Station, Hong Kong Observatory Technical Note No. 75

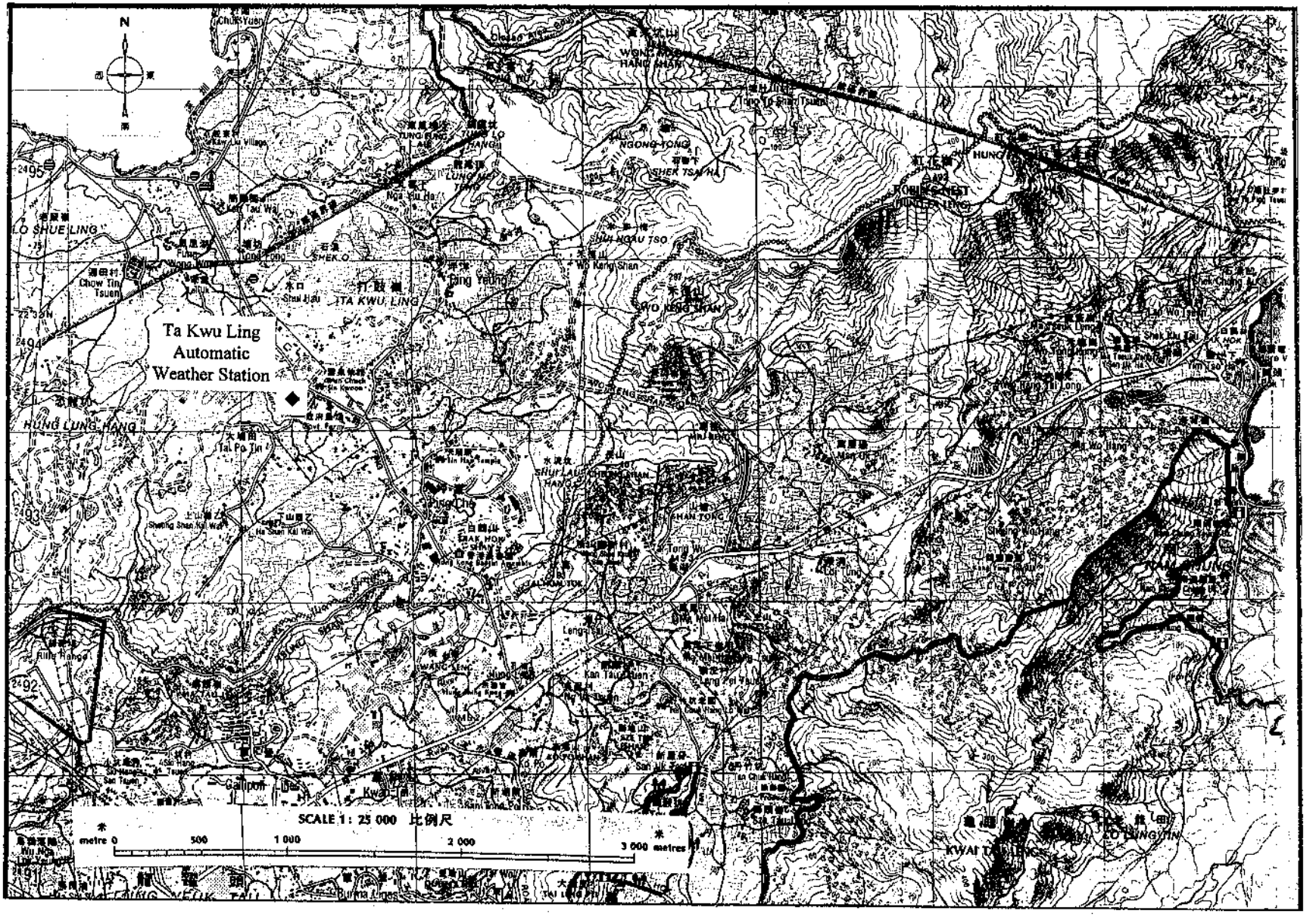
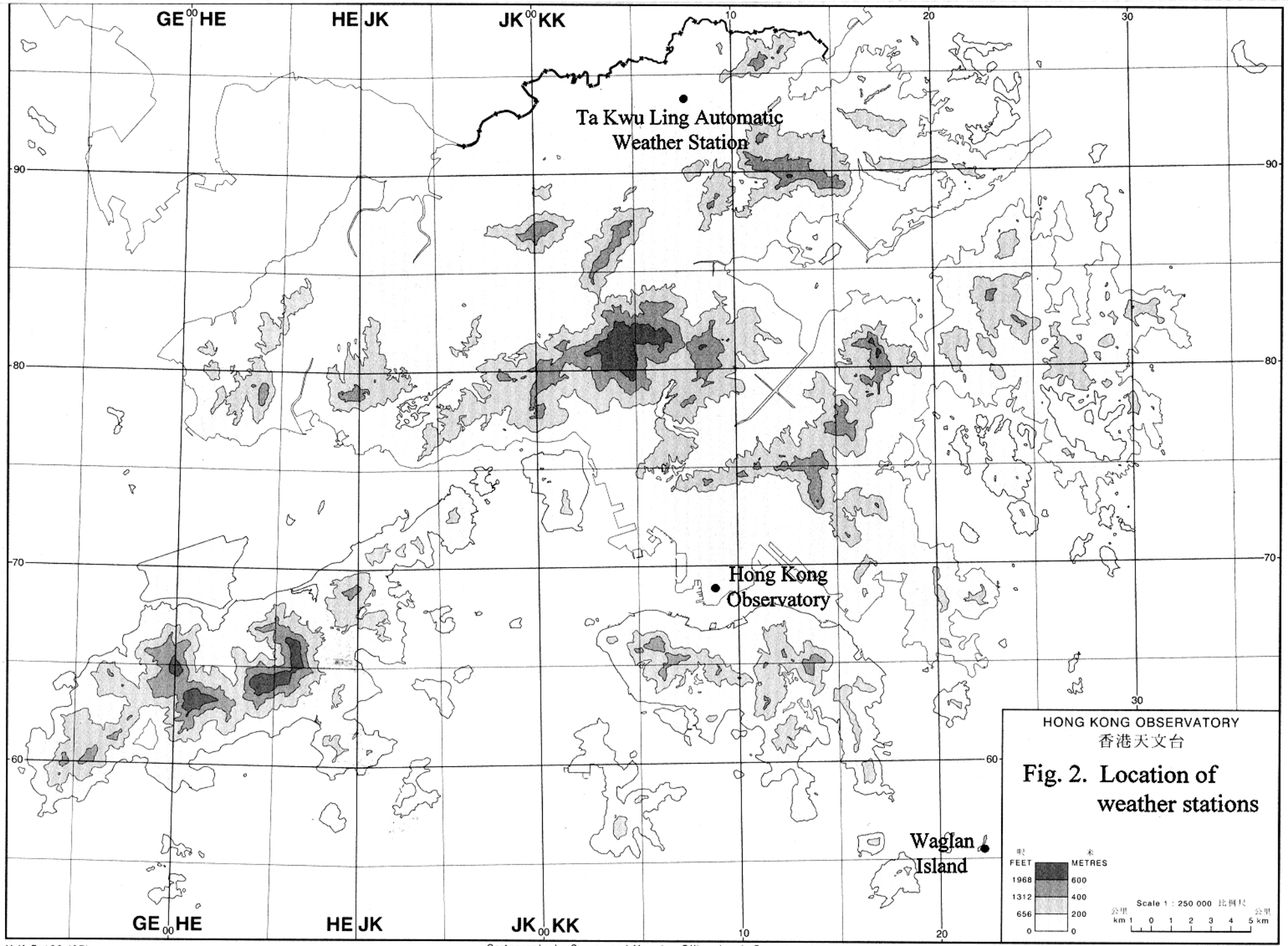


Fig. 1. Location of Ta Kwu Ling Automatic Weather Station.



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Cartography by Survey and Mapping Office, Lands Department.
地政總署測繪處繪製

Fig. 3(a). Instruments at Ta Kwu Ling looking towards the northwest. The tipping bucket rain-gauge is on the roof of the house next to the anemometer mast on the right.

Fig. 3(b). The Stevenson screen box with the ordinary and tilting siphon rain-gauges at Ta Kwu Ling looking towards the southwest.

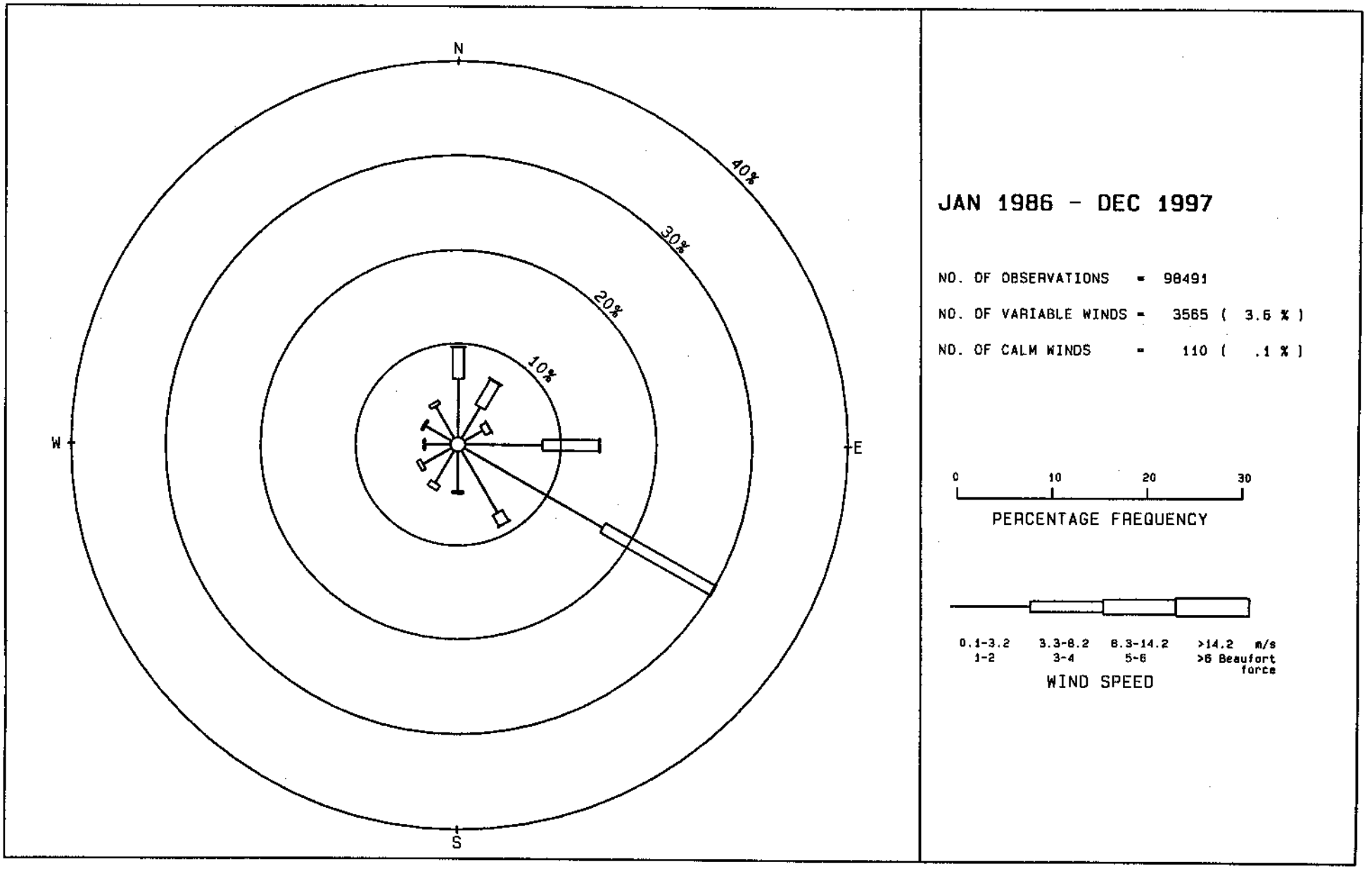


Fig. 4. Annual wind rose for Ta Kwu Ling, 1986-1997.

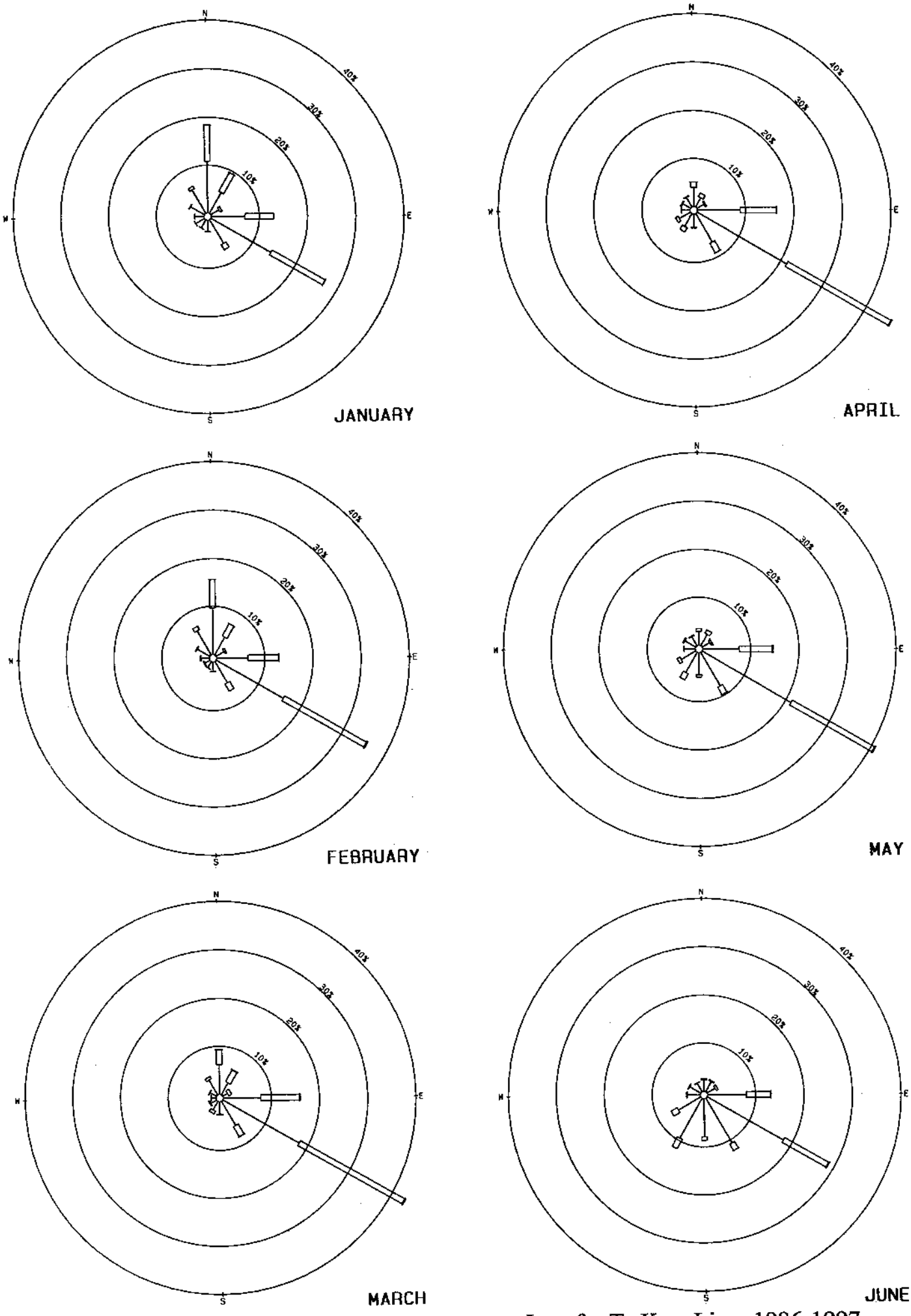


Fig. 5. Monthly wind roses from January to June for Ta Kwu Ling, 1986-1997.

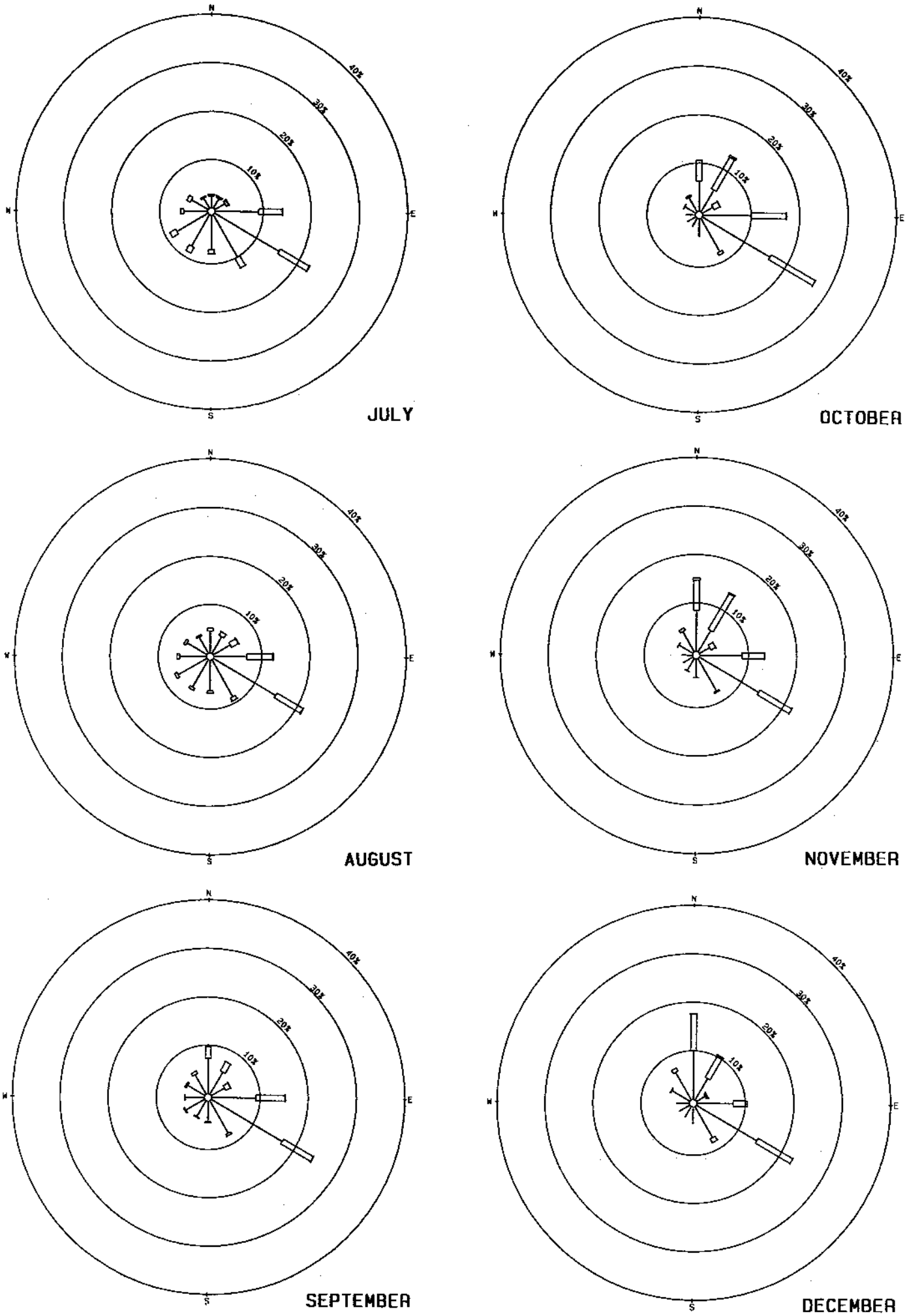


Fig. 6. Monthly wind roses from July to December for Ta Kwu Ling, 1986-1997.

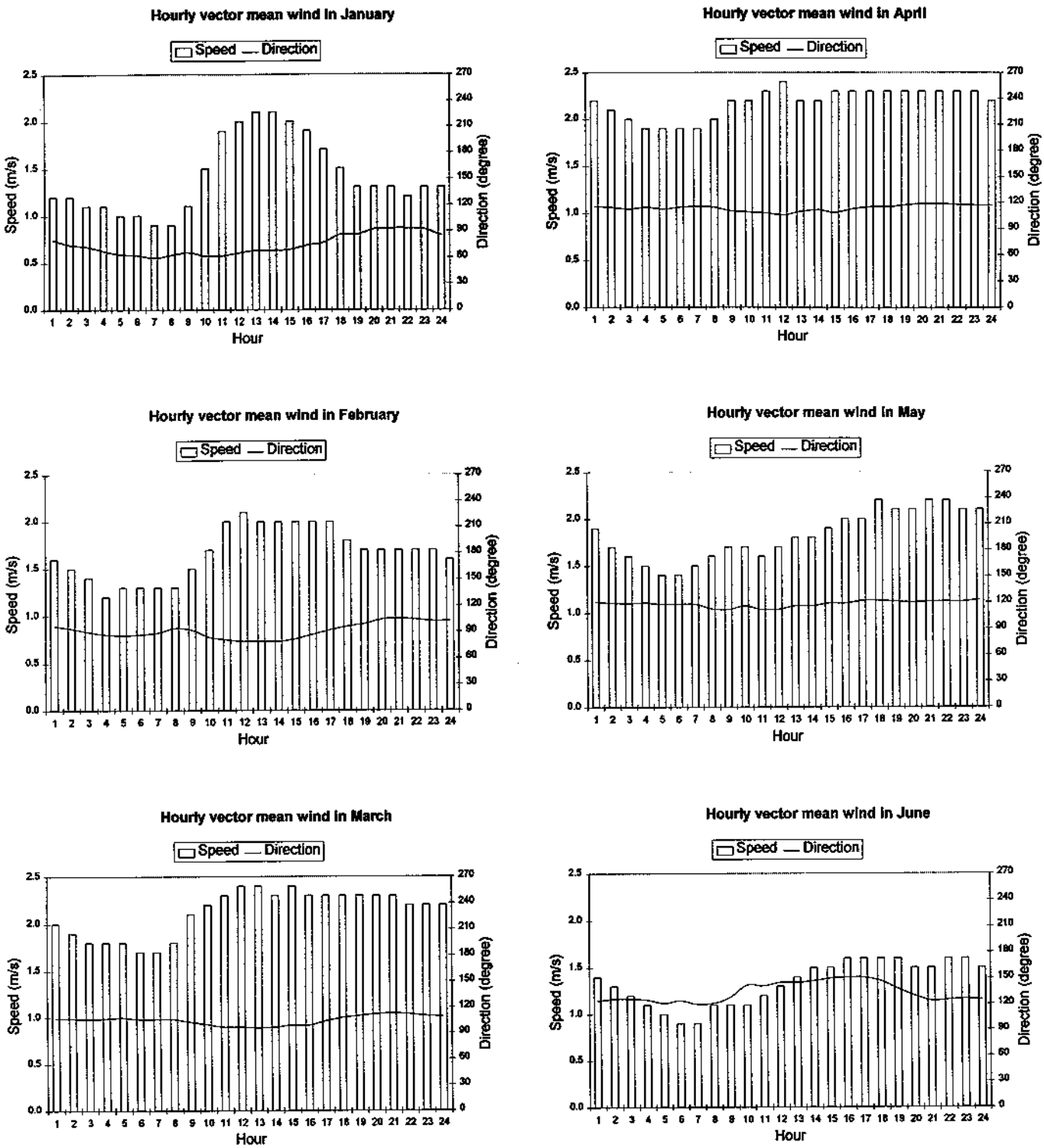


Fig. 7. Hourly vector mean wind from January to June at Ta Kwu Ling, 1986-1997.

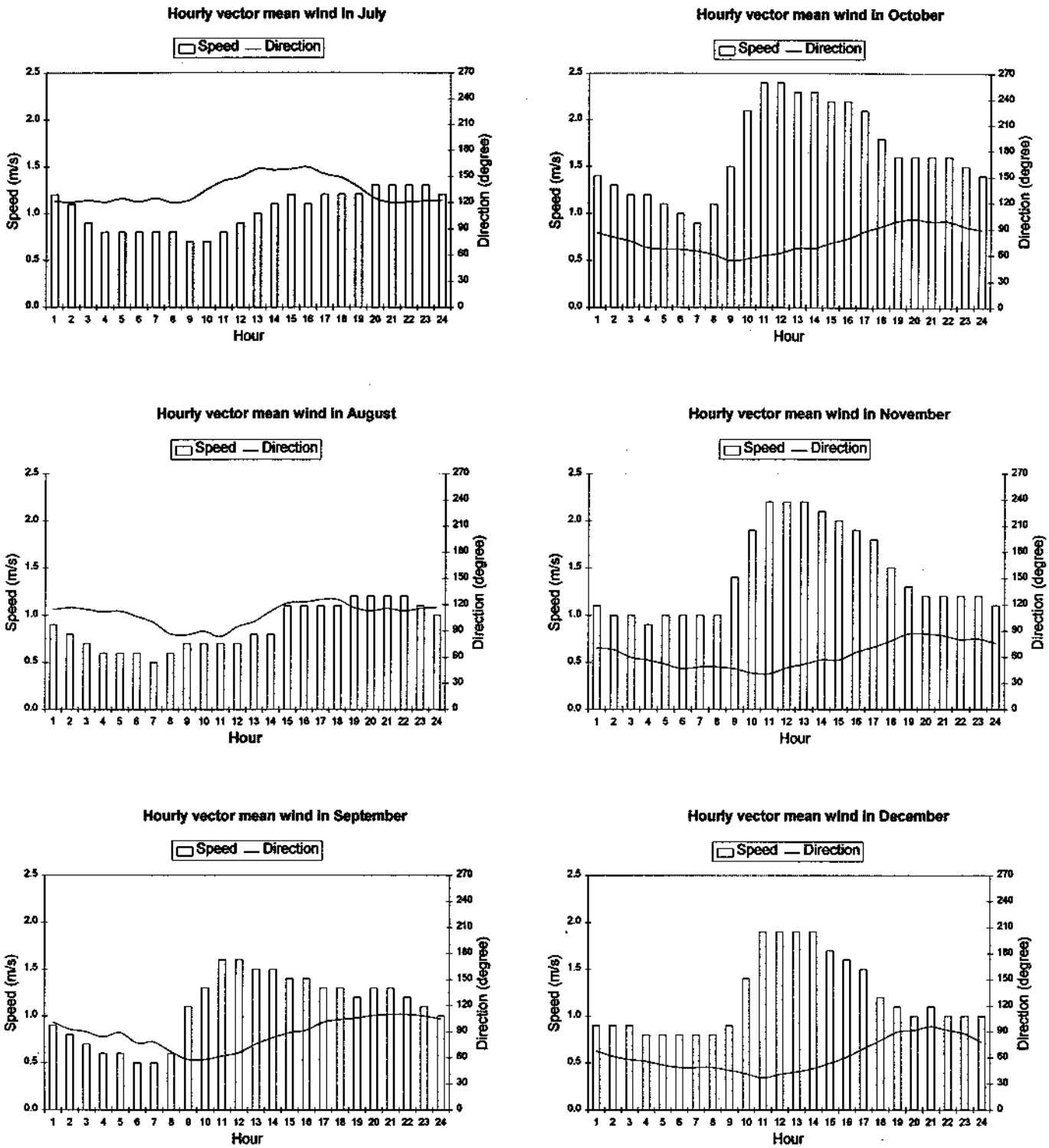


Fig. 8. Hourly vector mean wind from July to December at Ta Kwu Ling, 1986-1997.

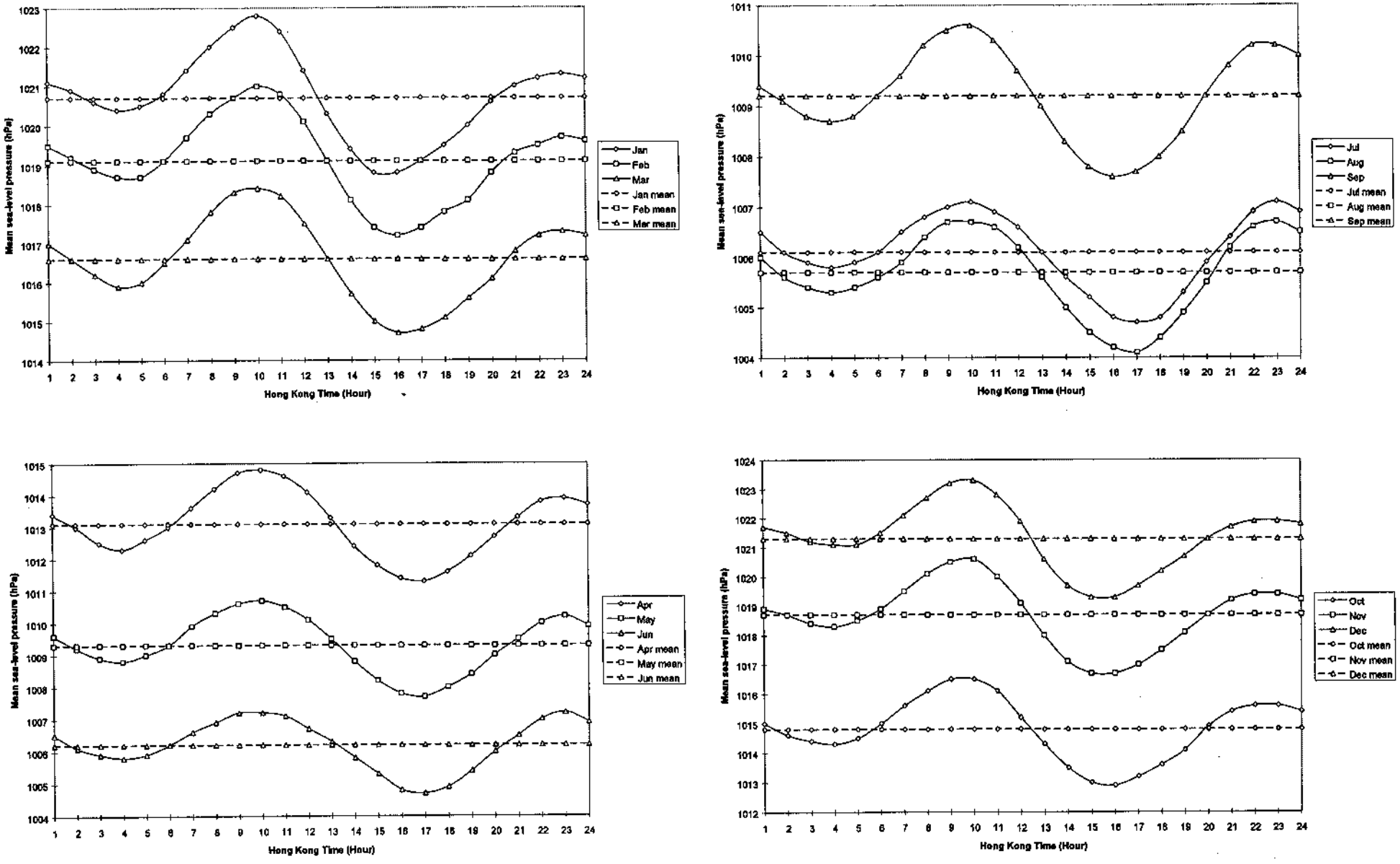


Fig. 9. Diurnal variation of mean sea-level pressure at Ta Kwu Ling, 1986-1997.

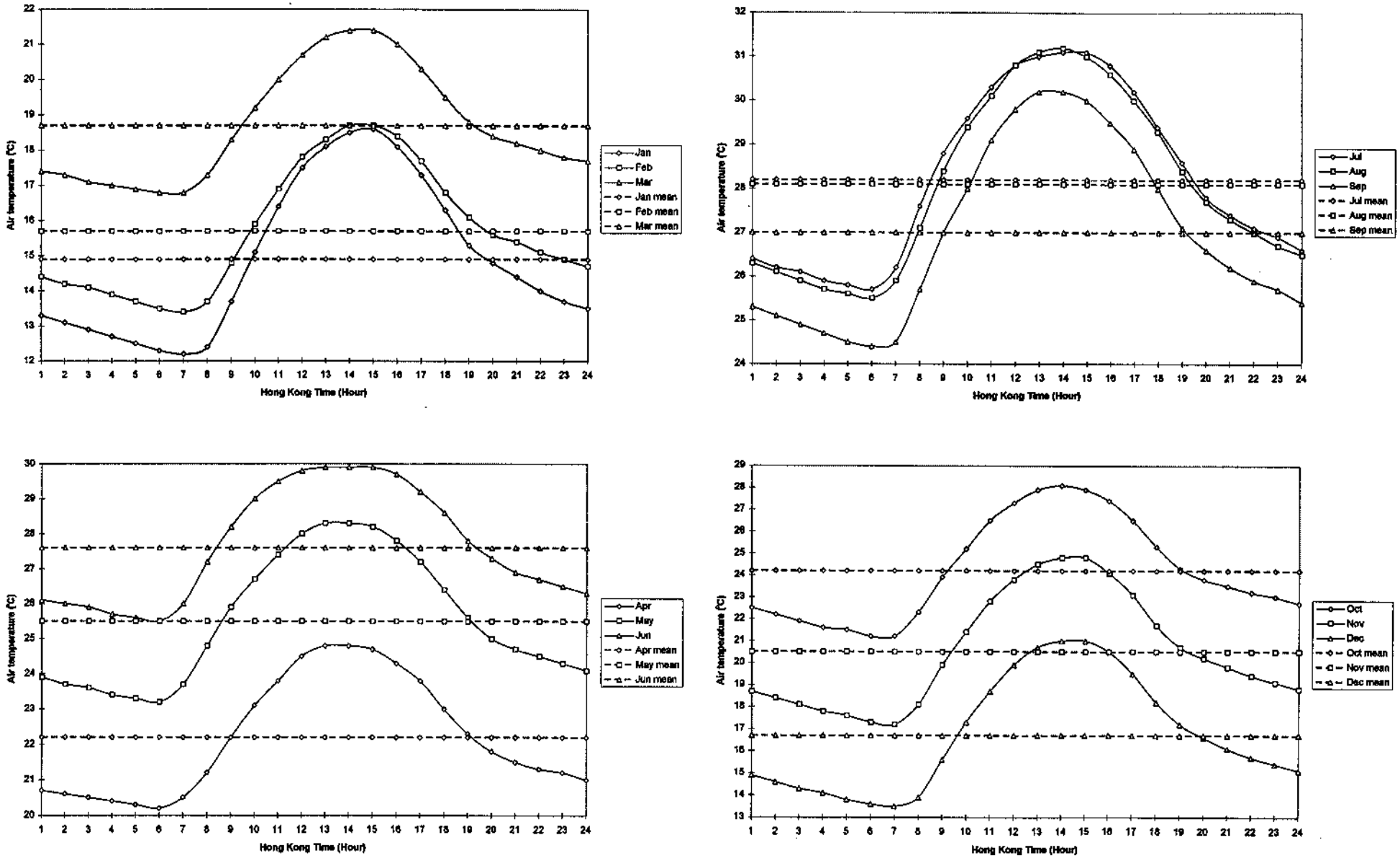


Fig. 10. Diurnal variation of air temperature at Ta Kwu Ling, 1989-1997.

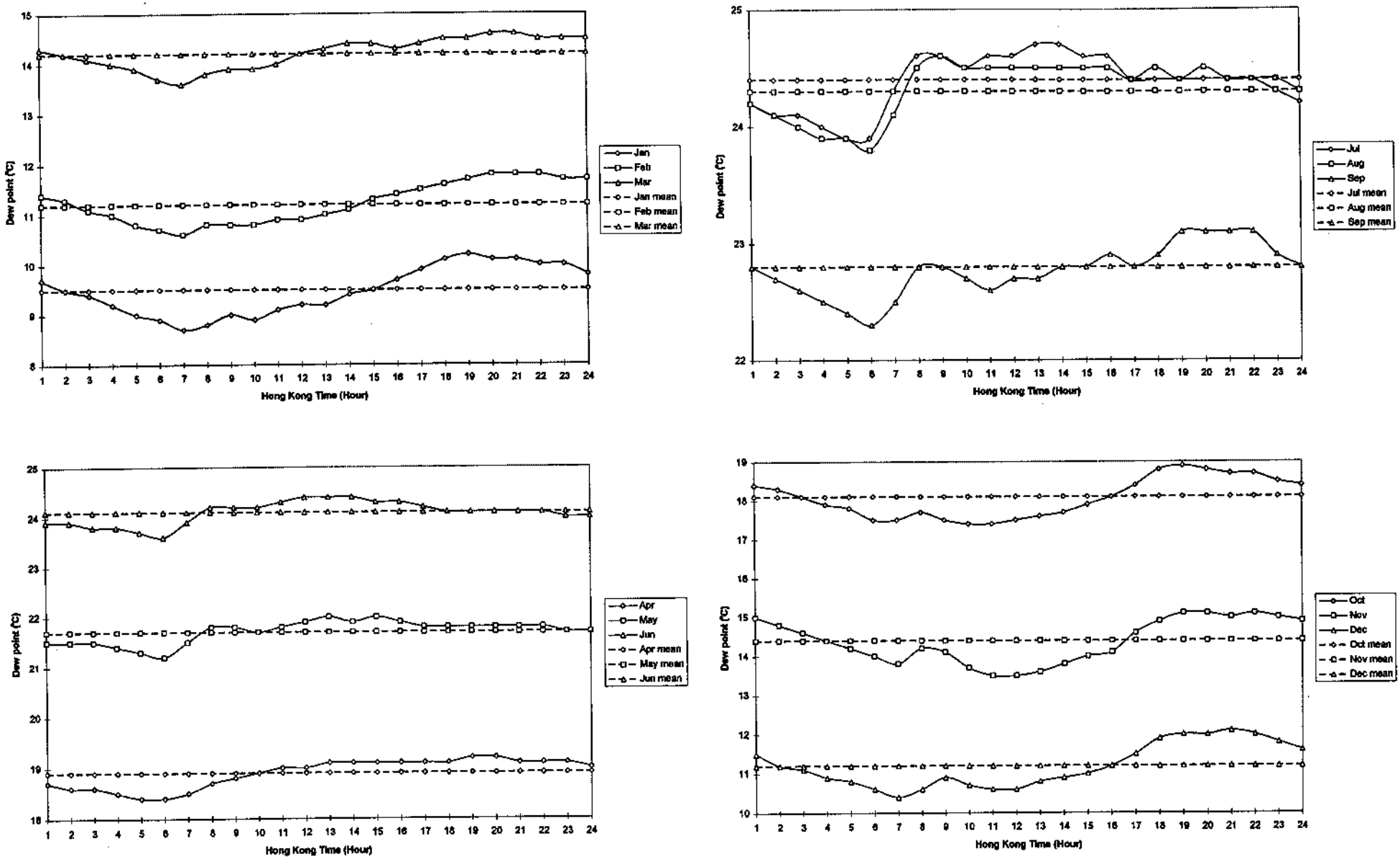


Fig. 11. Diurnal variation of dew point at Ta Kwu Ling, 1989-1997.

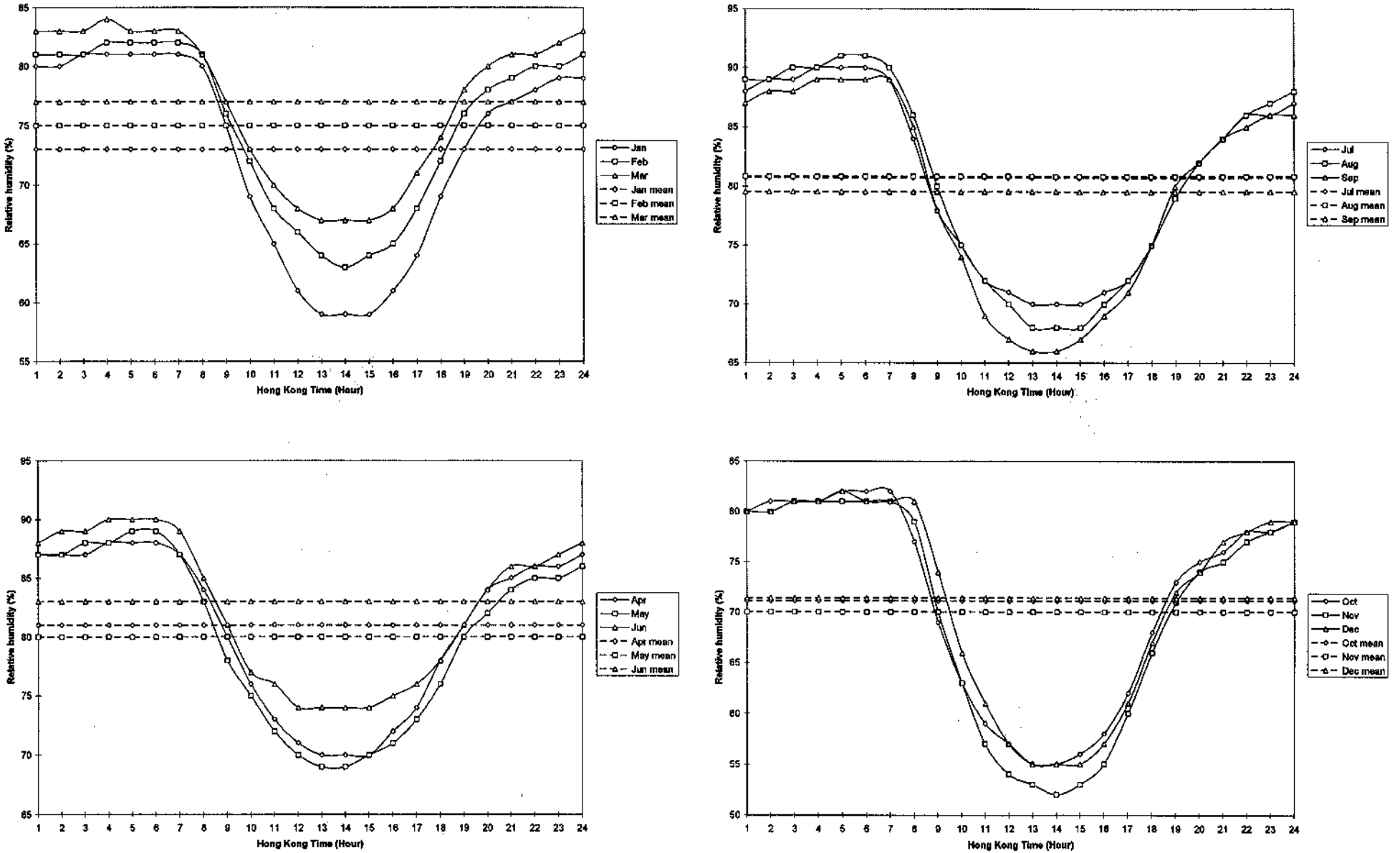


Fig. 12. Diurnal variation of relative humidity at Ta Kwu Ling, 1989-1997.

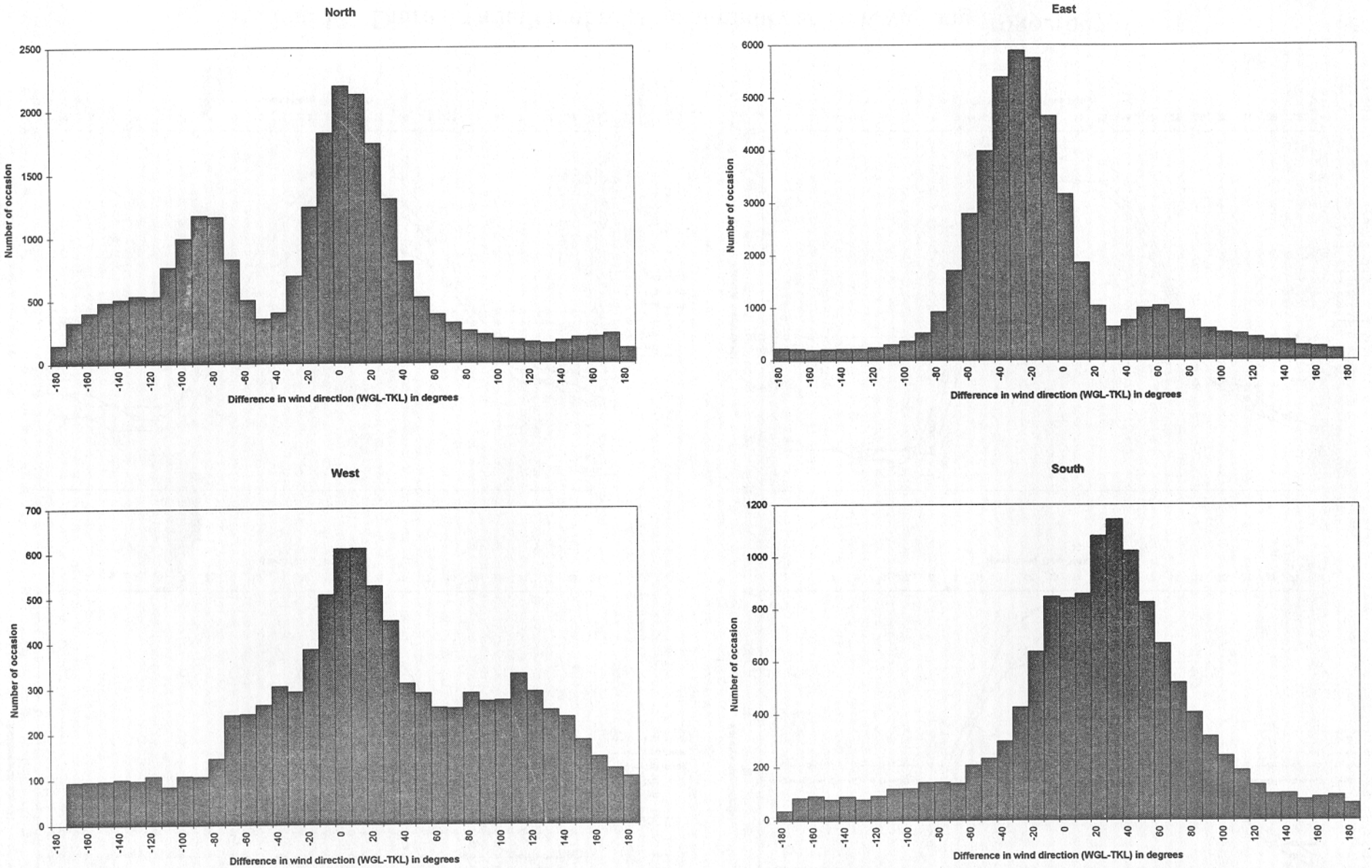


Fig. 13. Frequency distribution of the difference in hourly mean wind directions between Waglan Island (WGL) and Ta Kwu Ling (TKL), grouped according to the wind direction at Waglan Island (WGL-TKL).

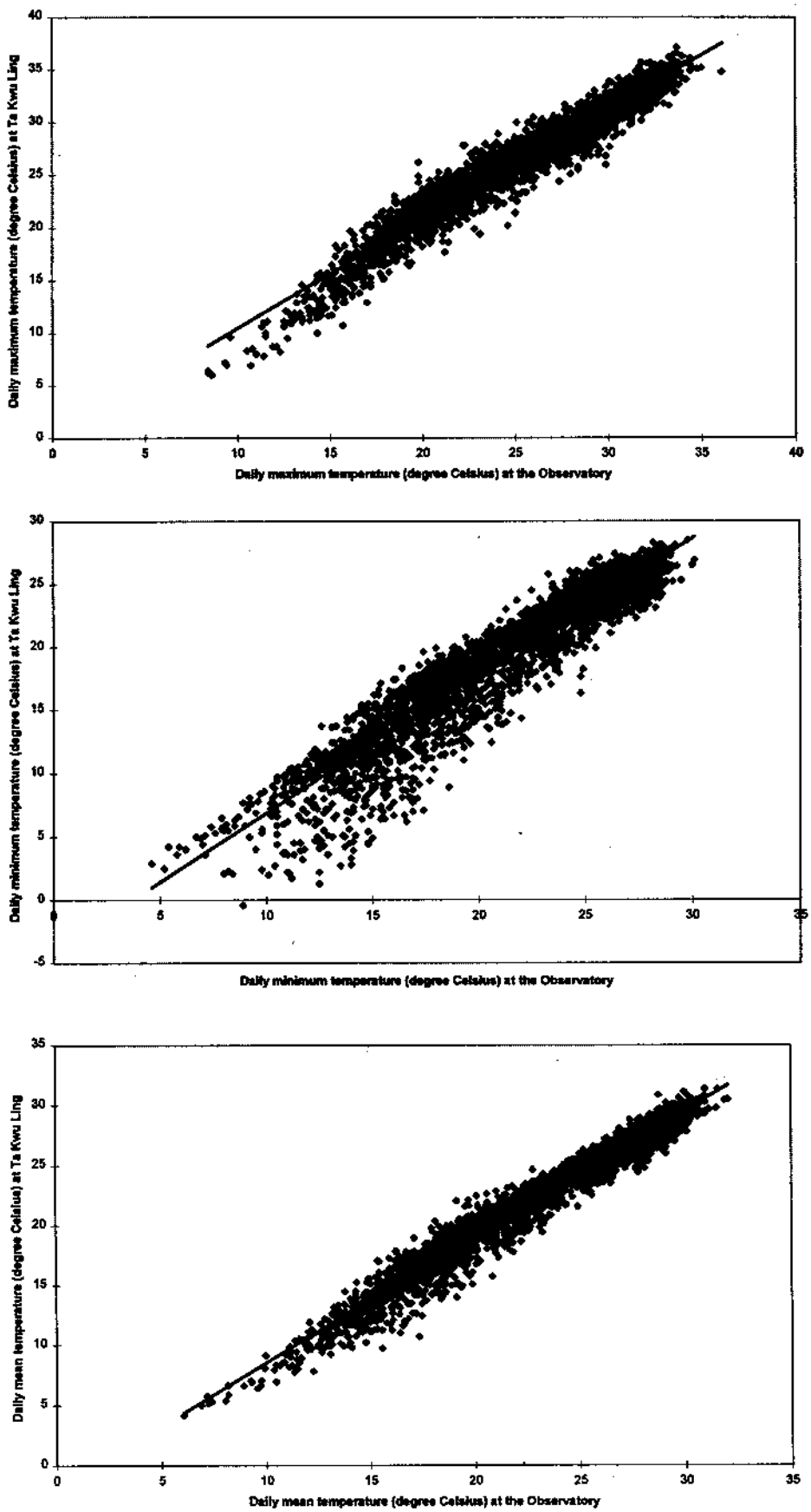


Fig. 14. Comparison of daily maximum, minimum and mean temperatures between Ta Kwu Ling and the Observatory.

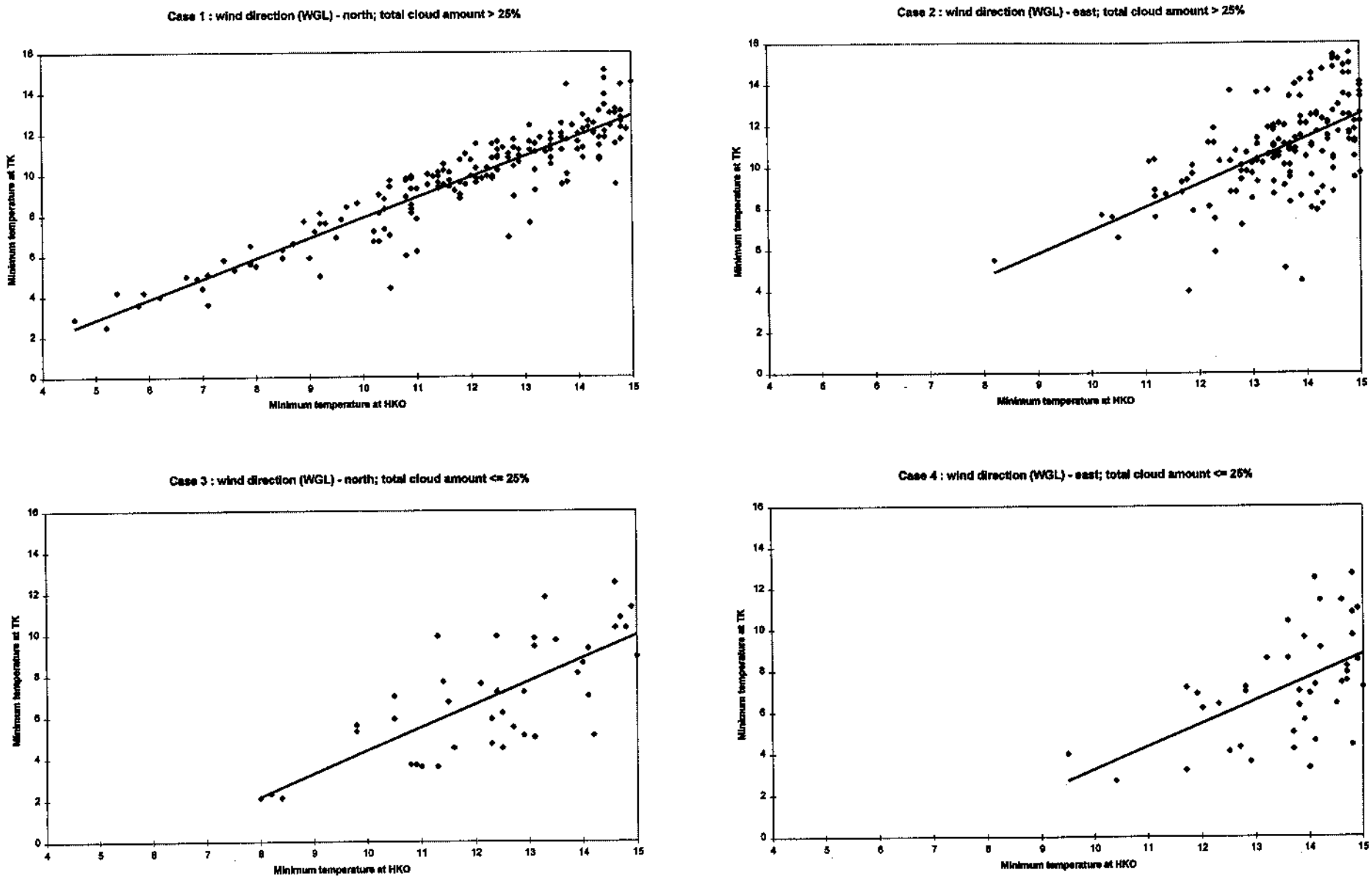
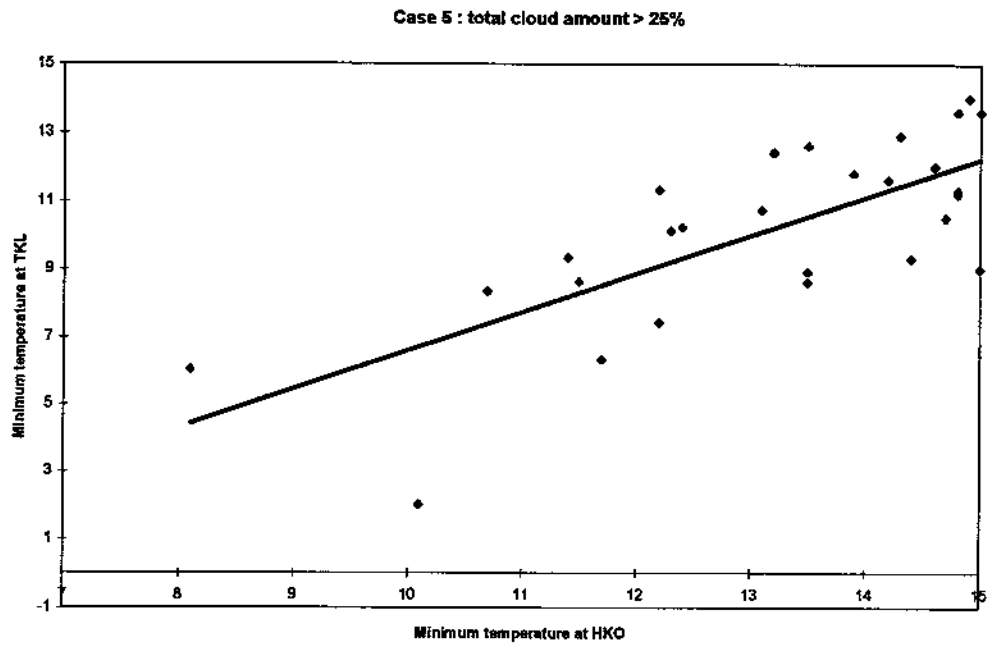


Fig. 15. Comparison of daily minimum temperatures between TKL and HKO when the mean wind speed of WGL is force 4 or above.



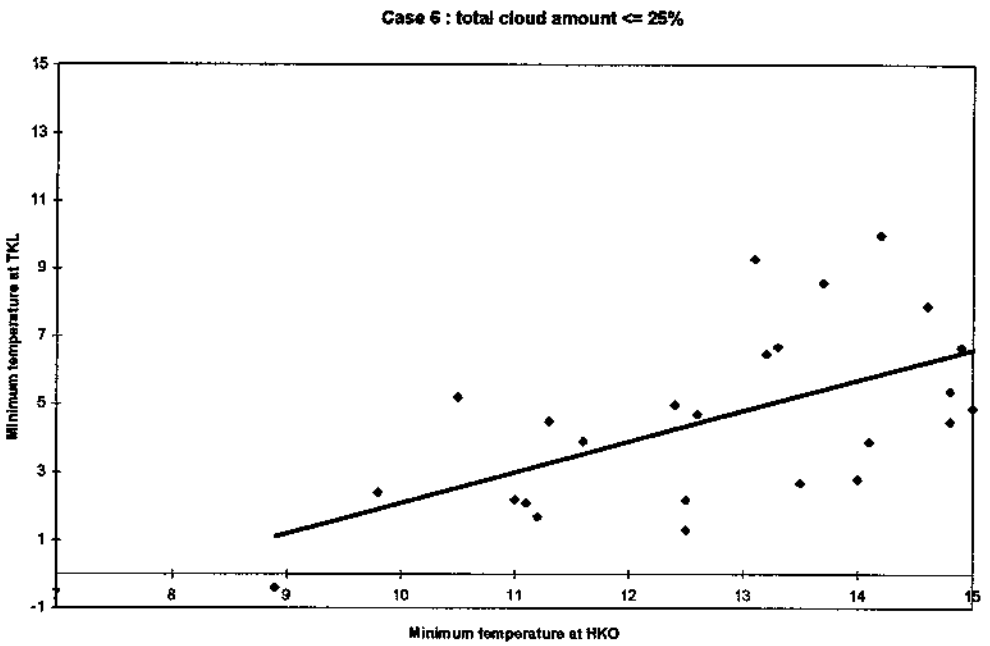
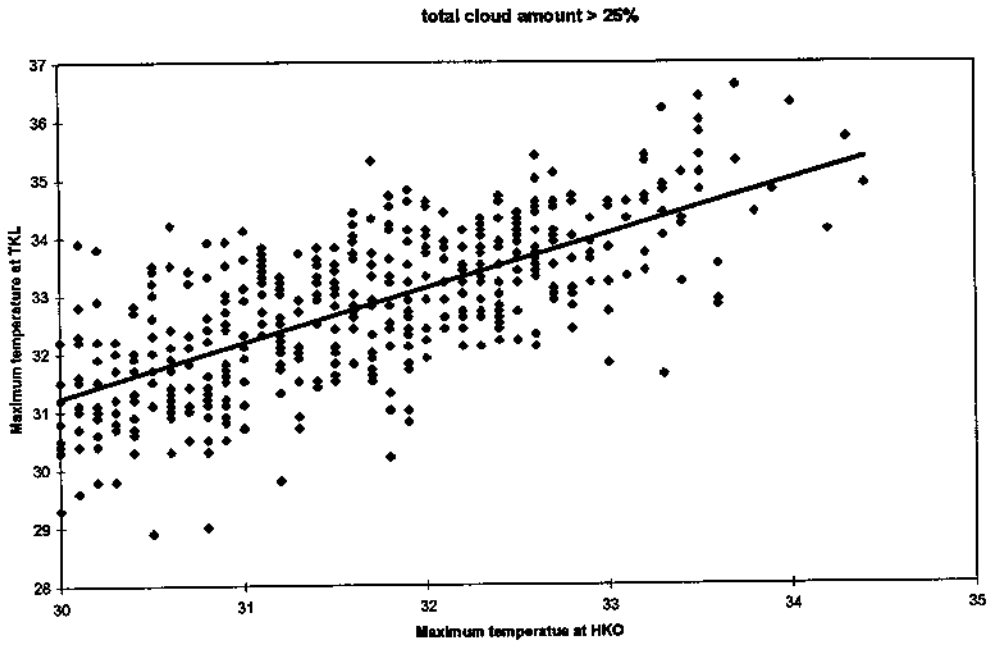


Fig. 16. Comparison of daily minimum temperatures between TKL and HKO when the mean wind speed of WGL is force 0 to 3.



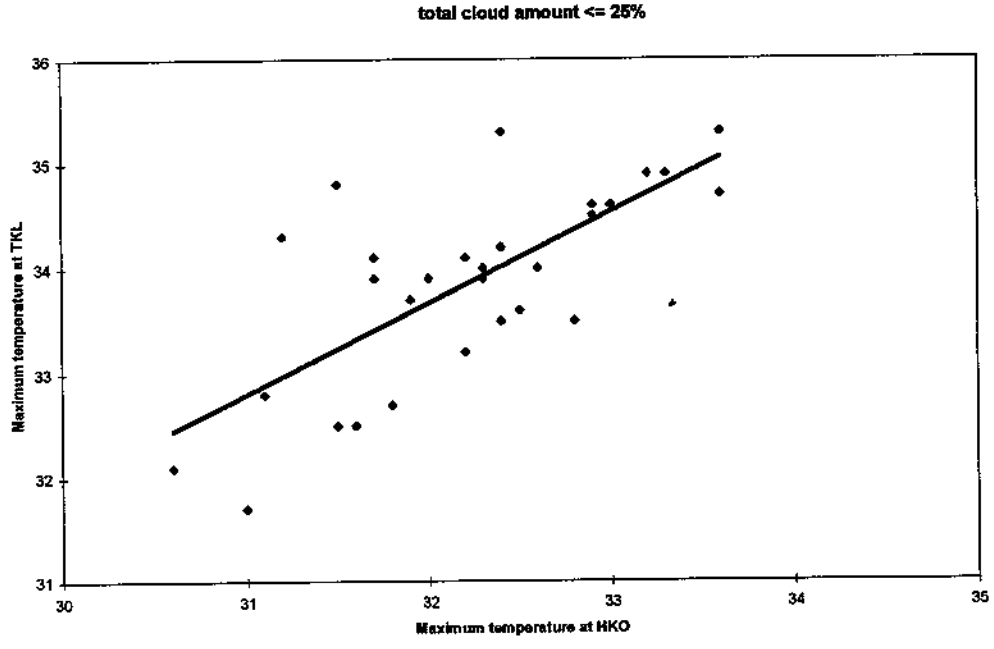


Fig. 17. Comparison of daily maximum temperatures between TKL and HKO when the mean wind speed of WGL is force 0 to 3.

TABLE 1.

CLIMATOLOGICAL SUMMARY FOR TA KWU LING, 1986-1997

Month	Air Temperature							Dew Point#	Relative Humidity#	Mean Sea Level Pressure	Prevailing Wind Direction	Wind Speed	Maximum Gust
	24-hour	Mean Daily#		Absolute Extremes##									
	Mean#	Maximum	Minimum	Maximum	Date	Minimum	Date						
	°C	°C	°C	°C		°C		°C	%	hPa	degrees	m/s	m/s
January	14.9	19.3	11.2	27.2	1/1/91	-0.4	29/01/93	9.5	73	1020.7	120	2.5	19.8
February	15.7	19.5	12.6	30.0	1/2/94	2.7	6/2/95	11.2	75	1019.1	120	2.8	22.6
March	18.7	22.4	15.9	30.3	28/03/93	7.0	5/3/95	14.2	77	1016.6	120	3.0	21.2
April	22.2	25.7	19.6	33.9	28/04/94	9.3	3/4/96	18.9	81	1013.1	120	2.9	22.3
May	25.5	29.3	22.7	35.7	24/05/91 25/05/91	17.8	7/5/90	21.7	80	1009.3	120	2.6	26.1
June	27.6	31.1	25.0	35.0	15/06/88	16.3	4/6/88	24.1	83	1006.2	120	2.2	28.5
July	28.2	32.2	25.1	37.1	7/7/89	21.1	30/07/89	24.4	81	1006.1	110	2.1	26.8
August	28.1	32.2	25.1	36.1	23/08/90	22.3	7/8/88	24.3	81	1005.7	110	2.0	29.0
September	27.0	31.0	23.9	36.4	1/9/90	16.9	27/09/88	22.8	79	1009.2	110	2.1	30.7
October	24.2	28.7	20.7	34.3	3/10/92	12.0	25/10/94	18.1	71	1014.8	110	2.5	28.8
November	20.5	25.5	16.5	32.2	1/11/96	4.2	29/11/88	14.4	70	1018.7	110	2.4	28.7
December	16.7	21.7	12.6	28.5	7/12/92 3/12/93	1.3	31/12/95	11.2	71	1021.3	120	2.2	26.0
Year	22.4	26.5	19.2	37.1	7/7/89	-0.4	29/01/93	17.6	77	1013.5	120	2.5	30.7

: 1989-1997 ## : June 1988 - December 1997

TABLE 1. (cont'd)

Month	Rainfall			Number of Days with Rainfall					Number of Hours with Rainfall			
	Total* mm	Maximum Daily mm	Maximum Hourly mm	>=0.5 mm	>=10.0 mm	>=25.0 mm	>=50.0 mm	>=100.0 mm	>=0.5 mm	>=10.0 mm	>=25.0 mm	>=50.0 mm
January	20.4	38.5	12.0	2.50	0.42	0.08	-	-	10.42	0.08	-	-
February	46.1	34.0	11.5	6.08	1.33	0.17	-	-	23.67	0.33	-	-
March	60.2	77.0	35.0	8.00	1.50	0.58	0.17	-	26.50	0.75	0.33	-
April	132.6	98.5	55.5	7.33	2.75	1.17	0.50	-	33.50	2.33	0.33	0.08
May	205.9	255.0	33.0	11.25	5.33	2.92	0.58	0.08	53.50	5.33	0.75	-
June	342.6	255.0	46.0	15.75	6.92	3.75	1.42	0.25	82.42	6.92	1.25	-
July	423.2	182.0	51.5	14.58	7.83	4.08	1.67	0.67	81.75	9.42	1.33	0.08
August	383.3	164.5	65.0	11.92	5.58	2.67	0.92	0.33	61.08	5.83	0.67	0.08
September	235.0	382.0	67.0	11.08	4.25	2.75	0.92	0.17	52.42	5.25	0.92	0.17
October	62.8	145.5	38.5	4.25	1.42	0.67	0.25	0.17	20.67	1.33	0.25	-
November	34.6	91.0	8.0	3.67	0.67	0.42	0.08	-	19.33	-	-	-
December	37.9	102.5	20.5	3.00	0.75	0.25	0.17	0.08	15.00	0.42	-	-
Year	1984.6	382.0	67.0	99.41	38.75	19.51	6.68	1.75	480.26	37.99	5.83	0.41

* : rainfall records from conventional rain-gauges are substituted for missing data

TABLE 1. (cont'd)

Month	Number of Days with Maximum Temperature#						Number of Days with Minimum Temperature#						
	>=30°C	>=33°C	>=34°C	>=35°C	>=36°C	>=37°C	<=10°C	<=5°C	<=4°C	<=3°C	<=2°C	<=1°C	<=0°C
January	-	-	-	-	-	-	8.42	2.25	1.50	0.92	0.25	0.08	0.08
February	0.08	-	-	-	-	-	5.08	0.58	0.33	0.08	-	-	-
March	0.33	-	-	-	-	-	1.42	0.17	-	-	-	-	-
April	4.17	0.25	-	-	-	-	0.17	-	-	-	-	-	-
May	10.58	2.50	1.58	0.33	-	-	-	-	-	-	-	-	-
June	15.75	5.58	1.42	-	-	-	-	-	-	-	-	-	-
July	19.17	10.00	5.08	14.20	0.33	0.08	-	-	-	-	-	-	-
August	17.92	9.00	4.58	1.00	0.17	-	-	-	-	-	-	-	-
September	16.58	5.42	1.58	0.42	0.08	-	-	-	-	-	-	-	-
October	6.25	0.25	0.08	-	-	-	-	-	-	-	-	-	-
November	1.00	-	-	-	-	-	1.67	-	-	-	-	-	-
December	-	-	-	-	-	-	6.58	1.08	0.50	0.33	0.08	-	-
Year	91.83	33.00	14.33	3.17	0.58	0.08	23.33	4.08	2.33	1.33	0.33	0.08	0.08

: 1989 - 1997

Table 2.

PERCENTAGE FREQUENCY OF OCCURRENCE OF HOURLY WIND DIRECTION AND SPEED WITHIN SPECIFIED RANGES AT TA KWU LING, 1986-1997

Month	Wind speed (m/s)	Wind direction (degree)											
		30	60	90	120	150	180	210	240	270	300	330	360
January	0.1 - 3.2	4.98	1.95	7.00	14.29	5.70	2.36	1.96	2.13	1.92	3.36	5.66	10.81
	3.3 - 8.2	4.49	0.47	6.00	12.59	1.21	0.06	0.01	0.01	0.01	0.06	0.62	7.57
	8.3 - 14.2	0.06	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February	0.1 - 3.2	4.22	1.90	6.52	15.93	5.09	1.96	1.43	1.22	1.78	3.00	5.80	9.65
	3.3 - 8.2	2.89	0.35	6.33	19.44	1.67	0.03	0.05	0.10	0.08	0.15	0.79	5.98
	8.3 - 14.2	0.04	0.00	0.10	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
March	0.1 - 3.2	2.83	1.13	7.82	18.12	5.73	2.54	2.03	1.30	0.93	1.47	3.54	6.14
	3.3 - 8.2	2.79	0.67	8.07	24.74	2.36	0.20	0.60	0.22	0.02	0.13	0.55	3.08
	8.3 - 14.2	0.07	0.00	0.10	0.20	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
April	0.1 - 3.2	2.17	1.67	8.93	21.38	6.81	2.78	3.09	2.70	1.75	1.83	2.29	3.96
	3.3 - 8.2	0.87	0.30	7.46	24.38	2.26	0.14	1.01	0.62	0.10	0.22	0.10	1.14
	8.3 - 14.2	0.00	0.00	0.05	0.21	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.1 - 3.2	2.73	1.83	7.59	21.2	7.96	4.47	4.76	3.46	2.26	2.57	2.15	2.91
	3.3 - 8.2	0.79	0.37	6.92	19.4	1.72	0.51	1.44	0.69	0.06	0.26	0.17	0.55
	8.3 - 14.2	0.00	0.01	0.07	0.22	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	0.1 - 3.2	2.33	1.92	8.04	18.14	10.71	7.90	9.46	5.39	2.64	2.62	2.02	2.28
	3.3 - 8.2	0.21	0.44	5.07	10.45	1.58	0.75	2.25	1.45	0.21	0.13	0.04	0.29
	8.3 - 14.2	0.00	0.00	0.04	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
July	0.1 - 3.2	2.32	2.44	9.06	15.50	9.98	7.02	7.42	7.46	4.95	4.00	2.41	2.47
	3.3 - 8.2	0.35	0.55	4.89	6.89	2.31	0.94	1.38	1.42	0.64	0.80	0.25	0.25
	8.3 - 14.2	0.01	0.11	0.13	0.11	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.01
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
August	0.1 - 3.2	3.94	4.07	6.92	15.00	8.67	6.25	6.49	6.86	5.60	4.72	3.80	4.48
	3.3 - 8.2	0.87	1.58	5.35	6.20	0.75	0.47	0.51	0.54	0.50	0.53	0.30	0.63
	8.3 - 14.2	0.01	0.09	0.14	0.12	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2 (cont'd)

Month	Wind speed (m/s)	Wind direction (degree) 30	60	90	120	150	180	210	240	270	300	330	360
September	0.1 - 3.2	5.29	3.17	9.08	17.03	7.65	4.23	3.80	4.51	3.94	4.12	4.60	7.24
	3.3 - 8.2	2.17	1.10	6.11	7.17	0.42	0.21	0.17	0.21	0.15	0.33	0.57	2.48
	8.3 - 14.2	0.01	0.04	0.11	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	0.1 - 3.2	5.30	2.53	9.96	16.18	7.87	3.66	1.98	1.93	1.90	2.64	3.41	6.28
	3.3 - 8.2	7.57	1.36	7.20	10.48	0.59	0.00	0.00	0.00	0.00	0.02	0.36	4.33
	8.3 - 14.2	0.38	0.02	0.14	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
November	0.1 - 3.2	5.15	2.43	8.63	14.15	7.62	3.82	2.89	2.24	2.15	3.36	4.80	8.42
	3.3 - 8.2	8.46	1.08	4.65	7.60	0.27	0.04	0.05	0.00	0.00	0.05	0.56	6.31
	8.3 - 14.2	0.23	0.02	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December	0.1 - 3.2	5.18	2.11	7.52	14.43	7.37	3.46	2.48	2.47	2.67	4.32	6.53	10.04
	3.3 - 8.2	5.03	0.33	2.92	8.25	0.89	0.00	0.00	0.00	0.00	0.07	0.75	7.45
	8.3 - 14.2	0.18	0.05	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Overall	0.1 - 3.2	3.87	2.24	8.10	16.8	7.59	4.19	3.95	3.44	2.68	3.16	3.92	6.24
	3.3 - 8.2	3.09	0.71	5.90	13.19	1.35	0.28	0.62	0.44	0.15	0.23	0.42	3.38
	8.3 - 14.2	0.09	0.03	0.07	0.12	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	> 14.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

STATISTICS OF THE OBSERVATIONS OF CALM AND VARIABLE WINDS AT TA KWU LING, 1986-1997

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
Number of observations	8269	7959	8614	8126	8313	7983	8531	7612	7545	8332	8404	8803	98491
Number of variable winds	347	233	207	143	238	278	332	346	301	322	383	435	3565
Percetage of variable winds (%)	4.20	2.93	2.40	1.76	2.86	3.48	3.89	4.55	3.99	3.86	4.56	4.94	3.62
Number of calm winds	37	23	8	0	0	0	1	1	1	0	1	38	110
Percentage of calm winds (%)	0.45	0.29	0.09	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.43	0.11

TABLE 3.

HOURLY VECTOR MEAN WIND AT TA KWU LING, 1986-1997

HOUR	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd	dir	spd
0100	81	1.2	97	1.6	107	2.0	116	2.2	121	1.9	124	1.4	122	1.2	115	0.9	101	0.9	86	1.4	71	1.1	68	0.9
0200	75	1.2	94	1.5	107	1.9	115	2.1	120	1.7	126	1.3	121	1.1	117	0.8	93	0.8	81	1.3	69	1.0	62	0.9
0300	73	1.1	90	1.4	106	1.8	113	2.0	119	1.6	126	1.2	123	0.9	115	0.7	90	0.7	76	1.2	60	1.0	58	0.9
0400	68	1.1	87	1.2	107	1.8	115	1.9	120	1.5	125	1.1	121	0.8	112	0.6	84	0.6	69	1.2	57	0.9	56	0.8
0500	64	1.0	86	1.3	108	1.8	113	1.9	118	1.4	121	1.0	125	0.8	113	0.6	89	0.6	67	1.1	52	1.0	52	0.8
0600	63	1.0	87	1.3	106	1.7	115	1.9	118	1.4	124	0.9	121	0.8	107	0.6	77	0.5	67	1.0	47	1.0	49	0.8
0700	60	0.9	89	1.3	106	1.7	116	1.9	118	1.5	120	0.9	125	0.8	100	0.5	78	0.5	65	0.9	49	1.0	49	0.8
0800	63	0.9	94	1.3	106	1.8	115	2.0	113	1.6	121	1.1	120	0.8	87	0.6	67	0.6	61	1.1	49	1.0	49	0.8
0900	66	1.1	92	1.5	103	2.1	111	2.2	112	1.7	128	1.1	123	0.7	86	0.7	58	1.1	54	1.5	47	1.4	46	0.9
1000	62	1.5	84	1.7	100	2.2	110	2.2	116	1.7	142	1.1	135	0.7	90	0.7	58	1.3	56	2.1	42	1.9	42	1.4
1100	62	1.9	81	2.0	97	2.3	109	2.3	112	1.6	141	1.2	145	0.8	84	0.7	62	1.6	60	2.4	41	2.2	37	1.9
1200	65	2.0	79	2.1	97	2.4	107	2.4	112	1.7	145	1.3	150	0.9	95	0.7	66	1.6	63	2.4	48	2.2	41	1.9
1300	68	2.1	79	2.0	96	2.4	111	2.2	116	1.8	145	1.4	159	1.0	101	0.8	76	1.5	69	2.3	52	2.2	44	1.9
1400	68	2.1	79	2.0	97	2.3	113	2.2	116	1.8	147	1.5	158	1.1	113	0.8	83	1.5	69	2.3	57	2.1	48	1.9
1500	69	2.0	82	2.0	99	2.4	110	2.3	119	1.9	150	1.5	159	1.2	122	1.1	89	1.4	75	2.2	57	2.0	54	1.7
1600	74	1.9	87	2.0	99	2.3	114	2.3	119	2.0	151	1.6	161	1.1	123	1.1	92	1.4	80	2.2	66	1.9	61	1.6
1700	77	1.7	92	2.0	104	2.3	116	2.3	122	2.0	151	1.6	153	1.2	126	1.1	101	1.3	88	2.1	72	1.8	71	1.5
1800	86	1.5	96	1.8	108	2.3	116	2.3	122	2.2	147	1.6	149	1.2	126	1.1	104	1.3	94	1.8	79	1.5	80	1.2
1900	86	1.3	99	1.7	110	2.3	118	2.3	121	2.1	138	1.6	138	1.2	117	1.2	106	1.2	100	1.6	87	1.3	90	1.1
2000	92	1.3	104	1.7	112	2.3	119	2.3	120	2.1	130	1.5	125	1.3	113	1.2	109	1.3	102	1.6	87	1.2	92	1.0
2100	93	1.3	105	1.7	113	2.3	119	2.3	121	2.2	124	1.5	120	1.3	116	1.2	110	1.3	99	1.6	85	1.2	96	1.1
2200	93	1.2	104	1.7	112	2.2	118	2.3	121	2.2	125	1.6	121	1.3	113	1.2	110	1.2	99	1.6	80	1.2	92	1.0
2300	92	1.3	102	1.7	110	2.2	117	2.3	121	2.1	126	1.6	122	1.3	116	1.1	108	1.1	93	1.5	81	1.2	88	1.0
2400	85	1.3	102	1.6	109	2.2	117	2.2	123	2.1	125	1.5	123	1.2	117	1.0	105	1.0	89	1.4	76	1.1	78	1.0

dir : wind direction (degree)
spd : wind speed (m/s)

TABLE 4.

HOURLY MEAN OF MEAN SEA-LEVEL PRESSURE (hPa) AT TA KWU LING, 1986-1997

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0100	1021.1	1019.5	1017.0	1013.4	1009.6	1006.5	1006.5	1006.0	1009.4	1015.0	1018.9	1021.7
0200	1020.9	1019.2	1016.6	1013.0	1009.2	1006.1	1006.1	1005.6	1009.1	1014.6	1018.7	1021.5
0300	1020.6	1018.9	1016.2	1012.5	1008.9	1005.9	1005.9	1005.4	1008.8	1014.4	1018.4	1021.2
0400	1020.4	1018.7	1015.9	1012.3	1008.8	1005.8	1005.8	1005.3	1008.7	1014.3	1018.3	1021.1
0500	1020.5	1018.7	1016.0	1012.6	1009.0	1005.9	1005.9	1005.4	1008.8	1014.5	1018.5	1021.1
0600	1020.8	1019.1	1016.5	1013.0	1009.3	1006.2	1006.1	1005.6	1009.2	1015.0	1018.9	1021.5
0700	1021.4	1019.7	1017.1	1013.6	1009.9	1006.6	1006.5	1005.9	1009.6	1015.6	1019.5	1022.1
0800	1022.0	1020.3	1017.8	1014.2	1010.3	1006.9	1006.8	1006.4	1010.2	1016.1	1020.1	1022.7
0900	1022.5	1020.7	1018.3	1014.7	1010.6	1007.2	1007.0	1006.7	1010.5	1016.5	1020.5	1023.2
1000	1022.8	1021.0	1018.4	1014.8	1010.7	1007.2	1007.1	1006.7	1010.6	1016.5	1020.6	1023.3
1100	1022.4	1020.8	1018.2	1014.6	1010.5	1007.1	1006.9	1006.6	1010.3	1016.1	1020.0	1022.8
1200	1021.4	1020.1	1017.5	1014.1	1010.1	1006.7	1006.6	1006.2	1009.7	1015.2	1019.1	1021.9
1300	1020.3	1019.1	1016.6	1013.3	1009.5	1006.3	1006.1	1005.6	1009.0	1014.3	1018.0	1020.6
1400	1019.4	1018.1	1015.7	1012.4	1008.8	1005.8	1005.6	1005.0	1008.3	1013.5	1017.1	1019.7
1500	1018.8	1017.4	1015.0	1011.8	1008.2	1005.3	1005.2	1004.5	1007.8	1013.0	1016.7	1019.3
1600	1018.8	1017.2	1014.7	1011.4	1007.8	1004.8	1004.8	1004.2	1007.6	1012.9	1016.7	1019.3
1700	1019.1	1017.4	1014.8	1011.3	1007.7	1004.7	1004.7	1004.1	1007.7	1013.2	1017.0	1019.7
1800	1019.5	1017.8	1015.1	1011.6	1008.0	1004.9	1004.8	1004.4	1008.0	1013.6	1017.5	1020.2
1900	1020.0	1018.1	1015.6	1012.1	1008.4	1005.4	1005.3	1004.9	1008.5	1014.1	1018.1	1020.7
2000	1020.6	1018.8	1016.1	1012.7	1009.0	1006.0	1005.9	1005.5	1009.2	1014.9	1018.7	1021.3
2100	1021.0	1019.3	1016.8	1013.3	1009.5	1006.5	1006.4	1006.2	1009.8	1015.4	1019.2	1021.7
2200	1021.2	1019.5	1017.2	1013.8	1010.0	1007.0	1006.9	1006.6	1010.2	1015.6	1019.4	1021.9
2300	1021.3	1019.7	1017.3	1013.9	1010.2	1007.2	1007.1	1006.7	1010.2	1015.6	1019.4	1021.9
2400	1021.2	1019.6	1017.2	1013.7	1009.9	1006.9	1006.9	1006.5	1010.0	1015.4	1019.2	1021.8
MEAN	1020.7	1019.1	1016.6	1013.1	1009.3	1006.2	1006.1	1005.7	1009.2	1014.8	1018.7	1021.3

TABLE 5.

HOURLY MEAN OF AIR TEMPERATURE (°C) AT TA KWU LING, 1989-1997

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0100	13.3	14.4	17.4	20.7	23.9	26.1	26.4	26.3	25.3	22.5	18.7	14.9
0200	13.1	14.2	17.3	20.6	23.7	26.0	26.2	26.1	25.1	22.2	18.4	14.6
0300	12.9	14.1	17.1	20.5	23.6	25.9	26.1	25.9	24.9	21.9	18.1	14.3
0400	12.7	13.9	17.0	20.4	23.4	25.7	25.9	25.7	24.7	21.6	17.8	14.1
0500	12.5	13.7	16.9	20.3	23.3	25.6	25.8	25.6	24.5	21.5	17.6	13.8
0600	12.3	13.5	16.8	20.2	23.2	25.5	25.7	25.5	24.4	21.2	17.3	13.6
0700	12.2	13.4	16.8	20.5	23.7	26.0	26.2	25.9	24.5	21.2	17.2	13.5
0800	12.4	13.7	17.3	21.2	24.8	27.2	27.6	27.1	25.7	22.3	18.1	13.9
0900	13.7	14.8	18.3	22.2	25.9	28.2	28.8	28.4	27.0	23.9	19.9	15.6
1000	15.1	15.9	19.2	23.1	26.7	29.0	29.6	29.4	28.0	25.2	21.4	17.3
1100	16.4	16.9	20.0	23.8	27.4	29.5	30.3	30.1	29.1	26.5	22.8	18.7
1200	17.5	17.8	20.7	24.5	28.0	29.8	30.8	30.8	29.8	27.3	23.8	19.9
1300	18.1	18.3	21.2	24.8	28.3	29.9	31.0	31.1	30.2	27.9	24.5	20.7
1400	18.5	18.7	21.4	24.8	28.3	29.9	31.1	31.2	30.2	28.1	24.8	21.0
1500	18.6	18.7	21.4	24.7	28.2	29.9	31.1	31.0	30.0	27.9	24.8	21.0
1600	18.1	18.4	21.0	24.3	27.8	29.7	30.8	30.6	29.5	27.4	24.1	20.5
1700	17.3	17.7	20.3	23.8	27.2	29.2	30.2	30.0	28.9	26.5	23.1	19.5
1800	16.3	16.8	19.5	23.0	26.4	28.6	29.4	29.3	28.0	25.3	21.7	18.2
1900	15.3	16.1	18.8	22.3	25.6	27.8	28.6	28.4	27.1	24.3	20.7	17.2
2000	14.8	15.6	18.4	21.8	25.0	27.3	27.8	27.7	26.6	23.8	20.2	16.6
2100	14.4	15.4	18.2	21.5	24.7	26.9	27.4	27.3	26.2	23.5	19.8	16.1
2200	14.0	15.1	18.0	21.3	24.5	26.7	27.1	27.0	25.9	23.2	19.4	15.7
2300	13.7	14.9	17.8	21.2	24.3	26.5	26.9	26.7	25.7	23.0	19.1	15.4
2400	13.5	14.7	17.7	21.0	24.1	26.3	26.6	26.5	25.4	22.7	18.8	15.1
MEAN	14.9	15.7	18.7	22.2	25.5	27.6	28.2	28.1	27.0	24.2	20.5	16.7

TABLE 6.

HOURLY MEAN OF DEW POINT (°C) AT TA KWU LING, 1989-1997

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0100	9.7	11.4	14.3	18.7	21.5	23.9	24.2	24.2	22.8	18.4	15.0	11.5
0200	9.5	11.3	14.2	18.6	21.5	23.9	24.1	24.1	22.7	18.3	14.8	11.2
0300	9.4	11.1	14.1	18.6	21.5	23.8	24.1	24.0	22.6	18.1	14.6	11.1
0400	9.2	11.0	14.0	18.5	21.4	23.8	24.0	23.9	22.5	17.9	14.4	10.9
0500	9.0	10.8	13.9	18.4	21.3	23.7	23.9	23.9	22.4	17.8	14.2	10.8
0600	8.9	10.7	13.7	18.4	21.2	23.6	23.9	23.8	22.3	17.5	14.0	10.6
0700	8.7	10.6	13.6	18.5	21.5	23.9	24.3	24.1	22.5	17.5	13.8	10.4
0800	8.8	10.8	13.8	18.7	21.8	24.2	24.6	24.5	22.8	17.7	14.2	10.6
0900	9.0	10.8	13.9	18.8	21.8	24.2	24.6	24.6	22.8	17.5	14.1	10.9
1000	8.9	10.8	13.9	18.9	21.7	24.2	24.5	24.5	22.7	17.4	13.7	10.7
1100	9.1	10.9	14.0	19.0	21.8	24.3	24.6	24.5	22.6	17.4	13.5	10.6
1200	9.2	10.9	14.2	19.0	21.9	24.4	24.6	24.5	22.7	17.5	13.5	10.6
1300	9.2	11.0	14.3	19.1	22.0	24.4	24.7	24.5	22.7	17.6	13.6	10.8
1400	9.4	11.1	14.4	19.1	21.9	24.4	24.7	24.5	22.8	17.7	13.8	10.9
1500	9.5	11.3	14.4	19.1	22.0	24.3	24.6	24.5	22.8	17.9	14.0	11.0
1600	9.7	11.4	14.3	19.1	21.9	24.3	24.6	24.5	22.9	18.1	14.1	11.2
1700	9.9	11.5	14.4	19.1	21.8	24.2	24.4	24.4	22.8	18.4	14.6	11.5
1800	10.1	11.6	14.5	19.1	21.8	24.1	24.4	24.5	22.9	18.8	14.9	11.9
1900	10.2	11.7	14.5	19.2	21.8	24.1	24.4	24.4	23.1	18.9	15.1	12.0
2000	10.1	11.8	14.6	19.2	21.8	24.1	24.4	24.5	23.1	18.8	15.1	12.0
2100	10.1	11.8	14.6	19.1	21.8	24.1	24.4	24.4	23.1	18.7	15.0	12.1
2200	10.0	11.8	14.5	19.1	21.8	24.1	24.4	24.4	23.1	18.7	15.1	12.0
2300	10.0	11.7	14.5	19.1	21.7	24.0	24.3	24.4	22.9	18.5	15.0	11.8
2400	9.8	11.7	14.5	19.0	21.7	24.0	24.2	24.3	22.8	18.4	14.9	11.6
MEAN	9.5	11.2	14.2	18.9	21.7	24.1	24.4	24.3	22.8	18.1	14.4	11.2

TABLE 7.

HOURLY MEAN OF RELATIVE HUMIDITY (%) AT TA KWU LING, 1989-1997

HOUR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0100	80	81	83	87	87	88	88	89	87	80	80	80
0200	80	81	83	87	87	89	89	89	88	81	80	80
0300	81	81	83	87	88	89	89	90	88	81	81	81
0400	81	82	84	88	88	90	90	90	89	81	81	81
0500	81	82	83	88	89	90	90	91	89	82	81	82
0600	81	82	83	88	89	90	90	91	89	82	81	81
0700	81	82	83	87	87	89	89	90	89	82	81	81
0800	80	81	81	84	83	85	84	86	85	77	79	81
0900	75	76	77	80	78	81	78	80	78	69	70	74
1000	69	72	73	76	75	77	75	75	74	63	63	66
1100	65	68	70	73	72	76	72	72	69	59	57	61
1200	61	66	68	71	70	74	71	70	67	57	54	57
1300	59	64	67	70	69	74	70	68	66	55	53	55
1400	59	63	67	70	69	74	70	68	66	55	52	55
1500	59	64	67	70	70	74	70	68	67	56	53	55
1600	61	65	68	72	71	75	71	70	69	58	55	57
1700	64	68	71	74	73	76	72	72	71	62	60	61
1800	69	72	74	78	76	78	75	75	75	68	66	67
1900	73	76	78	81	80	81	79	79	80	73	71	72
2000	76	78	80	84	82	84	82	82	82	75	74	74
2100	77	79	81	85	84	86	84	84	84	76	75	77
2200	78	80	81	86	85	86	86	86	85	78	77	78
2300	79	80	82	86	85	87	86	87	86	78	78	79
2400	79	81	83	87	86	88	87	88	86	79	79	79
MEAN	73	75	77	81	80	83	81	81	79	71	70	71

TABLE 8.

EXTREME VALUES OF TEMPERATURE, RAINFALL AND GUST AT TA KWU LING, 1986-1997

Rank	Daily Temperature##				Maximum Rainfall						Maximum Gust	
	Maximum °C	Date	Minimum °C	Date	Hourly mm	Time	Daily mm	Date	Monthly mm	Month	Hourly m/s	Time
1	37.1	7/7/89	-0.4	29/01/93	67.0	19 26/09/93	382.0	26/09/93	676.5	Sep-93	30.7	10 17/09/93
2	36.6	2/7/94	1.3	31/12/95	65.0	08 16/08/88	255.0	20/05/89	666.5	Aug-95	29.0	19 2/8/97
3	36.4	1/9/90	1.7	11/1/97	60.5	18 26/09/93	255.0	24/06/96	566.5	Jun-96	28.8	06 3/10/95
4	36.3	10/7/94	2.0	26/01/93	55.5	19 19/04/95	182.0	20/07/88	527.0	Sep-96	28.7	01 29/11/87
5	36.2	16/07/89	2.1	15/01/92	51.5	11 18/07/92	180.0	18/07/92	508.0	Jun-93	28.5	18 27/06/93
6	36.1	23/08/90	2.1	25/01/93	49.5	20 26/09/93	164.5	11/8/86	484.0	Jul-97	28.3	23 2/8/97
7	36.0	17/08/90	2.1	30/01/93	47.0	05 20/07/88	148.0	31/07/91	476.0	May-89	28.1	21 2/8/97
8	35.9	29/07/93	2.2	17/01/92	46.0	01 25/06/96	145.5	5/10/95	471.0	Jul-87	27.4	16 27/06/93
9	35.8	15/08/89	2.2	31/01/93	45.5	20 10/6/95	119.5	29/07/87	455.5	Jul-95	27.3	17 28/11/87
10	35.7	9/7/88	2.3	28/01/93	42.0	07 20/07/88	119.5	12/7/95	439.5	Jul-86	27.2	11 17/09/93
11	35.7	17/08/89	2.4	16/01/92	41.5	13 8/6/91	114.0	7/6/92	432.0	Aug-88	26.8	01 18/07/89
12	35.7	24/05/91	2.5	29/12/91	41.0	15 10/9/90	113.5	10/9/90	422.0	May-87	26.6	09 17/09/93
13	35.7	25/05/91	2.7	26/12/93	40.5	06 20/07/88	112.5	10/8/86	415.5	Oct-95	26.5	17 27/06/93
14	35.6	6/8/92	2.7	6/2/95	40.5	11 16/06/93	112.0	16/06/93	397.0	Jul-91	26.4	16 28/11/87
15	35.6	28/07/93	2.8	1/1/96	39.0	15 8/7/86	106.5	31/08/95	392.5	Jul-94	26.3	18 2/8/97
16	35.6	11/7/94	2.9	28/12/91	38.5	21 5/10/95	106.0	12/8/95	388.0	Jul-88	26.1	21 20/05/89
17	35.6	26/07/96	3.2	7/1/95	38.0	14 28/09/86	103.5	2/7/97	369.5	Jun-94	26.1	04 29/11/87
18	35.5	22/07/95	3.3	12/12/88	38.0	09 29/06/94	102.5	31/07/90	343.0	Aug-86	26.1	08 17/09/93
19	35.5	8/7/89	3.6	12/2/89	38.0	10 24/06/96	102.5	8/12/94	334.5	Jun-91	26.0	15 28/11/87
20	35.4	6/7/89	3.6	3/12/90	37.5	24 26/09/93	102.5	2/10/95	307.5	Jun-90	26.0	08 6/12/87
*	36.1	18/08/90	4.6	28/12/91	109.9	07 08/05/92	324.1	08/05/92	1147.2	Jul-94	37.5	16 27/06/93

: June 1988 - December 1997

* : extreme values recorded at the Hong Kong Observatory during 1986-1997